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Environmental policy creation : examining the Ontario municipal approach

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ENVIRONMENTAL POLICY CREATION: EXAMINING THE ONTARIO
MUNICIPAL APPROACH

by

Paul L. Nichols, B.Sc. (Cardiff University, 2005)

A thesis presented to Ryerson University

In partial fulfillment of the requirements for the degree of Master of Applied
Science in the Program of Environmental Applied Science and Management

Toronto, Ontario, Canada, 2005

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Abstract

Environmental Policy Creation: Examining the Ontario Municipal Approach

Paul L. Nichols

M.A.Sc., Environmental Science and Management

Ryerson University, Toronto, 2008

This thesis examines the environmental content of municipal official plans in Ontario, Canada. It is an exploration of how environmental policy can be measured, categorized and compared at the municipal level. The legislative and societal framework from which municipal environmental policy emerges is examined before a method for measuring the level of the policy is proposed. The results of the policy measurement are then analyzed quantitatively for relationships with demographic characteristics and qualitatively for strength of language and level of policy as well as for spatial patterns in policy levels. From these analyses conclusions are drawn regarding the presence of significant variation in the environmental content found in municipal official plans. Conclusions are also made regarding the attention given to individual components of municipal environmental content. Finally, recommendations for future environmental policy integration into municipal official plans are suggested as are recommendations for future research.

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Dedication

To my patient wife, Helen Burnett-Nichols, thank you for your interminable love and support in this and all of my endeavours.

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Chapter 1: Contextualization of the Study

1.1. Introduction

Environmental policy and municipal governance are not necessarily seen as directly related entities. More frequently, municipalities are seen as implementers of higher-level governmental policy. Yet municipalities are becoming increasingly active in the environmental policy development process. Contrary to the traditional assumptions, this model is well suited for addressing both local and global environmental issues, if smaller municipalities and the policy development process are supported by a strong structural framework. Ontario's tiered municipal system provides such a framework. In addition, Ontario's municipalities are empowered to develop environmental policy through provincial legislation. However, empowerment is not the same as requirement. Therefore the environmental policy emerging from municipalities would be expected to experience variations in the level of attention given to environmental issues. Existing research supports this suggestion, concluding that 'Canadian municipalities engaging in sustainable development seem to be at various stages along the learning curve' (Parkinson and Roseland, 2002, p. 424). The natural question then becomes, what factors explain this variation? Are trends and variations in municipal environmental policy in some way reflections of the communities from which they emerge? The answers to such questions have important implications for municipal planners who sometimes fail to fully utilize their policy-making potential and often off-load their responsibilities to developers

or consultants. The knowledge developed from these questions also has potential uses for local politicians, environmentalists and academics.

1.2. Research questions

The goal of this study is primarily to answer the following research questions:

1. Is there a significant difference in the environmental content found in official plans and, if there is, what relationship exists between the level of environmental content of Ontario municipalities' official plans and socio-economic or physical characteristics of their respective communities?
2. Which components of municipal governance may be given greater attention or more authority through the use of language when environmental policy is developed at the municipal level?

In order to answer these questions fully, they must first be unpacked and discussed in terms of several related issues. The initial set of issues focuses on the governmental framework that empowers policymaking at the local level.

What legislation empowers municipalities to create environmental policy?

Conversely, what limitations are placed on policymakers at the municipal level?

Also, what is the function of local environmental policy and where is it found within the context of municipal bureaucracy? Using the subsequent answers, the research questions are narrowed in a manner that increases study manageability and provides the study with a focal point for examination in the form of municipal official plans. The other set of issues focuses on how the environmental policy in official plans is structured and how it can be studied. What are the components of environmental policy used by policymakers at the municipal level? How can the 'level' of components of environmental content be defined individually and

analyzed? How can these 'levels' subsequently be combined to provide an overall measure of the environmental content of official plans? Finally, after the level of environmental content is measured, what socio-economic and physical characteristics of municipalities might be related to the measured levels and what methods can be used to examine if and to what extent a relationship exists? The answers to these questions provide the structure of the research and have guided the study in its approach to answering the primary research questions.

1.3. Scope of research

The scope of this research is based on the need to address a specific topic for which supporting knowledge exists but that has not been explicitly researched and thus remains insufficiently understood. Similarly, the case study approach is the result of the wealth of available data as well as the time required to collect and process it.

The information presented here is the result of a study of environmental policy creation within the context of official plans that govern Ontario municipalities. The study was undertaken between September 2006 and May 2008. The results of this research provide insights that may also be useful for municipalities outside of Ontario though, as the number and diversity of communities assessed in the study reflect an opportunity to assess a broader relationship. However, the utilization of this study's methodology in other provinces is required to fully measure the study's ability to assess the broader relationship. The study

contributes to the larger discussion of the role of official plans within municipal governance; are they intended to be the final word in planning decisions, or are they one tool in a larger planning toolkit. More importantly, what should their role be and how closely does their implementation follow this role. With its current scope, the research allows for the presentation of a case study which begins to address questions regarding the origins and extent of such policy creation that remain unanswered in the existing literature. By limiting the study to Ontario and environmental policy creation at the municipal level, the study is firmly based on well developed supporting literature.

1.4. Chapter breakdown

The study begins by reviewing the existing knowledge that surrounds municipal policy creation and highlighting key gaps in that knowledge. The review provides context for the study, detailing how federal and provincial practices have encouraged and often burdened municipalities with the responsibility of addressing environmental issues that often extend beyond traditional municipal spheres. It also examines how societal trends have supported this new paradigm. The review highlights key legislative measures and Ontario's municipal tier structure, and discusses their importance in the empowerment of municipalities in the environmental policy making process before transitioning into Chapter 3 with a review of previous methods used in similar studies.

Chapter 3 utilizes the key components of previous studies discussed in Chapter 2 in the development of the research methodology. By drawing from previous research, the study creates a unique approach to the study of environmental policy in official plans. The chapter details the sampling, collection and analysis processes and discusses the limitations and reproducibility of the study.

In chapters 4 and 5, the results of the study are detailed and interpreted. The chapters organize the presentation of the results and interpretation by analytical method. The quantitative analyses are discussed initially, addressing both categorical and overall-score-based results. Subsequently the results of language and spatial analyses are discussed in the qualitative section. Finally, the interpretations are summarized, allowing for conclusions to be drawn and discussed in Chapter 6.

Chapter 6 begins with an overall review of the study, after which the results of the study are once again detailed. From these results, several key conclusions are drawn and relevant recommendations are made with regard to improving the development of environmental policy at the municipal level. Finally, recommendations for future research are proposed which would build naturally from the knowledge and methods created in the current study.

Chapter 2: Municipal Environmental Policy Knowledge Review

2.1. Introduction

There exists an abundance of literature on the subject of environmental sustainability and the study of policies that purport to encourage sustainable development; countless debates on which policies and practices are sustainable, and even on how to define 'sustainability', clog the academic literature search engines. A basic Scopus search for the term 'sustainable development' creates a list of over 40,000 academic articles and documents. Obviously, the list can easily be narrowed down using any number of keywords, locations or other details that specify the sub-topic of interest within the 'sustainable development' discourse. This said, it is a disappointing commentary on the ill-defined nature of the term 'sustainability' when gaps the size of municipalities can easily be located in such an abundance of literature. This is precisely the case however regarding the contributions of some municipalities towards the creation of development policy that addresses environmental sustainability.

It is not suggested here that literature devoted to municipalities, their surrounding environment and the global environment does not exist. Indeed, proper attention has been paid to the individual relationships between municipalities and climate change, water quality, agriculture, energy, solid waste and so on (for examples see: Wilbanks and Kates, 1999; Jenerette et al, 2006; Marsden et al, 1999; Dietz and Vine, 1982; Ferrara and Missios, 2005). However, it is literature on municipalities' attempts at developing more holistic environmental policy through

their official plans which is lacking. This is not to say that none exists, Burke and Conroy's (2000) evaluation of sustainable development incorporation into local planning provides six performance evaluation principals that help to operationalize the broader sustainable development concept. Such work, along with the wider research into the relationship between municipalities and individual environmental components and the discourse on Canadian environmental policies and an understanding of federal and provincial legislation which both empower and limit municipalities, do form a useful framework. These discussions have guided this research, revealing the arenas in which municipal policy can integrate environmental content and suggesting what forms that content may take. However, the relationship between municipalities, their characteristics, and the development of sustainable environmental policy through key land use documents still requires discussion. By first contextualizing the subject through the existing literature and then discussing this research project's methods and results, such a discussion is initiated and the existing literature gap begins to contract.

This chapter examines environmental policy making in Canada and reviews the current research. This examination begins by examining the Canadian federal and Ontario provincial roles in and approaches to sustainable environmental policy creation. Structural and political influences at both levels are discussed and reveal why and how municipalities are currently involved in the policy making process. In addition, shifts in population trends are discussed in terms of how

they suggest societal values are encouraging municipalities to become increasingly involved in the process as well as how municipalities are viewed as the only level of Canadian government that has been successful at addressing environmental issues. The discussion then shifts to the topic of how municipalities are empowered to create environmental policy. Several key pieces of legislation are reviewed and critical passages are analyzed in order to illustrate the powers and limitations endowed upon municipalities in their role as environmental policymakers. In addition to detailing the extent to which the Province of Ontario dictates the type and amount of environmental content that can be expected in municipal official plans, this section also suggests how realistic it is to expect municipalities to be effective in environmental policy creation. The subsequent section details Ontario's tiered municipal system, providing the structural context needed to understand the importance of the sampling approach used in the current study. Finally, the chapter is concluded by examining related research that provides useful components and approaches used in policy research that are subsequently integrated into the current study's methodology in the following chapter.

2.2. The Federal Approach

In attempting to understand how environmental policy is developed, it is critical to first determine the goal or goals of the policies as well as the constraints under which they are developed. Currently, one of the most broadly discussed goals of environmental policy is to achieve (or at least approach) sustainable

development within an environmental context. Sustainable development is a theoretical ideal with contextually varying measures making the concept impossible to define concretely. The vagueness of its measures has not, however, diminished the importance of the concept in land-use planning or other fields (Hanna, 2005). At the broadest level, sustainable development was initially defined in the Brundtland Report as the process of meeting 'the needs of the present without compromising the ability of future generations to meet their own needs' (Brundtland, 1987, p. 43). Additionally, the Brundtland Report signals 'the emergence of "the environment" as a critically important facet' of governance (Sneddon, 2006, p. 255). Contextualized into an environmental policy framework, sustainable development suggests that environmental management and economic development can be a collaborative effort rather than separate and adversarial goals (Dryzek, 2005). And while this is a point of vigorous debate, it is not the focus of this examination. Instead, the goal of this research is to determine how the concepts of environmental sustainability and sustainable development find their way into municipal policy and what factors influence the form and intensity they take.

In order to address the question of how environmental policy is integrated into municipal policy documents, the wider Canadian approach to environmental policy must first be discussed. This is a necessity as the Canadian Constitution does not delegate responsibility for environmental protection to any one level of government (Parker and Rowlands, 2007). Therefore a holistic understanding of

how the environment is approached in Canada is requisite in order to understand how and why municipalities have subsequently entered the realm of environmental policymakers.

Broadly speaking, the federal approach to sustainable environmental policy in Canada can be labelled as fractured, uncommitted, poorly rounded and negotiation-based. In his presidential address to the Canadian Agricultural Economics Society, Adamowicz (2007) suggests that the OCED's 2004 environmental performance report for Canada rightly criticized Canada's environmental policy. While his critiques are perhaps too economically focused, he astutely draws from Copeland's (1998) work that Canada lacks integration and commitment to sustainability and environmental goals. This is a point which also resonates throughout much of Kathryn Harrison's work (See Harrison, 1999; Antweiler and Harrison, 2007), particularly with regard to Canada's negotiation-based approach to environmental policy. Negotiation-based approaches tend to be legally nonbinding with standards that may vary from sector to sector (Henriques and Sadorsky, 2008).

The allowance for such variation in standards illustrates Canada's lack of fortitude in comparison to the United States and other countries when it comes to mandating emission limits and abatement level. However, this does not suggest an absence of meaningful decisions regarding environmental policy at the federal level in Canada. Indeed, Harrison (2007) notes that while the United States and

Canada consistently showed similar levels of public support and (initially) the political will at the highest political levels for the Kyoto Protocol, the Canadian system of government had an institutional capacity to ratify the Protocol which the U.S. lacked. In addition, significant environmental legislation, such as the Canadian Environmental Protection Act (CEPA), 1999, has emerged from the federal level. This suggests that the broad Canadian approach to environmental policy lacks a clear, long-term, federally-led environmental strategy, either holistic in nature or sector based. And while calls for such strategy are not lacking, as evidenced in the Federation of Canadian Municipalities' encouragement of the Canadian Government to establish a national transit strategy (FCM, 2008) and Council of Canadians demands for a national energy strategy (CoC, 2008), there are clear reasons for the lack of such strategies in some sectors.

Structurally, the jurisdictional authority of Canada's provinces and territories are considerable, making direct federal regulation constitutionally difficult (Henriques and Sadorsky, 2008). For instance, the delegation of responsibility for natural resources to Canadian provinces and territories makes development of a national strategy difficult; as such, a strategy would rely heavily on the cooperation of all the country's provinces whose economic reliance on their natural resources varies greatly (Harrison, 2007). This variability logically suggests that the development of a national natural resource strategy would be highly problematic, time-intensive and susceptible to change with every national and provincial election. Political realities, though, have an equal, if not greater, potential to

explain the lack of national environmental strategies than do the technical difficulties associated with their creation.

The most important political reality in explaining the failings of Canadian environmental policy at every level is blame avoidance. Harrison (1996) suggests that when questions of responsibility and accountability arise in Canada, blame is generally funnelled down to the lowest common denominator possible. Traditionally this has resulted in the resting of blame for environmental failings on the provinces. However, it is possible for any level of government to practice blame avoidance using other levels, either upper or lower. The contamination of the water supply at Walkerton, Ontario in 2000 is a key example of provincial to municipal attempts at blame avoidance, with the provincial government of Ontario quickly shifting blame for the contamination onto municipal managers whose actions were 'bordering on criminal negligence' (Prudham, 2004, p. 344). Events such as this are a direct externality of the constitutional ambiguity regarding environmental jurisdiction discussed previously. It also indicates the direct effect of environmental policy on the health and welfare of the public. The relationship between these structural and political factors illustrates the limited role that the Canadian federal government plays in the development of environmental policy. Thus it is critical to also examine the Ontario government's commitment to the environment in order to further examine how municipalities have become involved in the creation of environmental policy.

2.3. The Provincial Push

As a result of the Canadian constitution and governmental structure, matters of the environment and its regulation generally occur at the provincial level (Henriques and Sadorsky, 2008). However, even at the provincial level, responsible environmental policy can be seen as somewhat diffuse. Ontario's Ministry of Environment (OMOE) is obviously a key source for environmental policy; however other ministries also contribute in a unique, but significant way. Most relevant to this discussion, Ontario's Ministry of Municipal Affairs and Housing (MMAH) addresses the environment through land use planning and its surrounding issues. The importance of the MMAH in environmental policy is discussed in further detail throughout this research; however, a greater understanding of the Ontario government's overall commitment and influences on environmental policy is found through the context of the OMOE's recent history.

Krajnc (2000) illustrates how party politics specifically contributed to the reduction of environmental policy output between the mid 1990s and 2000. Specifically, she notes that Bob Rae's New Democratic Party government cut \$200 million from the ministry's capital and operations budget (though mainly from the capital budget) and subsequently Mike Harris' Conservative governments' reduced the ministry's overall staff and resources by a third from when it entered office (Krajnc, 2000). More recently the OMOE has seen a renewed governmental interest in its work. Under the Dalton McGuinty Liberal government the ministry's

budget has begun to increase once again, by approximately \$23.3 million between the 2006-2007 and the 2007-2008 budgets, and by \$73.4 million between the 2007-2008 and the 2008-2009 budgets (OMOE, 2007; OMOE, 2008). However, these events are not isolated. Since its inception in 1971, the OMOE has seen significant fluctuations in support and funding from the Government of Ontario, often related to changes in public opinion and levels of governmental party control in Queen's Park (Krajnc, 2000).

The cumulative impact of the Rae and Harris governments' cuts significantly reduced the MoE's capacity and suggested a lack of commitment to the addressing of environmental needs and issues by Ontario's government, particularly during the Harris administration. In addition, the cuts resulted in an inconsistent pace of environmental policy creation (Krajnc, 2000). The subsequent effect on the municipalities was a reduction in support and guidance from upper-level governments. Under the traditional view of provincial-municipal government relations, such a realization is notable. Traditionally, the provinces are responsible for the development of policy goals and objectives and, to varying extents, the provision of financing to municipalities for the purposes of policy implementation (Greenbaum et al, 2002). The continuation of this line of reasoning then suggests that Canadian 'cities have very little control over their [own] destinies' (Broadbent, 2000, p. 1). Thus variations in the pace of environmental policymaking by Ontario's government, particularly during periods

of reduced output, result in potential gaps of knowledge or guidance for municipalities needing to address new environmental issues.

As noted above, while the OMOE is realizing an increase in its budgetary allowance today, much of the structural and functional impacts persist despite this increase. For example, powers of source water protection in Ontario are currently split between the province and municipalities. Specifically, the Planning Act (RSO, 1990), Drainage Act (RSO, 1990, c. D. 17), and Conservation Land Act (RSO, 1990, c. C. 17) grant municipalities in Ontario the power to utilize their official plans and sewer-use bylaws to control drainage, wastewater discharge flows and hold conservation easements in order to protect source water; however, if a contaminated site exists near a source water body, the power to require its remediation rests with the province through the Environmental Protection Act (RSO, 1990) (Ivey et al, 2006). As a result, the issue of poor provincial guidance is subsequently compounded by the difficulty of trying to effectively address environmental issues with splintered authority. Despite the fact that this problem is beyond the scope of the current study, it does begin to illustrate why and how municipalities appear to be more involved in the environmental policymaking process than they have been in the past.

2.4. Societal Emphasis

In addition to the political need for blame avoidance and the structural impacts of budgetary and legislative changes, societal change has also contributed to the

increased role that municipalities are playing in environmental policy. The connection between 'global' and 'local' is becoming an increasingly popular topic of discussion, visible through various 'think global, act local'-type campaigns (Brundtland, 1987). In this way the 'local' can be seen to have found a 'voice' in wider public debates. The development of such a 'voice' illustrates how the importance of cities and location has actually increased in the face of globalization (Florida, 2008; Bradford, 2002). However, as the importance of the city 'voice' increases, so does the responsibility for addressing environmental issues such as climate change (Parker and Rowlands, 2007).

The increase in the importance and the 'voice' of the 'local' in Canada is not surprising as the population continues to cluster together in cities, where at least 80 per cent of Canadians have lived since 2001 (StatsCan, 2001). Examples of this 'voice' can be seen in collective municipal efforts and organizations such as the Partners for Climate Protection program, in which 120 Canadian municipalities are partners (Parker and Rowlands, 2007). Frequently though, this connection is examined using a top-down, anthropocentric approach (Wilbanks and Kates, 1999). For example, questions are posed in a way that leads a discussion to detail how climate change might affect humans or the environment.

Recently however, research is beginning to ask, how human actions are impacting the environment and how those impacts can be reduced. In particular,

ecological footprint analysis is looking at the demands that human activity are placing on nature and the planet (FCM, 2005). The extent to which this shift in focus is a reflection of a shift away from the nature-culture dualism demanded by Haila (1999a, 1999b) is unclear. None-the-less, it suggests that Canadian society is beginning to appreciate the direct relationship between its actions at the local level and the broad state of the environment. Anecdotally this appreciation appears to carry over to Canadians' expectations of their local governments; while a gap in the academic literature currently exists, the popular media are full of potential evidence.

Locally focused articles cover a range of topics, including: concerns over the environment impacts of urban sprawl and solutions to such sprawl, debates over the redevelopment of local parks, and ideas on renewable energy (Toronto Star, 2007; Cautillo, 2008; Roberts, 2007). The breadth and importance given to the coverage of environmental topics itself warrants an in-depth discussion, however its place is not within this research.

What is of interest however, particularly in the context of local and regional events media coverage, is the attention being paid to municipally-based environmental policy development and implementation. The seemingly common knowledge that local governments are better able to realize the environmental issues that surround them than those in higher-level government offices in Ottawa or elsewhere, is finally beginning to be plainly stated and widely accepted

(Simon and Dobra, 2003; Brandford, 2002; Fowler and Hartmann, 2002). And as a result, suggestions that policymakers should consider using a 'bottom-up' approach are starting to evolve from the theoretical (See: Scott, 2003; Jacobs, 1992) to the applied (See: Brandford, 2002). This is not to say that the 'bottom-up' approach should completely replace more traditional methods; it simply suggests that the dialogue between tiers of government should be free of hierarchy and that environmental policy can be 'designed to align objectives across [all] the levels of government' (Brandford, 2002, p. 82).

However, concerns remain regarding the ability to practically apply the 'local' movement and 'bottom-up' policy creation theories. Indeed these concerns are warranted; finding the political will and institutional capacity to affect change in environmental policy at the municipal level has consistently proven to be a challenge (Wheeler, 2000, Robinson and Gore, 2005). Price (2002, p. 139) even suggests that 'it would be quite unrealistic to expect the governments of cities to be able to reorder the life and the organization of city functions to minimize environmental impacts'.

There are signs, however, that both will and capacity at the municipal level are being strengthened and developed. For example, the emphasis that municipalities are placing on finding solutions to their waste problems has led to steadily increasing diversion rates that currently reach levels of up to 55 per cent (Regional Municipality of Halifax, 2006; Jones, 2008). In addition, Canadian

cities are also beginning to develop their own 'Green Development Standard' and environmental plans separate from their official plans (City of Toronto, 2000; City of Toronto, 2007). In fact, with regard to climate change, it has been suggested that 'local government in Canada is the only level that can claim any real progress in terms of emissions reductions' (Robinson, 2006, p. 219). Therefore it appears that it is as not unreasonable to expect municipalities to 'reorder' themselves as Price (2002) suggests. The challenge then, is for municipalities to take the piecemeal changes and to combine them into a more holistic approach (Fowler and Hartmann, 2002).

Ferrara and Missios (2005) note the importance of understanding the path between the policies that initiate environmental projects and the results of those same projects. Indeed such an understanding is critical, however equally critical is an understanding of how the policies come to exist and why they exist in the forms that they do. How are municipalities empowered to create environmental policies? What limits are placed on that power? Indeed, how can municipalities address environmental issues using the holistic approach suggested above? Before an examination of the results of municipalities' attempts at creating meaningful environmental policy can take place, these questions must first be answered.

2.5. Legislative Empowerment

As Broadbent noted, Canadian municipalities 'are creatures of the provinces... [they] have no independent constitutional ability to resist whatever conditions the provinces opt to create for them' and thus they 'have very little control over their destinies' (2000, p. 1). Thus, the methods and extents to which municipalities can address environmental issues are highly dependent on the powers devolved to them by the province. In Ontario, provincial legislation empowers and requires municipalities to develop and regularly update their official plans. Official plans are actually products of a process, of negotiations between various stakeholders; at their best, they represent a truly inclusive communicative planning process. However, from a legislative stance, an official plan is a set of municipal policies aimed to 'maximize the well-being of residents, promote economic growth, make wise use of resources, and protect the environment from unnecessary harm' (Leo, 2002; p. 218). Official plans are seen to give a thorough consideration of the inter-related nature of various systems related to land-use and the environment as well as 'a "best" physical arrangement for future development' (Getzels and Thurow, 1979, p. 34). With respect to Ontario, municipalities are empowered to develop official plans through the Planning Act (RSO, 1990), which states that:

16. (1) An official plan shall contain,
 - (a) goals, objectives and policies established primarily to manage and direct physical change and the effects on the social, economic and natural environment of the municipality or part of it, or an area that is without municipal organization; and
 - (b) such other matters as may be prescribed. 2006, c. 23, s. 8.

The power granted through s. 16(1)(a) of the Planning Act (RSO, 1990) provides the potential for Ontario municipalities to address planning issues through the ecosystem approach. This approach focuses on the conservation of energy and resources in a manner which respects the environment (Price, 2002). However, municipalities' are not directed to use such an approach, suggesting the need to investigate the extent to which the environment is being addressed in their official plans. Such an investigation would need to be framed within the legislative limitations on municipal authority to establish policies related to management and physical change that impact the natural environment.

Section 2 of the Planning Act (RSO, 1990) outlines 'Provincial Interests' which municipalities 'shall have regard to' in their planning policies and processes. The interests extend into a wide range of policy areas, which with regard to environmental policy, include the protection of ecological systems and functions, agricultural and natural resources, the supply, efficient use and conservation of water and energy, the minimization of waste, the location of growth and development that is sustainable and that encourages public transit.

In addition, municipalities are required to have their official plans approved. The approving body for official plans is determined by the municipality's tier-level.

Section 17 of the Planning Act (RSO, 1990) addresses the approval of official plans. In particular, it states that:

17. (1) Except as otherwise provided in this section, the Minister is the approval authority in respect of the approval of a plan as an official plan for the purposes of this section. 1996, c. 4, s. 9.

Approval by upper-tier municipality

(2) An upper-tier municipality is the approval authority in respect of an official plan of a lower-tier municipality for the purposes of this section if the upper-tier municipality has an approved official plan.

Finally, the Planning Act (RSO, 1990) dictates that municipalities must regularly review their official plans in order to ensure the plans address the provincial policy statement. Section 3(10) states that:

The Minister shall, at least every five years from the date that a policy statement is issued under subsection (1), ensure that a review of the policy statement is undertaken for the purpose of determining the need for a revision of the policy statement.

While s. 3(5) states:

A decision of the council of a municipality, a local board, a planning board, a minister of the Crown and a ministry, board, commission or agency of the government, including the Municipal Board, in respect of the exercise of any authority that affects a planning matter,

(a) shall be consistent with the policy statements issued under subsection (1) that are in effect on the date of the decision; and

(b) shall conform with the provincial plans that are in effect on that date, or shall not conflict with them, as the case may be. 2006, c. 23, s. 5.

Thus, broadly speaking, the Planning Act (RSO, 1990) provides municipalities with the flexibility to create policies that address environmental issues within their jurisdiction, the guidance as to the areas deemed critically important by the Province and a regular schedule of review that ensures the continued relevance of their plans. However, there is vagueness in the legislation that suggests the thoroughness of official plan reviews may not be comprehensive. As a result,

more research into the environmental content is required in order to determine how comprehensively these issues are addressed in municipal policy documents.

Several other pieces of legislation relate to municipalities' official plans indirectly. Section 1(1) of the Planning Act (RSO, 1990) states that references to 'provincial plans' within the Act mean:

(a) the Greenbelt Plan established under section 3 of the *Greenbelt Act, 2005*,

(b) the Niagara Escarpment Plan established under section 3 of the *Niagara Escarpment Planning and Development Act, 1990*,

(c) the Oak Ridges Moraine Conservation Plan established under section 3 of the *Oak Ridges Moraine Conservation Act, 2001*,

(d) a development plan approved under the *Ontario Planning and Development Act, 1994*,

(e) a growth plan approved under the *Places to Grow Act, 2005*

The Greenbelt Plan addresses the preservation of rural and agriculture lands in Ontario by restricting development in designated areas. In order to conform to the Greenbelt Plan, municipalities must amend their official plan designations for 'prime agricultural areas' and 'rural areas'. The Plan provides general guidelines for the restriction of development, but allows for official plans to be more restrictive (Government of Ontario, 2005a). Over one million acres (400,000 Ha) of farm and rural land have been designated for protection as a result of the Greenbelt Plan (Caldwell and Hilts, 2005), suggesting the importance of addressing such protection in municipal official plans.

The Niagara Escarpment Plan and the Oak Ridges Moraine Conservation Plan areas both lie within the boundaries of the Greenbelt Plan (Government of Ontario, 2005b). Thus, these plans serve as more detailed policies for the protection of specific areas within the Greenbelt. Originally approved in 1985, the Niagara Escarpment Plan encompasses a range of geological and ecological features extending from Queenston, Ontario to the Bruce Peninsula (Government of Ontario, 2005b). Explicitly, the purpose of the Niagara Escarpment Plan is 'to provide for the maintenance of the Niagara Escarpment and land in its vicinity substantially as a continuous natural environment, and to ensure only such development occurs as is compatible with that natural environment'.

Implicitly, the Plan's purpose with regard to ecosystem functions is to serve as a counterweight to natural resource development pressures, particularly quarrying. However, as the boundaries of ecosystems like that of the Niagara Escarpment are difficult to define and can be seen as somewhat open (Moss and Milne, 1998), it cannot be said that the Plan itself is fully encompassing and effective. That is not to say that the escarpment and moraine plans and the green belt are not beneficial, as they do serve to protect an area far larger than any single municipality. Additionally, the conflict between the contrasting goals of natural resource protection and natural resource development poses an interesting dichotomy. However, the literature does not sufficiently detail the role of municipalities in creating policy that balances such conflicting goals.

Also within the boundaries of the Greenbelt Plan, the Oak Ridges Moraine Conservation Plan has a mandate similar to the Niagara Escarpment Plan. Its stated purpose is:

to provide land use and resource management planning direction to provincial ministers, ministries, and agencies, municipalities, municipal planning authorities, landowners and other stakeholders on how to protect the Moraine's ecological and hydrological functions (Government of Ontario, 2002, p. 3).

Hanna et al. (2007) note that the plan is a response to conflicts in the 1990s over housing development proposals within the 160 kilometre stretch of environmentally sensitive moraine located just north of the City of Toronto. They conclude that the comprehensive attention paid to the relationship between human action, ecological function and land-use planning policy make the Plan unique in the North American context. However, most relevant to this discussion is the realization that under the current tier system in Ontario, where municipalities of any tier are the approving authority for development proposals within their own jurisdiction, placing 'ecologically based planning' decisions into the hands of municipalities requires them to have a certain capacity to understand the fundamentals of such planning (Hanna et al., 2007, p. 347). Determining the level of understanding is critical to the current study of municipally-based environmental policy creation. However, the literature does not directly address how such a determination can or should be made.

In contrast to the Greenbelt, Niagara Escarpment and Oak Ridges Moraine Conservation Plans, development plans created under the Ontario Planning and Development Act, 1994 (OPDA, 1994) and the *Places to Grow* initiative launched under the Places to Grow Act, 2005 focus more directly on development. However, the intensions of both the later acts are still related to environmental conservation policy. For example, development plans are similar to official plans (OMMAH, 2007a), particularly in that they are intended to guide growth responsibly. The first development plan created under the OPDA, 1994, the Central Pickering Development Plan, utilized a lands exchange process in order to protect lands within the Oak Ridges Moraine (OMMAH, 2008a). Similarly, the overarching goal of the *Places to Grow* initiative is 'to manage growth and development in Ontario in a way that supports economic prosperity, protects the environment and helps communities achieve a high quality of life' (Ontario Ministry of Public Infrastructure Renewal (OMPIR), 2008). More precisely, Section 1 of the Places to Grow Act, 2005 states that:

The purposes of the Act are,

- (a) to enable decisions about growth to be made in ways that sustain a robust economy, build strong communities and promote a healthy environment and a culture of conservation;
- (b) to promote a rational and balanced approach to decisions about growth that builds on community priorities, strengths and opportunities and makes efficient use of infrastructure;
- (c) to enable planning for growth in a manner that reflects a broad geographical perspective and is integrated across natural and municipal boundaries;
- (d) to ensure that a long-term vision and long-term goals guide decision-making about growth and provide for the co-ordination of growth policies among all levels of government. 2005, c. 13, s. 1.

The focus of the Act and the initiative is on development, but in a way which aims to concentrate development into locations that are deemed suitable. This does not suggest that there are not critics to approaches such as this. Wekerle et al (2007) take exception to collective use of the seemingly antithetical practices of conservation and growth. In particular they suggest that the structure of the Greenbelt Plan, which essentially allows for urban expansion around Toronto to continue for up to three decades before reaching the greenbelt, and the implicit call for population growth in the Greater Golden Horseshoe region in the *Places to Grow* plan act as facilitators to the type of growth which compromises sensitive ecosystem function. What this suggests for the current study is that the level of attention that municipalities are required to pay to the environment in their official plans could be minimal, thereby justifying the need for more research into the *de facto* standard being adopted by municipalities in the province.

2.6. Ontario Tier Structure

In any broad study of municipal planning in Ontario, it is critical to understand the structure of the tiered system that municipalities fall into. This allows for a more fully developed command of the interactions between municipalities and the range of their authority. Sancton (2002) notes that the 'two-tier system' (there are actually three tiers) utilized by Ontario represents the compromise between two schools of thought on municipal and regional governance. The consolidationist approach strives for highly accountable and efficient municipal

governments through one level of governance, while the 'public choice' approach suggests financial efficiency is achieved through multiple levels of governance (Sancton, 2002). The two-tier approach draws from both approaches, permitting lower-tier municipalities the authority to address environmental issues through official plans while requiring them to conform to upper-tier regional municipalities' official plans. The benefit of this approach is found in the system's ability to detect and address environmental issues quickly at the local level without hindering smaller municipalities with the technical and program management responsibilities for which larger, regional municipalities are better suited. The water management and protection program established by the Regional Municipality of Waterloo (RMOW) provides an excellent example of this system at work. The program allows lower-tier municipalities to highlight potential hazards to local source water while the RMOW is empowered to direct growth away from sensitive water sources (Ivey et al, 2006)¹. Through this interaction, the RMOW and lower municipalities within its boundaries develop a thorough municipal knowledge of where and how to address source water protection that can be subsequently incorporated into municipal official plans (Ivey et al, 2006).

Ontario's two-tier system was established in 1954, prior to which cities in Ontario were organized into a one-tier municipal system (Sancton, 2002). Since 1954, upper-tier municipalities have been responsible for regional or inter-municipal services while lower-tier municipalities have provided more localized services;

¹ The passing of Ontario's Clean Water Act, 2006 resulted in a shift of responsibility for source water protection to Conservation Authorities (or the Province in the absence of a CA). However, the underlying value of the two-tier system is still demonstrated in this example.

and the line between these two types of services is often a contentious matter (Sancton, 2002). Ontario's Municipal Act, 2001 (RSO, 2001, C. 25, s. 17) clarifies the matter to some extent by providing a clear structure to the system. The Act removes all but the aesthetic value of municipal titles such as 'city', 'town', 'village', etc, and qualifies how each municipality is categorized. As a result, little question remains as to which services a municipality is to provide, as lower-tier municipalities are required to conform to the official plans of their upper-tier municipality.

The reasons for differentiation between tier levels go beyond simple institutional management. Socio-demographic values and concerns across the geographic spectrum also exist and are addressed to varying levels through the tier system. By allowing lower-tier municipalities to address local concerns within the framework constructed by its upper-tier counterpart, rural issues that might be otherwise overlooked can be addressed (Sancton, 2002). In addition, issues arising between the major interests of an area, as are seen in Marsden et al.'s (1993) discussion of conflicts between farmers, developers and residents in the rural, can be addressed formally and directly through local policy documents. Thus, while it is yet to be explicitly examined, it can be expected that multiple municipal tier levels facilitate attention to local environmental issues which are uniquely reflected in municipalities' individual official plans.

A final point of consideration regarding Ontario's tier structure is the third tier alluded to above. In addition to upper- and lower-tiers, the Municipal Act, 2001 also creates a 'single-tier' category. Single-tier municipalities are:

municipalities that are geographically located within a county but are not part of the county for the municipal purposes. Single-tier municipalities also include all northern municipalities where there is no upper-tier governance at the District level. Finally single-tier municipalities include those former county or regional municipalities that have recently been amalgamated into single-tier municipality (Government of Ontario, 2005).

There are currently 174 single-tier municipalities in Ontario, representing over a third of all municipalities in the province (based on information from OMMAH, 2008b). Single-tier municipalities are responsible for the provision of all local services to their residents, as there is no upper-tier municipality in place to support them (Government of Ontario, 2005c). For this same reason, single-tier municipalities' official plans go through the same approval process as upper-tier municipalities.

The City of Toronto provides a unique situation within the single-tier municipal category. In addition to the traditionally unique role that the City plays regarding business and the reflection of Canada's image internationally, Toronto also has certain powers delegated to it that separate it from other municipalities in Ontario and the rest of the country. Specifically, the city has 'broad powers to pass by-laws regarding matters that range from public safety to the city's economic, social and environmental well being' (OMMAH, 2007b). In particular, the City has the

authority to raise taxes in a variety of ways, with only a few limited areas of restriction (OMMAH, 2007b). While these powers may be interpreted in different ways and their importance debated, the critical issue for the current study is the City of Toronto's legislated differentiation from other Ontario municipalities and what that means for its role in the study, a point that will be further addressed in the next chapter.

2.7. Indices of Environmental Content

Commonly addressed throughout the urban policy and environmental literature is the need develop usable indices (Webster, 1998; Niemeijer, 2002; Hecht, 2003; Ebert and Welsch, 2004; Roberts, 2006). The development of an indicator set allows for a uniform method of analysis. Ebert and Welsh (2004) highlight the importance of uniformity in environmental indicators with regard to their measurements as a method of indicator definition. Development of such measurements within the context of the current study benefit from both the uniformity of measurements within Ontario and to the method of measurement proposed in the next chapter.

Webster (1998) suggests that public goods (water, waste management, etc) are a valuable set of indicators, as municipalities exercise a reasonably high level of control over them. As public goods are generally uniform in nature from one municipality to the next and relate in general to provincial interests, their use initially appears appropriate for the current study. However, Roberts (2006)

suggests that evaluation tools, such as indicators, should contain sufficient flexibility to allow for the evaluation to be contextualized to the individual location. At first the seemingly contradictory suggestions that indicators must allow for uniform analysis but also be flexible in nature appear irreconcilable. However, in the context of official plans, the structure created by broadly-stated provincial interests allows for the integration of these ideas. Wheeler (2000) states that good indices should be proxies for broad areas of concern that focus on the future and are easily understandable. The provincial interests previously outlined are easily understandable and sufficiently broad. Still, they are not sufficient for creating specific indicators alone, as they lack a collaborative or participatory approach in their development.

To rectify this concern, the provincial interests can be converted to indicators by examining ecological footprint (EF) analysis and finding common ground. An ecological footprint is a calculated area measurement that represents the terrestrial and aquatic area needed to sustain a population's (in this case a municipality's) natural resource consumption levels (Rees and Wackernagel, 1996). Ecological footprint analysis is a 'widely advocated' policy tool for measuring sustainability and is popular at global, national and local levels (Moore et al, 2007, p.1). However, despite its flexibility as an analysis tool, the methodological strength of EF analysis continues to be debated (Ibid). This has not dramatically diminished its overall use though, and was seen to be a potentially 'effective indicator for assessing and communicating progress toward

the policy objectives of the EU's Resource Strategy' (Best et al, 2008, p. 76). In addition, as tool for highlighting awareness of environmental concerns, little dissent in EF's value exists (Moore et al, 2007). It is in this capacity which ecological footprint analysis is of use to this study. For example, the Federation of Canadian Municipalities notes that "Canadians' energy demands make up the largest portion of our footprint" (2005, p. 7). In this way, EF analysis highlights energy-related environmental concerns. The natural linkage between this component of EF analysis and the provincial interest in energy supply, use and conservation is overtly clear. In addition, the EF analysis components of transportation, consumption of crop land, built area, sea space, forest land, and the combined residential and commercial/business (FCM, 2005) can be seen to relate to the respective provincial interests of supporting public transit, the protection of the province's agricultural resources, locating growth appropriately, supporting adequate water supply and conservation, the conservation of natural resources and mineral base and the reduction of municipally-produced waste. Finally, both the provincial interests and EF analysis have an overarching goal of protecting ecological systems and functions in the environment.

Eight indicators have been created by drawing connections between Ontario's provincial interests and components of EF analysis. These will be referred to as categories forthwith in this study in order to differentiate them from the indicator used to determine the level of attention given to each category. Eight categories may appear to be too small a number to form a comprehensive measurement

system. However, as Niemeijer (2002, p. 95) notes, 'the power of an index does not increase with the number of indicators and variables it covers but with the elimination of superfluous variables'. Thus, the value of the system should be viewed from the broad range of environmental sub-topics covered by the categories, rather than the number of them.

Soroka (2002) noted policy measures are prone to change with governing institutions, as well as with time and location. As such, the ability to measure attention levels and their variations is of critical importance to policy analysis.

Newig (2004) supports this assertion by differentiating attention from opinion. In particular it is stated that in 'contrast to public opinion, public attention does not indicate what people think, but what they think about...and it expresses the extent to which they dedicate their resources to a given subject' (Newig, 2004, p. 154). This same concept can be applied to policy creation at the municipal level, with the amount of attention being paid to an environmental topic reflecting the dedication of resources to that topic.

In addition to attention levels, language strength also plays a critical role in policy analysis. The delicate language used in policy means that subtle variation in phrasing can have a dramatic impact on how a policy is to be interpreted. Hanna et al. (2007) illustrate this in their study of integrated ecological and regional planning in the Oak Ridges Moraine. They note that when development pressure increased in the moraine during the 1990s, the weaker advisory-styled language

used in implementation phrasing of development policy concerning the moraine suggested, but did not require municipalities to adhere to provincial policy statements. However, by subsequently replacing the phrase 'shall have regard to' with 'shall be consistent with' in provincial policy statements, the provincial government removed ambiguity and required municipalities to adhere to its policy (Hanna et al., 2002, p. 341). What this suggests for the current study is the importance that language plays in policy analysis. As a result, the strength of language used in municipal official plans will be addressed in the analysis section of the methodology in the next chapter.

In summary the Canadian approach to environmental policy creation has been discussed at the federal, provincial and municipal levels. Components of the federal and provincial approaches have revealed that municipalities are playing an increasingly important role in this type of policymaking as a result of structural and political realities. In addition, societal encouragement for this increased role was also discussed and previous municipal successes in specific environmental sectors support the notion that, through their official plan, municipalities are well suited to serve as environmental policymakers. Subsequently the legislative empowerment of municipalities in Ontario and the structure that they work within has been detailed. And finally, previous research was examined in order to highlight key approaches and techniques that policy researchers have used and that may prove useful in the current study. In the next chapter these ideas are integrated to a larger methodology which, within the context created in this

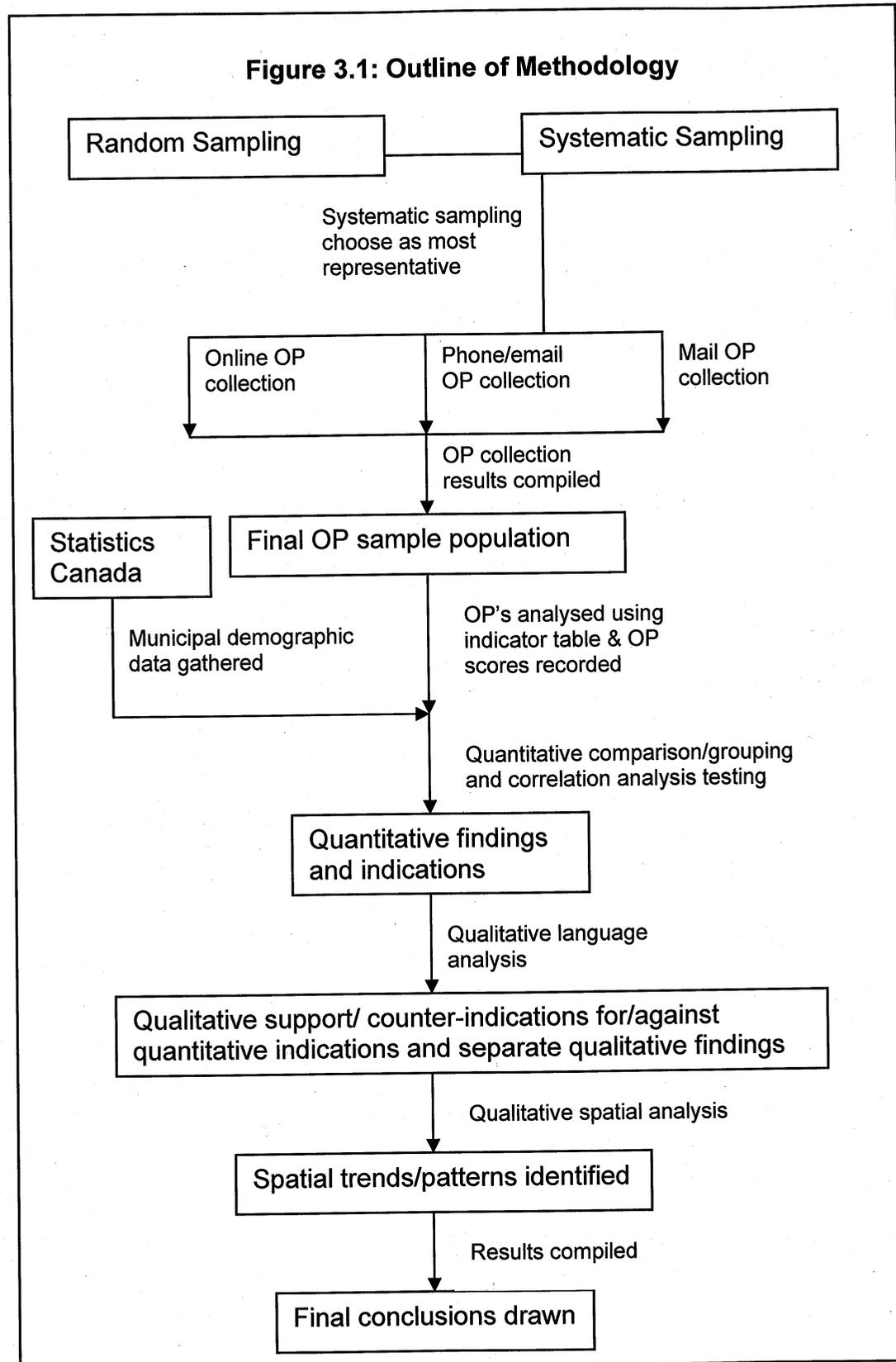
chapter, is used to further examine how municipalities integrate environmental policy into their official plans and what, if any, socio-demographic factors influence that process.

Chapter 3: Methodology

3.1. Greening of official plans

In the early development of the research methodology several key questions emerged that required answers in order to allow a logical and defensible sampling procedure to be created. First and foremost was the question of how large the sample should be? Determining the sample size required a balancing of three key factors: the total number of municipalities in Ontario, the approximate size of an official plan and the time limitations which the research was to be undertaken within. According to Ontario's Ministry of Municipal Affairs and Housing, there are 445 municipalities in the Province of Ontario (MAH, 2008). With regard to the size of official plans, a basic random sample found that Ontario municipalities' official plans can easily exceed 100 pages and can often approach 200 pages. As a result, alternative approaches were subsequently examined in order to determine the number of plans required to represent the spectrum of communities. It was determined that a sample of one-fifth of the official plans would be utilized for the research. A quintile of Ontario's municipalities, eighty-nine in total, represents a statistically significant portion of the total population as it more than eliminates concerns of small sample populations (<30) and the resulting statistical adjustments that would have to be made during data analysis. With this fundamental question answered, the rest of the study's methodology could be developed (for an outline, see Figure 3.1).

Figure 3.1: Outline of Methodology



3.2. Sampling

Based on the structural guidelines developed in the preliminary discussions, the sampling process required a list of every municipality in Ontario. This list was obtained from the Ministry of Municipal Affairs and Housing's website and represents the entire population from which the sample was drawn (OMMAH, 2008b). To ensure accuracy and to facilitate later analysis, the list was also compared to the 2006 Statistics Canada list of municipalities (StatsCan, 2006). The lists reflected the exact same municipalities, thus satisfying the question of completeness. The City of Toronto was removed from consideration, as it is uniquely empowered through unique legislative powers granted to the City by the Province through the City of Toronto Act, 2006. It is suggested here that the designation of such unique powers differentiates the City of Toronto from other Ontario municipalities to the point which the comparison of its official plan to others in the Province would not reflect the variation of efforts or desires to include environmental content as much as it would reflect the variations resulting from the devolution of different powers to different municipalities. As a result of the City of Toronto's removal from the population, the new population size became 444.

It was decided that two scenarios for selecting municipalities would be considered: random and systematic sampling. For the random sampling technique the list of municipalities was alphabetically organized in descending order according to municipality name. Using a random number table

municipalities were chosen according to the row number associated with the municipality name in the Excel file. If a number was chosen which did not correspond to one in the table with a municipality (any number over 444), it was discarded and a new number was chosen. This process continued until 89 municipalities were chosen. The random sampling technique resulted in a range of 13.2% between the highest and lowest percent of tier representation and 18.8% between the highest and lowest percentage of regional representation (Table 3.1).

	Total	Samples	Per cent of Total
Tier			
Upper	30	6	20.0%
Lower	241	35	14.5%
Single	173	48	27.7%
Total	444	89	20.0%
		Percentage Range	13.2%
Region			
Central	77	15	19.5%
Eastern	114	18	15.8%
Northeastern	119	29	24.4%
Northwestern	26	9	34.6%
Southwest	108	18	16.7%
Total	444	89	20.0%
		Percentage Range	18.8%

In the systematic sampling technique the total population was organized according to municipal population size, from smallest to largest. Correlation analyses determined that there was no relationship between population size and either tier-level or region. In addition, this ordering provided a sample containing an even distribution of municipalities by population, though this was not an explicit goal of the sampling. In order to prevent bias, a random number between

one and ten was drawn in order to determine the first sample, per standard procedure for systematic sampling (Babbie, 2004). The number five was drawn, so beginning with the municipality in the fifth row of the Excel table, every fifth municipality was taken. With a sample interval of 5, 88 sample municipalities were drawn. In order to obtain the final sample, a random draw was taken to determine if the municipality with the smallest or largest population would be included. The result of the draw determined that the smallest municipality would be used. The systematic sampling technique resulted in a range of 4.8% between the highest and lowest percent of tier representation and 7.3% between the highest and lowest percent of regional representation (Table 3.2).

	Total	Samples	Per cent of Total
Tier			
Upper	30	7	23.3%
Lower	241	50	20.7%
Single	173	32	18.5%
Total	444	89	20.0%
		Percentage Range	4.8%
Region			
Central	77	16	20.8%
Eastern	114	18	15.8%
Northeastern	119	25	21.0%
Northwestern	26	6	23.1%
Southwest	108	24	22.2%
Total	444	89	20.0%
		Percentage Range	7.3%

Based on the results of the two sampling techniques, the systematic sampling population was found to be the more evenly representative and thus, the more suitable (See Appendix A for the Initial Sample Population List). In addition,

fundamental research concepts suggested that the systemic sampling technique and thus their derived sample populations were better suited for this research. For example, it was previously mentioned that various correlation analyses revealed no meaningful relationships based on populations, tier levels, names or regions; thus suggesting a lack of known characteristics. Systematic sampling is considered well suited for large populations with no known characteristics (Walliman, 2001).

3.3. Collections & Limitations

While it was initially hoped that a collection of updated and approved official plans would exist and be readily accessible, the possibility that this would not be case was considered and certain limitations were therefore placed on the collection of official plans. One of these is based on the broad physical scope of the research. Given that the municipalities in the sample population were located across the Province and that physically visiting each municipality would not be feasible, it was decided that no official plan would be obtained through travel. In addition, it was decided that no official plan would be paid for as the research is voluntary in nature and payment would be considered non-voluntary. Under these limitations, official plans were requested from the sample municipalities. The results of the data collection process resulted in a sample size of 56. A complete breakdown of the final sample population breakdown is available in Appendix B.

3.4. Analysis

The analysis process began with an examination of the individual samples using an indicator table. The indicator table was created using categories derived from the common components of Ontario's 'Provincial Interests' and more advanced ecological footprint research discussed previously detailed in Chapter 2 (see Appendix C for the indicator table). Eight categories were used: Environment, Built Environment, Transportation, Energy, Waste, Water, Natural Resources, and Agriculture.

Official plans were first reviewed to determine whether their content addressed each category as they pertained to the Provincial Interests outlined in Ontario's Planning Act (RSO, 1990). This indicator is referred to as Legislative Prerequisites for the purposes of this research. For each of the Legislative Prerequisites addressed in a plan, the plan was given one point, with a maximum possible score of eight.

Next the plans were reviewed for environmental content that addressed the categories in a manner that fit with current ecological footprint recommendations. This indicator is referred to as Advanced Policy. For each of the categories addressed by an Advanced Policy, a plan was given five points, with a maximum possible score of 40. In addition the strength of language was measured for each category. The level of strength was rated as either not present and given a

score of zero, weak and given a score of one, or strong and given a score of five. Here again the maximum possible score was 40.

The next indicator utilized was the frequency of environmental references, specifically references to each of the categories. Frequency output is a basic quantitative output measurement tool used in content analysis (Neuendorf, 2002). The output measurement was slightly modified to count only references used in context. The frequency output measurement allowed the study to examine the dedication of resources to a given environmental category, as discussed in Chapter 2.

In order to allow for this indicator to be easily reproducible, key words were drawn from relevant literature as discussed in Chapter 2. The official plans were reviewed to record the number of times these words appeared in the documents and were directly related to the category. Thus 'nature', as a key word for the 'Natural Resources' category, was counted if used in relation to natural resources; but was not counted in instances where the word was used in another manner (i.e.: 'the nature of the proposal'). Once a total count of references was found for each of the categories, the category totals were summed and then divided by the total page count in order to arrive at a final average number of environmental references per page.

The final indicator used was the age of the official plan. Here 2008 was subtracted from the year the official plan was approved to arrive at a negative number. In instances where amendments were available and were approved after the official plan, 2008 was also subtracted from the year the last amendment was approved. Then an average of the two numbers was derived and used for the remainder of the research. Once this number was found, a final score for the Plan was created by adding the results of the Legislative Prerequisites, the Advanced Policy, the overall strength of language and the total average environmental references per page and then subtracting the age of the official plan.

Once the entire sample population had been reviewed and individual scores were given, the results were compiled and analyzed using a variety of techniques, both quantitative and qualitative. Initially the results were aggregated into fundamental statistical measures, specifically: range, mode, median, mean, and standard deviation. These aggregations allowed for a broad overview of the data and provided a starting point for further analysis.

Previous research suggests that few demographic characteristics are correlated with 'cities' level of seriousness about sustainability' (Portney, 2002, 377). This is not the same as determining which, if any, characteristics are correlated with the addressing of specific environmental categories in official plans. However, it does

provide useful initial indications and support for the validity of the method used in this study.

In order to determine whether a relationship existed between the demographic characteristics of municipalities and the environmental content of their official plans, several correlation analyses were conducted. This required several types of municipal data to be utilized. Municipal tier levels were taken from the Ministry of Municipal Affairs and Housing website. Additionally, municipal size, population, immigration, education, employment and industry data were used. These data were gathered from the Census of Canada (Statistics Canada, 2006). A list of the specific Statistics Canada Census headings and sub-headings of the data used in the correlation analyses is provided in Appendix D.

In choosing the sub-headings to use, those sub-headings expected to have the most direct or most inverse relationship to the categories found in the indicator table were chosen. For example, under the Industry heading the 'Agriculture and other resource based industries' and the 'Construction industry' were chosen. The former was chosen as it was hypothesized that a greater concern for the agricultural and natural resource components would be reflected in the official plans of municipalities with higher percentages of residents working within these industries. Conversely, it was expected that the lower score would be found in those municipalities with a higher economic dependence on the development industry as is reflected in the percentage of residents employed in construction.

Taken collectively, the demographic data drawn from the census create a framework of municipal characteristics which allowed for a variety of conclusions to be drawn from correlation tests regarding the presence of relationships between municipal official plans and community characteristics.

After completing the quantitative analysis of the data, a more qualitative approach to the analysis followed. This included both language and spatial analysis. In the language analysis, the official plans were analyzed for categorically-relevant material. The language was then organized based on the policy and strength indicators into one of four groups, those being: the absence of related policy (0), the presence of basic policy (1), the presence of advanced policy (2) and advanced policy that utilizes high levels of language strength (3). This allowed for theories that were suggested but not fully supported by the quantitative data to be examined in further detail and for general conclusions concerning the relative levels of categorical content present in official plans to be drawn. In addition, it also provided useful categories for the visual analysis conducted using ArcMap geographic information systems (GIS).

Using ArcMap a variety of visual analyses were conducted. The visual analysis began by first mapping the sample municipalities used for the study. This was done by obtaining the most up-to-date maps of Ontario municipalities from DMTI via the Ryerson University Library. As the maps were divided by tier level, it was necessary to merge the map files into a single file for analysis. It was

acknowledged that, as the files were not created at the same time by the same programmer or data compiler, some inconsistencies in the boundary lines and metadata could exist. However, given that the quantitative analysis done on the relationship between municipality area and the environmental content score of the official plan was completed using data solely from Statistics Canada, any visual inconsistencies were unlikely to be significant enough to compromise the resulting analysis.

Once the files were merged into one map and the sample municipalities identified the first set of maps produced for analysis cross-tabulated municipal density with official plan age and overall official plan score with official plan age. Each variable (dependant and independent) had three possible classes: low, medium and high. This resulted in nine possible classifications for an official plan. An additional classification (0) was added to represent the absence of an official plan in a given municipality. The second set of maps focused on level of environmental content found in official plans. The measurement system changed in these maps to reflect the four content-level based groups developed in the language analysis. Collectively, the maps allowed a visual inspection for clustering to be conducted. Thus, if clusters were identified for a particular category, additional investigation could occur or be recommended in order to identify a physical occurrence that would explain the cluster.

3.5. Reproducibility

The final methodological issue that requires attention is the reproducibility of the overall research. There was nothing unique or complicated in the sourcing of the data and materials used. The sampling and collection techniques were also developed using fundamental social science research techniques. With regard to the analysis though, there was a need for the verification of the process. The mapping analysis again was basic and easily reproducible; however, the method of scoring the official plans was somewhat distinctive in its development. This and the central role that the resulting scores played in the research led to determination that the reproducibility of the process must be verified.

As such, a municipality (Seguin) was chosen at random and used for the verification process. Seguin's official plan was scored using the method discussed above three times during the course of the study, with two month intervals between scorings. The results revealed a high level of reproducibility in the method. Between the first and second tests the scores differed by twelve points; however this was the result of a change in the point system made during the period between the tests. Once the individual point values were adjusted on the results of the first test to mirror the point value designations of the subsequent tests, the scores were identical. Between the second and third tests, there was a minor variation of less than one point that resulted from a slightly different count in the frequency of environmental references. However, the

variation did not affect the final score of the official plan as the final scores of all the official plans were rounded and the rounding was not affected by the variation.

The results of the reproducibility test suggest that, given adequate attention to the official plans, the scoring system used in the indicator table will reliably provide reproducible scores. It should be noted that this does not suggest that exact score will be reproduced by every researcher who uses this table if his/her interpretation of the indicators is uniquely different from another researcher, nor will any score be exactly reproducible as official plans age, Provincial Interests change and/or ecological-footprint theory matures. However, outside these notable exceptions, the methodology suggested here does provide a useable and reproducible way to fully analyze the environmental content of official plans and the relationship between the content and demographic and physical characteristics of the communities that produce them. In the next chapter the results and implications of these analyses are detailed.

Chapter 4: Results and Interpretation

4.1. Results and Interpretation

As stated in the previous chapter, the results of the study and their interpretation can be divided into quantitative and qualitative analyses. The following two chapters examine both analyses in order to begin addressing the fundamental research objectives posed at the beginning of this paper, those being to determine:

1. If there is a significant difference in the environmental content found in official plans and, if there is, what relationship exists between the level of environmental content of Ontario municipalities' official plans and socio-economic or physical characteristics of their respective communities?
2. Which components of municipal governance may be given greater attention or more authority through the use of language when environmental policy is developed at the municipal level?

This chapter begins with a breakdown of the quantitative analyses performed on the results of the official plan scores. First the scores are described and evaluated using fundamental statistical techniques including range, mean, median, mode and standard deviation. Next, the results of the correlation analyses conducted on the scores and various socio-economic factors are detailed. These results suggest something about the levels of attention paid to a range of environmental topics covered in the official plans. They also reveal whether a statistically significant relationship exists between the level of environmental content (including individual topics) in official plans and the socio-economic characteristics of their communities.

In Chapter 5 the discussion shifts to the results of the qualitative analysis. This chapter begins with the analysis of language used in Ontario municipal official plans. The results from this stage of the analysis process suggest how language is used in the development of topic-focused environmental policy by segregating official plans by category and highlighting the category-specific language used in those plans. In addition to language analysis, the qualitative analysis section also discusses the results in terms of spatial significance. The spatial analysis examines the results using maps created with ArcMap software. The maps create images of the quantitative and categorical data previously discussed. The results of these images are discussed in terms of the visual patterns that are displayed and how they relate to one another and/or to the major physical features of Ontario. The results of the qualitative analysis supplement the previous analysis and allow for a more comprehensive interpretation of the data.

Upon completion of the analyses, a final, comprehensive interpretation of the results is presented in Chapter 6. The final interpretation will integrate all three analysis components and highlight the ways in which the results complement each other as well as anomalies in the results of the differing analysis techniques. The comprehensive interpretation allows for final conclusions to be drawn and presented in Chapter 6.

4.2. Quantitative Analysis

In order to give the official plan scores a full quantitative analysis, the discussion begins with the eight individual categories detailed in the previous chapters. After the individual categories have been fully analyzed, the overall official plan scores are then examined.

4.2.1. Category-Based Analysis

Categorical scores represent the sum of the points an individual official plan received based in a category for the following indicators: Basic Policy, Advanced Policy, Average References per Page, and Language Strength. This type of analysis is necessary, as no previous study has examined municipal official plans in this manner (thus providing no baseline) and the average category references per page indicator creates an infinite number of possible scores. Therefore, category ranges, means, medians, and modes are compared to one another and individual category scores for municipal official plans are compared to one another with reference to categorical ranges, means, medians and modes.

In examining the means and medians of the categorical scores, a trend appears with infrastructure-related categories received generally lower scores than those that are more directly agricultural or environmental in nature (Table 4.1). For example, the mean scores of the Built Environment, Energy, Waste and Transportation categories represent the lowest categorical averages, respectively, with Transportation at the bottom. However, while the Built Environment mean is

the fourth lowest, it is actually closer in value to the top four means and thus more representative of the higher-value means. This suggestion is repeated by the median scores for each category, where the Built Environment category has the third highest score. However, here again, the Transport, Energy and Waste categories have the three lowest median scores.

Thus, in contrast to the previous hypothesis of urban municipal inattention to agricultural issues suggested in Chapter 3, the initial indications arriving from range, mean and median score data suggest that rural municipalities are paying more attention to agricultural and ecological-based issues in their official plans than to those related to urban infrastructure.

Table 4.1: Categorical Score Means and Medians

	Mean	Median
Environment	9.75	8.46
Built Environment	7.74	7.36
Transportation	3.76	2.57
Energy	4.83	2.09
Waste	4.21	0.43
Water	8.02	4.77
Natural Resources	9.1	8.13
Agriculture	8.53	3.29

With regard to ranges, the difference between the maximum and minimum scores vary from 16.30 (Energy) to 19.88 (Agriculture) points, creating a difference range of 3.58 (see Table 4.2). The highest scores across the categories range from 16.30 (Energy) to 20.97 (Environment), creating a top score range of 4.67. The lowest scores across the categories range from 0

(Energy) to 2.31 (Environment), creating a bottom score range of 2.31. Within individual categories, the wider ranges imply differentiation among municipal approaches to a category within their official plans while narrower ranges suggest a more consistent approach from one official plan to the next. When considered in relation to the overall official plan score range of 69, even the largest of these ranges (4.67) represents less than 7 per cent of the overall score range (0 to 69).

These results provide two important preliminary indications regarding the current study. First, it supports the category selection process discussed in chapters 2 and 3, as all of the categories are represented with ranges similar in nature. In addition, it supports the overall scoring method used, as no single category's scores are seen as significantly higher than the others, based on a +/- 3 standard deviation range of 13.57 to 23.36 for the Maximum category scores and -1.21 to 2.66 for the Minimum category scores.

Table 4.2: Categorical Score Maximums, Minimums & Ranges

	Maximum	Minimum	Range
Environment	20.97	2.31	18.66
Built Environment	19.94	0.71	19.23
Transportation	19.91	0.03	19.88
Energy	19.13	0.11	19.02
Waste	17.69	0.11	17.58
Water	17.13	0.19	16.94
Natural Resources	16.66	0.03	16.63
Agriculture	16.3	0	16.3

The Environment category has the highest maximum and minimum scores, however it does not have the widest range. This suggests that municipalities tend to provide more attention to or discussion of overall ecosystem-based environmental concern in their official plans than to other individual factors that may influence ecosystem protection or enhancement. In contrast, the Energy category has the lowest top and bottom range scores, and has the narrowest overall range. Thus, it can be inferred that municipalities tend to pay less attention to energy concerns in their official plans than they do to any of the other categories considered in this study; but that when they do address energy issues, they address the issues with similar levels of attention.

In something of a contrast to the Environment and Energy categories, Agriculture has the widest range of all the categories. While this may be generally expected due to the traditionally rural nature of agriculture and the strong association some municipalities have with it, the range seen in the Agricultural category also provides initial suggestions that highly urbanized municipalities may not perceive agricultural issues as relevant to their areas. More specifically, it appears that many municipalities have not begun to examine the role that concepts such as urban agriculture can play within their municipalities and within the province's wider agricultural agenda.

With regard to the other categories, those categories most associated with urban infrastructure (Transportation, Built Environment, and Waste) had lower top

scores but narrower ranges. In contrast, the Natural Resource and Water categories had wider ranges and higher top scores, indicating more variation in the amount of attention paid to these categories and that a higher level of detail was included when these issues were addressed. It should be noted at this point, that the current discussion excludes the four municipalities that self-reported 'no planning' within their jurisdiction.

In the initial quantitative examination of specific categorical scores, information derived from the analysis of ranges, means, and medians of the scores led to five indications:

1. Municipalities in Ontario provide more overall attention to the Environment category than to other categories.
2. Municipalities provide the least attention to the Energy category; but when addressed, municipalities provide a similar level of attention to category-specific details.
3. The wide range of scores in the Agricultural category would suggest a potential lack of attention by some larger, more urban municipalities to agricultural issues and concepts.
4. The lower mean and median scores in Transportation, Built Environment, Waste and Energy categories suggest less attention is being paid to infrastructure-based issues by many municipalities; in particular more rural municipalities may pay less attention to these issues due to the lower intensity usage experienced on their infrastructure.
5. The increased range in the Water and Natural Resource scores, in combination with their higher mean and median scores, indicate greater variation in the amount of attention paid to these categories, but that a higher level of detail was included when these issues were addressed.

Of these indications, the third and fourth would seem to require further testing using correlation analysis and spatial analysis using GIS to assess the validity of

the explanations. It was hypothesized that the degree of urban development, as reflected in population size, would be critical to the attention paid to some issues. A correlation analysis between official plan agricultural scores and the corresponding municipal population size, drawn from the 2006 census data, produces a result of 0.12. This suggests a very limited correlation between municipal population size and the agricultural scores of official plans. Correlation analyses addressing the fourth indication, regarding infrastructure-based issues, produces similar results, with non-significant ($0 < +/-0.1$) correlation coefficients of 0.007 between population size and waste scores and -0.08 between population size and energy scores. The results for the analyses between population size and transportation and built environment scores are slightly higher, but still reveal only a moderate ($+/-0.31$ to $+/-0.50$) to weak ($+/-0.10$ to $+/-0.30$) correlation at 0.32 and 0.28, respectively. These results suggest that initial indications relating urban population levels to agricultural and infrastructure attention levels in official plans are not statistically defensible.

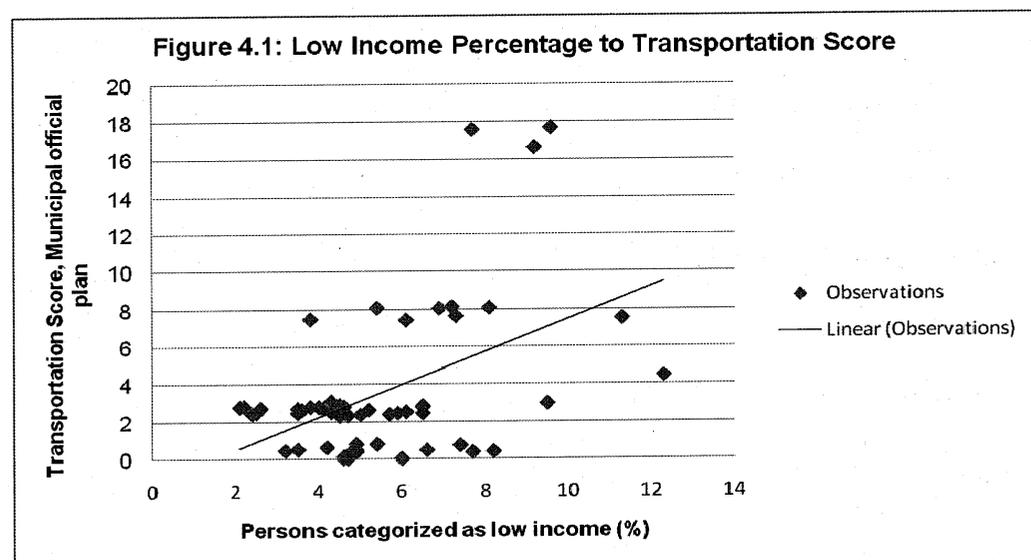
Despite the lack of evidence linking population size to official plan attention to infrastructure as a whole, the results did suggest that official plan attention to transportation-related environmental issues was more directly linked to municipal characteristics than any other category tested. The Transportation category contained the highest r-values in over half of the analyses run for municipal characteristics when compared to the other categories' results for the same characteristics. It also had the three highest overall r-values, though even the

highest values only revealed a moderate relationship. The correlation analysis between transportation and the number of persons employed in management occupations resulted in an r-score of 0.41. For the test between transportation and the number of persons holding a university certificate, diploma or degree, the score rose to 0.44. Finally, the test between transportation and the percentage of persons categorized as low income nearly surpassed the moderate classification ($+/-0.31$ to $+/-0.50$) with a score of 0.48. However, while a relationship is suggested by the result, it should be noted that the relationship does not appear to be linear as can be seen in Figure 4.1. These results are also interesting for two interrelated reasons. First, in combination with the lower mean and median scores previously discussed, the higher r-scores suggest that less attention is being paid to transportation-related environmental issues in some municipal official plans. The subsequent consideration that should be noted as a result of these findings is the possibility that the high r-scores for the Transportation category reveal a more fiscal, less principal-based approach used in addressing transportation-related environmental issues. This assertion requires future research in order to make a defensible determination.

From the results of the correlation analyses, it can be stated that population size does not directly influence municipal attention to agricultural-related environmental issues, nor to those related to overall municipal infrastructure. In contrast, municipal characteristics have a more significant impact on transportation-related environmental issues than on any other individual category.

Thus, the indications carried forward into the next phase of the quantitative portion of this study are that:

1. Municipalities in Ontario provide more overall attention to the components of the Environment category than to those in the other categories.
2. Municipalities provide the least attention to the components of the Energy category; but when addressed, municipalities provide a similar level of attention to category-specific details.
3. The increased range in the Water and Natural Resource scores, in combination with their higher mean and median scores, indicate greater variation in the amount of attention paid to these categories, but that a higher level of detail was included when these issues were addressed.
4. Municipal characteristics have a more significant impact on transportation-related environmental issues than on any other individual category.

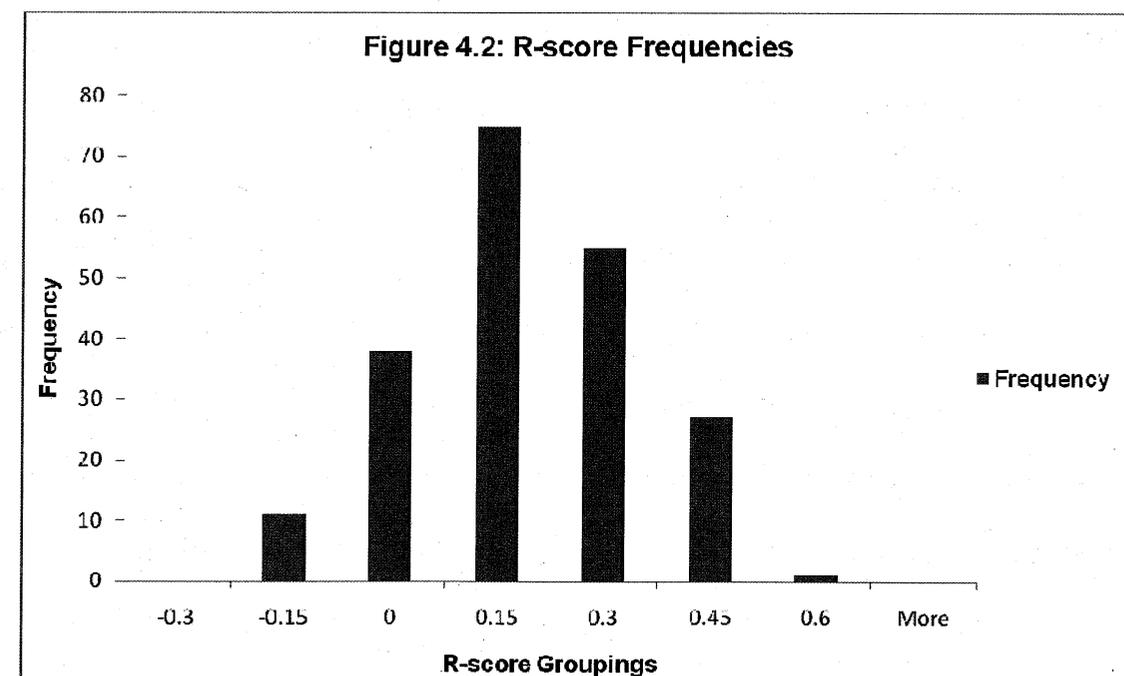


The assertions that the issues directly related to the Environment category receive the most attention and that those influencing the Energy category receive the least are adequately supported with the data detailed above. With regard to the assertions of variations in the level of detail given to the various categories, these are best addressed through qualitative content analysis, and will be further

addressed in the Qualitative Analysis section of this chapter. However prior to this, the results of quantitative analysis on the overall official plans scores still require discussion.

4.2.2. Overall Score Analysis

Fundamental statistical measures such as mean, median and range are somewhat less useful when examining the overall official plan scores, as there is no previous benchmark that can be used for comparison. Yet, if the mean score and score range are used with standard deviation these measures reveal that the scores approximate a normal distribution. The scores range from 0 to 69 with a mean score of 27. The standard deviation of the sample is 15.06, meaning that approximately 68 per cent of the samples should lie between 11.6 and 41.7, 95 per cent between -3.4 and 56.7, and 99.7 per cent between -18.5 and 71.8. No outliers exist within the sample population.



By contrast, the r-value results from correlation analyses provide a great deal of insight into the potential relationships between the overall scores and a variety of demographic characteristics. A similar distribution pattern to that of the overall official plan scores emerges in the distribution of the r-values. Figure 4.2 shows the distribution for all of the 207 correlation analyses run in the study. With regard to the overall official plan scores, 13 correlation analyses were run between the scores and various socio-economic variables (See Appendix E for a complete list of all correlation analysis tests and scores). The variables, drawn from the 2006 census, included data on population size, income, employment type, education and migration as described in Chapter 3. Similar to the previous correlation analyses, the results show only weak or moderate relationships (Appendix E).

Beginning with population size, the correlation analysis resulted in a coefficient of 0.16, suggesting only a weak correlation between the level of environmental content in a municipality's official plan and that municipality's population size. Similarly, the amount of migration into a municipality appears to have little impact on the level of environmental content present either, as the correlation coefficient between score and in migration during the past year was not significant at 0.02 and only slightly significant after five years with a coefficient of -0.18. Thus, there is little evidence to suggest that population size or migration levels are significant factors to consider when examining the level of environmental content in municipal official plans.

Education, however, appears to have more influence over the type and strength of content. While the percentage of residents 15 years or older having major educational studies in agriculture, natural resources and conservation has only a weak correlation to the environmental content score (0.24), the broad influence of education was more significant. The percentage of residents 15 years or older with a university degree, diploma or certificate has a moderate influence over the level of environmental content with a correlation coefficient of 0.32. Interestingly, this influence decreases when the focus shifts from overall scores association with education to overall scores association with employment.

None of the employment variables has a moderate association with the environmental content score, with the percentages of residents 15 years or older working in natural or applied science fields having the highest coefficient value (0.26). The remainder of the employment variables have either a weak influence or non-significant coefficient values (see Table 4.3). Interestingly, despite the weak influence of employment-related variables, the median income of residents

Employment Variables	Correlation to Official Plan Score
Employed in management role as % labour force 15+	0.19
Employed in business as % labour force 15+	0.00
% of labour force working in agricultural & natural resource industries	0.01
% of labour force working in construction industry	-0.07
ratio agricultural/natural resource employment to construction employment	0.15

15 years or older has a moderate influence (0.36) on environmental content.

However, the same cannot be said for the percentage of all residents classified as low income after taxes, as the coefficient value was non-significant (0.01).

Finally, correlation analyses were run between the overall scores of official plans and the size (land area) of municipalities. The result of the first test indicates that size has no impact on the level of environmental content, with a coefficient of -0.04.

Based on the categorically-based and the overall-score-based quantitative analyses, there are nine indications that directly relate to the research objectives cited at the beginning of this chapter. From the categorically-based analyses it appears that:

1. Municipalities provide more overall attention to the components of the Environment category than to those in the other categories.
2. Municipalities provide the least attention to the components of the Energy category; but when addressed, municipalities provide a similar level of attention to category specific details.
3. The increased range in the Water and Natural Resource scores, in combination with their higher mean and median scores, indicate more variation in the amount of attention paid to these categories, but that a higher level of detail was included by certain municipalities.
4. While population size is not related to the attention given to overall municipal infrastructure-related environmental issues in official plans, municipal characteristics appear to have the greatest influence on transportation-related issues.

And from the overall score-based analyses it appears that:

5. Little evidence exists to suggest that municipal population size or in migration levels impact the level of environmental content found in official plans.
6. Education appears to have a weak to moderate direct influence on environmental content levels.
7. The distribution of employment sectors in a municipality has no meaningful association with environmental content levels.
8. Despite the lack of influence that the type of employment has, overall income levels do have a moderate direct influence on the level of environmental content found in municipal official plans.
9. The level of environmental content is not influenced by the physical size (area) of a municipality.

The final four statements are well supported quantitative indications. However, as previously mentioned, the first three statements require qualitative analysis in order to define the type of attention being paid to the specific environmental categories previously discussed. Through this analysis, an enhanced understanding of the variations in the type and level of attention being paid to the environment, as well as the strength of language being used in official plan environmental content can be achieved.

Chapter 5: Qualitative Results and Interpretations

5.1. Qualitative Analysis

This chapter details the variations in the type of attention given to environmental categories in official plans and the levels to which various categories are addressed. The chapter begins by addressing the type and strength of language used in all eight of the categories of official plan environmental content. This is followed by a discussion of the spatial analyses performed on both the qualitative and quantitative data. Finally, a summary of the research findings is presented.

5.1.1. Categorical Analysis

When examining the language strength found in official plans, the results are best organized into four groups according to the indicators used in the scoring process: the absence of related policy, the presence of basic policy, the presence of advanced policy and high levels of language strength. Using these categories, language used in each of the eight categories can be fully analyzed. This analysis provides needed augmentation to the quantitative analysis discussed previously. It illustrates how variations in quantitative range correspond to the variations in the topics covered in each category and the level to which they are emphasized. This analysis also provides context useful in understanding the spatial analysis that follows.

5.1.1.1. Environmental Language

With regard to the Environment category, those plans with only basic policy features acknowledge a desire to protect the local ecosystem, but fail to address how that ecosystem could be protected, or qualify protection with weak language and the prioritization of another goal of the municipality. For instance, the Rideau Lake Official Plan states that 'The Township seeks to preserve the function of significant wildlife habitat without unduly restricting development' (2004, p. 47). Here the municipality states a desire to protect the ecosystem, but prioritizes development over such protection. In another example, the Town of Prescott 'Recognize[s] the natural environment as a community resource that must be preserved and considered in all land use planning decisions' (2005, p. 30). In this instance the environment is a tool for use by the municipality with no inherent rights of its own. While the municipality states that the environment is to be preserved, it lacks detailed guidance as to how this preservation is to be achieved.

Such official plans do lack prescriptive language though, and generally 'encourage' or 'support' these protection methods rather than requiring them. The Brooke-Alvinston Official Plan goes beyond simple acknowledgement and states that it 'will encourage landowners to employ farm management practices that are sensitive to the natural environment' (2000, p. 4). Here key land use practices are encouraged; however, the language is not demanding of

landowners and additional details on specific types of 'encouraged' practice would be beneficial. The Wellesely Official Plan goes even further, noting that:

The Township will attempt to adhere to the following principles when practicing environmental management: ...

2) Environmental standards for development must be established not only to prevent or minimize negative environmental impacts, but also where feasible, to enhance environmental features and functions.

3) Watershed and subwatershed planning is an effective tool for establishing policies in advance of urban development to protect the environmental features and functions of a watershed.

4) The rich native biodiversity of the Township must actively be conserved and enhanced (2003, p. 52).

The development of standards, the acknowledgement of ecosystem-based planning and the stated desire to conserve and enhance biodiversity suggest that the municipality has a true interest in protecting its local environment. However, the use of the word 'attempt' serves to weaken the municipality's commitment. This is the difference between municipalities with official plans that have basic and advanced policy and those that maximize the environmental policy potential of their official plans by also making firm commitments through the use of more stringent language. For example, the City of Kenora forgoes any potential development goals in lieu of the protection of local osprey and bald eagle environments:

The locations of heronries, nests of ospreys and nests of bald eagles are shown on Schedule "A". Council recognizes the importance of shielding the heronries and nests of osprey and bald

eagles from habitat destruction or disturbance and it is a policy of this plan that:

i) no road or pipeline construction, logging, blasting or other similar heavy development activities should take place within 200 metres of a heronry during the sensitive breeding season (between April 1 and August 15).

ii) no development that would result in activities of any kind, including pedestrian traffic, all terrain vehicles, etc., will be permitted within 400 metres of a heronry during the sensitive breeding season (2006, p. 17).

The Tay Valley Official Plan provides a similar example regarding local fish habitats, noting that '[w]here such fish habitat is identified, no development or site alteration shall be permitted within 30 metres of the habitat, unless it can be demonstrated that there will be no negative impacts' (2001, p. 25). Here the municipalities acknowledge the importance of the local ecosystem to specific members of the natural environment and require set guidelines for its protection to be followed. Where variations are allowed, the onus is placed on the developer to prove why the exception is warranted. The various types of ecosystems appear to allow for this category to be addressed in a multitude of ways, allowing for a wide range of policies to be developed. As a result, it is suggested that variation in the level of attention given to this category is based on how municipalities value their local ecosystems. Thus, this category provides a useful benchmark for measuring the value placed on the environment by municipalities and provides a potential for supplemental research.

5.1.1.2. Built Environment Language

In the Built Environment category, official plans with only basic policy tended to address growth issues in a broad sense, often with policies that 'manage[d] growth by directing it to appropriate locations' (Seguin, 2006, p. 1). These municipalities may state that the desire to explore more sustainable development methods such as infilling, however in contrast to municipalities like Aylmer, their official plans do not fully establish guidelines for such development practices. They also do not explicitly attempt to prevent inappropriate development placement, as is done by Galway, Cavendish and Harvey, whose official plan intends 'to prevent urban development on lands designated as Rural, particularly on lands suitable for forestry and specialized forms of agriculture (2000, p. 30). Without this type of language, municipalities cannot meet standards set by official plans such as the Regional Municipality of Durham and the municipality of Owen Sound, which provide detailed restrictions on the location of development, set targets levels for intensification and have begun acknowledging and encouraging so called 'green' building design and construction practices (Durham, 2004; Owen Sound, 2006).

5.1.1.3. Transportation Language

In the previous chapter it was determined that no statistically significant link exists between the size of municipalities and the level of attention given to transportation issues in their official plans. The results of the language analysis support this finding, as it was suggested that municipal official plans as a whole

lacked significant attention to transit issues, particularly in relation to the environment. Ironically, it was expected that municipal population size would be the preferred blame avoidance technique used to address such critiques. However, as with broad ecosystem issues, the varying nature and composition of municipalities do allow municipalities of any size to address transit issues within its borders with locally-created solutions. Unfortunately this was found to be the exception and not the rule when examining how transportation-related environmental issues were addressed in municipal official plans.

Generally, the language used is weak and focused on movement through neighbourhoods rather than through the city. Broad encouragement of cycling and walking as alternatives is often present, but this encouragement does not include details on how these alternatives should be supported or what types of vehicular trips they should replace. These findings are somewhat ironic, given the intensity of language used in the calls for a national transit strategy and other transit related matters discussed previously (see: FCM, 2008).

However, examples of more advanced policy are present in some official plans. The Official Plan of Whitby (2005) encourages urban development that supports transit systems but also fits transport routes to existing development, aiming to minimize the walking distance from door to transit stop to 400 metres. Collingwood's (2004) official plan provides a similar goal, aiming to integrate public transportation facilities into development proposals. While the nature of

development and public transit makes the use of stringent language difficult, this language can be utilized, particularly when it is supported with links connecting public transit goals to those related to climate change, as can be occasionally seen in official plans such as Oakville's (2006).

5.1.1.4. Energy Language

In sub-section 4.2.1. it was suggested that the Energy category received the least attention based on numeric scores, yet when energy-related content was present, municipalities addressed these issues to a similar level; an assertion supported by the language analysis. In addition to a number of official plans with no reference to energy issues, those plans that did address the issues tended to do so in a limited manner. The methods used to address these issues were generally limited to: encouraging development that supports passive solar gain, encouraging residential and governmental energy conservation measures, and recognizing and permitting alternative energy use and creation.

At the most basic level, municipalities such as Whitby limited their policies to '[encouraging] development of passive and active solar energy opportunities through the orientation of streets, exterior architectural design and location of buildings and responsive landscape' (2005, p. 207). Those municipalities with slightly more advanced policy addressed conservation more aggressively, encouraging the integration of conservation practices into the daily activities of

residents and local governments, as can be seen in Owen Sound's Official Plan which states that:

The City shall encourage the reduction of energy consumption and reliance on carbon-based fuels for energy, and support and encourage innovative energy producing options, green industry and green building designs and construction practices (2006, p. 92).

In addition, the types of language used in official plans with advanced policy such as this tend to support alternative energy production methods. Thus, the shift from basic to advanced policy is more subtle than is seen in some other categories. In addition, the uses of more stringent, definitive statements are more limited in this category, with only rare exceptions. For example, only one official plan reviewed stated that a comprehensive policy for wind turbine farms would be integrated into the plan (North Stormont, 2005).

Having developed sufficient support for the assertion reiterated at the beginning of this sub-section, an explanation for this trend should be sought. It is possible that energy concerns have begun to emerge more recently than those related to other categories. However, exact replication of language in multiple official plans suggests other potential reasons. Specifically, the official plans for Wellesley, Georgina, and Strong, Ontario all state that: 'The development of electric power facilities shall occur in an orderly manner to facilitate the efficient and reliable provision of adequate electric power' (Wellesley, 2003, p. 77; Georgina, 2002, p. 14; Strong, 2004, p. 4). In addition, the Strong Official Plan was prepared by a consulting firm. While it is unclear if the same, or any, consulting firm was

involved in the preparation of Wellesley's or Georgina's plans, it does suggest that consultancies could influence the type of language and attention that is paid to environmental or other topics in official plans. This question extends beyond the mandate of this study; however, it does pose a potentially interesting question for future research.

5.1.1.5. Waste Language

The Waste category is similar to the Energy category, in that it is frequently addressed in a similar manner by various municipalities. It is also the most polarized of the categories with regard to the number of municipalities at the extremes of policy attention levels. However, recycling and waste management practices are less dependent on local environments in contrast to alternative energy development. As such, this polarization can be logically expected. When policy is present, waste issues are initially addressed in a manner focused on the extension of landfill lifecycles. For example, Meaford's Official Plan states that it 'is a policy of Council to encourage the reduction, reuse and recycling of solid waste to ensure that the amount of waste required to be stored in landfills is minimized' (2005, p. 106). As municipal waste policy matures, it begins to incorporate additional methods like composting, which bring with it additional environmental benefits. These official plans do not, however, provide details on how the municipality will assist residents in the reduction and recycling process. In contrast, municipalities like Edwardsburgh-Cardinal (2003) provide details on

how the process will be facilitated, what materials are covered, who will manage the process, and the length of time the current plan will be in place.

5.1.1.6. Water Language

In contrast to the Energy and Waste categories, water policy is approached from a wide variety of angles. At the basic level, municipalities generally aimed to:

protect and enhance the natural attributes and functions of watercourses in the County in order to maintain and improve wildlife habitat and water quality. To protect headwater areas and groundwater resources from land uses that have the potential to degrade downstream watercourses and groundwater aquifers (Lambton County, 1998, p. 8.6-8.7).

Here the policy goal is multifaceted and shows a respect for the inherent value of local water resources. The statements at this level are unrefined though, lacking explanation of protection methods and prescriptive measurements such as the size of buffer areas.

More advanced policy statements frequently address water policy issues through voluntary development or education programs. For example Lambton Shores' Official Plan encourages 'processes such as man-made wetlands and permeable surfaces to absorb and distribute stormwater and recharge groundwater' (2001, p. 103). Mississippi Mills (2006, p. 50) provides a different approach: 'The Town may institute a program of public education aimed at enhancing public understanding of voluntary initiative and regulatory measures designed to protect and enhance the quality of groundwater', for example 'the installation and use of

water-saving plumbing fixtures'. In both instances, the municipalities provide specific methods to encourage the protection of water quality and quantity. However, in both instances, the policies are based on voluntary or potential, rather than the required actions. Meanwhile, municipalities like Meaford utilized more stringent language, stating, for instance, that 'all major applications for development shall be supported by a Water Resources Management (WRM) Report' (2005, p. 97). The subtle shift of language from 'may' to 'shall' enhances the enforceability, and possibly the effectiveness, of municipal water policy.

5.1.1.7. Natural Resource Language

The municipal approaches to Natural Resource policy are similar to that of the water policy approaches. Here again municipalities approach policy from a wide variety of angles, partially due to the differential distribution of natural resources among municipalities. Basic policies in this category are generally limited to broad statements regarding 'the protection of natural resources, such as agricultural lands, forests... mineral aggregates and minerals' (Tay Valley, 2001, p. 5). Municipalities also refer to protection based on 'best practices' related to a given resource; however their official plans fail to provide guidance on what constitutes such practices.

In more advanced policy, municipalities provide this additional detail, encouraging the replacement of removed trees in a new location. They also recognize the link between the protection of natural resource areas, the

continuity of these areas and normal ecological function, as can be seen in the official plans of Adelaide-Metcalfe (2005) and Leeds and the Thousand Islands (2006).

Finally, those municipalities with the most stringent natural resource policy go beyond the understanding of this relationship, to planning for its maintenance and expansion. For example, the New Tecumseth Official Plan states that when a woodlot is partially or completely cut, '100% of the trees removed shall be replaced and shall be of comparable number, size (to the extent possible) and natural diversity to those being removed' (1999, p.5-4). Additional details also include the species and form of the replanting, as well as the extent to which the replacements can take place in urban environments. Morris-Turnberry's official plan goes beyond maintenance and aims to increase forestry coverage in the municipality from 20 to 25% (Morris-Turnberry, 2006). In this way, the previous assertion that certain municipalities provide significantly more detail in their natural resource policies is supported through this qualitative analysis.

5.1.1.8. Agriculture Language

Finally, the Agricultural category provides an interesting study of how the language used in municipal official plan policy can suggest the types of pressures being felt by municipalities with regard to their agricultural resources. For instance, the unspecific language used in some municipal official plans is often seen to hint at pressures coming from industrial farming or resource

industry firms or those who seek to remove land from agricultural production.

The Innisfil Official Plan strives to maintain the agricultural base, but with broad statements suggesting that 'the minimum lot size for new agricultural parcels shall be maintained', the potential for new family farms is marginalized in favour of larger, industrial farms (Innisfil, 2002). In a similar manner, Lambton County's official plan prioritizes aggregate extraction over agriculture, stating that:

The intent of this Plan is to protect the aggregate resources in the County for possible future extraction, to ensure the compatibility of land uses and to ensure the appropriate rehabilitation of extraction areas. Extraction is permitted in agricultural areas as an interim use, provided that the lands are rehabilitated to a similar agricultural capability (Lambton, 1998, p. 9.1).

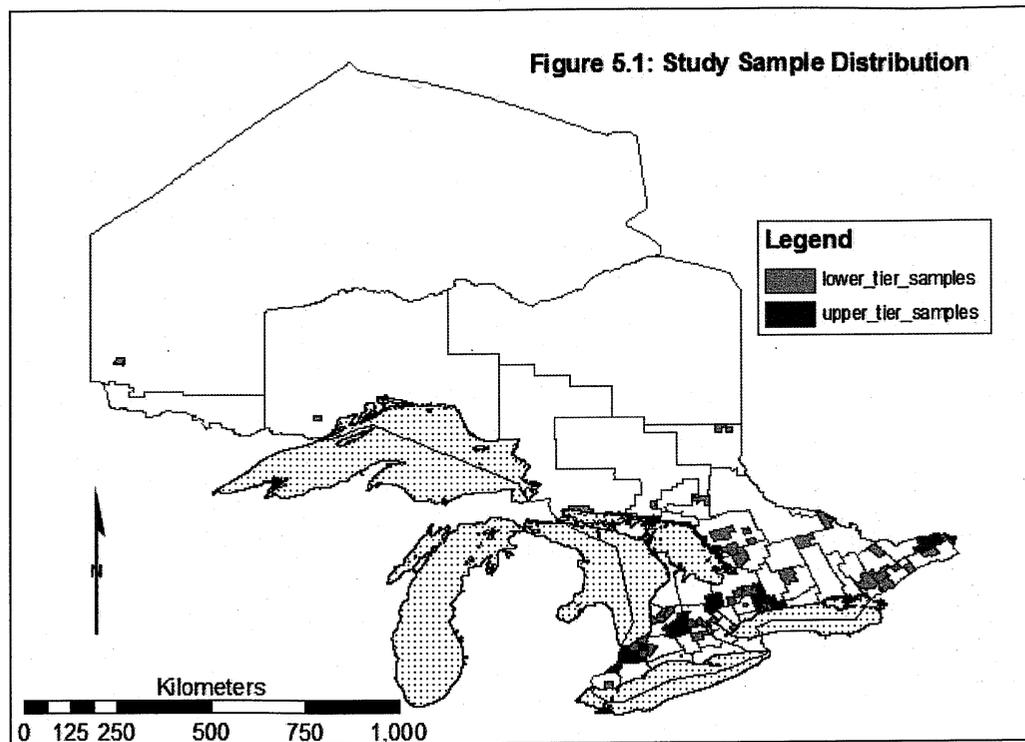
In contrast, municipalities with more advanced policies tend to qualify alternate uses of agricultural lands with conditions. In its official plan, Central Huron (2006, p. 67) requires prime agricultural lands used for mineral aggregate extraction to be rehabilitated 'to their former use in prime agricultural land', providing for very few exceptions.

Such plans also tend to address the potential environmental impacts of farm practice, as is seen in Rideau Lakes' (2004, p. 69) official plan, which in addition to stating an intent to protect prime agricultural land also 'encourages the preparation and practice of nutrient management planning and best management practice by all nutrient generators and users'. However, these municipalities still tend to utilize language that focuses on voluntary initiative actions.

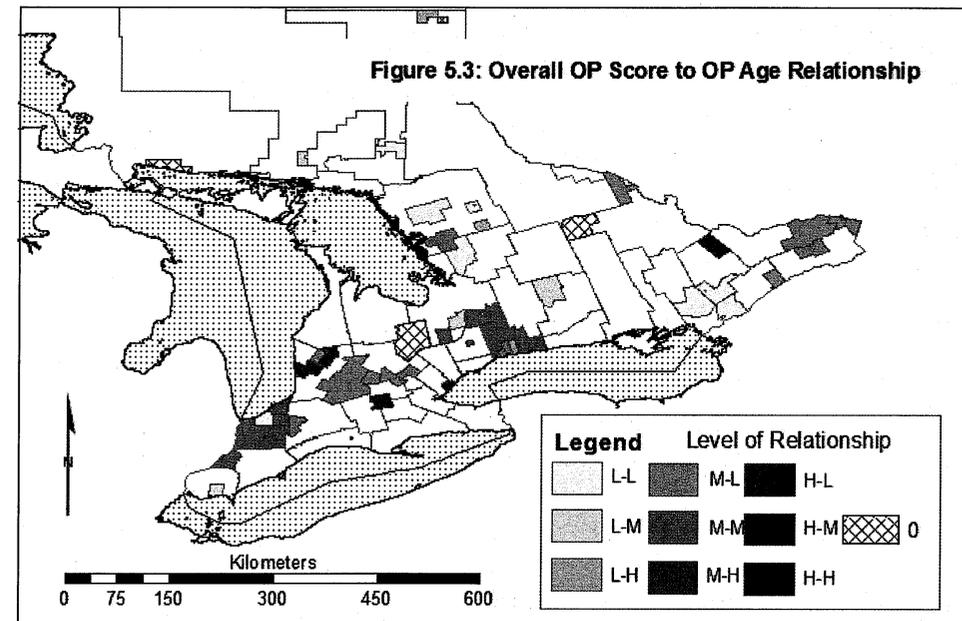
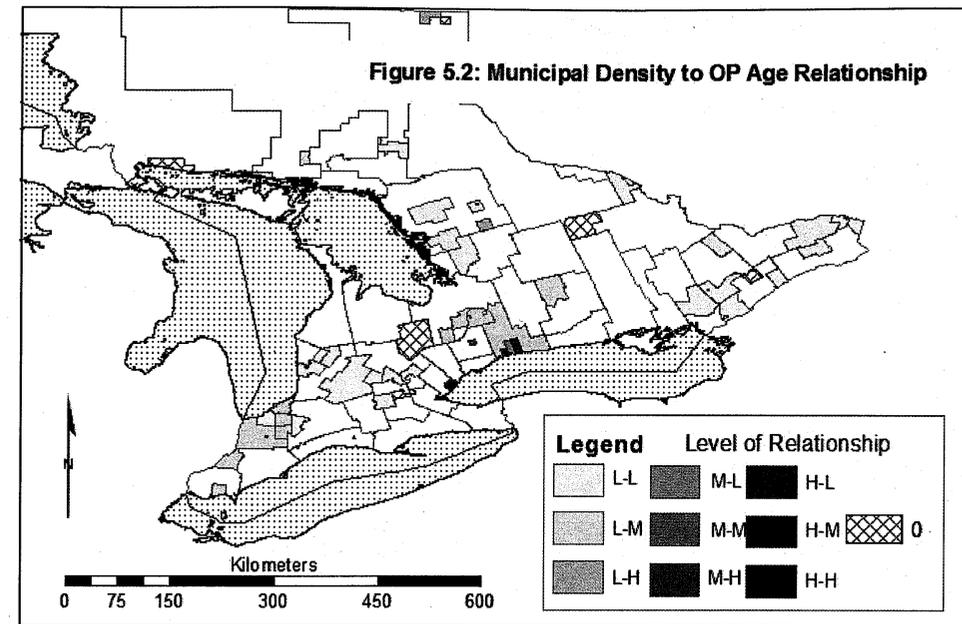
Those municipalities that most stringently address agricultural issues in their official plans restrict industry and tend to quantify development limits. New Tecumseth (1999, p. 7-3) takes this approach, stating that '[no] new non-agricultural use shall be permitted that would interfere with or hinder existing or future agricultural operations'. Through the use of restrictive language which focuses on the future of the municipality, New Tecumseth effectively protects the farmland, and related ecosystems, from aggregate extraction and other invasive industries. With regard to development restriction, Prescott and Russell's official plan highlights its shift from 10% to 0% growth distribution in agricultural areas, thus preventing any urban growth on agricultural lands, and notes the influence of provincial policy on this decision (2006). Thus, as increased attention is paid to agricultural issues in municipal official plans, there appears to be a related shift in where municipalities draw their influence, away from industry and increasingly from the Province.

5.1.2. Spatial Analysis

The spatial component of the qualitative analysis provides the ability to reveal any physical clusters or trends relevant to the study. These can reveal regional disparities that warrant further research. Due to the limited number of municipalities in northern Ontario and the resultant lack of ability for clusters to form this portion of the Province, the analysis is focused solely on the southern Ontario municipalities (Figure 5.1).

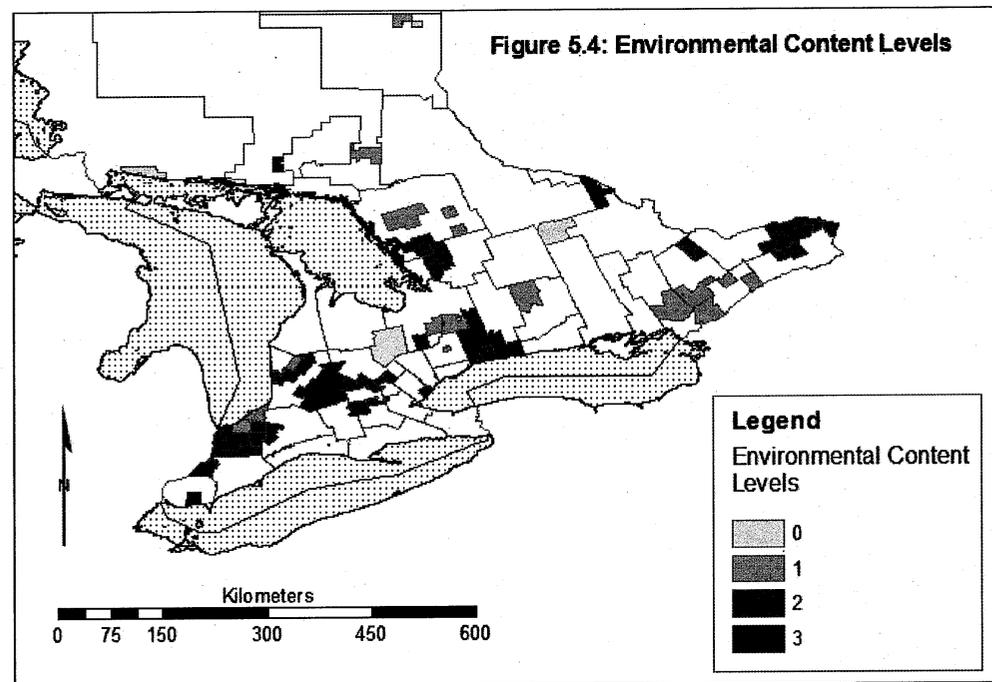


Beginning with the age of official plans, the analyses focused primarily on potential clusters of municipalities with official plans of the same (approximate) age in relation to density levels or the overall score of the official plan. Figure 5.2 reveals no noticeable clusters. Instead it suggests that the majority of municipalities in southern Ontario have current or expiring official plans, regardless of density levels. Figure 5.3 reveals some clustering, particularly in the eastern and western-most portions of southern Ontario. These clusters indicate mid-range overall official plan scores that are beginning to require updates. However, as the clusters are in opposite regions of the Province, and similar measures are found as isolated cases throughout southern Ontario, no regional trends appear to be present.



In shifting to category-specific spatial analysis, Figure 5.4 provides an example of how the visual representation of category-specific content levels reveals spatial trends in the data. In particular, higher levels of Environmental-related content are found in the urbanized areas along Highway 401; more specifically around Ottawa, Sarnia, Kitchener-Waterloo and the GTA. It also highlights irregularities in these trends. The small cluster of level 2 (Advanced Policy) municipal official

plans found north of Toronto, by Georgian Bay, does not fit neatly with the trend of higher level policy in more urbanized communities along Highway 401 though. This variation could represent a similar trend along Highway 400, though there are fewer data in this area to substantiate such an assertion.



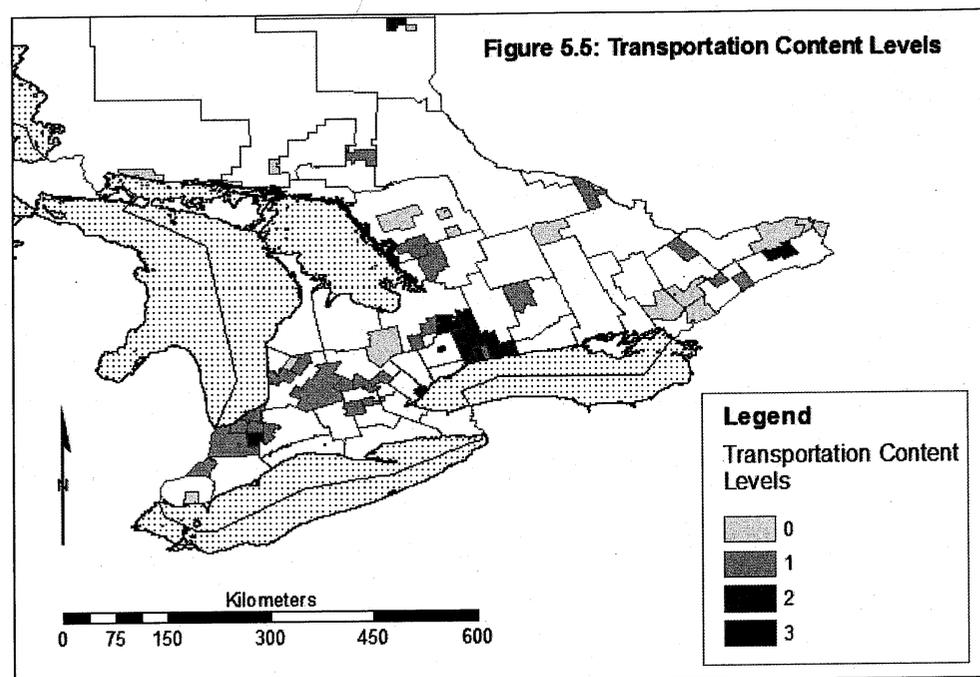
Interestingly, the trend of higher levels of policy being located in more urbanized municipalities along the 401, and possibly the 400, corridors is not limited to Environmental content only. In the Built Environment category, many of the instances of advanced policy and all but one instance of advanced policy using stringent language formed a similar pattern. Agriculture content also followed this pattern, though there were increased instances of advanced policy using stringent language in the less urbanized regions of the corridor. While this apparent spatial trend does not permit any broader, more definitive statements itself, it does suggest a pattern that leads to further questions that need answering. For example, do municipalities outside of major highway corridors

have weaker policy, and if so what are the reasons for this trend? Somewhat ironically, the spatial analysis of the Transportation category (Figure 5.5) is far less definitive in its support of this trend. This could be related to the previous discussion of how municipalities may be addressing Transportation-related environmental issues.

With regard to the other categories, few discernible trends are present. There were no notable clusters or patterns in the Waste category and no clusters in the Water category, though there was a high frequency of municipalities using advanced policy, with or without stringent language. In the Energy category there were no clusters and few instances of municipal official plans containing advanced policy with or without strong language; instead, basic policy was found uniformly throughout the Province. Finally, there was a wide range of policy levels and language strengths found in the Natural Resources category. No major clusters were found, though an unsurprising trend towards stronger language was found in municipalities outside of major urban areas.

5.2. Interpretive Summary

In concluding the analyses, a summary of the results and interpretations serves as a useful transition into the concluding chapter of this report. These interpretations are the basis from which the conclusions, recommendations and suggestions for future research are developed. Beginning with the analysis of the overall scores of official plans, it was noted that:



1. Based on correlation analysis, little evidence exists to suggest that municipal population size or in-migration levels impact the level of general environmental content found in municipalities' official plans.
2. R-scores suggest that education has a weak to moderate direct influence on general environmental content levels.
3. The distribution of employment sectors in a municipality has no meaningful association with general environmental content levels, as determined through correlation analysis.
4. Despite the lack of influence that the type of employment has, r-scores suggest that overall income levels do have a moderate direct influence on the level of general environmental content found in municipal official plans.
5. Correlation analysis reveals that the level of general environmental content is not influenced by the physical size (area) of a municipality.
6. No spatial patterns clusters or trends exist between overall official plan scores, density and the age of official plans.

Subsequently, the various analyses of the categorical analyses found that:

7. Municipalities provide more overall attention to the components of the Environment category than to those in the other categories.

8. Municipalities provide the least attention to the components of the Energy category; but when addressed, municipalities provide a similar level of attention to category specific details. In addition, even when addressed, the relevant content was limited and generally utilized weak language. These trends were supported through spatial analysis, which noted that basic policy was found uniformly throughout the Province.

9. The increased range in the Water and Natural Resource scores, in combination with their higher mean and median scores, indicate more variation in the amount of attention paid to these categories, but that a higher level of detail was included by certain municipalities. This indication is supported by the language analysis, which finds that water policy is approached from a wide variety of angles. Support is also found in the spatial analysis, which reveals a wide range of policy approaches distributed in a manner that suggested no clusters or physical trends.

10. Significant variations exist in the level and strength of language used in the environmental content of official plans, and those variations can broadly be organized according to the absence of relevant policy, basic policy, advanced policy and advanced policy utilizing stringent language.

11. While population size is not related to the attention given to overall municipal infrastructure-related environmental issues in official plans, municipal characteristics appear to have the greatest influence on transportation-related issues.

12. The spatial analysis of the Transportation category revealed only weak support for the assertion that stronger policy is potentially found in more urban municipalities located along major highway corridors.

Chapter 6: Conclusions and Recommendations

6.1. Study Review

Municipal planning is a unique environmental management tool. It is the framework through which society addresses the development associated with meeting its physical needs, and through which it strives to sustain and enhance the natural environment from which it meets its needs. With this knowledge, the study began with two key research objectives. One, to determine if a significant difference exists in the environmental content found in official plans; and if it did, to try and determine what relationship exists between the level of environmental content of Ontario municipalities' official plans and demographic or physical characteristics of their respective communities. The other objective was to determine which components of municipal governance are being given greater attention or more authority through the use of language when environmental policy is developed at the municipal level. By addressing these questions, the study provides insights that may also be useful for municipalities outside of Ontario. More importantly, it contributes to the larger discussion of the role of official plans within municipal governance, examining the current roles of official plans and how closely they match the 'ideal' role.

Having reviewed the literature, developed a research method and analyzed the results of that research, those questions have been more than answered. Indeed the information gathered and the knowledge created through this research far outstrips the initial objectives and expectations of this study. In this chapter, the

study findings are discussed in terms of their ability to address the research objectives. Following this, the research is discussed in terms of its impact on the literature gap discussed in Chapter 2, with regard to its explicit findings and its creation new questions. Finally, the chapter and study will conclude with recommendations for future research, as well as recommendations on how the environmental policy development process can be improved at the municipal level.

6.2. Addressing the Research Objectives

Several key findings are critical in determining whether a significant difference exists in the environmental content found in official plans. The range of overall official plan scores and category-based scores reveal that there is indeed a quantifiable difference in the amount of content. The quantitative data in combination with results from the language analysis illustrate that there is also a notable difference in the type of content found in various official plans, both in terms of subject matter and in terms of strength of language. With regard to attempts at determining the nature of the relationship between the level of environmental content in official plans and the demographic and/or physical characteristics of their respective communities, the results were less definitive, but still noteworthy. Most notable among these is the realization that population density is not a strong indicator of a municipalities environmental values. The results of the other correlation analysis also suggest that the demographic characteristics of a community only have a weak to moderate impact on the

inclusion of environmental content in official plans. However, the spatial analyses reveal that an, as yet, undefined spatial relationship may well exist between the strength of the environmental content and the physical location of municipalities, particularly at the categorical level.

In addressing the question of which components of environmental content received greater attention, results from the quantitative and qualitative analyses both highlight the increased attention received by the broad Environment, Water and Natural Resource categories. While the level of strength devoted to these categories often varies widely between municipalities; they are seen to receive significantly more attention. By contrast, the Waste and Energy categories received notably less attention by municipalities and are generally found to be addressed using weaker language. The weakness in these categories may reflect the relative newness in broader concern over the issues that surround waste management and energy supply and creation, though these suggestions are not directly addressed through the current research.

6.3. Developed Knowledge

In addition to addressing the research objectives, the information gathered through this research serves in the development of knowledge which is the first step in fill the literature gap noted in Chapter 2. The study has built on literature that discusses the integration of individual components of environmental content into official plans and has taken the subject a step further and revealed the

unequal nature of how these components are addressed from one municipality to the next. The research has integrated research methodology literature with urban planning and environmental concepts, creating an analysis tool which researchers can measure environmental content in official plans and compare the results categorically or holistically. In doing this, the study provides future researchers with the ability to examine the environmental content of official plans with other potential influences. Additionally, while highlighting the weak to moderate influence that these demographic characteristics have on environmental content, the research also provided other possible influences that future researchers may want to consider, such as those of government as seen in related legislation and those of consultants paid to develop official plans. In essence, the study has brought needed light to the lack of literature that aims to rigorously analyze municipal environmental policy by first providing an example of how such analysis can be done, and then by highlighting related questions which the current research does not fully answer.

6.4. Recommendations

With regard to new questions developed in the process of addressing the research objectives, there are three areas that clearly need to be addressed further. The broadest of these questions related to this study's finding that the demographic characteristics of a municipality have only a weak to moderate relationship with the level of environmental content found in official plans. This finding means that there are obviously other influences on environmental content

levels. What are these influences and how strong are they? In order to fully understand how environmental policy is developed, all of the influences need to be known, as do their relative strengths.

The next area relates to the language used in official plans. While certain passages closely reflect provincial interests and may frequently be seen in multiple official plans, what about language that is repeated in various official plans but does not reflect required legislative language or concepts? Do private consultancies impact the language used in official plans in a way that serves to make the end plans generic and less responsive to their respective communities? If so, what are the subsequent impacts of this trend? Additionally, does and should the repetition of language from one plan to the next make those plans more 'acceptable to planners and municipal leaders?

The final area for future research that emerges from this study relates to spatial trends in municipal environmental policy. Primarily, is there a relationship between a municipality's proximity to major highway corridors and the strength of the language used for the environmental policy in its official plan? Additionally, if a relationship is present, have the communities along these corridors developed a societal recognition for environmental concerns that is lacking in communities outside these corridors? However, there is a wide range of research that needs to be undertaken in the area of spatial trends in municipal policy, and this question represents only one of any number of possible foci.

In making recommendations regarding the future development of environmental policy at the municipal level it must be stated that, based on the study, municipal policymakers are well-placed and (for the most part) prepared to develop such policy. That said, any support for encouraging policy development at the municipal level is balanced with the acknowledgement that the continued oversight of the resulting policy must continue in order to ensure regional sustainability and consistency of temporal relevance. To this end, the initial recommendation is for increased guidance and training for municipal policymakers, particularly in small municipalities with a reduced ability to recruit professional policy analysts and developers.

The next recommendation is for increased funding to municipalities for policy development, implementation and review. The development of policy is of little use, if that policy can not be implemented and reviewed for success or failure.

The final recommendation is that municipalities strive to develop their own official plans, rather than rely on private consultants. Early indications from this study indicate that private consultant development of official plans may have a negative impact on the responsiveness of the policy in those plans to the environmental concerns of a municipality. Until this topic can be further studied and a determination made, municipalities are encouraged to look to neighbouring and upper-tier municipalities for assistance in developing official plans with

environmental policy that directly addresses the range of environmental concerns in the area.

Official plans are intended to address a wide variety of public needs and demands on the physical space within municipalities. The plans serve to balance these needs and demands while also respecting the inherent rights of the environment and its non-human components. To this end, the plans provide the goals and standards to which development within the municipality must adhere. Increasingly, these goals and standards need to encompass sustainable concepts throughout land-use categories from built environment to natural resources. The inclusion of sustainability in official plans must be responsive to local environmental concerns. However, those trusted with its integration must also have regard for their neighbouring municipalities and remember that the actions within on community have impacts that echo throughout a local, regional and global ecosystem.

Appendices

Appendix A: Initial Ontario Municipal Sample List

Municipality	Population	Tier Level	Region
Adelaide-Metcalfe, Township of	3117	Lower Tier	SW
Ajax, Town of	90167	Lower Tier	Central
Armstrong, Township of	1155	Single Tier	NE
Atikokan, Township of	3293	Single Tier	NW
Aurora, Town of	47629	Lower Tier	Central
Aylmer, Town of	7069	Lower Tier	SW
Blandford-Blenheim, Township of	7149	Lower Tier	SW
Brooke-Alvinston, Municipality of	2661	Lower Tier	SW
Calvin, Township of	608	Single Tier	NE
Central Elgin, Municipality of	12723	Lower Tier	SW
Central Frontenac, Township of	4665	Lower Tier	Eastern
Central Huron, Municipality of	7641	Lower Tier	SW
Central Manitoulin, Township of	1944	Single Tier	NE
Champlain, Township of	8683	Lower Tier	Eastern
Cochrane, Town of	5487	Single Tier	NE
Cockburn Island, Township of	10	Single Tier	NE
Collingwood, Town of	17290	Lower Tier	Central
Conmee, Township of	740	Single Tier	NW
Dufferin, County of	54436	Upper Tier	Central
Durham, Regional Municipality of	561258	Upper Tier	Central
Dutton/Dunwich, Municipality of	3821	Lower Tier	SW
Edwardsburgh/Cardinal, Township of	6689	Lower Tier	Eastern
Galway-Cavendish and Harvey, Township of	5284	Lower Tier	Eastern
Gauthier, Township of	133	Single Tier	NE
Georgina, Town of	42346	Lower Tier	Central
Guelph/Eramosa, Township of	12066	Lower Tier	SW
Harley, Township of	551	Single Tier	NE
Hilton, Township of	243	Single Tier	NE
Hudson, Township of	305	Single Tier	NE
Huron Shores, Municipality of	1696	Single Tier	NE
Innisfil, Town of	31175	Lower Tier	Central
Kenora, City of	15177	Single Tier	NW
Kingsville, Town of	20908	Lower Tier	SW
Kirkland Lake, Town of	8248	Single Tier	NE
Laird, Township of	1078	Single Tier	NE
Lambton Shores, Municipality of	11150	Lower Tier	SW
Lambton, County of	128204	Upper Tier	SW
Latchford, Town of	446	Single Tier	NE
Laurentian Hills, Town of	2789	Lower Tier	Eastern
Leeds and Grenville, United Counties of	99206	Upper Tier	Eastern
Leeds and the Thousand Islands, Township of	9435	Lower Tier	Eastern
Limerick, Township of	364	Lower Tier	Eastern

Appendix A: Initial Ontario Municipal Sample List (Continued)			
Municipality	Population	Tier Level	Region
Macdonald, Meredith and Aberdeen Additional, Township of	1550	Single Tier	NE
Manitouwadge, Township of	2300	Single Tier	NW
Markham, Town of	261573	Lower Tier	Central
Markstay-Warren, Municipality of	2475	Single Tier	NE
Marmora and Lake, Municipality of	3912	Lower Tier	Eastern
Meaford, Municipality of	10948	Lower Tier	SW
Merrickville-Wolford, Village of	2867	Lower Tier	Eastern
Mississippi Mills, Town of	11734	Lower Tier	NE
Morris-Turnberry, Municipality of	3403	Lower Tier	SW
Muskoka Lakes, Township of	6467	Lower Tier	Central
Nairn and Hyman, Township of	493	Single Tier	NE
New Tecumseth, Town of	27701	Lower Tier	Central
Niagara, Regional Municipality of	427421	Upper Tier	Central
Norfolk County	62563	Single Tier	SW
North Dumfries, Township of	9063	Lower Tier	SW
North Huron, Township of	5015	Lower Tier	SW
North Stormont, Township of	6769	Lower Tier	Eastern
Oakville, Town of	165613	Lower Tier	Central
Oil Springs, Village of	717	Lower Tier	SW
Oshawa, City of	141590	Lower Tier	Central
Owen Sound, City of	21753	Lower Tier	SW
Pelham, Town of	16155	Lower Tier	Central
Perry, Township of	2010	Single Tier	NE
Perth, County of	74344	Upper Tier	SW
Plympton-Wyoming, Town of	7506	Lower Tier	SW
Prescott and Russell, United Counties of	80184	Upper Tier	Eastern
Prescott, Town of	4180	Single Tier	Eastern
Rainy River, Town of	909	Single Tier	NW
Rideau Lakes, Township of	10350	Lower Tier	Eastern
Russell, Township of	13883	Lower Tier	Eastern
Seguin, Township of	4276	Single Tier	NE
Sioux Narrows-Nestor Falls, Township of	672	Single Tier	NW
South Algonquin, Township of	1253	Single Tier	NE
South Bruce, Municipality of	5939	Lower Tier	SW
South Frontenac, Township of	18227	Lower Tier	Eastern
St. Clair, Township of	14649	Lower Tier	SW
Strong, Township of	1327	Single Tier	NE
Sundridge, Village of	942	Single Tier	NE
Tarbutt and Tarbutt Additional, Township of	388	Single Tier	NE
Tay Valley, Township of	5634	Lower Tier	Eastern
The Nation, Municipality of	10643	Lower Tier	Eastern
Wellesley, Township of	9789	Lower Tier	SW
Whitby, Town of	111184	Lower Tier	Central
Whitchurch-Stouffville, Town of	24390	Lower Tier	Central
White River, Township of	841	Single Tier	NE

Appendix A: Initial Ontario Municipal Sample List (Continued)			
Municipality	Population	Tier Level	Region
Whitestone, Municipality of	1030	Single Tier	NE
Woolwich, Township of	19658	Lower Tier	SW

Appendix B: Final Sample List

Municipality	Population	Tier Level	Region
Adelaide-Metcalfe, Township of	3117	Lower Tier	SW
Ajax, Town of	90167	Lower Tier	Central
Aurora, Town of	47629	Lower Tier	Central
Aylmer, Town of	7069	Lower Tier	SW
Blandford-Blenheim, Township of	7149	Lower Tier	SW
Brooke-Alvinston, Municipality of	2661	Lower Tier	SW
Central Huron, Municipality of	7641	Lower Tier	SW
Champlain, Township of	8683	Lower Tier	Eastern
Collingwood, Town of	17290	Lower Tier	Central
Conmee, Township of	740	Single Tier	NW
Dufferin, County of	54436	Upper Tier	Central
Durham, Regional Municipality of	561258	Upper Tier	Central
Edwardsburgh/Cardinal, Township of	6689	Lower Tier	Eastern
Galway-Cavendish and Harvey, Township of	5284	Lower Tier	Eastern
Gauthier, Township of	133	Single Tier	NE
Georgina, Town of	42346	Lower Tier	Central
Guelph/Eramosa, Township of	12066	Lower Tier	SW
Huron Shores, Municipality of	1696	Single Tier	NE
Innisfil, Town of	31175	Lower Tier	Central
Kenora, City of	15177	Single Tier	NW
Kingsville, Town of	20908	Lower Tier	SW
Kirkland Lake, Town of	8248	Single Tier	NE
Lambton Shores, Municipality of	11150	Lower Tier	SW
Lambton, County of	128204	Upper Tier	SW
Laurentian Hills, Town of	2789	Lower Tier	Eastern
Leeds and the Thousand Islands, Township of	9435	Lower Tier	Eastern
Markstay-Warren, Municipality of	2475	Single Tier	NE
Meaford, Municipality of	10948	Lower Tier	SW
Merrickville-Wolford, Village of	2867	Lower Tier	Eastern
Mississippi Mills, Town of	11734	Lower Tier	NE
Morris-Turnberry, Municipality of	3403	Lower Tier	SW
Muskoka Lakes, Township of	6467	Lower Tier	Central
Nairn and Hyman, Township of	493	Single Tier	NE
New Tecumseth, Town of	27701	Lower Tier	Central
North Dumfries, Township of	9063	Lower Tier	SW
North Huron, Township of	5015	Lower Tier	SW
North Stormont, Township of	6769	Lower Tier	Eastern
Oakville, Town of	165613	Lower Tier	Central
Oil Springs, Village of	717	Lower Tier	SW
Oshawa, City of	141590	Lower Tier	Central
Owen Sound, City of	21753	Lower Tier	SW
Perry, Township of	2010	Single Tier	NE
Perth, County of	74344	Upper Tier	SW
Plympton-Wyoming, Town of	7506	Lower Tier	SW

Appendix B: Final Sample List

Municipality	Population	Tier Level	Region
Prescott and Russell, United Counties of	80184	Upper Tier	Eastern
Prescott, Town of	4180	Single Tier	Eastern
Rideau Lakes, Township of	10350	Lower Tier	Eastern
Seguin, Township of	4276	Single Tier	NE
South Algonquin, Township of	1253	Single Tier	NE
South Frontenac, Township of	18227	Lower Tier	Eastern
Strong, Township of	1327	Single Tier	NE
Tay Valley, Township of	5634	Lower Tier	Eastern
Wellesley, Township of	9789	Lower Tier	SW
Whitby, Town of	111184	Lower Tier	Central
Whitestone, Municipality of	1030	Single Tier	NE
Woolwich, Township of	19658	Lower Tier	SW

Appendix C: Indicator Table and List of Keywords

Indicator Table

Category	Indicators	Advanced Policy
	Legislative Prerequisites	
Environment	The protection of ecological systems, including natural areas, features and functions	Provides detailed conservation plans for natural areas not already protected by higher tiers of government Provides plans to encourage/maintain biodiversity
Built Environment	The appropriate location of growth and development	Encourages mixed use zoning Increases core densities Encourages brownfield redevelopment Encourages green roofs/buildings
Transportation	Promotion of development that is designed to be sustainable, to support public transit and to be oriented to pedestrians	Encourages reductions in green house gas emissions Encourages reductions in end-use energy demands
Energy	The supply, efficient use and conservation of energy	Encourages 'green' energy Encourages energy-efficient homes
Waste	The minimization of waste	Establishes recycling program Encourages composting
Water	The supply, efficient use and conservation of water	Provides specific methods for protecting groundwater Encourages water efficient buildings and businesses Establishes conservation guidelines
Natural Resources	The conservation and management of natural resources and the mineral resource base	Encourages sustainable forestry/urban forests Encourages sustainable yields of renewable resources Provides environmental guidelines for resource development
Agriculture	The protection of the agricultural resources of the Province	Encourages farmers markets Encourages local produced goods Discourages development on agricultural land

List of Keywords

Environment

Environment
Ecological
Ecosystem
Biodiversity

Waste

Waste
Recycle
Compost
Landfill
Garbage

Built Environment

Urban
Built
LEED
Mixed (use)
Sustainable
Brownfield
Intensification
Infill

Natural Resource

Natural Resource
Mineral
Forest
Tree
Nature

Energy

Energy
Insulation
Efficiency
Renewable

Water

Water
Storm
Watershed

Agriculture

Agriculture
Garden

Transportation

Transport
Transit
Traffic
Pedestrian

Appendix D: Statistics Canada Headings and Sub-headings			
Headings	Population and dwelling counts	Mobility status	Educational attainment/Major field of Study
	Lived within the same province or territory 1 year ago, but changed addresses from another census subdivision (municipality) within the same province or territory	Lived in a different province or territory 1 year ago	University certificate, diploma or degree
	Population in 2006	Lived in a different country 1 year ago	Agriculture, natural resources and conservation
	Land area (square km)	Lived within the same province or territory 5 years ago, but changed addresses from another census subdivision (municipality) within the same province or territory	Management occupations
		Lived in a different province or territory 5 years ago	Business, finance and administration occupations
		Lived in a different country 5 years ago	Natural and applied sciences and related occupations
			Agriculture and other resource-based industries
			Construction industries
			Income in 2005 all persons in private households (counts) % in low income after tax - All persons
			Labour force activity/Occupation/Industry

Appendix E: Correlation Analysis Results

	Land Area (sq km)	2006 Population	Lived outside municipality one yr ago	As % of '06 Pop	Lived outside municipality 5 yrs ago	As % of '06 Pop	University certificate, diploma or degree	As % of Pop 15+
Overall Score	-0.04	0.16	0.17	0.02	0.17	-0.18	0.22	0.32
Total Environment Score	0.00	0.33	0.33	-0.06	0.32	-0.17	0.33	0.16
Total Built Environment Score	0.02	0.29	0.30	0.09	0.31	0.13	0.30	0.25
Total Transportation Score	-0.15	0.33	0.34	0.15	0.35	0.07	0.44	0.38
Total Energy Score	0.01	-0.07	-0.07	0.03	-0.08	-0.12	-0.05	0.08
Total Waste Score	-0.10	0.02	0.02	0.09	0.02	-0.06	0.11	0.24
Total Water Score	0.01	0.24	0.25	-0.21	0.24	-0.27	0.28	0.20
Total Natural Resource Score	-0.06	0.06	0.07	0.11	0.07	-0.04	0.11	0.12
Total Agriculture Score	0.14	0.13	0.13	-0.04	0.14	-0.09	0.10	0.05

Major Field of Study	Agriculture, natural resources and conservation	As % of Pop 15+	Occupation Natural and applied science and related	As % of Total exper. Labour force 15+	Management occupations	As % of Total exper. Labour force 15+	Business, finance and administrative occupations	As % of Total exper. Labour force 15+
Overall Score	0.20	0.25	0.19	0.26	0.20	0.19	0.17	0.00
Total Environment Score	0.33	-0.05	0.32	0.06	0.33	0.01	0.33	0.01
Total Built Environment Score	0.24	-0.12	0.32	0.40	0.30	0.20	0.30	0.02
Total Transportation Score	0.24	-0.12	0.37	0.27	0.41	0.33	0.34	0.27
Total Energy Score	0.02	0.07	-0.07	0.07	-0.06	0.13	-0.07	0.02
Total Waste Score	0.03	0.15	0.05	0.27	0.07	0.15	0.02	-0.03
Total Water Score	0.23	0.20	0.26	0.25	0.27	-0.03	0.25	-0.03
Total Natural Resource Score	0.02	0.23	0.08	-0.04	0.09	0.19	0.07	-0.04
Total Agriculture Score	0.20	0.27	0.13	0.00	0.12	0.10	0.14	-0.15

Industry Agriculture and other resource based industries	As % of Total exper. Labour force 15+	Construction industries	As % of Total exper. Labour force 15+	Ratio Employed in Agri/Resource to Construction industries	Median income(\$) persons 15+	% in low income - after tax - all persons
Overall Score	0.15	0.01	0.14	-0.07	0.15	0.38
Total Environment Score	0.32	0.00	0.30	-0.28	0.10	0.36
Total Built Environment Score	0.25	-0.21	0.28	-0.17	-0.02	0.26
Total Transportation Score	0.17	-0.24	0.28	-0.15	-0.07	0.26
Total Energy Score	-0.01	-0.02	-0.08	0.06	0.04	0.03
Total Waste Score	-0.02	-0.03	-0.01	-0.15	0.06	0.16
Total Water Score	0.22	0.10	0.22	-0.08	0.19	0.32
Total Natural Resource Score	-0.01	0.04	0.04	0.14	0.19	0.12
Total Agriculture Score	0.17	0.04	0.14	0.10	0.11	0.17

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