

Tightening the Belt:

A Comparative Analysis of the Effectiveness of the Urban Growth
Boundary in Portland, Oregon and the Ontario Greenbelt in the Greater
Toronto Area, Ontario

by

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Abstract

As the world's population continues to increase, development is inevitable. Within North America, this has led to continuing sprawl and expansion of cities, which is resulting in a catastrophic loss of farmland. This is referred to as urban sprawl. Policy has been implemented as a means of combatting urban sprawl, and through the examination of two key greenbelt policies within North America – the Ontario greenbelt in Ontario, Canada and the Urban Growth Boundary in Portland, Oregon – this study aims to examine which is more effective. This study will look at five key variables as a means of analyzing both greenbelt policies and their effectiveness since their implementation. This study will suggest that both the Ontario and Portland greenbelt policies have been moderately effective in controlling urban sprawl, but will also pin point which has been more effective and why.

The conclusions of this study are important to future policy implementation and policy review. Further studies should be done to compare other variables, and an addition quantitative analysis would be able to provide statistical comparisons of the two cases chosen.

Key words: sustainability, greenbelt, Ontario, Portland, Urban Growth Boundary, effectiveness, urban sprawl, commuting, farming, comparison

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Chapter One: Introduction, Literature Review, and Methods

Introduction

Statement of the Problem

The idea behind greenbelts was first established in the nineteenth century as a means of preserving farmland and stopping city expansion. By the turn of the 20th century, planners were beginning to realize that urban growth was inevitable, and greenbelts became even more widely used. Urban sprawl, or the increase of development of suburban and rural areas, specifically outside of the urban core (Laquatra et al, 2010), has long since been an environmental concern that has demanded attention. Ultimately, the practice of regulating different land-uses, where areas for development are separated from areas that should be left for agricultural and as natural land, was thought to be unproblematic and easily justified. It was soon realized that urban sprawl was not an easy problem to remedy, but rather, city limits can be subjective and controversial.

Planners and policy makers view greenbelts as a mechanism for controlling sprawl because it allows for “development to occur in a restricted and well planned manner, protecting natural land and farmland from unnecessary development” (Amati, 2008, p1). The use of greenbelt policy allows planners the ability to place a limit on city growth, while simultaneously keeping nature close to the city. Some of the issues associated with urban sprawl include increased green house gas emissions, decreased agriculture and green spaces, a diminished sense of community, and water pollution. Greenbelts exist across the globe, but their effectiveness differs from country to country, and city to city. When looking at

greenbelt policy and what has been achieved, or not achieved, it is important to understand that groups and regions will perceive the effects differently. For example, policy makers will look at the outcomes in terms of what has been accomplished as it aligns with the set out policy, whereas community members may only see it in terms of raising property values. Because of the varying degrees of effectiveness of greenbelts on a global scale, it is critical to examine each individual greenbelt to fully understand how, and why, it has been effective or ineffective.

To date, the key objective of greenbelt policy is to control urban sprawl and protect environmentally sensitive ecosystems, but more objectives have been laid out as the sustainable planning practice has proliferated. Other objectives include sustaining rural and small towns, protecting the economic viability of farmland, preserving agricultural land as a commercial source of food and employment, providing open space, encouraging recreation and tourism, promoting the linkages between ecosystem and provincial parks, ensuring that development of transportation and infrastructure continues in an environmentally sensitive manner, and promoting sustainable resource use (Carter-Whitney & Esakin, 2010).

Since greenbelt policy first started to be implemented in North America, much has changed; technologies have developed, the world's population has exceeded seven billion, government policies have been created and changed, and wars have broken out. The constantly changing political, social, and economic environments affect how greenbelts are perceived and how they are able to limit urban sprawl. These changes include, but are not limited to, policy implementation,

changing societal views and economic changes, such as a recession or market failure.

Greenbelt policy often takes the possibility of change into effect, which can be seen through clauses included within the policy, which may specifically acknowledge that, unless there is policy conflict specific to the natural environment or human health, the greenbelt plan prevails (Government of Ontario, 2013). This is paramount, as it shows that the policy takes into account the changing nature of society.

Furthermore, the relatively recent nature of many of the North American greenbelts means that the advantages, problems, and general effects are only lately becoming examinable. As it stands, the concept of greenbelts has stayed fairly constant across the globe, but the slight differences in government, population, environmental concern, the changing economic market and the pressures of urban sprawl have caused each country to address the policy implementation a little differently.

As cities succumb to urban sprawl, they are faced with a variety of challenges. As cities expand away from the city core, water and electricity infrastructure must also expand outwards. Generally, road construction is crucial, as is the development of amenities such as emergency services, waste disposal sites, hospitals, and schools (Tindal, Tindal, Stewart & Smith, 2013, pg 46). There are also environmental implications of sprawl, such as air pollution from car exhaust, water

pollution from chemical runoff into near rivers and streams, and flooding caused by storm sewers, all of which negatively affect the health and well being of residents. Other challenges that cities face as they expand include policy and land use issues, such as land use zoning and building permits, as well as the need to ensure that municipalities can deliver all necessary services - from infrastructure, medical facilities, and community centers (Tindal et al. 2013, pg. 48). As cities expand, there are countless problems and challenges that must be addressed. All of the aforementioned issues are those that result from urban sprawl, illustrating why it is such a pressing environmental issue that demands policy action, specifically in the form of greenbelt policy. Based on this, how effective are greenbelts at controlling urban sprawl? Two greenbelts that can be used to evaluate this are the Ontario greenbelt, which is located in the Golden Horseshoe region, and the Portland Urban Growth Boundary.

Have the greenbelt in Ontario, Canada and the Urban Growth Boundary in Portland, Oregon been effective in addressing the issue of urban sprawl? What lessons are to be learned from both the Ontario greenbelt and the Portland Urban Growth Boundary in terms of policies to control urban sprawl?

Purpose of the Study

The purpose of this study is to identify how effective greenbelt policy can be and the ability of the policy to control urban sprawl. This will be done through a comparative case study of the greenbelt in the Greater Toronto Area, and the

Portland Growth Boundary.

There are some comparable attributes between the two selected greenbelts, and one of the most important is the rate of population growth. Based on their respective 2013 censuses, the population growth rate in Portland, Oregon is 1.1% (Christensen, 2014) and the population growth rate of the Greater Toronto Area is 1.5% (StatsCanada, 2014). Importantly, the cities are not growing at the same rate, but at comparable rates which both show significant growth patterns. The examination of population growth is a key consideration when looking at urban sprawl. As the population continues to grow there is an increased pressure to build homes and communities for people to live both in the city core and the suburbs. This is the exact reason why greenbelt policy is needed. The ability of a city to control urban sprawl that results from population growth is incredibly important to compare as means of evaluating greenbelt effectiveness.

Contrastingly, there are many variables that set the two greenbelts apart. To begin, the two policies differ slightly. While both are meant to curb urban sprawl, the greenbelt is an area of land that development cannot occur on, while the urban growth boundary is an area of that that is designated for development. In other words, they both separate urban and rural land, but one designated where development is allowed, while the other designated where it not allowed (Carter-Whitney, 2008). Another important difference is the age of the greenbelt policy, where Portland has had a regional growth strategy since 1995 and the GTA has had the Greenbelt Act since 2005 (Friendman, 2014). Another difference is the size of

the area being protected, as well as the size of the population in each area. All of these differences will have an effect on the ability of each region to control sprawl.

The comparative analysis of these two cases will allow for it to be made clear if greenbelts have been successful in limiting urban sprawl, and to what extent. Based on the analysis, it will become clear which variables hinder or support greenbelt policy, and to what extent.

Definitions

A greenbelt protects key environmentally sensitive lands and farmlands from development and sprawl (Carter-Whitney, 2008).

Sustainable development, according to the Brundtland Report, is “development that meets the needs of the present without compromising the ability of future generations to meet their own needs of the future” (World Commission on Environment and Development, 1987).

An objective refers to the goals set out for the chosen cases.

Stakeholder refers to any party that has an interest in greenbelt policy, such as farmers, the public, NGOs etc.

Urban sprawl refers to the increase of development of suburban and rural areas, specifically outside of the urban core (Cornell University, 2010).

Sustainable housing development: refers to the ability of the housing industry to

develop housing that has less waste, more recycling, low environmental impacts and costs, as well as greater user satisfaction. This refers to both suburban development and city core densification (Finch, 2007).

Delimitations and Limitations

A limitation to this study will be the availability of two perfectly comparable greenbelt case studies that are similar in all aspects except the approach taken to achieve the greenbelt objectives. Economic, social, political, and environmental atmospheres differ from country to country, and state to state, which makes it difficult to decide on two case studies that share enough commonalities to warrant a further comparison. However, the study will choose the best possible cases to allow for a comparative analysis.

A limitation to this study will be the restricted amount of data that has been compiled in relation to each selected greenbelt. As it stands, the Golden Horseshoe Greenbelt was created in 2005, making it only ten years old. As a result, the effects of the greenbelt are still being developed and not much data has been collected. Furthermore, some of the data associated with the Portland Growth Boundary was created by the municipal government and is not easily accessible. Furthermore, the absence of any data pertaining to the amount of farmland that has been developed since the greenbelt policies came into practice has meant that other, less obvious variables have had to be considered.

A limitation to this study will be time, with only eight months from this

study's inception to completion.

A delimitation of this study will be that it focuses on only two greenbelt case studies. This is due to time constraints, which does not allow for a thorough analysis of more than the two selected cases.

Significance of the Study

This study will contribute to the slowly growing research revolving around greenbelt policy and its ability to continue to curb urban sprawl, even as society and environment change.

The world's population is expected to exceed eight billion people by 2025, which means that increased urban development is inevitable (United Nations, 2013). However, the use of sustainable planning, such as greenbelts, may be a way to encourage sustainable housing development, rather than accepting urban sprawl as the answer.

Through the use a comparative analysis this study will provide an analysis of the ability of both greenbelts to achieve their main object of limiting urban sprawl. Once the five selected variables have been compared, a grade and it will then be determined which case study has a higher over all grade in greenbelt effectiveness.

Literature Review

Environmental Politics and Greenbelts

Greenbelts are a form of environmental policy that has been used to combat environmental problems; trying to address one of the roots of environmental problems – urban sprawl – using policy and government. Urban sprawl refers to the increase of development of suburban and rural areas, specifically outside of the urban core (Cornell University, 2010). It is important to understand why sprawl is an environmental issue, which includes worsened air quality caused by car dependence, a loss of green space and farmland caused by constant growth, loss of sense of community, water pollution, and climate change (Squires, 2000). As cities continue to expand, these issues continue to be exacerbated.

According to Marco Amati, the use of greenbelt policy may be one of the most internationally well-known attempts to combat urban sprawl (2008). Interestingly, Amati mentions in the preface that, nearing the end of his research, it became apparent that no other book had yet to compare greenbelts on an international level (2008). His book is filled with examples from around the world where greenbelts have been implemented, and he comments on the theory versus practice contrast that exists (Amati, 2008). One key example of this is the phenomenon of leapfrogging, where development ‘leaps’ over the greenbelt to surrounding regions. Although sprawl within the greenbelt is being controlled, it is not being stopped, but rather, is being relocated.

Similarly, Ding, Knapp and Hopkins developed a theoretical analysis to analyze the ability for greenbelts to manage urban growth, and concluded that the effectiveness of a greenbelt is contingent on the investment made in infrastructure and the continuous and small extension of the physical greenbelt (1999).

Previous Greenbelt Work

Importantly, since the publication of Amati's book, there have been several articles released that compare particularly selected greenbelts, such as Maureen Carter-Whitney and Thomas Esakin's *Ontario's Greenbelt in an International Context* (2010). This study was done on behalf of the Canadian Institute for Environmental Law and Policy in 2010. The report looks at nine greenbelts outside of Ontario and analyses the legal structure of each greenbelt, the distinct features of each, and any issues that are apparent. Carter-Whitney and Esakin draw the conclusion that the potential of greenbelt policy is irrefutable. They base this assertion on the fact that greenbelts have achieved the intended objective of controlling sprawl, but they have also been able to change over the years to become even more significant in environmental policy. They also argue that the Ontario greenbelt is a "vibrant multi-use greenbelt that is protecting significant agricultural and environmentally sensitive lands from development" (Carter-Whitney & Esakin, 2010, pp. 92). Their conclusions were made based on a number of reoccurring themes that appeared in their study, such as the capacity of the greenbelts to adapt to account for societal needs, the tension between growth and infrastructure, where growth was occurring faster than infrastructure could be built, and the need of proactive support from

surrounding farmers.

While there may be a limited compilation of comparative reports in regards to international greenbelts, the research pertaining to other aspects of greenbelt policy and specific greenbelts is ample. Myung-Jin Jun (2004) says that, despite the numerous studies and reports done to study greenbelts, there has been no agreement over what makes them effective. In his paper, Jun uses the indicators of development patterns, transportation, and mobility to analyze the effects of Portland urban growth boundary. The effects of greenbelts on housing prices have been explored, and it was found that greenbelt policy does place a pressure on housing prices, but that it is relatively small (Phillips & Goodstein, 2000). Cox (2001) explored the same phenomenon and found that it is not urban sprawl that raises housing prices, but that it is people's desire to live away from the city that does. Simply put, the more demand there is for suburban housing, the more competitive and expensive the market becomes. He established this by using 17 different variables to compare Portland's greenbelt to Atlanta's (Cox, 2001).

The studies above, with the exception of Cox's comparison of Portland to Atlanta, all deal with multiple greenbelts and use multiple indicators in their comparisons. A study of a much more intense magnitude was done in 1993 by comparing Scotland and England's greenbelts. The purpose of the study was to assess the effectiveness of the greenbelts to achieve their existing purposes, namely control sprawl, the role of greenbelts in management policy, the permanence of greenbelts in the changing society, the results of carbon dioxide emissions in

relation to transportation, the analysis of urban fringe issues, and the impacts of the control policy on development (Elson, 1993, p1). The study looked at all of these aspects individually, and then proposed solutions, questions, and further research opportunities for each.

The Debate

The lack of agreement on the usefulness and importance of greenbelting, has resulted in an interesting debate. Jan Brueckner (2000) argues that any policy measure designed to control urban sprawl will have an unfavourable effect on the American lifestyle, and sees greenbelt policy, and any other form of sprawl policy, to be misguided and believes that sprawl is benign. She also says that greenbelts “can easily yield undesirably draconian outcomes because they are not directly linked to the underlying market failures responsible for sprawl” (Brueckner, 2000, pp. 170) and believes that stringent policy like this will do more harm than good. Brueckner fears that the easy-to-implement policy has great potential to be misused, and fears it may needlessly restrict the city limits, leading to rising housing prices and unwarranted density increases. Contrastingly, Ding *et al* recommend that greenbelt policy be used to “promote compact and contiguous development patterns that can be efficiently served by public services and to preserve or protect open space, agricultural land, and environmentally sensitive areas” (Ding *et al*, 1999, pp.53).

This paper will contribute to the debate surrounding greenbelts, which will be done by examining how greenbelts have been successful in restricting urban

sprawl, looking specifically at the environmental implications that have resulted.

Methods

The methodological framework that will be explored in this thesis is a comparative analysis of the two aforementioned greenbelts - Ontario and Portland. To establish the effectiveness of both the Ontario greenbelt in Ontario, Canada and the Urban Growth Boundary in Portland, Oregon, five variables will be examined and compared, and then assign a score of between 1 and 5. Based on the overall score of each policy, it will be determined which has been more effective, and in which categories. The five variables that have been selected are intensification/densification rate, potential growth capacity, commuting times, the price of farmland, and the number of farms within the protected area. Each of these selected variables relate directly back to the ability of the policy to achieve its set out goal and will be critical in determining if, and to what extent, the greenbelt policy has been effective.

Variables

The ability of the greenbelt policy to control sprawl is the number one objective, and although the most obvious variable to examine would be the amount of farmland that has been developed since the implementation of the policy, that data is not available. For this reason, other variables will be looked at to that help to show if the greenbelt policy has been successful. The first variable will be the intensification/densification, or the rate at which the already built regions are becoming denser. This variable will show if the GTA and Portland are becoming

denser city cores, and to what extent. If the city is becoming denser, then that means that development within the already built areas is being encouraged, which is one step in limiting urban sprawl.

The second variable that will be examined is the potential growth capacity of the region, which is the extent to which the area has accounted for future population growth and development. Population growth is inevitable, so the ability of the greenbelt policy to account for future growth directly correlates with the policy's ability to control sprawl. Policy needs to look at current and future trends if it is to properly and effectively address the issue of urban sprawl.

The third variable being examined is commuting times. One aspect of controlling sprawl is limiting the reliance on cars and other fossil fuel methods of transportations. As city boundaries continue to grow, communities become further and further spread apart, thus having to rely on cars, opposed to bikes or walking. For this reason, commuting times will be examined to demonstrate how the policy is affecting transportation. This is important to consider as greenbelt policy aims to improve the quality of life within its region, and commuting times do well to show how the quality of life is improving, or decreasing. The more time spent behind the wheel each days is less time that is spent with family or friends.

The fourth variable that will be examined is farmland prices within the protected areas. To understand how effective the greenbelt and urban growth

boundary policy is at achieving its set out objectives, it is central see how the greenbelt policy is affecting local farmland and agricultural production. A decrease in farmland prices will be seen as an indicator of greenbelt success, as, in theory, that means that farmers have more access to inexpressive land to expand their operations.

The fifth and final variable to be examined will be the number of farms within the protected area. Protecting farmland is a key aspect of greenbelt policy, which is also directly linked to controlling urban sprawl, where urban sprawl expands onto valuable farmland. A decrease in farms can mean two things - which there are fewer farms and fewer farm related outputs, or that farms are consolidating and outputs are remaining the same, or even increasing. The first potential outcome shows that the greenbelt policy is ineffective in protecting farmland, while the second outcome proves the opposite. For this reason, the exploration of the number of farms will show how effective the policy has been.

Scoring System

The scoring system will assign a grade between 1 and 5 to each individual category. A score of 1 means that the variable has slipped below previous trends since the policy came into effect, demonstrating that the variable has worsened, which could possibly be attributed to ineffective greenbelt policy. A score of 3 means that the variable has stayed consistent with previous trends pre-policy, showing neither a decrease nor increase, subsequently meaning that the policy does not appear to be effective or ineffective. A score of 5 means that the variable has

exceeded previous trends since the policy came into effect, showing that the policy has been effective in a positive manner. A score of 2 or 4 shows that the variable has shifted, but only partially in either direction. The table below is how each category will be scored and displayed.

| Variable | Ontario Greenbelt | Portland UGB |
|------------------------------------------------|--------------------------|---------------------|
| <i>Intensification/densification</i> | | |
| <i>Potential growth capacity</i> | | |
| Commuting times | | |
| <i>Land prices within the protected region</i> | | |
| <i>Number of farms</i> | | |
| Overall effectiveness | | |

Figure 1. Scoring table.

Chapter Two: The Ontario Greenbelt

History

The history of Ontario's Greenbelt is much shorter than Portland's Urban Growth Boundary. In 2003 the government passed Bill 27, otherwise known as the Greenbelt Protection Act, 2003. This act designated a study area and one year moratorium on any development within the area. The study of this site, in collaboration with public consultation, resulted in the introduction of the Greenbelt Act of 2005. The legislation was passed on February 28, 2005 by Dalton McGuinty's Liberal government, and protected more than 1.8 million acres of land. As of 2011, this area was home to some 5500 farms and more than half of all Ontario's class one farmland. The main objective of the Ontario Greenbelt is to protect the quality of life within the Golden Horseshoe region in anticipation of future population growth and subsequent urbanization (Carter-Whitey, 2008).

A review must be carried out every ten years, and must be done in collaboration with the Oak Ridges Moraine Conservation Plan and the Niagara Escarpment Plan. Importantly, the Act gives the public the opportunity to participate in the review process. The Ontario greenbelt has already seen some expansions in its ten years, including the addition of Credit River and Etobicoke Creek ravines in Mississauga (Chan, 2014). The first expansion was seen on January 10, 2013, when 255 acres of Glenorchy Conservation Area was added on the 1.8 millions acres already protected by policy (Dana, 2013).



Figure 2. Map on Ontario greenbelt (Carter-Whitney, 2010).

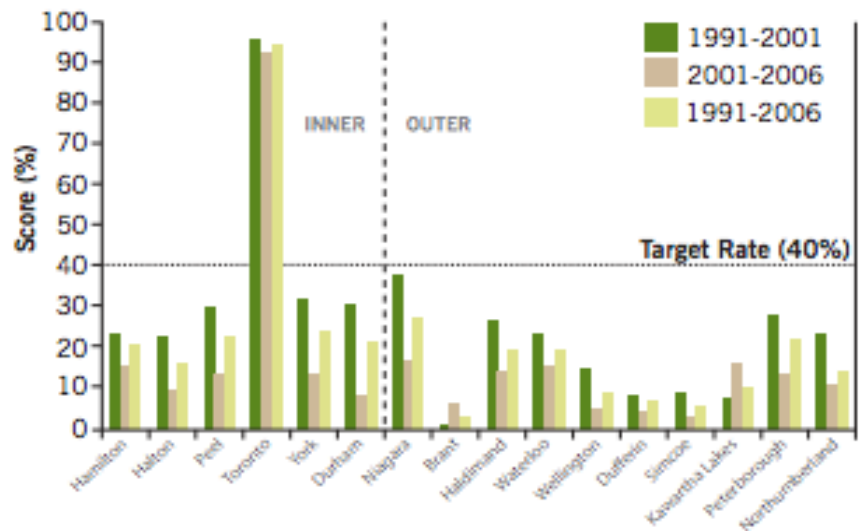
Findings and Analysis

According to Mausberg, a former University of Toronto environmental studies professor, before the greenbelt policy came into fruition, the Greater Golden Horseshoe was experiencing urban sprawl at an alarming rate of 2400 acres a year, an equivalent to 1200 soccer fields (Murray, 2011). Since the development of the Greenbelt policy, development within the protected boundaries has been decreasing, which could be for a few different reasons.

Intensification/Densification

Intensification is defined as “a growth management technique that aims to guide residential development away from natural areas and greenfields (underdeveloped) sites towards existing areas” (Toronto and Region Conservation Authority, 2011, p 54).

Fifteen-year Intensification Rate, Greater Golden Horseshoe, 1991 to 2006 Measured within the 1990 Built Boundary



Source: The University of Toronto and the Neptis Foundation 2009.

Figure 3. Fifteen-year intensification rate in the Golden Horseshoe between 1991 and 2006 (TRCA, 2011, p 54).

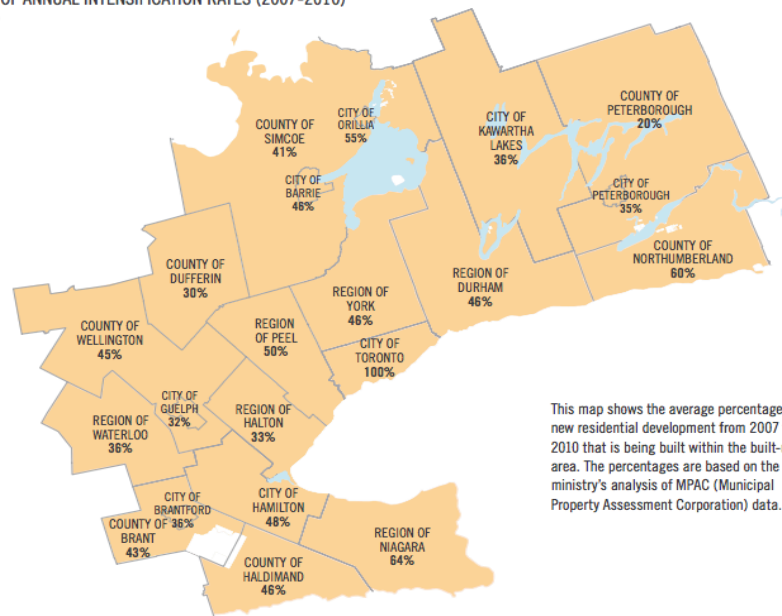
As previously stated, the ability of a region to protect and curb urban sprawl is vital in analyzing the effectiveness of greenbelt policy, and intensification is directly

linked to that. According to a study conducted by the Neptis Foundation, the analysis of data from 1991 to 2006, concluded that the intensification rate of the Greater Toronto Area is approximately 36% (TRCA, 2011). This means that 36% of all the development within the GTA was done in already built up urban areas. Notably, the highest rate of intensification can be seen within Toronto itself, at average of 94%. The below chart demonstrates intensification trends in the various GTA regions. This data reveal that intensification was occurring long before the Greenbelt policy came into effect in 2005, as only one year of Greenbelt policy is reflected in this data.

For the years following the implementation of the Greenbelt policy, indicators shows that many municipalities have achieved an average intensification of 60%. This

was measured using 2012 property assessment data, which was then used to calculate the percentage of new residential

MEASURING RESIDENTIAL INTENSIFICATION
 AVERAGE OF ANNUAL INTENSIFICATION RATES (2007-2010)

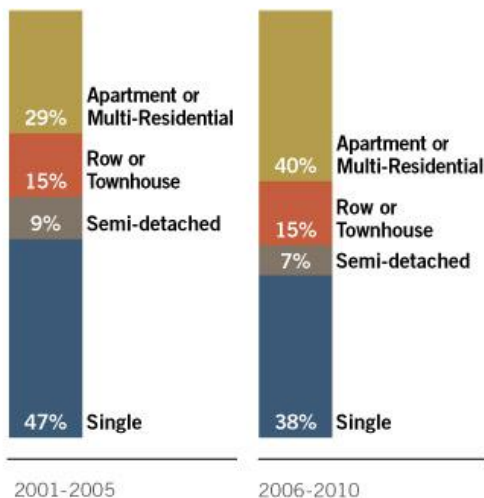


This map shows the average percentage of new residential development from 2007 to 2010 that is being built within the built-up area. The percentages are based on the ministry's analysis of MPAC (Municipal Property Assessment Corporation) data.

Figure 4. Average percentage of residential development built within the built up areas (Ministry of Municipal Affairs and Housing, 2015).

dwellings that were built within the upper and single tier areas between 2007 and 2010. The intensification data shows that an increase in intensification can be seen post-greenbelt policy, where Toronto sees a 100% intensification rate now, compared to 94% in 2006, and the rest of the GTA sees many municipalities with an intensification rate of 60%, versus the average of 36 % pre-greenbelt.

Housing types are important when considering intensification rates as well. Data shows that housing within the Golden Horseshoe areas has been shifting to be more dense beginning in the 1990s, as the above intensification data shows. Between 2006 and 2010, the first five years of the Greenbelt policy, 38% of housing was comprised of single family home, a decrease of nine percent from the 2001-2005 period, which saw single family homes making up 47% of housing (Collins-Williams, 2012). Resultantly, there has been an 11% rise in apartment and multi-residential housing, which is directly related to the phenomenon of intensification. The shift from single family homes to apartment style housing demonstrated that, at least to an extent, the cities are building up instead of out



following the implementation of the greenbelt, which is on way of reducing urban sprawl and the land consumption.

Ergo, intensification demonstrates that urban sprawl in the Greater Golden Horseshoe may be decreasing since the 2005

Figure 5. Total Housing Stock in the Greater Golden Horseshoe CMAs (Collins-Williams, 2012).

when the greenbelt policy came to be, with the city becoming more densely developed. Keep in mind, however, that there is no way to know if that is as a result of the Greenbelt policy until more data is made available following the news review later in 2015.

Potential Growth Capacity

To examine the potential growth capacity within the Ontario greenbelt, we will look at the whitebelt. A whitebelt is the land that lies between the edge of the greenbelt and the outer ridge of city development.

This area is not under Greenbelt

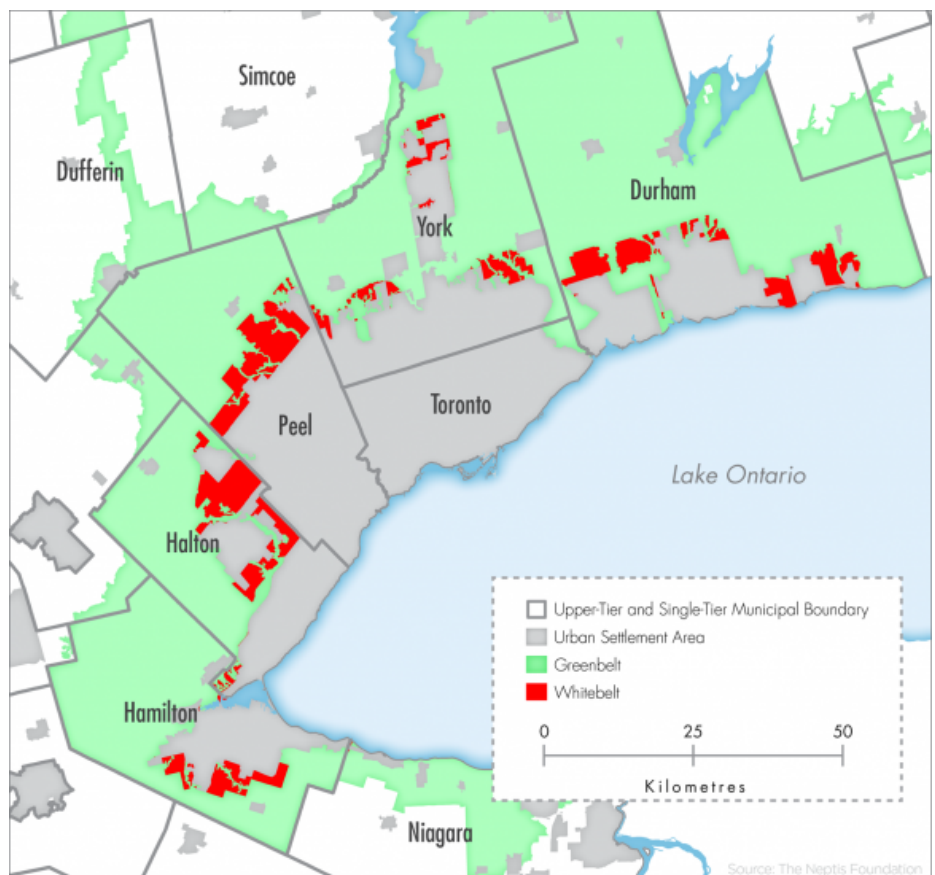


Figure 6. Whitebelt area in the Ontario Greenbelt (Allen & Campsie, 2013).

policy and is intentionally left to accommodate future urban growth. Currently, majority of the Golden Horseshoe whitebelt is used for agricultural and rural purposes. The Ontario Greenbelt has a whitebelt of 46 000 hectares, which is located, primarily, in Peel, Halton, and Durham. However, given the quality of land

currently available for development, there is little pressure for development on the whitebelts - yet (Allen & Campsie, 2013).

According to the Neptis report, urban expansion can continue at its current rate for up to two generations before the city edge meets the inner edge of the greenbelt. In fact, development proposals from 2011 only account for about 17% of the whitebelt to be developed, leaving 1120 000 acres of land to be left untouched until 2013 (Tomalty & Komorowski, 2011). No plans have yet been approved by the provincial government. This means that there is plenty of room for future development before urban sprawl begins to take over the greenbelt land.

The current debate is that this whitebelt land, comprising of farms and green space, should also be protected from development. Either way, it is possible that the Greenbelt policy has been able to control urban sprawl better than ever before, as a result of the use of the whitebelt, as it has allowed for future growth to continue in a sustainable, manageable, and responsible manner.

With that in mind, it is important to acknowledge that this is a negative externality associated with greenbelt policy. Specifically, leapfrogging, when development jumps the greenbelt to find land that is still available for rezoning, is an issue that has been directly correlated with whitebelts. As the development must be planned based on the expected population growth for the next ten years, it is often easier for urban growth to go beyond the protected land into small

communities. These communities are often not equipped to deal with such rapid growth (Pigg, 2015). These communities include Bradford, Guelph and Kitchener-Waterloo, all of which are losing valuable farmland as consequence of the leapfrogging resulting from the Greenbelt.

A statistical analysis was performed to explore the relationship between agricultural zoning and leapfrogging. Interestingly, the data shows that leapfrog development is not going to be exhibited equally all across the Greenbelt boundary, but is likely to be more concentrated in specific locations that are close to urban areas. The data also shows that Brant and Simcoe County are currently susceptible to the highest rate of leapfrogging as a result of high farmland prices directly outside of the greenbelt (Vyn, 2012). This has resulted in leapfrogging over the expensive farmland to nearby towns. This proves that urban sprawl is not necessarily being limited, but that it is displacing development to regions outside of the Golden Horseshoe. However, by no means does this mean that all development is being relocated to outside of the protected area, which can be seen through the increasing intensification rates examined earlier and the fact that the city is still seeing a population increase of over one percent annually. This just means that some of the development is being moved outside of the GTA.

Intensification and potential growth capacity affect the ability to control sprawl and account for population growth. By acknowledging that that growth is inevitable, the policy is able to adapt accordingly and tries to promote growth in a

smart and sustainable manner.

Commuting Times

Since the implementation of the Greenbelt policy, carbon dioxide emissions within the GTA have seen a decrease of 44% (TRCA, 2011), but has this been a result of decreased time spent driving? To start, we must note that close to 70% of commuters

in the GTA take private transportation. This is an important clarification to make because it demonstrates the over dependence on cars is a result of urban sprawl. The government estimates that commuting times will increase up to 45% by 2031 if development patterns continue as they were before the Greenbelt policy was implemented (Ministry of Public Infrastructure Renewal, 2006).

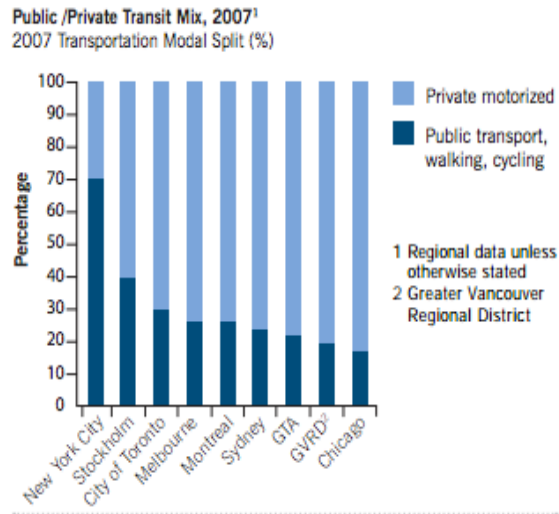


Figure 7. Percentage of GTA commuters who take private transportation versus public

According to the National Household Survey of 2011, the GTA now has the longest average commuting time in Canada at 32.8 minutes (Campion-Smith, 2013). The Canadian Index of Wellbeing suggest that from 1994 to 2010, the GTA has seen commuting times increase by 11.9%, which represents a 6.4 minute longer commute. The average commuting time in Toronto is 65.6 minutes, 63.6 minutes in Oshawa, and 59.2 in Barrie, marking the three longest commuting times in the GTA

(Canadian Index of Wellbeing, 2014).

Remarkably, the average commute time for the rest of Canada actually saw an increase of close to 20% (Statistics Canada, 2014). Although there is no statistical data yet available for what may cause this interesting contrast of the GTA average increase in commuting time of 11.9% compared to the Canadian average increase of 20%, it may very well be in part thanks to the Greenbelt policy.

Based on the above data, it appears that commuting times have increased. It would have been possible to attribute a decrease, or plateau in commuting time to the greenbelt policy, but no data was found to show the annual increase in commuting times, which means that it is not possible to show if the bulk of the 12% increase was pre or post greenbelt policy.

Rise of the Local Food Movement

The implementation of the greenbelt policy has coincided with a local food movement within the Golden Horseshoe area. In 2011, six years after the greenbelt policy was first introduced, a public poll was conducted by Friends of the Greenbelt Foundation that found support for the Greenbelt was growing. Respondents were asked what they thought the most important benefit of the greenbelt was, and 15 % said ensuring local sources of food (Bouvette, 2011). The poll showed a 10% increase in local food topics overall, an example being that 96% agreed that locally grown food supports local farmers.

This local food movement has offered farmers a chance to survive in our globalized market economy. The number of local farmers markets in the Golden Horseshoe has doubled to 112 and the Durham District School Board announced in the fall of 2014 that they would purchase all of their apples and five vegetables for school cafeterias from local growers (Porter, 2015). While the farmers are being more supported by their local communities more than ever before, they are also running into challenges as a result of the greenbelt policy.

Land Prices

Of the 1.8 million acres protected by the Ontario greenbelt, 43% of that is farmland (Porter, 2015), or 5500 farms. The actual greenbelt policy does not lay out any provisions to support local agriculture in a meaningful or impactful way. Land prices, traffic, lack of farming infrastructure, access to farm equipment, are all challenges that farmers are facing, and while none of these factors were actually caused by the greenbelt policy, they were also not addressed within the policy (Murray, 2011). The Ontario Federation of Agricultural president was quoted saying that that “[the greenbelt policy] allowed farmers to buy more land at affordable prices (Porter, 2015),” which has proved to be true. In fact, estimates say that farmland is 24% cheaper than before the greenbelt (Green, 2015). This decrease in price shows that the policy has been effective, although there is another dimension that should be considered. Most farms that are located in urban areas do not have the luxury of being able to expand, as the land around them was developed long

before the greenbelt policy came into effect (Murray, 2011). That means that, even though the land may be cheaper than before, the land available is not adjacent to the already built farms, and it would make little sense for farmers to fragment their businesses across the Golden Horseshoe.

Decrease in Farms

Looking at the number of farms pre and post greenbelt policy, a decline is evident. In total, a decrease of over 270 farms has occurred from 2006-2011.

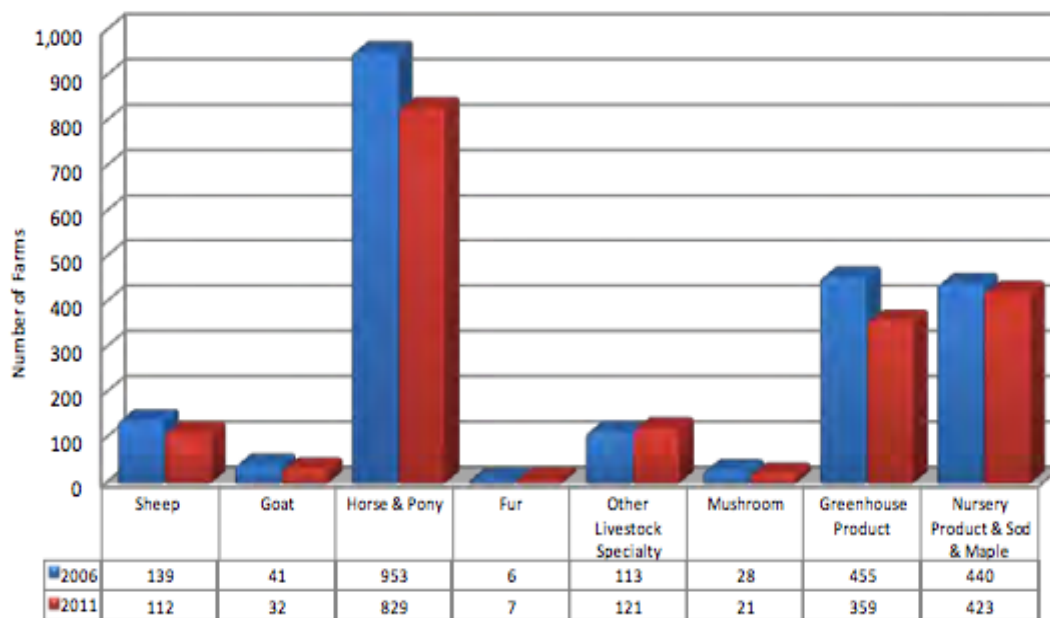


Figure 8. Number of farms in the Golden Horseshoe, 2006 versus 2011 (Golden Horseshoe Food and Farming Alliance, 2014).

While data shows that the number of farms in the regions are decreasing since the implementation of the greenbelt policy, the examination of trends from 1981 to 2011 show that the decrease has remained fairly consistent.

As a consistent trend is evident, another factor to examine is the number of farm animals within greenbelt farms, compared to the number of animal on farms in the rest of Ontario. This allows for us to see that what is happening within the greenbelt is not equal across the entire province. Arguably, this demonstrates that the greenbelt policy has not been effective enough to bring farming to the same level it is elsewhere.

A University of Guelph study was conducted by rural planning professor Harry Cuning, which used census data from 2006 to 2011 to look at agricultural changes in the greenbelt are compared to the rest of Ontario. It is critical to point out that this study period only includes one year where the greenbelt policy was actually in effect. However, it can be

used to illustrate the trends that existed before the greenbelt was implemented. The data found that every single farm was experiencing decreased than the rest

| Farm animal | Within greenbelt | Rest of Canada |
|---------------------|-------------------------|-----------------------|
| Pigs | 31% | 14% |
| Beef cattle | 24% | 13% |
| Dairy cattle | 13% | 9% |

Figure 9. Decrease in farm animals in and outside of the Greenbelt.

of the province. This was further reiterated by the data which found that the number of physical farm animals on the greenbelt saw a far more significant decline than the rest of Canada, which can be seen below (Murray, 2011). Fewer farm animals means that the farming operations are decreasing in size.

In conclusion, the five variables show that there have been some achievements for the greenbelt policy, but there have also been some drawbacks. Most importantly, it appears that most of the trends from before the greenbelt implementation appear to be consistent to what is occurring since implementation. The different mechanisms of the policy, such as the whitebelt, have allowed for the greenbelt to account for future trends and try and limit further issues from becoming exasperated, such as commuting times and the decreased number of farms. It appears that the GTA still have a ways to go before it can be said conclusively that the policy has been entirely effective in achieving its set out objectives.

Chapter Three: Portland, Oregon Urban Growth Boundary History

The history of Portland's Urban Growth Boundary (UGB) dates back to the 1970s, when Governor Tom McCall, with the help of farmers and environmentalists, convinced Legislature to adopt the first set of state planning laws in 1973. Senate Bill 100 required urban growth boundaries be developed and that natural resources were protected, which resulted in the Portland Urban Growth Boundary being developed in 1977. The main objective of the UGB policy is to protect farm and forested land from urban sprawl, while simultaneously promoting the efficient use of land within the boundary through development and redevelopment (Carter-Whitney, 2008). Since 1977, Oregon law has required that there be a 20-year supply of land for future residential development within the boundary lines. In 1980 the UGB was deemed to be consistent with the statewide planning goals set out in Bill 100 (Oregon Metro, n.d.).

A council review must be done every five years to report the land supply that is left within the UGB, and the boundary is adjusted to

meet the forecasted



Figure 10. Map of Portland Oregon Urban Growth Boundary (Oregon Metro, 2014).

population and employment growth for the region. Before the boundary is extended, local government will first evaluate what steps can be taken to accommodate the growth, such as up-zoning, redevelopment of brownfields, or more investment into transportation. If these steps are not sufficient, then the boundary will be redrawn. Resultantly, the UGB has been redrawn over three dozen times. While most expansions were only about 20 acres or so, the last expansion in 2011 added almost 2000 acres to the boundary.

State law was developed to define what criteria is to be used to determine what land should and should not be included within the UGB. This resulted in a priority system. First priority land, or urban reserve land, is an area outside of the current boundaries that are designated as land that could, if necessary, be brought inside the boundary within the next 50 years as a means of combating urban growth. Second priority land, also know as exception or non-resource land, refers to the land that is right next to the UGB that is not forest or farmland, and is also not urban or rural reserve land. Third priority land, also termed marginal land, is exclusive to Washington County, and fourth priority refers to farm or forest land, and priority is given to areas that have lower productivity outputs (Oregon Metro, n.d.).

The reserve process was recently adopted, which looks at land that is currently outside of the UGB that could be suitable for future development in the next 40-50 years. This system is how the municipal government plans to deal with the anticipated one million rise in population growth between now and 2040. The reserve system has two different land designations - urban and rural reserves.

Urban reserves are any land that is considered suitable for development within 50

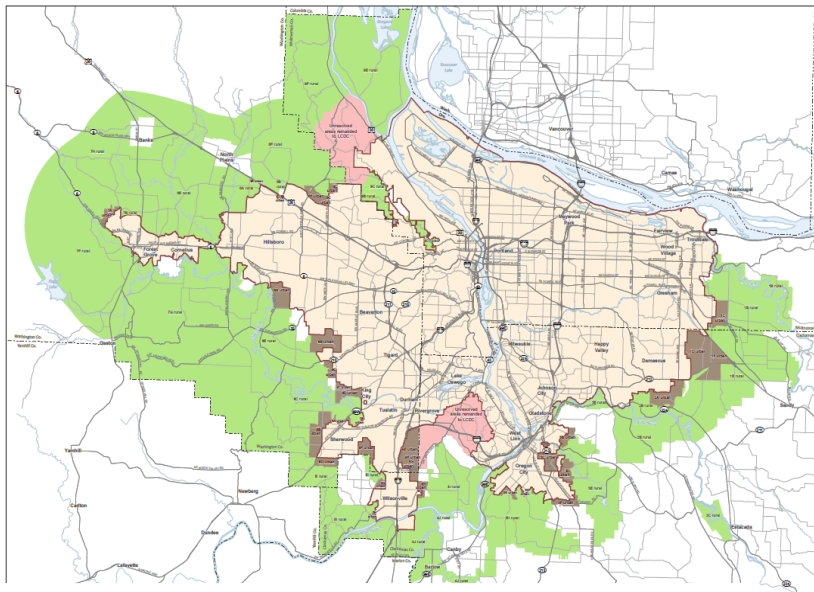


Figure 11. Urban and rural land reserves in the Portland UGB as of the 2014 review (Metro, 2014).

Figure ?? Urban and Rural land reserves in the Portland UGB as of the 2014 review (Metro, 2014).

years of its land designation, while rural reserves pertains to land that is intended to protect agricultural and natural resources

against urbanization for the next 50 years (Metro, 2014). In essence, these reserve areas form the basis for where the UGB can expand should it need to.

Findings and Analysis

Analysis has shown that, should the development patterns continue as they have, Portland will need 120 000 acres of land to accommodate the growth between now and 2040 (Poitras, n.d.). The ability of the UGB to accommodate the increasing population will be examined through intensification/urbanization patterns within the UGB.

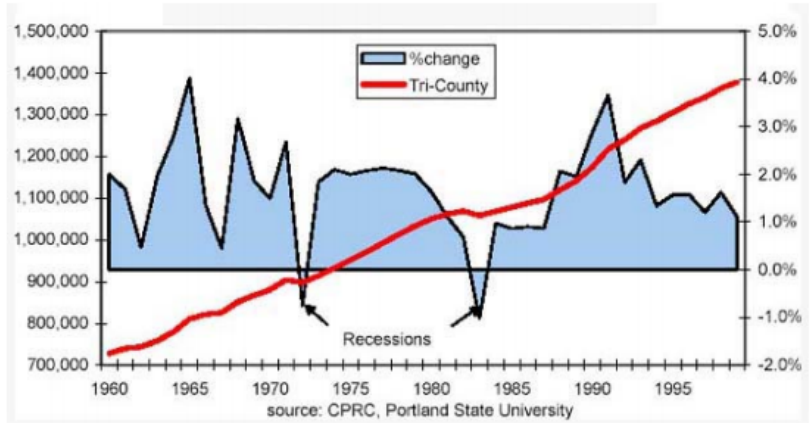


Figure 12. Population trends for the Greater Metro Region (Poitras, n.d).

Intensification/densification patterns

Between 1990 and 2000, Portland’s population grew by 21%, while surrounding suburbs grew from 30-40% (O’Tool, 2007). Similarly, from 1980 to 2000, the population in Portland increased by 54%, but the urbanized land increased by only 36% (Kline and Alig, 1999, in Jun, 2004). Based on this data, the Portland metro area ranks ninth out of 36 metropolitan areas for urbanized land.

| Portland Chart - Google Docs | 1980 | 1990 | 2000 | Percentage change 1980–2000 | Rank (out of 32) |
|------------------------------|--------|--------|--------|--------------------------------|---------------------|
| Urbanised population (000s) | 1026 | 1172 | 1583 | 54.3 | 8 |
| Land (square miles) | 349 | 388 | 474 | 35.8 | 9 |
| Density | 2940.3 | 3021.0 | 3340.0 | 13.6 | 15 |

Source: US Bureau of Census, STF3, 1980, 1990 and 2000.

Figure 13. Population, land area and densification in Portland (Jun, 2004).

When looking at data from within the UGB and outside of the UGB, it must be noted that census information is not easy to obtain because the UGB crosses over census boundaries. However, Jun was still able to collect and analyze data with this concern in mind. He was able to establish spatial distribution of housing from 1960 to the 1990s, which illustrates that 75% of the housing units were built within the UGB. Other important facts to consider include that rapid population growth in the 1970s meant that twice as many houses were constructed as in the 1960s. The 1980s saw a decrease in construction as a result of the economic downturn, but then the 1990s doubled the housing constructed in the decade before (Jun, 2004). Between 2007 and 2012, the region saw levels of redevelopment that exceed past rates, with 58% of new residential buildings being the result of redevelopment (Metro, 2014). This shows that the densification of the region has been increasing since the UGB policy was first implemented.

What is interesting is that Portland is actually considered a low density region, being only 10% above the average density in major urban areas. In fact, Portland's density is less than half of that of Los Angeles (Cox, 2013).

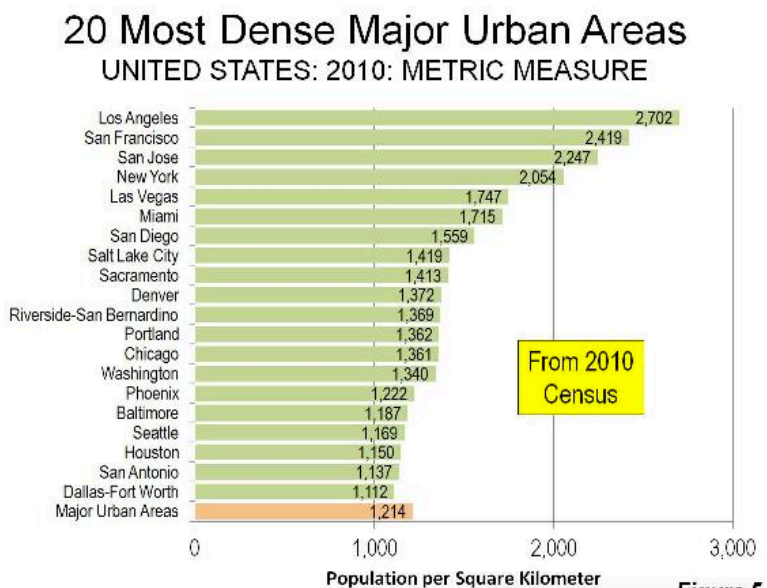
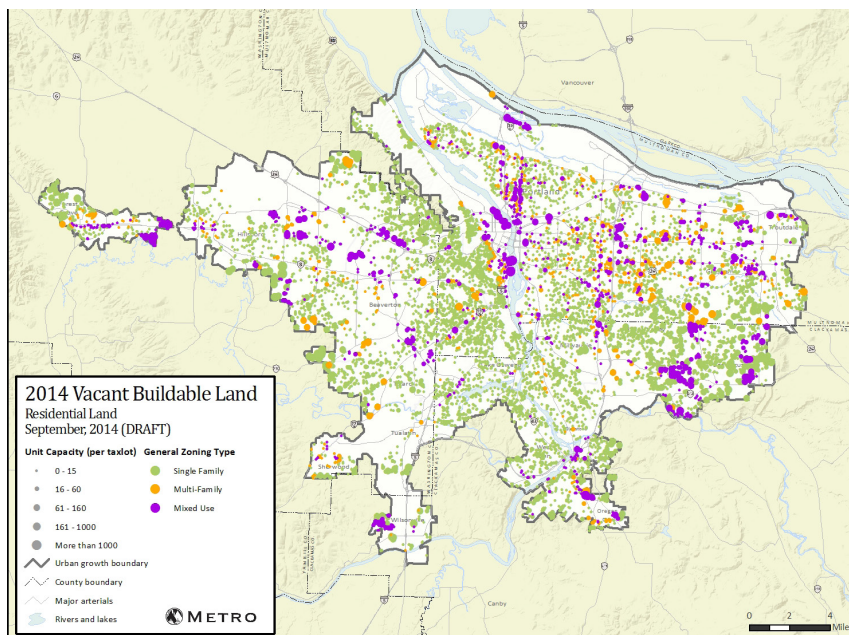


Figure 14. 20 Most dense major urban areas in the United States (Cox, 2013).

However, trends still show that the region has been doing well at increasing density over the years. Based on the fact that Portland does not appear to be all that dense, but shows that there appears to be a steady increase in densification, it can be said that the policy is partially effective in control urban sprawl.

Potential Growth Capacity

When the UGB was first developed it was only 23000 acres, and the boundary contained enough land to accommodate the predicted demand for low-density development (Poitas, n.d.). However, as the UGB has expanded, policy was developed that requires that the Portland Metro government to perform an UGB review every five years as a means of accounting for the growth expected in the next 20 years. The idea of “loosening the belt”, where the UGB is redrawn, means that the growth capacity within the region is volatile and changes every five years (Senville, n.d.).



To analyze the possible population growth and subsequent need for development, Metro uses a probabilistic range forecast, and the

Figure 15. 2014 land available for development within the UGB (Metro,

baseline has the highest probability, with a 90% that the growth will be within that range. The most current review was performed in 2014, and shows that the growth capacity within the UGB equates to 1.3 million residences, and that is after taking into account the needed infrastructure that will be required, such as additional sidewalks and streets (Metro, 2014). This is remarkable considering that as of 2000, the UGB covered 24 cities and had 1.3 million residences. That means that the 2014 reviews has determined that the growth capacity of the area is double what was already built as of 2000 (Jun, 2004, Metro, 2014). This means that the region is able to account for future development needs, which shows that they are trying to prevent future urban sprawl from occurring. The potential growth capacity of the area does demonstrate that thought and consideration is put in to future development, which could be an indicator of progress.

Commuting Times

Between 1982 and 2003, the average commuting time in Portland increased more rapidly than compared to major cities such as Atlanta, Boston, New York, Los Angeles and San Francisco (O'Toole, 2007). This may be tied to the fact that auto and transit users alike have increased by 26% from 1980-2000 (Jun, 2004), in addition to the fact that cross border commuting has also seen significant increases during this time period. As seen below, many Portland residents travel outside of their suburbs for work, a commuting patterns those goes against the goals of the UGB. This issue directly and negatively affects commuting times within the area.

TRAVEL COMMUTE PATTERNS

2011 COMMUTE PATTERNS FROM CITIES/PLACES IN THE PORTLAND METROPOLITAN AREA
LINES CONNECT A PERSON'S PLACE OF RESIDENCE TO PLACE OF EMPLOYMENT
LINE THICKNESS REPRESENTS NUMBER OF PEOPLE

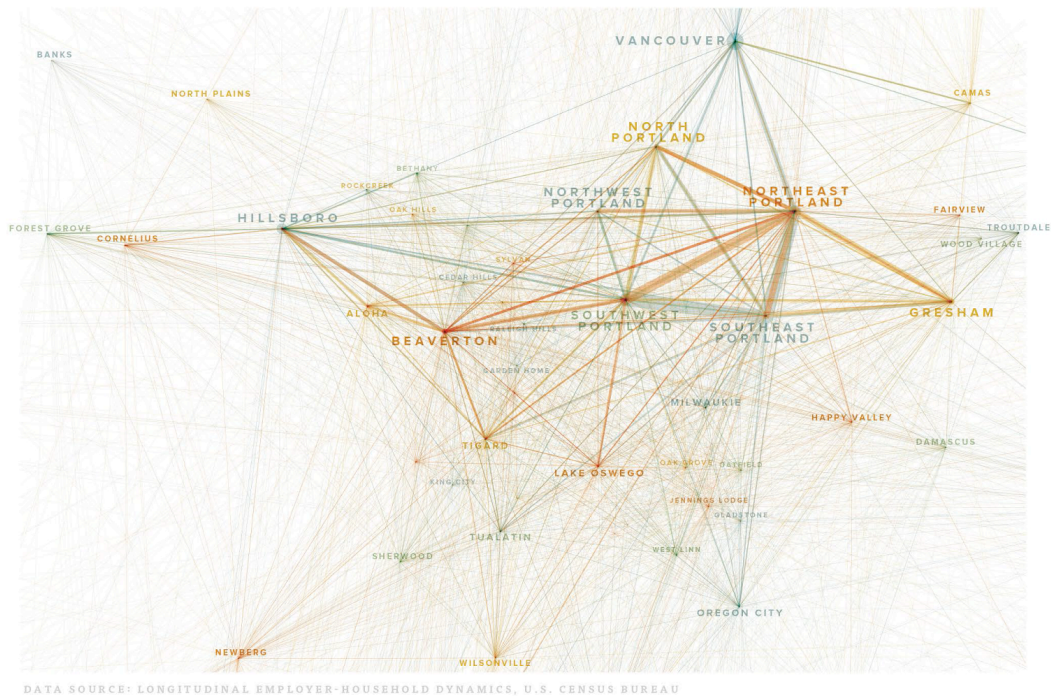


Figure 16. Commuting paths in the Portland Metro (Metro, 2014).

Between this 1980 and 2000, the median commuting time in Metro increased by 14.5%. When this time period is broken down, an increase of only 2% was seen from 1980-1990, but then commuting times skyrocketed to 12% longer in the following decade (Jun, 2004). This makes the mean travel time 25 minutes, versus 24 minutes in 2004 (Stinger, 2015). Some possible reasons for why commuting times have seen such drastic increases include, but by no means are limited to the suburbanization of the populations, and an increased dependency on cars. This may be reiterated by the fact that studies show that Portland has the nation's sixth worst traffic congestion, where in 1982 the metro ranked only 39th for congestion.

According to this same study, Portland ranks fifth in commuter stress in that nation, which is a measure of direction traffic congestion (Cox, 2013).

Bike Portland released a report in 2013 that illustrated a shift in car ownership in the Portland metro area. The study found that, between 2005 and 2011, 60% of the population growth in Poland resulted from households that have

Low-car households as a share of Portland growth, 2005-2011

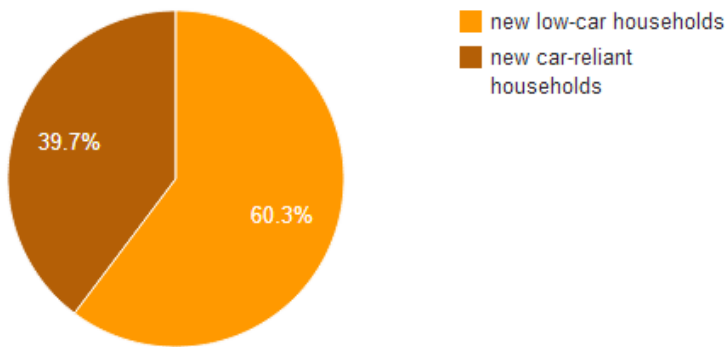


Figure 17. Portland population growth in car-reliant versus low-car households (Andersen, 2013).

fewer cars than adults (Anderson, 2013, in Schmitt, 2013). That is, the study concluded that development in

Portland is beginning

to shift away from a car

dependent, but if that is the case, why are commuting times still increasing.

Regardless, it still appears that the average commuting time in Portland is continuing to increase, despite the fact that it should be decreasing as an indicator that sprawl is not occurring.

Land Prices

Before 1990, all of the undeveloped land within the UGB was farmland.

Interestingly, the farmland that needs protecting is that which is not inside the UGB.

To combat this, Portland has developed a system for exclusive agricultural zoning. These zones mean that the land can only be used for farming, and statistical analyses show this this has largely been successful in stopping the urbanization of farmland that is outside of the UGB (Edelman, 1998). Any soil that is considered 'good' is protected under UGB legislation for exclusive farm use. This is interesting considering most of this land is outside of the UGB. Regardless, this is a benefit to farmers because they would otherwise not be able to afford land to expand their operations. This is because, should the land be zoned for mixed uses, the competition from development companies would be no match for local farmers (Richmond, 1997).

An empirical analysis, performed by Nelson in 1994, found that Portland saw a shift to higher urban values and lower farmland values within the UGB. As mentioned previously, lower farmland prices are an indicator of UGB effectiveness.

Number of Farms

What is different about farmland in Portland, and even Oregon, is that it is protected under a statewide land planning program, and the UGB is, in fact, one aspect of the

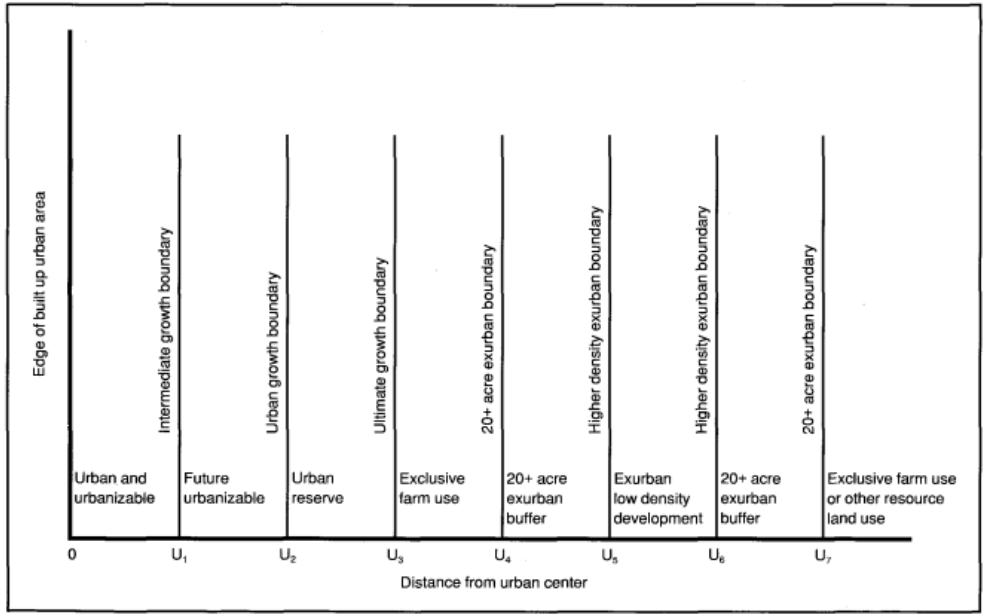
| Land use category | Acres ^a | % all land | % privately owned land |
|-----------------------|--------------------|------------|------------------------|
| Total land area | 61,587 | 100.00 | |
| Publicly owned | 33,750 | 54.80 | |
| Privately owned | 27,837 | 45.20 | 100.00 |
| Inside UGBs | 2,048 | 3.33 | 7.36 |
| Outside UGBs | 25,789 | 41.87 | 92.64 |
| Exclusive farm use | 16,036 | 26.04 | 57.61 |
| Primary forest use | 8,771 | 14.24 | 31.51 |
| Rural residential | 710 | 1.15 | 2.55 |
| Commercial | 10 | 0.02 | 0.04 |
| Industrial | 46 | 0.07 | 0.17 |
| Rural service centers | 29 | 0.05 | 0.10 |
| Other | 189 | 0.31 | 0.69 |

a. Figures rounded to nearest 1,000 acres.
 Source: Adapted from Department of Land Conservation and Development 1986.

Figure 18. Land use designations in Oregon, 1981 (Nelson, 1992).

planning program. Therefore, of the 61.6 million acres of farmland, 2 million acres are within UGBs across the state (Nelson, 1992).

Oregon has seen an increase in small and medium sized farms in recent years, and



Portland is not exempt from this growth. In fact, between 2000 and 2015, Portland saw a 13%

Figure 19. Regional planning for protecting farmland (Nelson, 1992).

increase in agricultural

sector sales. Moreover, the metro region is seeing increasing sales at a faster rate than other parts of the state, which has been a trend for the last 25 years (Mylott, n.d.). Ergo, the number of farms is increasing, as are farm related sales.

Chapter Four: Conclusion and Recommendations

Comparison

While comparing the data, it of utmost importance that the age of both policies and protected parcels of land are considered. The Ontario greenbelt came into effect in 2005, whereas the Portland UGB was implemented back in the 1970s. Of course, this does not mean they are inappropriate to compare against one another.

A grade will be assigned to each region for each variable. **5** means that the variable has exceeded previous trends since the policy came into effect; **4** means that the variable has exceeded previous trends slightly, **3** means that the variable has stayed consistent with previous trends pre-policy; **2** means that the variable has slipped below previous trends slightly; and **1** means that the variable has slipped below previous trends since the policy came into effect.

To quantify the ability of both regions to control sprawl, we consider both the current composition of the region post policy implementation, and also how much the region has planned for future development. As pointed out, both the GTA and Portland have similar population growth rates, so evaluating the growth capacity of both protected areas can be used as a measure to account for how and why intensification/densification are at the rate they are. The ability for the region to account for future development directly relates to the intensification of the city,

where the planning should be concentrated within the centre of the region, opposed to the periphery.

Intensification/densification

Within the GTA, the intensification rate sits at 36%, with some municipalities exceeded 60%. This rate has exceeded previous intensification trends, showing that, between 2006 and 2010, Toronto has a intensification rate of 100%, and surrounding areas were also improving upon previously recorded rates. However, taking into account. For this reason, the Ontario greenbelt is given a **5** for this variable, as an obvious and impressive increase in intensification can be seen.

Similarly, Portland has also seen densification exceeding what it once was. However, it is still considered a low-density region, and between 1990 and 2000, while the population more than doubled, densification only increased by 36%. Unlike Ontario, the progress in Portland appears to be much slower and far less impressive. Although the data shows that the intensification rates have been fairly consistent over the years, there has been no real increase, which is what should be expected. For this reason, a grade of **3** is given for this variable.

Potential Growth Capacity

In terms of growth capacity, Ontario and Portland handle it differently, but both do take into recognize that population growth and future development is

inevitable, so the policy implemented tries to allow for development but in a more sustainable manner.

The Ontario greenbelt uses a whitebelt to ensure adequate growth capacity for the upcoming years. This area is 46 000 hectares, but the land will not be needed for years. In fact, current development proposals only request 17% of the whitebelt, which would mean that the other 83% will left untouched until 2031, at the earliest. Now, it should be pointed out that it appears that the green belt policy is controlling sprawl within the greenbelt area, but that has put an unexpected pressure on the municipalities that are not protected by the greenbelt boundary. As a result, leapfrogging development has begun to occur. So, yes the policy is doing what it intended - to protect the Golden Horseshoe from urban sprawl, but it appears that the sprawl is simply being displaced to other areas of the province. Therefore, this variable is given a grade of **4**, where it is obvious that the future development is considered, but it has come at the expense of regions outside of the Greenbelt.

The Portland UGB undergoes a review every five years, which must postulate expected population growth and ensure that there is adequate land to account for such growth. This means that the growth capacity of the regions changes every five years. As of the most current review in 2014, 1.3 million additional residents are expected, so the necessary amount of land has been reserved for development. While Portland does have a review process, it does not do nearly as much to ensure that development is situated in the core, thus, it is being given a grade of **3**.

Commuting Times

Between 1994 and 2010, commuting times increased by 11.9% in the GTA, which appears to be inline with the trends from before the policy was implemented. Although the increase is less than what was seen nationally, there is no evidence that commuting times have plateaued or decreased, this demonstrating that the policy has not been effective enough. The data also makes it impossible to know for sure if the increase in commuting times was even over the 16 years of data, of if it spiked pre or post greenbelt. Resultantly, this variable is given a grade of **3**.

In Portland, a similar trend has been seen, where the median commuting time has increased by 14.5% from 1980-2000. While studies also show that the city is beginning to shift away from car dependency, commuting times still show that the UGB policy has not been effective enough to depict a plateau or decrease in time spent commuting. Because a huge spike was not detected, this variable receives a grade of **3**, like Ontario.

Land Prices

The Ontario greenbelt has resulted in farmland being 24% less expensive than it was before the greenbelt policy. This gives farmers the opportunity to buy more land and allows for them to expand their current operations. In terms of the actual greenbelt policy, it has given farmers the financial ability to grow, meaning it has succeeded to do what it intended. The significant decrease in land prices is a

success of the greenbelt policy; therefore, it is given a score of **5**.

In Portland, urban land value has increased while farmland value has decreased, a result of the reserves system that is used to protect farmland. The use of agricultural zones means that farmland can only be used for farmland, which eliminates the competition from developers and allows for farmers to buy land as they wish. Therefore, land prices in Portland received a grade of **5**.

Number of Farms

The Golden Horseshoe region has experienced a significant decrease in number of farms from 1981 to 2011, and it appears that the number of farms has decreased slightly faster since 2006. Since the greenbelt implementation, it appears that the trends have been worsening, although not too significantly. Therefore, this category is given a grade of **2**.

Portland has been experiencing the opposite trend, where the number of small and medium sized farms has actually been increasing. Additionally, the region has also seen an increase of 13% in sales from the agricultural sectors, showing that the farms within the UGB are flourishing. Therefore, this variable is given a grade of **4**, as it has seen positive trends since the UGB policy came into implementation.

Scores

| Variable | Ontario Greenbelt | Portland UGB |
|------------------------------------------------|--------------------------|---------------------|
| <i>Intensification/densification</i> | 5 | 3 |
| <i>Potential growth capacity</i> | 4 | 3 |
| <i>Commuting time</i> | 3 | 3 |
| <i>Land prices within the protected region</i> | 5 | 5 |
| <i>Number of farms</i> | 4 | 4 |
| <i>Overall effectiveness</i> | 21 | 18 |

Grading Scale

- 1** means that the variable has exceeded previous trends since the policy came into effect
- 2** means that the variable has exceeded previous trends slightly since the policy came in to effect
- 3** means that the variable has stayed consistent with previous trends pre-policy
- 4** means that the variable has slipped below previous trends slightly since the policy came in to effect
- 5** means that the variable has slipped below previous trends since the policy came in to effect

Recommendations

Policy Recommendation

This study shows that there are many alterations and changes that could be made to the current policy to strengthen its ability to control sprawl and lessen other environmentally harming effects.

1. Urban sprawl should remain at the heart of all greenbelt policy, because the world's population is only going to continue to increase. There must be policy in place to account for the infrastructure development that will be needed to accommodate for this. Urban sprawl, as this study shows, is linked to many other issues, such as commuting and carbon dioxide emissions, land prices, and water pollution. Ergo, with urban sprawl remaining at the heart of greenbelt policy, all of these issues can be addressed at once.
2. There appears to be quite a divide between theory and practice, which neither of these policies seems to address adequately. The strength of this type of policy lays in its ability to be executed in a practical and fairly easy way. Therefore, the policy should look not just at the overall picture of the region being protected, but also looking at the various communities that comprise of the entire area.
3. Based on the analysis, Portland and Ontario seem to both be doing adequate in achieving the objectives of greenbelt policy, however, Ontario is slightly

behind Portland in terms of the effect on farmland. Urban sprawl seems to be occurring in both regions on some degree. Based on this, it is recommended that Ontario look to the Portland policy for guidance and re-address how the policy effects farmland within the Golden Horseshoe.

4. It is recommended that both Ontario and Portland look at how their policy is affecting commuting, as both have seen fairly drastic increases in commuting times that appear to be increasing to some magnitude.
5. Both Portland and Ontario should consider expanding the amount of land that is protected from development. In Ontario's case, this would mean enlarging the greenbelt, while in Portland's case, this would mean restricting the size of the UGB. Both regions appear to be doing well at combating sprawl, which means that the policy is working. By increasing the protected areas, the policy can only become more and more effective, and this may also be a way to combat the leapfrogging effect.
6. Urban sprawl cannot be addressed solely by greenbelt policy. Therefore, the policy should work in collaboration with other policies, organizations, and levels of government. This is epitomized where the farmland in Oregon is protected not just by the UGBs, but also by the state government legislature.

For future studies

There is no doubt that this thesis could be extended into a further study, either from an academic and policy standpoint. This thesis has set out the foundation for any study that wishes to pursue determining the effectiveness of greenbelt policy, and could be carried out in many ways. Firstly, additional variables could be examined in addition to the five that this thesis selected. That would allow for a more conclusive and stronger argument as to which of the two policies is stronger and more effective. Additionally, this study could be extended over a few years, with specific variables being measured annually. This would allow for trends to be shown over a short period of time to show what is changing from year to year. This type of analysis would also allow for external factors to be considered as influencing the examined variables. For example, the rate of intensification could be directly compared to the annual population growth. This may prove, or disprove, that the actual greenbelt policy is having any effect, but rather, it is just a trend that is directly linked to population and how it alters from year to year.

Additionally, this study could take into account public perception of the policy, and how that has shifted since the implementation of the policy. While it was clear that there are strong public opinion linked to the greenbelt and farming, this thesis project was not the appropriate venue to explore that further.

Another recommendation for future studies of this sort would be to develop a more detailed grading scale. While this thesis rates each variable from 1 to 5, it

could be advantageous to go into a more nuanced assessment. The undergraduate level of this thesis prohibited that a more complex and detailed grading system could not be developed. However, should this study be explored further, a grading scale with more grades and more categories would only further strengthen the conclusions of this study.

Conclusion

In conclusion, neither greenbelt has been entirely successful in achieving all the set out objectives. However, it appears that the Ontario case study has done a better job than Portland to address the selected variables.. However, the lack of data showing how much farmland has been developed since each greenbelt came into existence means that it is impossible to make a conclusive argument. Both cases show that they have the ability to account for population growth and controlling where the growth occurs, but they are not able to completely curb urban sprawl.

While neither region was able to combat commuting times, this may very well be a result of other factors besides the ineffectiveness of greenbelt policy. Otherwise, it is obvious that the policy is doing far more good than harm. Yes, the fact that some development is being displaced outside of the greenbelt area demonstrates that the policy is not perfect, but that should not take away from the fact that urban sprawl is still being addressed and appears to be less than pre-greenbelt policy.

The data analysis shows that public perception and opinion plays a large role in greenbelt policy effectiveness, but this study has focused on variables that are separate from opinion because it better encapsulated if and how the greenbelt has been effective. By being able to quantify that intensification and densification has increased in the regions, it is obvious that urban sprawl is being contained to an

extent, even if it has gone against society's desire to have large backyards.

Therefore, Ontario received a grade of 21, out of a possible 25, while Portland only received an 18 out of 25. This shows that, while both cases are positively addressing urban sprawl issues, Ontario stands out as having the more effective greenbelt policy.

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