Greenbelts Around the World Responding to Local and Global Challenges

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Executive Summary

Greenbelts are important physical, cultural and economic elements of cities and regions around the world. These spaces, taking many forms, provide important functions including environmental protection and enhancement, food production, recreation and tourism, urban containment, access to nature, and ecological services including carbon capture. Greenbelts have long been foundational to the structure and function of urban regions, originating in 19th century England, and remain relevant and as important as ever today.

This report examines how greenbelts are evolving to respond to current and emerging conditions found within cities and regions around the world, as an update to the Greenbelt Foundation's global greenbelt research first published in 2010. Greenbelts have come under increased stress since that time from a combination of forces, including urban and suburban development, the creation and expansion of infrastructure projects within protected areas and changes in political agendas. There are also positive changes to report, among them the increasing popularity of local food and urban agriculture, a hyper-awareness through the COVID-19 pandemic about the health benefits of nature and access to open space, and the growing recognition of the environmental benefits provided by natural areas, particularly given climate change pressures.

As a result, there is a need to update the analysis in the 2010 report with the most current information. Through a similar approach to the original report, this update involved detailed research of eight case studies to identify trends, threats and opportunities for greenbelt protection and enhancement. This report studies and compares the following eight greenbelts:

- British Columbia Agricultural Land Reserve, Canada;
- Copenhagen Green Wedges, Denmark;
- European Green Belt;
- Green Heart, the Netherlands;
- London Metropolitan Green Belt, England;
- Melbourne's Green Wedges, Australia;
- San Francisco Bay Area Greenbelt, USA; and
- São Paulo City Green Belt Biosphere Reserve, Brazil.

These cases were selected for reasons including the longevity of the greenbelts, similar development pressures faced and having comparable policy goals to the Ontario Greenbelt Plan.

The research is based on a review of academic literature, government policy documents media articles, and 20 interviews with greenbelt experts from around the world. Further, the research was focused around four main themes for each case study: 1) nature-based solutions; 2) food and the agricultural system; 3) outdoor tourism and recreation; and 4) growth management.

Lessons Learned

The information and insights gained from this research are aimed to provide recommendations for international greenbelt planning in general and for Ontario's Greenbelt more specifically. Overall, the key findings of this research are that:

1. **Greenbelts reflect the historical, social, political and environmental contexts of the jurisdictions in which they are located.** The case studies illustrate how each greenbelt has been shaped (quite literally in most cases) in response to unique local and regional contexts. This approach produces an array of spatial forms, stakeholder involvement and policy objectives that are specific to each location. Accordingly, this report highlights the many ways greenbelts have become important land-use planning tools which can be flexibly adapted and applied to a range of contexts.
2. **Strong public awareness and support are important for the long-term protection of greenbelts, which is especially critical since the research shows that greenbelt policies are most often vulnerable to development and political pressures.** A related, and possibly compounding, challenge is creating and maintaining a strong sense of connection between residents and their greenbelt. In response, non-governmental and other greenbelt-related organizations invest in common strategies to encourage engagement including public education programs and the promotion of recreational and tourism activities such as cycling and hiking tours.
3. **Threats to greenbelt protections have increased since 2010.** As seen in the case studies, many greenbelts are located in or adjacent to rapidly growing regions within which further growth and expansion is either planned for or anticipated to be inevitable. Such intense growth pressures are creating growing demands for new housing and infrastructure services. Thus, policymakers are under pressure to release protected land for new development and change urban growth boundaries. However, this development results in the loss of productive farmland and natural areas. As cities and regions face challenges with environmental degradation and agricultural viability, this research finds that greenbelts are or can be an important land-use planning tool to manage growth.
4. **Greenbelt policy and implementation can be threatened or diminished by changes in governing political parties and a lack of municipal cooperation.** Compared to most greenbelts studied, Ontario's is relatively well-insulated from potential harmful changes that may result from changes in government and other shifts, owing to embedded protections in planning and growth management legislation. The research found that many greenbelts are quite vulnerable to politics and growth pressured, in the absence of comprehensive and sustained policy protections.

5. **Greenbelt policy goals have become increasingly multifunctional and are expected to fulfill more objectives than ever before.** The research found that the role and function of greenbelts are under increasing pressure to be "all things to all people." While public awareness and use of greenbelts has been bolstered by the COVID-19 pandemic, this is contributing to higher and wider expectations of what greenbelts should or could be. Wider public access to, and opportunities within, greenbelts for recreation and tourism for example could pose threats to the integrity of their ecosystems and ability to provide important ecological functions including species protection and pollination.
6. **The COVID-19 pandemic affirms the importance of greenbelts for public health and well-being, contributing to increasing demands for access to natural spaces including the attractiveness of housing in urban peripheries.** This is a challenging combination, especially given the traditional role of greenbelts as growth containment features or urban separators, posing further strains on greenbelts.

Moving Forward

Based on the case study findings, this research identifies several strategies that may be applied to further enhance and strengthen the protection of the Ontario Greenbelt:

1. Ensure the continued permanence of firm boundaries for the Greenbelt;
2. Municipal planning and development decisions regarding Greenbelt lands can be supported through enhanced guidance;
3. The Ontario Greenbelt needs to be supported by programs and funding priorities that align with its planned functions and policy goals;
4. Re-affirm the strong leadership and supportive role of the Greenbelt Foundation in order to further raise the awareness of the Ontario Greenbelt;
5. Leverage regional research programs to further advance the Greenbelt Plan objectives, beyond land use planning;
6. Call for higher standards and levels of coordination for infrastructure projects and resource extraction within the Ontario Greenbelt, including a fuller assessment of cumulative impacts;
7. Enhance equitable access to the greenbelt. It can be challenging to access the Ontario Greenbelt's recreational and tourist sites without a private vehicle. However, better utilizing the existing local and regional transit networks could increase residents' access to the greenbelt;
8. Explore ways to increase the supply of Greenbelt grown products in the local marketplace;
9. Plan celebrations for the 20th anniversary, in 2025, of the Ontario Greenbelt.

Overall, this research confirms that Ontario's Greenbelt is an international leader in greenbelt planning. It is underpinned by a strong policy framework, has broad public support and its implementation is supported by dedicated civil society groups and the Greenbelt Foundation, all of which contribute to making the Ontario Greenbelt a vibrant and thriving landscape.

Photo: Shutterstock

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Introduction

Greenbelts have been foundational to regional planning for over a century, with roots in the British "Garden City" tradition

Greenbelts have been a mainstay planning approach to manage urban development and protecting farmland and natural areas for more than one hundred years. Defined as natural areas and open lands surrounding cities, towns or regions, greenbelts often contain a combination of public and private lands on which there are development restrictions.[1] The primary purposes of greenbelt policies include protecting agricultural land, nature conservation, urban growth containment and providing recreational spaces.[2] Greenbelts date back to the late 19th and early 20th century and are closely linked to Ebenezer Howard's Garden City concept and initiatives to protect green spaces around European cities such as Paris and Vienna.[3] Garden cities were proposed by Ebenezer Howard as a new type of settlement that would combine the best of town and country living, increase the amount of green space available to residents and would address the urban problems at that time of overcrowding and poor air quality.[4] In reaction to rapid rates of urbanization and industrialization, greenbelt policies at that time were meant to separate urban and rural areas, confine growth, protect farmland and provide a refuge for residents from the unhealthy urban conditions.[5] Based on the British model, the greenbelt concept spread internationally and was adopted in cities such as Melbourne and Copenhagen. This planning approach reached the height of its popularity in the years immediately following World War II up until the 1970s.[6]

1 Erickson, 2004.
2 Amati, 2008; The Ontario Greenbelt Plan's goals are aligned to an extent with these general greenbelt policy goals. In addition to a focus on agricultural land protection and nature conversation, the Ontario Greenbelt Plan aims to support rural communities and mitigate climate change (Ministry of Municipal Affairs, 2017).
3 Konijnendijk, 2010.
4 Sturzaker and Mell, 2017.
5 Ibid.
6 Amati, 2008.

Greenbelts continue to evolve in form and function to respond to contemporary challenges including climate change

In recent years, the concept of the greenbelt has evolved to reflect changing conditions found within cities and regions, as well as changing societal views on nature and evolving land use planning paradigms. In addition to previous policy objectives such as growth control and farmland protection, recent greenbelt policies often have new, multi-functional goals which include climate change mitigation and adaptation, economic development, promoting regional identity and the provision of ecosystem services.[7]
The management of greenbelts has also become more complex in recent years, as more private and civil society stakeholders are becoming engaged in greenbelt policy implementation. The history of greenbelts reflects this planning approach, which has remained a powerful tool to manage the urban-rural periphery.

The Greenbelt Foundation is updating its global greenbelt research, first completed in 2010, to reflect the ways in which greenbelts are evolving to respond to current and emerging conditions

In 2010, the Greenbelt Foundation published a report that examined greenbelts and greenbelt-like areas in nine jurisdictions outside of Ontario, Canada. The report included the London Metropolitan Green Belt, the Netherlands's Green Heart and Randstad region, the Copenhagen Finger Plan, Germany's Iron Curtain Green Belt, the Frankfurt Green Belt, the Melbourne Green Wedges, the Portland Urban Growth Boundary, British Columbia's Agricultural Land Reserve (ALR), and the São Paulo Green Belt Biosphere Reserve.[8] These areas were chosen for several reasons such as longevity, similar development pressures, and comparable goals to Ontario's Greenbelt.[9] The report described these greenbelts' legal, policy, institutional and governance frameworks, any distinctive features, key challenges, threats facing these green spaces, and their successes.

Through an analysis of documents and interviews with stakeholders in each region, the 2010 report identified themes relevant to the nine greenbelts studied. These themes included: the capacity of greenbelt plans and policies to evolve and address current societal needs; continued pressures from urban growth and related infrastructure; the importance of proactive support for farmers and agriculture in near-urban areas; opportunities for the restoration and enhancement of natural areas, and examples of public engagement with local greenbelts. Key lessons for Ontario's Greenbelt were also identified. The report revealed that land use protections are necessary but insufficient to achieve greenbelt objectives, noting that infrastructure expansion and resource extraction have the potential to negatively influence the ecological integrity of greenbelts. The report also emphasized the importance of public education regarding the benefits of greenbelts, the need for more awareness of greenbelt policies and implementation programs, and the importance of greenbelt policy monitoring and evaluation.

> **Greenbelts remain a powerful planning tool to manage the urban–rural periphery.**

7 Macdonald et al., 2021.
8 Carter-Whitney, 2010.
9 In this report, the Greater Golden Horseshoe Greenbelt is referred to as the Ontario Greenbelt. However, it should be noted that there is also a greenbelt located in Ottawa, Ontario, Canada.

This 2022 global greenbelts report updates, confirms and adds to the body of international research and highlights emerging trends

Within the past decade, the popularity of the local food movement, farmers markets and urban agriculture has greatly increased in North America. With a growing recognition of their environmental benefits among policymakers, greenbelts are now seen as playing an important role in making cities and regions more resilient to changing future global conditions related to climate change. Finally, there has been a significant increase in the use of parks, open spaces, and natural areas by people during the COVID-19 pandemic. The pandemic has elevated the value of parks and natural areas, reinforcing their importance for people's physical and mental health, and underscoring the need for having high-quality green spaces that are accessible to all urban residents.[10]

In the time since the publication of the 2010 report, greenbelts continue to be threatened by urban and suburban development pressures and political changes. In England for example, new national planning regulations require municipalities to develop in greenbelt areas, if determined that the land was required for meeting housing targets. In the Netherlands, the Green Heart was removed as a national strategic planning concept. With no national guidance, provincial governments have each created their own open space policies. In the São Paulo Green Belt Biosphere Reserve, national legislation protecting native vegetation and forests was weakened, allowing property owners to deforest and/or develop more of their land.

Within planning and policy practices, nature-based solutions have become increasingly popular in recent years as a way to publicize the environmental benefits and their associated economic contributions to politicians and the public.[11] Within land use planning and policy documents, the terms “natural assets”, “ecosystem services” or “green infrastructure” have become more commonly used and integrated into greenbelt polices within the past decade. While these similar terms may have different meanings in different jurisdictions, the common theme underlying these discussions is that environmental benefits provided by greenbelts are increasingly recognized and promoted.

This update studies 8 greenbelts, is organized around 10 major research questions, and examines conditions and trends across 4 themes

Given the changes since 2010, there is a need to update the information found in the original Greenbelt Foundation report. This includes current information on important trends as well as opportunities to address threats to greenbelts and strengthen their protection. Specifically, the purpose of this report is to update the 2010 Global Greenbelts report with a 2022 version that will:

1) Reflect recent political, institutional and policy changes, and progress towards meeting goals, and emerging challenges in the regions reviewed in 2010;
2) Incorporate additional greenbelts not previously included in 2010, which are relevant to the updated report; and,
3) Identify lessons learned from other contexts which can be applied to Ontario's Greenbelt as well as any recommendations for meeting Greenbelt Plan objectives.

10 McCormick, October 7, 2020.
11 Ibid.

This report features eight greenbelts:

- British Columbia's Agricultural Land Reserve, Canada;
- Copenhagen Green Wedges, Denmark;
- European Green Belt;
- Green Heart, the Netherlands;
- London Metropolitan Green Belt, England;
- Melbourne's Green Wedges, Australia;
- San Francisco Bay Area Greenbelt, USA;
- São Paulo City Green Belt Biosphere Reserve, Brazil.

Not all of the cases have the traditional spatial form of a greenbelt, which is a belt of continuous protected land surrounding a city or region. For example, the Green Heart in the Netherlands is a protected area surrounded by a ring of cities within the Randstad. In addition, the scale of the size of the greenbelts included in the report varies considerably (see Figure 1). While most of the greenbelts discussed are related to a specific city or region, the European Green Belt spans across 24 countries and covers 12,500 kilometres. Finally, the greenbelts examined do not all share the same policy goals, as objectives are often found to be context specific. For example, the British Columbia Agricultural Land Reserve's main focus is on agriculture. In contrast, the European Greenbelt does not have an emphasis on the protection of agricultural land. However, all these cases were selected for this research for several reasons. Most of these greenbelts have been established for many years. As a result, they have experienced several political and policy changes. In addition, many of the cases face similar challenges such as population growth, housing and infrastructure development pressures, environmental degradation and loss of farmland. Finally, most of the cases share one or more policy goals with the Ontario Greenbelt Plan.

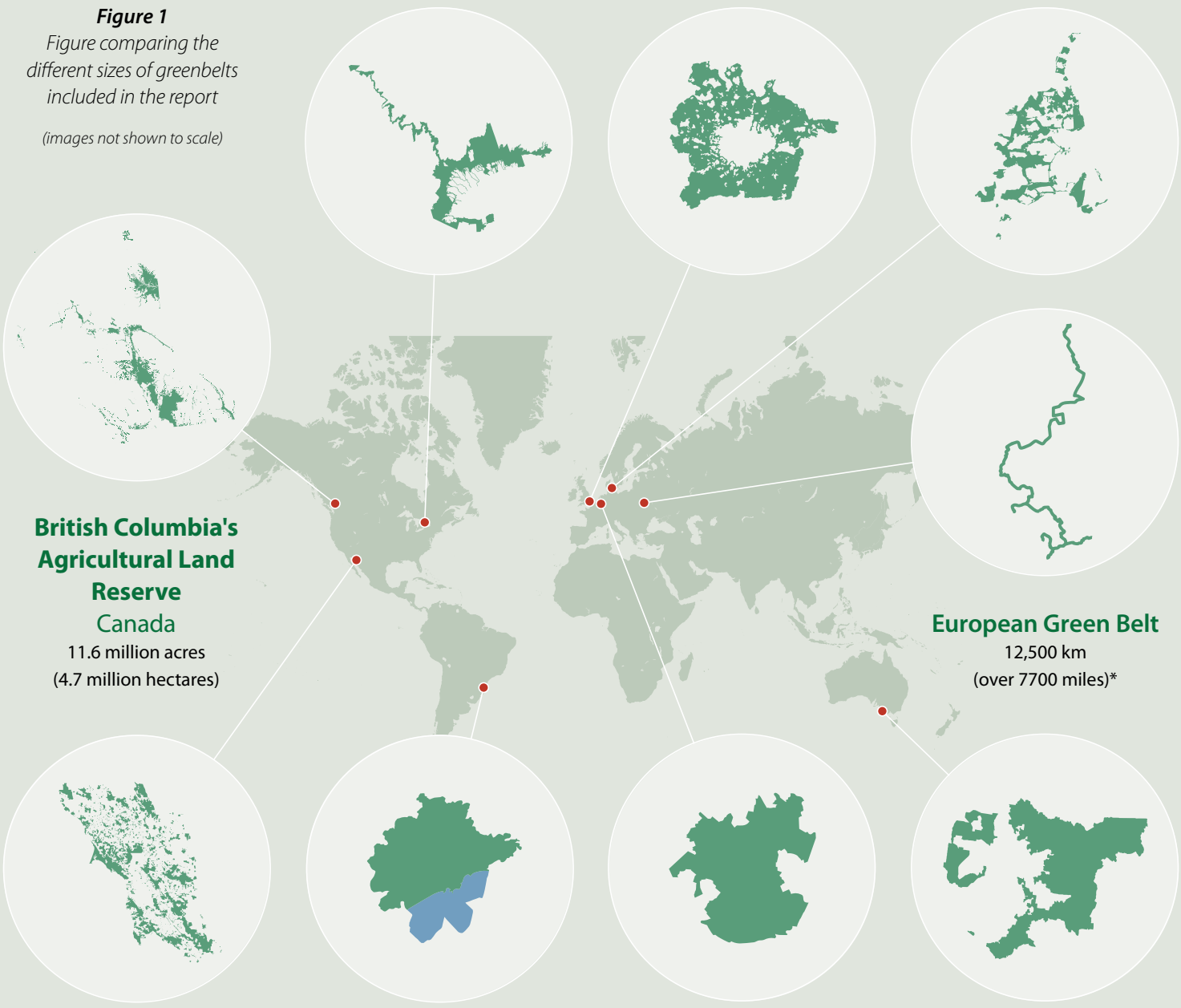
Some greenbelts were not selected to be included in this research including cases in Asia, Africa and the Middle East. Comparative research with cases in these geographical contexts would be challenging due to the often different institutional and political structures, informal land-use systems or rapid urbanization rates seen in those cases. However, there are cases worth considering for future research such as Seoul, South Korea as it is a demilitarized zone, similar to the European Green Belt. There are also recently developed greenspaces that could be considered for future research such as the Green Network in the Halifax Regional Municipality or others that have increased significantly in size such as the greenbelt around Tehran.

> **Greenbelts are now seen as playing an important role in making cities and regions more resilient to changing future global conditions related to climate change.**

Figure 1

Figure comparing the different sizes of greenbelts included in the report

(images not shown to scale)



Ontario Greenbelt
Canada
2 million acres
(800,000 hectares)

London Metropolitan Green Belt
England
1.25 million acres
(508,120 hectares)

Copenhagen Green Wedges
Denmark
87,668 acres
(35,478 hectares)

British Columbia's Agricultural Land Reserve
Canada
11.6 million acres
(4.7 million hectares)

European Green Belt
12,500 km
(over 7700 miles)*

San Francisco Bay Area Greenbelt
USA
3.3 million acres
(1.3 million hectares)

São Paulo City Green Belt Biosphere Reserve
Brazil
5.9 million acres
(2.4 million hectares)

Green Heart
The Netherlands
444,789 acres
(180,000 hectares)

Melbourne Green Wedges
Australia
1.49 million acres
(605,000 hectares)

* There is no overall measurement in hectares or acres for the European Green Belt. Each bordering country defines the Green Belt by themselves. There are also several large nature conservation areas that while not in the Green Belt itself, connect to a large biotope network. These factors make it difficult to have an overall measurement for this case.

This report addresses the following major research questions for each greenbelt studied:

1. What changes have taken place to the physical features of the greenbelts?
2. What recent progress has been made towards meeting existing policy goals?
3. What political, institutional, governance and policy changes have taken place, and how have these changes affected the ability to meet greenbelt policy goals?
4. How have public, private, and civil society stakeholders involved in the governance and stewardship of the greenbelts changed?
5. What are the emerging challenges and what measures have been taken to address them?
6. How is the role of greenbelts in providing nature-based solutions being recognized and promoted? What programs or strategies are being used to promote, protect, or enhance the environmental benefits provided by greenbelts?
7. How does farming and food fit into the objectives of the greenbelt? How have policymakers supported farming and agri-food systems to ensure a thriving agricultural system?
8. What is the significance of tourism to the rural economies? What programs or strategies are being used to promote nature and agricultural-based tourism?
9. How have major growth pressures to the greenbelt changed over the past decade and how have governments tried to address or mitigate these threats?
10. What recommendations can be made to policymakers to improve greenbelt planning in general and more specifically in the context of Ontario's Greenbelt?

There are four main themes that were examined for each greenbelt:

Nature-based solutions: Given growing climate change pressures, greenbelts can play an important role in climate change adaptation and mitigation strategies for a city or region. Natural areas such as greenbelts provide significant environmental benefits including carbon and water storage, flood and erosion control, wildfire management, waste treatment, water filtration, and habitat for animal and plant species.[12] Functions that conserve, restore, or improve the management of natural areas to protect against climate change and environmental degradation are referred to as "nature-based solutions". Ecosystem restoration, as well as the protection of watersheds, biodiversity and environmentally sensitive areas can be seen as nature-based solutions that contribute to regional resilience.

Food and the agricultural system: One of the main policy goals of greenbelts is to protect farmland. Agriculture and the agri-food sector can make a significant contribution to regional economies through creating tax revenue and employment opportunities. Agricultural land also provides several ecosystem services which can reduce the impacts of climate change including storm water storage, water filtration, protection against erosion on waterways, carbon sequestration, pollination, and providing habitat for animal and plant species.[13] In addition, the close proximity of greenbelts to large urban areas provides opportunities for farmers to access large markets and respond to the growing interest in local food production. However, while greenbelt policies can protect agricultural land, there is often the recognition among planners and farmers that protecting farmland alone is not enough to ensure sustainable agricultural communities.

12 Tomalty and Komorowski, 2011.
13 Tomalty, 2015.

Protecting and supporting the entire agricultural system including all infrastructure, services, and agri-food assets that support farming is needed to ensure a viable agricultural sector and strong rural economies.

Outdoor tourism and recreation: Recreational and tourism activities based in greenbelts such as hiking, cycling, skiing, culinary tours, horseback riding and seasonal activities (e.g., apple picking, corn mazes and summer festivals) provide economic development opportunities for rural areas.[14] These activities allow for residents and visitors to build a stronger connection to greenbelts and provide farmers with additional revenue streams to support their businesses. In addition, the recreational spaces within greenbelts can provide important physical and mental health benefits for residents. These natural areas provide opportunities for residents to exercise, socialize and engage in other leisure activities.

Growth management: As seen in several cases within this report, greenbelts can be situated around cities and regions experiencing intense urban development pressures, along with rapid population growth rates. As a result, politicians are often under increased pressure from the development industry and real estate investors to relax greenbelt restrictions to allow for more residential and commercial development and infrastructure projects within protected areas.

This update draws from several sources including interviews with greenbelt experts from around the world, to reflect common and different approaches

This report was based on a review of literature such as academic books and journal articles, NGO reports, government policy documents, planning reports, newspaper, and other media articles, with attention paid to material published after the 2010 report. In addition, a total of 20 interviews with experts including government representatives, civil society groups, and academics were conducted related to each greenbelt studied (see Appendix 1). The Ontario Greenbelt was not included in this report as a case study that is explored in-depth, but rather is reflected upon in the recommendations in the concluding chapter. As a result, to provide some context to the Ontario Greenbelt, the following is a brief outline of this case.

The Ontario Greenbelt is among the largest in the world, with a high level of regional and local policy protection

Established in 2005, the Ontario Greenbelt is an area of permanently protected land that stretches across 810,000 hectares of forests, farmland, rivers, lakes, and wetlands (see Figure 2). The Greenbelt builds upon ecologically significantly landscapes such as the Oak Ridges Moraine, Niagara Escarpment, and the Rouge National Park. In 2005, the Greenbelt Act was passed by the Ontario provincial government to establish a legal protection framework under the Greenbelt Plan, released later that same year. The main policy goals of the Greenbelt Plan include protecting against the loss and fragmentation of agricultural land, protecting natural heritage and water resource systems, mitigating climate change, and providing support to rural communities.[15]

14 Mausberg, 2017.
15 Ministry of Municipal Affairs, 2017.

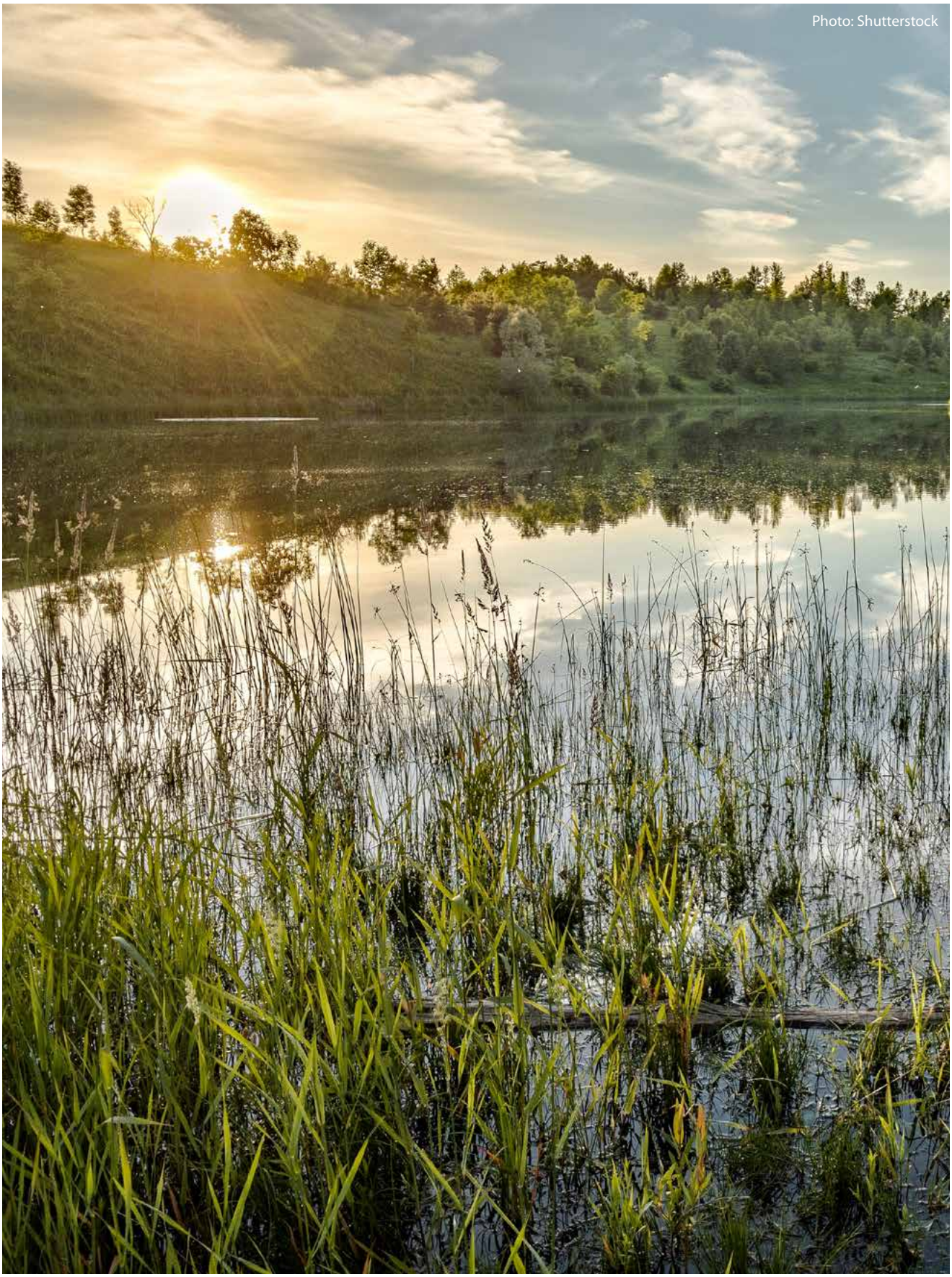
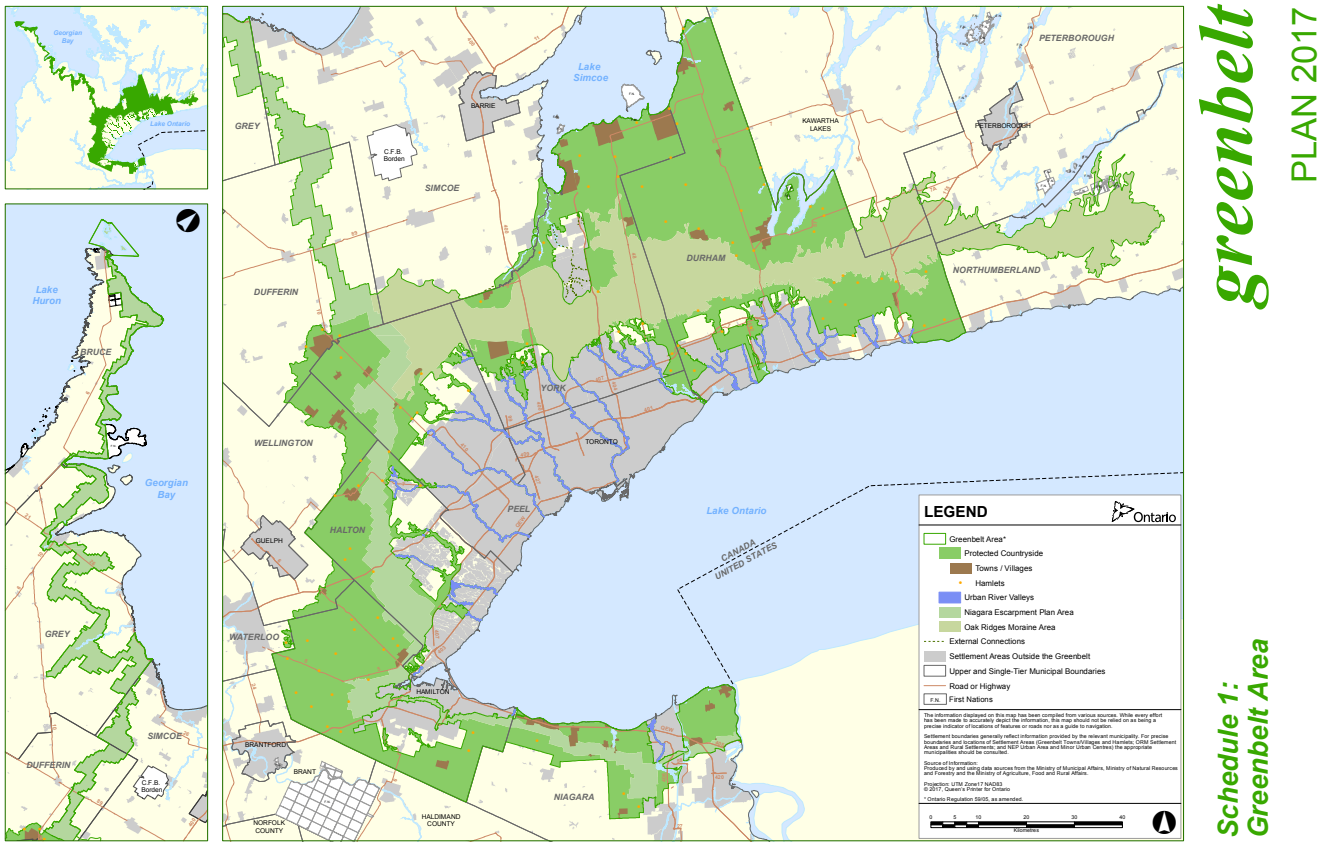


Photo: Shutterstock

There are two unique features of Ontario's Greenbelt that support effective policy implementation. First, the Greenbelt Act allows for the appointment of a Greenbelt Council to advise the Minister of Municipal Affairs and Housing on matters related to plan implementation. The Council is composed of members with backgrounds related to land use planning, agriculture, the environment, and transportation. Second, in 2005 the provincial government created the Greenbelt Foundation and through $25 million in initial funding, this non-profit organization works to promote the greenbelt through public education, grant-making, and research programs.[16] In 2011, the foundation was given funding for a second time of $20 million (CAD). In late 2020, the provincial government committed an additional $12 million (CAD) between 2021 to 2023 to the foundation to continue its work to protect and enhance Ontario's greenbelt.

Figure 2 *Map of the Ontario Greenbelt*



Source: Ministry of Municipal Affairs, 2017

16 Formerly known as the Friends of the Greenbelt Foundation.

The Greenbelt Plan was designed to work together with a regional growth plan for the Greater Golden Horseshoe (GGH) region. The Greenbelt Plan outlines where urbanization will not occur to provide permanent protection for agricultural land and environmentally sensitive areas. Introduced in 2005, the Places to Grow Act allows for the creation of regional growth plans and in 2006, the first one created was for the GGH region. The GGH Growth Plan is a 25-year plan that outlines population and employment projections and has policies to encourage intensification and densification within built up urban areas.[17] It is one of the fastest growing regions in North America. The GGH region has a population of 9 million (2016) and is expected to grow to 14.8 million people and 7 million jobs by 2051.[18] As a result, the Greenbelt and GGH Growth Plans play a key role in better managing the region's rapid growth and assisting in achieving the vision for more sustainable development patterns and improved quality of life for the region's residents. Municipalities have the main responsibility for implementing the Greenbelt and GGH Growth Plans. They are responsible to bring their planning documents such as Official Plans into conformity with these plans and must ensure that their planning decisions (e.g., development applications) conform as well. The Ministry of Municipal Affairs and Housing (MMAH) is the provincial ministry responsible for the Greenbelt Plan and GGH Growth Plan. The MMAH must conduct a review of these plans every 10 years. It is only during the review process that amendments are allowed to protected areas within the greenbelt and those changes cannot decrease the total area of the greenbelt.[19] MMAH launched the first coordinated review of the Greenbelt Plan, Niagara Escarpment Plan, Oak Ridges Moraine Conservation Plan and GGH Growth Plan in 2015. During this review process, an advisory panel was appointed and based on their findings, along with an extensive public consultation process, revised plans were released in 2017.

This report presents key characteristics and lessons learned from each greenbelt case study, to further support greenbelt planning and implementation in Ontario and that may have relevance internationally

This report is organized as follows: in chapters 2 to 9, each greenbelt is examined beginning with a summary of key facts for that case study. Themes covered for each greenbelt include: distinctive features; the legal, policy and institutional framework; growth management; food and agriculture; nature-based solutions; and outdoor tourism and recreation. The focus of the discussion is on changes related to each of these themes within past 10 years. However, for the two new greenbelts added to this research (i.e., the European Green Belt and San Francisco Bay Area Greenbelt) more context is added, as these cases were not discussed in the 2010 report. In addition, the terminology used throughout the report may vary slightly based on each case study and city or region examined. For example, the term "greenbelt" is spelled differently (e.g., greenbelt or green belt) depending on the case study. Some of the cases do not use the term greenbelt, and instead their protected natural areas examined are called green wedges (e.g., Copenhagen and Melbourne). Also, the phrase land use planning is more commonly used in North America, while spatial planning is used in the European context. In the chapters outlining the different greenbelts, we use the terminology that is specific for that case. In chapter 10, the report concludes with presenting key findings from the research, lessons learned and provides recommendations for international greenbelt planning in general and in the Ontario context more specifically.

17 Ministry of Municipal Affairs and Housing, 2020.
18 Ibid.
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Photo courtesy of Lenore Newman

2

British Columbia Agricultural Land Reserve (ALR)

Year Established	1973
Size	4,612,9044 hectares of land across six administrative regions.
Main Policy Objectives	To preserve agricultural land and to promote farming.
Key Features	- ALR covers 5 per cent of BC's land area. - Provides province wide agricultural protections.
Institutional framework and governance	- The Agricultural Land Commission Act (1973) provides the legislative framework for the ALR. - The Agricultural Land Commission (ALC) was established to oversee the implementation and management of ALR lands. - Farm Practices Protection (Right to Farm) Act (1996). Protect farmers from nuisance complaints.
Threats	- High cost of farmland. - Residential incursion. - Empty land problem. Land not being farmed defeats the purpose of the ALR.
Successes	- Longevity. Land area has not changed significantly since the ALR's inception. - High public support.

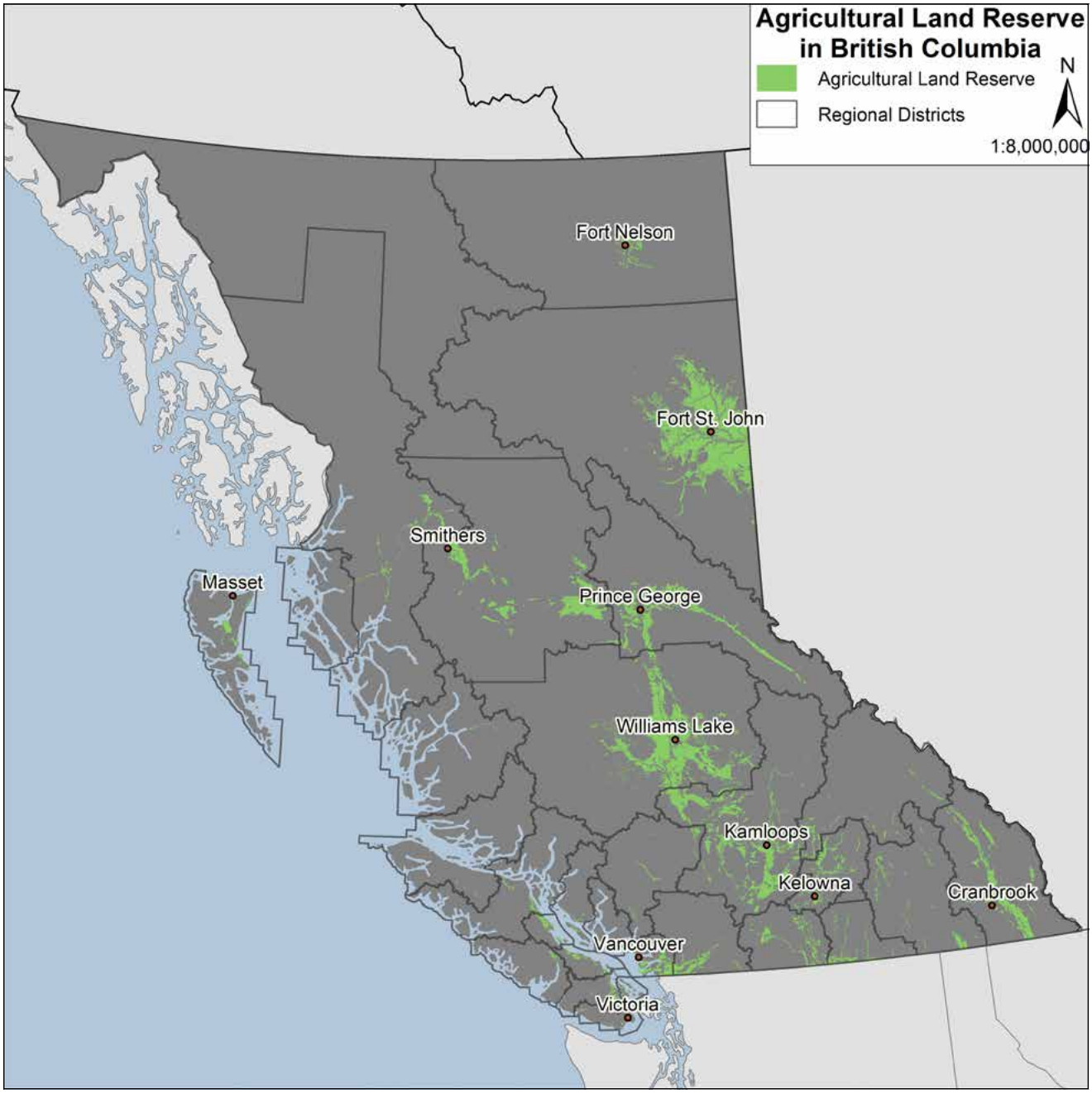
2.1 Distinctive Features

British Columbia's Agricultural Land Reserve (ALR) was created to preserve agricultural land and promote farming amid concerns over population growth and urban expansion. Established in 1973, the ALR covers about 5 per cent of the province's land area or 4,612,9044 hectares of land (see Figure 3).[20] Only 11.9 per cent of the province has land that is appropriate for growing crops for human consumption.[21] Agricultural production varies across the province and depends upon factors such as land, soil quality, and climate. More than 200 agricultural products are produced in the province across six administrative regions. The North region produces the majority of the province's grain and oilseeds, while cattle production occurs mostly in the North, Interior, and Kootenays regions. Fruit tree and grape production predominantly takes place in the Okanagan valley, located in the Interior region. The South Coast and Island regions, which include the Fraser Valley, Metro Vancouver and Vancouver Island, produces a range of products including berries, vegetables, and livestock. The Fraser Valley also produces the majority of the province's dairy and poultry products.[22]

“ The British Columbia's Agricultural Land Reserve (ALR) was created to preserve agricultural land and promote farming amid concerns over population growth and urban expansion.

20 Agricultural Land Commission, 2020.
21 Provincial Health Services Authority, 2016.
22 Crawford & Beveridge, 2013.

Figure 3 *Map of British Columbia's Agricultural Land Reserve*



Source: Provincial Agricultural Land Commission, 2021.

The boundaries of the ALR were created based on biophysical features including soil quality and climate conditions. Attention was also paid to avoiding the creation of small, isolated pockets of farmland. In addition to extensive public hearings, regional and municipal governments were involved in the boundary creation process by identifying lands favourable to agricultural production.[23] There are one hundred and fifty-three local governments within the ALR boundary, however, the size of the protected lands within each jurisdiction ranges widely, from a few hectares to several thousand.[24] Approximately half of the ALR lands are Crown lands owned by the federal or provincial government, while the other half are privately-owned.[25]

Since many of British Columbia's urban centres are located in close proximity to the province's prime farmland, there are many benefits associated with protecting agricultural land. Farms in the ALR are located close to marketplaces and labour forces, providing both direct and indirect employment.[26] This enhances food security and access, mitigating pressures from rising transportation costs and threats like climate change.[27] The ALR also functions as an urban containment boundary and provides habitat for wildlife. There is strong public support for the ALR within the province. In 2008, a survey revealed 95 per cent support for farmland preservation.[28] In addition to popular support, one of the successes of the ALR is its longevity. Despite boundary changes over the years, the land area has not changed significantly since the ALR's inception. Between 1973 to 2020, 104,615 hectares of agricultural land was removed from the ALR (from 4,717,519 hectares to 4,612,904 hectares of land).[29]

Indigenous people have lived in British Columbia for over 10,000 years and it is the traditional territories of 198 distinct First Nations.[30] The province's agricultural lands have been, and continue to be, important sites for Indigenous food provision including practices such as hunting, fishing, farming, and gathering medicines.[31] Approximately 200,000 Indigenous people currently live in the province and include First Nations, Inuit, and Métis people.[32] Nearly 95% of British Columbia is located on unceded traditional First Nations territory. This means that First Nations people never legally surrendered or signed away their lands to the Crown or to Canada.[33] As the province continues its treaty negotiation process with numerous First Nations, this will have implications for the ALR. For example, the Tsawwassen Final Agreement, negotiated by the Government of Canada, the Government of British Columbia and the Tsawwassen First Nation will include the removal of 207 hectares of provincial Crown land from the ALR.[34]

23 Nixon & Newman, 2016.
24 Martin Collins, personal communication, June 22, 2021.
25 Agricultural Land Commission, 2020.
26 ALR values and benefits, 2014.
27 Campbell, 2006.
28 Newman, Powell & Wittman, 2015.
29 Agricultural Land Commission, 2020.
30 B.C. First Nations and Indigenous People, 2021.
31 Provincial Health Services Authority, 2016.
32 B.C. First Nations and Indigenous People, 2021.
33 Wilson, 2018.
34 Tsawwassen Final Agreement, n.d.

2.2 Legal, Policy and Institutional Framework

In the late 1960s early 1970s, approximately 6,000 hectares of farmland in British Columbia were converted to non-agricultural uses each year.[35] Concerns over the loss of valuable agricultural land led to the creation of the Agricultural Land Commission Act, passed by the provincial government in 1973. The Act established the Agricultural Land Reserve, a special agricultural zone that restricts non-agricultural uses to protect prime agricultural land. The Act also created the Agricultural Land Commission (ALC) to oversee the implementation and management of ALR lands.[36]

The Agricultural Land Commission is an independent provincial agency that works to preserve farmland and encourage farming in the ALR. The ALC is comprised of 17 members representing six administrative regions of British Columbia. Members are required to be knowledgeable in matters pertaining to agriculture, land use planning, local government, or First Nations government. The Commission Chair is appointed by Cabinet while six regional Vice Chairs and additional members are appointed by the Minister of Agriculture.[37] Commissioners are typically appointed for a two-year term and can hold the position for a maximum of four terms.[38] The ALC is responsible for decision-making as well as research and policy development, application adjudication, compliance, and enforcement. The ALC sets out procedures for applications such as the exclusion and inclusion of land, non-farm uses, soil and fill use, land division, transportation, and recreational trails.[39]

Permitted uses in the ALR are outlined in the Agricultural Land Reserve Use Regulation. Permitted farm uses include poultry, dairy, and crop production as well as livestock raising and grazing. Additional farm uses such as processing farm products, farm retail sales, wineries and cideries, agritourism activities, and agroforestry are permitted subject to conditions and regulations. Permitted non-farm uses must be compatible with agriculture, have a low impact on the land, and can be prohibited by local governments. Examples of permitted non-farm uses include home based businesses, pet kennels and breeding facilities, aggregate extraction (less than 500 m^3), conservation, passive recreation, education, and research.[40]

Additional legislation that applies to the ALR is the Farm Practices Protection (Right to Farm) Act. This Act was passed by the provincial government in 1996 to protect farmers from nuisance complaints such as dust, odours or noise produced from farm operations. The legislation ensures that farmers cannot be held liable for a private claim of nuisance if they are farming their land within approved parameters.[41]

Two waves of legislative changes took place between 2010-2021 which affected the governance of the ALR. In 2014 under the provincial Liberal government, decision-making was regionalized to include six panel regions governed by an executive committee and the ALR was split into two zones. Zone 1, which covered the Lower Mainland, Fraser Valley, Okanagan Valley and Vancouver Island, experienced very little change. Conversely, land use considerations in Zone 2, which included the North, the Kootenays and the rest of the Interior, were broadened to include additional objectives and development considerations such as social, economic, and cultural factors, rather than predominantly agriculture.[42]

35 Agricultural Land Commission, 2020.
36 Nixon & Newman, 2016.
37 Agricultural Land Commission, 2020.
38 Martin Collins, personal communication, June 22, 2021.
39 Agricultural Land Commission, 2020.
40 Permitted uses in the ALR, 2014.
41 Farm Practices Protection (Right to Farm) Act, 1996.
42 MacLeod, 2014.

In 2017, the New Democratic Party (NDP) formed a coalition with the Green Party to create a minority provincial government. This government implemented a second wave of legislative changes in 2019 which repealed many of the amendments enacted by the Liberal government in 2014. Bill 15, the Agricultural Land Commission Amendment Act 2019 replaced the regional governance model to one commission with regional representation.[43] Furthermore, the ALR was re-consolidated into a single zone and the Agricultural Land Commission Act was strengthened to include the preservation of the integrity and continuity of the ALR.[44]

One of the most significant legislative changes introduced in 2019 removed the right of private landowners to apply for land exclusions. Historically, private landowners could submit an application to the ALC to request permission to exclude land from the ALR. Since the passing of Bill 15-2019 in September 2020, applications for exclusion must be done though municipalities or local government.[45] First Nations government, transportation, and utility companies such as BC Hydro and BC gas can also submit applications for exclusion.

Maintaining ALR land agriculturally productive is important for its continuity since the high cost of land presents a barrier for new farmers. The B.C. Land Matching Program, delivered by the Young Agrarians, connects new farmers with land to set up or expand their business. It also connects landowners with people interested in farming their land, providing leasing opportunities. The program provides farmers with support to understand regulations, access resources, and matches people with land and farming opportunities. Since launching a pilot program in 2016, over 182 matches have been made on more than 3,578 hectares of land.[46]

“The B.C. Land Matching Program, delivered by the Young Agrarians, connects new farmers with land to set up or expand their business. Since launching a pilot program in 2016, over 182 matches have been made on more than 3,578 hectares of land.

43 BC Ministry of Agriculture, 2019.
44 Martin Collins, personal communication, June 22, 2021.
45 Application instructions, 2014.
46 B.C. Land Matching Program, 2021.
47 Commission de protection du territoire agricole du Québec, 1999.
48 Ibid.

2.3 Growth Management

While the purpose of the Agricultural Land Reserve is to preserve agricultural land, according to Dr. Lenore Newman, Director of the Food and Agriculture Institute at the University of the Fraser Valley, it also "[acts] as a more traditional greenbelt…purely because municipalities have relied upon it to do so."[49] According to a 1998 ALC report, more than 80 per cent of British Columbia's population lives in two regions containing much of the province's prime farmland. While the ALR provides robust protections for agricultural land, there is pressure to remove agricultural land from the ALR, especially close to major population centres.[50] In some regions, such as southwestern BC, it is common to see housing, business development, and farmland in close proximity, due to a patchwork of protected and unprotected land.

Urban growth is managed primarily through Regional Growth Strategies (RGS) and Official Community Plans (OCP). Regional Growth Strategies provide direction for sustainable, long-term planning over a 20-year period. Their goal is to "promote human settlement that is socially, economically and environmentally healthy and that makes efficient use of public facilities and services, land and other resources."[51] Focusing on key issues to be managed at a regional scale, Regional Growth Strategies must address housing, transportation, regional district services, parks and natural areas, and economic development.[52] The strategies are developed through collaboration among local governments, the province, and other public bodies and also with input from business and other community stakeholders. These are initiated, adopted, and implemented by regional districts and must be approved by affected municipalities and adjacent regional districts.[53] There is flexibility in the development of Regional Growth Strategies as each regional district will have its own reason for initiation. This can range from urban containment and growth management, addressing concerns such as water conservation and environmental protection, and providing context for transportation and other infrastructure decisions.[54]

Official Community Plans are local government by-laws that provide objectives and policies to guide planning and land use management decisions. The Plans play an important role in growth management because they establish land use and transportation patterns as well as greenhouse gas reduction targets, policies, and actions.[55] Urban Containment Boundaries can be implemented by municipalities and local governments to guide urban growth. They are used to protect agricultural, conservation, and rural lands and provide predictability for land use decisions. Policies for the establishment, implementation, and review of an Urban Containment Boundary must be included in a Regional Growth Strategy and Official Community Plan. In Metro Vancouver, Urban Containment Boundaries play an important role in the Metro 2040 Plan where 98% of growth will be directed within the established boundaries.[56]

> **"While the ALR provides robust protections for agricultural land, there is pressure to remove agricultural land from the ALR, especially close to major population centres.**

49 Lenore Newman, personal communication, July 8, 2021.
50 Campbell, 2006.
51 British Columbia Ministry of Community Services, 2006.
52 Ibid.
53 Regional growth strategy, n.d.
54 British Columbia Ministry of Community Services, 2006.
55 Official community plan, n.d.
56 Urban containment, 2017.

The high cost of land and residential incursion are major challenges for the ALR. Conversion to urban land uses generates higher short-term economic returns than agricultural production.[57] For example, removing farmland from the ALR can come at an economic cost which is 10-times the cost of keeping it protected. Furthermore, since the ALR land use regulation allows for residential uses without requiring agricultural activity, there is a trend of people buying ALR land, building a large house, and living on the land without farming it. Martin Collins, Director of Policy and Planning at the B.C. Agricultural Land Commission points out, "[this is] a big problem that…arose since 2010. It is the question of where do very rich people put their houses? They tend to go to places where they have lots of room. The ALR is the only place in the Lower Mainland with lots of room." Since there is no mandate to farm ALR land, in some areas it has become essentially a low-density residential zone rather than an agricultural area.[58] Dr. Lenore Newman confirms "(t)hat is the biggest fight and…the fight we're experiencing now, is for the soul of the ALR. Is it an agricultural zone or is it a residential greenbelt zone? And to be honest, a residential greenbelt is winning at the moment."[59]

In 2019, the NDP-Green provincial government attempted to address the issue of residential incursion by transferring housing authority in the ALR to the ALC. Prior to that, local governments had the power to approve housing on ALR land if it was deemed necessary for farm labour requirements. That provision, however, was more broadly interpreted by local governments resulting in permissions for two or more houses to be located on ALR properties.[60] Currently, ALR landowners are permitted to have a principle and secondary residence on their property. The secondary residence can be used to house extended family, tourist accommodation, housing for farm workers, or act as rental property for supplemental income. While this change has provided additional flexibility and sources of income for landowners, critics fear the addition of dwellings and infrastructure will drive up the cost of farmland.[61]

2.4 Food and Agriculture

There are approximately 17,500 farms of varying sizes within in the ALR, a large number of which are relatively small.[62] Over 200 agricultural products are produced for the local and export markets, contributing $1.9 billion to the provincial economy in 2017.[63] Four regions produce most of the province's food which include the lower Fraser Valley, the Okanagan, South-central Vancouver Island and Peace River. These areas, except for Peace River, are located in and around major population centers.[64]

The ALR provides an array of benefits for farmers and landowners. The ALR provides a stable land base that allows businesses to grow and has unified administrative rules outlining permitted activities and land uses.[65] In addition, the complementary Farm Practices Protection Act provides protections for farmers against nuisance complaints such as noise, dust, and livestock odours.

While ALR regulations can promote stability and predictability for agricultural production, farmers also need flexibility to adapt to changing markets and the high cost of land. Strict rules govern the construction of farm buildings and business activities on ALR which can sometimes penalize farmers more than residential owners.[66] For example, the Agricultural Land Reserve Use Regulation permits the storing, packing,

57 Nixon & Newman, 2016.
58 Lenore Newman, personal communication, July 8, 2021.
59 Ibid.
60 Martin Collins, personal communication, June 22, 2021.
61 Boivin, 2021.
62 Lenore Newman, personal communication, July 8, 2021.
63 Agricultural Land Commission, 2020.
64 Provincial Health Services Authority, 2016.
65 Martin Collins, personal communication, June 22, 2021.
66 Lenore Newman, personal communication, July 8, 2021.

preparing, and processing of farm products on ALR land if 50 per cent of the products are grown or raised on the same land.[67] This can limit farmers looking to supplement their income with complementary farm-related activities.

The growth of the greenhouse industry and vertical farming provides opportunities for farmers to adapt to changing markets but also presents challenges for regulators. Vertical farming involves the growing of crops on top of each other rather than in traditional horizontal rows. This agricultural practice conserves space and is usually located indoors, in warehouses for example. Both greenhouse production and vertical farming rely on the construction of structures which control light, temperature, and water. These structures protect crops from external threats like pests and weather, and food production can occur year-round, increasing yields.[68] While the ALC does not privilege one type of agricultural production over another, there are concerns that greenhouses and vertical farms disengage farming from the soil. It is feared that such could result in the construction of large industrial structures on prime agricultural land, permanently shifting away from prime soils and further attracting non-farm uses because of their similarity to general industrial structures.[69]

Farm stores are another opportunity for farmers to diversify their operations and increase income, given the high cost of farmland near urban areas. Farms stores are permanent, year-round retail outlets that sell items produced both on- and off-farm.[70] The ALC provides policies that regulate farm retail sales, requiring that the total area of the store (indoor and outdoor) not exceed 300 square metres. There are no limitations for retail sales if the products originate and/or are processed on the farm. If the farm store sells other products, only 50 per cent of the retail products can be produced elsewhere while the other 50 per cent must be produced on the farmland where the retail sales take place, or by a cooperative to which the farm-owner belongs.[71]

In addition to improving the economic viability of small farms, farm stores connect consumers to local food systems, provide educational opportunities, and build local support for local agriculture and preservation measures.[72]

One way the province is supporting local agriculture is through "buy local" policies. The 2015 B.C. Provincial Agrifood and Seafood Strategic Growth Plan includes goals for increasing in-province purchases of British Columbia products by $2.3 billion (or 43 per cent) by 2020.[73] This includes purchases by food retail and services as well as public sector institutions like schools and hospitals. Through the power of institutional purchasing, these programs provide a local alternative to traditional supply chains as well as expanded and more stable markets for agricultural products, especially for small- and medium-scale farmers.[74] In addition, the province's "Buy BC" program was created by the Ministry of Agriculture, Food and Fisheries to help promote local food and beverage products through branding, marketing promotional activities, events and more. The Buy BC logo helps consumers easily identify British Columbia food products.[75]

> **"There are approximately 17,500 farms of varying sizes within in the ALR. Over 200 agricultural products are produced for the local and export markets, contributing $1.9 billion to the provincial economy in 2017.**

67 Agricultural Land Commission Act, 2002.
68 Vertical farming, 2021.
69 Martin Collins, personal communication, June 22, 2021.
70 Newman, et al., 2017.
71 Agricultural Land Commission Act, 2002a.
72 Newman, et al., 2017.
73 Powell & Wittman, 2018.
74 Ibid.
75 Learn about Buy BC, 2021.

Finally, the high cost of land and pressures of climate change are both challenges to the province's agricultural sector. The price of land near urban centers has risen to the point where it is difficult to farm economically. A 2016 report on land prices in Metro Vancouver reveals that the cost of agricultural parcels under five acres range from $150,000 to $350,000 per acre while parcels over 40 acres can range from $50,000 to $80,000 per acre. According to Farm Credit Canada, the financial viability of farms becomes questionable when land prices reach $80,000 per acre.[76]

Furthermore, the reduction of farming on ALR land creates an empty land problem. For example, in Metro Vancouver, only half of ALR land is used for farming while the other half is used for residential purposes or held by investors. Climate change also presents challenges to agricultural production as changes in precipitation and temperature lead to more severe storms, drought conditions, wildfires, and more frequent plant disease outbreaks. Flooding and salination due to sea level rise in low-lying areas may also impact land quality and negatively affect crop growth.[77]

2.5 Nature-Based Solutions

While the purpose of the ALR is to support agriculture and preserve agricultural land, it also provides several environmental benefits. These include habitat for wildlife, climate regulation, soil conservation, erosion control, water retention, and biodiversity preservation.[78] Soil is considered one of the province's most important resources and supports the growth of fiber and food, filters air and water, contains a diverse array of organisms and supports natural ecosystems.[79]

The province also has an Environmental Farm Plan (EFP) Program to assist farmers in learning how to reduce agriculture's impact on the environment. Participation is at no cost to the farmer and includes an on-farm consultation and an agri-environmental risk assessment. The program helps farmers improve sustainability of their operations, promote on-farm biodiversity, reduce green gas emission, increase water and nutrient efficiency, protect riparian areas, and build healthy soil.[80]

In addition, landowners, conservation organizations and government agencies can apply to the ALC for conservation covenants to restrict agriculture on land that is environmentally sensitive.[81] Conservation covenants are voluntary legal agreements between a landowner and a conservancy or land trust that promotes land uses that protect natural features. These agreements are registered on the land title which ensures the land is permanently protected.[82]

2.6 Outdoor Tourism and Recreation

Outdoor tourism and recreation in the ALR are predominantly farm related. Often referred to as "agritourism", it can be defined as "farming-related activities carried out on a working farm or other agricultural settings for entertainment or education purposes."[83] Agritourism provides a number of benefits to farms such as the generation of additional income and work opportunities, an improvement of living and working conditions on the farm, and the opportunity to generate off-season revenue. Agritourism activities

76 Sussmann, et al., 2016.
77 Provincial Health Services Authority, 2016.
78 About the ALC, 2014.
79 Agricultural land and environment, n.d.
80 Environmental Farm Plan Program, n.d.
81 Agricultural Land Commission, 2011.
82 Islands Trust, 2022.
83 Arroyo, Barbieri & Rich, 2013, p.45.
84 Vaugeois, Bence, & Romanova, 2017.

can also help to spread awareness about local farms and products and can be used to educate the public about food security. Furthermore, it can also boost rural economies, help preserve rural land, heritage, and traditions, and build support for local farming and agriculture.[84]

The ALC regulates tourism activities on ALC land. Permitted activities include agricultural heritage exhibits, farm tours, educational activities, cart, sleigh, or tractor rides, activities that promote or market livestock, harvest festivals and seasonal events, and corn mazes.[85] For example, Krause Berry Farms located in the Fraser Valley not only hosts seasonal activities such as berry picking and tractor rides but also includes a market bakery, harvest kitchen, and estate winery which operates in all seasons.[86] Furthermore, farmers with BC assessment "Farm" status are permitted to have up to 10 tourist accommodation units on their land which can range from a campsite to rooms in a cabin or other structure.[87] While there are many benefits to agritourism, it is labour-intensive, which can inhibit some farmers engaging in agritourism activities.

"We Heart Local BC" is a program initiated by the British Columbia Agriculture Council (BCAC) which aims to create direct connections between agricultural producers and consumers as well a strengthening BC's food system. The program features farmers who provide agritourism services on their farms and celebrates local agriculture. The British Columbia Agriculture Council (BCAC) is a non-profit organization that promotes the collective interests of all agricultural producers in BC, representing over 14,000 BC farmers and ranchers.[88]

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Photo: Shutterstock

3

Copenhagen Green Wedges

Year Established	1949
Size	35,478 hectares[89]
Main Policy Objectives	To guide urban growth and preserve green space.
Key Features	- Guides urban growth along five "fingers" stretching from the "palm" of the inner-city outwards along railway and highway infrastructure. - Fingers separated by four green wedges and five green rings which include farmland and natural areas.
Institutional framework and governance	- The Ministry of Industry, Business and Financial Affairs is responsible for spatial planning - Planning with Greater Copenhagen must take place within the framework of the 2019 Finger Plan
Threats	- Loosening development restrictions in the face of population growth pressures. - Overuse of recreational and tourist areas.
Successes	- Longevity and popular support. - The combination of the Planning Act and Finger Plan has been successful in controlling urban sprawl.

89 It is challenging to get an accurate view of the changing size of the green wedges over the past decade. The definitions of green wedges and what is included in this land-use category have changed with different versions of the Finger Plan. Therefore, data is hard to compare between the various iterations of the Finger Plan. (Henrik Vejre, personal communication, November 1, 2021).

3.1 Distinctive Features

The Copenhagen Finger Plan is a comprehensive urban planning strategy used to guide urban growth and preserve green space the Copenhagen Metropolitan Area. The landscape to the north of the City of Copenhagen consists of rolling hills, lakes, and forests and was historically the location for summer residences, mansions, and villas owned by the royal family and other members of the aristocracy. There is a high level of agricultural land to the west of the city, and this area was dominated by farmland until the mid-nineteenth century.[90]

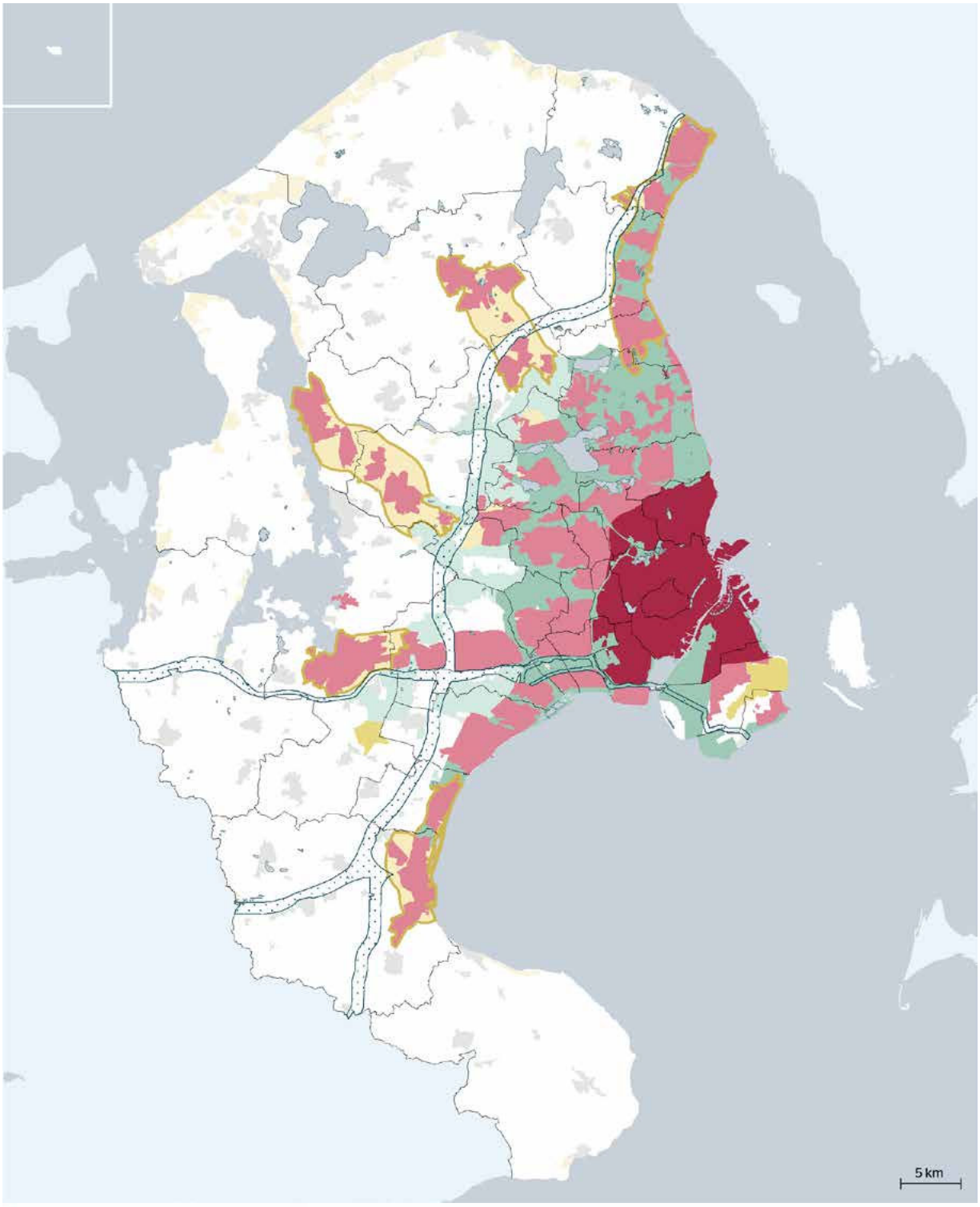
The Copenhagen Finger Plan, developed in 1947, guides new housing and local services along five "fingers" stretching from the "palm" of the inner-city outwards along railway and highway infrastructure (see Figure 4).[91] The urban fingers extend approximately 40 km outside of central Copenhagen and encompass 34 municipalities.[92] The fingers are separated by four green wedges and five green rings which include farmland and natural areas and provide access to leisure and recreational opportunities for urban residents.[93] Furthermore, the green wedges and rings protect biodiversity and provide ecosystem services such as safeguarding air quality.[94]

Inspired by the Garden City movement in the United Kingdom, the Finger Plan integrates residential areas with green spaces and access to public transport.[95] The Finger Plan was first drafted over 70 years ago and still guides urban planning to this day. The longevity of Finger Plan is an indicator of its success. Highly regarded in the international planning community, the Finger Plan is considered to be one of the biggest planning achievements in Denmark. It was recognized by the OECD as important for the region's competitiveness and in 2006 was included as an outstanding cultural heritage site in the Ministry of Culture's national list.[96]

Highly regarded in the international planning community, the Finger Plan is considered to be one of the biggest planning achievements in Denmark.

90 Vejre, 2017.
91 Sørensen & Torfing, 2019.
92 Nilsson, 2019.
93 Caspersen & Olaffson, 2010.
94 Nilsson, 2019.
95 Ibid.
96 Olesen, 2021.

Figure 4 *Geographical Areas of Greater Copenhagen*



Source: Ministry of the Environment, Denmark, 2015.

3.2 Legal, Policy and Institutional Framework

The Finger Plan was developed after the Second World War by the private Urban Planning Lab and implemented by the Regional Planning Office, an independent institution financed by the municipal and regional governments.[97] The Regional Planning Office published a "Sketch of a new plan for the greater Copenhagen Area" in 1947 which was the first regional plan to establish boundaries for future urban growth in the Copenhagen Metropolitan Area and a precursor to the Finger Plan.[98] While the plan was not officially endorsed by elected officials, it received support by government officials, interest groups, and civil society organizations. It was widely circulated and served as a guide until a new General Plan was created in 1952, which integrated many policies of the previous plan.[99]

In 1949, a new planning law was introduced requiring local and regional governments to create long-term development plans to regulate land use through the establishment of three zones: 1) land zones; 2) urban zone; and 3) middle zones.[100] The development of housing in land zones was strictly prohibited, laying the groundwork for the protection of farmland and other natural areas located in the green wedges and rings. This planning law was expanded and renewed in the 1960s and 1970s, guiding development along the urban fingers.

The Finger Plan's core principle of separating land uses was included in urban development plans for the Copenhagen Metropolitan Area throughout the 1950s, 1960s, and 1970s and informed planning reforms in the 1990s and 2000s.[101] The "finger" metaphor helped to popularize the plan which promoted urban development along transportation corridors, radiating like fingers from the "palm" of the central city. Protected green space in the form of wedges separating the urban fingers is protected by a national planning act. The outer parts of the green wedges have a rural character providing opportunities for forest and countryside recreation while the more central parts of the wedges provide spaces for parks, allotment gardens, and outdoor recreation facilities.[102]

While the Finger Plan has been challenged over the years by new developments, it has endured since its original launch, over seventy years ago. In fact, regional plans developed in 2005, 2007, 2013, and 2017 include "Finger Plan" in their titles.[103] In 2007, regional planning responsibilities were split between the municipal and national levels as part of government reforms. This led to the creation of "Finger Plan 2007" a national planning directive which integrated several guidelines from the regional plan. The remaining guidelines were transferred to the municipalities to implement. Furthermore, the Finger Plan was written into the Danish Planning Act, requiring the Greater Copenhagen Area to adhere to the principles of the plan. In 2013, a revised Finger Plan was published by the Danish Ministry of Environment which focused on the importance of the green wedges for climate adaption.[104]

97 Sørensen & Torfing, 2019.
98 Beery, et al., 2017.
99 Sørensen & Torfing, 2019.
100 Ibid.
101 Ibid.
102 Beery, et al., 2017.
103 Sørensen & Torfing, 2019.
104 Olesen, 2021.

The election of a Liberal national government in 2015 led to further revisions of the Finger Plan. Several initiatives were implemented to modernize the planning process to make it more pro-growth and business friendly. First, spatial planning responsibilities were transferred from the Ministry of the Environment to the Ministry of Industry, Business and Financial Affairs to align with policy objective to promote business and growth.[105] Second, the Danish Planning Act was revised to relax urban development regulations, especially for rural areas. Finally, the Finger Plan was revised in 2017 and in 2019 as part of this modernization process, loosening restrictions so that municipal requests for urban development and economic growth could be accommodated. The most current version (2019) of the Finger Plan was integrated into a larger policy package entitled "The Capital 2030." The main goal of the policy document is to promote economic growth in the Greater Copenhagen Region.[106]

> **While the Finger Plan has been challenged over the years by new developments, it has endured since its original launch, over seventy years ago.**

105 Ibid.
106 Ibid.

3.3 Growth Management

The Finger Plan has been successful in preventing urban sprawl amid the rapid urbanization of Copenhagen and the surrounding region in the post-war years. The plan has facilitated this urbanization while also balancing the quality of life for residents by providing access to fast and reliable public transit to the city centre as well as recreational green spaces adjacent to residential areas.[107] The Finger Plan has achieved this through two design principles. The first is "station proximity" which encourages the development of housing, businesses, and services along the railroad lines and roads. This ensures that development is located along pre-existing infrastructure and is easily accessible to residents and workers. Second, the creation of "green wedges" between the urban fingers ensures that residents can access the benefits of high-quality green space which include leisure and recreation opportunities as well as improved air quality and other ecosystem services.[108]

One of the major challenges facing the Copenhagen Finger Plan is managing growth. The regional population is expected to grow by 200,000 people by 2030 and there is pressure to relax the Finger Plan in order to accommodate this growth.[109] While rural and peri-urban areas are considered to be assets to local municipalities, there has also been pressure from some municipalities to expand urban development into these areas despite the protests of local environmental groups.[110] Over the past few decades, for example, several plan exemptions have been made to permit new business developments on rural land. In addition, some municipalities have fast-tracked land conversions to allow for the construction of new residential developments in green spaces.[111] The lack of coordination in municipal planning has also contributed to the erosion of the green wedges. For example, one of the green wedges located northwest of the city has experienced tremendous pressure due to urbanization. The remaining green space was preserved when four local municipalities came together to implement a joint agreement to protect it.[112]

> **"The Finger Plan has been successful in preventing urban sprawl amid the rapid urbanization of Copenhagen and the surrounding region in the post-war years.**

107 Sørensen & Torfing, 2019.
108 Ibid.
109 Olesen, 2021.
110 Nina Larsen Saarnak, personal communication, June 29, 2021.
111 Kristensen, et al., 2019.
112 Sørensen & Torfing, 2019.

3.4 Agriculture and Food Production

Agricultural production is the predominant economic activity in the peri-urban and rural areas in the Greater Copenhagen Region. Since the 1970s, the zoning of urban and rural areas has been the main planning tool used to preserve farmland and deter urban sprawl.[113] While the Finger Plan has been relatively successful in protecting the size of the green wedges, it has been ineffective in preventing changes in agricultural use. For example, hobby farms and recreational facilities are increasingly replacing traditional farms and agricultural production.[114]

This shift is occurring for a number of reasons. First, farmers are expanding and diversifying economic activities on their land to create alternative sources of income, especially in areas where agriculture is declining. In locations close to urbanized areas, these activities often include on-farm sales, processing, and "care farming".[115] Care farming, also known as social farming, is defined as "the therapeutic use of agricultural and farming practices."[116] It is used to support and promote the mental and physical health of community members through a range of activities such as horticulture forestry, livestock farming, gardening, and woodwork.[117] In rural locations, nature conservation and agri-tourism activities contribute to alternative income sources for farmers.

Second, there is an increase in people purchasing relatively inexpensive farmland for business or residential uses. These are attractive properties for businesses due to close proximity to urban markets, and attractive for residents seeking access to rural amenities.[118] Recent reforms to planning legislation have made it easier for non-farmers to purchase agricultural properties. For example, there is no longer the requirement for people to hold a farm certificate to buy farmland.[119] Furthermore, these lands are regulated by a number of different planning regulations which creates ambiguity and loopholes. For instance, agricultural land is regulated by the Agricultural Act while land conversions are regulated by the Planning Act, and uncultivated land is regulated by the Nature Protection Act.

Finally, as agricultural production is concentrated in fewer and larger farms, non-farm activities are permitted in empty or surplus farm buildings. Production activities such as workshops, repair shops, and entrepreneurial activities are allowed provided they are small in scale. This regulation can create economic opportunities in rural areas while avoiding the disjointed development of large-scale industrial activities and related infrastructure needs.[120] While there are many benefits of creating new economic activities on farms, such as increased income for farmers and the adaptive reuse of empty buildings, these can have unintended consequences including increased traffic and urban sprawl.[121]

113 Kristensen, et al., 2019.
114 Sørensen & Torfing, 2019.
115 Kristensen, et al., 2019.
116 Murray, et al., 2019.
117 Ibid.
118 Ibid.
119 Kristensen, et al., 2019.
120 Ibid.
121 Ibid.

3.5 Nature-Based Solutions

The protection of green space in the Greater Copenhagen Region has been important for guiding growth, preventing urban sprawl, and providing recreational and cultural opportunities for urban residents. Over the years, these protected spaces have maintained their relevance by fulfilling additional functions such as climate change mitigation and promoting biodiversity.[122] This "green structure" includes green and blue spaces in the city such as gardens, public parks, natural areas, green sports grounds, lakes, rivers, and transport corridors. Many of these green and blue spaces are protected or listed for preservation.[123] Within the past decade, municipalities have had an increased focus on biodiversity and there has been growing recognition of the climate change mitigation and adaptation functions provided by greenspaces.[124]

Copenhagen's green structure provides many benefits. It mitigates the effects of climate change by reducing urban heat islands, facilitating stormwater collection and flood prevention, and reducing air and noise pollution. It also promotes biodiversity, provides opportunities for recreation and leisure, and contributes positively to the mental health of urban residents.[125] The City of Copenhagen's Climate Adaptation Plan (2011) recommends improving existing green and blue spaces by creating a continuous network of green space. On a regional level, this includes connecting green wedges and green corridors to city parks and other natural spaces. These green links and corridors can provide flood protection, create habitats for plants and animals, and provide urban residents with improved recreational and leisure opportunities.[126]

Copenhagen's green structure can help mitigate higher temperatures and heat waves which contribute to the urban heat island effect. "Heat islands" occur when heat from the sun is stored in city surfaces such as roads, buildings, and roofs and released again at night. This creates higher temperatures in the city than the surrounding countryside, due to urban development. Furthermore, as the climate changes, the City of Copenhagen is experiencing more frequent and intense precipitation. In 2012, the City of Copenhagen introduced a Cloudburst Management Plan to mitigate extreme rainfall events. Extreme rainfall events are defined as periods of brief and intense rain and often cause flooding.[127] Mitigation measures include the creation of green and blue infrastructure such as parks and green corridors that can either store additional rainwater or direct it to areas that can accommodate the additional volume. This also takes pressure off the city's sewer network and minimizes damage due to flooding.[128]

Finally, as the region sees more precipitation, higher temperatures, and rises in sea levels, there is a need to protect biodiversity. It is predicted that some non-native plant and animal species will become more widespread and invasive. Studies have been commission to determine how the city could protect and enhance biodiversity threatened by the changing climate. Studies have recommended the creation of new links or corridors between green spaces to ensure that plants and animals can move between areas when their habitats change. Furthermore, it is recommended the city plant native species that are more tolerant to increased rainwater and humidity so that they are resilient to the effects of climate change.[129]

122 Vejre, 2017.
123 The City of Copenhagen, 2011.
124 Henrik Vejre, personal communication, July 5, 2021.
125 Ibid.
126 Ibid.
127 The City of Copenhagen, 2012.
128 The City of Copenhagen, 2011.
129 Ibid.

Photo: Shutterstock

3.6 Recreation and Tourism

Green space and recreational planning in Copenhagen predate the first Finger Plan (1947). A plan for nature conservation is outlined in Olaf Forchhammer's "Green Report" of 1936 and identifies areas of significant recreation and aesthetic value as well as corridors that could connect these areas to the city. A recreation path system and parkways were proposed to connect central Copenhagen with recreational areas and facilities such as camp sites. The report focused on the northern part of the region which was undergoing rapid urbanization.[130]

Close and convenient and access to green space is a central goal in the Copenhagen Finger Plan and has been included in planning policies since 1947. The green wedges play an important role in the health and wellbeing of urban residents and access to green space determines how frequently they are used.[131] Green spaces in the Greater Copenhagen Region provide a range of leisure and recreation opportunities including hiking, mountain biking, and horseback riding as well as other forms of exercise and social gathering.[132]

The region features a network of green bicycle lanes and dedicated cycling infrastructure built along green and blue spaces. A total of 115 km of cycle lanes is planned, and the network fills in missing links in existing cycling infrastructure. It provides shortcuts and creates a calm, safe, and attractive cycling environment for commuters as well as people cycling for recreation.[133]

One unique feature found within the Greater Copenhagen Region, compared to other cases examined in this report, is beach parks. For example, Strandparken by Køge Bay is located 15 km from Copenhagen's city centre.[134] This popular beach park includes natural areas, beaches, the ARKEN museum of modern art, art installations, cafes, and recreational areas for biking, hiking, fishing and sailing. However, with population growth in Greater Copenhagen, there are increased demands on greenspaces for recreational purposes, which can create several types of conflicts. For one, municipalities aim to further enhance facilities to attract more tourists.[135] Simultaneously, there are calls to upgrade recreational facilities to keep pace with the needs of current residents and visitors; there is already a very limited availability of bicycle rental facilities, shelters for hikers, and cafes, for example.[136] However, nature conservation groups are not always in favour of facility expansions and increasing the number of visitors to natural areas.[137] These groups generally prefer quieter natural areas with fewer tourists, recreational facilities and development.[138]

130 Vejre, 2017.
131 Caspersen & Olaffson, 2010.
132 Ibid.
133 Beery, et al., 2017
134 Strandparken, n.d.
135 Nina Larsen Saarnak, personal communication, June 29, 2021.
136 Henrik Vejre, personal communication, July 5, 2021.
137 Nina Larsen Saarnak, personal communication, June 29, 2021.
138 Ibid.

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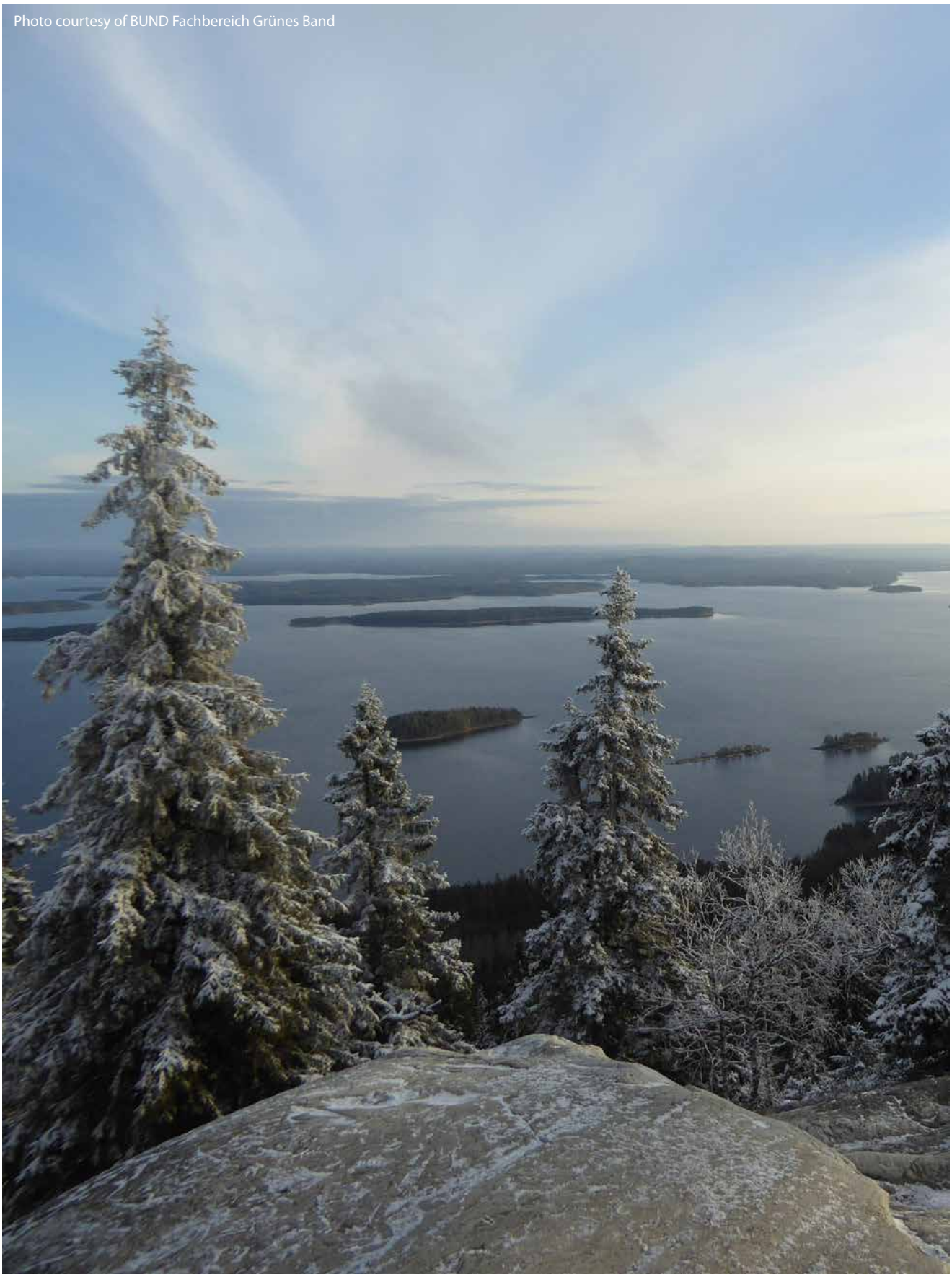

Photo courtesy of BUND Fachbereich Grünes Band

4

European Green Belt

Year Established	2003
Size	12,500 km, spans across 24 countries
Main Policy Objectives	- To create an ecological network connecting natural and cultural areas across Europe.
Key Features	- Divided into four regions: The Fennoscandian Green Belt; the Baltic Green Belt; the Central European Green Belt; and the Balkan Green Belt. - 49 national parks, 9 bio-geographical regions.
Institutional framework governance	- Managed by the European Green Belt Association, which coordinates transnational and activities along this greenbelt. - Involves more than 150 government and non-government organizations. - A Regional Coordinator has been appointed for each of the four sections of the Green Belt.
Threats	- Fennoscandian Green Belt: mineral extraction and logging. - Baltic Green Belt: nutrient run off into the sea from tourism and commercial infrastructure disrupting marine ecosystems. - Central Europe: intensive farming practices. - Balkans Green Belt: illegal poaching, logging, hydropower plants.
Successes	- Cited by the EU Commission as the only example of existing transnational green infrastructure.


Photo courtesy of Klaus Leidorf

4.1 Distinctive Features

The European Green Belt covers an area of more than 12,500 kilometres., spanning from the Barents Sea at the Russian-Norwegian border, going through Central Europe to the Black Sea in the Balkans. The Green Belt connects 24 countries and includes almost all European bio-geographical regions. There are 49 national parks located directly within the Green Belt and 7,319 protected areas can be found within a 50 km-wide zone on either side of the greenbelt.[139] Running along the former Iron Curtain, this greenbelt has become a living monument to 20th century European history. With the absence of conventional land uses, agriculture and sparse human settlement, these conditions allowed for natural areas to remain undisturbed for years and created a network of natural habitats spanning the continent. Thus, one of the main aims of the European Green Belt initiative has been to preserve this cultural heritage and promote the historical features of this landscape.[140] The Green Belt is divided into four regions: The Fennoscandian Green Belt; the Baltic Green Belt; the Central European Green Belt; and the Balkan Green Belt (see Figure 5). The 2010 report for the Greenbelt Foundation examined the German 'Iron Curtain' Greenbelt. This German Green Belt forms part of the Central European Green Belt. Therefore, the European Green Belt represents a significant change from the discussions in the 2010 report. The European Green Belt has an international geographical scope, and a different legal and policy framework and more stakeholders involved it is management than the German 'Iron Curtain' Green Belt does.

139 European Green Belt Association, 2013.
140 European Green Belt Association, 2018b.

Figure 5 *Map of the European Green Belt*

Source: European Green Belt Association, 2019.

1. **The Fennoscandian Green Belt** includes Norway, Russia and Finland and has a landscape characterized by lakes, wetlands, bogs, and old-growth coniferous taiga forests.
2. **The Baltic Green Belt** includes the countries of Estonia, Latvia, Lithuania, Poland, Russia (Baltic Coast) and Germany (Baltic Coast). The Baltic Green Belt is the only part of the European Green Belt that does not follow the state borders of the former military block, and instead is comprised of marine and coastal habitats that serve as reserves for migrating birds and marine animals.
3. **The Central European Green Belt** includes the Czech Republic, Austria, Hungary, Slovakia, Germany (inner-German Green Belt), Italy, Slovenia, and Croatia. This Green Belt features a wide diversity of landscapes including lowlands, rivers, lakes, alpine regions, and many nature conservation areas.
4. **The Balkan Green Belt** includes Serbia, Bulgaria, Romania, Kosovo, Montenegro, Albania, Greece, Turkey, and FYR Macedonia. Primarily located along the mountain ranges of the Balkan Peninsula, this Green Belt includes landscapes such as alpine ecosystems, forests, lakes, and coastal areas.[141]

The European Green Belt has been internationally recognized for its achievements. In 2013, the EU Commission cited this greenbelt as being the only case of existing transnational green infrastructure.[142] In 2015, the International Union for Conservation (IUCN) cited the European Green Belt initiative as a model for pan-European cooperation among stakeholders.[143] In the future, one of the goals of the European Green Belt Association would be to have the entire greenbelt designated as a UNESCO world heritage site.[144]

Korean Demilitarized Zone (DMZ)

The Korean Demilitarized Zone (DMZ), established since the end the Korean War in 1953, acts as a buffer between North and South Korea. For almost 70 years, the DMZ has been mostly off limits to visitors and residents which has allowed plants and animals to flourish in the absence of human interference.[145] The DMZ is 250 km long and 4 km across and connects with a Civilian Control Zone, located in South Korea, for an additional 20 km. The DMZ and Civilian Control Zone contains five rivers as well as biodiverse ecosystems which include thousands of species of plants, mammals, fish, and birds, many of which are endangered. In addition, the area contains several historically and archeologically significant sites.[146]

While the two countries are still technically at war, there are plans to transform the DMZ to promote peace, ecology, and tourism. Gyeonggi Province, which is adjacent to the DMZ and surrounds the South Korean capital of Seoul, is working to designate the site as a UNESCO biosphere reserve and World Heritage site. Several projects are proposed for the DMZ and Civilian Control Zone, including the preservation of plants and animals, the development of infrastructure such as walking trails, bicycle paths, and tourist facilities, and the removal of land mines which are still found throughout the zone.[147]

141 European Greenbelt Association, 2013; EuroNatur Foundation et al., 2014.
142 Friends of the Earth Germany (BUND), 2020.
143 Ibid.
144 Liana Geidezis, personal communication, July 7, 2021.
145 Healy, 2007
146 Ibid.
147 Yonhap, 2021.

4.2 Legal, Policy and Institutional Framework

The European Green Belt has a unique governance and institutional structure compared to other greenbelts examined in this report, as it has an international group of stakeholders managing this green space. In 2003, the European Green Belt was officially launched as an international project by the environmental organization EuroNatur, the German Federal Agency for Nature Conservation (BfN) and the International Union for the Conservation of Nature (IUCN).[148] The project was initially limited to the German border area, but the German Green Belt was expanded shortly after to span across Europe.[149] From 2005 to 2010, IUCN was responsible for managing this initiative. Since 2011, an international steering committee has coordinated this project including EuroNatur and the Friends of the Earth Germany (BUND) with support from BfN.[150]

In 2014, the European Green Belt Association was established and is responsible for the governance of this project. The association has a mandate to facilitate communication among its members, coordinate, and promote transnational activities along the greenbelt and ensure that the greenbelt is protected.[151] It works with over 150 organizations including government agencies and civil society groups related to nature conservation and regional development.[152] The European Green Belt can be seen as an exercise in transboundary cooperation. All member countries involved expressed their support for the initiative; however, some members are more active than others in promoting and protecting their regions within the greenbelt.[153] The association operates with limited finances, primarily funded by membership fees. Large-scale projects related to the greenbelt are often funded by participating national governments.[154] A Regional Coordinator has been appointed for each of the four sections of the Green Belt, which are environmental NGOs. Their main task is to support and facilitate the implementation of activities in their region with the representatives from national governments and NGOs in each region.[155] A Coordination Group was established to allow for increased involvement of each region, to record greenbelt relevant activities and to raise the profile of this initiative.[156]

The European Green Belt is protected by a patchwork of policies and legislation offering varying degrees of protection. The Natura 2000 network at the EU level has been an important policy tool for securing land throughout the European Green Belt.[157] However, the challenge is that Natura 2000 does not cover areas within the greenbelt that do not belong to the European Union such as Albania, Norway, Kosovo, or Russia.[158] Thus, the Emerald Network, also at the EU level, forms an important component to protect additional areas within the greenbelt.[159] Areas within the European Green Belt are protected as national parks, Ramsar sites and have various national protection categories within specific countries.[160] Ramsar sites are wetlands which are designated as being internationally important under the Convention of Wetlands, which is an international treaty focusing on the conservation of wetlands through local, national and international cooperation.[161]

148 EuroNatur, n.d.
149 Ibid.
150 Ibid.
151 European Green Belt Association, 2018a.
152 Friends of the Earth Germany, 2020.
153 Liana Geidezis, personal communication, July 7, 2021.
154 Ibid.
155 European Green Belt Association, 2018c.
156 Ibid.
157 EuroNatur Foundation et al., 2014
158 Ibid.
159 Ibid.
160 Zmelik et al., 2011.
161 The Ramsar Convention Secretariat, 2014; The Convention on Wetlands was established in the city of Ramsar, Iran in 1971 and came into force in 2971; hence the name Ramsar sites.

A problem is that not all areas within the greenbelt have legal protection. In addition, some areas within the greenbelt have been converted to development or grasslands over the years, leading to gaps within the ecological network. In 2012, the "Closing the Gaps in the Green Belt" project in Germany was funded by the Federal Biological Diversity Programme to address this concern.[162] This project aimed to identify and close gaps within the inner German Green Belt and to better connect these areas to valuable environmentally sensitives areas on either side of this greenbelt.[163] BUND Friends of the Earth Germany also recommended adding extra land to the inner German Green Belt.[164] Through donations, this organization was able to purchase 800 hectares of land that was confiscated by the East German government which was unclaimed by its former owners. This land was added to the greenbelt through the establishment of nature conservation trusts.[165]

4.3 Growth Management

Unlike many of the other examples discussed in this report, the European Green Belt does not have policy goals related to urban growth control. In most cases, the European Green Belt is not located close to major cities, as it runs along the former demilitarized area of the Iron Curtain. However, with population growth and urbanization occurring rapidly within many regions throughout the continent, the ecological integrity of the European Green Belt is threatened by major infrastructure projects. For example, in the Central European Green Belt, grey infrastructure projects such as the development and expansion of roadways and power plants are a leading cause of habitat fragmentation and degradation.[166] One of the main effects of the development of this grey infrastructure is wildlife mortality as roaming species such as the Eurasian otter or lynx can be killed in road accidents.[167] Therefore, these infrastructure projects threaten to further fragment natural habitats within the greenbelt, which can undermine the important role it plays in connecting natural areas across the continent.

4.4 Food and Agriculture

Agriculture is not a major theme or policy goal in the case of the European Green Belt. While agriculture activities may be located within or close to the greenbelt in some regions, intensive farming practices are seen as a threat to this greenbelt's goal of nature conservation. For example, in the Central European Green Belt, industrialized agriculture is seen as contributing to habitat fragmentation as it causes the land to be unusable as natural habitat for most animal and bird species.[168] In addition, the heavy use of pesticides and fertilizers in agricultural operations can harm plants and animals and drive away local bird populations.[169] In Germany, there has been some success in convincing farmers to adopt lower impact and more sustainable farming practices such as using less pesticides.[170] However, these less intensive practices happen on a smaller scale and are still not the norm.[171]

162 Friends of the Earth Germany (BUND), GrunesBand Deutschland. 2017.
163 Ibid.
164 Ibid.
165 Ibid.
166 EuroNatur Foundation et al., 2014.
167 Ibid.
168 EuroNatur Foundation et al., 2014.
169 Ibid.
170 Uwe Riecken, personal communication, July 2, 2021.
171 Ibid.

Photo courtesy of Kai Frobel

4.5 Nature-Based Solutions

The European Green Belt is envisioned as an ecological network across Europe and has the potential to support the European Commission's goal of creating and developing green infrastructure. In this case, green infrastructure is defined as "a strategically planned network of valuable natural and near-natural areas with further environmental elements, which is designed and managed in such a way that a wide range of ecosystem services is guaranteed in both urban and rural areas and the biological diversity of protected."[172] A recent study shows that the European Green Belt could make an important contribution to the development of a transnational biotope network[173] and green infrastructure at the EU level.[174] Based on analysis of data from the Central European and Balkans greenbelts, this study reveals that these regions have significantly higher concentrations of eco-system services related to climate change mitigation measures, natural hazard regulation and cultural services than the neighbouring areas located outside of the greenbelt.[175] One challenge however is that the benefits of these eco-system services provided by the European Green Belt are not recognized or studied in some of the member countries.[176]

By forming a strong ecological network across the continent, the European Green Belt provides numerous environmental benefits. The areas of relatively undistributed wilderness created by the Iron Curtain allows for the development of considerably diverse ecosystems that have become refuges for endangered plant and animal species. In addition, the European Green Belt provides important transborder migration corridors for birds and provides habitat for large mammals such as bears, wolves and lynx.[177] Finally, this greenbelt can help to mitigate the effects of climate change on wildlife by increasing the connectivity within ecosystems at a large scale, allowing for the migration of species to new areas.[178] Therefore, establishing this greenbelt allows for a connectivity between diverse landscapes and provides the backbone for a pan-European ecological network.[179]

The threats to the environmental protection of the European Green Belt vary considerably by region. In the Fennoscandian Green Belt, the extraction of natural mineral resources such as iron ore, gold, nickel, and oil, along with the logging of old growth boreal forests threaten valuable habitats within the region.[180] In the Baltic Green Belt, excessive nutrient levels from agricultural activities, traffic and industry are being washed into the sea which negatively impacts marine ecosystems.[181] In the Balkans Green Belt, the development of hydro-power dam projects leads to habitat fragmentation and the disruption of river ecosystems, while the illegal killing of wildlife poses threats to biodiversity.[182]

"This greenbelt can help to mitigate the effects of climate change on wildlife by increasing the connectivity within ecosystems at a large scale, allowing for the migration of species to new areas.

172 EU Commission, 2013. Cited in Schwaderer et al., forthcoming.
173 The term biotope is used interchangeably with habitat and is more commonly used in Europe. A biotope can be defined as a division of a landscape that is characterized by similar physical and environmental conditions and a specific grouping of animal and plant species that a geographical area that has similar biotic and abiotic features (Burcharth et al., 2007).
174 Schwaderer et al., forthcoming.
175 Ibid.
176 Liana Geidezis, personal communication, July 7, 2021.
177 Zmelik et al., 2011.
178 Ibid.
179 Ibid.
180 EuroNatur Foundation et al., 2014
181 Ibid.
182 Ibid.

4.6 Outdoor Tourism and Recreation

Cultural heritage is the main tourism activity within the European Green Belt. In Germany, alone, there are almost 50 border museums located within that portion of the Central European Green Belt.[183] For example, the Borderland Museum Eichsfeld in Teistungen/Thuringia is located on the site of a former border crossing point.[184] With its exhibitions related to border security, life within that region and reunification, these museums provide important insights into the history of East German society and politics, in relation with the greenbelt.[185] Other major tourism-related activities in this greenbelt include walking, hiking, as well as cycling routes and tours. Similar to other cases examined in this report, greenbelt tours are promoted online with recommended routes available for download (e.g., for the Green Belt in Thuringia). However, not all areas within the European Green Belt are easily accessible for tourism purposes. Given the vast size of this greenbelt, the entire length of the greenbelt is not well developed for tourists and some areas may lack route signage.[186] Also, as some areas contain old border fortifications or landmines, tourists do need to proceed with caution in those locations.[187]

There are several examples of European Green Belt initiatives related to tourism that can be highlighted as best practices for practitioners in other jurisdictions to consider implementing. First, every year between September 18 and 24, the European Green Belt initiative is celebrated through "European Green Belt Days". Developed in 2016, these activities are sponsored by the European Green Belt Association and are meant to increase public awareness about the greenbelt and encourage cross-border collaboration and exchange of activities between partners. Local organizations and municipalities are responsible for organizing the activities which can include guided tours of greenbelt areas, exhibitions, cultural events, public lectures, art projects and events for school children. All of these activities are designed to introduce the European Green Belt to a wider audience and celebrate related local initiatives. Second, the "Experiencing the Green Belt" project took place from 2007 to 2011 along the inner German Green Belt.[188] Funded by the German Federal Agency for Nature Conservation and implemented by BUND Friends of the Earth Germany as well as local stakeholders, this ambitious project promoted and developed a range of greenbelt related activities that highlighted the potential of the memorial landscape.[189] After its completion, national opinion polls showed the project produced higher levels of awareness and acceptance of the greenbelt among residents.[190]

Tourism related activities can also pose threats to the environmental protection of the greenbelt. For example, certain regions within the Baltic Green Belt have become so popular with tourists and visitors in recent years there is a need to limit the number of hotel projects, to lessen the impact of these activities on the surrounding natural areas.[191] Similar issues are occurring within the Balkan Green Belt, where tourism has increased dramatically in the past ten years. This has resulted in both coastal and mountain regions being under threat from new resort developments.[192] These examples reflect trends seen in other cases about the challenges of balancing nature conservation, development and tourism purposes in greenbelt areas, and having the appropriate level of government oversight to effectively address those issues.

183 Friends of the Earth Germany (BUND), GrunesBand Deutschland, 2017.
184 Ibid.
185 Ibid.
186 Ibid.
187 Ibid.
188 EuroNatur Foundation et al., 2014
189 Ibid.
190 Ibid.
191 EuroNatur Foundation et al., 2014
192 Ibid.

Photo courtesy of Liana Geidezis

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Zmelik, K., Schindler, S., & Wrbka, T. (2011). The European Green Belt: international collaboration in biodiversity research and nature conservation along the former Iron Curtain. Innovation: *The European Journal of Social Science Research, 24*(3), 273-294.

Photo courtesy of Paul Miner, CPRE

5

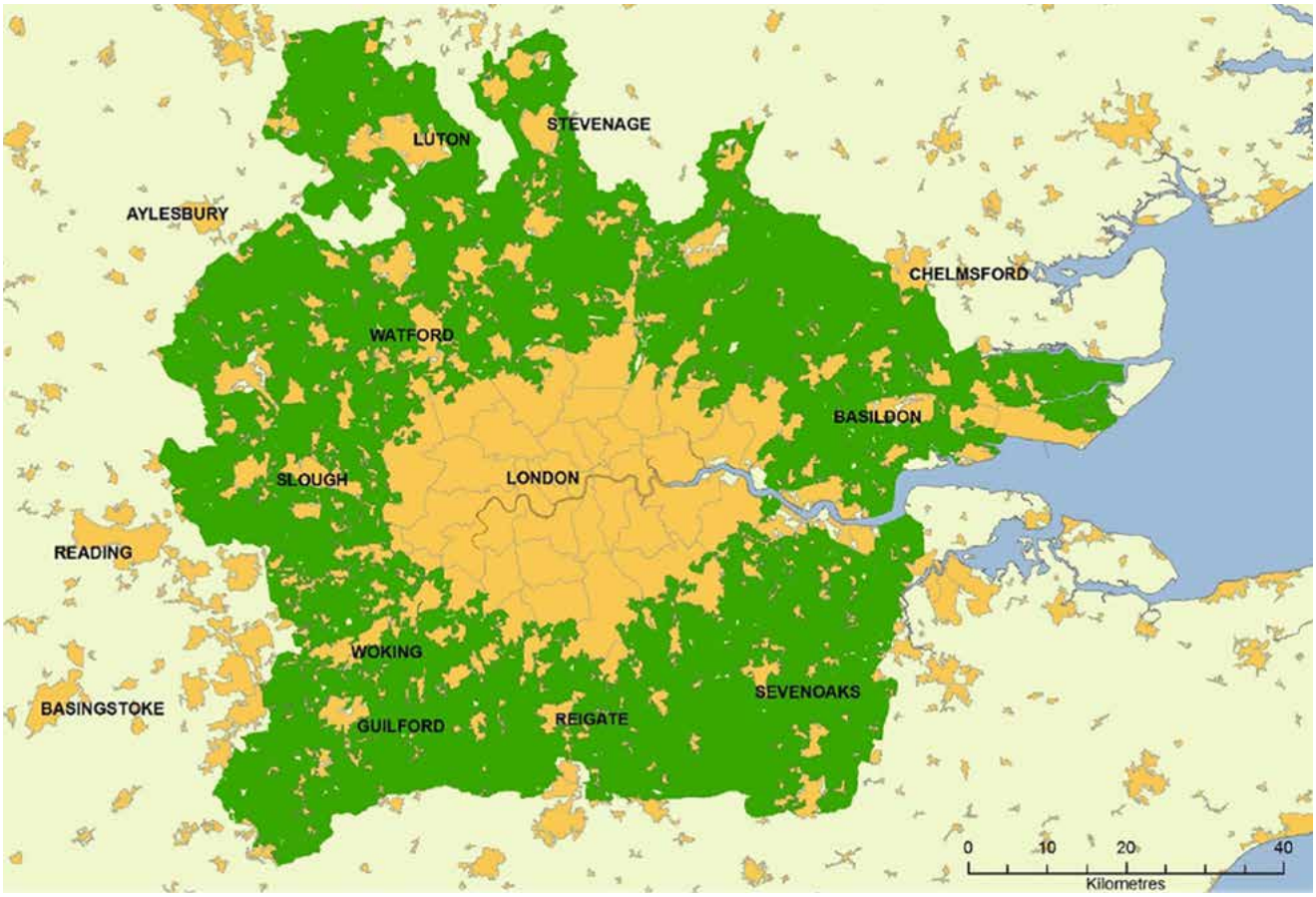
London Metropolitan Green Belt

Year Established	1938
Size	508,120 hectares
Main Policy Objectives	- To check the unrestricted sprawl of large built-up areas. - Prevent neighbouring towns from merging into one another. - Safeguard the countryside from encroachment. - Preserve the setting and the special character of historic towns. - Assist in urban regeneration, by encouraging the re-use of derelict buildings and vacant lands.
Key Features	- Valleys, forests, farmland, tree belts, woodland areas and corridors with motorways and rail lines.
Institutional framework and governance	- The National Planning Policy Framework outlines national government Green Belt policies. - Green Belt boundaries can only be altered under "exceptional circumstances." - The Department for Levelling Up, Housing and Communities has the main responsibility for Green Belt policy. - Local planning officials and councils play an important role in planning decisions related to the Green Belt.
Threats	- Increasing pressure for housing and related challenges in protecting farmland and natural areas. - Highway expansion.
Successes	- The London mayor strongly supports the continued protection of the Green Belt.

5.1 Distinctive Features

Green Belt land covers 13 per cent of England and the London Metropolitan Green Belt is the largest of 14 Green Belt areas in the country.[193] The London Green Belt has a size of 508,120 hectares (2021) and covers most of Hertfordshire and Surrey, extending beyond Southend (see Figure 6).[194] The majority of the London Green Belt is undeveloped land (92 per cent), although 58 per cent of this land is registered for agricultural uses and 16 per cent is woodlands.[195] Much of the remaining land is used for recreational purposes including golf courses, gardens and horse training facilities. The London Green Belt has a wide variety of landscapes such as valleys, forests, farmland, tree belts, woodland areas and corridors with motorways and rail lines.[196] There is also a diversity of landforms found within the Green Belt including the North Thames Basin, the Greater Thames Estuary, the North Kent Plain and the Thames Valley. As it was proposed before World War II, the London Green Belt is the one of the earliest established greenbelts examined in this report. It is also has been widely studied and written about in the academic literature on greenbelt planning.[197] Given its long history, the London Green Belt can provide important lessons to policymakers in other jurisdictions that have greenbelts.

Figure 6 *London Metropolitan Green Belt*



Source: All Parliamentary Group for the London Green Belt, 2019.

193 Crestwood Environmental Ltd., November 1, 2018.
194 Ibid, Department for Levelling Up, Housing and Communities, September 28, 2021.
195 In England, the term undeveloped land in relation to green belts can include agriculture, recreational uses, woodlands, and gardens. Developed land within green belts includes residential buildings and transportation infrastructure (London Green Belt Council, January 2021.)
196 Carter-Whitney, 2010.
197 See Mace, 2018; Sturzaker and Mell, 2017.


Photo courtesy of CPRE

5.2 Legal, Policy and Institutional Framework

Greenbelts are strongly linked to the history of British land use planning, particularly the work of prominent planners in the late 19th and early 20th centuries such as Ebenezer Howard, Patrick Abercrombie and Raymond Unwin. The origin of greenbelts in British planning is associated with rapid urbanization and industrialization in the late 19th and early 20th centuries, leading to unhealthy and crowded conditions found within cities. These conditions inspired Ebenezer Howard's famous Garden City concept, which combined the best features of towns and the countryside including green spaces for urban residents.[198] In addition, there was a strong preservationist movement during this period having a significant influence on the planning system. These preservationists wanted to protect the natural landscapes of the English countryside and saw greenbelts as a way to ensure a separation between city and countryside.[199]

Proposals for a London Green Belt have existed since 1890. However, the official realization of this Green Belt didn't occur until 1938 with the passing of the Green Belt (London and Home Countries) Act, which allowed for the purchase of land around London to protect it from development.[200] The Town and Country Planning Act 1947 is seen as setting the foundation for the British planning system, which is still relevant today.[201] This Act allows for local planning authorities to designate areas as Green Belts. The first Green Belts were not formally implemented until 1955, once the national government issued Green Belt Circular 42/55.[202] This circular guided Green Belt planning for the next 30 years and formalized the request for local authorities to establish Green Belts. From 1988 to 2012, Green Belt planning was guided by the national government's Planning Policy Guidance 2 (PPG2). It set out the modern understanding of the purposes of Green Belts.[203]

198 Sturzaker and Mell, 2017.
199 Amati, 2008.
200 Crestwood Environmental Ltd., November 1, 2018.
201 Sturzaker and Mell, 2017.
202 Carter-Whitney, 2010.
203 Crestwood Environmental Ltd., November 1, 2018.

In 2012, the PPG2 was officially revoked when the National Planning Policy Framework (NPPF) was introduced. The NPPF sets out the broad national government guidelines for plans that local authorities must work within.[204] The NPPF retained the original purposes of Green Belts that had been in place since 1988 but removed objectives for Green Belt lands.[205] The main goal of Green Belt policy is to prevent urban sprawl by keeping land permanently open.[206] The NPPF establishes five purposes for Green Belts:

1. To check the unrestricted sprawl of large built-up areas;
2. To prevent neighbouring towns merging into one another;
3. To assist in safeguarding the countryside from encroachment;
4. To preserve the setting and the special character of historic towns; and
5. To assist in urban regeneration, by encouraging the recycling of derelict and other urban land.[207]

In addition, the NPPF recognizes the importance for local authorities to provide a supply of housing to meet the needs of present and future generations.[208] However, the NPPF also states that new housing is not considered an appropriate development in Green Belts.[209] Thus, local authorities are required to make planning decisions that balance housing needs with protecting Green Belt land.

In 2018, the Ministry of Housing, Communities and Local Government published a revised NPPF. This updated NPPF implemented reforms announced in a 2017 "Fix our Broken Housing Market" White Paper.[210] The five purposes of the Green Belt have remained unchanged from the 2012 NPPF. However, national Green Belt policy was revised to reflect broader updates to the NPPF.[211]

Changes to the Green Belt can only be made by a strategic policymaking authority through the preparation of local plans. A policy was added to the 2018 NPFF, stating that "Green Belt boundaries should only be altered where exceptional circumstances are fully evidenced and justified, through the preparation or updating of plans."[212] Before deciding that exceptional circumstances exist to justify changing Green Belt boundaries, authorities must first demonstrate they have "examined fully all other reasonable options for meeting its identified need for development."[213] Potentially problematic is that the NPFF does not, specifically, define what circumstances can be considered "exceptional". This leads to a weakened and inconsistent application of Green Belt policies.[214] Thus, the London Green Belt Council has argued that a clearer definition of what constitutes exceptional circumstances is needed.[215] In 2019, the NPPF was further amended to improve and update planning processes. The 2019 NPFF reiterates national Green Belt policy and urges local planning authorities to maximize the use of brownfield sites before altering Green Belt boundaries.[216] However, it is widely concluded that the changes made to the NPPF in 2018 and 2019 have made it easier to remove land from the Green Belt, and to use that for housing development.[217]

204 Mace, 2018.
205 Sturzaker and Mell, 2017.
206 There is no legal definition for the term "open" in relation to the Green Belt. This feature continues to be debated within planning and policy practice. In general, open refers to undeveloped land that is available for agricultural, recreational, forestry and nature conservation purposes (Landscape Institute, 2018).
207 Ministry of Housing, Communities and Local Government, 2021.
208 Ibid.
209 Ibid.
210 Department for Communities and Local Government, February 2017.
211 Crestwood Environmental Ltd., November 1, 2018.
212 Ministry of Housing, Communities and Local Government, 2021.
213 Ibid.
214 Watson, S., May 6, 2020.
215 London Green Belt Council, January 2021.
216 House of Commons Library, June 10, 2019.
217 Paul Miner, personal communication, July 1, 2021.

The national government has recently indicated its intention to make significant changes to modernize and overhaul England's planning system. In August 2020, the "Planning for the Future" White Paper was released.[218] Reforms proposed in the paper include increased consultation with local communities, protecting valuable green spaces (including the Green Belts) by allowing for more brownfield development, streamlining the development process to allow homes to be built faster, and changing the current planning process to a clearer rules-based system.[219] These planning reforms have been controversial, particularly with planning experts, local authorities and countryside preservation groups. CPRE, a countryside charity in London, warned that the loosening of planning laws to facilitate housing development and giving developers' freer rein could lead to the destruction of green spaces and increased suburbanization in rural areas.[220] Despite these concerns, a planning bill to implement the "Planning for the Future" White Paper reforms was announced by the national government in May 2021.

There are several stakeholder groups involved in the management of the London Green Belt, along with other Green Belts in England. The Department for Levelling Up, Housing and Communities (formerly Ministry of Housing, Communities and Local Government) has the main responsibility for housing and local government within England, including Green Belt policies. Other government agencies play a role in protecting the Green Belts including Natural England.

Local councils (municipalities) also have a key role in managing Green Belts in the regions where they are located. A portion of the London Green Belt is situated within the jurisdiction of the Greater London Authority; however much of it is located in the surrounding local authorities.[221] Local planning officials can make decisions on whether to allow development within the Green Belt, while the boroughs (which is a lower tier of local government in London) have planning authority to make decisions on other matters related to Green Belt Policy.[222]

In addition to government authorities, there are other stakeholders that play an important role in the protection of the Green Belts in England. CPRE (formerly the Campaign to Protect Rural England) was formed in 1926 to advocate for the establishment of Green Belts. They continue to promote agriculture, local food and countryside preservation. The London Green Belt Council is a voluntary organization that brings together 100 organizations such as local council members, residents and environmental groups to provide advice on the London Green Belt to politicians and raise public awareness about threats to this green space.

218 House of Commons Library, March 10, 2021.
219 Ibid.
220 Booth, May 11, 2021.
221 Carter-Whitney, 2010.
222 Ibid.

5.3 Growth Management

The threat of new residential development within the London Green Belt has increased significantly in the past decade. London's population is expected to grow from 8.9 million in 2021 to approximately 10.8 million by 2041.[223] This growth places intense and competing pressures on the city and region's land supply. The London Green Belt Council finds that the pressure on the London Green Belt has been growing considerably in recent years.

There are current plans to build 233,276 new homes on land within the London Green Belt.[224] The number of dwellings proposed within greenbelt land has increased from 123,000 in 2016 to 233,000 in 2020 (an 89 per cent increase).[225] There is little evidence that affordable housing development in the London Greenbelt is taking place.[226] Also, new residential development within the Green Belt often occurs at low densities, leading to the inefficient use of land.[227] In addition, the COVID-19 pandemic has influenced housing markets and consumer preferences for homes. With remote work options, the geography of where people can live has expanded rapidly. Without the need for commuting to work, people have been moving out of London and there has been increased housing activity in rural communities in the past 18 months.[228]

Despite the national government's commitment to the protection of Green Belts in England, the threats to all Green Belts have increased considerably since regional plans were abolished in 2009, and the adoption of the NPPF in 2012.[229] A complex combination of factors have weakened the strength of Green Belt protections, leading to the increased likelihood of the release of Green Belt land for development.[230]

First, the London Green Belt Council states that there is lack of a comprehensive strategy for the London Green Belt.[231] There are 66 local planning authorities within the London Green Belt and there is little cooperation and consistency between these planning authorities on how to protect the Green Belt.[232] All local authorities take their own positions on the Green Belt, resulting a fragmented approach to policy implementation.[233]

Second, local councils are required to have enough land to meet their housing targets for the next five years.[234] To meet those targets, local authorities will often remove land from the Green Belt. This change in land designation should only happen under "exceptional circumstances", according to national planning policy. Local authorities continue to release large amounts of Green Belt land for new residential developments, despite planning policies to the contrary.[235] The planning concept of exceptional circumstances is being interpreted loosely by planning staff and inspectors and used to justify development within the Green Belt.[236]

223 Greater London Authority, 2021.
224 London Green Belt Council, January 2021.
225 Ibid.
226 London Green Belt Council, January 2021.
227 CPRE, February 2021.
228 Catriona Riddell, personal communication, July 13, 2021.
229 Ibid.
230 London Green Belt Council, January 2021.
231 Ibid.
232 Ibid.
233 Catriona Riddell, personal communication, July 13, 2021.
234 London Green Belt Council, January 2021.
235 Ibid.
236 Ibid.

Finally, increasing housing supply targets could put further development pressure on the Green Belt. In recent years, the national housing supply cannot keep pace with the increasing demand for homes. As a result, in 2017, the national government made an ambitious commitment to deliver 300,000 new homes annually, with the goal of 1.5 million new homes by 2022.[237] The amount new housing being built is currently lower than this ambitious goal of the national government. Before 2020/2021, the new housing supply had been increasing each year since 2013.[238] In 2019/2020, 2430,000 new homes were built. However, that number fell to 216,000 new homes built in 2020/2021, due in part disruptions caused by the COVID-19 pandemic.[239]

As part of the 2020 proposed planning reforms, the standard method for calculating housing needs was amended by the national government.[240] The new algorithm applies a so-called "Cities and Urban Centres Uplift", where 20 of England's largest urban areas will have their housing targets increased by 35 per cent.[241] This uplift will add further pressure to the Green Belts throughout the country. London will face the largest pressure on their Green Belt, having to find space for 177,907 additional homes once all current brownfield land has been developed.[242]

Ultimately, the combination of these factors puts the London Green Belt under intense pressure for residential development. The London Green Belt has become a "battleground" between stakeholders, with evidence showing that it is under greater threat than it was a decade ago.[243]

> **London's population is expected to grow from 8.9 million in 2021 to approximately 10.8 million by 2041. This growth places intense and competing pressures on the city and region's land supply.**

237 House of Commons Library, January 14, 2021.
238 House of Commons Library, February 4, 2022.
239 Ibid.
240 House of Commons Library, Mach 10, 2021.
241 CPRE, February 2021.
242 Ibid.
243 Catriona Riddell, personal communication, July 13, 2021; London Green Belt Council, January 2021.

5.4 Food and Agriculture

Farming is an important land use within the London Green Belt. There are over 200 farms in Greater London, covering about 11,000 hectares, or about a third of Greater London's Green Belt area.[244] The average size of a farm in London is 53 hectares, which is smaller than the national average of 86 hectares.[245] Agriculture employs approximately 3,000 people in London.[246]

One of the major threats to farming is development pressures, either from developers or neighbouring developments encroaching onto farm operations. Of the total amount of land developed for residential purposes in England's Green Belts between 2013 and 2018, 74 per cent (1,969 hectares) was on greenfield sites, the majority of which was originally farmland.[247] Some of the key challenges faced by farmers is the high cost of land which makes it difficult for new farmers to buy land, the competitive market for food, and difficulties in retaining land long-term because of development pressures.[248] However, profitable farming operations is one way to prevent inappropriate development and landowners from seeking to sell their land.[249]

More sustainable farming practices can be achieved through a variety of methods. For example, diversification strategies such as farm shops and farmers markets respond to the growing popularity and demand for locally produced food. In addition, farms within the London Green Belt have an opportunity to tap into the large customer base located in urban centres and can supply restaurants and grocery stores with locally grown products.[250] Finally, community farms such as Forty Hill Farm or Sutton Community Farm engage local communities through growing produce, purchasing fruit and vegetable boxes, offering jobs and apprenticeship opportunities and educating the public about farming practices.[251]

In recent years, Brexit has caused a significant amount of uncertainty for the agricultural sector. When the UK left the EU, it left the Common Agricultural Policy (CAP), under which UK farmers received approximately 3.5 billion GBP annually in farm support.[252] Agricultural policy is devolved in the UK where England, Scotland, Wales and Northern Ireland are each responsible to develop their own farming policies.[253] England has guaranteed the same level of farm support funding for the immediate future. In 2020, the Agricultural Act was passed. This legislation provides a framework for how farms in England will be supported from 2021 onwards.[254] It involves gradually phasing out direct payments to farmers over a seven-year transition period.

Going forward, farmers will receive new payments for providing “public goods”. Key to this new regime will be an Environmental Land Management Scheme, which will support the goals of the national government's 25-year Environmental Plan.[255] Farmers will be compensated for initiatives to increase biodiversity, promote animal welfare, restore landscapes and increase productivity through investments in new equipment.[256] Farming and environmental groups have generally been supportive of the principles of these new programs. However, these stakeholders are concerned that these schemes do not provide certainty about long-term funding and have little focus on food production. There are also concerns regarding the rapid speed of the transition.[257]

244 London Assembly Environment Committee, December 2018.
245 Ibid.
246 Ibid.
247 CPRE, February 2021.
248 London Assembly Environment Committee, 2018.
249 London Green Belt Council, January 2021.
250 Ibid.
251 London Assembly Environment Committee, December 2018; London Green Belt Council, January 2021.
252 House of Commons Library, January 29, 2020.
253 Ibid.
254 Ibid.
255 Institute for Government, October 11, 2021.
256 Ibid.
257 Ibid.

5.5 Nature-Based Solutions

There has been a growing recognition in academic literature and policy discourse regarding the importance of the environmental benefits provided by Green Belts in England. The country has a history of emitting high levels of greenhouse gases.[258] Thus, the UK has a target of net-zero emissions of greenhouse gases by 2050, which will require a significant transition in land-use and agricultural practices in the coming decades.[259] Managing natural areas and farmland more effectively will be key to reaching this target. The London Green Belt performs a range of important environmental functions related to climate change mitigation and adaptation measures and supporting a low carbon economy. These functions include carbon storage, reducing urban heat island effects, filtering air pollution, providing sites for local food production, flood control and maintaining healthy and diverse ecosystems.[260]

In addition, the London Green Belt can play a role with meeting some of the objectives in the national government's 25-year Environmental Plan.[261] For example, this plan has policies to expand woodlands and to encourage better future management of these natural areas.[262] The London Green Belt contains 16 per cent woodlands. With tree planting programs and land acquisitions, these natural areas will likely expand in the future. The benefits of expanded woodlands include the recreational value for urban residents, increased carbon storage capacity and providing more habitat for wildlife.[263] The London Green Belt provides important woodland sites to help achieve these environmental policy goals.

However, there are contrasting views among the various local authorities within the metropolitan region about environmental protection and the value of the London Green Belt. This Green Belt is viewed differently by local authorities inside and outside of London, with some officials more interested in loosening land use restrictions to allow for more development than environmental protection.[264] In contrast, the Mayor of London (Sadiq Khan) strongly supports the continued protection of London's Green Belt. London's Green Belt is seen as the "green lung" of the city, as it performs several beneficial functions such as combating the urban heat island effect and providing space for recreation and farming.[265] The London Green Belt also provides the significant function of containing the further expansion of residential development. This growth control mechanism has helped to drive the re-use and intensification of London's previously developed brownfield lands. It ensures that London makes efficient use of its land and infrastructure, and that inner urban areas benefit from regeneration.[266]

"The London Green Belt can play a role with meeting some of the objectives in the national government's 25-year Environmental Plan. This plan has policies to expand woodlands and to encourage better future management of these natural areas.

258 London Green Belt Council, January 2021.
259 Ibid.
260 London Green Belt Council, January 2021; CPRE and Natural England, 2010.
261 London Green Belt Council, January 2021.
262 Ibid.
263 Ibid.
264 Catriona Riddell, personal communication, July 13, 2021.
265 Greater London Authority, 2021.
266 Ibid.

5.6 Outdoor Tourism and Recreation

The London Green Belt contains many significant recreational areas and provides an important refuge for the city's residents. It has more than 10,000 km of Public Rights of Way, which include publicly accessible footpaths, byways and bridleways.[267] Public Rights of Way are legally protected areas for walking and leisure activities on paths that are marked with specific signs.[268] The London Green Belt also includes more than 500 km of National Cycle Network (NCN) routes.[269] Public access within this Green Belt has been made easier through the creation of Regional Parks in the Colne and Lea Valleys and the development of the NCN and walking routes such as the London Loop.[270]

There is increasing research showing the positive impacts on people's physical and mental health from spending time in natural areas.[271] The London Green Belt can play a significant role in providing people with access to the countryside and natural areas. Studies have estimated that universal access to high quality green spaces could save the British National Health Services approximately 2 billion GBP annually.[272] In England, there is support for programs that encourage physical outdoor activities. For example, the Walking the Way to Health Initiative (WHI) was launched in 2000 to support people meeting for regular walks to improve their health.[273] In 2009, this national program was expanded by Natural England and the Department of Health for three years.[274] As of 2009, there were approximately 600 WHI schemes with 32,000 participants.[275] The health benefits of the WHI program is estimated to save the health care system 11 million GBP annually.[276] The popularity of these walking programs shows that the London Green Belt with its abundance of natural areas can play a significant role in health related initiatives.

Photo courtesy of Sarah West, CPRE

267 Campaign to Protect Rural England, 2016.
268 National Government of England, n.d.
269 Ibid.
270 London Green Belt Council, January 2021.
271 Ibid.
272 Ibid.
273 Natural England, July 10, 2009.
274 Ibid.
275 Natural England and Campaign to Protect Rural England, 2010.
276 Ibid.

Lee Valley Regional Park

The Lee Valley Regional Park provides an example of a long-term approach to managing the Green Belt, which combines nature conservation, recreation and tourism. Lee Valley Regional Park is a 40,000-hectare park that serves London, Hertfordshire and Essex.[277] This regional park is made of up of 82 per cent of Green Belt land and includes urban green spaces, country parks, nature reserves, lakes and riverside trails.[278] This former industrial area has been transformed into an award winning open space that attracts more than 8 million visitors per year.[279]

This area was protected in 1966 and the Lee Valley Regional Park Authority was created in 1967.[280] The Lee Valley Regional Park Authority has an appointed board with members from local authorities in London, Essex and Hertfordshire. The Authority has an operating budget of 25 million GBP annually which comes from revenue generated from its own investment activities and a levy on local council taxpayers.[281] There is a Leisure Trust that manages the sport venues, including 2012 London Olympic sites. The regional park has its own Biodiversity Action Plan to ensure the protection of ecologically significant areas. There are more than 500 events per year held in the regional park, and many of these activities are focused on increasing access to nature for underrepresented groups.[282]

> **The London Green Belt contains many significant recreational areas and provides an important refuge for the city's residents. It has more than 10,000 km of Public Rights of Way, which include publicly accessible footpaths, byways and bridleways.**

277 Campaign to Protect Rural England, 2016.
278 Ibid.
279 Lee Valley Regional Authority, 2021.
280 Campaign to Protect Rural England, 2016.
281 Ibid.
282 Ibid.

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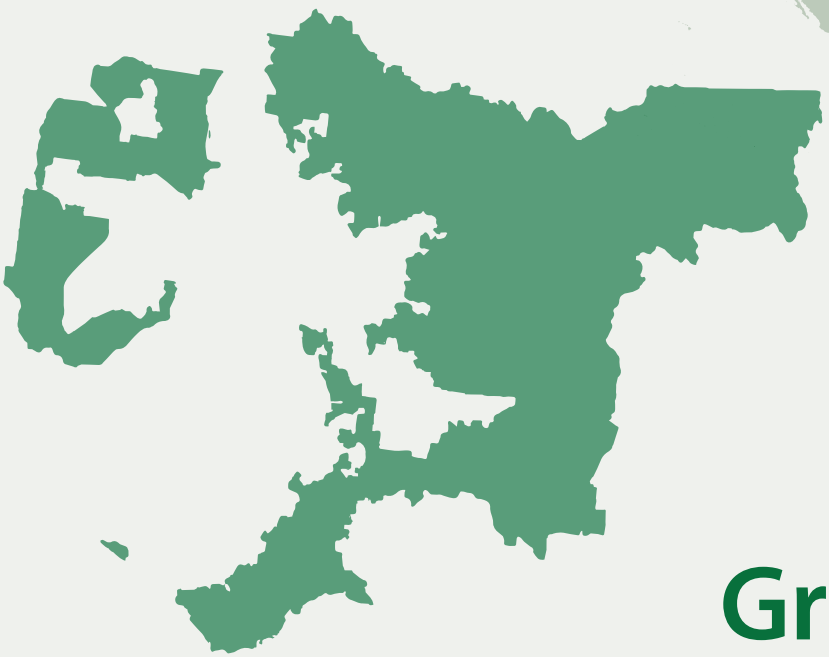
Photo: Shutterstock

6



Melbourne Green Wedges

Year Established	2003
Size	605,000 hectares
Main Policy Objectives	Green wedges are designed protect farmland and natural areas and support a range of non-urban uses such as natural resource extraction, tourism, recreation, airports, and sewage plants.
Key Features	- 12 designated green wedges located across 17 municipalities. - Includes a range of landscapes such as coastal areas, wetlands, forests, grasslands, ranges, and hills. - Over 50 per cent of the land within the green wedges is privately owned.
Institutional framework and governance	- The green wedges have legal protection under the State of Victoria Planning and Environment Act 1987. - Plan Melbourne 2017-2050. This regional plan includes policies to protect and manage the city's agricultural land and green wedges. - Municipalities located within the green wedges develop and implement Green Wedge Management Plans. - Victoria's Department of Environment, Land, Water and Planning has the main responsibility for supporting policy implementation.
Threats	- Rapid population growth and the accompanying demand for new housing threaten the protection of farmland and green spaces. - The impacts of climate change. - Over development of tourist areas.
Successes	- There have been no urban boundary expansions since 2012. - Indications that the green wedges and the urban growth boundary will not be weakened as part of the current policy review.

6.1 Distinctive Features

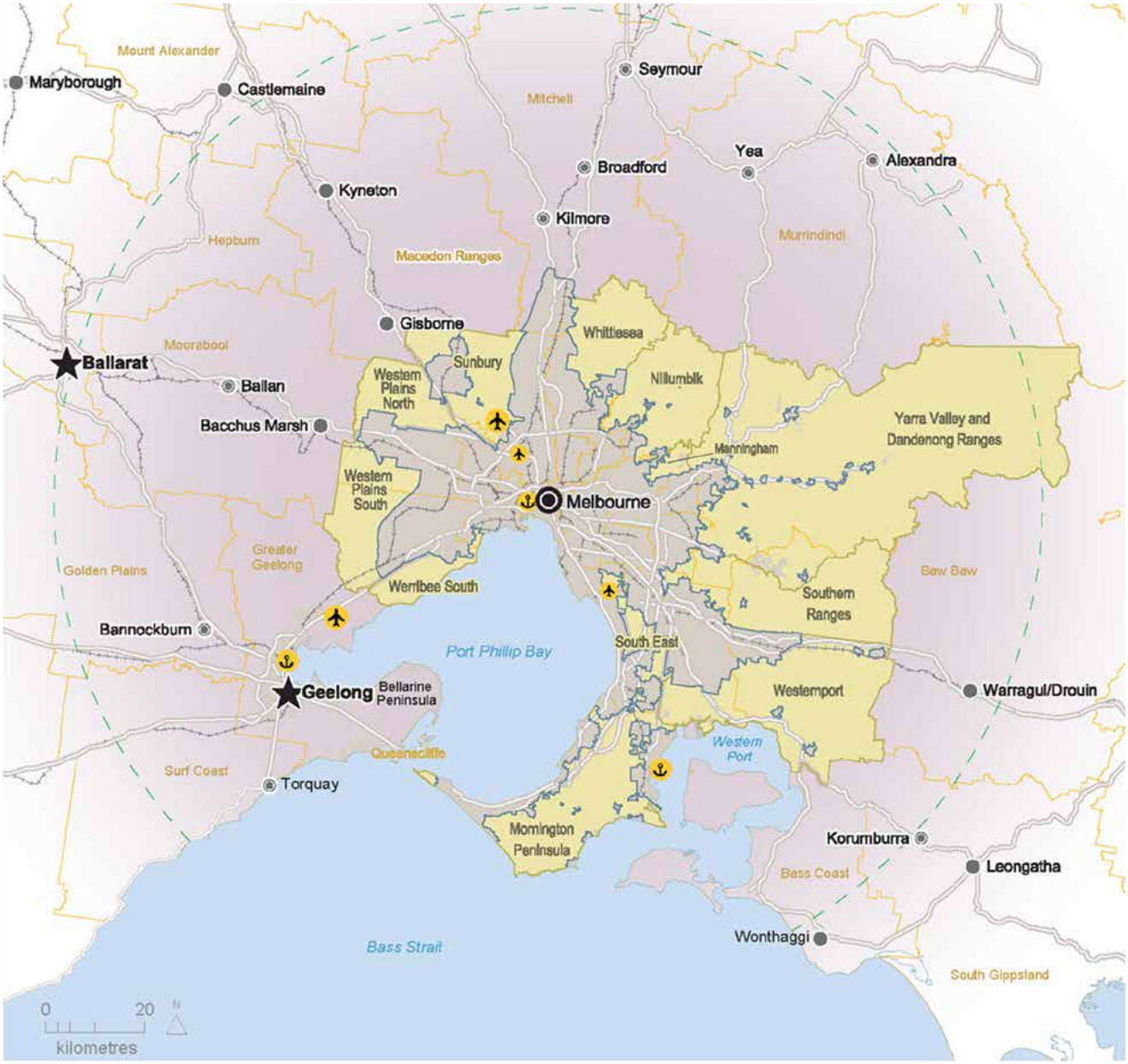
Melbourne has 12 designated green wedges located across 17 municipalities, forming a ring around the city (see Figure 7).[283] These green wedges are non-urban areas located outside of Melbourne's urban growth boundary. The total area of land within the green wedges is 605,00 hectares, which accounts for approximately 68 per cent of the total Greater Melbourne Metropolitan area. The land uses and natural features of each of these green wedges of unique and include a range of landscapes such as coastal areas, wetlands, forests, grasslands, ranges, and hills.

The 12 green wedges in Melbourne include: Manningham; Mornington Peninsula; Nillumbik; South East; Southern Ridges; Sanbury; Werribee South; Western Plains North; Western Plains South; Westernport; Whittlesea; Yara Valley and Yara and Dandenong Ranges.[284]

The green wedges include agricultural, tourism and recreational uses, as well as assets that support Melbourne such as sewage treatment plants, airports, landfill sites and extractive industries.[285]
Found within the green wedges are features of international and national significance including the Ramsar listed wetlands such as Westernpoint, the Edithvale-Seaford wetlands, Port Phillip Bay, the Western Grassland Reserve and the UNESCO Morningstong Peninsula and Westernpoint Biosphere Reserve.[286]
Ramsar sites are wetlands which are designated as being internationally important under the Convention of Wetlands. That is an international treaty focusing on the conservation of wetlands through local, national and international cooperation.[287] The green wedges also protect areas of iconic landscapes that attract high numbers of visitors each year such as Great Ocean Road, Bellarine Peninsula, Macaedon Ranges, Western Port, Phillips Island, and the Yarra Valley and Dadenong ranges.[288]

283 Department of Environment, Land, Water and Planning, April 13, 2021.
284 Ibid.
285 Department of Environment, Land, Water and Planning, 2015.
286 Department of Environment, Land, Water and Planning, 2017.
287 The Ramsar Convention Secretariat, 2014.
288 Department of Environment, Land, Water and Planning, 2017.

Figure 7 *Melbourne's Green Wedges*



Melbourne's green wedges and peri-urban areas

- Green wedge land
- Peri-urban area
- 100-km radius from central Melbourne
- Capital city
- Regional city
- Regional centre
- Peri-urban town
- Road network
- Rail network
- Transport gateway – major airport
- Transport gateway – airport
- Transport gateway – seaport
- Urban area
- Urban growth boundary
- Local government area boundary

Source: Department of Environment, Land, Water and Planning, 2017

6.2 Legal and Policy Framework

Melbourne's green wedges have been included in planning policies for more than fifty years. The proposal to protect non-urban lands first emerged in the mid-1960s with green wedges being included in State of Victoria government policies in 1968.[289] In 1971, the Melbourne strategic plan "Planning Policies for the Melbourne Metropolitan Region" included nine green wedges.[290] This first regional plan for Melbourne was intended to confine urban development to growth corridors separated by green wedges (or non-urban areas) that would direct growth patterns for the coming decades.[291] However, by the late 1990s and early 2000s, Melbourne's green wedges were under considerable threat from new development and municipal councils were under pressure to allow for development within natural areas.[292] Between 1996 and 2002, 4,000 hectares of non-urban land within the green wedges was approved for residential development and other urban land uses.[293]

In 2003, green wedges were given official protection under the Planning and Environment Act, 1987 by the Victoria government. Under this Act, green wedges are defined as "land that is described in a metropolitan planning scheme as being outside an urban growth boundary."[294] These changes to the Planning and Environment Act, 1987 gave legal protection to the green wedges and were an outcome of the 2002 regional growth plan entitled "Melbourne 2030".[295] This regional strategy also established an urban growth boundary (UGB) around Melbourne, which was designed to better manage outward development. The UGB was implemented to encourage development into areas that had the infrastructure and services to support that growth while also protecting green wedge and peri-urban areas.[296] These peri-urban areas are located beyond the green wedges, include local government areas, have a rural character, and are located primarily within a 100-kilometre radius of Melbourne.[297]

The Melbourne 2030 plan also introduced mechanisms to establish and protect green wedges.[298] Planning policies related to the green wedges are integrated into the Victoria Planning Provisions to limit permitted land uses in green wedge areas. In addition, the Victoria Planning Provisions provide a framework for municipal plans and include a metropolitan green wedge land use policies that has provisions to protect green wedges from uses that would hinder their agricultural, environmental, or recreational value.

Currently, the main policy that guides green wedge planning is "Plan Melbourne 2017-2050". This 2017 regional growth plan is designed to manage housing and employment demands in the coming decades, while balancing those needs with protecting and managing the green wedges and peri-urban areas.[299] The plan has several policies related to green wedges including the protection of farmland and strengthening the management of green wedge land.[300] In addition to farmland and environmental protection, green wedges support a range of non-urban land uses such as natural resource extraction, tourism, airports, waste recovery areas and sewage plants.[301]

289 Carter-Whitney, 2010.
290 Buxton, 2014.
291 Ibid.
292 Green Wedges Coalition, November 2007.
293 Buxton and Goodman, 2002.
294 Department of Environment, Land, Water and Planning, 2017.
295 Carter-Whitney, 2010.
296 Department of Environment, Land, Water and Planning, May 2020.
297 Peri-urban areas are often viewed as neither urban nor rural spaces but rather a distinct form of settlement. These areas have characteristics such as lower population and development densities than urban areas, heterogeneous land-uses and are within commuting distances of urban markets (Buxton, 2014); Department of Environment, Land, Water and Planning, 2017.
298 Carter-Whitney, 2010.
299 Department of Environment, Land, Water and Planning, 2017.
300 Ibid.
301 Ibid.

Victoria's department of Environment, Land, Water and Planning has the main responsibility for supporting policy implementation related to the green wedges. Municipalities also play a significant role in the implementation of green wedge policies. Local councils are subject to state policies about the UGB and green wedges.[302] If green wedges are located within their jurisdiction, local councils must develop and implement a Green Wedge Management Plan. These plans are adopted by local councils and identify objectives for the sustainable development of each green wedge.[303] Since there is significant variation in the conditions found within each green wedge, these plans are meant to be locally specific and identify the features of each green wedge, the preferred future land uses, and the resources needing protection.[304]

There are several planning tools which are designed to protect green wedges. First, land uses within the green wedges and peri-urban areas are controlled by six rural zones. Second, there are regulations requiring approval from both Houses of Parliament for planning amendments that seek to alter the UGB or green wedge subdivision controls. Finally, the Green Wedge Management Plans set out objectives for the sustainable use of each green wedge.[305]

There are numerous policy changes in the past decade that have impacted the green wedges. First, a reform of Victoria's planning zones in 2013 broadened the range of permitted uses within the green wedges and decreased permit restrictions.[306] In the rural conservation zone, for example, conditions restricting group accommodation, hotels and restaurants were removed.[307] Land uses within the green wedges are now seen as more flexible, as schools and religious centres are allowed in some zones.[308]

Second, green wedges and peri-urban areas have been under review since 2018. Plan Melbourne 2017-2050 made commitments to protect the green wedges and farmland in peri-urban areas by strengthening planning controls and clarifying what permitted land uses are allowed within green wedges.[309]
To deliver upon those commitments, the Victoria government launched a review which includes technical assessments, public consultations and proposed planning reforms outlined in a 2020 consultation report.[310] As of the time of writing, the final results of the public consultation have yet to be released and proposed planning reforms are set to be implemented in 2022.[311] However, there are indications that this review will not significantly weaken green wedge protections or alter the UGB.[312]

302 Carter-Whitney, 2010.
303 Department of Environment, Land, Water and Planning, 2015.
304 Ibid.
305 Department of Environment, Land, Water and Planning, 2017.
306 Ibid.
307 Buxton, 2016.
308 Rosemary West, personal communication, August 5, 2021.
309 Department of Environment, Land, Water and Planning, May 2020.
310 Ibid.
311 Department of Environment, Land, Water and Planning, n.d.
312 Michael Buxton, personal communication, June 30, 2021; Jack Krohn, personal communication, July 12, 2021.

6.3 Growth Management

Like other cases discussed in this report, Melbourne is forecasted to experience significant demographic changes in the coming decades. It is predicted that between 2015 and 2050, Melbourne will grow by 3.4 million people from a population of 4.5 million to nearly 8 million.[313] The significant increase in population will require an additional 1.6 million homes and 1.5 million jobs to support that growth.[314] Melbourne has already grown by more than 800,000 new residents in the past decade.[315]

Given these significant population increases, there is a need for regional planning measures to effectively address these growth pressures. Since 2000, every Australian capital city has introduced a metropolitan strategic spatial plan. These plans include growth containment policies meant to limit development in peri-urban areas.[316] However, Buxton (2014) states that none of these planning policies has been effective in containing urban growth or fundamentally changing peri-urban development patterns.[317] Instead, North American style low-density development has continued in peri-urban areas, consuming large amounts of farmland and natural areas.

Despite strong parliamentary regulatory controls and regional growth plans, politicians have been able to change the legislation to continually expand the UGB. This boundary has been expanded several times including by 1,610 hectares in 2003; by 11,132 hectares in 2005; by 43,600 hectares in 2010 and by 6,000 hectares in 2012.[318] There have been no significant changes to the UGB since 2012. The current UGB has been confirmed as the outer most limit for growth in the Plan Melbourne 2017-2050 plan.[319]

These urban growth boundary expansions have resulted in several issues. First, these boundary expansions have been controversial as there has been strong opposition from residents' groups about these policy changes. For example, in 2011 the Victoria government proposed to add 6,000 hectares of land for urban growth. The Green Wedges Coalition stated that the review process during 2011-212 was undemocratic and disorganized, as there was a lack of community consultation and often limited discussions within local councils about proposed changes.[320] In addition, the Green Wedges Coalition questioned whether more land was even necessary for urban development since previous expansions allocated enough land for urban growth for the next 20-50 years.[321]

Second, these frequent changes to the strategic plans for Melbourne reflect a broader concern about a lack of bipartisan support for peri-urban planning, as changes in political parties have often resulted in subsequent reforms to spatial planning policies.[322] Maintaining UGBs over the long-term is key for the integrity of green wedge protection.[323] However, each new strategic plan contains substantive revisions to previous policies and makes it difficult to take a long-term perspective to regional planning.[324]

313 Department of Environment, Land, Water and Planning, 2017.
314 Ibid.
315 Ibid.
316 Buxton, 2014.
317 Ibid.
318 Buxton, 2014; Victoria Planning Authority, n.d.-b
319 Victoria Planning Authority, n.d.-b
320 Green Wedges Coalition, February 19, 2012.
321 Ibid.
322 Buxton, 2014.
323 Jack Krohn, personal communication, July 12, 2021.
324 Buxton et al., 2016.

Finally, there is a longstanding debate within academic literature about the relationship between urban growth containment policies such as UGBs and subsequent increases in land and housing prices.[325] There are also similar narratives occurring in other cases examined for this report such as London and Ontario. However, regardless of this critique, in the past the Victorian government has accepted developers' arguments about the UGB increasing land prices and modified policies to allow for larger supply of future land for urbanization at very low development densities.[326]

In addition to urban growth boundary expansions, the green wedges have been threatened by a significant increase of planning permit applications involving large scale developments with related infrastructure uses such as parking lots. A problem is that the planning policies allow for a broad range of discretionary uses within rural and green wedge zones. These developments can be seen as changing the green wedges from rural to urban areas.[327]

The 2010 UGB expansion was significant and was accompanied by the introduction of a new planning tool: the Growth Areas Infrastructure Contribution (GAIC). Following the 2010 UGB expansion, there were reports of large profits made by some landowners who became "instant millionaires".[328] It was found that per hectare land prices inside the UGB after this expansion increased by 89 per cent compared to land prices found outside the boundary.[329] The intention of the GAIC was to create a tax from the expected land values resulting from the UGB expansion and to finance infrastructure costs related to new suburban development.[330] In 2008 submissions to the Australian Senate committee, it was estimated that cities could gain approximately between $300,000 and $400,000 per hectare from this rezoning.[331]

There was strong landowner pressure to modify the proposed GAICs and this tool was redrafted several times before it was approved in 2010. The GAIC is now designed to fund infrastructure in growth areas and applies to land brought into the UGB that is zoned for urban development.[332] The modified GAIC is seen as a purchaser pays model whereby the bulk of the costs are pushed onto the future homeowners.[333] This levy system is intended for the tax to be paid by developers and added to the cost of new housing, which ultimately passes the charges onto the consumer.[334] In 2011, legislation was passed deferring the GAIC until the point of development, which further removes landowners from liability for these charges.[335]

The planning policies allow for a broad range of discretionary uses within green wedge zones. These developments can be seen as changing the green wedges from rural to urban areas.

325 Buxton and Taylor, 2011; Dawkins and Nelson, 2002; Jun 2006.
326 Buxton, 2014.
327 Thatcher, May 2019.
328 Taylor, 2016.
329 Ball et al, 2012.
330 Taylor, 2016.
331 Ibid.
332 Victoria Planning Authority, n.d. –a
333 Taylor, 2016.
334 Ibid.
335 Ibid.

6.4 Food and Agriculture

Melbourne is located in a very productive agricultural region. In Australia, the term "foodbowl" is used to describe productive regional areas which are a major source of food.[336] Melbourne has many small yet very productive regions for agricultural production that are located at the fringe of the city. There is overlap between the 12 designated green wedges and the foodbowl discussed in the literature.[337] Most of the foodbowl is located in areas located beyond the urban boundary. Melbourne's foodbowl covers approximately 1.7 million hectares of agricultural land, which is approximately 12 per cent of Victoria's 14.8 million hectares of farmland.[338] The foodbowl contributes $2.45 billion annually to Melbourne's regional economy and 21,001 full time jobs.[339] There are also secondary benefits of the foodbowl as it protects against drought and the impacts of climate change and the green wedges allow for the protection of land for agricultural purposes versus urban development.

In addition, agri-tourism is a sector that could increase the economic contribution of Melbourne's foodbowl. The value of farm tourism was valued at $115 million in 2006.[340] There are many farm businesses that are active with tourism related activities, particularly in East Gippsland. Even though some farms can generate income from tourism related activities, there are barriers to involvement in this sub-sector because farmers need to obtain new skills as tourism operators and there are considerable capital outlay costs.[341]

The largest threat to agricultural production in Melbourne is urban and suburban development. Melbourne's population growth over the past decades has been accommodated by reducing the amount of farmland, and that trend is expected to continue in the future. A 2016 report from Deloitte Access Economics predicts that the potential impacts of continued urban sprawl on Melbourne's foodbowl could lead to significant negative consequences.[342] The reduction in farmland could lead to reduced agricultural output and employment which would increase the price of agricultural products. This loss of farmland could also put Melbourne's food security at risk, in the face of climate change pressures and declining supplies of natural resources such as fresh water, particularly during drought years. Areas within the foodbowl are located close to highly secure water sources such as the Eastern and Western Water Treatment Plants, which have access to recycled water to grow crops during droughts.[343] The impact of predicted population growth and meeting potential housing demand through the loss of farmland in the foodbowl is substantial. The value of annual agricultural output is predicted to drop between $32 million and $111 million due to urbanization pressures.[344]

“The impact of predicted population growth and meeting potential housing demand through the loss of farmland in the foodbowl is substantial. The value of annual agricultural output is predicted to drop between $32 million and $111 million due to urbanization pressures.

336 Sheridan et al., 2016.
337 Deloitte, 2016.
338 Ibid.
339 Ibid.
340 Ibid.
341 Ibid.
342 Ibid
343 Ibid.
344 Ibid.

6.5 Nature-Based Solutions

Melbourne is a city that is rich in biodiversity with a high diversity of species.[345] This high level of biological diversity in Melbourne is due to a wide variety of natural habitats found within the greater Melbourne area as well as factors such as the historical development of the city and the geographical isolation of Australia that allowed for this diversity to develop.[346] However, there has been a steady loss of nature within greater Melbourne over the past decade. This natural biodiversity is threatened by rapid urban and suburban development along with the growing impact of climate change.

First, Melbourne is the fastest growing city in Australia. This population growth and the associated housing demand creates significant negative impacts to the environment. Urban growth can place increased pressure on ecosystem processes through habitat destruction, fragmentation, and degradation. In addition, urban development in greater Melbourne is linked to a loss of indigenous flora and fauna, the increased presence of invasive species and the destruction of rare ecosystems.[347] Second, climate change is predicted to impact Melbourne significantly through more frequent droughts, brushfires, extreme heatwaves, reduced rainfall, increased windstorms and sea level changes.[348] The impacts of climate change will place significant stress on Melbourne's environmental systems.

Addressing the impact of urban development and climate change on natural areas has in recent years became a priority for Melbourne.[349] The city has several policy areas focused on nature conservation including a Nature in the City strategy, an Urban Forest Strategy, and an Open Space Strategy. Proposed actions in these strategies include tree planting, increasing the diversity of trees, developing baseline data of habitats, linking habitats through the creation of corridors and purchasing land for new open spaces.[350] These strategies are designed to support biodiversity initiatives at regional, state, national and the international level.[351] While these municipal strategies do not directly address the green wedges, they do support other initiatives which influence regional ecosystems including the green wedges.

The green wedges provide significant environmental benefits related to biodiversity protection and ecosystem services. The green wedges provide benefits such as visual amenities, protection of water quality and opportunities to preserve biodiversity.[352] Given their proximity to cities, the value of the green wedges increases for residents due to their close access to recreational spaces.[353] In addition, green wedges are important natural areas as they provide habitat for endangered species. Large areas of natural habitat have been destroyed by fires in recent decades in Victoria. For example, the 2019-2020 Australian brushfires destroyed up to 7 billion trees and adversely impacted nearly 3 billion animals.[354] Therefore, scholars including Stanley and Stanley argue the comprehensive protection for lands with high biodiversity values should be one of the main factors guiding the future planning of green wedges. This could be achieved through improved integrated strategic planning for green wedges that is set within a planning context that recognizes the importance of biodiversity conservation principles.[355]

345 Ives et al., 2013.
346 Ibid.
347 Ibid.
348 City of Melbourne, 2017.
349 Ives et al., 2013.
350 City of Melbourne, 2017.
351 Ibid.
352 Deloitte Access Economics, 2016.
353 Stanley and Stanley, 2021, p. 6.
354 Ibid.
355 Ibid.

6.6 Outdoor Tourism and Recreation

Green wedges and peri-urban areas make significant contributions to supporting tourist economies by attracting visitors to natural areas and providing recreational and tourism opportunities. Several green wedge and urban fringe locations are among the most popular day trip destinations for Melbourne residents such as the Mornington Peninsula, Yarra Valley/Dandenongs and the Macedon Ranges, with the Peninsula Region.[356] The Peninsula Region is one of the three biggest regions outside Melbourne in terms of tourism related employment (12,200 jobs in 2018-2019). In 2018, the Peninsula region attracted 7.5 million tourists with 5.6 million of them going for day trips.[357] The importance of local tourism for the regional economy is expected to increase because of the COVID-19 pandemic, as residents may be looking to avoid international travel and vacation locally instead.

However, it is possible to overdevelop tourism activities within the green wedges. The Green Wedges Coalition has argued that allowing the development of large-scale tourism related complexes with restaurants, hotels or conference centres threaten green wedges and that loopholes within legislation must be closed to stop this form of development.[358] Another challenge is how to balance impacts of different land uses permitted within the green wedges. For example, quarries are seen as a valuable land use within green wedges.[359] Hillview Quarries currently operates a quarry in the Mornington Peninsula Shire within a green wedge. They have applied to the Minister of Planning for permission to develop a new quarry on land they own within a green wedge area. This quarry would have an output of around one million tonnes of granite per year for approximately 70 years.[360] This natural resource extraction operation would cause a host of potential impacts including clearing natural vegetation to develop the mine, endangering koala habitat, and disrupting cycling trails.[361] Given the significance of the tourism sector to the Mornington Peninsula economy, there is concern among stakeholders that an expansion of this quarry will significantly threaten tourism and recreational activities in the area.[362] This example highlights that decisions regarding permitted land uses within the green wedges involve balancing different priorities. It is important for policymakers to understand the different trade-offs involved when deciding which land uses to approve within natural areas.

It is important for policymakers to understand the different trade-offs involved when deciding which land uses to approve within natural areas.

356 Stanley and Stanley, 2021
357 Ibid.
358 Green Wedge Coalition, 2007.
359 Stanley and Stanley, 2021.
360 Ibid.
361 Ibid.
362 Ibid.

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Photo courtesy of Groene Jonker

7

Netherlands Green Heart

Year Established	1958
Size	444,789 acres (180,000 hectares)
Main Policy Objectives	- The Green Heart is seen as essential to quality of life within the Randstad or "Ring City". - To retain its open character. - To protect the landscape qualities of the Green Heart in a sustainable manner.
Key Features	- Agricultural land with peat meadows, polders (i.e., land reclaimed from the sea) and flood plains. - Cultural heritage landscapes including historic towns, monuments, windmills and the Old Dutch Waterline.
Institutional framework and governance	- The Green Heart has been removed as a national strategic planning concept. - The Green Heart has been abolished by the province of South Holland. Green Heart policies still exist in the provinces of North Holland and Utrecht. - Introduction of a new national Environment and Planning Act. - The National Strategy on Spatial Planning and the Environment (NOVI) identifies the Green Heart as an area of special significance. - The Green Heart Administrative Platform and the Green Heart Foundation play a key governance role.
Threats	- Urbanization pressures. - Infrastructure development (e.g., roadway widening). - Soil subsidence and agricultural sector reform. - Climate change.
Successes	- Preservation and promotion of cultural heritage. - Popularity of tourism and outdoor recreation. - Incorporation of the Green Heart into broader ecological networks (e.g., National Nature Network (NNN)).

7.1 Distinctive Features

The Green Heart (Groene Hart) in the Netherlands has a unique spatial form compared to other cases examined in this report. It does not have the traditional shape of a greenbelt (i.e., nature conservation and agricultural land forming a belt of land around a city or region). Instead, the protected areas within the Green Heart are surrounded by four cities in the Randstad (Rotterdam, the Hague, Amsterdam and Utrecht) (see Figure 8). The Green Heart is located within the provinces of Utrecht, North Holland (Noord-Holland) and South Holland (Zuid-Holland). There are approximately 700,000 residents that live within the Green Heart and 7 million residents that live around it.[363]

The Green Heart is an important contributor to the quality of life within the urban region. This area is primarily an agricultural landscape with peat meadows, polders, flood plains and drained lakes.[364] Polders are low lying land that is reclaimed from a body of water and protected by dykes, which is characteristic of the Dutch landscape.[365] The peat meadows are very characteristic of the areas within the Green Heart. These areas are known for their narrow plots of land, dikes, and swamps and have a high ecological value that is mainly used for agricultural purposes.[366]

Maintaining the openness of the Green Heart is considered key to respecting its cultural-historical value. In this case, openness is seen as maintaining a non-urban landscape that does not permit land uses and development which might detract from the area's image of being open.[367] The Green Heart is also rich with cultural heritage including historic farmhouses, towns, churches, and windmills, the oldest of which date to medieval times.[368] In addition, the Old Dutch Waterline runs through the Green Heart, which includes a series of fortresses and dikes that Dutch cities used for defense purposes.[369]

363 Stichting Groene Hart, 2020a.
364 Carter-Whitney, 2010.
365 Ibid.
366 Stichting Groene Hart, 2020b.
367 Tisma and Meijer, 2019; Stichting Groene Hart, 2020a.
368 Tisma and Meijer, 2019.
369 Stichting Groene Hart, 2020c.

Figure 8 *Map of the Green Heart in the Netherlands*

Source: Stichting Groene Hart, n.d.

7.2 Legal, Policy and Institutional Framework

In the Dutch spatial planning system, the provinces and municipalities implement the national spatial and environmental planning policies. Thus, the provinces and municipalities play a key role in managing the Green Heart. The Green Heart is a key concept within Dutch national spatial planning. Because the Randstad has a Green Heart, it can profile itself as a green metropolis.[370]

Three distinct phases of planning regulations pertain to the Green Heart.[371] First, the Green Heart has been a strategic planning concept. The Green Heart concept was made official in 1958 in several government reports and has become an important concept in Dutch planning.[372] While the national planning authority and the provinces agreed on the importance of retaining the Green Heart, there were no formal measures in place to prevent urban development in that area during that time.[373] This approach to planning in the Green Heart continued until the 1990s.

The second phase of Green Heart development linked it to local land-use regulation.[374] In 1990, the Green Heart's boundaries were defined for the first time in the planning document, Supplement to the Fourth National Policy Document on Spatial Planning (Vierde Nota over de Ruitelijke Ordening Extra, Vinex) and then further elaborated in 1992.[375] The defined boundaries led to a restrictive policy that limited urban land-uses within its borders.[376] The provinces of South Holland, North Holland and Utrecht were required to adopt a contour policy, whereby they had to create a revised regional plan that defined the outermost building boundary for every town, village and hamlet.[377] Thus, no urban extension within the Green Heart was allowed beyond what was defined in the current plans.[378] In 2002, the Green Heart was designated as a national landscape. This classification meant that development was allowed within the Green Heart, provided that the core landscape qualities were preserved or strengthened. In addition, building capacity would not be allowed if it exceeded demand in the area.[379] However, strong national policies to protect the Green Heart did not endure long-term, ending in 2010 with the election of a new government.

The third phase of Green Heart planning is connected to broader trends of deregulation and decentralization.[380] In 2010, a new right-wing national government was elected and made changes to national spatial planning policies. The Green Heart was removed as a national strategic planning concept.[381] In 2012, a new, more central coalition Cabinet took over and landscape protection stopped being a concern of national planning and was delegated to the provinces. However, the coalition government stated that sustainable urban development was of national importance.[382] The provinces became responsible for future development within their jurisdictions and were not obligated to follow previous regulations, with the exception of the National Ecological Network.[383]

370 Van der Valk and Flaudi, 1997.
371 Korthals Altes, 2018.
372 Korthals Altes, 2018; Tisma and Meijer, 2019.
373 Korthals Altes, 2018.
374 Ibid.
375 Tisma and Meijer, 2019.
376 Korthals Altes, 2018.
377 Ibid.
378 Ibid.
379 Ibid.
380 Ibid.
381 Ibid.
382 Ibid.
383 Tisma and Meijer, 2019.


Photo courtesy of Ruben Griffioen

In addition, during this phase, the Green Heart was abolished by South Holland at the provincial level.[384] Of the three provinces involved in Green Heart protection, South Holland has the biggest land area within the Green Heart. Thus, while a Green Heart policy still exists in the provinces of North Holland and Utrecht, it does not in South Holland. With the three provinces involved taking different approaches to Green Heart, it has led to inconsistent policy implementation. In addition, the lack of political incentive to deal with the Green Heart holistically can undermine its protection in the long-term.[385] In South Holland, the province still has an urban containment policy with different categories of protection for rural areas.[386] However, the lack of a Green Heart policy means that the location inside or outside the Green Heart will not influence the feasibility for development. The abolition of the Green Heart as a national planning concept and as an area of special significance has influenced planning in South Holland. Certain locations within the Green Heart are being readied for development, as they no longer have more protection than any other sites outside a built-up urban area.[387]

384 Korthals Altes, 2018.
385 Chris Kalden, personal communication, June 28, 2021.
386 Korthals Altes, 2018.
387 Ibid.

The above outlined changes, particularly the disappearance of the Green Heart as a national policy concept, reflect broader shifts in Dutch national spatial planning in the past decade. It is no longer comprehensive; its geographical scope is narrower and spatial planning has been increasingly delegated to provinces and municipalities.[388] Many national urbanization policies have been abolished and economic development has become a main priority for spatial planning.[389]

Furthermore, Dutch environmental and spatial planning legislation is currently being significantly reformed. The introduction of the new Environment and Planning Act (Omgevingswet) will combine, simplify and modernize legislation and regulations related to construction, the environment, spatial planning, nature and water.[390] This ambitious new legislation will bring together 26 laws, 60 general administrative orders and 75 ministerial regulations.[391] At the time of writing, the implementation of this new Act has been delayed until July 1, 2022.

A National Strategy on Spatial Planning and the Environment (NOVI) is a precursor to the new Environment and Planning Act coming into effect. A draft of the NOVI was released in 2019. The NOVI integrates and replaces previous policies including the National Environmental Policy Plan, the Government Vision on Nature 2014 and the National Policy Strategy for Infrastructure and Spatial Planning (SVIR).[392] In the NOVI, the Green Heart has been identified as a landscape of special significance deserving additional protection.[393] While the NOVI is ambitious, scholars have questioned the effectiveness of the reforms that integrate several sector policies into one predominant environmental law with few specific designations for provinces and municipalities to work with.[394] However, as the Environmental Planning Act and NOVI have not yet been implemented, it is unclear what the implications of these new policies might be.[395]

In addition to government authorities, there are other organizations that support the effective governance of the Green Heart. First, there is the Green Heart Administrative Platform (Bestuurlijk Platform Groene Hart), which a multi-stakeholder coalition between entrepreneurs, civil society organizations and government authorities. The focus of the organization is on projects related to promoting the Green Heart's identity, recreation, subsidence and spatial quality.[396] This administrative platform includes representatives from three provinces, national government ministries, a regional water board, along with aldermen and a mayor of local municipalities.[397] The organization works with key stakeholders on projects involved the Green Heart such as provincial and municipal governments, water boards, PBL (the Netherlands Environmental Assessment Agency), universities and local businesses. Second, the Green Heart Foundation (Stichting Groene Hart) is committed to preserving and enhancing the Green Heart. The foundation works together with municipalities, the private sector, non-governmental organizations and residents on marketing, promoting and monitoring the Green Heart.[398] In addition, the foundation organizes consultations for local and regional organizations that are actively involved in managing the Green Heart. The foundation also supports the development, branding and sale of a wide range regional products from the Green Heart.

388 Zonneveld, 2016.
389 Ibid.
390 Rijksoverheid, n.d.-a.
391 Ibid.
392 Rijksoverheid, n.d.-b.
393 Ibid.
394 Nadin and Zonneveld, 2021.
395 Van der Wouden, personal communication, June 24, 2021.
396 Bestuurlijk Platform Groene Hart, n.d.-a
397 Ibid.
398 Tisma and Meijer, 2019.

7.3 Growth Management

The Randstad is one of the largest metropolitan regions in Europe with a population of over 8 million people.[399] It is the economic centre of the country and has an extensive transportation and infrastructure network including the port of Rotterdam, Schipol Amsterdam Airport, railways, dikes and water pumping stations. The Randstad is seen as an attractive region for businesses and new residents given its cultural amenities, highly educated workforce and access to infrastructure networks and natural areas. However, the close proximity of this metropolitan region's major cities to the Green Heart creates significant threats to the continued protection of this open space.

First, the Green Heart has been threatened over the past decades by development pressures. Scholars have found that Dutch national spatial planning policies have failed to prevent urban sprawl within the Green Heart, despite efforts to redirect growth elsewhere.[400] Within the Green Heart, the percentage of urban land-uses grew from 13% in 1996, to 15.4% in 2006, and to 16.4% in 2015.[401] This higher rate of growth within the Green Heart is, in part, caused by business park development.[402] Municipalities have been interested in developing business parks in order to attract more employment in their jurisdictions. In addition, in recent years there has been the growth of distribution centres in the Green Heart, particularly between Gouda and the Hague.[403] Furthermore, pressure on the Dutch housing market is likely to increase in the future. In 2018, the national government announced that one million new homes should be built before 2030 to meet growing demand.[404] However, there are concerns that building these homes would require the destruction of natural areas and farmland, and may not address housing affordability issues. At the time of writing, the government was not on track to meet this ambitious target. Given the current planning approvals, the number of new homes estimated to be built by 2030 is 585,000.[405]

Second, as four major cities surround the Green Heart, transportation issues impact this open space. High levels of congestion are an ongoing problem in the Randstad. There is frequently a high number of traffic jams in and around the Green Heart.[406] Almost half of the commuters from the Green Heart work in the surrounding cities, in particular Amsterdam and Utrecht, which puts pressure on the roadways.[407] The Green Heart's local road network is often used as a short cut to avoid the congestion issues on regional networks.[408] In the past 10 years, the road network in the Green Heart has remained relatively the same. However, in part to deal with the growing traffic congestion, the capacity has been increased by road widening.[409] Extra lanes have been added along the A2, A4, A12 and the N210 roadways within the Green Heart.

399 Nadin and Zonneveld, 2021.
400 Van der Wouden, 2021.
401 Ibid.
402 Ibid.
403 Van der Wouden, personal communication, June 24, 2021.
404 Van der Wouden, 2021.
405 Jansma and Ockhuijsen, June 7, 2021.
406 Stuurgroep Nationaal Landschap Groene Hart, 2018.
407 Ibid.
408 Fazal et al., 2012.
409 Ibid.

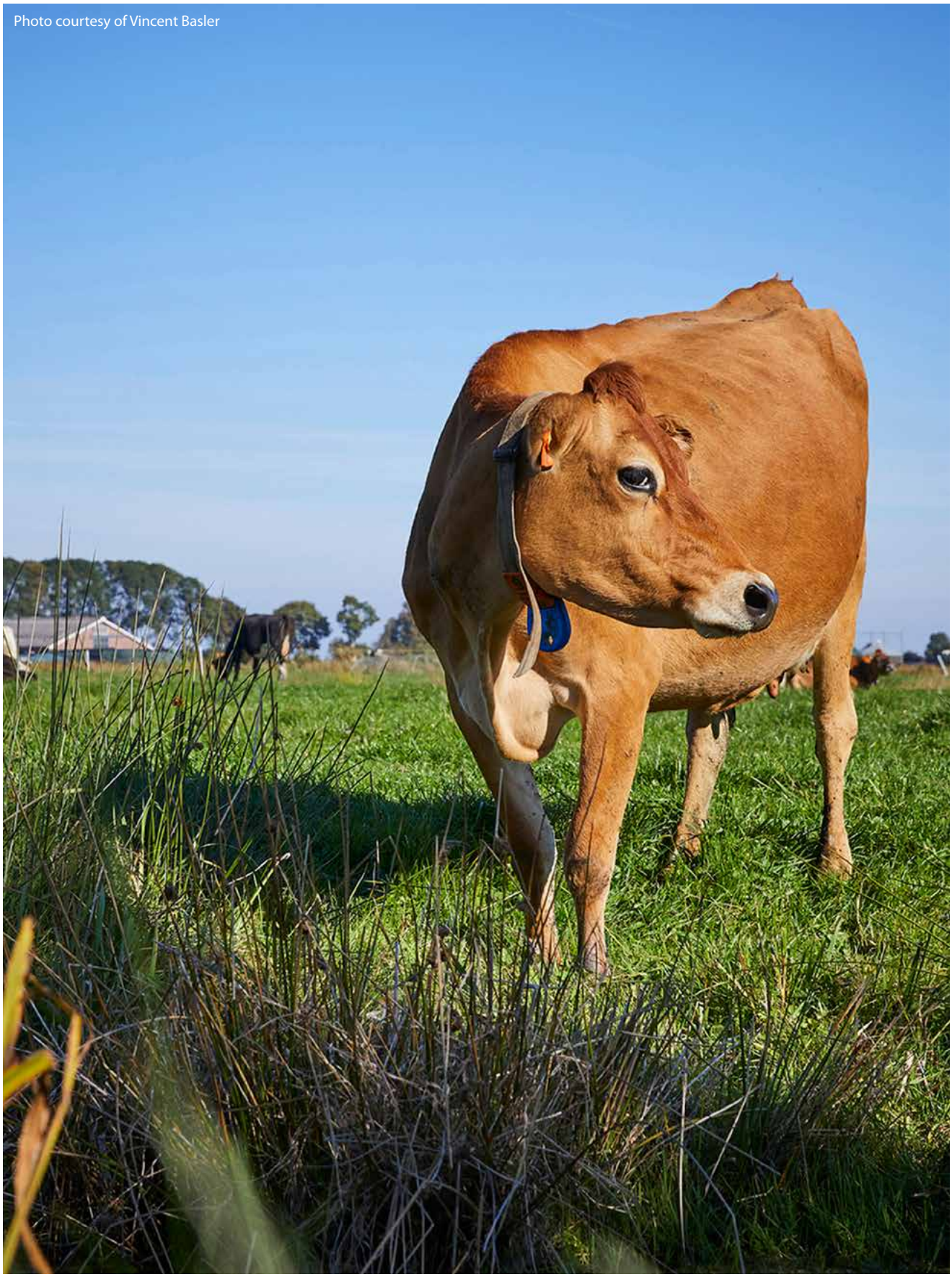

Photo courtesy of Vincent Basler

7.4 Food and Agriculture

The main land use within the Green Heart is agriculture. There are approximately 3,500 agricultural businesses within this area.[410] Almost half of the agricultural operations within the Green Heart are dairy farms. Horticulture and livestock farms also play a key role in this sector. Agricultural land prices within the Green Heart have increased rapidly between 2012 and 2018, with prices rising by 22%.[411] Similar to other locations in the Netherlands, agriculture in the Green Heart is under intense pressure. Dutch agriculture has been highly productive since the 1950s. However, the stability of this agricultural system in the long-term remains uncertain.[412]

One of the main issues facing the agricultural sector is soil subsidence (i.e., the sinking, setting or compaction of the soil). A large portion of the Green Heart contains peat soil or clay on peat soil, making it vulnerable to subsidence.[413] Almost the entire Green Heart lies below sea level. De-watering makes living, working and agriculture possible in these conditions. De-watering is a process whereby the water board drains the peatland for agricultural purposes, bringing the water table down to below the land surface.[414] Lowering the surface water level is a common way to achieve the carrying capacity needed to facilitate productive crop yields.[415] However, dewatering means that the peat settles, resulting in the gradual subsidence of the soil. It is estimated that peat meadow subsidence averages 8 mm per year and in heavily drained areas used for crops, subsidence rates can be up to several centimetres per year.[416] The dewatering of the peat meadows causes a chemical reaction that oxidizes the peat, resulting in CO_2 emissions and poorer water quality.[417] In addition, there are higher costs associated with infrastructure maintenance in these areas. If no actions are taken, then over time the management costs for water boards and municipalities will increase. The agricultural sector will face limitations with their operations, with dairy farming being the hardest hit.[418] It is estimated that it will cost an additional 200 million euros over the next 40 years for water management as a result of subsistence.[419] Thus, addressing subsidence is a major priority for governments within the Green Heart.

There are different measures being explored to mitigate subsidence rates in peatlands including sub-surface irrigation, refraining from adjusting the depth of the water table and changing land uses to natural areas or wetland agriculture.[420] However, in the long term, collaboration between the stakeholders is needed on this issue, as reducing subsidence will have significant impacts on future agricultural operations. An example of such collaboration is the Green Heart Land Subsidence Regional Deal (2019-2023), which involves eight regional governments, universities, the agricultural sector, businesses and residents. Twenty million euros has been invested in this initiative from the national and regional governments, which will support 24 innovative projects that focus on addressing subsidence issues.[421]

410 Stuurgroep Nationaal Landschap Groene Hart, 2018.
411 Ibid.
412 Stuurgroep Nationaal Landschap Groene Hart, 2017.
413 Stuurgroep Nationaal Landschap Groene Hart, 2018.
414 PBL, 2016.
415 Ibid.
416 Ibid.
417 Stuurgroep Nationaal Landschap Groene Hart, 2018.
418 PBL, 2016.
419 Ibid.
420 Ibid.
421 Regio Deal Bodemdailing Groene Hart, 2022.

7.5 Nature-Based Solutions

While the predominant land-use within the Green Heart is agriculture, the landscape also plays an important role in nature conservation. The Green Heart assists with mitigating climate change through carbon storage and protecting biodiversity.[422] It also provides habitat for wide variety of flora and fauna species, including migratory birds. However, due to land use changes in recent decades, biodiversity in the Green Heart is under threat. For example, in agricultural areas, 60% of species biodiversity has decreased since 1970s.[423] As a result of these adverse impacts, efforts have been made to reduce habitat fragmentation and increase the protection of natural areas. The National Nature Network (NNN) covers 30,000 hectares of the Green Heart, which is 17% of the area. The NNN is a green infrastructure related network linking natural areas that focuses on developing and maintaining the EU's Natura 2000 network within the Netherlands and to ensure species protection under the Birds and Habitats Directive. Also, 22,000 hectares of the Green Heart is under the regulation of the Agricultural Nature and Landscape Management system, which is 12% of the area.[424]

Climate change for the Netherlands is expected to bring an increased risk of flooding due to rising sea levels, more drought periods, heavier precipitation and biodiversity loss.[425] As the Green Heart is one of the lowest and wettest areas within the country, the consequences of climate change could be significant there. As a result, the country's energy system must be reformed significantly in the coming years. In 2015, the Netherlands signed the Paris Climate Agreement. For the country, this means an 85-95% reduction in greenhouse gas emissions in 2050 compared to 1990 levels.[426] The aim is to meet 14% of Dutch energy needs sustainably by 2020 and 16% by 2023.[427] The Green Heart can play a key role in this energy transition. The Green Heart has the physical space to host sustainable energy solutions such as windmills, solar panels, biomass and geothermal energy. The total power generated by wind turbines in the Green Heart has increased by 140% since 2010.[428] However, the percentage of sustainable energy generated in the Green Heart is still lower than what occurs within the rest of the country, and thus could be improved in the coming years.

> **The Green Heart assists with mitigating climate change through carbon storage and protecting biodiversity. Due to recent land use changes, biodiversity in the Green Heart is under threat. As a result, efforts have been made to reduce habitat fragmentation and increase protection of natural areas.**

422 Patricia Franscoise-Braaksma, personal communication, July 12, 2021.
423 Bestuurlijk Platform Groene Hart, n.d.-b.
424 Stuurgroep Nationaal Landschap Groene Hart, 2018.
425 Stuurgroep Nationaal Landschap Groene Hart, 2017.
426 Bestuurlijk Platform Groene Hart, n.d.-c.
427 Ibid.
428 Stuurgroep Nationaal Landschap Groene Hart, 2017.

7.6 Outdoor Tourism and Recreation

The Green Heart provides important recreational spaces for its residents and visitors from surrounding cities. The Green Heart has many cycling, walking and sailing routes, along with local attractions. These activities resulted in approximately 1.35 billion € being spent on leisure activities in this area.[429] Thus, recreation and tourism in the Green Heart play an important role in supporting the regional economy. In addition, the number of jobs in the tourism and recreational sectors in the Green Heart has increased more than the national average in the Netherlands in recent years. More than 6% of the jobs in the Green Heart are related to the tourism and recreational sectors.[430]

Despite this importance of tourism and recreation, there is no single tourism organization that serves the Green Heart as a whole and there is not a coherent tourism strategy.[431] Tourism programs are largely focused on the leisure economy and promote local attractions such as museums, galleries, windmills, cheese markets and the historical towns and fortifications of the Dutch Waterline. Similar to other greenbelts examined in this report, there is a focus on promoting cycling and hiking routes. The Green Heart Foundation has mapped out routes that are available to download from an app which promotes the exploration of natural areas as well as the industrial history of the area.

As a result of its unique landscapes and the abundance of water resources found within the Green Heart, there is potential for the leisure economy to further grow in the coming years. In the Green Heart, there are efforts being made to strengthen the leisure economy.[432] This is being done through making better use of the tourism and recreational icons of the Green Heart and making waterways more accessible for water sports.[433]

429 Ibid.
430 Stuurgroep Nationaal Landschap Groene Hart, 2017.
431 Chris Kalden, personal communication, June 28, 2021
432 Stuurgroep Nationaal Landschap Groene Hart, 2017.
433 Ibid.

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Photo courtesy of Ben Botkin

8

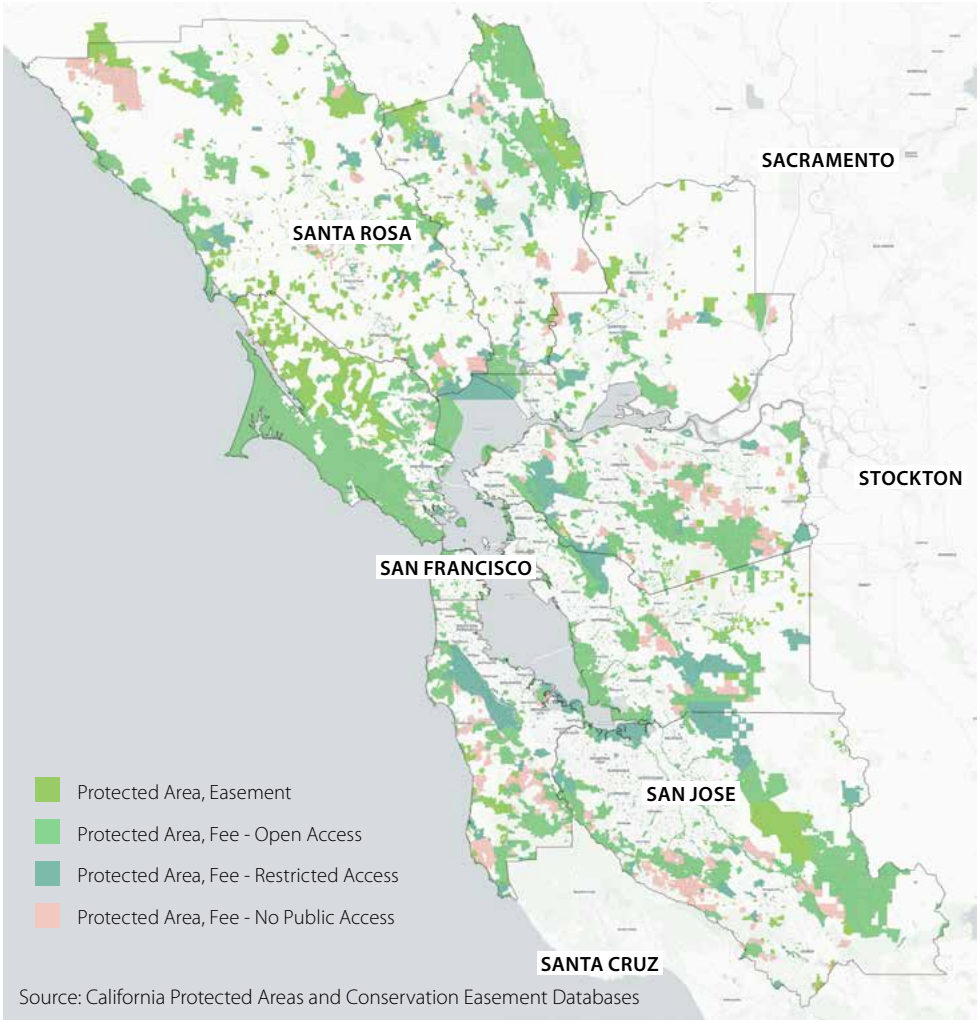
San Francisco Bay Area Greenbelt

Year Established	1970s
Size	3.3 million acres, spans across 9 counties and 101 municipalities.
Main Policy Objectives	To foster, promote, and support natural processes, creating healthier landscapes that are more resilient to disturbance.
Key Features	- Not considered a unified "greenbelt." - Network of protected land includes ranchland, farms, wildlife habitat, and wetlands.
Institutional framework and governance	- Main pieces of legislation include the Federal and State Endangered Species Act (1973) and the Wildlife Corridors Conservation Act of 2019. - Environmental organizations play an important role in bringing people together, mobilizing resources, and providing leadership. - Habitat Conservation Plans (HCPs) and Natural Community Conservation Plans (NCCPs) provide scientific and legal frameworks to assist in conservation efforts.
Threats	- Urban sprawl and development on natural and agricultural lands. - Construction of large-scale event centres and resorts on farmland. - The division of undeveloped lands into smaller lots. - High cost of land for agricultural uses and conservation. - Threats of climate change such as wildfire, drought, sea level rise, and invasive species.
Successes	- Partnerships across local jurisdictions, regional open space districts, environmental and equity non-profits, and agricultural stakeholders. - Popular support for land conservation. - Strong level of protection secured through voter-approved urban growth boundaries (UGB).

8.1 Distinctive Features

The San Francisco Bay Area greenbelt is unique in that it is not considered a unified "greenbelt." It is a network of protected land consisting of "open space, parks, preserves, and agricultural lands which surround or are adjacent to a city or urbanized area that restricts or prohibits residential, commercial, and industrial development."[434] Almost 3.3 million acres[435] of the Bay Area's nine counties are protected open spaces which include ranchland, farms, wildlife habitat, and wetlands[436] (see Figure 9). The network of natural and working lands surround 101 municipalities across nine counties in the Greater San Francisco Bay Area and include the cities of San Francisco, Oakland, and San Jose.[437] The goal of the San Francisco Bay Area greenbelt is to foster, promote, and support natural processes, creating healthier landscapes that are more resilient to disturbance. Tom Robinson, Project Director of the Bay Area Conservation Lands Network adds, "The goal is not just to make sure that these lands are functioning as naturally and as robustly as possible, but to do it now."[438]

Figure 9 *Map of San Francisco Bay Area Protected Lands*



Source: California Protected Areas and Conservation Easement Databases

434 Greenbelt Alliance, 2021, p. 5.
435 Sarah Cardona, personal communication, July 22, 2021.
436 Greenbelt Alliance, 2017.
437 Tom Robinson, personal communication, July 21, 2021.
438 Ibid.

The San Francisco Bay Area features diverse and unique landscapes in the form of old redwood forests, oak grasslands, hillside and valley rangelands, wetlands, and riparian stream valleys. This complex ecosystem is home to several native and endemic plants and animals. More than 3,000 plant species are found in the region with 121 plant species at risk and listed for federal and state protection.[439] In addition, the Bay Area's ecosystems support over 300 species of birds as well as iconic animals such as mountain lions, bobcats, Golden Eagles, and steelhead trout.[440]

For thousands of years the Bay Area has been home Indigenous people, including the Ohlone, Miwok, Kashia, Pomo, Mishewal Wappo, Amah Mutsun, and Patwins tribes.[441] According to the U.S. Census, the Indigenous population in the Bay Area is 18,500 and is projected to grow in the coming decades.[442] Indigenous people in the Bay Area have traditionally been stewards of these lands. Traditional stewardship practices include controlled burns to promote the growth of grasses and seeds and to mitigate the risk of intense wildfire. The Amah Mutsun tribal band and the Muwekma Ohlone tribe protect their shared ancestral lands in Coyote Valley by restoring it for wildlife, growing and gathering native plants, as well as sharing traditional knowledge and stories.[443]

Photo courtesy of Ben Botkin

439 Bay Area Open Space Council, 2019.
440 Ibid.
441 TOGETHER Bay Area, 2020.
442 Indigenous populations in the Bay Area, 2021.
443 Greenbelt Alliance, 2017.

8.2 Legal, Policy and Institutional Framework

The network of protected lands that form the San Francisco Bay Area greenbelt is made up of government-owned parks, reserves, and open spaces as well as privately owned land.[444] Generations of Bay Area residents have fought for these protections in the form of conserved or protected areas.[445] These are natural and agricultural lands that are permanently protected by fee title ownership or conservation easements which prevents the conversion of these lands to uses that are incompatible with biodiversity conservation.[446] Federal and state tax incentives were created in the 1970s to encourage landowners to donate their land to land trusts or sell conservation easements to public authorities as a way to protect agricultural and ecologically sensitive areas.[447]

The San Francisco Bay Area has been a leader in the conservation of open space, bay waters, and coastal areas for over a century. Environmentalists fought for the protection of Yosemite Valley which became the first U.S. national park in 1860. Tax-funded conservation began in the 1920s and 1930s, with the creation of several state parks and the East Bay Regional Park District. In the 1960s, Bay Area residents organized to stop the widespread development of freeways, pushed for regional greenbelt planning, and worked to protect agricultural areas with conservation reserves. The Golden Gate National Recreation area was established in the early 1970s as well as several open space districts and land trusts.[448]

Environmental organizations have played an important role in bringing people together, mobilizing resources, and providing leadership to protect Bay Area lands. These have been successful due to organizing at different scales. At the local level, organizing reflects everyday experiences and demands, such as working to preserve local creeks, while organizing at the regional level provides a broader prospective.[449] For example, the Greenbelt Alliance works with local growth control groups to provide planning expertise and a regional vision, helping build a regional greenbelt from both the bottom up and the top down. Tom Robinson reveals, "without NGOs and civil society groups, so much of the most critical elements of all of this conservation work would simply not happen."[450]

Many of the hard-fought conservation victories laid the groundwork for a myriad of laws and land use regulations that continue to protect the Bay Area lands. While there is no single policy that works to protect these lands, there is a suite of legislation, policies, and programs that work together to protect environmentally sensitive areas, watersheds, and agricultural lands at the federal, state, regional, and local level. Primary pieces of legislation used to conserve the San Francisco Bay Area lands includes the Federal and State Endangered Species Act (1973) and the Wildlife Corridors Conservation Act of 2019. In addition, state climate change legislation is playing an increasing role in conservation efforts where local jurisdictions are required to consider sustainability in their growth plans. For example, the California Global Warming Solutions Act of 2006 requires the state to reduce its greenhouse gas emission to 1990 levels by 2020 and 40 per cent below 1990 levels by 2030. The legislation also appoints the California Air Resources Board (CARB) to develop policies to meet the goal.[451]

444 Walker, 2019.
445 Greenbelt Alliance, 2017.
446 Bay Area Open Space Council, 2019.
447 Farja, 2017.
448 Tom Robinson, personal communication, October 26, 2021.
449 Ibid.
450 Tom Robinson, personal communication, July 21, 2021.
451 Berkeley Law, 2021.

Growth and development impacts on Bay Area lands are mitigated through the implementation of Habitat Conservation Plans (HCPs) and Natural Community Conservation Plans (NCCPs). These plans provide scientific and legal frameworks to assist in conservation efforts and provide funding for land protection, monitoring, restoration, and long-term stewardship.[452] This funding is generated from local development fees as well as federal, state, and foundation grants. Habitat and Natural Community Conservation Plans work to protect threatened and endangered species as well as natural heritage at the regional and local level. Currently, the Bay Area has three Habitat Conservation Plans at the regional scale, which covers Solano County, East Contra Costa County, and Santa Clara Valley, as well as one that covers all nine counties.[453]

At the regional level, a number of jurisdictions work together to protect the Bay Area greenbelt lands. The Bay Area's Metro Transit Commission (MTC) has initiated a Priority Conservation Program which allows communities to identify and designate potentially at-risk areas that they want to protect.[454] This includes farming, ranching, recreational, and resource lands. Furthermore, the Conservation Lands Network 2.0, a regional conservation strategy for the San Francisco Bay Area sets out a number of goals and data driven decision making tools to support investment in land protection and stewardship. The goals for the Conservation Lands Network 2.0 include the conservation of 2.5 million acres of priority lands by 2050; the conservation of irreplaceable landscapes, core habitats and the lands that connect them; and the stewardship of lands to maintain ecological and hydrological processes to support ecosystem function and resilience.[455]

The Conservation Lands Network 2.0 recognizes that conservation work must be done on a regional scale because "species, habitats, water, and natural processes do not adhere to county or other administrative boundaries."[456] Through the Bay Area Open Space Council, over 65 land conservation and management organizations work together to achieve these conservation goals. In addition to conservation efforts, land stewardship is increasingly important in managing biodiversity and ecological resilience in the region.

Finally at the local level, a strong level of protection is secured through voter-approved growth boundaries. Urban growth boundaries (UGB), also sometimes called urban limit lines (ULL), are municipal urban growth boundaries written into a city or county's general or comprehensive plan. The boundaries define where growth can or cannot occur and depending on the policy, changes can be approved by either elected officials or voters.[457] Urban growth boundaries create a separation between urban areas and surrounding natural and agricultural lands and are meant to encourage compact, walkable development located close to public transit services. Urban growth boundaries are implemented for a set time period, which is usually 20 years, and are a proven tool for preventing urban sprawl in the Bay Area.[458] Another mechanism which helps to manage urban growth are community separators. These policies are also voter enacted and are used to preserve land outside of urban growth boundaries to maintain the character between urban and rural areas. In 2016, Sonoma County designated 36,000 acres of land as community separators. Recently, voters renewed the protection of the system which now totals over 53,000 acres of protected land between towns.[459]

452 Bay Area Open Space Council, 2019.
453 Ibid.
454 Chirag Rabari, personal communication, July 7, 2021.
455 Bay Area Open Space Council, 2019.
456 Ibid.
457 Greenbelt Alliance, 2017.
458 Greenbelt Alliance, 2016.
459 Greenbelt Alliance, 2017.

8.3 Growth Management

The San Francisco Bay Area, like in many other parts of North America, is experiencing an affordable housing crisis. According to the Greenbelt Alliance, home prices in some parts of the region have doubled since 2004. This is compared to the national average which has seen a 13 per cent increase.[460] It is predicted that by 2040 the population of the Bay Area will grow from 7 million to 9.3 million people.[461] The high cost of land, housing unaffordability, and population growth have led to development proposals on open space and farmland across the region.[462] Around 31 per cent of natural vegetation in valleys, foothills, and mountains have been eliminated due to conversions to urban and agricultural lands.[463] About 293,100 acres of natural and agricultural lands are at risk for development over the next 30 years with 63,500 acres of that land at risk for development within 10 years.[464]

The majority of the region's natural and agricultural lands experiencing development threats are in communities at the edge of the region, including Santa Clara County, eastern Contra Costa County, and Solano County. Since many of these new developments are in the region's periphery, they encourage urban sprawl and car-dependency.[465] Traditionally it was easier and less costly to develop farmland and open spaces, but more recently this has become a less popular development mode due to a combination of citizen action and urban growth boundaries.[466] This trend in confirmed in the Greenbelt Alliance's 2012 At Risk Report where the amount of total land at risk in the Bay Area has dropped in-part due an increase in land acquired for permanent protection. Furthermore, Bay Area communities and decision makers have also voted to restrict development on 2.2 million acres of land through a combination of growth boundaries, hillside ordinances, and agricultural zoning.[467] Protection of greenbelt lands is considered essential for sustainable growth, encouraging infill development and creating healthy central business districts.[468]

The planning profession including local city planners have played an important role in the conservation of greenbelt lands by addressing urban sprawl, housing supply, and local land use regulation.[469] The Metropolitan Transportation Commission is a public, governmental agency that is responsible for planning, financing, and coordinating transportation projects in the Bay Area. The commission's scope has expanded over the years to include other regional issues such as housing and development.[470] The MTC's regional planning staff provides services and support to the Association of Bay Area Governments (ABAG), a council of governments made up of local officials which has historically focused on regional issues such as housing, land use, the environment, and economic development.[471]

Every four years, planners working under MTC and ABAG produce a long-range plan called Plan Bay Area which focuses on housing, the economy, transportation, and the environment. The latest Plan Bay Area (2050) is due for adoption in October 2021. Matt Maloney, Director of Regional Planning, explains that "the plans…envision a forecasted development pattern for the region with housing and jobs. They also contain a fiscally constrained set of transportation projects and programs. Together with the transportation and the development piece of it, we're required to achieve some greenhouse gas reduction targets that are set by the state of California."[472]

460 Ibid.
461 Greenbelt Alliance, 2016.
462 Greenbelt Alliance, 2017.
463 Bay Area Open Space Council, 2019.
464 Greenbelt Alliance, 2017.
465 Ibid.
466 Tom Robinson, personal communication, July 21, 2021.
467 Greenbelt Alliance, 2017.
468 Greenbelt Alliance, Bay Area Open Space Council & Association of Bay Area Governments, 2009.
469 Walker, 2019.
470 What is MTC? 2021.
471 Matt Maloney, personal communication, July 7, 2021.
472 Ibid.

The goals of the Plan Bay Area 2050 include: "increasing the supply, diversity, and affordability of housing; promoting infill development; promoting an improved intraregional relationship between jobs and housing; protecting environmental resources; and promoting socio-economic equity."[473] The plan does not forecast any development outside of the urban growth boundaries and focuses largely on infill development around transit stations.[474]

Municipalities are not forced to comply with the Plan Bay Area 2050, rather it serves as a guide or vision for the future. Chirag Rabari, Principal Planner, notes, "one of the key things is partnerships. That's something we've really tried to focus on in the implementation of the plan is that to really maximize the viability of these strategies, we need to do things in concert with our partners across the region. Whether they're the local jurisdictions, the regional open space districts, our environmental and equity non-profits and advocates, agricultural stakeholders, etc. We have to work together with our partners across the region to really make this vision, a success and a reality."[475]

For the first time, Plan Bay Area includes an environmental element which explicitly includes strategies to protect and conserve the environment. This includes the maintenance of urban growth boundaries, the provision of strategic funds to help conserve and manage high-priority natural and agricultural lands, and the modernization and expansion of the region's parks, trails, and recreational facilities. Ben Botkin, Associate Planner, shares, "As part of the public and stakeholder outreach there has been overwhelming support in the Bay Area for conservation of our natural lands… it's pretty politically unpopular to do greenfield development…and that's a big part of why these environment strategies…got added in the first place."[476]

While there has been a reduction of greenfield development, in recent years the construction of large-scale event centres and resorts on farmland has grown. It is speculated that the connection to agriculture has allowed these developments to side-step the review process. Another threat to the San Francisco Bay Area's network of protected lands is the division of undeveloped lands into smaller lots. The Greenbelt Alliance points out this practice is largely invisible until development occurs, which fragments the landscape. These practices can occur far from urban centres, allowing for development to take place on valuable habitat or farmland.[477]

"Plan Bay Area includes an environmental element which explicitly includes strategies to protect and conserve the environment. This includes the maintenance of urban growth boundaries, the provision of strategic funds to help conserve and manage high-priority natural and agricultural lands, and the modernization and expansion of the region's parks, trails, and recreational facilities.

473 Greenbelt Alliance, 2016, p. 4.
474 Matt Maloney, personal communication, July 7, 2021.
475 Chirag Rabari, personal communication, July 7, 2021.
476 Ben Botkin, personal communication, July 7, 2021.
477 Greenbelt Alliance, 2017.

8.4 Food and Agriculture

Farmers in the San Francisco Bay Area produce a wide variety of local fruits, vegetables, fresh meat, and dairy products for the region and for export. The Bay Area's agricultural lands also host a thriving wine industry with Sonoma and Napa counties leading the region in wine grape production. Grazing lands account for the largest agricultural use, amounting to almost 75 per cent of the region's agricultural lands.[478] About 2.3 million acres of land is used for farming and grazing with 237,000 acres considered prime farmland.[479] The region's agricultural production generates almost $2.7 billion a year. When factoring in additional economic activity like jobs, food processing and food related tourism, the number increases to $6.1 billion annually. The Greenbelt Alliance reveals, "For every 100 jobs created directly by agriculture, 94 jobs are created in related businesses."[480]

There is much diversity in the region's farming operations which varies in acreage, scale of operation and connection to markets. Most operations are small farms which sell products through farmers markets, local grocers, and direct sale while a few larger scale operations sell their products through wholesalers for the global export market.[481] Although organic production, direct marketing, and agricultural tourism play a small economic role, these activities have been on the rise over the past 20 years.[482]

While almost 40 per cent of land in the Bay Area is devoted to farming and livestock grazing, since 1984 more than 200,000 acres of agricultural land across nine counties have been lost to development.[483] In addition to development pressures, agricultural challenges include the high cost of land, insufficient infrastructure, regulatory issues, and a lack of access to capital.[484] Several ideas have been proposed to keep farmers and ranchers stay on the land which include the reduction of costs and barriers to farming, finding ways to help farmers bring their products to market, and compensating farmers for the public benefits of their lands.[485] There are a number of policies and programs that have been created to help protect agricultural land in the San Francisco Bay Area and keep it in production. In the 1980s, right-to-farm laws were passed in California to protect farmers from nuisance complaints, lawsuits, and demands to restrict their activity. Furthermore, the state requires real estate disclosure statements where sellers of land must inform potential buyers if the land is located within one mile of farmland and that the property "may be subject to inconveniences or discomforts resulting from agricultural operations that are a normal and necessary aspect of living in a community with a strong rural character and a healthy agricultural sector."[486]

Each county also has a Local Agency Formation Commission (LAFCo) with a mission to limit urban sprawl, preserve natural and agricultural lands, and oversee boundary changes. The Santa Clara LAFCo has a robust agricultural policy that discourages the development of farmland even within growth boundaries and encourages municipalities to create buffers between agricultural land and new development to minimize potential conflicts. LAFCos as well as cities and counties can also develop policies that compensate for the loss of agricultural land to urban uses. Development approvals can include conditions that require the purchase of conservation easements or title transfer to a land trust or governmental organization to ensure agricultural land continues to be protected.[487]

478 Unger, Lyddan & Kraus, 2011.
479 Greenbelt Alliance, 2015.
480 Greenbelt Alliance, 2015.
481 Unger, Lyddan & Kraus, 2011.
482 Ibid.
483 Kraus & Unger, 2017.
484 Greenbelt Alliance, 2015.
485 Greenbelt Alliance, Bay Area Open Space Council & Association of Bay Area Governments, 2009.
486 Greenbelt Alliance, 2015, p. 19.
487 Greenbelt Alliance, 2015.

As the cost of agricultural land in the Bay Area's periphery continues to rise, farmers and ranchers are increasingly selling their land for development purposes. The introduction of agricultural easements and land trusts are meant to provide incentives for landowners to keep their land in agricultural use. The Williamson Act allows for landowners to enter contracts with local governments to restrict land uses to agricultural or related uses in exchange for tax benefits or other financial compensation.[488] Any future owners of the land must comply with the terms of the easement which ensures the protection of the land for agricultural purposes in perpetuity. Land trusts also play an important role in the conservation of agricultural land. Community Land Trusts (CLT) have historical roots in the Black civil rights movement. The first CLT was developed in the late 1960s by African American farmers in Georgia with the goal to increase economic and political independence.[489] In the San Francisco Bay Area, the Marin Agricultural Land Trust (MALT) was created almost 30 years ago and was one of the country's first. Since its inception, 47 per cent of the county's farmland is permanently protected.[490]

Climate change and drought conditions also create a challenge for farmers and ranchers in the San Francisco Bay Area because the lack of irrigation water limits agricultural output. A variety of innovative solutions are being developed, including the creation of storage ponds as well as tanks that collect rainwater from barns and houses. Grant programs have also been introduced to help farmers finance water infrastructure projects. Tom Robinson notes, there are a multitude of benefits for helping farmers adapt to the impacts of climate change. "It's not just conserving the agricultural land; it's helping the farmers be more resilient to these long periods of lack of water through onsite storage of stormwater. Whatever's left in the creek after the storms and the runoff and groundwater recharge is for fish and not being pulled out to irrigate crops."[491]

Another way to help protect agricultural lands is to provide support to farms and ranches so that they can maintain economic viability. California FarmLink is an organization that helps to connect new framers with landowners looking to lease or sell their land. FarmLink also provides technical assistance, helping facilitate farm transfers and lease agreements. The Greenbelt Alliance also recommends the promotion and marketing of local farm direct sales options like farmers' markets and community supported agriculture programs.[492]

For example, in Contra Costa County, government staff are working with the Brentwood Agricultural Land Trust and local farmers to bring fresh fruits and vegetables directly to food insecure neighbourhoods in the city of Richmond. Furthermore, many Bay Area institutions like hospitals, schools, and corporations require their distributors to source locally produced food. The Farm Fresh Healthcare project supplies six Bay Area hospitals with food sourced from 10 small and mid-sized farms.[493]

> **"The San Francisco Bay Area's agricultural production generates almost $2.7 billion a year.**

488 Greenbelt Alliance, 2017.
489 Doe, 2021.
490 Ibid.
491 Tom Robinson, personal communication, July 21, 2021.
492 Greenbelt Alliance, 2015.
493 Ibid.

8.5 Nature-Based Solutions

The effects of climate change are apparent in the San Francisco Bay Area and threaten both humans and the natural world with increasing droughts, severe storms, extended wildfire seasons, and sea level rise.[494] The Bay Area's network of natural and working lands provide environmental resilience and mitigate the effects of climate change. Forests store carbon and help to stabilize the climate, wetlands mitigate flooding and create a buffer for rising tides, and wildlife corridors can allow animals to migrate to less hazardous areas, preserving biodiversity. Additional ecosystem services include water filtration and storage, clean air, food production, and pollination.[495]

Active stewardship and land management practices contribute to ecosystem resilience by addressing threats like climate change, invasive species, human activity, disease, fire, and water shortages. Chirag Rabari reveals, "I think there is very much recognition across the region that with climate change, we do need to be much more proactive about addressing climate hazards and leveraging our natural resources to help us address the expected climate hazards of the future."[496]

Protecting the San Francisco Bay Area's greenbelt from urban development is fundamental for safeguarding the region's limited water supply. 30 per cent of the Bay Area's water comes from local rivers, streams, and aquifers. 1.2 million acres of land are important sites that capture, store and filter water, replenishing the regions water sources.[497] These watersheds reduce the need for costly infrastructure for water treatment and storage and help to mitigate the impacts of climate change in the form of unpredictable precipitation, hotter summers, and increased drought.[498] Keeping water in the ecosystem is important for biodiversity and provides habitats for fish and other aquatic life.

The Bay Area's natural and working lands also play an important role controlling wildfire. Wildfires are a natural feature in the region's landscape and provide ecological benefits to fire-adapted natural plants and trees, like stimulating new growth.[499] In recent years, wildfires have increased in intensity and occurrence due to drier winters, unpredictable rainfall, hotter summers, drought, and high winds.[500] Stewardship and land management activities play an important role in promoting ecological resilience and preventing the loss of life. Prescribed burns, as practiced by the region's Indigenous people for thousands of years, can mimic natural fire which controls how much combustible material is present in the landscape.[501]

Development on high-risk lands like ridges, hillsides, and canyons is the biggest risk factor that contributes to loss of lives and property. Greenbelts in the form of open space, parks, and preserves acts as natural wildfire buffers and creates separation between communities and wildlands. These lands also provide space for firefighters to create fuel breaks and mount a defense against encroaching fires. Agricultural lands like vineyards, orchards, and other food crops tend to be wildfire resistant due to the land's high-water content.[502]

494 Bay Area Open Space Council, 2019.
495 Greenbelt Alliance, 2016.
496 Chirag Rabari, personal communication, July 7, 2021.
497 Greenbelt Alliance, 2016.
498 Bay Area Open Space Council, 2019.
499 Ibid.
500 Greenbelt Alliance, 2021.
501 Bay Area Open Space Council, 2019.
502 Greenbelt Alliance, 2021.

Finally, the Bay Area Greenprint is a tool used to convey the many benefits of the Bay Area's network of natural and agricultural lands. It identifies, maps, and measures the contribution of natural resources to the ecosystem, economy, and local and regional communities and makes this information available to planners, agencies, conservation groups, and other stakeholders. Developed through a collaboration of the Nature Conservancy, Bay Area Open Space Council, American Farmland Trust, Greenbelt Alliance, and GreenInfo Network, the Greenprint can be used to educate the public on the natural values of the land.[503]

8.6 Outdoor Tourism and Recreation

The San Francisco Bay Area is well known for its parks, trails, and open spaces, attracting residents and tourists alike. The region's network of protected open space makes it a top tourist destination, contributing economic and public health benefits.[504] Access to these spaces have been incredibly important for the physical and mental health of local residents during the COVID-19 pandemic.[505] Ben Botkin reveals, "I think with COVID, it became very apparent to folks how important it is to have close to home access to outdoor recreation."[506]

From a regional planning perspective, COVID-19 emphasized the importance of spaces for outdoor recreation as well as the need to ensure access is equitably distributed through the region.[507] For example, the Bay Trail when completed will cross all nine counties, linking residents in 47 cities to recreational space for hiking, jogging, skating, cycling, among other activities.[508] Agritourism connects Bay Area residents and tourists to local food sources, creating new sources of revenue for farmers. Agritourism also presents an opportunity to educate the public on the importance of local food production.

While tourism and recreation present a number of benefits and opportunities for the region, the dramatic increase in demand of open and recreational spaces is creating tension. Tom Robinson notes, "it is possible to love these lands to death." Traffic and congestion in peripheral and rural areas is causing concern for local residents. Managers are attempting to mitigate visitor impacts on wildlife and some places are implementing a reservation system to control the crowds.[509]

503 Bay Area Greenprint, n.d.
504 Greenbelt Alliance, Bay Area Open Space Council & Association of Bay Area Governments, 2009.
505 TOGETHER Bay Area, 2020.
506 Ben Botkin, personal communication, July 7, 2021.
507 Ben Botkin, personal communication, July 7, 2021.
508 Greenbelt Alliance, Bay Area Open Space Council & Association of Bay Area Governments, 2009.
509 Matt Maloney, personal communication, July 7, 2021.

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Photo courtesy of Adriana Mattoso

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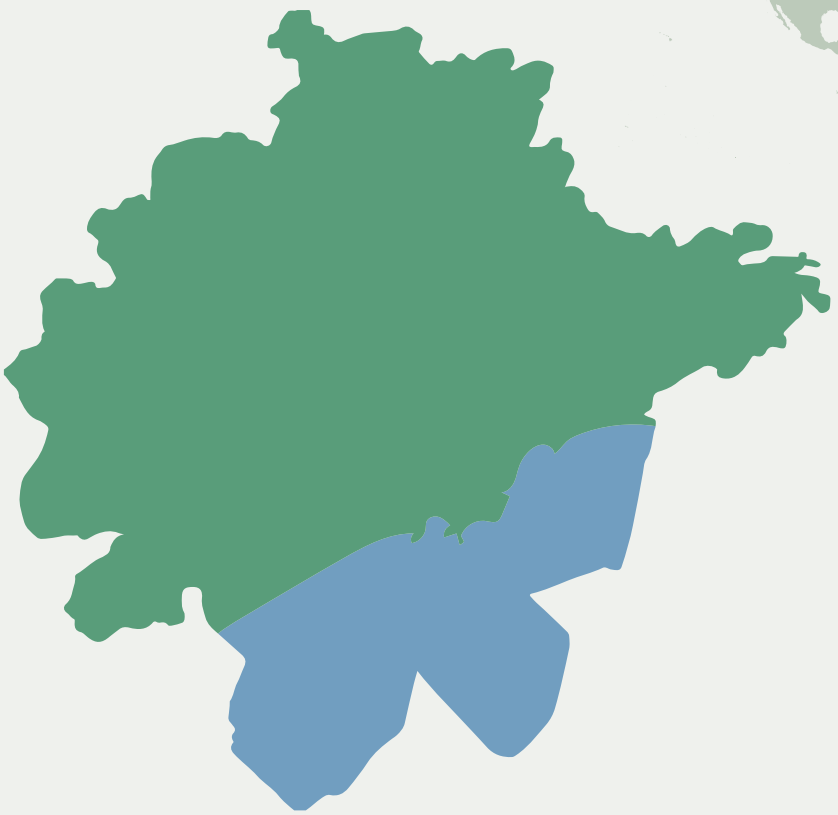


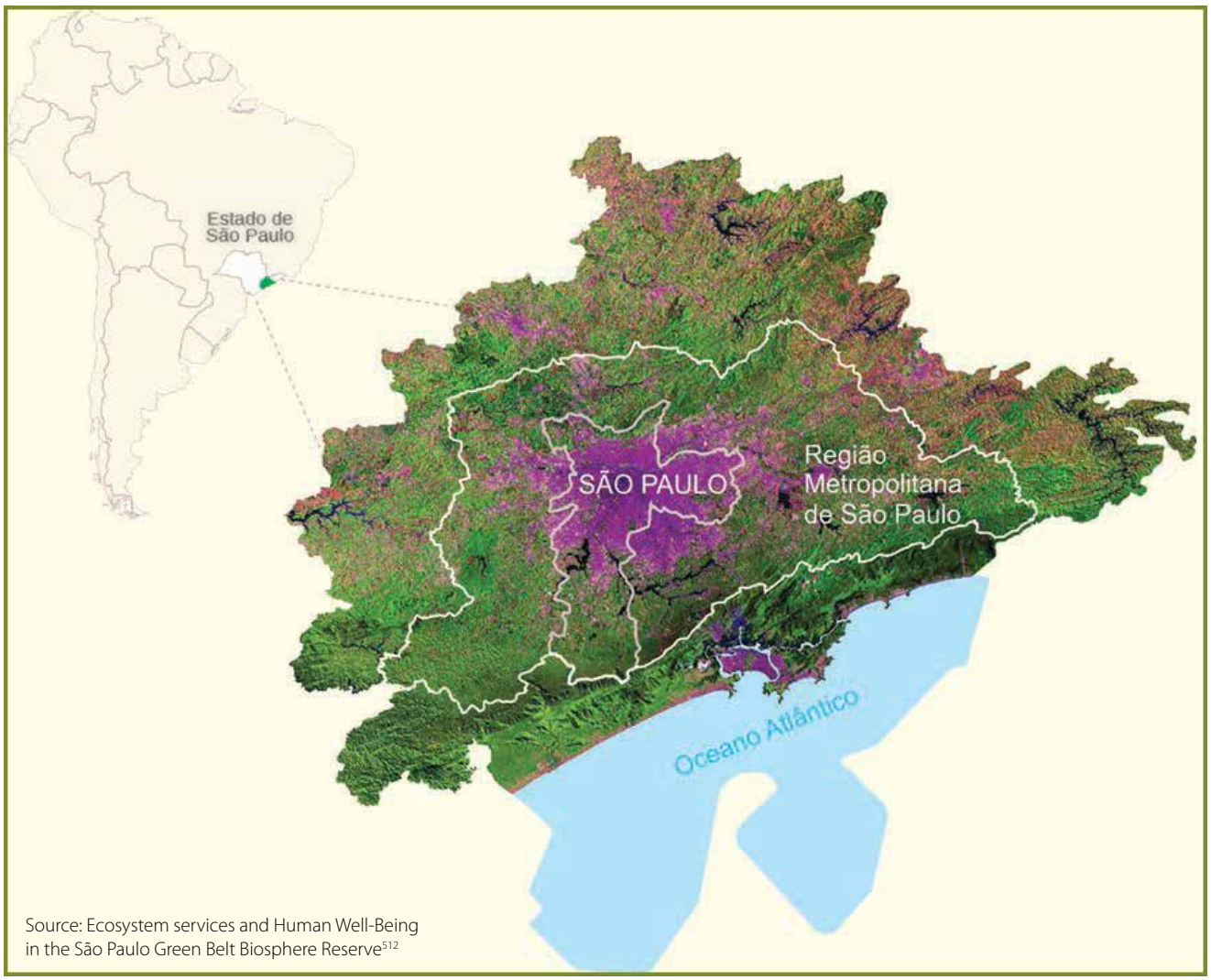
São Paulo Green Belt Biosphere Reserve

Year Established	1994
Size	2,400,682 hectares, encompassing 78 municipalities.
Main Policy Objectives	To ensure biodiversity conservation, preserve ecosystem services, and promote the wellbeing of residents.
Key Features	- Largest UNESCO biosphere reserve in an urban context. - Provides food, water, and mitigates the impacts of climate change for more than 25 million people.
Institutional framework and governance	- The management of the São Paulo Green Belt Biosphere Reserve is shared by a Coordinating Board and Management Council. - One of the major pieces of legislation that apply to the Green Belt Biosphere Reserve is the National Forest Act (Forest Code) which was created in 1965. - Forestry Institute has played an important role in creating, managing, and researching protected areas in the state of São Paulo since 1986.
Threats	- Urban growth and real estate speculation, infrastructure projects, resource extraction, and pollution.
Successes	- Citizen-led movement for conservation led to the creation of the Green Belt Biosphere Reserve. - Assessment of ecosystem services and dissemination of information to the general public and decision makers allows for greater understanding of nature-based solutions.

9.1 Distinctive Features

The São Paulo Green Belt Biosphere Reserve (GBBR) was established in 1994 through the Man and the Biosphere program of the United Nations Educational Scientific and Cultural Organization (UNESCO). It is located within the boundaries of the Mata Atlântica Biosphere Reserve which was established by UNESCO a few years earlier in 1992. The Mata Atlântica Biosphere Reserve stretches 3,000 km along the Atlantic coast and includes 17 Brazilian states.[510] Designated as an independent biosphere reserve in 2017, the GBBR encompasses 78 municipalities including the Metropolitan Region of São Paulo and the municipality of Santos, one of Brazil's busiest ports. The total area of the GBBR is 2,400,682 hectares which includes 1,863,032 hectares of land and 537,650 hectares of water.[511] It is the largest UNESCO biosphere reserve in an urban context (see Figure 10).

Figure 10 *Map of the São Paulo Green Belt Biosphere Reserve*



Source: Ecosystem services and Human Well-Being in the São Paulo Green Belt Biosphere Reserve[512]

510 UNESCO, 2020.
511 Rodrigues et al., 2020.
512 Serviços Ecossistêmicos e Bem-Estar Humano na Reserva da Biosfera do Cinturão verde da Cidade de São Paulo

The goal of the São Paulo Green Belt Biosphere Reserve is to ensure biodiversity conservation, preserve ecosystem services, and promote the wellbeing of residents.[513] Historically, the Green Belt was intended to provide land for horticultural production.[514] It provides food, water, and mitigates the impacts of climate change for more than 25 million people living in the area covered by the GBBR.[515] Spanning from forested mountain ranges to the Atlantic coast, the biosphere reserve includes tropical forests and cerrado (savannas), river basins, agricultural lands, coastal and marine ecosystems, cities, cultural heritage sites, and Indigenous lands.[516]

The São Paulo Green Belt Biosphere Reserve preserves biodiversity and resources from the Atlantic Forest Biome which has experienced massive deforestation due to urbanization, industrial growth, and intensive farming. Currently, less than 16 per cent of its original forest cover remains in the form of small and fragmented patches.[517] Despite this fragmentation, the remaining forest is home to a high number of diverse and unique species "including more than 20,000 species of plants, 261 [species] of mammals, 688 [species] of birds, 280 [varieties] of amphibians and many more not yet described by science."[518]

The São Paulo Green Belt Biosphere Reserve is not only home to thousands of unique plants and animals, but also home to two Indigenous reserves. The Jaraguá reserve, located in the northern part of São Paulo is the smallest in Brazil at 1.7 hectares. It is home to 700 Guarani Mbya indigenous people who reside in six villages. The much larger Tenondé Porã reserve (16,000 hectares) is located at the southern edge of São Paulo and is home to 1,175 Indigenous people. Many residents of all ages speak only Guarani and grow their own food like sweet potatoes and beans.[519] As of 2010, the Brazilian Institute of Geography and Statistics (IBGE) recorded 11,918 Indigenous people living in the urban area of São Paulo and 1,059 in its rural area. While there is the presence of 72 ethnic groups in the region, The Guarani, Pankararé and Pankararu peoples are the most represented. Regardless of whether Indigenous people live in the city or reserves, they face significant discrimination, poverty, and an education system that refuses to acknowledge their presence.[520]

> **The São Paulo Green Belt Biosphere Reserve is the largest UNESCO biosphere reserve in an urban context.**

513 Rodrigo Victor, personal communication, July 6, 2021.
514 Ramos-Ribeiro, 2014.
515 Rodrigues et al., 2020.
516 Ramos-Ribeiro, 2014.
517 Ribeiro, et al., 2009.
518 Alarcon, et al., 2015, p. 2.
519 Thomas, 2021.
520 Ibid.

9.2 Legal, Policy and Institutional Framework

In the late 1980s, concerns over environmental degradation in the peri-urban areas of São Paulo led to the mobilization of citizens and organizations to oppose a proposed ring road project, the Via Perimetral Metropolitana which is now called the Rodoanel Metropolitano. There were concerns that the project, proposed to bisect São Paulo's metropolitan green belt, would adversely impact the city's water supply.[521] Led by activist Vera Lucia Braga, community members collected close to 150,000 signatures calling for the suspension of the road project and for the creation of a reserve to protect the region's natural resources and biodiversity.[522]

In response to the civic campaign, the Forestry Institute, an agency of the São Paulo State Secretariat for the Environment, brought the petition to UNESCO to seek a biosphere reserve designation, which it received in 1994. The Forestry Institute has played an important role in creating, managing, and researching protected areas in the state of São Paulo since 1986. Since 2007, it shares the task of managing conservation areas with the Forestry Foundation.


Photo courtesy of Adriana Mattoso

521 Carter-Whitney, 2010.
522 Rodrigues et al., 2020.

The Forestry Foundation is responsible for the conservation, management, and expansion of the forests in the State of São Paulo. Working in partnership with government and civil society institutions, the Forestry Foundation is responsible for managing 66 conservation units of integral or strict protection and 53 units of sustainable use.[523] Conservation units are created to protect and conserve natural features as well as environmental heritage. The two major categories of protected areas ('strictly protected' and 'sustainable use') are based on the International Union for Conservation of Nature (IUCN) Protected Areas Categorization system.[524] Strict nature reserves protect biodiversity and geological features where human use and impacts are strictly controlled and limited. Protected areas with sustainable use of natural resources conserve ecosystems while permitting sustainable management and extraction of natural resources.[525]

Biosphere reserves are required to enact zoning of protected areas that includes 1) core areas devoted to long-term protection, 2) clearly identified buffer zones surrounding core areas that permit activities that are compatible with conservation goals, and 3) outer transition areas that allow for sustainable resource management practices.[526]

The management of the São Paulo Green Belt Biosphere Reserve is shared by a Coordinating Board and Management Council. The nine-member Coordinating Board, which is in charge of the Forestry Institute, runs programs and projects for the GBBR.[527] It also assists the Management Council in implementing its policies. The Management Council is a voluntary body which includes 34 members, 17 of which are government officials who represent seven regions. The other 17 members include representatives from the private sector, NGOs, and scientists from research institutions.[528] The purpose of the Management Council is to assist in the management of the GBBR and to create policies for environmental conservation and sustainable development. It is also meant to be a forum where members of the public can participate in the creation of management policies. The Coordinating Board is responsible for a number of programs and projects which includes the Youth Program (YP), Greenbelt Research Program (GBRP) and Sustainable Tourism.[529] The Youth Program is meant to improve the livelihood of the local population through education and work opportunities in fields like tourism, agroforestry, and recycling.[530]

One of the major pieces of legislation that apply to the GBBR is the National Forest Act (Forest Code) which was created in 1965. The National Forest Act requires private and public landowners to conserve and restore native forest cover in ecologically sensitive Permanent Preservation Areas (PPA), which include hilltops, as well as buffers along rivers and around springs.[531] In addition, landowners must set aside 20 per cent of their property (or between 35 per cent and 80 per cent when in the Amazon) for native vegetation conservation or sustainable use. In 2012, the Brazilian National Congress voted to weaken the Forest Code with the introduction of the Native Vegetation Protection Law.[532] This new law introduced significant changes to the 1965 Act, reducing the amount of area required for Permanent Preservation Areas as well as eliminating the requirement for small rural properties to set aside 20 per cent of their land as a Legal Reserve.[533] In addition, the 2012 law created a national land registry (SICAR) as a way to address illegal deforestation by reducing the costs of monitoring, enforcement, and compliance.[534]

523 Instituto Florestal, 2021.
524 Rodrigo Victor, personal communication, July 6, 2021.
525 IUCN, n.d.
526 Elbers, 2008.
527 Victor et al., 2004.
528 Elbers, 2008
529 Victor et al., 2004.
530 Elbers, 2008.
531 Alarcon, et al., 2015.
532 Rosário, Guimarães & Viani, 2019.
533 Ibid.
534 Azevedo, et al., 2017.

9.3 Growth Management

The São Paulo Green Belt Biosphere Reserve faces a number of threats which include urban growth and real estate speculation, infrastructure projects, resource extraction, and pollution.[535] Dr. Yara Maria Chagas de Carvalho, an academic representative on the GBBR Management Council notes, "São Paulo State and particularly the Green Belt Biosphere Reserve is the most important area in economic and population terms in Brazil. The main threat is related to that because you're always having new infrastructure being proposed, population growth causing urban [expansion] and poor housing spreading over new sensitive areas, water and air pollution and so on."[536] Urban growth is largely managed at the local level, where spatial planning is conducted by municipalities. The São Paulo Strategic Master Plan, released in 2016, defines a set of guidelines for the city's development and growth for the next 16 years.[537]

Urban growth expands from the centre of São Paulo creating dense, central areas with a concentration of infrastructure, public services, and high-income residents. Low income and poor residents are displaced to areas in the periphery which are characterized by concentrated poverty, spatial segregation, pollution, and violence.[538] Population growth in São Paulo's peripheral areas is greater than the city itself, putting pressure on native ecosystems and watersheds and exposing residents to potential flooding and landslides.[539]

Much of this population growth in São Paulo's periphery is due to illegal settlements. While the practice was considered illegitimate between the 1950 and 1970s, informal urbanization is now considered a legitimate, although undesirable, form of urban growth.[540] Lacking proper infrastructure and urban services, these settlements are often located in Permanent Preservation Areas including hilltops and riverbanks or along the boundary of Conservation Units.[541]

"The São Paulo Green Belt Biosphere Reserve faces a number of threats which include urban growth and real estate speculation, infrastructure projects, resource extraction, and pollution.

535 Victor et al., 2004.
536 Dr. Yara Maria Chagas de Carvalho, personal communication, July 26, 2021.
537 City of São Paulo, 2014.
538 Victor et al., 2004.
539 de Mello-Théry, 2011.
540 Rocco, Royer & Gonçalves, 2019.
541 de Mello-Théry, 2011.

9.4 Food and Agriculture

Agriculture plays an important role in the São Paulo Green Belt Biosphere Reserve where farmers produce many types of fruits and vegetables for the region as well as crops for international and domestic export. The municipality of Mogi das Cruzes in the eastern part of the GBBR is the primary food supplier of the Metropolitan region of São Paulo and is the largest production center for fruits, vegetables, and flowers in Brazil.[542] Additional agricultural activities in the GBBR include raising livestock and forestry. Commercial farming has been present in the Southern region of the GBBR (Parelheiros) since the early 1990s, with the arrival of Japanese and German immigrants.[543]

Both conventional and organic farming methods are present in the GBBR and there is a strong social movement in support of family farmers and organic or "alternative" agriculture.[544] In the 1980s, organic agriculture was promoted to improve the economic outcomes of small-scale farmers.[545] Farmers connected with consumers through a system of farmers' markets and direct sale, largely organized by civil society and religious organizations. Benefits of organic agriculture include the preservation of cultural and environmental landscapes, increased farming incomes, and positive impacts for rural economies through activities such as agrotourism. More recently, the concept of "agroecology" has emerged to describe a set of agricultural practices that imitate natural processes in order to improve agricultural systems. It can be defined as "the integrative study of the ecology of the entire food systems, encompassing ecological, economic, and social dimensions".[546] Agroecological agriculture can help to reduce ecosystem degradation and preserve water quality.[547]

While there was initially little government support for organic farming, permissive regulations were established in 1994 and a number of government programs were developed to support organic agriculture in the region. Recent programs include the "National Plan of Agroecology and Organic Production" (Plano Nacional de Agroecologia e Produção Orgânica) created by the federal government in 2012 to support the development of urban agriculture and organic production. In 2013, the state of São Paulo initiated the "Program Organic São Paulo" (Programa São Paulo Orgânico) to encourage the transition from chemical-dependent agriculture to organic farming.[548] The state government of São Paulo also supports local agriculture through the Secretariat of Agriculture and Supply, founded in 2012.[549] It was created to promote the sustainable production of food, fiber and bioenergy and to protect health and safety of producers and consumers.[550]

Although these public policies provide legal support for small scale farmers and organic agriculture, farmers in the region face several challenges. Real estate valuation and the high cost of land makes it more profitable for landowners to sell their land for urban development rather than engage in agricultural practices.[551] Rodrigo Victor, technical advisor at São Paulo State Forest Foundation recommends putting in place "mechanisms, through which local growers could stay in the lands and could earn their money without having the need to sell their lands for real estate speculation."[552] Furthermore, a lack of infrastructure in São Paulo's periphery means that it is difficult for farmers to bring products to market. Recent efforts have been made to improve the distribution of food produced in the GBBR to promote financial sustainability in the sector.

542 dos Santos & Bello, 2014.
543 Amato-Lourenço et al., 2021.
544 Dr. Yara Maria Chagas de Carvalho, personal communication, July 26, 2021.
545 Blanc, 2009.
546 Francis et al. 2003 as cited in Migliorini & Wezel, 2017.
547 Rodrigues & Victor, 2018.
548 Amato-Lourenço et al., 2021.
549 Maiellaro, et al., 2019.
550 São Paulo Governo do Estado, n.d.-a.
551 Rodrigo Victor, personal communication, July 6, 2021.
552 Rodrigo Victor, personal communication, July 6, 2021.

9.5 Nature-Based Solutions

The São Paulo Green Belt Biosphere Reserve provides food, water, and climate mitigation measures for more than 25 million people living in the region. These "ecosystem services" are an economic driver in the region and make up 20 per cent of Brazil's GDP.

From 2003 to 2013, the Forestry Institute conducted a Subglobal Assessment (SGA) of the GBBR as part of the Millennium Ecosystem Assessment (MEA), initiated to assess the condition of the world's ecosystems and the services they provide.[553] The assessed ecosystem services include provisioning services like food, water, and medicine; regulating services like air quality, climate regulation, regulation of water flows, waste treatment, and erosion prevention; supporting services like soil formation and fertility as well as maintenance of genetic diversity; and cultural services like recreation and tourism.[554]

The Subglobal Assessment is an important reference document for the São Paulo City Green Belt, providing information for decision makers on the importance of ecosystem services, threats posed by urban expansion, and options for dealing with these issues.[555] Furthermore, the assessment publicizes the ecosystem services that need to be protected and those that need to be recovered.[556] This work was expanded through the collaboration of over 70 researchers and 35 institutions and was released in a recently published book, *Ecosystem services and Human Well-Being in the São Paulo Green Belt Biosphere Reserve*.[557]

Forests provide several nature-based services in the GBBR. In addition to being a source of timber and fiber, they sequester carbon, reducing greenhouse gasses. They also help to conserve and purify water, protect against landslides and erosion, and counter the urban heat island effect.[558] Individuals and landowners play a large role in reforestation efforts, in part due to government legislation that requires the conservation of native forest cover in ecologically sensitive Permanent Preservation Areas. Although plantation forests, like the large-scale planting of Eucalyptus, can help to sequester carbon and control urbanization, some environmental activists consider them to be "biodiversity desserts."[559] Furthermore, some of these reforested areas are subject to real estate speculation which presents a threat to the GBBR.[560]

Restoring forests also helps to mitigate stress on São Paulo's water supply. Two important water basins, the Upper Tietê and the Santos lowlands, are fully located in the GBBR while the basins of the Piracicaba, Capivari and Jundiaí rivers are partially located in the area.[561] The Cantareira water supply system, which is the largest of five water supply systems feeding the city of São Paulo, has been a focus of reforestation efforts. It is found that root systems in riparian forests can reduce soil erosion by 36 per cent, reducing expenses associated with sediment pollution management. Furthermore, riparian root systems act like a sponge, retaining water during rainy seasons and releasing it during drier times. Finally, leaves in the forest canopy can collect water droplets from fog which drips down to the forest floor, replenishing the ground water.[562] The Nascentes Program, initiated by the State Government of São Paulo, aims to restore 20,000 hectares of riparian forest on land owned by São Paulo's water company. As of 2021, 41,557,340 seedlings have been planted on 24,929 hectares of land.[563]

553 Millennium Ecosystem Assessment, 2005.
554 Intergovernmental Platform on Biodiversity and Ecosystem Services, 2012.
555 Ibid.
556 Rodrigues & Victor, 2018.
557 Serviços Ecossistêmicos e Bem-Estar Humano na Reserva da Biosfera do Cinturão verde da Cidade de São Paulo.
558 Ibid.
559 Mendes, 2019.
560 Rodrigues & Victor, 2018.
561 Ibid.
562 Fluence News Team, 2018.
563 São Paulo Governo do Estado, n.d.-b.

9.6 Outdoor Tourism and Recreation

International and domestic tourism in the São Paulo Green Belt Biosphere Reserve contributes significantly to the region's economy. The most common activities include tourism of traditional cultures, ecotourism, and agritourism. The traditional Caipira culture has been preserved in parts of the GBBR and refers to people who live and work in rural areas. As descendants of Portuguese colonizers, Indigenous, and African people, they adopted Indigenous techniques for fishing and farming.[564] Their traditional way of life, a blend of Portuguese and Indigenous culture, is considered to be a "living museum" of local history, culture, and traditions. Tourists can travel to rural villages to experience traditional food and music.

There are a variety of opportunities for ecotourism in the GBBR, but this sector is largely underdeveloped. Private tour operators bring groups into the greenbelt to camp and there are many hostels and hotels for people to stay and visit.[565] While there are no state-wide policies to support sustainable tourism in the GBBR, the Trilhas de São Paulo programme created by the State Secretariat for the Environment, encourages hiking on 40 listed trails where nine of those trails are located in the greenbelt. Furthermore, the "Routes of São Paulo" (Rotas de São Paulo) programme includes seven suggested tour routes that showcase natural, historical, and gastronomical features of the GBBR.[566] Agritourism is also popular in the GBBR where farmers are increasingly opening their doors for people to come and experience a rural lifestyle and eat local food. Rodrigo Victor reveals "this is also increasing [farmers'] incomes because on the one hand, their production activities could be decreasing, so they try to enhance the economical options for their sustainability."[567]

The biosphere reserve is also an important resource for local residents to access green space for leisure and recreation, since parks and open space in São Paulo are lacking and, in the periphery, especially. As Rodrigo Victor notes, "the lack of forested open public spaces becomes dramatic owing to poverty, rusticity, and negligence. In these poor peripheries, competition for small leisurely space is commonplace."[568]

> **"International and domestic tourism in the São Paulo Green Belt Biosphere Reserve contributes significantly to the region's economy, with the common activities being tourism of traditional cultures, ecotourism, and agritourism.**

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564 Moraes, 2020.
565 Rodrigo Victor, personal communication, July 6, 2021.
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568 Victor et al., 2004, p. 245.

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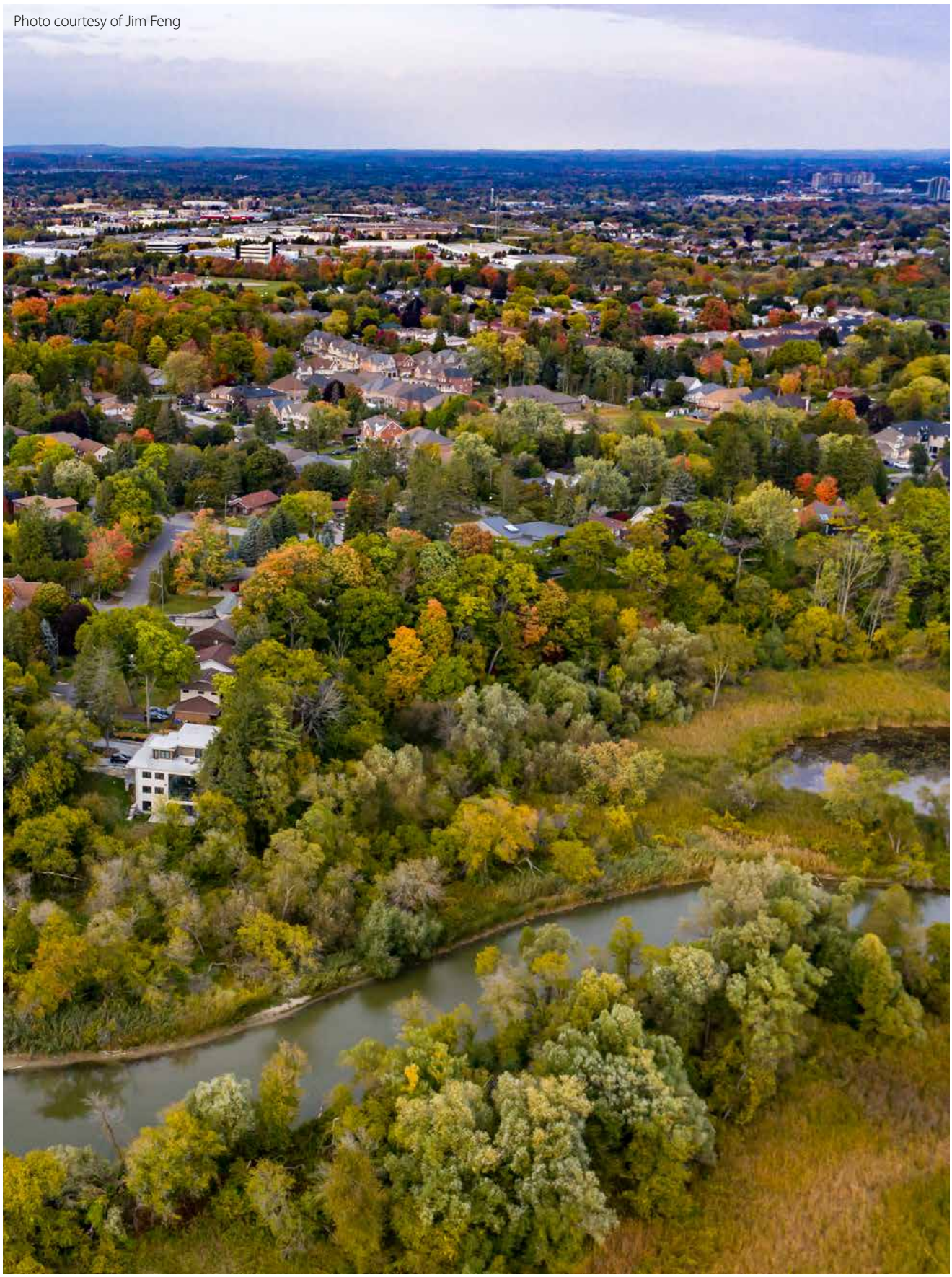

Photo courtesy of Jim Feng

10

Conclusion

This update to the 2010 Global Greenbelts Report reveals key findings from a range of elements and issues

As an update to initial research undertaken a decade ago, this report explored important trends as well as opportunities to mitigate threats and strengthen the protection of greenbelts in eight international cases. Examined were recent political, institutional and policy changes along with emerging challenges within the case studies, including new greenbelts. Four main themes were analyzed for the selected cases including nature-based solutions, growth management, food and agriculture and outdoor tourism and recreation. Based on a review of the literature and interviews with experts in each case, there are seven main findings about greenbelt planning and policy implementation that were revealed from this research:

1. Greenbelts reflect their political, historical, social, and environmental contexts

Reviewing eight case studies shows that the greenbelt concept has been adapted to each context, resulting in a variety of locally specific spatial forms, policy goals and stakeholder involvement unique to each jurisdiction. For example, the European Green Belt is strongly linked to its post-World War II "Iron Curtain" roots with its policy goals focused on the preservation and promotion of cultural heritage and creating a transnational nature conservation network. In the San Francisco Bay Area, diverse stakeholders are involved in the conservation of natural and agricultural land which has resulted in a patchwork of protected land rather than a unified greenbelt. Thus, this research shows the value and continued relevance of the greenbelt concept, as it can be flexibly adapted and successfully applied in a wide variety of contexts.

2. More than policy is required to support the planned function and viability of greenbelts

Land use protections for greenbelts, as in Ontario, are important but are not the only ingredient for successful and lasting implementation. The research has shown that strong public awareness and support are required, especially since greenbelts can be vulnerable to development or political pressures. For example, in the San Francisco Bay Area, there is strong public support for protecting natural and agricultural lands through the implementation of municipal urban growth boundaries since many such measures are voter-enacted. One challenge, then, is how to develop and maintain a strong sense of connection between residents and their greenbelt. Throughout the case studies, there were common strategies used by civil society groups and local governments to encourage residents to engage with their greenbelt in such ways as promoting recreational activities (e.g., cycling, hiking, culinary or local history tours) and through public education initiatives (e.g. campaigns, partnerships). One challenge to a high level of engagement occurs where greenbelts span vast territorial ranges including very remote areas, making it difficult to achieve a critical mass of awareness and participation (e.g., the European Greenbelt, the British Columbia ALR). Another issue is accessibility; greenbelt areas are not always accessible by local or regional public transit, thereby limiting public access to those with their own vehicles. Also, the price to access certain greenbelt related activities (e.g., culinary tours, horseback riding) can be cost-prohibitive for some groups. Thus, while building a strong connection between residents and their greenbelts are key to their future protections, it can be challenging to build those connections.

3. Threats to global greenbelt protections and planned functions have increased over the past decade

The 2010 Global Greenbelt Report found that urban development was one of the largest and most consistent threats to greenbelt protection.[569] This research shows that over the past 10 years, several greenbelts have continued to face significant threats. Many of the greenbelts examined are located within rapidly growing regions that are expected to significantly increase their population in coming decades. These intense growth pressures are creating significant demands for new housing and related infrastructure. In particular, with rising housing and land prices, there is often a need for more affordable housing options within these growing regions. Thus, politicians can be under pressure to release greenbelt land for new development. As a result, in some cases such as Melbourne, there have been changes to the urban growth boundaries to allow for more growth. In London, more planning permissions have been granted to allow for development within greenbelt land over the past decade.[570] In addition, the British national government recently changed the method for calculating housing needs, which will place local authorities under even greater pressure to release greenbelt land for development to meet these new housing targets.[571] Therefore, the research demonstrates that greenbelts remain under intense development pressures in many jurisdictions and those conditions have worsened in some cases over the past decade.

In addition, there is a need to balance competing interests involved in greenbelt management. As in seen in many of the cases, more housing and infrastructure services need to be developed to support growing cities and regions. However, this development often results in the loss of highly productive agricultural land and biodiversity in peri-urban areas. Urban and suburban development can negatively influence a city or region's long-term food security. Farmland loss can result in a diminished local food supply that, in combination with population growth, can put additional upward pressure on food prices.[572] Thus, as cities and regions get closer to environmental tipping points and face challenges regarding agricultural viability, greenbelts can be an important policy tool to manage development pressures more effectively.

569 Carter-Whitney, 2010.
570 Campaign to Protect Rural England, 2021.
571 Ibid.
572 Deloitte, 2016.

As recommended in the 2010 Global Greenbelt Report, these significant development pressures highlight the critical need for the effective planning for growth.[573] Most of the jurisdictions examined in this report have recognized the importance of this and have linked their greenbelts to broader regional growth management strategies. In addition, as greenbelts can assist with achieving more compact urban development, they can also form important components of smart growth policies.[574] For example, Ontario's Greenbelt Plan is supported by the Greater Golden Horseshoe Growth Plan and a regional transportation plan. Greenbelt policy implementation can be more effective when these policies form part of a comprehensive planning framework, which is designed to manage future growth while also protecting agricultural land and nature conservation areas.

4. Changes in governing parties, lack of municipal coordination, can fragment greenbelt policy and implementation

Since greenbelts are created through wilful acts of government, greenbelt policies can be vulnerable to changes in political regimes at national, state, regional, provincial, and municipal levels. There can be significant changes made to land use and spatial planning policies and environmental legislation after an election, for example. New political parties, especially those with ties to business and industry, can value the greenbelts differently than their predecessors which can lead to the significant revision of policy goals. There are cases in this report where greenbelt policies have been considerably impacted by the decentralization of land use planning powers. For example, in the Netherlands a right-wing national government took office in 2010 and made changes to national spatial planning policies. The Green Heart was removed as a national strategic planning concept in 2012 and responsibility for this landscape was delegated to the provinces. In British Columbia, the provincial Liberal government in 2014 passed legislation to split the Agricultural Land Reserve (ALR) into two zones, which permitted non-agricultural uses and development in Zone 2. A change in government in 2017 led by a minority NDP-Green Coalition reversed these changes and strengthened the purpose of the Agricultural Land Commission Act to include the preservation of the integrity and continuity of the ALR.

In most cases, lower levels of government such as municipalities have the primary responsibility for greenbelt policy implementation. Municipal cooperation on regional matters including greenbelts can prove challenging, owing to a combination of competition and governance structures. One of the findings of the 2010 Global Greenbelt Report was that greenbelts are vulnerable to implementation problems as policies are often set by one level of government, yet implementation is overseen by a different level of government.[575] Our research confirms this finding and shows that this issue continues to influence greenbelt policy implementation. As seen in our cases, without strong leadership from higher levels of government or regional planning mechanisms, local municipalities often take their own approach to policy implementation based on their own specific interests. These circumstances contribute to inconsistent greenbelt policy implementation across a region, which can undermine achieving the overall objectives of that greenbelt.

573 Carter-Whitney, 2010.

574 Smart growth is a land-use planning approach that started in the 1990s in North America as a reaction against low-density development. Smart growth principles include mixed land-uses, transit-oriented development, urban intensification and densification and preserving green spaces (Krueger and Gibbs, 2008).

575 Carter-Whitney, 2010.

5. Greenbelts are expected to provide a wider range of functions, fulfill a greater number of objectives, than ever before

Greenbelt policy goals have become increasingly multifunctional in recent years. That is, policy directions have expanded from the traditional tenets of farmland protection and controlling urban growth to include economic development, climate change mitigation and promoting regional identity.[576] For example, in the São Paulo Green Belt Biosphere Reserve (GBBR) a myriad of ecosystem services are promoted to educate the public and policymakers on importance of the GBBR for human wellbeing. However, there is debate in the academic literature that critiques this increasing multifunctionality, or the "all things to all people" mode, of greenbelts. Buxton (2019) argues that extending the concept of multifunctionality beyond rural uses such as farming to include housing and commercial and industrial developments undermines the original purposes of greenbelts.[577] Once the agricultural and natural functionality of greenbelts becomes expanded through diversity of functions and objectives, it can become difficult to resist the encroachment of urban development and activities within these green spaces.[578]

Furthermore, there is no one-size-fits-all approach to multifunctional greenbelt planning. In many of the cases examined in this report, greenbelt policies have multiple objectives and allow for a wide array of land uses. In some cases, greenbelt objectives that were less multi-functional such as the British Columbia ALR focused primarily on agriculture. In other cases, less emphasis may be placed on more traditional greenbelt policy goals such as urban growth control or farmland protection. For example, there is little focus on agricultural production within the European Green Belt. In fact, agriculture within the European Greenbelt is sometimes viewed as a threat to nature conservation efforts.[579] Therefore, the research reinforces the finding that greenbelt planning is context-specific; that those policies most adapted to local and regional conditions are very effectively implemented.

Finally, greenbelt policy goals should be expanded upon, beyond more traditional purposes including preservation of farmland and nature conversation areas. There is also a need to focus on the restoration and enhancement of ecological and agricultural functions within greenbelts, which play a key role in supporting the long-term resilience of cities and regions. For example, improvements can be made to enhance the climate change resilience within greenbelt lands, particularly related to storm water management systems and moderating the effects of increasing temperatures in urban areas (i.e., heat islands). In addition, there can be a focus on providing more opportunities to improve local food production and support for farmers. Thus, once greenbelts are established, policy goals need to shift in focus from preservation to enhancing these green spaces' natural and agricultural assets.

6. Greenbelts are not immune to the impacts of the COVID-19 pandemic, revealing their importance to public health and well-being

Greenbelts are becoming increasingly important to cities and regions in the face of mounting global problems such as climate change, rising oil prices and food and water scarcity. In the past decade, policymakers, scholars, and the public have become more aware of the environmental and economic benefits provided by greenbelts – urban access to nature, local food production, water management – and the COVID-19 pandemic has highlighted their significance more strongly.

576 Macdonald et al., 2021.
577 Buxton, 2019.
578 Ibid.
579 Uwe Riecken, personal communication, July 2, 2021.

The COVID-19 pandemic has influenced greenbelts in many ways, but two main aspects were revealed in the research. First, the pandemic has reinforced the value of having access to high quality green spaces close to where people live. With lockdowns and restrictions during the pandemic, there has been a dramatic increase in the use of parks, open spaces, and natural areas in many cities around the world. Residents have been using public parks and green spaces in record numbers for physical activity, socializing, and leisure. For example, according to Park People's *2021 Canadian City Parks Report*, 94 per cent of Canadian cities revealed that park use had increased during the pandemic. Moreover, two-thirds of Canadians surveyed reported that they had spent more time in parks than prior to the pandemic.[580]

The pandemic has elevated the value of green spaces for many residents and has shown that these areas are an essential part of cities' and regions' natural infrastructure systems.[581] Greenbelt land is often located close to or within cities, providing spaces of refuge for urban residents during the pandemic. In addition, people may have sought to escape the cities for day trips and explore greenbelt areas within their region. However, the pandemic has also revealed significant inequalities regarding access to these green spaces. Recent research has shown that residents in low-income communities often face barriers and lack safe and easy access to open spaces close to home.[582] The pandemic, therefore, does present an opportunity to reflect on questions of equitable access to greenbelts.

7. The pandemic has spotlighted the lure of peripheries, the rising demand for access to open and natural spaces as remote work becomes the new normal

The demand for suburban and rural housing has increased since the beginning of the pandemic. This has been driven in part by the shift in remote work for upper- and middle-class workers in professional and office positions who desire more space and larger homes to accommodate this shift in workplace.[583] Furthermore, the increase of people moving to rural and suburban communities is influenced by the desire for some people to get away from crowded conditions in larger cities and to relocate closer to natural spaces and amenities. Interview participants identified such trends happening within the London Metropolitan region and in Melbourne.[584] This is also reflected in the demand of suburban and rural housing in Ontario's Greater Golden Horseshoe region where housing sales are up 40 per cent in municipalities including Caledon, Innisfil and King, outside of Toronto's typical suburban areas such as Markham and Richmond Hill.[585]

This outward migration to communities, often several hours outside cities to areas within and beyond greenbelts, can create a host of new challenges. These trends are putting intense pressure on rural and suburban housing markets, as people are looking to buy in areas often with limited housing stock. Thus, questions can be raised about the longer-term influence of this recent trend of urban residents moving to these rural and suburban communities and their associated impact on local services and the environment. New housing will need to be built in these communities to meet demand, which could result in further loss and fragmentation of agricultural and ecological systems. In addition, what happens if remote work patterns change again in the near future and those residents need to return to work in an office? In that case, there could be increased pressure placed on local and regional highways from these commuters.

580 Stark, Garrett & Amberber, 2021.
581 McCormick, October 7, 2020.
582 McCormick, October 7, 2020.
583 Üçoğlu, Keil & Tomar, 2021.
584 Catriona Riddell, personal communication, July 13, 2021; Jack Krohn, personal communication, July 12, 2021.
585 Bingley, 2020.

The pandemic has raised many questions for policymakers, planning practitioners and civil society groups to consider the future of greenbelt planning. For example, will trends towards increased public use of natural areas continue, and how will that effect planning practices in the future? How do we think differently about the assets provided by greenbelts in light of the pandemic? Will the trend towards the outward migration of some residents from cities continue in the coming years and if so, what will the longer-term impacts of those changing settlement patterns be on rural and suburban communities?

The Ontario Greenbelt is an international leader in greenbelt planning, supported by firm and focused regional growth management planning and civic action

The research findings confirm that the Ontario Greenbelt has many strengths that make it a leader in international greenbelt planning. There is strong policy protection provided through the Greenbelt Act and Greenbelt Plan. The Greenbelt is supported by a regional growth and regional transportation plan, forming a comprehensive strategy to manage regional development. In 2015, the provincial government led a coordinated policy review of the Greenbelt Plan which found that it was successful in protecting farmland and environmentally sensitive areas within the Greenbelt boundaries, directing development towards settlement areas.[586] One of the recommendations from the 2010 Global Greenbelt Report suggested a performance measurement framework was needed to measure the long term effectiveness of the Greenbelt.[587] As part of the review process, performance indicators were established for the Greenbelt and GGH Growth Plan to evaluate and monitor policy implementation.[588] In addition, during the review process, the Greenbelt Plan was strengthened and revised to include new language related to climate change and green infrastructure, with an updated plan released in 2017.

The Ontario Greenbelt is strongly supported by dedicated individuals and organizations from a variety of stakeholder groups that continue to champion Greenbelt protection. Ontario is unique among the international cases studied for this report in that policy implementation is supported by two organizations: the Greenbelt Foundation and the Greenbelt Council. In 2011, the Foundation was given funding of $20 million (CAD). In 2021, the provincial government provided an additional $12 million (CAD) in funding for the Greenbelt Foundation, enabling it to continue its work to protect and enhance the Greenbelt for the next several years.

In addition, expanding the Greenbelt to protect nature conservation and farmland outside its boundaries was a recommendation in the 2010 Global Greenbelt Report.[589] Since that report was written, 21 new urban river valleys and seven coastal wetlands were added to the Greenbelt Plan in 2017. Recently, the provincial government has launched consultations for expanding the Greenbelt further. The consultations are ongoing as of the time of this writing, but proposed additions of new environmentally sensitive areas to the Greenbelt could result in the largest expansion since its introduction.

586 Ministry of Municipal Affairs and Housing, 2015a.
587 Carter-Whitney, 2010.
588 See Ministry of Municipal Affairs and Housing, 2015a; Ministry of Municipal Affairs and Housing, 2015b.
589 Carter-Whitney, 2010.

There are opportunities to further strengthen and enhance the protection of the Ontario Greenbelt, particularly in light of the next review of the Greenbelt and regional growth plans. Accordingly, this report concludes in the next section with recommendations that could be applied to all global greenbelts, including some that may be applicable to Ontario's. These recommendations are organized based on the four themes examined in this report (i.e., growth management, food and agriculture, nature-based solutions and outdoor tourism and recreation) and provide additional directions related to governance and implementation strategies.

10.1 General Recommendations

10.1.1 Regional Growth Management

Enact firm urban growth boundaries. Policymakers should be strict about maintaining urban growth boundaries, making it difficult to change greenbelt policies. For example, policy changes could require approval from several levels of government (e.g., national, state, regional or provincial), or require parliamentary approval. It could also be written into legislation that greenbelt policy changes are allowed only during a review process every 5 or 10 years, as happens in Ontario.

Integrate greenbelt policies with regional growth management and transportation plans. Many of the cases in this report are located within rapidly growing regions that are expected to significantly increase in population over the coming decades. Growth pressures are creating increasing demand for new housing near or even within greenbelts. Greenbelts can be an effective growth management tool, only if supported by other land use policies. Policy integration can assist with making clear connections between multiple policy domains related to greenbelt planning, including agriculture, transportation, nature conservation and recreation.

10.1.2 Food and Agriculture

Policies that protect farmland should be supported by programs and initiatives to help farmers continue to farm and to keep land in production. While greenbelt policies may freeze the conversion of farmland in protected areas, other programs and policies are needed to support farmers, keep land in production, and to promote sustainable rural economies. As seen in the cases studied, agriculture often intersects with layers of regulations from multiple levels of government and non-governmental agencies, creating a complex situation for landowners to navigate. Programs can be implemented to help farmers adapt to changing markets and/or the pressures of climate change. For example, the British Columbia Land Matching Program assists with connecting farmers with land to establish or expand their business. In addition, the program connects landowners with individuals interested in farming their land and provides them with leasing opportunities. These types of programs provide farmers with support to understand regulations and match people together that have land with more opportunities for farming.[590]

Agricultural easements and land trusts should be considered to protect land in perpetuity. The introduction of agricultural easements and land trusts can provide incentives for landowners to keep their land in agricultural use. These land use agreements allow for landowners to enter into contracts with local governments or NGOs to restrict land uses to agricultural and related uses in exchange for tax benefits or other financial compensation. Any future owners of the land must comply with the terms of the easement which ensures the protection of the land for agricultural purposes in perpetuity.

590 B.C. Land Matching Program, 2021.

Support the diversification of farming operations to capitalize on opportunities provided by the greenbelt. Farmers and landowners can be educated on the benefits and opportunities that being within a greenbelt provides, including how to expand operations to attract new customers. Agritourism, which includes farmers' markets and apple-picking, can provide new revenue sources for farmers. The research found winery tours in the GGH region, cheese farms in the Netherlands, and farm stores and restaurants in the British Columbia Agricultural Land Reserve. These activities connect people to local food sources within greenbelts and contribute to a greater awareness of the benefits of greenbelts by landowners and the general public.

Compensation for farmers' role in land stewardship. Farmers play a significant role in the environmental stewardship of the land. That role could be formally acknowledged in agricultural policies and farmers may be compensated as a result. In England for example, a new post-Brexit agricultural policy regime is being established. Farmers will soon be compensated for delivering environmental benefits rather than for the amount of land farmed.[591] Farmers will be subsidized for initiatives that increase biodiversity, restore landscapes and promote animal welfare, while continuing to use their land for agricultural production.[592] While these strategies are in the early stages of implementation, they represent a considerable shift in how farmers' and other land managers' roles in land stewardship are viewed by government authorities.

Encourage local institutions to buy greenbelt-grown products. Institutions such as schools, hospitals and retirement homes need to buy food products for their clients and visitors in large quantities. Through support of farmers associations, business associations and governments, these institutions could enter agreements with local farmers to supply greenbelt-grown products.

Brand and promote greenbelt-grown products. Promoting locally grown and produced products through greenbelt specific branding can be an effective way to generate both awareness and economic activity. Farming associations, local environmental organizations, or agencies responsible for managing greenbelts could be involved in producing and distributing such branding materials, making them accessible to farmers and local merchants. With the assistance of local business associations, these greenbelt-grown products could be promoted at farmers' markets and in local businesses, and through tourism literature.

10.1.3 Nature-Based Solutions

Update greenbelt policies to include language about nature-based solutions. Greenbelt policies should be updated to reflect recent planning and policy discourses and practices about sustainability, climate change, green infrastructure, and ecosystem services. Over the past decade, knowledge about the environmental benefits provided by greenbelts has grown. However, those benefits should be reflected in greenbelt policies.

Conduct research to determine the benefits of, and best approaches for, nature-based solutions. The economic impact that greenbelts provide to the agricultural, tourism and recreation sectors has become more widely recognized over the past decade. However, it was found that further research could be done in most cases to assess the scope of the greenbelt's contribution to local and regional economies. This research could provide landowners and municipalities with information on how they could make more strategic investments that capitalize on the natural assets provided by their greenbelts. For example, organizations in the San Francisco Bay Area have created a “Greenprint” which identifies, maps, and measures the contribution of natural resources to the ecosystem, economy, and local and regional communities. This information is made available to planners, government agencies, conservation groups, and other stakeholders.

591 Institute for Government, October 11, 2021.

592 Ibid.

Educate the public, stakeholders, and policy makers on the benefits of nature-based solutions. Many regions rely on greenbelts and protected land to provide ecosystem services such as carbon capture, flood mitigation and water storage, erosion control, soil quality, air and water purification, biodiversity conservation, wildfire mitigation and more. These "services" are essential for human wellbeing and survival, yet many people who live in and around greenbelts do not know about the crucial services they provide. The São Paulo Forestry Institute recently published a book on ecosystem services which provides information to the public and decision makers on the importance of ecosystem services, threats posed by urban expansion, and options for dealing with these issues. This example highlights that public education programs need to be updated to include more recent information about the environmental benefits provided by greenbelts.

Recognize and support greenbelts' value to national or international nature conservation planning. Greenbelts often protect local environmentally sensitive areas that link to national or international nature conservation networks. As such, greenbelts can make an important contribution to national or international nature conservation planning. For example, the European Green Belt supports the formation of a transnational biotope network, contributing to the implementation of the EU's 2020 biodiversity strategy.[593] Thus, greenbelt protection can support national and international environmental policies and help to strengthen broader nature conservation networks.

10.1.4 Outdoor Tourism and Recreation

The impact of recreational activities should be monitored, to ensure effective management and balance of uses. While recreation and tourism are important greenbelt policy goals, it is possible to overuse green spaces for those purposes. As seen in the case studies, there can be overcrowding on nature trails and other natural areas. In some cases, recreational activities may need to be monitored to ensure effective management, if they become disruptive to residents or local ecosystems. For example, limits could be applied to the number of event permits issued or major recreational facilities permitted within greenbelts. With population growth and greenbelt areas located close to cities, demand can be high for recreational activities in these green spaces. However, these demands need to be counterbalanced with environmental protection goals to ensure that greenbelt policy objectives are not undermined.

Acknowledge and respond to Indigenous history, culture and land rights within greenbelts. There is a long and rich history of Indigenous peoples living in and around greenbelt land, especially in colonial countries such as Canada. The celebration of Indigenous history and culture through the creation of art installations, festivals, and education centres for example can provide an incentive for people to visit greenbelts year-round and learn about the people who have lived on the land for millennia. The Greenbelt Foundation, in Ontario, currently supports the Moccasin Identifier project, a placemaking initiative that works to raise awareness about the current and historical presence of Indigenous people in the Greenbelt region.[594]

Create and promote self-guided cycling, hiking, sailing, and walking tours for greenbelt areas. Creating self-guided tour routes that are available online or in-print will allow people to explore greenbelt areas on their own, within prescribed guidelines. These tours provide excellent opportunities to promote local museums, businesses, and attractions within the greenbelt and highlight the best sites to visit within these green spaces. Promoted tours should be tailored to suit different types of visitors with shorter and longer routes available. There are many such examples including within the Ontario Greenbelt, the Dutch Green Heart and the Thuringia area of Germany which is part of the European Green Belt.

593 Schwaderer et al, forthcoming.

594 Greenbelt Foundation, n.d.

Develop tourist attractions within the greenbelt with a public education focus. In addition to the cycling and hiking routes, other tourist attractions could be created within greenbelts. For example, nature conservation centres, art installations or seasonal festivals could be created which have a mandate to educate the public about the environmental and societal benefits provided by the greenbelt. These tourist attractions can become destinations with the greenbelt and provide additional mechanisms to increase residents' connections to these green spaces.

Hold a design competition to create a greenbelt mascot. To enhance public education programs, a mascot could be created for the greenbelt as Frankfurt has done. A competition could be held with local artists to design a mascot for the greenbelt, which could be run by the organization managing this green space or another NGO. Members of the public could vote on the possible designs and the winning image could be used on route signage, and in tourism and public education material to further brand and promote the greenbelt.

Frankfurt Greenbelt, Germany

Frankfurt's greenbelt in Germany has several innovative public education and promotion programs which could inspire similar approaches in other greenbelts. There are 15 art installations located within the greenbelt including a giant caterpillar, owl, and woodpecker. These art installations were designed by artists from the New Frankfurt School through a collaboration between the municipality of Frankfurt and the Museum of Comic Art.[595] This greenbelt also has an official mascot, designed in 2001 by caricaturist Robert-Gernhardt and further refined by illustrator Philip Waechter. This green mascot is a combination of a pig, a newt and has wings. It is found on signage for hiking and cycling trails, at public education centres and on products designed for children such as stuffed animals and stickers.[596] These education and promotion activities have provided unique opportunities for residents to create stronger connections to that city's greenbelt.

10.1.5 Governance and Policy

Greenbelt policies should be regularly updated and monitored. Greenbelt planning effectiveness and implementation monitoring was recommended in the 2010 Global Greenbelts Report, and this research update confirms the importance of that recommendation.[597] Policies should be updated frequently to reflect changing regional or urban conditions, and new policy issues such as urban agriculture. Ideally, policies should be updated at regular intervals (e.g., 5 to 10 years) as in Ontario. In addition, greenbelt policies should be monitored on a regular basis to ensure that objectives are being meet and to inform policy reviews. Incremental losses in greenbelt lands must be monitored and measured including those related to housing and infrastructure development and farm severances. In many of the cases examined, civil society groups are taking a major role in monitoring greenbelt policy implementation and informing the public about benefits, threats, and opportunities.

595 Stadt Frankfurt am Main. n.d.-a.
596 Stadt Frankfurt am Main. n.d.-b.
597 Carter-Whitney, 2010.

A comprehensive strategy for greenbelt planning is needed. Without an overarching strategy for greenbelt planning, there is a risk that policy implementation can become fragmented among the various government authorities involved. As seen in London, there is little cooperation between how different planning authorities protect the greenbelt.[598] Local authorities each have their own separate planning policy. As a result, the broader vision of greenbelt protection is being fragmented and undermined.

Avoid the temptation to make greenbelts "many things for many people". Allowing a wide range of land uses and activities within greenbelts could be counter-productive to their primary planning function, creating avoidable conflicts. The research has shown some land uses policies to be over-permissive, opening the door to contain several non-compatible land uses such as major infrastructure, intensive recreational uses, and even some industry. For example, logistics operations and warehousing centres are located within the Green Heart in the Netherlands. In Melbourne, large recreational complexes and schools have been either proposed or developed within the green wedges.

Consider forming a steering committee or equivalent body to guide, monitor policy implementation. Such bodies can provide key functions that help improve the management of greenbelts. Responsibilities can include facilitating knowledge exchange between stakeholders through organizing events and meetings, lobbying governments for policy changes, and raising public awareness. From the case studies in the report, there are two examples of such organizations: the European Greenbelt Association and the Green Heart Administrative Platform and Advisory Group in the Netherlands. These organizations include representatives from government, civil society groups, landowners and farmers. The Ontario Greenbelt Foundation fulfils a similar role to these organizations, as it has public education, grant-making and research programs.

Launch and sustain education, awareness campaigns aimed at the general public and decision-makers. It is important to build broad support and understanding of the importance and value of greenbelts, including climate change mitigation and close access to nature. Environmental groups, NGOs and local residents are often responsible for creating public education programs, monitoring threats to the greenbelts, publishing independent research and lobbying governments for planning and policy reforms.

Incorporate greenbelts and growth planning into school curricula. Education about greenbelts and growth management can be incorporated into the curricula for public schools, as an effective tool for encouraging stewardship of greenbelts and other natural features. Topics such as agriculture, nature conservation, recreation and urban and regional planning could be discussed. Children can take field trips to key sites within greenbelts and learn about farms, local food sources and how the environmental systems within the region are interconnected with one another. Public education and building stronger connections between people and their greenbelt are key to the long-term success of these green spaces.

Recognize the achievements of successful greenbelt initiatives. It is important to find opportunities to celebrate successful greenbelt projects and recognize the years of hard work by committed individuals and organizations to promote and protect these green spaces. For example, the European Green Belt Association has their annual Green Belt Days for one week every September.[599] These activities are meant to increase public awareness of the greenbelt and to increase cross-border collaborations between partners. In addition, Ontario's Greenbelt Foundation hosts the Friends of the Greenbelt Awards to recognize individuals and organizations in areas of municipal leadership, agriculture, community engagement and the protection of the greenbelt, Oak Ridges Moraine and Niagara Escarpment.[600]

598 London Green Belt Council, January 2021.
599 EuroNatur Foundation, 2018.
600 Friends of the Greenbelt Foundation, November 4, 2020.

Pursue and maintain partnerships with a variety of stakeholders, to enhance greenbelt protection and stewardship. These partnerships can include multiple levels of government, non-profit groups, private landowners, as well as community volunteers. Opportunities can be provided, for example, through grant-making programs aimed at specific greenbelt activities and functions such as trail maintenance. These opportunities for partnership are particularly important where there are funding challenges and a lack of local government cooperation.

Lend support to private landowners within greenbelts. In some cases, financial hardships and other pressures have led some landowners to sell lands for development or other incompatible uses. The introduction of conservation easements and land trusts can provide incentives, including financial compensation, to make it easier for owners with fewer resources to conserve agricultural and natural service functions on their lands. Furthermore, government programs can be developed to connect landowners with individuals or organizations who want to lease the land for agricultural or conservation uses.

10.2 Recommendations for the Ontario Greenbelt

While this report is globally focused, the research has identified approaches and strategies which can be applied to further strengthen and enhance the protection of the Ontario Greenbelt, as follows:

1 **Continue to ensure the permanence of the Greenbelt.** The Ontario Greenbelt continues to be a best practice in greenbelt planning, owing to the strength of the Greenbelt Act and to holistic and consistent Provincial growth management policies of which the integration of the Greenbelt Plan with Growth Plan for the Greater Golden Horseshoe is a key principle. There are opportunities to further strengthen Greenbelt protection. For example, the research has confirmed the importance of maintaining firm and lasting boundaries to achieve Greenbelt goals. The Greenbelt Act states that any boundary changes must not reduce the total Greenbelt Area. This requirement can be enhanced to clarify that boundaries can only be amended to expand the Greenbelt Area to include new areas for protection.

2 **Support municipal planning and development decisions through enhanced education.** Municipalities are the primary implementers of Provincial land use planning policies including the Greenbelt Plan and Growth Plan. The province can provide up to date and consistent guidance and training on how to implement policies which will support the achievement of the goals and objectives of the Plans.

The Province also plays an import role by maintaining consistency in decision making when considering requests from municipalities that impact the Greenbelt Plans. This role can be enhanced by collecting and sharing case history from the Local Planning Appeals Tribunal and courts that relate to Greenbelt Plan cases.

3 **Maintain, and enhance where possible, alignment between Greenbelt-supporting policies and programs.** The effectiveness and longevity of the Ontario Greenbelt must be supported by program and funding priorities that align with its planned function. Maintaining program and funding support for Conservation Authorities, for example, recognizes the importance of the Greenbelt's ecological function and contribution to a healthy region beyond its boundaries.

The Greenbelt Foundation, therefore, has an important role in bringing awareness to, and supporting the coordination among, organizations and agencies with complementary mandates. For example, monitoring and periodic reporting on funding and initiatives on a range of actions (e.g., local food production, agriculture education programs) can be coordinated and shared.

4 **Re-affirm the leadership and supportive role of having a third-party organization to further the awareness of, and opportunities within, the Ontario Greenbelt.** The Greenbelt Foundation is an organization unique to greenbelt planning and implementation, on a global scale. Not only does the Ontario Greenbelt benefit from clear and long-term protections through Provincial policy, that policy also allows the Foundation to support the Greenbelt more broadly through education, research and partnerships. The Foundation acts as an arm's length public agency from government and serves the public interest in the role of steward, animator, investor and connection to civil society. There is a critical function in having an organization focused on enhancing the economic and environmental functions of the Greenbelt, and that can provide advice to government.

Where possible, the Foundation should be open to opportunities to re-affirm or "refresh" its ongoing role through focused discussions with partners, related groups, and the public. Public awareness of, and participation in, Foundation activities can also be enhanced through such a process.

5 **Leverage regional research programs to further advance the Greenbelt Plan objectives, beyond land use planning.** The Greenbelt Foundation, farm organizations, Conservation Authorities, universities, municipalities and citizen scientists are active leaders and supporters of many research and program initiatives to advance the Greenbelt Plan goals. In addition to supporting sustainable land use planning approaches, the Greenbelt Foundation is active in the areas of natural heritage and water resource systems, the agriculture system with an emphasis on farmers and local food, and supporting implementation-focused agencies including Conservation Authorities. This information should be used to inform Provincial programming and policy development through the 10-year review of the Greenbelt and Growth Plans.

6 **Call for evaluation of cumulative impact and higher standards and levels of coordination for infrastructure projects and resource extraction within the Ontario Greenbelt.** Significant infrastructure investments and raw materials, such as sand and stone, are necessary to support the continued population and economic growth of the Greater Golden Horseshoe Region. However, linear infrastructure and resource extraction can cause significant environment damage within the Greenbelt given the sensitivity of the agricultural system and natural heritage system core areas and natural corridors. The Greenbelt Plan's policies could be augmented to provide direction that these lands should be avoided wherever possible. Opportunities should be explored to support enhanced coordination across municipal and provincial agencies in the review, approval and implementation or commissioning of projects and activities to avoid Greenbelt fragmentation. An assessment of these policies should be included in the Provincial 10 Year Review.

7 **Enhance equitable access to the greenbelt.** It can be challenging to access the Ontario Greenbelt's recreational and tourist sites without a private vehicle. However, better utilizing the existing local and regional transit networks could increase resident's access to the greenbelt. For example, an inventory could be conducted to assess the current transit service provided in or near Greenbelt areas. Existing transit routes could be adjusted to service local greenbelt attractions and shuttle buses could be added for seasonal activities. The Greenbelt Foundation could create "Greenbelt Sundays" and work in partnership with municipalities, transit companies and local tourist attractions to encourage residents to explore sites within the Greenbelt. Furthermore, partnerships could be created with bike sharing companies to have bicycles available for use near trailheads or recreational sites. The long-term protection of Greenbelts is strengthened when residents can build connections to these green spaces. Those connections can be enhanced by increasing equitable access to the Greenbelt.

8 **Explore ways to increase the supply of Greenbelt grown products in the local marketplace.** Research has shown the potential for import replacement of some fruits and vegetables grown in the Greenbelt and associated economic benefits. The province should actively explore ways to take advantage of this potential, and consider marketing and branding. For instance, there is the successful Foodland Ontario branding for Ontario grown products. This branding could be made more local with the creation of a specific logo for greenbelt produced and grown products. This local branding would reinforce a direct connection between consumers and the Greenbelt. Existing networks such as the Greenbeltfresh.ca and Ontariofresh.ca website, farmers' markets, the Greenbelt Farmers' Market Network and agricultural associations (e.g., Ontario Federation of Agriculture) could assist with promoting Greenbelt produced products.

9 **Plan celebrations for the 20th anniversary of the greenbelt.** The 20th anniversary of the Greenbelt in 2025 creates an opportunity to recognize and celebrate the many achievements of the past decades. The Province in partnership with a range of local stakeholders including the Greenbelt Foundation, Conservation Authorities, community groups and municipalities should take leadership in organizing the anniversary. The 20th anniversary of the Ontario Greenbelt provides significant opportunities to celebrate achievements and further increase public awareness about the important benefits of the Greenbelt for agricultural, nature, tourism, recreation and the rural economies.

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Appendix A: Persons Interviewed

Name	Title	Organization	Date of Interview
Ben Botkin	Associate Planner	Metropolitan Transportation Commission/Association of Bay Area Governments	July 7, 2021
Catriona Riddell	Director	Catriona Riddell & Associates Ltd	July 13, 2021
Chirag Rabari	Principal Planner/Analyst	Metropolitan Transportation Commission/Association of Bay Area Governments	July 7, 2021
Chris Kalden	Chairperson	Green Heart Foundation	June 28, 2021
Gabriel Schwaderer	Executive Director	EuroNatur Foundation	July 7, 2021
Henrik Vejre	Professor, Landscape Architecture and Planning.	Department of Geosciences and Natural Resources Management, University of Copenhagen	July 5, 2021
Jack Krohn	Senior Impact Assessor, Impact Assessment Unit, Statutory Planning Services	Department of Environment, Land, Water and Planning, Victoria Government	July 12, 2021
Liana Geidezis	Head of Department Greenbelt Germany	BUND (Bund für Umwelt und Naturschutz Deutschland e.V. - Friends of the Earth Germany)	July 7, 2021
Lenore Newman	Director, Food and Agriculture Institute	University of the Fraser Valley	July 8, 2021
Matt Maloney	Director of Regional Planning	Metropolitan Transportation Commission/Association of Bay Area Governments	July 7, 2021
Martin Collins	Director of Policy and Planning	British Columbia Agricultural Land Commission	June 22, 2021
Michael Buxton	Emeritus Professor, Environment and Planning at the School of Global, Urban and Social Studies	RIMT University, Melbourne	June 30, 2021
Nina Larsen Saarnak	Lead for Local Complaints	Danish Society Nature Conservation (Danmarks Naturfredningsforening)	June 29, 2021
Patricia Franscoise-Braaksma	Manager, Coordination Office of the Green Heart	Green Heart Administrative Platform (Bestuurlijk Platform Groene Hart)	July 12, 2021
Paul Miner	Head of Land Use & Planning	Campaign to Protect Rural England (CPRE) England	July 1, 2021
Ries van der Wouden	Senior Researcher, Department of Spatial Planning and Quality of the Local Environment	PBL Netherlands Environmental Agency	June 24, 2021

Name	Title	Organization	Date of Interview
Rodrigo Victor	Technical Advisor	São Paulo State Forestry Foundation	July 6, 2021
Rosemary West	Coordinator	Green Wedges Coalition	August 5 2021
Sarah Cardona	Deputy Director	Greenbelt Alliance	July 22, 2021
Tom Robinson	Project Director	Bay Area Conservation Lands Network 2.0	July 21, 2021
Uwe Riecken	Deputy, Conservation, Development and Sustainable Use of Nature and the Landscape	BfN, Federal Agency for Nature Conservation, German Federal Agency for Nature Conservation	July 2, 2021
Yara Maria Chagas de Carvalho	Academic Representative	São Paulo Green Belt Biosphere Reserve (GBBR) Management Council	July 26, 2021