The Many Faces of Resilience

Rural Ontario Case Studies of Response to Climate Change and Peak Oil

By

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Abstract

This research employs case study methodology to provide an in-depth look at resilience building strategies for peak oil and climate change in rural Southern Ontario. Key informant interviews with selected organizations create case studies that underscore the needs and requirements for effectively building community resilience in the rural organizational setting. Through the analysis and comparison of five case studies from across Southern Ontario, this research identifies key themes and insight on the necessary components to resilience-building activities in rural locations. Two case studies are organizations that support small scale farming ventures, two case studies are organizations that work to increase ecological diversity through tree planting, and one case study is a regional network that has formed specifically to address the challenges of climate change. Through grouping themes that emerge from each of the case studies, the research uncovers the central need for cross-sectoral education, leadership, and collaboration to address the inter-related nature of resilience building for climate change and for peak oil.

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1. Introduction

Global forces and trends of climate change and peak oil[1] are increasingly shaping all communities, including those in rural Southern Ontario. As these forces shift, so too must our communities. The dual challenges of peak oil and climate change necessitate community and municipal strategies and approaches to respond and adapt to changing circumstances. In general, response and adaptation work is seen as resilience-building, which certain organizations and municipalities are more proactively pursuing on the local level. Learning from these proactive organizations and municipalities will assist planners, municipalities, and other community organizations to increase the resilience of their communities. This study highlights five selected case studies of resilience-building within rural southern Ontario to observe their relevance to climate change and peak oil, and to draw out more general strategies and approaches that might be of most interest and concern to other rural southern Ontario communities. The observations from each case study are cross-analyzed with the other case studies to provide general themes that crosscut the resilience work being undertaken.

It is clear that innovation and experimentation in resilience is occurring in many places, across Southern Ontario, and in many other regions of the world as well. This research begins to uncover pockets of organizational and municipal resilience measures that are being experimented with throughout rural southern Ontario, where challenges are being faced as potential opportunities, and where alternatives are sought and supported. Although this is by no means a conclusive compendium of rural southern Ontario resilience strategies, it provides five selected case studies from which relevant and effective approaches can be gleaned.

Problem Statement

All communities and municipalities face the unprecedented challenges of peak oil and climate change, which underscores the need for knowledge of effective approaches to building resilience. Approaches in a rural context can be very different from approaches in an urban context and there continues to be a need for rural strategies to be documented and disseminated for use by similar communities. For the purposes of this study, the focus is on rural southern Ontario, and examples of resilience-building are highlighted through specific, thematic case studies.

[1]The term Peak Oil can be contentious. It is appropriate, however, in that it captures the fact that conventional energy supplies are limited and they are likely to get increasingly expensive as demand outstrips supply.

Research Goal, Objectives, and Significance

Focusing on community organizations and municipalities in rural southern Ontario, this research aims to provide case studies that reveal resilience-building strategies that respond to peak oil and climate change. The objectives of the research include:

- Draw attention to the realities of climate change and peak oil with a rural southern Ontario lens;
- Highlight specific approaches and strategies that enable resilience-building activities; and,
- Determine themes that may help other organizations, municipalities, or communities in resilience activities.

The choice of the case study to guide the research reflects contemporary understanding of the value of case studies as Yin (2009) articulates, "The more that your [research] questions seek to explain some present circumstance… the more that the case study method will be relevant." The current nature of the treats of climate change and peak oil make case study methodology particularly useful, as will be further described in the methodology section. Through case study methodology, this research is significant in bringing resilience-building activities to the fore, and highlighting the similar goals being achieved by differing tactics, despite divergent approaches or strategies.

The Transition Movement that continues to spread throughout the globe has been recently researched in the southern Ontario context by Émanuèle Lapierre-Fortin, in her study *Weathering the perfect storm: How Two Citizens' Groups are Building Resilience to Climate Change and Peak Oil in Ontario*(2011).So too, Lapierre-Fortin studies the Eden Mills Carbon Neutral project in depth. Due to her recent research in these regards, this current study touches on the Transition movement, but does not pursue it in depth. Rather, this research explores the strategies and themes that unite other types of organizational and municipal interventions. In light of the enormous challenges that climate change and peak oil pose, this research uncovers some of the pinpoints of hope that are forming a constellation of resilience in rural southern Ontario.

Research Design and Methodology

The methodologies used in this research are summarized in the following table, and explained more fully in this section. The methodologies chosen were relate directly to the objectives of the research as outlined in Section 1, and to the overall approach to case study preparation and analysis, as explained below.

Table 1: Methodologies Employed

Objective	Key Elements of Research	Methods
Highlight specific approaches and strategies that enable resilience-building activities	Identification of organizations specializing in resilience activities in rural southern Ontario, including organizational information and specific strategies.	*Case Studies* Phase 1: Survey, as described below to identify case studies; determine themes of agriculture, ecology, and collaboration. *Case Studies* Phase 2 and 3: Key informant interviews with organizations of interest for further case study preparation, as further described below.
Determine themes and strategies that may help other organizations, municipalities, or communities in resilience activities	Creation of Case Studies from Key Informant interviews for the purpose of exposing findings on community response.	*Case Studies* Phase 2, 3, and 4: preparing and analyzing case studies in order to draw out potential approaches and strategies to strengthen resilience activities, as further described below.

The methodologies chosen, as outlined above, are described in greater detail below.

Case Study Methodology

The decision to pursue case studies emerged from the research questions being asked, and from an apparent dearth of resilience building examples available in the literature from the rural Ontario context. In his 2009 book on case studies as a methodology, Yin elaborates on the types of research benefit the most from the use of case studies. Yin suggests that "case studies are the preferred method when (a)

'how' or 'why' questions are being posed, (b) the investigator has little control over events, and (c) the focus is on a contemporary phenomenon within a real-life context" (Yin, 2009: 2). In the context of this research, the question that case study analysis is invoked to answer deals specifically with "how" rural communities might respond to climate change and peak oil and build local resilience; thus, condition (a) is met. Similarly, the investigator, in the cases being examined, has no control over events but is rather looking to describe reactions and plans of others to deal with events, which meets condition (b). Finally, in regards to (c), the focus of this research is about a contemporary issue that is set in a real life context. As such, the aims and the qualities of this research position it to gain much value from the use of case studies. Throughout this work, the aim has been to determine lessons and themes that will inform the strategies and best practices of organizations and other groups working on community resilience. This aim is fully consistent with Yin's assessment of case studies, and their usefulness.

In terms of structuring the research, the diversity of resilience approaches and communities was determined as an essential component that could only be captured with the use of more than one case study. This type of methodology is common and provides a distinct and helpful ability to compare and draw out themes: "Case studies can cover multiple cases and then draw a single set of 'cross-case' conclusions" (Yin, 2009: 20). The result of this decision was flexibility to identify and group cases, and to focus more deeply on some than on others. As a result, there are five case studies, grouped into three areas of interest, including agriculture, ecology, and collaboration.

Phase 1: Survey

In order to find the most appropriate organizational examples to profile, the research used a nested approach, as described in Yin (2009, 63). This approach started wide, with a cross-Ontario survey, and narrowed in to identify organizations of interest. In the spring of 2011, a group of graduate students under the direction of Dr. Wayne Caldwell surveyed municipalities province-wide to determine the level of knowledge, understanding, and ability to act on climate change and peak oil.[2] From this survey specific areas of intervention and interest were identified, as well as potential organizations and municipalities of note.

Phase 2: Farm-Based Organization and Farm Ecological Restoration Case Studies

[2]Survey results will be available at www.waynecaldwell.ca

The following chart is replicated at the beginning of relevant sections and is intended to provide guidance as to which case studies are being discussed. The light shading indicates the areas under discussion:

CASE STUDY ORGANIZATION				
Agriculture Farm Based Organizations		**Ecology** Farm Ecological Restoration		**Collaboration** Regional Network
Everdale	*FarmStart*	*Green Legacy*	*Trees for Mapleton*	*Niagara Climate Change Network (NCCN)*

The Agriculture and Ecology case studies are each composed of two smaller cases, from which cross cutting themes on agricultural resilience and ecological resilience emerge. This amalgamation is consistent with Yin's suggestion that cases must be chosen that illuminate the research questions, and that also have enough potential data to make observations (Yin, 2009, 26). In order to adequately represent the diversity of work within the agricultural and ecological fields, these cases were analyzed in tandem to build on the larger themes of agriculture and ecology. These four cases underwent the same process:

- An internet scan of southern Ontario-based small farm proponents was conducted, identifying two themes of farmer support and farm ecology.
- Two small farm support organizations were chosen based on the relevance of their programming.
- Two farm ecological restoration programs were chosen based on the number of recommendations to them from the survey.
- Website and literature reviews on these organizations were conducted.
- History of the programs, specific resilience-building activities, and the program's relationship to climate change and peak oil were chosen as necessary components for other groups or municipalities to learn from.
- An interview guide was designed and refined (Appendix A).
- Key Informant interviews with the Executive Directors of each organization (waiver appears as Appendix D), and review of documents that Executive Directors referred to.

Within each smaller case, themes were drawn, which were then compared with the other complementary case for specific learning in both the agriculture and ecology realm.

Phase 3: Regional Network Case Study

CASE STUDY ORGANIZATION				
Agriculture Farm Based Organizations		**Ecology** Farm Ecological Restoration		**Collaboration** Regional Network
Everdale	*FarmStart*	*Green Legacy*	*Trees for Mapleton*	*Niagara Climate Change Network (NCCN)*

The methodology for the Collaboration theme and the NCCN case study differs from the other case studies, and is longer and larger in scope. From the 2011 Caldwell Research Team municipal survey, twelve potential case studies were chosen based on municipality's responses. The chosen potential municipalities that reported innovation or substantial community engagement were short-listed.

In the early fall of 2011, a representative from each of the short-listed municipalities was interviewed (guiding questions for the initial interview appear as Appendix B). From these interviews, the Niagara Region was chosen for more in depth study on the formation of the Niagara Climate Change Network (NCCN), an independent collaborative resilience-building network composed of leaders from a variety of sectors. To understand the NCCN's community engagement process, including group formation, relationships, and strategies, the following methods were pursued:

- Background web and literature research on the NCCN and Niagara Region;
- Two interviews with Curt Benson, Niagara Region planner identified in the original survey;
- Five key informant interviews, based on Benson's suggestions, using a variety of questions identified in Appendix C (interview waiver appears as Appendix D). Interviewees, in alphabetic order, include executive directors of local organizations, regional planners, and university researchers.

Interviewees provided relevant documents, presentations, and literature that was incorporated into the research and findings (included in the reference list). The results of the interviews and background research were compiled into a case study on collaboration, and themes have been identified to compare with the other case studies being examined.

For ease of comprehension, and to identify case similarities, the following table outlines the attributes of the cases being discussed with particular attention to the themes of this work.

Table 2: Case Study Attributes

Cases		Attributes						
		Peak Oil Relevance	Climate Change Relevance	Education as Key Component	Leadership in the Sector	Leadership in the Community	Rural Focus	Builds Resilience
Farm Based Organizations	Everdale	High	Medium	High	High	High	High	High
	FarmStart	High	Medium	Medium	High	Medium	Medium	High
Farm Ecological Restoration Organizations	Green Legacy	Medium	High	High	High	High	Medium	High
	Trees for Mapleton	Medium	High	High	High	High	High	High
Regional Network Formation	Niagara Climate Change Network	High	High	Medium	High	Medium	Medium	High

Phase 4 Analysis and Conclusions:

The use of a number of cases for synthesis and understanding is a method that allows for similarities to be drawn between cases that are also quite different. The technique described by Yin for this type of analysis is cross-case synthesis, which treats each case as a separate study, and then aggregates finding across them (Yin, 2009, 156). With five case studies, as described in the chart above, there is a great degree of difference in terms of organizational history, programs, and relevance to climate change and peak oil. In order to find common themes with broader applicability, the final stage of this research required multifaceted analysis that included the following steps:

- Consolidation of data;
- Drawing of observations from each case study;
- Comparison between observations between Small Farm Support Organizations;
- Comparison between observations of Farm Ecological Restoration Organizations;
- Finalization of themes relating to Small Farm Support, Farm Ecological Restoration, and Regional Network Building.

The conglomeration of themes and observations from the diverse case studies was used to identify overarching themes and suggestions that appear in the conclusion section. The overarching themes led to conclusions, and recommendations based on conclusions.

2. Case Studies

Farm-Based Organization Case Studies

CASE STUDY ORGANIZATION				
Agriculture Farm Based Organizations		**Ecology** Farm Ecological Restoration		**Collaboration** Regional Network
Everdale	*FarmStart*	*Green Legacy*	*Trees for Mapleton*	*Niagara Climate Change Network (NCCN)*

Case Studies of the farm based organizations of Everdale and FarmStart provide insight into local organizational approaches to farm and food resilience. Observations from these two cases are summarized in a table at the end of this section.

The effects of peak oil and climate change on our food system have the potential to be devastating. The need to increase the resilience of the food system that most rely on for basic sustenance is central to increasing community resilience. From the vibrant "Eat Local" campaigns, including farmers markets, community supported agriculture, and hundred mile markets, to increasing students' understanding of food issues, there are a number of entry points into resilience planning through a food system lens. Community organizations exploring farming issues and food production are a key component of resilience planning. These two case studies explore community responses to peak oil and climate change as they relate to small farms and training for resilience. The executive directors of both organizations were interviewed in the summer of 2011, and provided candid information on their organizations, and how they see their work in relation to peak oil and climate change, as well as the strengths and challenges they see emerging on the ground.

Case Study #1: Everdale

In Erin Township, just south of Hillsburgh is a fifty acre farm known as Everdale Environmental Learning Centre. In a bucolic setting of rolling hills nestles a charitable centre dedicated to sustainable farming and education. Everdale's Executive Director, Brendan Johnson describes Everdale as a farm learning centre that trains the next generation of farmers, and educates youth to be stewards of the land – environmentally aware local food champions, consumers and future farmers, conscious of the world we live in.

History

Since 1998, Everdale has been providing hands-on, practical learning experiences in order to move towards environmentally-focused agricultural practices. It evolved over the years as it saw the needs and wants of its constituency and found gaps in educational opportunities both for new farmers, but also for children to have experiential farm opportunities. The organization of Everdale was created around those needs. Currently, Everdale predominantly serves the local constituency of the Wellington County area, with approximately 70 – 75% of visitors from the local area. The remainder are people from the Greater Toronto Area, with approximately five percent provincial or national visitors. Everdale, as a place and an organization, is specifically designed to provide educational experiences for people to learn about farm issues, and food issues: Everdale is committed to connecting consumers and farmers.

The successful Community Shared Agriculture (CSA) program began in 1998 with 13 members: it currently has over 300 members. CSAs offer individuals the opportunity to purchase a "share" of the vegetable harvest, which they receive every week. With incorporation as a not-for-profit in 2000, Everdale began to offer farm internships, which were closely followed by farm programs for children and youth. Everdale was a founding partner of the Collaborative Regional Alliance for Farmer Training (CRAFT) in 2003, and received charitable status in 2004.

As an educational facility, Everdale has a number of projects including 12 acres of organic vegetable production, laying hens, sheep, donkeys, draft horses, composts, solar showers, greenhouses, an earthen oven, wind turbine, and solar dehydrators. There are four strawbale buildings, a learning space called "the Hub," "Home Alive" – a demonstration naturally built home, and two staff residences.

Everdale Programs

Internships and Farmers Growing Farmers (FGF)

Everdale runs a successful internship program that teaches organic farming methods in the most practical setting – on the farm. After running the internship program for some time, and seeing many aspiring farmers start their own farms only to find themselves without the business plan that they needed for success, Everdale started the Farmers Growing Farmers (FGF) program. FGF works with new farmers who are pursuing farm enterprises. FGF helps with planning, mentorship, start-up and establishment of ecologically based farms interested in direct marketing. Eventually, Everdale aspires to get formal recognition for new farmers and the training they achieve through Everdale, as well as access to land, grants, and loans. At this point, for many new farmers, farming is cost prohibitive.

Brendan Johnson, Everdale's Executive Director, views Everdale's encouragement of small farmers as very significant. He sees Everdale's promotion of new farmers, and success of new farmers in their communities as showcasing ecological farming as a real way to grow food and feed communities. Everdale show how it is both successful and realistic to farm without the inputs of conventional farming.

School Programs and Summer Camp

Through workshops that are hands on and linked to the public school curriculum, Everdale works to develop environmental stewardship. Everdale both teaches schoolchildren on site, and visits schools to provide interactive environmental programming. Beginning in late fall, and running until early spring, Everdale runs the "Farmers in the Schools" programs. Everdale educators (and sometimes an Everdale chicken) will bring farm learning into the classroom with curriculum-linked programs. During the summer, Everdale offers a farm camp that has been very successful.

Workshops

A number of skill building workshops are offered throughout the season. These include a series of programs on backyard chickens, beekeeping, food preservation, growing sprouts, introduction to permaculture, invasive species, garden maintenance, bread baking, mushroom cultivation, soap making, onion braiding, season extension, seed saving, and others.

Everdale's dedication to environmental sustainability, community development, and resilience building has positioned them to be recognized for the work they do. In 2011 alone, they were awarded the Sustainable Farm Award from the National Farmers Union, and the Education Award from the Organic Council of Ontario. In that same year, the chair of their board was short-listed in the Local Food Category in the Green Toronto Awards.

Key observations from the Everdale case study are presented with FarmStart's observations in Table 5, following Case Study #2: FarmStart.

Case Study #2: FarmStart

FarmStart is on a mission: to support a new generation of farmers "to develop locally based, ecologically sound and economically viable agricultural enterprises" (www.farmstart.ca). FarmStart actively searches

out opportunities and solutions to encourage local food supply through addressing the need for agricultural entrepreneurship and new farm enterprises. They provide training to promote sustainable business models that allow new farmers to have sustainable livelihoods. Their website is very clear – that food security is dependent on recruiting and training new farmers to farm successfully as a career:

> The loss of farmers and the lack of young people taking their place will soon become a very real problem for the Canadian domestic food supply. With an average age of farm operators at 52, and some 80% of current farmers looking to sell or transfer their farms in the next ten years, agriculture faces difficult succession / intergeneration transfer issues. The difficulties, risks and disincentives facing those who wish to start a farm enterprise are often overwhelming and discouraging. (www.farmstart.ca)

There are four groups that FarmStart works with: young people with farm backgrounds, young people new to farming, second career farmers, and new Canadian farmers. The types of farm enterprises that are supported vary from urban to rural, as well as cooperative farms, intensive agriculture, no-till organic agriculture, and those that explore new market opportunities or value added products. Most of the people FarmStart supports are young people from non-farm backgrounds, but for anyone interested in farming, the door is open.

Executive Director Christie Young describes the huge transition that is occurring in agriculture, with 75% of farmers retiring in the next 10 years, 60% of whom do not have successors. There is a generational impasse, that Young sees as dovetailing with a transition in the approach to farming, which is linked to fossil fuels, health, quality of food, and equity. The new generation of farmers are practicing a new kind of farming that binds the entrepreneurial to the ecological. Young finds the nexus of world issues in food, as she says: “if we can’t figure out how to feed ourselves, to grow food and treat the people who grow food properly, and treat the land properly, we won’t be able to figure out all the other issues.” Young sees food and agriculture as central, and FarmStart as taking on a piece of the puzzle, a part of a web of things that are happening to increase community resilience in food. FarmStart sees its role as preparing for the challenges that are coming by investing in new farmers.

FarmStart promotes ecological agriculture and sees the role of the farmers it supports as stewards of the environment. This encompasses all aspects of the farm enterprise, and sits in contrast with conventional agriculture: “In a time of rising oil costs and decreasing fossil fuel supplies industrial farming is becoming less environmentally and economically sustainable” (www.farmstart.ca). In general, the farming style promoted by FarmStart hinges on diversity, and management that builds the soil through the use of cover crops, green manure, compost, mulch, crop rotation, and no till methods.

FarmStart advocates for organic methods, and supports certified organic agriculture, yet does not exclude other approaches.

History

FarmStart began in 2005 at the Ignatious Jesuit Centre just North of Guelph Ontario, which owns hundreds of acres and was looking to do something different. Young, founder of FarmStart and current Executive Director, had visited Intervale (www.intervale.org) in Burlington, Vermont. Intervale was one of the first incubator farms that Young saw in action (Intervale has since evolved into a community farm). What Young saw was a physical facility that supported farmers, with a community and intention that was impressive: it was working to help new farmers learn and establish themselves. When Young returned, many of her friends were starting farms, and she witnessed little support for them in their transition. There were internship programs, and the local food movement was thriving, but in terms of support to make a farm business a reality – support for new farmers with a new business model– there was nothing.

Ignatious Jesuit centre was the site of the first FarmStart incubator, and FarmStart offices are still located there. Very quickly, FarmStart realized that a farm incubator was not enough. People came to the incubator without business skills required for a farm enterprise. Thus, FarmStart developed programs in response to the needs of the new farmers to help them develop businesses that were sustainable economically, as well as ecologically, and that were modeled for increasing resilience in terms of inputs or fossil fuels.

FarmStart Programs

FarmStart provides training and resources, as well as more tangible farm start-up resources, including access to land, farm infrastructure, and a small grants program. With the grants comes business plan development and review. One of the strengths of FarmStart's work is the mentorship program, where new farmers are connected to established farmers to learn, ask questions, and start to build a farmer network. This mentorship connection is described by Young as another form of capital – social and human capital that enables new farmers to increase their confidence, and to build a community of support for their work. FarmStart works with OMAFRA to fill in the gaps where OMAFRA does not provide services.

FarmStart also works at farm linking to increase the access to land and addressing some of the succession issues facing farming communities in Ontario. This is one of the most challenging aspects of FarmStart's work – how to transfer from a farming community that uses traditional, fossil fuel based

methods, to a farm community that is quite different. FarmStart views its role as a bridge builder – not to take on the succession issue entirely, but to create a different way of looking at the transition, to provide tools, resources, and encouragement, and to help form relationships of trust. The area of farm linking is key, from working with farmers who believe that something different is possible, assisting with a relationship between farmers that have land and new farmers, all the way to transferring land. There are many challenges to farm linking, not least of which is large farm assets (equipment, machinery) that may not be relevant to the next generation of farmers working in a post peak oil scenario.

The new farmers engaging with FarmStart feed into the increasing relevance and popularity of local food, combined with concerns about animal welfare, ecological sustainability, climate change, and peak oil. Provincially, all of these factors have resulted in a remarkable increase in the number of farmer's markets, and in the number of farmers offering Community Supported Agriculture (CSA) as an option for fresh produce purchases. The potential markets in the Greater Toronto Area, including ethno-culturally specific foods, have led to the success of the McVean Incubator Farm. The McVean Incubator Farm is located in Brampton on conservation land, and was formed through an agreement between FarmStart and the Toronto and Region Conservation Authority. At McVean, people interested in pursuing a career in agriculture have access to test plots, and are connected to business training and agricultural support. Many new Canadians, with farm experience from their country of origin, have used McVean to explore their possible participation in agriculture in Ontario.

FarmStart does its best to take the rose tinted glasses off farming. Young acknowledges that the greatest challenge to their work is public understanding: that farming is really hard work, and that in general, "the general population is used to cheap food that fossil fuels and off-shore labour have allowed." It is evident to FarmStart that no matter how passionate and dedicated a new farmer may be, it is hard to figure out how to make a farming business work in this context. The issue of land ownership also weighs heavily – land values are almost always outside the reach of new farmers. Young sees a number of deep societal issues that impact the viability of the farmers that FarmStart works with. Even though FarmStart works to change these however they can, the advocacy work has not yet made it easier for the farmers trying to find a piece of land. Until the price of food reflects the true cost of producing it – a cost that will inevitably increase as reliance on fossil fuels is increasingly replaced by human or animal labour – farmers are stuck growing for a clientele used to paying low prices.

Farm Support Organization Observations

The general observations gained from both Everdale and FarmStart are represented in the table below as they stem from the evidence from each individual case study. The general observations gleaned here are summarized and added to Table 8, that draws conclusions and insight from observations in all the case studies herein.

Table 3: Observations and Evidence from Farm Support Organizations

General Observations	Everdale Case Study Evidence	FarmStart Case Study Evidence
Recognition of Climate Change and Peak Oil as driving forces for small farm support	Climate change and peak oil are deeply interwoven into the approach to programs at Everdale. They specifically provide programming to increase people's ability to grow food to have healthier communities and healthy people. A driving force behind their work is the understanding that the current farm methods are not tenable in the future – that a different way is needed.	FarmStart's work hinges on acknowledging that the current system of agriculture is deeply embedded in fossil fuel reliance, and methods that are not ecologically sound. FarmStart believes that the consolidation of food business has worked against a resilient food system, putting farmers at risk as they rely on fewer types of crops, putting ecosystems at risk through monocultures, and putting food safety at risk through consolidation of production lines.
Recognition for small farmer support work is growing, even though financial support	A major challenge for Everdale, as a charitable non-profit organization, is funding. They have many people contacting them to learn alternative farming methods, as well as other communities from around the world.	FarmStart has put in place necessary partnerships such as working with Toronto and Region Conservation Authority to have access to land for a small farm start-up plot, and has recently (2011)

continues to be an issue.	Finding the resources to continue their educational programs in the non-profit environment is extremely challenging.	achieved charitable status. The support for FarmStart's work is continuing to grow; however, the focus on partnership and funding is a continual requirement.
A localizing approach to farmer education and local food networking is expanding, based to some degree on knowledge of peak oil/climate change	With a long-term lens, Everdale is looking outward to influence other organizations both provincially and nationally; it is their vision to assist in training other organizations to successfully provide farmer training and youth programming in order to create their own food hubs and networks. Everdale has a vision of a network of local food farm communities spreading across the country and across the world. In a very long term vision, Johnson sees Canada having self sustaining communities based on local ecological farming.	Currently, the agricultural system as a whole is extremely reliant on cheap energy as the amount of energy put into food production greatly outweighs the amount of energy in the food. FarmStart recognizes that farmers feel the effects of fuel costs rising more than most, because their businesses are so reliant on energy. The resilience and sustainability of farms increases as they are less reliant on fossil fuels. FarmStart is very clear that they do not tell people how to farm; however, they do provide alternative ways of growing that are less dependent on fossil fuels.
Local businesses and local jobs come from supporting small farm development, which relies on a number of	Everdale views its work as intrinsically related to building community resilience in relation to peak oil and climate change. Everdale sees their work supporting more local, sustainable ecological farms as directly related to creating more local businesses and local jobs, as well as building	As FarmStart aims to diversify food production, they are training people in a new approach to growing, one that is increasingly diverse: a type of farming that promotes ecological resilience as well as economically resilient business models. FarmStart envisions a

different approaches.	community. As Johnson elaborates: "The act of growing our own food to feed our own people leads directly to healthier communities as people gather to grow food, and to support local farm businesses. This in turn increases communication, and people get to know each other outside the direct link to food."	farming industry that has many people growing food, with many options in how it is grown and processed. The links between food, public health, ecological health and agriculture shape the work at FarmStart.
Ecological, small scale farming is a necessary transition in the face of peak oil and climate change	The type of farming that Everdale teaches and advocates is also directly linked to the challenge that peak oil poses to conventional farming methods. Locally produced food – food grown within a community for a community – lessens the dependence on foods that needs to be shipped from other countries.	In terms of climate change, Young views FarmStart's role as helping farmers to establish more resilient growing systems. She believes that farmers will feel the effects of climate change most directly, as weather patterns influence farming more than other careers. Young suggests looking at business models that change the predominant type of farming – models that increase the resilience of the ecological systems, and that cut yields in the short term but are more sustainable in the long term. In addition, FarmStart highlights the capacity of agriculture to help moderate climate change by creating carbon sinks.
Farming techniques are directly related to peak oil preparedness, and low impact agriculture	Farming techniques promoted and taught by Everdale also decrease the reliance on fossil-fuel based inputs – the type of farming used, both ecological and organic – aims to look after the soil without the use of chemical	FarmStart is working in a transition time, between high input agriculture, and low input agriculture; between artificially low food prices, and the real costs of growing food. As they mediate this bumpy terrain,

is a growing field	fertilizers that are derived from fossil fuels. In addition to annual crop production, Everdale is also beginning a new project with four acres of a permaculture forest garden. This method of farming is very low impact as the resources to farm, grow, and harvest food are substantially lower. The permaculature forest model of food production is a model they would like to see expanded throughout the province.	they are guided by the belief that sustainable farming is possible and is necessary for our shared future, and that sustainable farming incorporates the realities of both peak oil and climate change as vital planning components.

Farm Ecological Restoration Organizations

CASE STUDY ORGANIZATION				
Agriculture Farm Based Organizations		**Ecology** Farm Ecological Restoration		**Collaboration** Regional Network
Everdale	*FarmStart*	*Green Legacy*	*Trees for Mapleton*	*Niagara Climate Change Network (NCCN)*

Within this section, the farm based organizations of the Green Legacy and Trees for Mapleton are explored, and observations are distilled in Table 6, at the end of this section.

Peak oil and climate change have the potential to greatly influence the ecological systems of Ontario in general, but also in terms of on-farm ecology. The need for fossil fuels in farming is currently very high; thus increased fuel prices could greatly inhibit their future use. The resulting changes in the farm landscape could be substantial, and could support more ecologically diverse systems. Simultaneously, distinct challenges to farm ecology are the possible effects of climate change, which are multitudinous. In order to explore this, and the role the humans can play in re-establishing ecosystems, two organizations were chosen for case studies. Within this section, the Green Legacy and Trees for Mapleton display two proactive, tree and education based approaches to offsetting the potentially damaging effects of climate change and peak oil.

Case Study #3: Green Legacy

Wellington County's green vision for the future is emerging from the Wellington County Green Legacy, a unique program designed to enable active community response. At first glance, the Green Legacy seems to be simply a municipal tree nursery and tree planting program; however, the intent behind it, and its outcomes, have deep implications for the resilience of the communities involved.

Wellington County, through the Green Legacy, has planted more trees than any other jurisdiction in North America . It has an average tree cover of 17%; however, Environment Canada recommends a minimum tree cover of 30%, which would require approximately 50 million trees to be planted within Wellington County. The Green Legacy's Tree Nursery manager Rob Johnson estimates that to plant the needed trees at the current rate would require 500 years; thus, Johnson is driven by the knowledge that

it “needs to happen faster,” and the Green Legacy continues to expand its numbers and its involvement of the County’s children and residents in a unique program that has been recognized globally.

History

The County of Wellington was celebrating its 150th anniversary in 2004. Within County Council there was discussion of a legacy project as part of the celebrations. The idea of planting 150 trees was brought up, and was expanded to 150,000 trees. Thus, the County of Wellington’s Green Legacy program had its humble beginnings as a Municipal project to truly have a Green Legacy of tree planting. Wellington County Stewardship Council assisted in sponsoring the Green Legacy, and continues to be involved.

Early on, the Green Legacy hired Johnson, who has been praised for his dedication, excitement, and ability to work with politicians to expand knowledge and support for the important work of tree planting. Through on-going County support, the Green Legacy is able to maintain and expand its programs and has engaged many community members, including thousands of students, in an extremely successful tree nursery and tree planting program. In the first year of operation, the Green Legacy started with 150,000 trees. Every year since then, they have added an extra 1,000 trees. Well over a million trees have been planted to date.

As a Wellington County program, the Green Legacy is almost entirely funded by the County, with some extra funding from granting agencies. The vision remains simple: to grow and plant more trees throughout Wellington County. With a small staff, and with many dedicated volunteers giving thousands of hours each year, the Green Legacy is greening the County at a pace that is unique to Ontario, and North America. Through a municipally funded tree nursery and planting project, Wellington County is planting trees at a very rapid rate, and increasing the ability of Wellington County to adapt to climate change through protecting and improving farm yields. The foresight of the original council is paying off – the Green Legacy is having a lasting impact in its community and is receiving attention from every level of government, as well as from the United Nations international billion tree campaign that recognized the Green Legacy’s contribution to the environment.

Green Legacy Programs

The Green Legacy provides trees to residents of Wellington County for planting within County borders. It also provides tree planting, with the assistance of students from throughout the County and from Guelph. Students from Kindergarten to Grade 3 are involved in planting tree seeds and tending to new

trees as they grow in their classrooms. Grades 4 to 6 help out in the greenhouses by transplanting seedlings, and participate in an interpretive nature hike during a field trip to the Green Legacy. Grades 7 and 8 plant trees for private land owners, farmers, and on public property. High school students are also incorporated through the Community Environmental Leadership Program, and through Outdoor Education. Through all these programs, two purposes are served – the trees are grown and planted, and the children learn about trees and environmental stewardship. Approximately 6,000 students are involved each year.

The Green Legacy has forged working relationships with over 30 groups, including the Ministry of Natural Resources, the local stewardship councils, Conservation Authorities, and the University of Guelph, as well as local groups effecting environmental change within Wellington. To assist with its nursery and programming, the Green Legacy annually accepts thousands of volunteers, who learn, teach, help grow the trees, and work with the school groups that come through.

All of this effort has paid off. Johnson asserts that in Southwestern Ontario, Wellington County tied with Haliburton for the greatest number of trees planted, and Haliburton does re-foresting after logging. Within the Grand River Conservation Authority area (of which Wellington is a part), 85% of trees planted are planted within the County of Wellington where a culture of tree planting has been initiated and maintained since the Green Legacy's inception. Due to its success, the Green Legacy is now in the process of expanding – there is a new nursery being built at Luther Marsh in the North end of the County where Johnson is developing programs to have kids teach other kids, and where the impact of the Green Legacy can be expanded.

Key observations from the Green Legacy case study are presented with Trees for Mapleton's observations in Table 6, following Case Study #4: Trees for Mapleton.

Case Study #4: Trees for Mapleton

Mapleton Township, within Wellington County, has an extremely active group called Trees for Mapleton who are dedicated to a vision of 20 – 25% tree cover. In the vision, as articulated by Paul Day, a spokesperson for the group, every farm field would be wrapped with a windbreak, living snow fences would protect all the roads, every stream would be buffered by trees, and all the hardwood fragments

would be linked up and wrapped with spruce windbreaks. Trees for Mapleton pursues this vision through increasing the awareness of the economic value of trees to farm income, through specific farmer education, and through tree planting programs.

History

Day, an active member of Trees for Mapleton, member of the Stewardship Council, and supporter of the Green Legacy, has done his research. He knows of an 1884 provincial statute that says the government will pay a farmer 25 cents to move a tree from the bush to the roadside or around the farm. At that time, with the incentive of the subsidy, tree planting on farms happened across the province. Day wants to see the same emphasis on tree planting again. Thus Day worked to start Trees for Mapleton with the objective of building a resilient countryside in Mapleton, a township with the gift of prime agricultural land. In 1997 a group of masters students completed an evaluation of Wellington County's natural resources to establish a baseline. It was from this study that areas were red flagged in terms of tree cover, intensity of agriculture, and agricultural practices. In Mapleton there was less than 10% tree cover (Environment Canada suggests 30% is the minimum that there should be). Trees for Mapleton aims to change that.

Trees for Mapleton Programs

Tree planting on agricultural land in Mapleton is the centre of Trees for Mapleton's work. Paul Day has researched and drawn conclusions about the economic benefits of integrating trees into the farm landscape. As an example, he explains that in 2011, beans sold for $13/bushel. The average yield in Mapleton is 40 bushels/acre. Day's research shows that a good windbreak protecting a field can increase yield by 20%. This would mean 8 extra bushels/acre or approximately $100/acre advantage from that windbreak.

As another tool to convince people of the economic benefits of tree planting, Day elaborates on the increased efficiencies that trees provide when planted around homes or barns – that windbreaks can increase efficiency by up to 25%. This could mean substantial savings or added profit, for no expense given that the programs to support tree planting are offered for free.

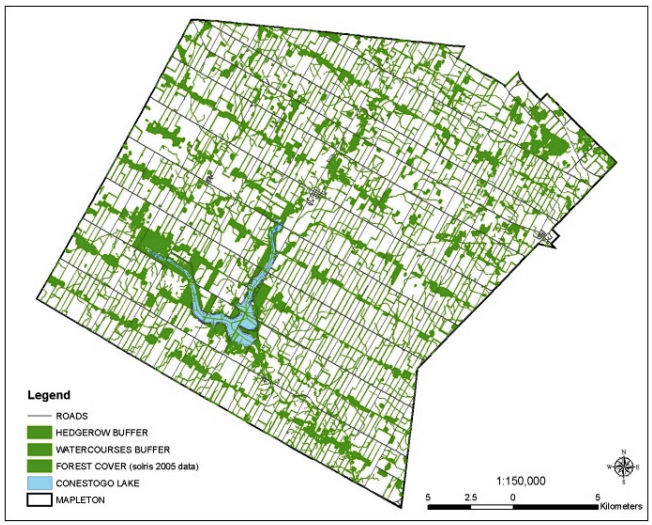
Within the models that Day has created, he shows that the average farm can increase income by $25 – 30,000 annually. It is these statistics that emphasize the importance of tree planting to farmers and

landowners – as Day says "The key change agent is the economics. Some farmers feel altruistic about the beauty of trees, but to really change people, put money on the table." Trees for Mapleton makes this kind of improvement possible, with no cost to the farmer, by providing free trees and free planting within Mapleton.

In Mapleton, the majority of trees are machine planted or hand planted by professionals – funding for which usually comes through Environmental Farm Plans. Every year there is an increase in the number of farms participating, and new farmers continue to get involved: in 2010, 75% of farmers that used the program were new to it. Understandably, this model and the support that Trees for Mapleton is achieving is gaining the attention of other groups; Trees for Mapleton has met with and provided tours and demonstrations to interested parties from both Huron County and North Perth. It is not a model that Trees for Mapleton wants to keep for themselves – Day sees the potential benefit as relevant throughout the province; however, he does believe that it should stay local, and be managed on a volunteer basis – he fears that if it were taken up by the provincial government and spread from the top down, that the buy-in from farmers would diminish substantially.

The ties with the Green Legacy are notable. A full 40% of the trees being planted through the Green Legacy go to Mapleton Township, which has planted close to 400,000 trees in the past 10 years, including 300 km of windbreaks. Trees for Mapleton is volunteer driven, with many partners including two conservation authorities, the municipality and the county. However, for the past three years, Trees for Mapleton has had funding through the Ontario Trillium Foundation that has supported a farm forester to be available to the farming community. Through this support, Trees for Mapleton also delivers farmer education, running workshops, bus tours, and bringing speakers to Mapleton Township to increase the local knowledge and build support for tree planting. In turn, the vision is to move from 10% to 20% tree cover, as depicted below:

10% tree cover



20% tree cover

Figure 1: Trees for Mapleton Vision

Source: Day, Trees for Mapleton Powerpoint

Farm Ecological Restoration Organization Observations

The table below gathers the evidence from both the Green Legacy and Trees for Mapleton that supports more general observations about Farm Ecological Restoration Organizations role in community resilience. The observations identified in the table below are represented in the Table 8, that provides insight from all the cases under study.

Table 4: Observations and Evidence from Farm Ecological Restoration Organizations

General Observations	Green Legacy Case Study Evidence	Trees for Mapleton Case Study Evidence
Trees and tree planting are an essential to adapting to climate change and peak oil on farms. The benefits of restoring tree cover are multitudinous and include direct economic benefits to landowners.	The role of trees and tree planting in protecting agriculture and the food system is critical. Beyond the beneficial carbon sequestering that trees provide, trees help to moderate climate in changing weather patterns: Johnson ascertains that trees are the most effective way to moderate climate on the local level. This makes trees central to climate moderation in the farm landscape, as well as necessary as windbreaks for sustaining crop production during unpredictable weather and violent storms. As Johnson says, "research around the world shows using trees as windbreaks has an extremely positive impact on agriculture." For agriculture, there is a yield increase and thereby an	Day's research shows that Mapleton's lack of tree cover results in losses of 3 – 4 million dollars per year due to lower yields. When extrapolated across Southwestern Ontario, the resulting figure of lost revenues is 200 million dollars. The economic statement that Day emphasizes is central to encouraging farmers and landholders to increase their tree planting efforts. The benefits of Trees for Mapleton's work are economic, and they are also practical community resilience measures as the protection of farmland and soil is central to food production and thus central to the survival of Southwestern Ontario communities. Day notes that in Ontario, a million acres in the last 10 years have been lost to urban sprawl, and he wonders where our food will come from. He, amongst many others, is

	economic value directly related to trees planted in the right place to protect farm crop yields (see more in the Trees for Mapleton case study).	concerned that in our current generations we are "borrowing from future generations to pay our grocery bill, and taking away the resource that they could use to pay our debts back."
Maintaining soil health decreases reliance on petroleum-based fertilizers, and is related to ecological integrity of a farm.	The potential benefits of tree planting have some influence in scenarios of restricted access to energy, in terms of reducing the reliance on petrochemicals for fertilization and crop protection. Trees accomplish this through reducing erosion that in turn results in maintaining soil nutrients and diminishing the need for more chemical fertilizers. Further, trees as a hedgerow or wind break also provide useful habitat for predatory insects and birds to assist in pest control. Tree breaks and hedgerows play a major role in breaking up monocultures and adding diversity that may lead to increased resilience of the crop system. Finally, Johnson mentions the possibilities of using trees as fuel – if it can be done sustainably. Two specific tree types, willow and poplar, can be cut every three years as a fuel source that has much better EROEI (energy return on energy invested) ratios than oil sands oil. Trees play a vital role in buffering streams and woodlots to prevent degradation and soil erosion, and in being living snow fences. Wellington County has ideal soil for	The intensive agriculture being practiced today has a high risk of soil loss, which is exacerbated in the face of climate change, including violent storms or variable weather. Trees for Mapleton believes a network of windbreaks, living snow fences, and buffers across the countryside is one of the most effective resilience measures that could be taken: that these tree belts will be central to agriculture's ability to adapt to a changing climate. Day suggests that Trees for Mapleton is "trying to provide resilient countryside through a network of strategically planted trees" that protects farm fields from storms and floods, and that helps to maintain soil integrity. Living snow fences similarly protect against snow and ice, and saves in terms of reduced need for maintenance, accidents, road closures, and use of salt.

	agriculture, and many farms; thus, the Green Legacy is working to plant more trees on the landscape through developing relationships with farmers and landowners. The message that the Green Legacy emphasizes is that trees are part of the solution to changes in climate that effect agriculture.	
Environmental education is central to creating a resilient culture.	Green Legacy raises environmental awareness in children and volunteers. One of the goals of the Green Legacy is to ensure that every school-aged child from Wellington County and the City of Guelph becomes involved with the program. This goal is directly related to the Green Legacy's commitment to programming that embodies the values of stewardship, tree appreciation, and tree care. Through this, the Green Legacy seeks to re-establish a deeply held land ethic that reconnects both students and volunteers with the land. Johnson and the Green Legacy are working towards a cultural change around the importance of trees and planting through the educational initiatives. Through the successes thus far, it is evident that the Wellington County community is taking this challenge on.	Trees for Mapleton centres on educating the farming community in Mapleton. Their vision for the future is that education and action will increase tree cover from 10 – 20%.

Regional Network Formation

CASE STUDY ORGANIZATION				
Agriculture Farm Based Organizations		**Ecology** Farm Ecological Restoration		**Collaboration** Regional Network
Everdale	*FarmStart*	*Green Legacy*	*Trees for Mapleton*	*Niagara Climate Change Network (NCCN)*

In the two previous sections, four small community based organizations were cases to understand local community resilience measures. In this section, a cross-cutting collaboration of local government, business, and community organizations is examined for observations and themes on community resilience building. The case study is presented first, followed by a table detailing the observations that emerged from this case.

Peak oil and climate change are overarching challenges that will impact every sector within communities. As such, sectors working together, communicating and initiating community response, may be the most effective way of increasing community resilience. The Niagara Climate Change Network (NCCN) is a relatively new group that is working to address the climate change challenge within the Niagara region. Although not specifically working on peak oil challenges, as illuminated in Table 4: Case Study Attributes, the experiences of the NCCN in their group formation work has resulted in learning that has numerous potential applications.

Case Study #5: Niagara Climate Change Network (NCCN)

Due to the deep implications of climate change and peak oil for all segments of society, these twin challenges require a public engagement strategy beyond the norm: effective response requires a shared path forward that necessitates multi-stakeholder, multi-sectoral collaboration based on trust. This is possible only through engaging and ascertaining the participation of community leaders from all sectors. A collaborative response based on shared representation and decision-making is more likely to be favorably received than initiatives developed or led by one strong player.

The need for collaboration is clear, yet the strategies to achieve it are not. The development of the Niagara Climate Change Network (NCCN) is an attempt at collaboration worthy of note. The NCCN story begins with Brock University initiating dialogue and methodology for multi-sectoral collaboration through the “Niagara Climate Change Project.” Brock researchers view “collaboration among a wide

range of stakeholders" as central to the process of engagement (Armitage& Plummer, 2010). Thus, the "Niagara Climate Change Project" catalyzed the formation of the Niagara Climate Change Network (NCCN), a group of community, industry, and government leaders currently in a collaborative community engagement process. Though the NCCN is in early stages of development, the case elucidates strategies to engage leaders, as well as elements that help and hinder engagement. After a synopsis of the Niagara Region, the role of Brock University and the Niagara Region will be examined, followed by a discussion on key learnings about group dynamics, and the interrelationship of trust, ownership, and leadership within the NCCN. Accomplishments and next steps for the NCCN highlight its potential to address the twin challenges of climate change and peak oil through resilience-building. After more than a year of forming as a group, the NCCN is poised to assume leadership in Niagara in 2012. As such, the NCCN's engagement process holds important lessons for community engagement and participation elsewhere.

The Niagara Region

The Niagara Region is known for Niagara Falls, an agricultural climate that permits soft fruit to be grown, a thriving viticulture industry, and many various cultural attractions. The Region is situated between two lakes – Ontario and Erie – and consists of land totaling 1,852 km^2. The population of the Region is just under 500,000, largely in the urban centres of Niagara Falls and St. Catherine's, with a number of suburban communities, and a considerable amount of rural, agricultural land. Approximately 12 million people visit the region annually (Niagara Region, "About Niagara Region," 2011). Niagara Region is composed of 12 municipalities, the geography of which appears below:

Figure 2: Niagara Region
Source: Niagara Region, "Area Municipalities," 2011

Agriculture is central to Niagara's economy, and agricultural products support local needs and are exported. Many events and festivals surround the agricultural industry and feed into the tourism. Niagara Region is also home to Brock University and Niagara College. The particulars of the Niagara Region are important, especially when considering its ability to adapt to changing circumstances: "the capacity to adapt to the impacts of climate change is not uniform for all individuals, communities and societies. Some have a greater capacity to adapt while other [sic] less so" (May, Pickering & Plummer, 2011: 1). The experience of Niagara is unique in that there are very particular actors, industries, and interrelationships that define how an engagement process will unfold. Nonetheless, the lessons learned in the process of forming the Niagara Climate Change Network have relevance to other regions that may differ substantially, but have similar dynamics.

The Process

Brock University's Niagara Climate Change Project was essential to initiating the process that led to the NCCN. The Project was based on a process from Sweden called a Social Ecological Inventory or SEI, originally designed to enhance ecosystem management; however, in Niagara SEI was employed for its capacity to "provide a starting point for participation" (Schultz, Folke, & Olsson, 2007: 141). SEI identifies pre-existing knowledge and activities in conjunction with key actors that allows researchers to "identify and select the most appropriate set of actors to work with, and builds trust with these actors; and provides a starting point for understanding and enhancing a regions' sustainability and resilience" (Schultz, Plummer, & Purdy, 2011: 2). Researcher Kerrie Pickering explains that SEI was used to identify and engage leaders within Niagara: individuals who are perceived as leaders within their sector and by other sectors, who are already working on climate change, and who have the capacity and networks to bring the work of the leadership group back to their sectors and constituencies. The SEI began in Niagara in May 2010, after the research team had time for background research. Initially, the researchers desired relatively equal representation of sectors in the leadership group:

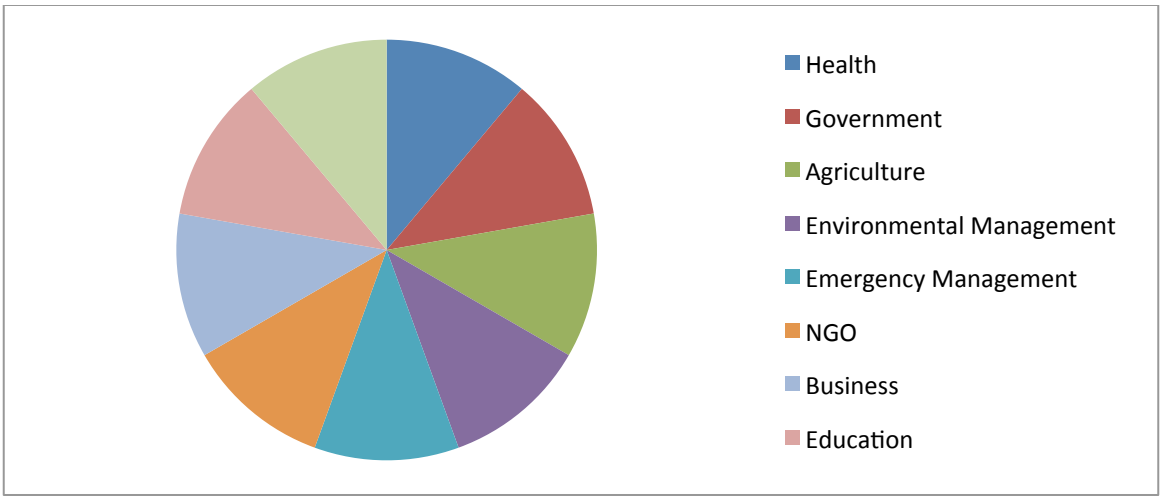


Figure 3: SEI Desired Representation Chart
Source: Pickering, Baird, & Plummer, "Social-Ecological Inventories" Presentation, slide 8

The inventory concluded in October 2010 with the formation of the group that would later call itself the NCCN, the first meeting of which occurred in November 2010. Although all sectors were represented, they were distributed less equally than *Figure 8* describes: 38 key actors from 33 organizations represented each of the 9 sectors. Actual representation appears below:

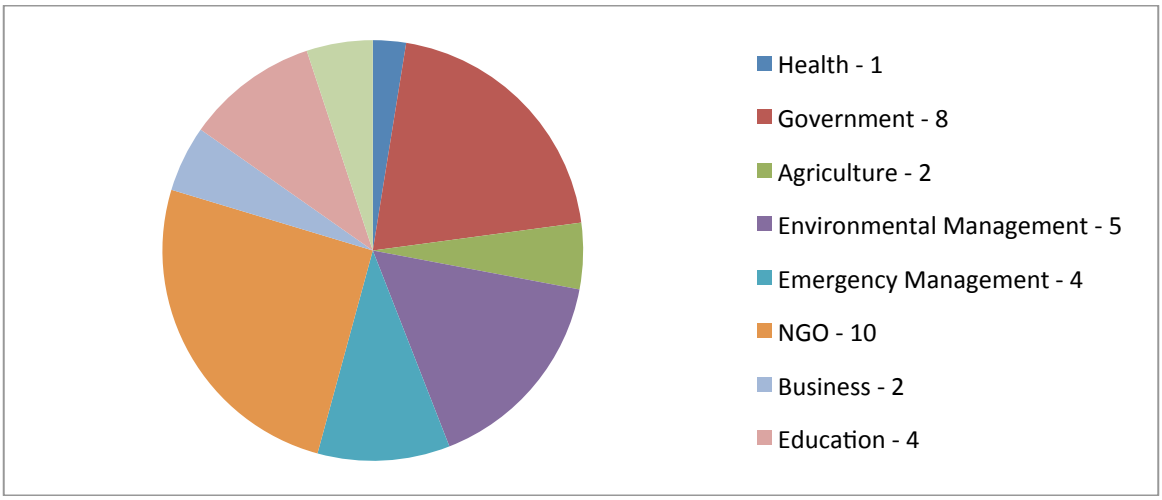


Figure 4: SEI Actual Representation Chart
Source: May, Pickering & Plummer, 2011: 2

May, Pickering, and Plummer (2011) describe the process that this group of 38 members went through. There was an initial meeting to introduce the Brock University Project, including design, goals, and ethics. Because the researchers wanted to obtain baseline data for network analysis, the participants were not given time for interaction during the initial session. During the first session, participants described

access to information about local climate change projections as a major challenge. Thus, the following meeting provided information on potential impacts in the Niagara Region, at the end of which participants requested another meeting time to learn from each other about activities occurring in Niagara. It was in this third meeting that participants described their efforts and plans related to climate change. Discrete areas for potential collaboration began to emerge. The meetings continued, with some people and organizations leaving the group; however, within seven months of the first meeting, a core group had formed. This included 18 participants from 8 sectors, visually displayed below:

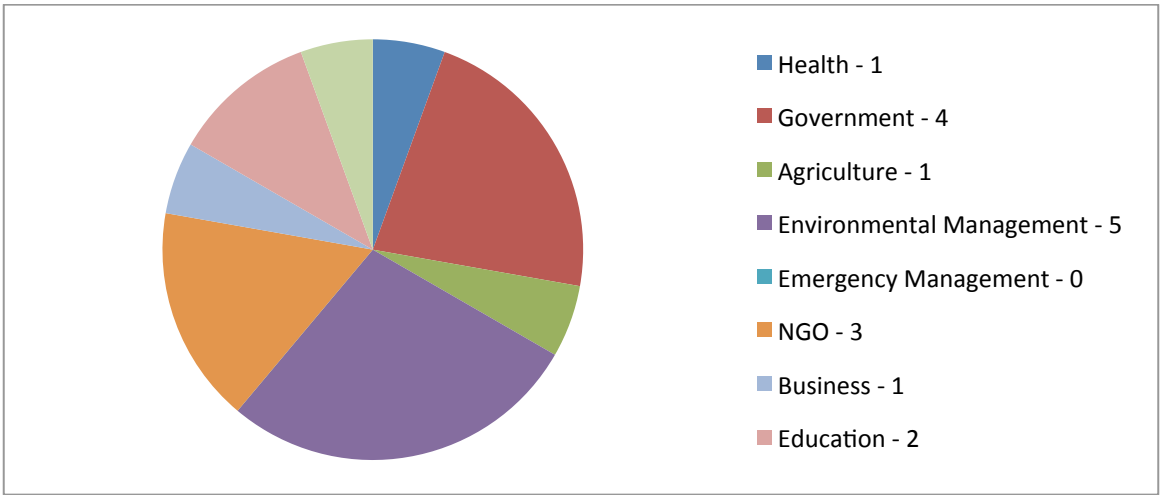


Figure 5: Core of the NCCN
Source: May, Pickering & Plummer, 2011: 2

From the group represented in *Figure 9*, the NCCN elected a Steering Committee in the fall of 2011. The Steering Committee is currently in communication at least weekly and often daily, with monthly meetings that will become bi-weekly in 2012. The Steering Committee reports to the rest of the NCCN membership. It is anticipated by the Steering Committee that 2012 will see a dramatic increase in NCCN membership in addition to increased awareness of the NCCN in the general public.

To this point, the NCCN has largely been a process of engagement of community leaders. Broader community engagement is central to the outcomes desired, but the process to get all the sectors at the same table has been a microcosm of the larger engagement process that will be pursued and that NCCN members anticipate will spiral out from the engaged leaders. Many of the key informants described both the desire to get to "action," or broader community engagement, but all were aware that the process of building a network of change-makers is critical to the long term success of the initiative.

Role of the Brock University Research Team

As mentioned above, Brock University has played a necessary role in the formation of the NCCN. Dr. Ryan Plummer, of Brock University, received support for the "Niagara Climate Change Project" from Environment Canada, with the goal of the research described as:

> To facilitate and support the development of a collaborative network of existing stakeholders in Niagara to collectively engage in planning and actions for adaptation to climate change. An iterative and reflexive process that is driven by the participants . . . . Our goal is to facilitate the growth of a collective network that will continue to adapt to climate change under its own direction.(Pickering, "Niagara Climate Change Project" Presentation)

In 2010 Brock University entered a five year agreement with Environment Canada for the Project; however, the research team was notified in 2011 that the committed funds were no longer available as the department through which it was funded had been disbanded. Despite no funding since May 2011, the researchers continue to work with the network and in fact did not inform many of the network participants that funding had been cut. As a result, the transfer of facilitation and ownership occurred earlier than anticipated, but was not seen as a hindrance. Though researcher Kerrie Pickering is still involved in on-the-ground work, she has declined a role on the Steering Committee.

Despite the unforeseen, unfortunate, and somewhat dramatic end to Brock's research funding, the role of the University in instigating the network is of note. Brock's position of respect and relative neutrality allowed the researchers to engage diverse sectors that have experienced difficulties working together in the past; Brock's involvement has also been credited in bringing the Region to the table. The research team is aware of this role: "Brock University and Environment Canada have been ideal institutions to begin this process due to their political neutrality in the Niagara region. Through the formation of the NCCN several members who had previously collaborated have struggled to overcome past conflicts" (Pickering, May, & Plummer, ND). Despite bringing leaders together, the research team believes that leadership of the NCCN is not a role for Brock, just as enforcing collaboration is not Brock's role. As Pickering describes, "we did not want to lead or enforce collaboration. If no one wanted to work together our research would have ended." This difficult but necessary position in terms of leadership is elaborated on in the next section.

Anthony Barnett, Chair of the Steering Committee, views the process the network went through as initialized by Brock, but requiring specific group-building including shared educational opportunities. Barnett assessed Brock's first educational session as a starting point, and took it upon himself to organize a video conference with Gord Miller, Environmental Commissioner of Ontario, and an international variety of climate change scientists. This shared educational experience, Barnett believes,

brought the group together by underscoring how Canada lags behind in assessing and reacting to climate change. Barnett suggests that the group development process relied on shared access to relevant climate change information, and that through this educational opportunity, the network was able to gel. Thus, the role of Brock as a catalyst and instigator is vital, for the network would not have formed without it; however, shared understanding was only cultivated through a number of shared educational opportunities undertaken by the group together.

Brock researchers' documentation at the outset focuses on adaptation to climate change. Given the researchers' restraint from leadership, as the NCCN assumed ownership and leadership, the network's goals and aspirations expanded beyond climate change adaptation. Curt Benson, a Regional sustainability planner, notes a distinct shift in focus. The group saw adaptation as important, but also saw a need for mitigation. Thus, the outcomes have been a hybrid of the two. To date, there is no specific distinction to address energy restriction or peak oil concerns; however, the ability of the group to shift its direction suggests that as the network's focus continues to evolve, fossil fuel realities may also become specifically included as goals and objectives.

Brock's intention to research the process of the network forming in fact allowed the network to form. Even though Brock researchers are not able to complete the original project, through no fault of their own, initiating a network of leaders poised to bring change to the Niagara Region is a laudable achievement that is being noticed. Robson, the Region's commissioner, asserts that "if the university, the folks who are hard wired to research and provide critical analysis aren't engaged then the process is lost." As such, Brock's role as an impartial, well-respected initiator allowed many parties to join, and cleared the way to overcome past difficulties between organizations. Brock set the stage for a shared learning process that created a group able to increase the resilience of the Niagara Region in a way that is non-partisan and productive.

Role of Niagara Region

The Niagara Region has been very involved in the NCCN formation process. In 2010 the Region received funding from the Federation of Canadian Municipalities to hold events and develop a climate change action plan, which it has brought to the NCCN table. Cathy Fusco, of the Niagara Region Planning Department, serves as Secretary on the NCCN Steering Committee. Fusco sees herself as an equal player at the table – neither leading the discussion nor following, but rather working collaboratively on an effective network that supports climate change work throughout the Niagara Region. Fusco describes the Region's role at the NCCN as predominantly for support, but also as an active collaborator. Fusco's

views are supported by Commissioner Patrick Robson who describes the success of the NCCN not so much as a successful outcome, but rather as success in the engagement process. As he says, "success is the process that allowed you to get to a successful outcome." For some time, the Region has worked towards climate change goals by working on decreasing emissions from its buildings and fleets – Robson believes that to be a leader in this, the Region was responsible to lead by example. Through the NCCN, the Region is experiencing a different type of leadership, and the opportunity for a broader discussion with multiple sectors is welcome. Other NCCN Steering Committee members not only see the necessity of the Region being at the table, but also welcome the perspective that the Region brings. Anthony Barnett, Chair of the Steering Committee, recognizes the Region as playing a critical role by acknowledging the urgent nature of the issue and by encouraging the group to work at a faster pace, to get past the planning phase and into the action phase as quickly as possible. Barnett reports that "the Region has been saying, speed up, speed up."

Commissioner Robson notes that the sustainability trend is relatively new within Niagara's municipal planning context: "Five years ago if you asked me if the region would be in sustainability or local food, I would have said no." However, as Robson explains, the Niagara Region is becoming an increasingly active player by responding to the community's message that sustainability initiatives must have the Region's attention. In the Region's Department of Integrated Community Planning, there are a number of plans that feed into resilience work, including a local food action plan and a smart growth plan. Robson stresses the need to "guard against climate change itself being compartmentalized" – that there are benefits from, and relationships with, a variety of other initiatives already on the ground. In this way, climate change may not have been a driver for these plans, but there is a direct correlation between the plans and decreased emissions. Similarly, for many climate change plans, there is a corresponding spin-off that addresses fossil fuel shortages; thus, even though peak oil or rising energy prices do not specifically drive many of the sustainability initiatives, there are results that begin to address reliance on fossil fuels. Despite the Region's support of the NCCN, when asked about the challenges of pursuing climate change action, Robson does not hesitate for a moment before saying, "the major challenge is politics, politics, and then some more politics." There are still strong voices coming from upper levels of government and within the Niagara Region that question human created climate change and the need for increased resilience. These are hurdles that are beyond the capacity of NCCN to address at this point, but that continue to influence the pace and direction of change.

Group Dynamics

The NCCN was composed of members specifically invited to participate by Brock University researchers. Pickering, one of the researchers, explains that the intent was to connect groups already doing things, and to bring together leaders to open the possibilities for collaboration. Through a structured process that took a number of months, the Brock researchers interviewed people to identify names that kept recurring as climate change leaders – it was these people who were invited to attend, what Pickering calls the "gatekeepers" of their sector. Invitation was not open, and Pickering had to let a few interested people know that they could not join at the early stage. As such, this was a particular, strategic form of community engagement that was not focused on the broader community, but rather on a subset of leaders in the anticipation that the leaders could involve their communities as time went on. As the Network is maturing and coming into its own, the membership is opening up. Interviewees spoke about the desire to have many more groups and people involved in 2012.

Figures 2 through 4 show quite low representation from the business sector. In Niagara Region there are twelve chambers of commerce, one for each of the lower tier municipalities. There is only one represented in the larger network, and it is not on the Steering Committee. This is a challenge that Anthony Barnett, Chair of the Steering Committee, finds hard to swallow. It is also hard to fix. In the next round of engagement, there will be a focus on attracting more business to the table, and a higher degree of fluidity to membership, which was difficult within the guidelines that Brock was operating under.

Secretary of the Steering Committee Cathy Fusco asserts that everyone at the NCCN table agrees that climate change requires not only collective work, but also a commitment to action. Fusco sees "that action is the consensus around the table," that the goal of the network goes beyond policy to explore what is being done, what best practices are out there, how to educate people, and how to make a substantial change. Brock researchers did not give the NCCN a specific action-oriented purpose or goal, but rather provided the space and time for collaboration to emerge. Steering Committee member Evan DiValentino described the process as revealing the ways that different sectors and participants can work together, and is anxious to get to the point of action. DiValentino feels that he is part of a support network that is not yet firmly committed to anything, but working to figure out how to help the community. He anticipates more action-oriented work in the near future.

The group dynamics of the NCCN are further affected by the different sizes and types of organizations represented. Although participation is seen as primarily a volunteer commitment, the stakeholders participating have different capacities and abilities to support their involvement. A crucial factor in

creating a cohesive group is determining funding. Non-profits often do not have external funding, or a guaranteed base of financial support, and there is concern about how to finance their participation. Determining how to make participation possible for the variety of groups continues to be a work in progress. While some participants are fully supported by their organization to be there, others "receive little or no recognition from their organization, with the efforts sometimes perceived as a waste of resources" (May, Pickering & Plummer, 2010:3). Because of this, the same members often volunteer their time on committees and have more input into the process and results. There is some concern that the process is becoming based on the directions of a few of the participants, and is increasingly less transparent (May, Pickering & Plummer, 2010: 3).

Trust

The issue of trust emerged in a number of discussions. Specifically, it was revealed that there is a history within Niagara of organizations experiencing difficulty cooperating. There are twelve municipalities within the Region, with a reputation of not getting along with each other, and a non-profit sector that has been described as incredibly competitive. According Steering Committee Chair Anthony Barnett, the beginning of the NCCN process was marred by a distinct lack of relationships where no one trusted anyone, including Brock University. Barnett suggests that participants believed the NCCN was going to become political, and thus no representative wanted to divulge information on what their organization was doing.

Commissioner Robson sees the formation stage in a similar way, and sees community ownership as only possible once all fears that "someone's role is going to be cannibalized" has been addressed. Robson recognizes the pride that community organizations and activists take in their work, and their concern that "government will push them to the side." As such, the NCCN and the Region had to spend dedicated time ensuring that groups understand that the Region sees its role as helping to champion and celebrate the work that is happening. Cathy Fusco, who works for the Region and serves as Secretary of the Steering Committee, sees her role as specifically demonstrating that the Region is dedicated to building trust to move towards collaboration. Fusco knows that working together will allow the group to do more than working in isolation, and is determined to display that understanding in her role and actions within the NCCN.

Ownership and Leadership

Whether it is a network or an agency, appropriate ownership and leadership is critical to sustainability and transparency. Brock researchers recognized from the start that participants must feel ownership of

the network to determine appropriate leadership and work effectively. Thus, from the beginning, Brock was reticent about assuming leadership in the belief that group ownership would emerge through the leadership process. Since losing funding in 2011, Brock's approach in fact prepared the network for Brock's early retraction; nevertheless, the process of creating group ownership of the process was not immediately forthcoming. Pickering, the on-the-ground researcher, recognizes that groups require leadership to feel secure, and to know who to turn to. Leadership based on ownership needed to be developed internally in order for the NCCN to survive.

The initial inventory of Niagara cites lack of leadership as a challenge to working collectively. A dearth of appropriate leadership continued into the formation of the NCCN and affected its functioning. Without Brock taking the reins, and with "no other neutral and well-respected organization volunteering to take that position the formation of the network has been delayed and led to some stakeholders to leaving the process" (May, Pickering & Plummer, 2011: 3). Each key informant identified the importance of the initial leadership by Brock and the need for continued, steady leadership throughout the process. For the first year of the project, this leadership was needed; however, formation of the Steering Committee in the fall of 2011 provides collaborative leadership, which has been effective thus far.

Chair of the Steering Committee, Anthony Barnett, believes that shared education helped leadership to emerge by building a common understand of climate change, and the naïveté within Canada. Since that knowledge is somewhat against the grain, Barnett suggests that major players' desire for leadership of the NCCN may have shifted; where there may have previously been a desire to lead, some may have stepped back to not be the bearer of the "news" of climate change. The Region itself, as explained by Commissioner Robson, sees its role in leadership as creating a dynamic that allows everyone to recognize that the sum is greater than the parts, and that sharing and collaborating is essential. Researcher Kerrie Pickering notes there is history in all levels of government that has led to some mistrust. This makes it hard for the Region to assume a leadership role on its own, even if it wanted to; the Region's leadership must be moderated by a collaborative approach to decision-making. This is evidenced in the Steering Committee whose shared leadership brings a cohesive message to Niagara.

Accomplishments

The NCCN is a young network, but has reached a number of milestones in its history:

1. **Steering Committee:** The formation of the Steering committee is recognized by some as a key accomplishment thus far even though some members suggest that success should be measured in actions. Nonetheless, specific tasks outlined here have set the stage for the action.

2. **Climate Change Charter:** Brock University anticipated a Charter "that group members, municipalities, organizations and individuals could publicly sign on to but that required no initial action" (May, Pickering & Plummer, 2010: 2). "Niagara's Climate Change Charter" was written in committee and is in its final draft. It is intended that all organizations within the NCCN will sign the Charter to commit to action, and that the Charter will be disseminated throughout the community early in 2012.
3. **White Paper:** There is a white paper that reflects on present adaptive strategies being undertaken in Niagara, as well as opportunities and vulnerabilities. Initially, it was unclear to the Steering Committee what the NCCN's role in the white paper was, as it was largely driven by Brock researchers and the Region. However, at present, it seems that the white paper will rest with the NCCN as well, and will be released in 2012.
4. **Climate Change Action Plan:** The NCCN also plans to have a Climate Change Action Plan available in 2012. May, Pickering, and Plummer (2010) anticipate a climate action plan that describes specific actions for both mitigation and adaptation in the Niagara Region.
5. **Inner Group Collaboration:** Members of the network are beginning to collaborate with each other outside of the NCCN. Chair Barnett's organization *Commonplace Eco-village* has joined with other organizations to pursue funding collaboratively.

May, Pickering, and Plummer (2010: 3) state that "[i]n part because of the present lack of municipal climate change policies it is our belief that over time these action items will significantly influence local and regional policy and governance." Due to the integration of the NCCN, there is a high probability that this long-term success in policy will be achieved. Thus far, the NCCN has been in group formation stage, and is just now entering a planning stage. In the future, the opportunities that the NCCN will create and participate in have the potential for deep impact. The action that defines success for many participants seems right around the corner, and will be all the more powerful due to the strength of the NCCN and the planning that has occurred to date.

NCCN Next Steps

The steps taken by the NCCN in the past year are substantial: "For 2011 – 2012 the network has been able to access adequate funding signaling that these stakeholders are very serious about present action items" (May, Pickering & Plummer, 2010: 3). The next steps are also planned, and have been described by key informants as the following:

- To determine how to communicate a message that is credible and palatable to the public and other organizations.

- To go public, and work with the media to have the NCCN become known within the general population. Success will be the NCCN's ability to have the truth about climate change understood and accepted in order to be acted on.
- To launch in early 2012 with the original organizations, and to expand to be inclusive. To release the Charter at the launch, and form subgroups to take the Charter to the larger community. The community's reaction will help to determine the next steps for the NCCN.
- To build trust in the community, in a process that reflects how trust was built within the NCCN.

Relationship to Peak Oil and Community Resilience

Within the NCCN there are members with deep understanding of peak oil, and there have been attempts to increase the group's knowledge through presentations from Transition Towns. However, it is not yet clear how deeply this knowledge has penetrated or is influencing the group's direction. Barnett, Chair of the Steering Committee, believes that the NCCN has been looking into both climate change and peak oil since the summer of 2011; however, DiValentino, member of the Steering Committee, suggests that there has been little discussion on peak oil, and there is little understanding of how it might affect the community. Barnett and DiValentino agree that the larger community is relatively unaware of peak oil, and that it does not come up as an important issue at this time. Within the Region, Commissioner Robson assesses the understanding of peak oil as higher now than a few years ago, but does not believe that it garners attention or interest from the community. From Brock University's perspective, their project and the NCCN is focused on climate change, and Brock's researchers see their role gathering knowledgeable and active people, not to convince them of challenges, but rather to motivate organizations to collaborate.

One thing is clear: the NCCN is working on resilience. The key informants agree that almost all the work being pursued with climate change in mind will also build resilience to peak oil, or the increasing cost of fossil fuels. In this way, the work of the NCCN is directly related to community resilience, and to peak oil. The NCCN's approach is firmly grounded in the need for collaboration and common strategies to increase the resilience of the community as a whole. Thus, the gathering of sectors to respond to climate change enables relationship building and networking that is central to responding to fuel shortages and to preparing for community resilience in general.

Regional Network Formation Observations

The NCCN is a new multi-stakeholder network that formed outside of direct government initiation. It has overcome barriers between the organizations and sectors involved by building relationships and

crossing historical divides to face a common challenge. The involvement of Brock University as a necessary catalyst and initiator unveiled distinct lessons on group dynamics. Developing trust, ownership and leadership has taken time, and though the incubation time of the group may have been frustrating, the network has met a large degree of success in its formation stage. Brock has noted that the "Niagara Climate Change project is a collaborative participatory approach to climate change adaptation... It is expected the newly formed network will have a significant impact on local policy and governance thereby strengthening Niagara's resilience to future impacts of climatic and environmental change" (Pickering, May, & Plummer, ND). The ability to work together effectively is the essence of resilience-building, and will assist Niagara in responding to a variety of challenges by collaboratively building community response. Despite the difficulty inherent in working together across sectors, the NCCN has emerged ready to take the reins in the movement towards resilience.

Collaborative Network Observations

There are many resilience themes evident in the NCCN case study. Specific observations have been noted in the table below that has gathered and sorted the evidence from the Case Study. The observations from this table are juxtaposed with the observations from the other cases under study in the concluding Table .

Table 5: Observations and Evidence from the NCCN

General observations	**NCCN Evidence**
Engagement process is critical, can be difficult, and should reflect needs of multiple stakeholders.	• Can be long and demanding • Difficult to achieve equitable distribution of sectors, especially in initial stages of engagement • Logistic and initiatory role can be provided by post-secondary institutions
Role of researchers and universities can act as a catalyst.	• For the NCCN, Brock's role was essential in formation • The network determined its own goals to move beyond adaptation to climate change; this trend could lead to further sustainability goals that include fossil fuel concerns • The network began to determine its own needs and to pursue them, particularly the need for more shared educational opportunities. • The intent to research network formation in fact led to network formation.
Having the Region at the table is extremely important, and is beneficial when all network members feel like equals; it is difficult or impossible for the	• Region's support and participation in sustainability initiatives is essential. • Region must see itself as equal at the table • Planning for resilience take a number of forms and might have impacts in areas that are unintended – e.g. a local food plan has a climate change impact

Region to lead this type of initiative.	• Climate change is still not accepted across the board, and politics can hinder climate change initiatives • Region has great influence, and is appreciated for seeing the urgency of the issues.
Group dynamics are able to be effectively harnessed with a shared vision and focus on specific action.	• The NCCN membership was originally chosen by Brock for leadership in climate change. • Business is currently underrepresented. • There is consensus within the NCCN that action is necessary. • Various organizational sizes and capacities determine dynamics and abilities to contribute. • Some groups need funding to participate, and some participants do not have the support of their organizations.
Building trust is time-consuming and necessary.	• Trust is required for collaboration and group work; this took longer than anticipated. • Building trust between government and the not-for-profit sector takes specific effort as non-profits might believe the municipality wants to take away the role of the not-for-profit sector.
Successful leadership emerges from a group that feels a degree of ownership over an initiative.	• Group ownership is a precursor to successful leadership in a multi-stakeholder group. • It is difficult for groups to function and continue without leadership. • Un-biased and respected leadership is essential for collaboration – this makes it difficult for municipal governments to lead. • Collaborative leadership structures that reflect ownership can emerge, like the NCCN Steering Committee.
Accomplishments in the early stages are less tangible, but include guiding documents that ground the network.	• Within the space of 12 months, the NCCN has formed a Steering Committee and is in the midst of preparing central documents to be used to expand its reach.
Preparations for Climate Change also prepares communities for other challenges, like peak oil.	• Resilience work that is pursued, like forming strong networks to have a greater impact on the community, are applicable to a variety of changing circumstances, and to resilience overall.

3. Overarching Themes, Discussion, and Recommendations

In the previous chapters each area of inquiry, Agriculture, Ecology, and Collaboration, received similar attention in that observations were made based on evidence from the cases. Tables 5, 6, and 7 summarized each of these sections. To understand the inter-related nature of the case studies within this work and to glean larger themes from them, the specific observations from each section have been amalgamated and aligned to find larger themes for community resilience-building activities which have been captured in the following table

Table 6: Overarching Case Study Themes

	CASE STUDY ORGANIZATION				
Overarching Themes	**Agriculture** Farm Based Organizations		**Ecology** Farm Ecological Restoration		**Collaboration** Regional Network
	Everdale	*FarmStart*	*Green Legacy*	*Trees for Mapleton*	*Niagara Climate Change Network*
Theme 1: ***Educating stakeholders in the issues is a necessary first step to the changes being pursued.***	A localizing approach to farmer education and local food networking is expanding, based to some degree on knowledge of the peak oil/climate change crises. There is a deep need for more and different kinds of farming, and financial support continues to be a challenge.		Environmental education is central to creating a culture that is resilient, and is often best done through experiential or hands on educational techniques.		The engagement process is critical, can be difficult, and should reflect needs of multiple stakeholders. Education can provide a centre-point for engagement. Accomplishments in the early stages are less tangible, but include guiding documents that ground the network.

Theme 2: ***Leadership is absolutely essential, and must be based on high levels of trust and a sense of overall ownership with the stakeholders involved.***	Both Everdale and FarmStart are recognized leaders in small farmer support in Ontario. Both have earned this position through their ability to partner with other organizations (including each other), and have the support of the small farm community.	Trees for Mapleton and the Green Legacy are leaders in their field, and work closely with partners and funders to enable their communities to work toward more ecologically resilient landscapes.	Successful leadership emerges when a group feels ownership and trust, both of which take time. Group dynamics are effectively harnessed with shared vision and focus on specific action. Researchers and universities can be catalysts in this regard.
Theme 3: ***Almost all responses to climate change inherently increase community resilience and thereby simultaneously act as responses to peak oil.***	Ecological, small scale farming is a necessary transition in the face of peak oil and climate change. Farming techniques are directly related to peak oil preparedness, and low impact agriculture is a growing field.	Maintaining soil health without petroleum-based fertilizers is related to ecological integrity of a farm. The benefits of restoring tree cover are multitudinous and include adapting to climate change and peak oil.	Groups are able to interact with climate change more readily because of its wide acceptance in the scientific and government communities. Within groups, some individuals see the impacts of peak oil and some do not, but the responses to climate change interact with both challenges.

The three overarching themes identified above highlight areas of particular relevance to resilience building activities in rural Southern Ontario. Each will be further expounded on for deeper understanding, and for the purposes of forming relevant recommendations.

Theme 1: Educating stakeholders in the issues is a necessary first step to the changes being pursued.

Pursuing broad-based educational initiatives, or "awareness building" as Transition Towns suggests (Hopkins, 2010), is crucial to both bringing a community together around an issue, and to instigating response and action. Each of the interventions examined in this research had an education component. Although the education pursued differed in terms of the audience – where the Green Legacy had interpretive hikes, the NCCN pursued shared webinars – educational initiatives are united in their attempt to build a critical mass of stakeholders within the community that recognize the challenges and risks that climate change and peak oil pose. There is little doubt that organizations and networks play a central role in the baseline education of the general public; it is important to remember, however, that internal cohesion, or the ability of the organization and/or network to have a shared internal vision – is necessary to be effective in more broad-based public education campaigns.

RECOMMENDATION: In Niagara it was evident that the region and municipalities were becoming involved in educational initiatives; this support of education of a variety of types increases community awareness which in turn increases the likelihood of action and thereby the resilience of the community and its ability to respond. For this reason, the education theme recommends municipal and regional support of climate change and peak oil educational initiatives in conjunction with on-the-ground community organizations.

Theme 2: Leadership is absolutely essential, but the leadership that emerges must be based on high levels of trust and a sense of overall ownership with the stakeholders involved.

It became clear that the small farm support and ecological farm restoration organizations are all leaders in their field. The type of leadership that is held by individual organizations is of great importance in local resilience building, and is related to – but distinctly different from - the leadership requirements within a regional network that draws leaders from a variety of sectors. In both cases, leadership is based on the trust of the constituents involved. It became clear from the cases studied that leadership possibilities across the board increase when partnerships and networks formed, and when there is common understanding of the issues at hand. The leadership involved in a network is much more complex than in a local community organization. Within a broad based network , local governmental

leadership can be difficult to reconcile in a multi-sectoral group. In the case of Niagara, a post-secondary institution with a reputation of objectivity and an un-biased approach was able to catalyze a response, if not lead it. As such, the municipal governments involved in Niagara were absolved of any leadership responsibilities, which made it easier for some sectors to be involved, but perhaps more difficult for others.

RECOMMENDATION: Municipalities and Regions would be wise to invest in partnership and network development, not as leaders but as participants. Networks are crucial for cross-sectoral, community wide initiatives. Similarly, post-secondary institutions, as members of their communities, are uniquely positioned to initiate and support resilience-based discussions. Simultaneously, on-the-ground community organizations who specifically work on resilience building bring critical knowledge to partnerships and collaborations and are central to building trust, gaining inroads to specific communities, and finding appropriate leadership.

Theme 3: Almost all responses to climate change inherently increase community resilience and thereby simultaneously act as responses to peak oil.

Each of the responses to climate change within this research have repercussions that respond to peak oil as well. As such, groups that may view themselves as working specifically on climate change are also responding to peak oil, even if it is not in their guiding documents to do so. The small farm and farm ecology organizations have specific mandates that are not explicitly about climate change or peak oil; however, the key informants who drive these organizations are very well informed of the issues, and present well-considered links between the larger issues of climate change and peak oil, and the more tangible work on the ground. Even without climate change or peak oil being explicit in their missions, these organizations are implicitly following a resilience-building agenda. Similarly, the NCCN is concerned with climate change, but is moving towards actions that will influence both climate change and peak oil.

RECOMMENDATION: As organizations link their vision to climate change, it could be beneficial to include the concept of peak oil, which may in fact increase the buy-in from sectors and groups of individuals who are not attuned to "climate change." Recognizing the multiple implications of resilience building work may increase the ability of communities and organizations to respond.

Through in-depth study of five rural Ontario organizations, these three themes and recommendations have emerged. There are many organizations pursuing work that is related to rural community resilience,

some in conjunction with local government, and some in partnership or collaboration with other organizations. As the need for rural community resilience deepens, research is needed to share the learnings that are emerging in a constantly shifting landscape. These five case studies presented are an initial glimpse at a diverse and multi-layered picture of the rural community response to the challenges of climate change and peak oil.

4. Conclusion

The five case studies bring together approaches that differ widely, but that are all relevant to building local community resilience. The cases highlighted sit amongst many interventions and projects to meet this challenge, as increasing numbers of community groups and organizing committees thoroughly comprehend the interrelated nature of resilience, and the role of every sector in addressing climate change and peak oil. Clean Air Hamilton, for example, succinctly describes their work as follows:

> Clean Air Hamilton is an innovative, multi-stakeholder agent of change dedicated to improving air quality in our community. We are committed to improving the health and quality of life of citizens through communication and promoting realistic, science-based decision-making and sustainable practices" (Clean Air Hamilton Coordinating Committee Terms of Reference, ND).

Clean Air Hamilton is thus very similar to the NCCN, yet approaches the same issues through the entry point of air quality. It further exemplifies the number of groups that are focusing on these deep and important issues, and the number of case studies that could have been done to further understand resilience. Within the cases that were chosen it was possible to address the research objectives of this work and to draw appropriate conclusion. Reflections on each of the research objectives appear in the following table.

Table 7: Reflection on Research Objectives

Objectives	**Reflections**
Objective 1: Highlight specific approaches and strategies that enable resilience-building activities.	The five case studies explored very specific responses to building the resilience of rural Ontario communities. These case studies are by no means conclusive, as there are many other organizations and networks that could have been further explored; however, those included here provide a general framework for understanding the difference in approaches that are all captured under the "resilience" umbrella.
Objective 2: Determine themes that may help other organizations, municipalities, or communities in resilience activities.	This objective is met through the cross-sectional analysis and suggestions presented in the previous section "Overarching Themes, Discussion and Recommendations." Through analyzing and comparing the five cases under study, three themes are explored that may be helpful to resilience builders in many communities.

In meeting the above objective, it became clear that there are specific strategies available to governments, groups, and individuals to consider in pursuing community resilience. The theme of collaboration and working together is very strong in both the literature and in the practice of the cases studied herein. Innes and Booher write that "consensus building among stakeholders is increasingly common as a way to search for feasible strategies to deal with uncertain, complex, and controversial planning and policy tasks" (1999: 1). The approach to planning thus takes on a level of collaboration that is much deeper and integrated than in previous times. It is thus becoming the current necessity to work together, since "accomplishing anything significant or innovative requires creating flexible linkages among many players" (Ibid). Innes and Booher thus point to a central crux of the challenges we face – that it will take many sectors, much integration, and willingness to collaborate for any deep and lasting change, and for our communities to truly be able to respond effectively to the challenges being faced. Similarly, Elinor Ostrom's work on protecting shared resources, and the plethora of support for learning to work together, or re-engaging with the commons (Walljasper, 2010) fully aligns with Innes and Booher's direction. So too, the cases explored through this research support further integration, trust, and collaboration as critical to rural communities' ability to meet the challenges of our era.

Peak oil and climate change are incredibly complex and potentially deeply dangerous challenges being faced by every community on the planet. The answers are not easy, obvious, or straightforward, and the risk is high: these challenge our personal and professional lives in unimaginable ways. However, the actions being taken to educate on, understand, and collaboratively address these challenges are inspiring and hopeful. Learning from case studies of resilience building activities may increase or assist the ideas, impetus, and support for building resilience in communities across rural Ontario. There are many next steps to take on the path to sustainability; however, if we walk the path together, we're less likely to become lost.

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Appendix A: Interview Questions for Farm Support and Farm Ecology Organizations

Agricultural Case Study Interview Questions Draft 1

1. How do you summarize the work that you do?
2. Tell me a bit of the history of your organization . . . geographic region . . . . target group
3. What is the specific problem that you are working to resolve?
4. What is your vision of how your project can resolve the problem you have identified?
5. How does your work relate to community resilience?
6. How does your work relate to peak oil?
7. How does your work relate to climate change?
8. How does your understanding of climate change and peak oil influence your work?
9. What strategies do you use?
10. What does success look like?
11. What do you think is the "most significant change" your organization affected?
12. What are major challenges in your work?
13. Are you working with other community groups or your municipality?
14. How do you see your work moving forward?
15. Are there other organizations you think I should interview for this research?

Appendix B: Interview Guide for First Contact with Municipalities/Regions

- Relative to others (municipalities) how would you rate yourself in terms of innovation or engagement related to climate change or peak oil...?

- How do you summarize the work in your municipality that relates to climate change and peak oil?

- How has the community been engaged in your strategies and initiatives?

- What is the community response to your strategies and initiatives?

- What do you think is the "most significant change" you have seen in your region?

- What are the major challenges?

Appendix C: Key Informant Interview Guide for the NCCN

(Questions from this list were chosen according to the role of the interviewee)

NCCN Structure

- What is your role in the NCCN?
- How have you been engaged in the NCCN?
- Degree of community ownership?
- What is your relationship with Partners for Climate Protection (PCP), the partnership between Federation of Canadian Municipalities and ICLEI – has it been a useful process?

Community Engagement

- How has the community been engaged in your strategies and initiatives?
- What is the community response to your strategies and initiatives?
- What are the major challenges to the engagement?
- How have different sectors responded differently?
- How do you ensure representation of various groups?
- Did the process you went through adequately engage organizations to the level that there is community ownership of the direction?
- Is there anything you would revise in a similar process?

Relationship with University

- How necessary has Brock's involvement been to the NCCN?
- Have there been challenges?

Connection to Peak Oil

- Is there knowledge of / discussion on Peak Oil within NCCN?
- Is there understanding of Peak Oil within the region of Niagara internally? Externally?

Agriculture

- How are the implications of CC/PO on Agriculture being discussed or decided on?
- Are you finding significant differences in buy-in or understanding between urban, sub-urban, and rural populations?

Overall

- What does success look like?
- What do you think is the "most significant change" NCCN has affected?
- What are major challenges in your work?

Appendix D: Waiver

UNIVERSITY of GUELPH

ONTARIO AGRICULTURAL COLLEGE
School of Environmental Design and Rural Development
Capacity Development and Extension • Landscape Architecture • Rural Planning and Development

CONSENT TO PARTICIPATE IN RESEARCH

TITLE :

Regional Development: Planning for Resiliency in the 21st Century – A Methodology and Approach for Communities Dealing with Climate Change and Rising Oil Prices

You are asked to participate in a research study conducted by Erica Ferguson (Graduate Student Researcher), from the School of Environmental Design and Rural Development at the University of Guelph. This research sponsored the Ontario Ministry of Agriculture, Food and Rural Affairs (OMAFRA). It is part of a Masters major paper, in partial requirement for a MSc degree in Rural Planning and Development.

If you have any questions or concerns about the research, please feel free to contactErica Ferguson at 519.599.2959 or by email fergusoe@uoguelph.ca or Professor Wayne Caldwell at waynecaldwell@hurontel.on.ca.

PURPOSE OF THE STUDY

The purpose of this study is to describe and highlight innovative approaches to building community resilience in Ontario, and to describe case studies for learning purposes.

PROCEDURES

If you volunteer to participate in this study, we would ask you to:

Participate in an interview

The interview will be approximately 1 hour in length in a mutually-agreed upon location, at the participant's convenience.

POTENTIAL RISKS AND DISCOMFORTS

There are no known or anticipated risks to you as a participant to this study.

POTENTIAL BENEFITS TO PARTICIPANTS AND/OR TO SOCIETY

The information collected will be made available to you, and may be useful to you. The results may also be useful to other communities or organizations pursuing similar work.

PAYMENT FOR PARTICIPATION

You will not receive payment or other remuneration for your involvement in this study.

CONFIDENTIALITY

Your quotations may be used in the report, and you will be identified as a leader in your endeavour, and as a contact person for other organizations interested in your work. Should you wish to remain anonymous, please check the box below.

☐ I wish to remain anonymous.

PARTICIPATION AND WITHDRAWAL

Participation in this study is voluntary and you may withdraw at any time without consequences of any kind. You may exercise the option of removing your data from the study. You may also refuse to answer any questions you don't want to answer and still remain in the study. The investigator may withdraw you from this research if circumstances arise that warrant doing so.

RIGHTS OF RESEARCH PARTICIPANTS

You may withdraw your consent at any time and discontinue participation without penalty. You are not waiving any legal claims, rights or remedies because of your participation in this research study.

SIGNATURE OF RESEARCH PARTICIPANT

I have read the information provided for the study "Regional Development: Planning for Resiliency in the 21st Century – A Methodology and Approach for Communities Dealing with Climate Change and Rising Oil Prices"as described herein. My questions have been answered to my satisfaction, and I agree to participate in this study. I have been given a copy of this form.

_____

Name of Participant (please print)

_____ _____

Signature of Participant Date

SIGNATURE OF WITNESS

_____

Name of Witness (please print)

_____ _____

Signature of Witness Date