VISIONING THE FUTURE OF THE GREENBELT SERIES

The Ecological Value of Ontario's Greenbelt

Prepared on behalf of the Greenbelt Foundation by Peri Dworatzek, Bumika Srikanthalingam, Kaitlin Pal, and Eric Miller, at York University, Ecological Footprint Initiative.

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Possibility grows here.

Ecological Footprint Initiative

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All photographs are courtesy of the Greenbelt Foundation unless otherwise credited.

Land Acknowledgement

The Greenbelt Foundation acknowledges that the land we meet on and strive to protect is the traditional territory of the Anishinaabe, Haudenosaunee, Huron-Wendat, and is now home to many other diverse First Nations, Métis, and Inuit. The area we now call the Greenbelt consists of treaty lands. It is important that we learn about the history and continued presence of these treaties because we are all treaty people.

The lakes, rivers, and wetlands, as well as forests, ravines, and healthy farmlands in the Greenbelt have been stewarded and protected by the First Peoples since time immemorial and we are grateful to the First Peoples for their care of the land on Turtle Island. We respect and are inspired by the deep connection of kinship that Indigenous Peoples have with the land.

We acknowledge the truth of the events of the past and their continuing effects, and the enduring rights of Indigenous Peoples.

We recognize that the Greenbelt is based on a land management plan developed by settlers, and we as a Foundation have a responsibility to ensure the work we do reflects the continued efforts and rights of the First Peoples of this land.

We will continue to look for ways to align our mandate with the Calls to Action from the Truth and Reconciliation Commission, and further educate ourselves on Indigenous Knowledge Systems that can inform and support our mandate to sustain the air, lands and waterways in the Greenbelt.

GREEN BELT

Possibility grows here.

Ecological Footprint Initiative

Visioning the Future of the Greenbelt Series

The Greenbelt is an essential framework for protecting Ontario's agricultural lands, natural areas, and water resources within the Greater Golden Horseshoe, one of Canada's fastest-growing regions. It underpins sustainable regional growth, strengthens climate resilience, and enhances the quality of life and economic vitality for communities across southern Ontario. The decisions and investments made in the Greenbelt today will determine the long-term environmental, social, and economic health of the region for future generations.

The **Visioning the Future of the Greenbelt Series** aims to ensure the Greenbelt continues to serve as a cornerstone for achieving food sovereignty, water security, ecological health, and economic prosperity in Ontario. Through a series of discussion papers, the series explores the Greenbelt's current and future role in addressing the challenges and opportunities of our time, positioning it as a vital solution for the province's sustainable future.

Collectively, the reports in this series will:

- **Articulate the Greenbelt's importance** by highlighting how it contributes to Ontario's success today and in the decades ahead.
- **Distill key issues and summarize existing evidence** to inform a cohesive and accessible narrative about the Greenbelt's interconnected systems across the GGH and southern Ontario.
- **Identify challenges, opportunities, and pathways** to strengthen the Greenbelt's role in climate adaptation, economic resilience, and regional well-being.
- **Provide clear, actionable policy recommendations** that translate research insights into evidence-based strategies for decision-makers, municipalities, Indigenous communities, stakeholders, and the public.

Ultimately, the discussion papers in the **Visioning the Future of the Greenbelt Series** seek to reinforce the Greenbelt's position as a dynamic, forward-looking system that supports Ontario's environmental sustainability, food and water security, and long-term prosperity, ensuring that the region continues to thrive for generations to come.

Foreword

Farmland, forests, wetlands, and other ecological landscapes are immensely valuable to all living things, supporting food systems, water security and biodiversity, providing recreational spaces, and absorbing pollution and carbon. Some of the goods and services these landscapes provide can be measured as biocapacity, or productivity, and compared with our ecological footprint, or consumption of natural resources. Together, these measures help us understand whether we are living sustainably within nature's limits.

Ontario's Greenbelt comprises 2 million acres (821,178 hectares) of agricultural and natural landscapes. It was created in 2005 to maintain and strengthen its ecological value and support growth in the Greater Golden Horseshoe (GGH), the province's largest and most populated area. At a local scale, the ecological footprint of urban areas generally exceeds the ability of nature to replenish its resources and absorb waste. Communities depend on broader regional biocapacity to sustain growing populations, economies, and well-being. It is important, therefore, to measure, protect, and enhance the ecological value of Ontario's Greenbelt to safeguard regional food systems, water resources, biodiversity, and climate resilience that millions of people rely on.

The Ecological Footprint Initiative at York University works to advance the measurement of biocapacity and ecological footprint and the application of these measures around the world. This paper presents an overview of the biocapacity of Ontario's Greenbelt and regional sustainability between 2015 and 2020. Findings show that Ontario's Greenbelt has more productive lands than the rest of the province, but its biocapacity is diminishing. The trends and pressures identified in this report should be used to inform municipal and provincial decisions for land use planning related to cropland protection, conservation, and development.

Key Takeaways

- **The ecological value of Ontario's Greenbelt reaches all Ontarians**. Greenbelt biocapacity benefited Ontarians regardless of whether they lived in municipalities that contain protected Greenbelt lands.
- **Ontario's Greenbelt provided about three times the amount of biocapacity per hectare,** when compared to biocapacity from the rest of Ontario.
- **Even though the size of Ontario's Greenbelt is small relative to the size of the province, it supports a significant proportion of consumption by Ontario residents**. Ontario's Greenbelt supported three times the amount of ecological footprint in relation to the proportion of Ontario's area, i.e. 2.1% of Ontario's ecological footprint from 0.7% of Ontario's area. Pastures in the Greenbelt supported about 17% of Ontario's ecological footprint of grazing land, while cropland in the Greenbelt supported about 9% of Ontario's cropland ecological footprint.
- **The ecological value of Ontario's Greenbelt is diminishing**. Between 2015 and 2020, Greenbelt biocapacity diminished within 36 municipalities, due to incremental land use changes and development that degraded or fragmented Greenbelt systems. No municipality had a significant growth in biocapacity.
- **The ecological value of Ontario's Greenbelt is not exclusive to rural areas**. About half of Greenbelt biocapacity existed within municipalities which border Lake Ontario and tend to be more populated and built-up.

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Introduction

This paper examines the ecological value of Ontario's Greenbelt and its contributions to the long-term sustainability of the province.

Ontario's Greenbelt permanently protects over two million acres (821,178 hectares) of agricultural, natural heritage and water resource systems. Located within the Greater Golden Horseshoe, the Greenbelt provides benefits locally and across distances. Some of these benefits can be measured as biocapacity, the ability of ecosystems to supply the natural resources humans consume and absorb the waste we produce. Greenbelt biocapacity can be compared to Ontario's ecological footprint, which measures the demand for biocapacity. Together, these measures provide an indicator of sustainability, showing how the Greenbelt sustains Ontario's production and consumption of ecological goods and services.

As Ontario's population and economic activity continue to expand, there are increasing demands for food, water, land and the need to respond to climate change. Greenbelt farmland, forests, wetlands and water provide the resources that a growing population needs, producing food, providing clean drinking water, conserving biodiversity, and storing carbon. Measuring and tracking the Greenbelt's biocapacity enables the province and local governments to maintain and enhance the capacity of natural systems, and sustain ecological and human health, while supporting development, local economies, and climate resilience.

The Greater Golden Horseshoe is a small geography. It accounts for just 3.6% of Ontario's land area, but is home to 70% of Ontario's population, which is expected to reach 15 million by 2051. How the region grows and builds infrastructure will enhance or diminish the Greenbelt's biocapacity as demands increase, potentially undermining the balance needed for long-term sustainability.

Measuring Biocapacity

Defining biocapacity

Biocapacity is the ability of farmland, ecological lands, and waters to provide food, forest products and other materials, and sequester carbon. Ecological footprint measures the amount of biocapacity needed to support human activities and can be viewed as the demand for ecosystem goods and services.[1]

Measuring the biocapacity of Ontario's Greenbelt helps to understand how it supports Ontario's consumption, how it relates to Ontario's trade of food and forest products, the role it plays in managing Ontario's carbon budget, and how its capacity is affected by changes in land use.

Biocapacity is currently being used to track progress towards improving biodiversity in Ontario. The Ontario Biodiversity Strategy aims for per-capita resource consumption and waste generation to be reduced to a level that is within Ontario's biocapacity limits by 2030 (Ontario Biodiversity Council, 2023).

Table 1 defines components of biocapacity that relate to different land use or land cover in the Greenbelt. These definitions and the framework of components are consistent with prior provincial assessments of Ontario's biocapacity (Miller et al., 2021, and Miller et al., 2025), which are comparable to National Ecological Footprint and Biocapacity Accounts (e.g. Lo et al., 2025). These provincial assessments and national accounts were produced by researchers at the Ecological Footprint Initiative of York University, building upon decades of academic research evolving the framework of biocapacity and ecological footprint.

1. There are several measures of ecological footprint: production, imports, exports, and consumption. Only ecological footprint of consumption is used throughout this report. Ecological footprint of consumption corresponds to the amount of biocapacity needed to support consumption that took place within a geographic area within a year.

Table 1
Biocapacity components defined and related to ecological footprint

Biocapacity component	Definition reflecting its capacity within the Greenbelt	Ecological footprint component supported
Cropland	Agricultural fields managed as row crops, orchards, or vineyards, which had the capacity to yield food and fibre crops consumed by humans or fed to animals or fish.	Cropland
Pasture	Meadows, shrubland, and agricultural fields managed for hay or grazing, which had the capacity to be grazed by livestock to supplement any feed provided by cropland.	Grazing land
Forest	Treed areas with the capacity to be harvested for timber products and pulpwood or firewood, or which were sequestering carbon because they were not harvested.	Forest products (if harvested) or Carbon uptake
Wetlands	Marshes, fens, bogs, and swamps which had the capacity to sequester carbon.	Carbon uptake
Aquatic	Open freshwater bodies deeper than 2 metres which had the capacity to support fish, invertebrates, and aquatic plants.	Fishing grounds
Built-up	Land occupied by transportation infrastructure, brownfields, buildings (e.g. residential and commercial), urban recreation areas and lawns.	Built-up
Low	Areas not classified within the above categories, such as barren lands, dunes, and undefined clearings.	(None)

Biocapacity and ecological footprint are measured in the same unit so they can be compared to each other and across jurisdictions. Local hectares (ha) are converted to a globally standardized and equivalent unit called global hectares (gha). This is done by converting Ontario biological yield to an equivalent world-average biological yield, and to an equivalence of a world-average hectare of biologically productive area. Conversion coefficients used in this report are consistent with coefficients derived by Miller et al. (2025) to derive Ontario's biocapacity. The global hectares unit enables comparisons of biocapacity or ecological footprint within and outside of Ontario and over a timeframe from 1961 to the present.

Data sources

Figure 1 maps biocapacity in relation to the Greenbelt. Biocapacity was attributed to the Greenbelt by relating Ontario Land Cover dataset at a 15 metre-resolution (Ontario Ministry of Natural Resources and Forestry, 2025) with a Greenbelt Designation shapefile (Ontario Ministry of Municipal Affairs and Housing, 2023). Both were sourced from Ontario GeoHub reflecting the most recent data available. Ontario Land Cover includes two years of raster data with the most recent reflecting the landscape in 2020. Ontario's classification of land cover was related to components of biocapacity following the same approach used by Miller et al. (2025) to derive biocapacity within the entire boundary of Ontario. Figure 2 provides photographic samples of biocapacity in Ontario.

Prior research from Miller et al. (2025) revealed that Ontario's 2020 ecological footprint was 11% below its 2019 level due to a reduction in overall consumption and emissions during the peak of the COVID-19 pandemic and its associated lockdowns in Ontario. Nevertheless, the year 2020 was chosen for this analysis because it is the most recent year for which full land cover and consumption datasets were available.

Figure 1 Biocapacity within the Greenbelt in 2020

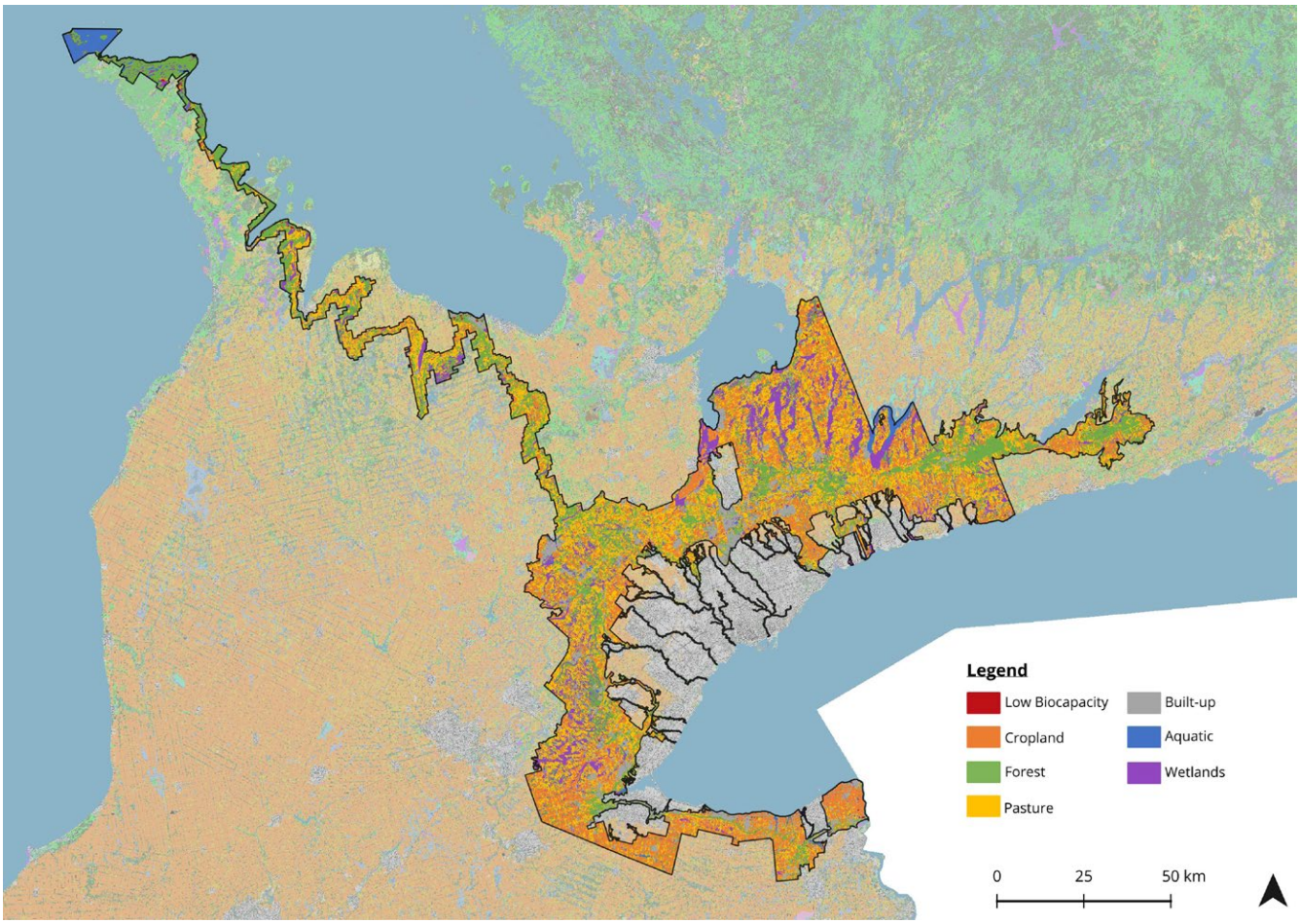
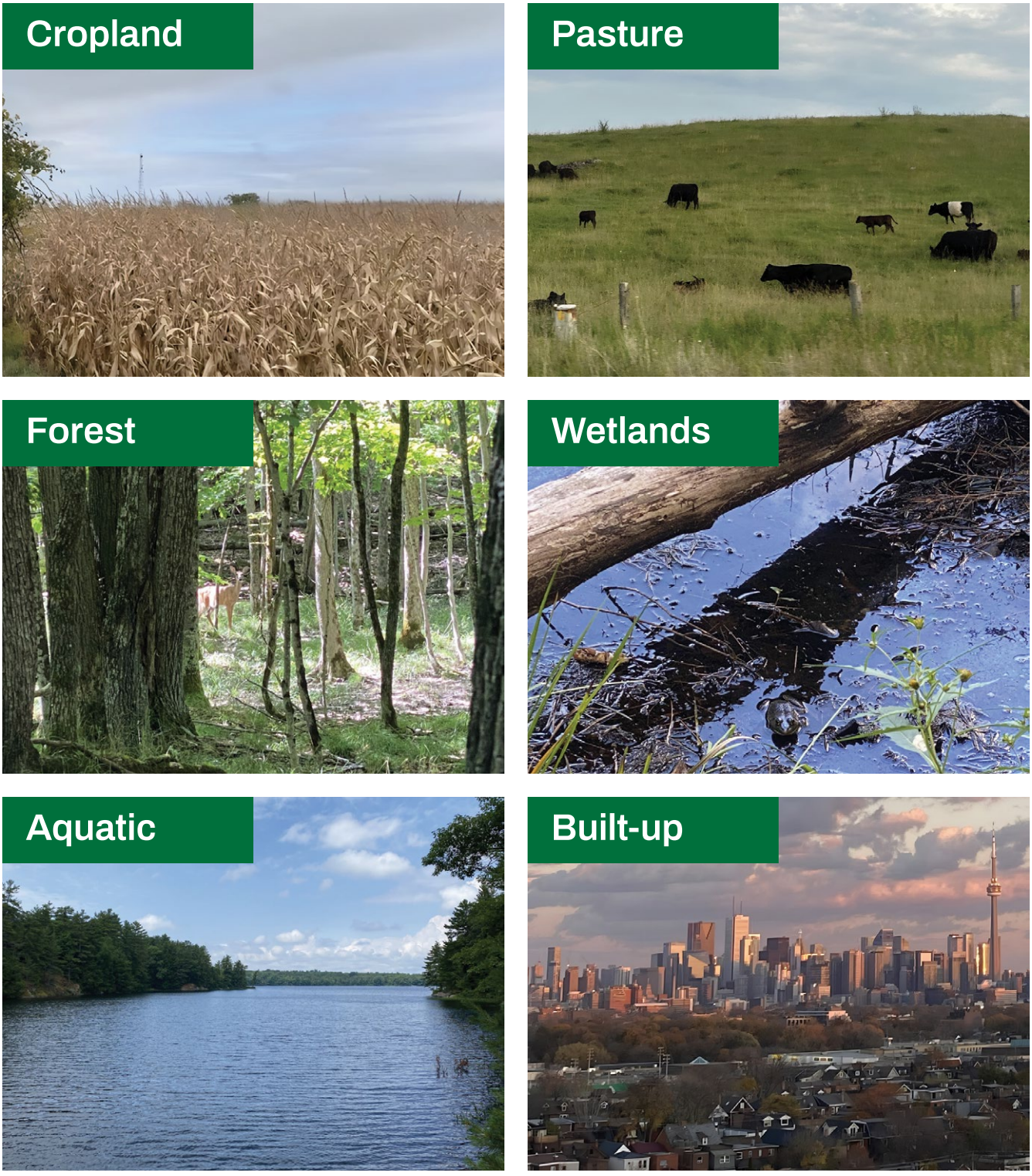


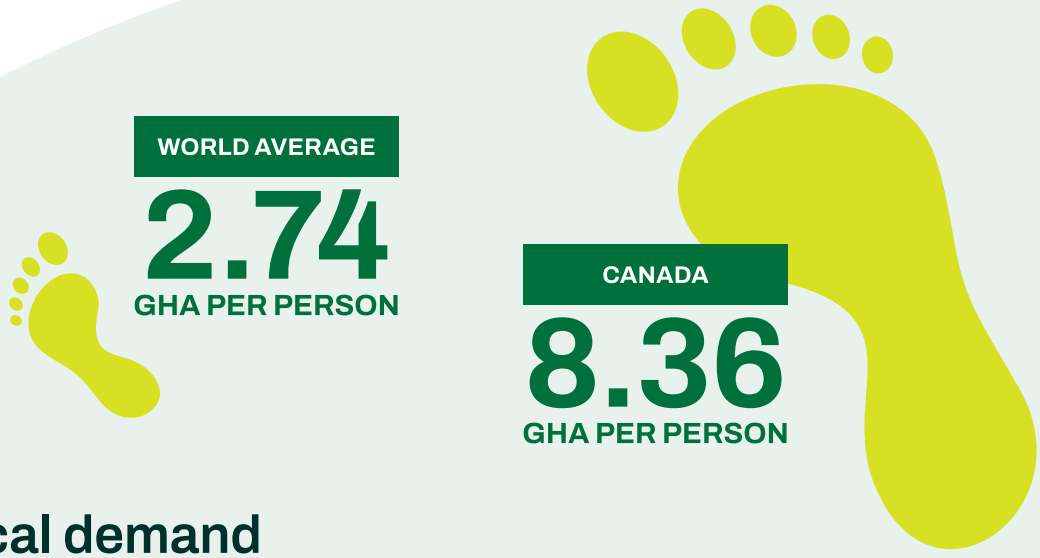
Figure 2 Photographic samples of biocapacity components within Ontario's Greenbelt



Change and Challenges

More global demand than supply

There is more demand for the Earth's lands and waters than can be supplied on a yearly basis. In 2022, world biocapacity was 11.9 billion gha compared to an ecological footprint of 21.8 billion gha. More renewable resources are being used than can be regenerated within a year, and more waste is being created than can be metabolised within a year. On average, this amounts to an ecological footprint of 2.74 gha per person compared to a biocapacity of 1.5 gha per person. This represents global ecological overshoot, when ecological footprint exceeds biocapacity on a yearly basis. Global ecological overshoot has occurred every year since the early 1970s (Lo et al., 2025).



High local demand

In Canada, there is a very high per capita demand on the natural environment. In 2022, total ecological footprint was over 300 million gha, which is 8.36 gha per person (Lo et al., 2025). This is disproportionately higher than the world average of 2.74 gha. Canada's ecological footprint continues to increase as the population grows. Between 2012-2022, Canada's total ecological footprint increased by 12%. Although per person ecological footprint has remained relatively stable since 2012, there are opportunities to reduce ecological footprint to help offset increasing demands on the environment. Reducing greenhouse gas emissions is the most effective and efficient way to reduce our ecological footprint.

Trade issues

Canada's consumption cannot be fully supplied by the production of goods and services within territorial borders. The markets in Canada and Ontario are heavily dependent on global supply chains, causing issues when there are trade disputes and supply shortages. Increasing local food production in the Greenbelt could make Ontario less reliant on global supply chains and reduce Ontario's ecological footprint at the same time.

Changes in land cover

Land cover is changing across Ontario's Greenbelt. Between 2015 and 2020, there was a combined loss of 2,842 ha of agricultural land (i.e., cropland and pasture) and a gain of 2,372 ha of built-up land in the Greenbelt. Figure 3 identifies changes in land cover, measured in hectares, in the Greenbelt between 2015 and 2020. Changes in land cover in the Greenbelt resulted in a total loss of 3,237 gha of biocapacity. The loss in farmland biocapacity generally corresponded to a gain in built-up biocapacity.

Across the province there are changes in land cover, some more significant than others. Table 2 shows the percentage change in land cover from 2015 to 2020 for the Greenbelt, the Greater Golden Horseshoe, and the rest of Ontario. The greatest proportional increase in built-up land was in the Greenbelt when compared to the GGH and the rest of Ontario. There were also significant fluctuations in areas of low biocapacity, a proportional increase of 5.74% low biocapacity land in the Greenbelt, a 13.5% decrease in the GGH, and a gain of almost 8% in the rest of Ontario.

While there were changes in land cover over this period, it is important to note that the overall area for most components has remained relatively stable. Indeed, the area of cropland and pasture decreased by less than 1% each, with a loss of 1,132 ha in cropland and 1,709 ha in pastures (Figure 3). Built-up area increased by less than 0.5% from 79,429 ha to 81,802 ha. The area of forest and wetland decreased by less than 0.5% each.

Figure 3 Land cover change in hectares in Ontario's Greenbelt between 2015 and 2020 by biocapacity component

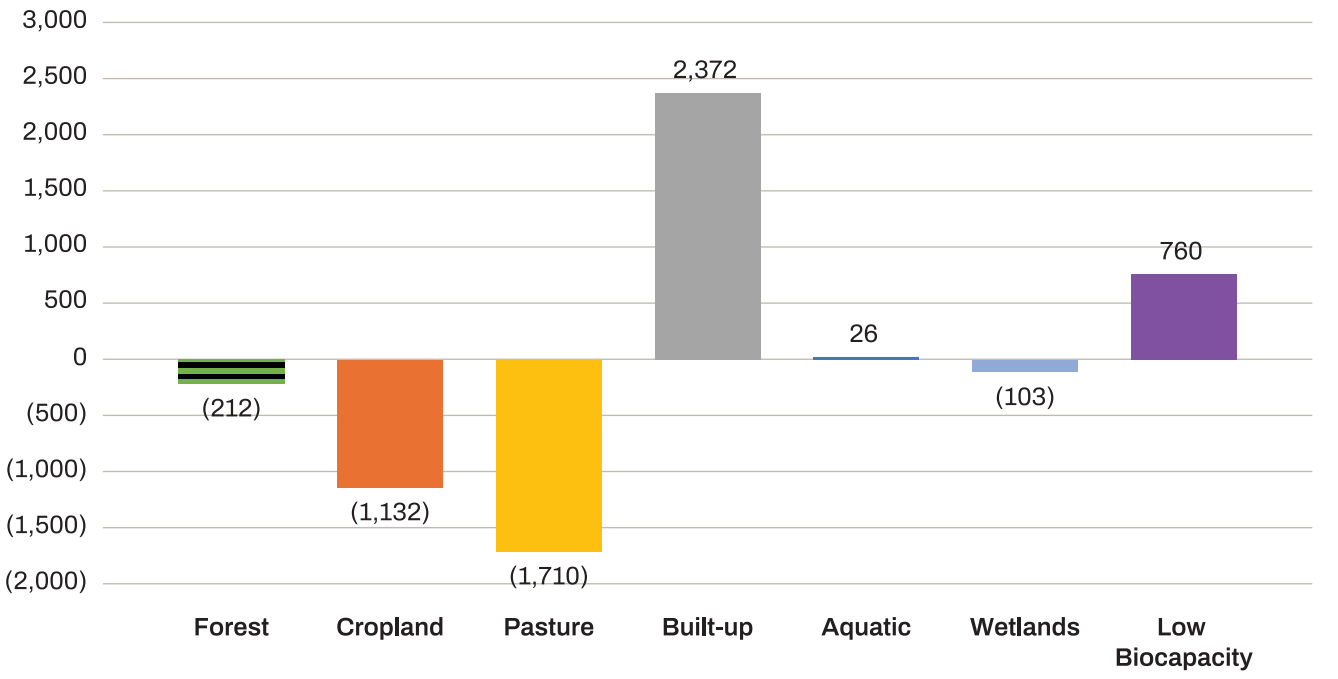


Table 2
Difference between 2015 and 2020 land cover as a proportion of the 2015 land cover (ha) of each biocapacity component. The table compares the area of the Greenbelt, the area of the Greater Golden Horseshoe (GGH) without the Greenbelt, and Ontario without the Greater Golden Horseshoe and the Greenbelt

	Difference in 2015 and 2020 land cover as a proportion of 2015 land cover (percentage change)		
	Greenbelt	Greater Golden Horseshoe	Rest of Ontario
Forest	-0.1%	-0.3%	-0.1%
Cropland	-0.6%	-0.8%	0.1%
Pasture	-0.8%	-0.7%	-0.4%
Built-up	3.0%	2.4%	1.9%
Aquatic	0.1%	0.1%	0.0%
Wetland	-0.1%	-0.2%	0.0%
Low biocapacity	5.7%	-13.6%	7.8%

Ontario's Biocapacity Advantage Provided by the Greenbelt

Greenbelt biocapacity

Ontario's Greenbelt contains a high amount of biocapacity per unit area. In 2020, about 821,178 hectares of land and water in the Greenbelt provided about 2,225,604 gha of biocapacity. Per Ontarian, about 0.05 ha of Greenbelt provided 0.15 gha of biocapacity. This reflects the fact that Ontario's Greenbelt provides three times the amount of biocapacity per hectare of land. Averaged across all components, Ontario's Greenbelt provided an average of 2.8 gha of biocapacity per hectare, compared to the rest of Ontario providing an average of 1.02 gha per hectare.

ONTARIO'S GREENBELT	REST OF ONTARIO
2.80	**1.02**
GHA OF BIOCAPACITY PER HECTARE OF **LAND**	**GHA** OF BIOCAPACITY PER HECTARE OF **LAND**

Figure 4 compares Greenbelt area (ha) to Greenbelt biocapacity (gha) in the year 2020, by component. This figure illustrates the extent to which components of the Greenbelt provided above- or below-average amounts of global hectares per unit of area. Cropland in the Greenbelt provided the greatest ratio of global hectares to hectares, resulting in proportionally more cropland biocapacity than cropland area. For every hectare of cropland in Ontario's Greenbelt, there are 8 gha of biocapacity. On a global basis, every hectare of cropland yields 3 gha of biocapacity. This confirms the local and global significance of cropland in the Greenbelt and its protected status.

ONTARIO'S GREENBELT	GLOBALLY
8	**3**
GHA OF BIOCAPACITY PER HECTARE OF **CROPLAND**	**GHA** OF BIOCAPACITY PER HECTARE OF **CROPLAND**

Figure 4 Hectares and global hectares of Greenbelt biocapacity in 2020, by component

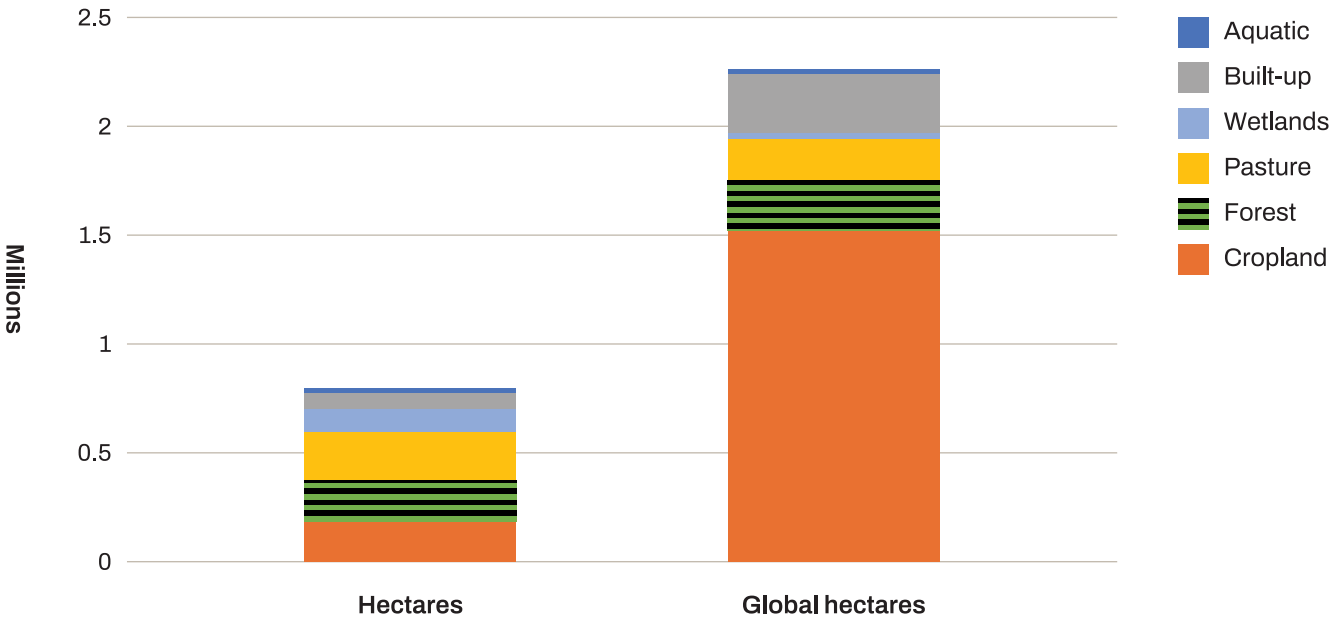


Figure 5 presents the composition of biocapacity components in Ontario and Ontario's Greenbelt. In 2020, the rest of Ontario's total biocapacity of 108,253,341 gha (Table 3) reflects a smaller proportion of cropland compared to Ontario's Greenbelt, which provided the greatest amount of biocapacity per unit of area. Ontario's Greenbelt contained less biocapacity from forests, wetlands, and aquatic areas, when compared to the rest of Ontario.

Figure 5 Proportion of biocapacity components in Greenbelt compared to the rest of Ontario, in 2020

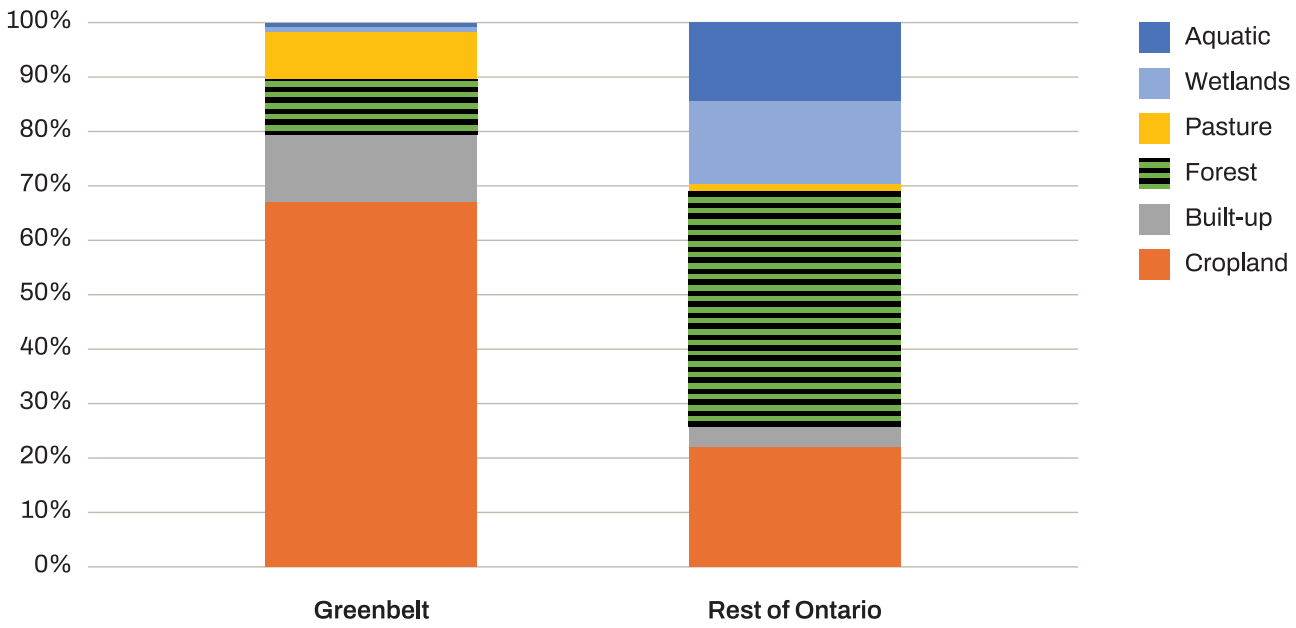


Table 3
Area (ha) compared to biocapacity (gha) and their proportions (%) by component, for the Ontario Greenbelt and the rest of Ontario, in 2020.

	Ontario Greenbelt				Rest of Ontario			
	Area		Biocapacity		Area		Biocapacity	
Component	(ha)	(%)	(gha)	(%)	(ha)	(%)	(gha)	(%)
Cropland	181,648	22%	1,517,165	67%	2,857,935	3%	23,870,063	22%
Pasture	224,328	27%	192,640	9%	1,773,297	2%	1,522,805	1%
Forest	229,029	28%	231,872	10%	45,466,072	43%	46,533,669	43%
Wetlands	72,184	9%	25,699	1%	35,699,341	33%	16,661,446	15%
Aquatic	18,183	2%	14,505	1%	19,241,009	18%	15,348,813	14%
Built-up	81,802	10%	273,723	12%	1,289,995	1%	4,316,546	4%
Low Biocapacity	14,003	2%	0	0%	382,754	0.4%	0	0%
Total	**821,178**	**100%**	**2,255,604**	**100%**	**106,710,403**	**100%**	**108,253,341**	**100%**

Greenbelt biocapacity supporting ecological footprint

The Greenbelt supports Ontario's ecological footprint with a remarkably high ratio per unit of area. Table 4 compares Greenbelt biocapacity to Ontario's ecological footprint, both from 2020. Overall, Ontario's Greenbelt supported 2.1% of Ontario's ecological footprint from just 0.7% of Ontario's area. Pasture in the Greenbelt provided 192,640 gha of biocapacity which supported about 17% of Ontario's ecological footprint of grazing land. Cropland was also significant, providing a biocapacity equivalent of 9% of Ontario's ecological footprint of cropland.

Table 4
Greenbelt biocapacity compared to Ontario's ecological footprint in 2020, measured in global hectares (gha).

Biocapacity component	Greenbelt biocapacity (gha)	Greenbelt proportion of Ontario's ecological footprint (% gha)	Ontario ecological footprint	Ecological footprint component
All components	**2,255,604**	**2.1%**	**106,325,650**	**All components**
Cropland	1,517,165	9.0%	17,054,581	Cropland
Pastures	192,640	17.0%	1,138,867	Pastures
Forest	231,872	0.3%[2]	14,292,802	Forest
Wetlands	25,699		68,978,194	Wetlands
Aquatic	14,505	1.0%	1,351,812	Aquatic
Built-up	273,723	8.0%	3,509,394	Built-up

Municipalities containing Greenbelt

Ontario's Greenbelt extends across 63 municipalities based on 2021 census subdivision boundaries. About 50% of Greenbelt biocapacity exists within just seven municipalities: City of Hamilton, Scugog, Clarington, Caledon, Brock Township, Uxbridge, and King. About 80% of Greenbelt biocapacity exists within 22 municipalities. Figure 6 illustrates the distribution of biocapacity within Greenbelt municipalities, arranged in decreasing order. The orange line represents the total proportion of Greenbelt biocapacity, increasing as each municipality is added to the total on the right-hand axis. Figure 7 lists the top 10 municipalities with the greatest biocapacity in global hectares and compares it to their area in hectares. These figures show that 340,000 gha of Greenbelt biocapacity was provided by 88,000 ha in the City of Hamilton, which accounted for about 15% of Greenbelt biocapacity. Ratios of Greenbelt biocapacity in global hectares to Greenbelt area in hectares varied among the municipalities as identified in Figure 7. Niagara-on-the-Lake had a higher ratio than the other top 10 municipalities, reflecting a higher proportion of cropland within its portion of Greenbelt.

2. There is one proportion for wetland and forest because forest biocapacity has the dual purpose of carbon sequestration and supplying forest products. Wetland carbon sequestration is included within forest carbon uptake ecological footprint.

Figure 6 Distribution of Greenbelt biocapacity in 2020 within 63 municipalities that had land in the Greenbelt, highlighting (in yellow) seven municipalities that contained 50% of the total

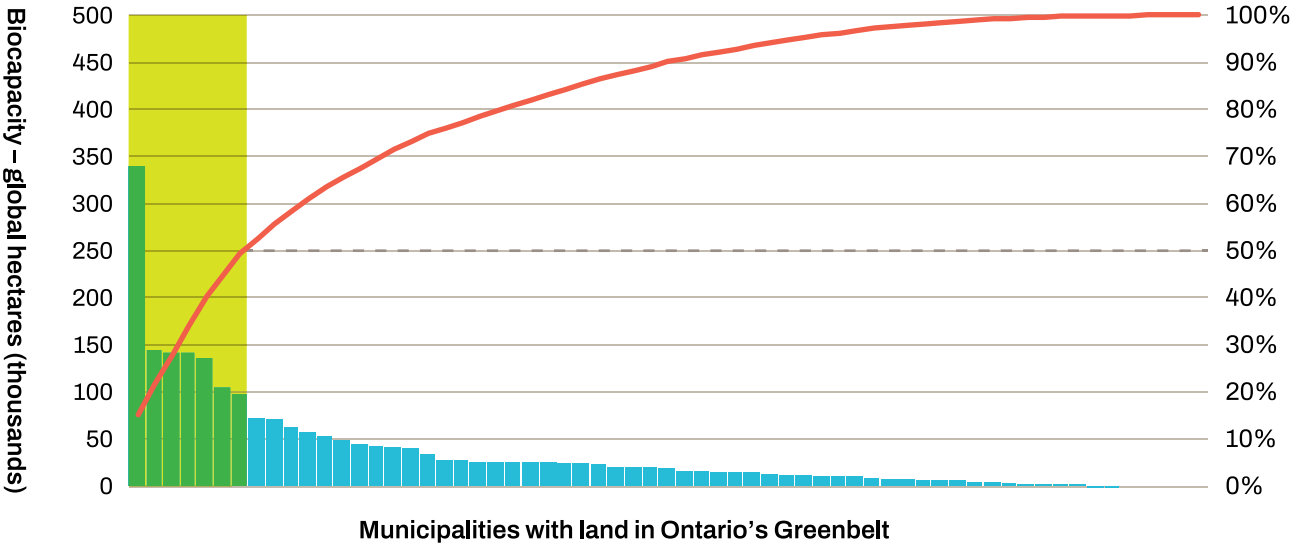
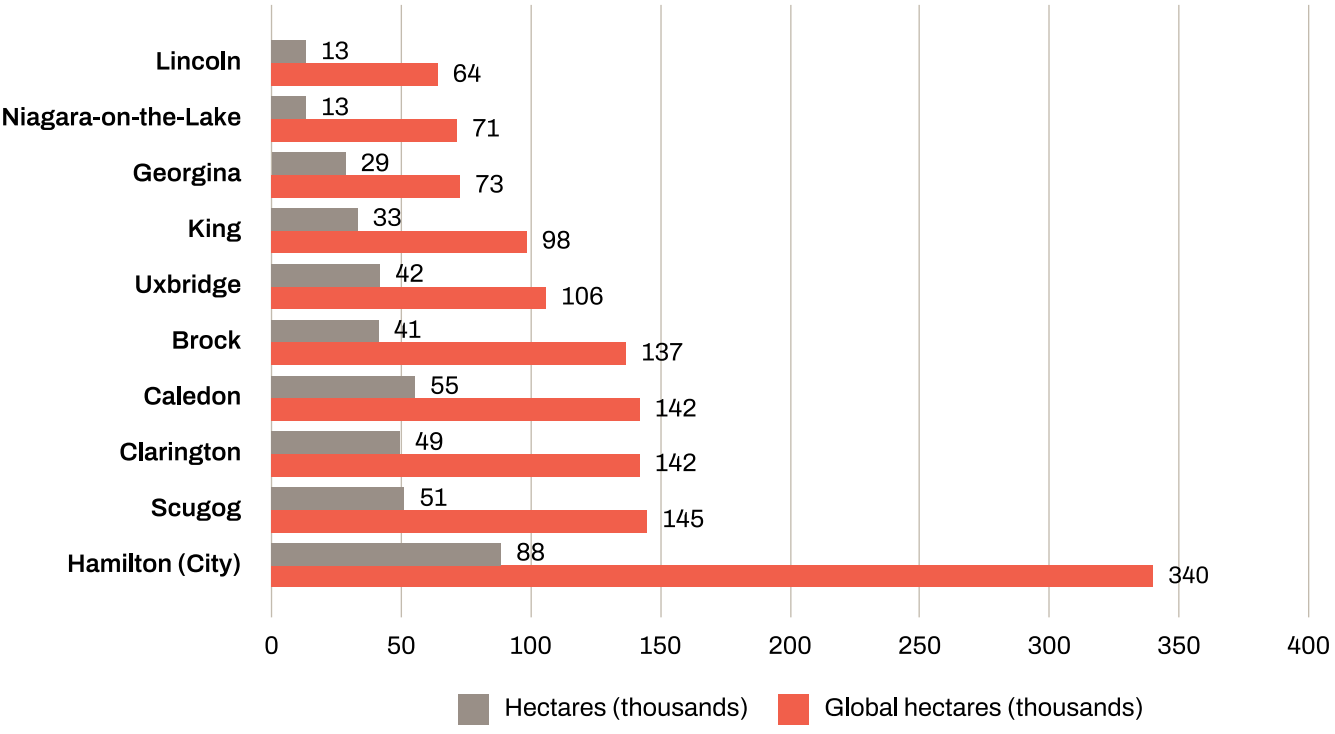


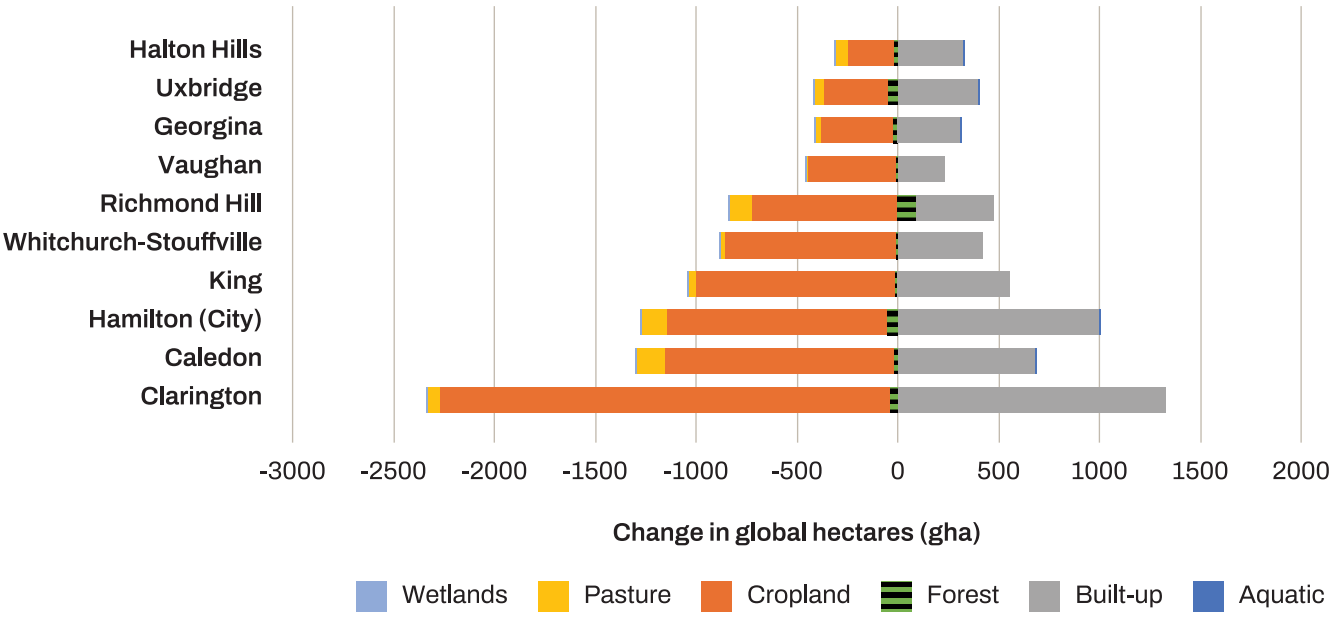
Figure 7 Ten municipalities with the greatest Greenbelt biocapacity compared to their land area in hectares, in 2020



Among the 63 Greenbelt municipalities, biocapacity varied on an average per capita basis. Brock Township had the highest ratio of Greenbelt biocapacity relative to its population, at 10.8 gha per person, with a population of 12,636 in 2020. Municipalities averaging more than 5 gha per person of Greenbelt biocapacity included Scugog, Northern Bruce Peninsula, Alnwick/Haldimand, and Mulmur Township. Other municipalities had a lower ratio, with 35 municipalities averaging less than 1 gha per person. The municipalities with an average of more than 5 gha per person all have a population of less than 23,000 people, while some municipalities with the largest total biocapacity also have larger populations, such as the City of Hamilton, Clarington, and Caledon. Clarington and Caledon have a population larger than 75,000 and the City of Hamilton has a population of over half a million.

The total amount and composition of Greenbelt biocapacity changed within certain municipalities between 2015 and 2020. Figure 8 identifies ten Greenbelt municipalities with the greatest loss of cropland biocapacity. Reductions in biocapacity are reflected by the bar to the left of the 0 axis. Bars to the right of the 0 axis reflect gains in biocapacity, by component. The greatest loss of cropland biocapacity occurred in the City of Clarington, with a loss of 2,233 gha. Most often, a loss in cropland biocapacity corresponded to a gain in built-up biocapacity.

Figure 8 Municipalities with the greatest loss of cropland biocapacity between 2015 and 2020



Greenbelt municipalities are characterized as “inner boundary” if they border Lake Ontario, and “outer boundary” if they do not (Figure 9). Inner boundary municipalities tend to be more built-up and populated, especially the City of Toronto. Figure 10 compares the biocapacity of inner and outer boundary municipalities. About 48% of Greenbelt biocapacity exists within inner boundary municipalities, totalling 1,076,656 gha compared to 1,178,947 gha for outer boundary municipalities. Outer boundary municipalities had slightly larger proportions of forests, pastures, wetlands, and aquatic areas, while inner boundary municipalities had slightly higher proportions of cropland.

Figure 9 Map of “inner boundary” Greenbelt municipalities bordering Lake Ontario and “outer boundary” municipalities

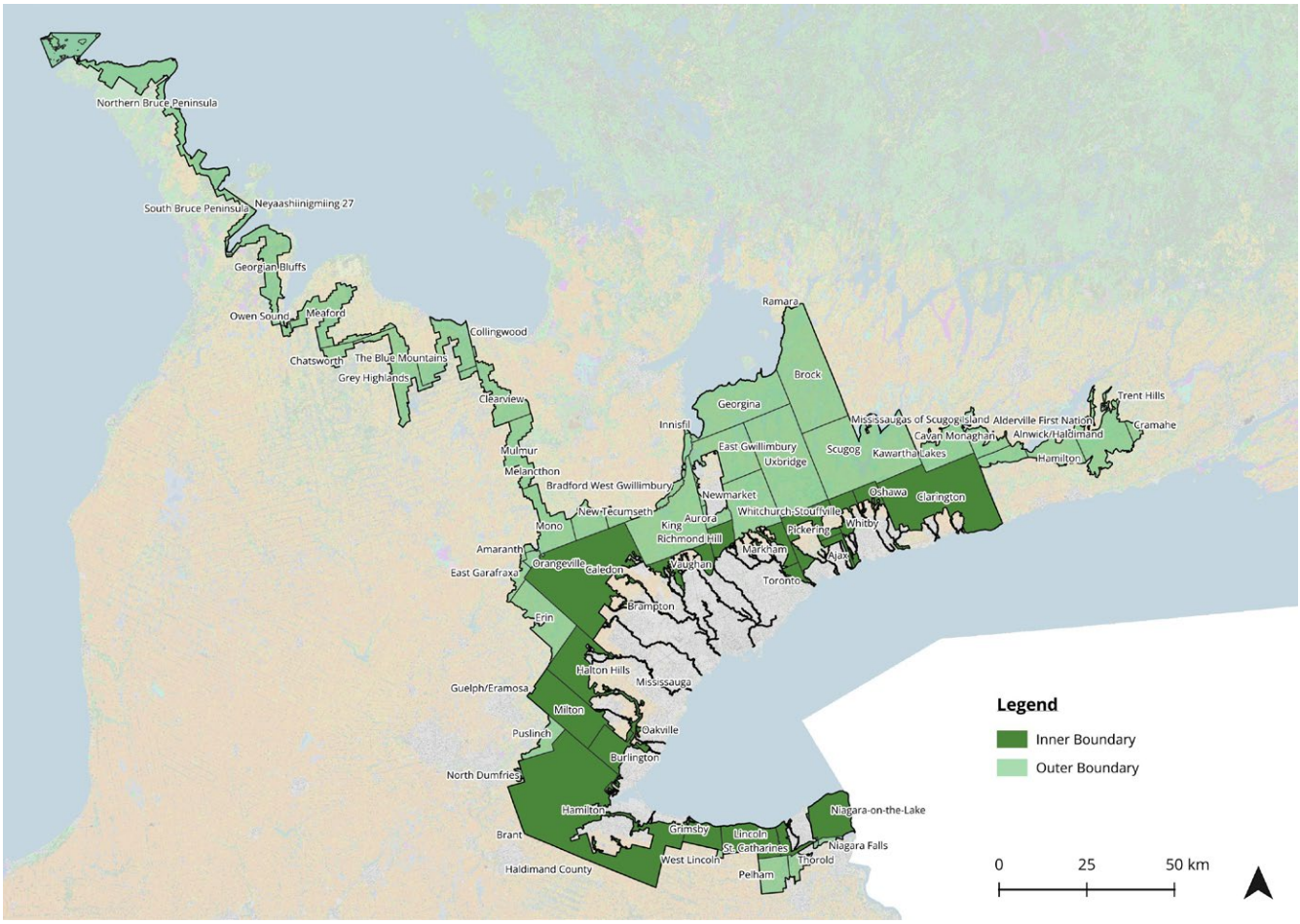
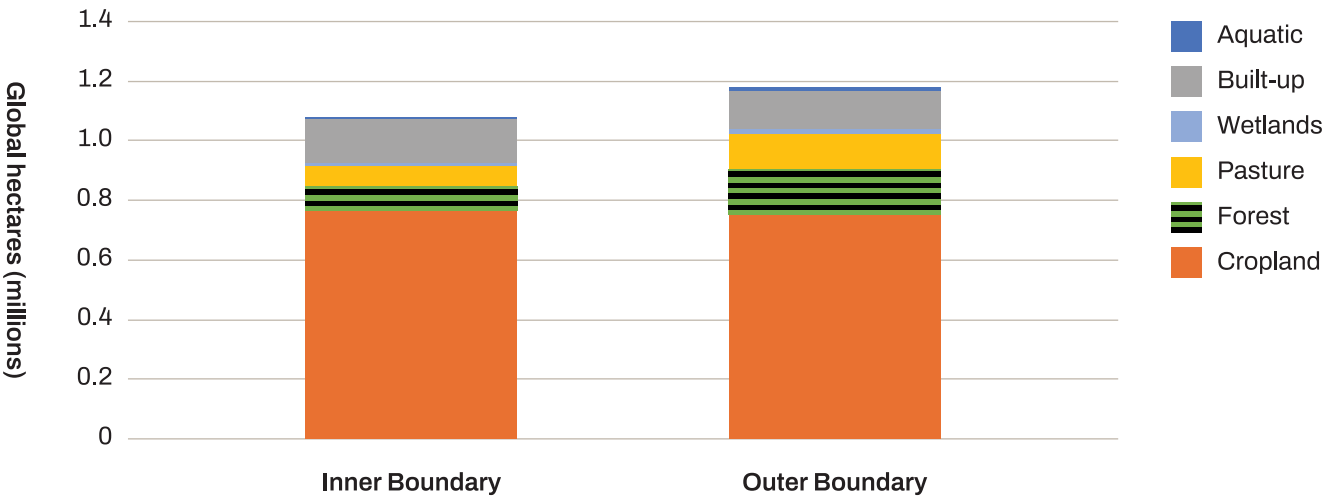


Figure 10 Biocapacity of inner boundary municipalities versus outer boundary municipalities



Municipalities beyond the Greenbelt

Greenbelt biocapacity benefits Ontarians regardless of whether they live in Greenbelt municipalities or not. From a food perspective, cropland and pasture biocapacity in the Greenbelt supported regional demand for local food. To analyse the regional significance of Greenbelt food biocapacity, a 100-kilometre (km) buffer was placed around the Greenbelt boundary to approximate the typical distance that local food travels from production to consumption, based on the Thunder Bay and Area Food and Agriculture Market Study (2017).

Figure 11 maps Ontario's Greenbelt compared to the GGH Growth Plan Area and a 100 km "local food buffer" from the Greenbelt boundary. This 100 km boundary extends far beyond the 63 municipalities within the Greenbelt to include 237 municipalities across Southern Ontario.

Figure 12 compares total biocapacity within the Greenbelt to the "adjacent" area and the rest of Ontario. Area within the 100 km local food buffer was labelled as being "adjacent" to the Greenbelt, to distinguish it from the rest of Ontario. Figure 13 compares the proportions of biocapacity components for the same areas. The adjacent area had 24,548,700 gha of biocapacity with proportionally less cropland and pasture biocapacity than the Greenbelt, and proportionally more aquatic biocapacity. The rest of Ontario had an even smaller proportion of cropland and pasture biocapacity. This reinforces the significance of the Greenbelt from a food perspective. While the rest of Ontario had significant amounts of forest, aquatic and wetland biocapacity, the Greenbelt and adjacent areas provided significant support to Ontario's ecological footprint of food (cropland and grazing land).

Figure 11 Map of Ontario's Greenbelt, a 100 km buffer from its boundary labelled as a "local food buffer" and the Greater Golden Horseshoe (GGH) Growth Plan Area.

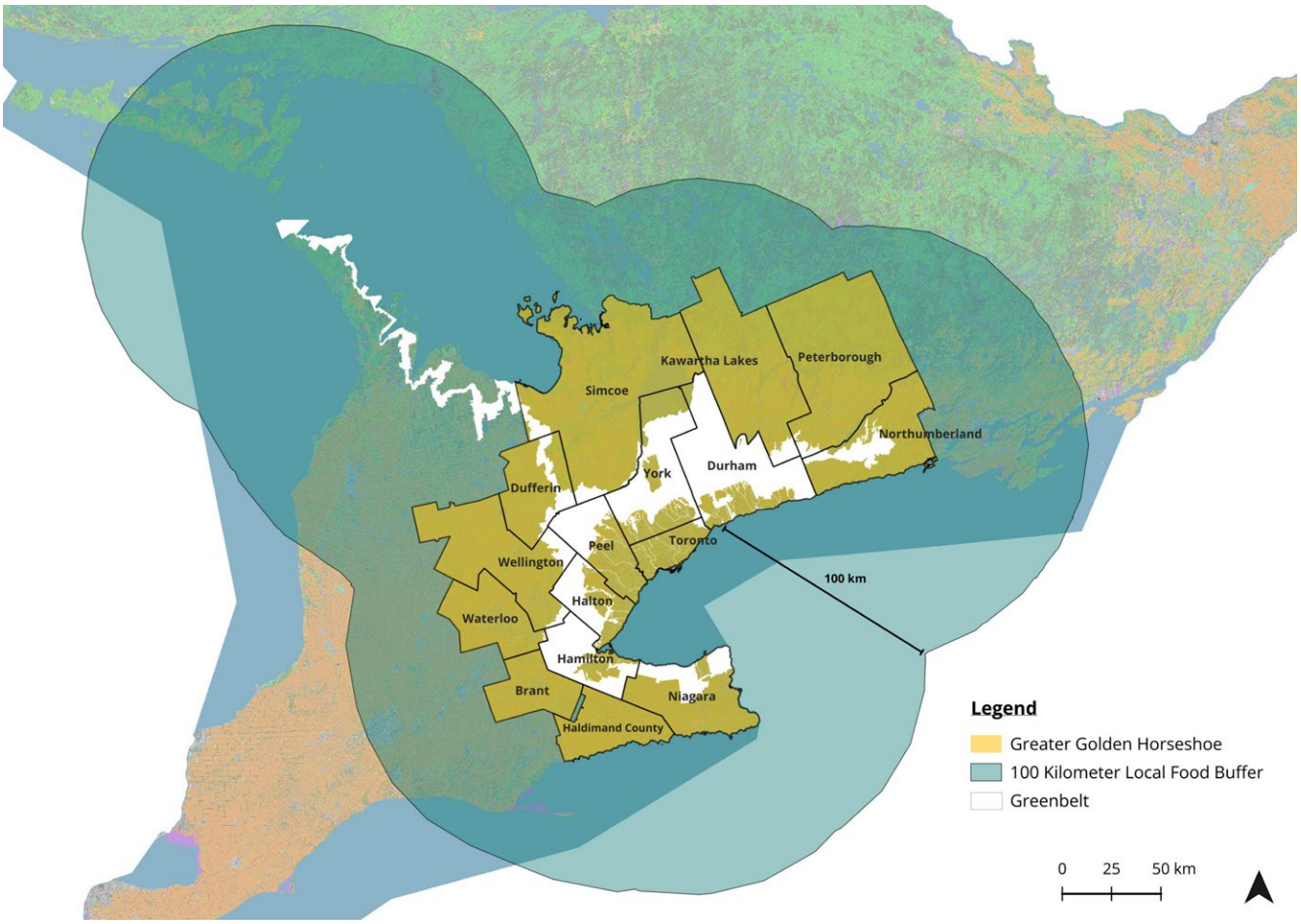


Figure 12 Biocapacity in the Greenbelt (gha) compared to 100 km zone adjacent to it and the rest of Ontario, in 2020

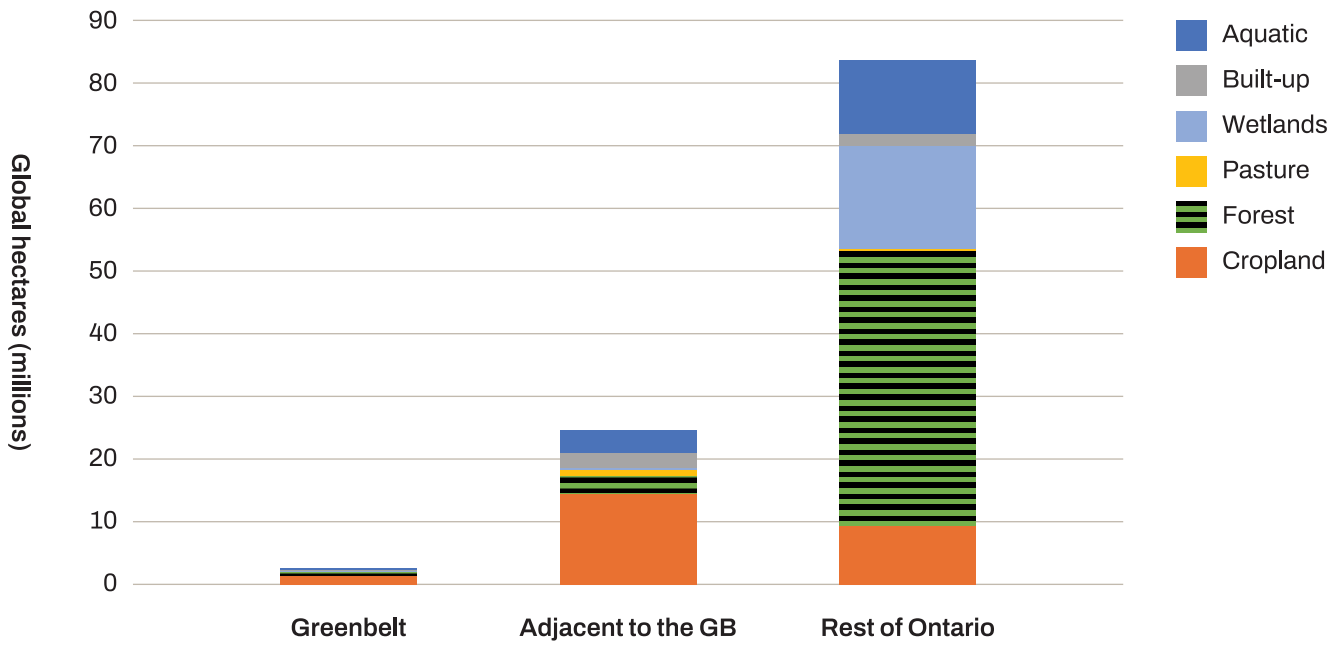
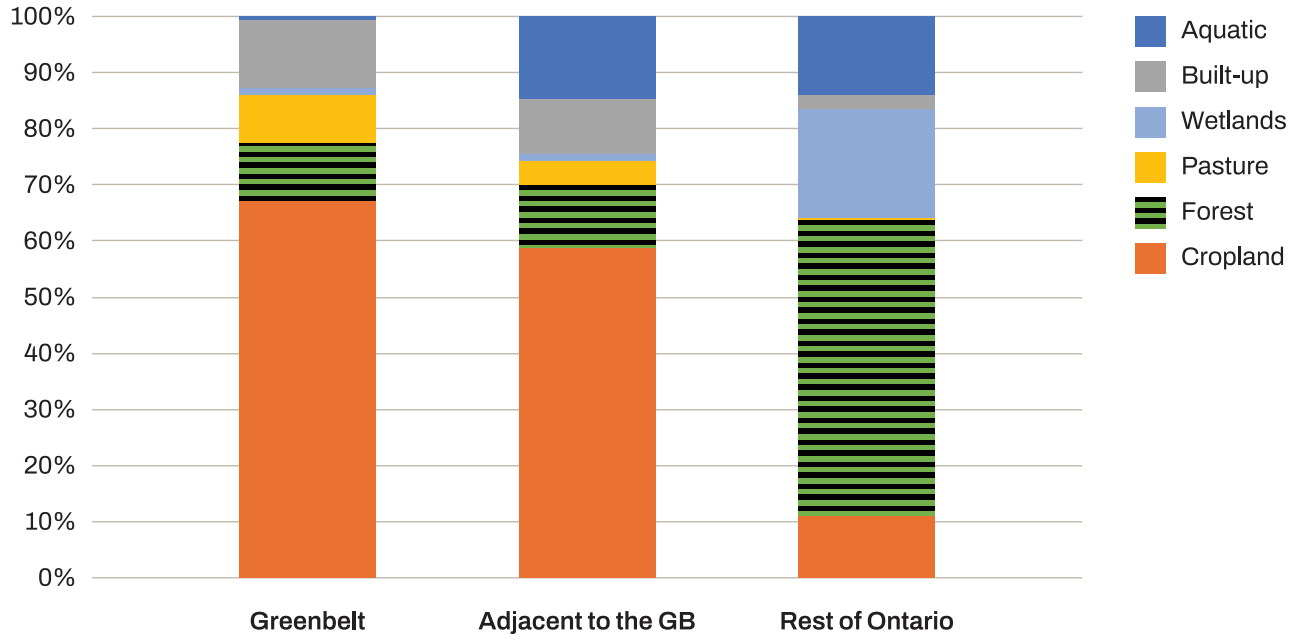


Figure 13 Proportion of biocapacity components within Greenbelt compared to 100 km zone adjacent to it and the rest of Ontario, in 2020



A Future of Opportunities

There are many opportunities to improve the protection of the Greenbelt through the application of land cover, land use, and biocapacity data. Land cover and land use data are beneficial for tracking changes in area over time. Biocapacity data adds the element of measuring the ecological value of the land. Together these datasets are important for making informed planning decisions regarding development and land use changes. One such decision could relate to the expansion of lands protected by the Greenbelt Plan. This research confirms that lands adjacent to the Greenbelt provide high amounts of biocapacity per unit of area, which could be protected by Greenbelt expansion.

Changes in land cover composition within the Greenbelt resulted in a loss of 3,237 gha of biocapacity between 2015 and 2020. Statistics Canada estimates that Ontario's population could reach 19 million people by 2050 in a medium growth scenario (2026). If Greenbelt biocapacity were to stay at the 2020 levels, this would reduce Greenbelt biocapacity from 0.14 gha per person to 0.12 gha per person by 2050. Additionally, Ontario's ecological footprint was projected by Miller et al. (2025) to grow by 7% from 2025 to 2030, which would necessitate an increase in Greenbelt and Ontario biocapacity by the same amount.

Sharing this data with professionals and civil society can facilitate enhanced protection of the Greenbelt. One way is to make the data available on a web-accessible dashboard, organized by municipality, about the amount and components of local biocapacity provided by Greenbelt landscapes. This dashboard could be built to allow users to compare biocapacity over time, reflecting changes in area of Greenbelt-designated lands and changes in their average biocapacity per unit of area. This dashboard could be kept current with future updates in provincial land cover data and provincial assessments of biocapacity, which are expected to continue reporting over the coming years. Dashboard-generated tables and figures can help users to visualize the data.

Sharing the geospatial data generated from this research could also expand its application in efforts to protect the Greenbelt. For example, the biocapacity raster dataset (at a 15-metre resolution) generated for this report could be overlaid with data about soil assets, specialty crop areas, recreation, biodiversity, and municipal data which is increasingly available through open-data portals. Accompanying biocapacity data with other datasets can be useful to inform municipal policies and bylaws about managing and conserving agricultural and ecological lands. These are some of the potential ways that land use, land cover, and biocapacity data can be analysed and shared with practitioners and civil society to support the protection of Ontario's Greenbelt and natural heritage system more broadly.

Conclusion

The Greenbelt was created in 2005 to protect the natural resources, agricultural lands, and waters that a growing population needs. Current policy priorities in Ontario are increasing development pressures, which may lead to unintended consequences on natural heritage systems across the Greater Golden Horseshoe and the province. Furthermore, at a time of global instability and economic uncertainty, we must explore ways to better integrate the holistic elements of sustainability to show that it is possible to have a strong economy while protecting critical ecological systems and ensuring positive social outcomes. A healthy environment produces healthy economies and healthy people. Now more than ever, it is vital that we understand the value of Ontario's Greenbelt.

The Greenbelt is a key part of Ontario's landscape that has important benefits for Ontarians. On average, the Greenbelt has higher levels of ecological value than other areas across the province. Measuring ecological value using a biocapacity accounting framework provides a consistent and reliable tool for quantifying the value of different environments. Measuring biocapacity and sharing this data publicly can be an important resource for land use planning and decision-making. Requiring biocapacity to remain above a certain threshold through public policy is one possibility to protect the Greenbelt as the province continues to grow. The Greenbelt benefits everyone across the province by supplying food, forest products, and carbon sequestration. It is important that the Greenbelt is protected for the benefit of current and future generations.

Recommendations

This report is a starting point for understanding Greenbelt biocapacity, providing a high-level overview of a new ecological accounting framework. These recommendations can guide the future of the Greenbelt so it can continue to benefit Ontarians.

- Prioritize collection and reporting of land use and land cover data to provide more frequent updates on changes across the province. Provide a more detailed categorization of types of agricultural lands.
- Use land cover and land use data to identify areas more at risk of losing farmland, wetlands, and other natural cover to build an evidence-based case for their protection through planning and policy.
- Provide municipal and provincial governments with geospatial biocapacity data to inform strategic land use planning and policy frameworks.
- Produce regularly updated maps of natural heritage, agricultural, and water systems both within and adjacent to the Greenbelt for municipalities to use in land use planning processes.
- Develop strategies and fund projects to enhance Greenbelt biocapacity through restoration, regenerative agriculture, and soil health best practices.
- Renew commitments to reduce greenhouse gas emissions, which is the most effective and efficient action for reducing our ecological footprint and improving sustainability.
- Explore ways to incorporate biocapacity into municipal natural asset management inventories and frameworks.
- Establish a provincial Greenbelt biocapacity target of at least 0.15 gha per Ontarian. Plans for new or expanded rural settlement areas or greenfield development, which contribute to greater consumption, should be met with a clearly outlined plan to increase Greenbelt biocapacity, to protect our ability to produce food and clean water for a growing population at an affordable cost.

References

Government of Ontario. (2019, April 16). *Schedule 1: Greater Golden Horseshoe Growth Plan Area* [Map]. https://files.ontario.ca/schedule_1_greater_golden_horseshoe_plan_area.jpg

Miller, E., Robinson, J., McMaster, M.-L., Holloway, E., & Kapoor, A. (2021). Ontario's Ecological Footprint and Biocapacity: Measures and trends from 2005 to 2015 [Report submitted to the Ontario Ministry of Natural Resources and Forestry.]. Ecological Footprint Initiative.

Miller, E., A.M.M. Reeves, P. Dworatzek, and K. Lo. (2025). Ontario's Ecological Footprint and Biocapacity as of 2025. Report submitted to Ontario Ministry of Natural Resources.

Lo, K., Miller, E., Dworatzek, P., Basnet, N., Silva, J., Van Berkum, J. L., Halldórsdóttir, R. B., & Dyck, M. D. R. (2025). National Ecological Footprint and Biocapacity Accounts, 2025 Edition. Data and metadata version 1.0. Produced for Footprint Data Foundation by researchers at York University and University of Iceland. Available at: https://footprint.info.yorku.ca/data/

Ontario Biodiversity Council. (2023). Ontario's Biodiversity Strategy 2023-2030. https://ontariobiodiversitycouncil.ca/ontarios-strategy/#About-the-Strategy

Ontario Ministry of Municipal Affairs and Housing. (2023, December 14). *Greenbelt outer boundary* [Shapefile]. Ontario GeoHub. https://ws.gisetl.lrc.gov.on.ca/fmedatadownload/Packages/GBOUTBND.zip

Ontario Ministry of Natural Resources and Forestry. (2025, March 5). *Ontario Land Cover Version 1.0* [Raster Digital Data]. Ontario GeoHub. https://ws.gisetl.lrc.gov.on.ca/fmedatadownload/Packages/ONTARIO_LAND_COVER_Version_1_0_Geodatabase.zip

Ontario Ministry of Natural Resources and Forestry. (2021, March 8). *EcoZone* [Shapefile]. Ontario GeoHub. https://ws.gisetl.lrc.gov.on.ca/fmedatadownload/Packages/ECOZONE.zip

Statistics Canada. (2021). *Census subdivision boundary files* [Shapefile]. https://www12.statcan.gc.ca/census-recensement/2021/geo/sip-pis/boundary-limites/files-fichiers/lcsd000b21a_e.zip

Statistics Canada. (2021). *Census division boundary files* [Shapefile]. https://www12.statcan.gc.ca/census-recensement/2021/geo/sip-pis/boundary-limites/files-fichiers/lcsd000b21a_e.zip

Statistics Canada. (2026). *Population Projections for Canada, Provinces, and Territories: Interactive Dashboard*. Catalogue no. 71-607-X. https://www150.statcan.gc.ca/n1/pub/71-607-x/71-607-x2022015-eng.htm

Thunder Bay and Area Food Strategy. (2017, October). *Thunder Bay and Area Food and Agriculture Market Study*. Harry Cummings and Associates. https://www.northernpolicy.ca/upload/documents/publications/tbfoodstrat_marketstudy2017.pdf