

**EXPLORING WILD BLUEBERRIES AS A PLACE-BASED SOCIO-
ECONOMIC DEVELOPMENT OPPORTUNITY IN IGNACE, ONTARIO**

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A thesis submitted in partial fulfillment of the requirements for the degree

of

Master of Science in Forestry

Lakehead University

Thunder Bay, Ontario

Canada

April 2013

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ABSTRACT

Milne, R. 2013. Exploring Wild Blueberries as a Place-Based Socio-Economic Development Opportunity in Ignace, Ontario

Keywords: community development, complexity, complex adaptive systems, conjoint analysis, cooperative, economic diversification, local patterns of interaction, market survey, non-timber forest products, place-based strengths, social enterprise, wild blueberries, willingness-to-pay.

Wild blueberries are an important food source in rural communities of Northwestern Ontario, and can be used as a possible alternative to diversify their economic resource base. This study explores the socio-economic development opportunity through wild blueberries in and around the township of Ignace in Northwestern Ontario through two research papers. The first paper demonstrates the economic viability of a wild blueberry business by exploring the market demand and willingness-to-pay for wild blueberries picked by rural and First Nation communities, and developing an economic profile of a pilot wild blueberry picking and selling business in and around the township of Ignace in Northwestern Ontario. The second paper explores through a community case study how a complex adaptive system's theoretical lens can facilitate an understanding of the challenges associated with alternative development opportunities in communities, where growth and economic development are limited to primary resource industries such as mining and forestry. From a complexity lens, the resilience and adaptation of local communities in sustainable diversification of resource based businesses are explored. The results of market survey and conjoint analysis support wild blueberries as a viable food source for economic development and strengthening food security in the region. The complex relationship and challenges demonstrate that such challenges may be better understood and overcome through a complexity approach.

LIST OF PAPERS**PAPER I**

Milne, R., Shahi, C., and Nelson, C. 2013. Wild Blueberries as an Alternative Economic Development Opportunity in Rural and First Nation Communities of Northwestern Ontario. Submitted to Journal of Forest Products Business Research.

PAPER II

Milne, R., Nelson, C., and Shahi, C. 2013. Complex Adaptive Systems Perspective: A Case Study of the Emergence of a Wild Blueberry Co-operative in Ignace, Ontario. Submitted to Society and Natural Resources.

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ACKNOWLEDGEMENTS

It is with immense gratitude that I acknowledge the support and guidance received from my supervisors, Dr. Chander Shahi and Dr. Connie Nelson. They enabled me to successfully develop, conduct and analyze data collected for my thesis as well as course work. I would like to further express my gratitude towards my supervisors for all their time and patience spent reading and correcting drafts and providing insight and beneficial comments. It has been an honour being their graduate student and I really appreciate all the time they have spent with me preparing this thesis.

I would like to thank the Ontario Ministry of Agriculture, Food and Rural Affairs (OMAFRA), the Food Security Research Network (FSRN), Doug Pronger and Northern Communities Investment Readiness fund (NCIR), Patricia Area Community Endeavours (PACE), the Ontario Ministry of Economic Development, Trade and Employment Summer Company Program, the Faculty of Graduate Studies and the Faculty of Natural Resources Management for their financial support during the course of this program. I extend my sincere appreciation to Cori Ham, external examiner, for the valuable suggestions he offered for improving this thesis.

I would like to express sincere thanks and great appreciation to Doug Pronger for his hospitality in welcoming me to Ignace and for his help connecting me with residents of the community and preparing meetings. I appreciate all of his beneficial suggestions in developing this project as well as his support and promotion of the community of Ignace and wild blueberry initiatives in general. In addition, I would like to thank the community of Ignace for their hospitality and willingness to discuss and share ideas.

I would like to thank John Graveson, Thunder Bay Country Market, for use of a booth free of charge during the Thunder Bay Country Market. I greatly appreciate the help of Stefanie Armstrong, Small Business Advisor, Northwest Business Centre, for her support in business planning and development.

I would like to sincerely thank Eva Scollie and Lois-Ann Bender for their moral support and help filling out and understanding academic forms and procedures associated with the program. I would like to further thank Lois-Ann for her help collecting orders for Ignace Wild Blueberries.

I would like to express my sincerest gratitude to Emile Desforges, Ignace Wild Blueberries partner, for his hospitality and willingness to assist in the development of this project. He provided me with practical information regarding the wild blueberry industry of Ignace Township. I would like to further thank Emile for his help locating productive blueberry patches and for his help picking and marketing blueberries.

Last but not least, I would like to express my deepest appreciation for the contributions made by my wife Youma, who moved to Thunder Bay, and Ignace with me, and offered me the support and patience needed to complete this endeavour.

Ryan Milne
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1. INTRODUCTION

1.1 THESIS RATIONALE AND OVERVIEW

Food security is widely recognized as a prerequisite in building and supporting community resilience and overall well-being. There are an estimated 200 forest-dependent communities in Canada for which forest resources both timber and non-timber make up 50% of total household income (Natural Resources Canada 2011). Nearly 25% of these communities rely entirely on forest resources for survival. Dependence however is not strictly economic; some people living in or near forested areas rely on forest resources as a source of food and subsistence (Stroink and Nelson 2012; Nelson and Stroink 2010; Stroink and Nelson 2009), while others may value it for other non-subsistence purposes (LePage and Jamieson 2011; MacPherson 2010; Cocksedge, Titus and Mitchell 2010; Prell 2009). Such values placed on forest resources may be aesthetic, cultural, traditional and medicinal. In Ontario, natural resources have traditionally been planned for and managed independently from food security (LePage and Jamieson 2011; Cocksedge, Titus and Mitchell 2010; Prell 2009). As a result, communities in Northwestern Ontario, whose dependence on natural resources is almost absolute, often face issues of food insecurity and economic development that is based on primary resource industries such as forestry and mining (Hamilton 2012; Belcher 2010; Mitchell and Hobby 2010; Duchesne, Zasada and Davidson-Hunt 2001).

Economic development in Northwestern Ontario is largely based on primary resource industries such as logging and mining (Prell et al. 2009). Historically, such activities have been quick in generating employment for community residents, profit for

multinationals, and taxes and stumpage fee revenues for the province. Primary resource industries such as forestry have remained largely unchanged for decades. The forest industry in Ontario for example has relied primarily on the sale of pulp and paper, and dimensional softwood lumber to the United States (US). Although technologies have evolved and the manner in which products are manufactured may be more efficient, the end product as well as market destination has remained largely unchanged (Natural Resources Canada 2011; Woodbridge and Norman 2003; CFSA 1994). While the approach of 'business as usual' remained profitable for many years; open free trade markets and increased competition from other countries have exposed major flaws in the industry (e.g. lack of diversity in terms of product development and market destination and land tenure that has favoured the allocation of long term sustainable forest licenses to a few large multinational companies with no local investment incentives or social responsibility) (Natural Resources Canada 2011; Lazar 2007). Recognizing the stagnant nature of the current industry as well as the economic dependence that many communities still demonstrate; alternative natural resource-based development opportunities to support community well-being are being explored (Cocksedge, Titus and Mitchell 2010; Keefer et al. 2010). Lack of diversity in terms of employment opportunities limits community resilience and restricts infrastructure development and overall well-being. Non-timber forest products (NTFP) are abundant in Northwestern Ontario and have been suggested as a possible source of economic development (Sims et. al 1997; Baldwin and Sims 1997; Duchesne, Zasada and Davidson-Hunt 2001). Wild blueberries in specific grow abundantly throughout the Boreal Forest Region of Northwestern Ontario and represent a potentially viable economic development opportunity.

Wild blueberries, an important NTFP natural resource, exist in a complex and dynamic environment, and reliance on such resources is also dynamic. The complex and dynamic environment refers to the complex relationships that exist between systems such as society, natural resources, food security and economic development.

Management regimes must therefore be inclusive to and incorporate such systems. In complexity theory, such systems are referred to as complex adaptive systems (CAS) and characterized by connected and diverse entities, interdependent and capable of adapting; and where the outcomes of adaptation are novel and rarely predictable (Page 2009).

While individual systems are dynamic and defined by a distinct set of characteristics, their interaction mutually shapes the evolution of all systems.

Natural resource-based business development has been severely constrained over the years as a result of policy development, market opportunities and access to capital all having been developed for conventional large scale businesses (Mcbain and Thompson 2011; Manwaring et al. 2011; LePage and Jamieson 2011). Furthermore, business development opportunities in the wild blueberry sector have been mostly limited to individual picking and selling, or through cooperative business development models. Until wild blueberries are recognized as a formal industry and supported through sector specific policies, further industry development will likely be slow and limited to small-scale isolated growth. Although there are no laws preventing the development of NTFP-based businesses, primary resource commodity development seems to have overshadowed the potential for NTFPs to support rural economic development. People are often hesitant to invest in new business endeavors as current natural resource management practices for timber and logging often engage in land based activities that

are barriers to NTFP development. Thus, even though wild blueberries on Crown land are a public resource and no special policy is needed to establish such a business, there is still fear of uncertainty and failure due to current land use licensing arrangements and practices.

This thesis, through case studies from communities of Northwestern Ontario and with specific reference to Ignace, Ontario, explores: the economic viability of wild blueberries as a potential development opportunity; wild blueberries as a local food source to increase food security; development of a pilot wild blueberry business; as well as the complex relationship that exists between society, natural resources and economic development. Chapter 1 provides a general background of the study as well as relevant information regarding wild blueberries in Northwestern Ontario and NTFPs and diversification of forest resource use. Chapter 1 also presents preliminary research methods and results that will provide a better understanding on the context of both papers. Chapters 2 and 3 are prepared as separate papers and submitted for publication in the *Journal of Forest Products Business Research* and the journal of *Society and Natural Resources*, respectively. Chapter 2 presents the results of willingness-to-pay and market demand survey for wild blueberries. Furthermore, Chapter 2 presents the results of a cost-benefit analysis based on *Ignace Wild Blueberries*, a wild blueberry picking and selling business that operated during the summer of 2012. Chapter 3 uses a CAS perspective based on complexity theory to explore how concepts of resilience and adaptation facilitate understanding why sustainable diversification of NTFP has been to date so challenging. Furthermore, Chapter 3 presents challenges faced by resource-based communities and discusses how through a complexity theory lens, these challenges are

viewed as connected, interdependent, dynamic and can either limit community resilience or act as a catalyst to social innovation. Chapter 4 synthesizes both papers and presents conclusions regarding the socio-economic viability of wild blueberries as a natural resource-based development opportunity and forest tenure and management considerations for such initiatives.

1.2 BACKGROUND

The forest sector of Canada has been severely downsized over the past decade. From 2000 to 2010, the number of direct jobs generated by the forest sector has reduced from 367,400 to 222,500 (Natural Resources Canada 2011). As a result, many communities are working to increase economic diversification through the creation of local natural resource-based opportunities (Davis 2011; Cocksedge, Titus and Mitchell 2010; Mitchell and Hobby 2010; Belcher et al. 2010; Forest BioProducts 2009). NTFPs occur in abundance throughout the Boreal forest of Northwestern Ontario and have been suggested as a potential source for natural resource-based economic development. NTFPs are not recognized as a formal sector, and as a result, limited support is offered by provincial governments in terms of land tenure, forest management and policy (Natural Resources Canada 2011; Lawson 2009). Limited research has been carried out to present case-specific examples of successful NTFP business development initiatives in rural communities of Northwestern Ontario. Such research is needed to promote further development of the NTFP, such as wild blueberry, industries in Northwestern Ontario, and to demonstrate the ability of NTFPs as a viable source of economic development through successful case studies.

In recent years, the Township of Ignace in Northwestern Ontario has been promoting economic diversification through community development projects, which focus on the natural environment, natural resources and tourism (The Township of Ignace 2007). The Ignace Economic Development Committee (IEDC) was established to optimize economic development opportunities within the Township of Ignace through strategic partnerships, education and economic development projects (The Township of Ignace 2007). Wild blueberries are abundant in the area and have been suggested as a possible alternative to diversify the local economy. With access to a community airport and for its location along the Trans Canada Highway and the Canadian Pacific Railway mainline, Ignace is well positioned to take advantage of the high consumer demand for wild blueberries and further develop the industry in Northwestern Ontario. The Township of Ignace in partnership with the Food Security Research Network and the Faculty of Natural Resource Management at Lakehead University is working towards the development of a wild blueberry co-operative in Ignace.

1.3 LITERATURE REVIEW

1.3.1 FOOD SECURITY

World Food Summit (1996) defined food security as physical and economic access to adequate, safe, and nutritious food to meet dietary needs and food suitable for an active and healthy life. Food security is regarded as a prerequisite for social progress and overall good health. Rural communities of Northwestern Ontario often face challenges of food insecurity stemming from absent or insufficient infrastructure, low income, a short growing season, remoteness and great distance to major centres, lack of communication and knowledge sharing within and between communities (Socha et al.

2012). Residents of rural Northwestern Ontario communities rely heavily on, or at least purchase mostly imported foods (Stroink and Nelson 2009). Even though these communities may have physical and economic access to adequate healthy food, food sovereignty is severely limited. In a situation where international food supply chains become restricted as a result of civil conflict, politics, or poor weather conditions, and the flow of food stops, formerly food secure communities could quickly become food insecure. Food sovereignty is an evolving concept that is dependent on food security. Both food security and food sovereignty must be considered and managed holistically (Nelson and Stroink 2012; Nelson and Stroink 2011).

Currently around the World there are approximately 850 million food insecure people (IFAD, FAO, and WFP 2012). 7.7% of Canadian households were food insecure in 2007-2008. Such numbers are even more troubling considering the fact that Canada produces more food than is needed (Wiebe and Wipf 2012). Although most communities in Canada would have been food sovereign at one point in time, industrialization and globalized free trade markets have since contributed to the current food insecurity and food subjugation faced by many communities today. Most food consumed by Canadians has been imported from international and often unknown sources. In many cases, food has travelled thousands of kilometers often having been stored in warehouses before arriving in the Canadian grocery stores. As a result, Canada's food system is largely integrated within and dependent on the global food system. Challenges faced by the global food system are, therefore, also felt by the Canadian food system.

Canada's agriculture and food policies, similarly to those of other developed nations are contributing to the current global food crisis wherein the industrialized, high-

input, export-driven agricultural production sector, along with concentrated corporate processing and retailing facilities are environmentally and socially unsustainable (Wittman, Desormais; Niebe 2012). In Canada, many communities are exploring alternative methods of agriculture and food production systems in an attempt to increase local food sovereignty through localized control of food production, marketing, and engaging in policy reform (MacRae and Abergel 2012).

1.3.2 WILD BLUEBERRIES IN NORTHWESTERN ONTARIO

The current wild blueberry industry is made up of individuals picking and selling, picking for personal use, or picking for people unable or unwilling to pick for themselves. Wild blueberries are sold fresh during the growing season or frozen for sale in later months. Individual harvest levels range from about 200 litres per season to about 1,500 liters plus per season. Wild blueberries are most commonly sold in four litre pails or three litre baskets. Assuming an average price of \$30 per four litre pail or \$25 per three litre basket if sold in Ignace, represents a gross income of \$1,500 per season to \$12,500 per season. These figures could possibly be much higher if wild blueberries are sold in cities such as Winnipeg, Thunder Bay or Toronto. In Thunder Bay for example, the going rate is about \$40 per four litre pail or \$35 per three litre basket.

In Northwestern Ontario, wild blueberry growth coincides most commonly with forest disturbances such as logging and wildfire. Although wild blueberry rhizomes would have been present in the soil prior to logging or wildfire, increased exposure to sunlight, water and nutrient availability promotes its emergence from the soil (Baldwin and Sims 1997; Hall et al. 1979; Smith 1969). In the case of logging, wild blueberry plants emerge the following year, while fruit set may appear over the next two to three

years (Baldwin and Sims 1997; Sims et al. 1997; Hall et al. 1979; Smith 1969). Areas having been disturbed by wildfire normally support vegetative growth and fruit set over the next few years. If left alone, a wild blueberry patch can remain productive for five to ten years or more. Many factors, both man-made and natural, can prolong and promote patch productivity or severely limit growth and patch duration. Competition from associated vegetation, herbicide applications and other silvicultural programs can severely limit wild blueberry growth (Moola et al. 1997). Likewise, tree planting and natural succession can prolong and encourage wild blueberries during early stages of plant growth. Tree cover can modify and regulate microclimatic conditions in favour of wild blueberry growth (Baldwin and Sims 1997; Sims et al. 1997; Hall et al. 1979; Smith 1969). During the first six to seven years of growth, trees provide shade and protection from exposure to weather extremes such as frost, heat, rainfall and wind. While wild blueberries require sunlight for growth and fruit production, these are equally able to benefit from a moderated microclimate with reduced temperatures, evapo-transpiration and weather extremes (Baldwin and Sims 1997; Sims et al. 1997; Hall et al. 1979; Smith 1969). After about seven years, trees become dominant and too big. At this point, blueberry plants no longer receive desired amounts of sunlight for growth. Blueberry rhizomes become dormant in the soil until future forest disturbances allow for emergence.

Three types of wild blueberries grow throughout the Boreal forest zone of Northwestern Ontario. Velvet leaf blueberry (*Vaccinium myrtilloides* Michx.), low sweet blueberry (*Vaccinium angustifolium* Ait.) and low sweet var. *Nigrum* blueberry are all common to the Boreal forest zone of Northwestern Ontario and occur in abundance

throughout the Kenora District (Baldwin and Sims 1997; Sims et al. 1997; Hall et al. 1979; Smith 1969). Both varieties of the low sweet blueberry are early seral species, grow in association with one another, and respond well to frequent disturbances. Velvet leaf blueberry on the other hand is a late seral species and may or may not grow in association with the other two varieties, and responds less well to frequent disturbances (Baldwin and Sims 1997; Sims et al. 1997; Hall et al. 1979; Smith 1969). Both the low sweet blueberry and its nigrum variety exhibit leaf pubescence (presence of leaf surface hair or trichomes). This feature is thought to increase resistance to glyphosate spray as leaf trichomes reduce the rate of glyphosate absorbed through the leaves. Leaf pubescence is absent in velvet leaf blueberries and as such, are more susceptible to the effects of glyphosate spray (Baldwin and Sims 1997; Sims et al. 1997; Hall et al. 1979; Smith 1969). For the purpose of this report, no distinction was made between different varieties of wild blueberries and the term wild blueberry refers to all wild blueberries growing naturally in the area.

1.3.3 NON-TIMBER FOREST PRODUCTS AND DIVERSIFICATION OF FOREST RESOURCE USE

The forest sector of Canada has been greatly downsized over the past decade. Socioeconomic benefits once provided by the sector no longer have the same impact on rural community development and wellbeing (Forest BioProducts 2009). Many rural communities have been prompted to explore and develop new forest-based opportunities in response to the Canadian forest industry crisis. In 2008, the Northeast Superior Forest Community (NSFC) initiated a request for proposal seeking a cooperative NTFP model development study. The goal of the proposed project was to develop an NTFP

cooperative in order to facilitate harvesting, marketing and sale of NTFPs. Forest BioProducts Inc. of Sault Ste. Marie was successful in its application and carried out a study for NSFC. The report compiled existing research, administered surveys and questionnaires with NTFP experts and consulted with government officials to explore the potential for sustainable NTFP management in the Northeast Superior Forest (Forest BioProducts 2009). The report relied heavily on traditional ecological knowledge of NTFPs, which is highly developed in rural and First Nation communities. NTFPs are highly valued by rural and First Nation communities as a source of income, food security and as an alternative to primary forestry activities.

Forest BioProducts Inc. (2009) studied a range of NTFPs and concluded that while markets are abundant and the potential for development is equally great. Although employment opportunities generated by most NTFP initiatives are low wage, job potential is high and capital cost is relatively low (Forest BioProducts 2009). The report highlighted the need for: additional NTFP inventories to support sustainable development; policy support; stakeholder collaboration and cooperation; and for development initiatives to be developed from within the individual communities seeking to participate in such activities (Forest BioProducts 2009).

Multiple-use forest management is applied as an alternative to the traditional management of forests for timber production (Cocksedge, Titus and Mitchell 2010). It is the practice of simultaneously managing forests for timber and non-timber values. As part of an effort to promote the incorporation of NTFPs into sustainable forest management, Cocksedge et al. (2010) conducted a survey in British Columbia to investigate interactions between forest and NTFP sectors. The survey was administered

to 287 respondents representing twelve different sectors. The survey was designed to elicit responses about NTFPs, the forestry sector and the awareness and importance of multiple-use forest management. The study explored opportunities and barriers to multiple-use forest management.

It was concluded that NTFPs could provide social, economic and ecological benefits to forest managers and communities, if they are incorporated within the scope of forest management planning (Cocksedge, Titus and Mitchell 2010).

Recommendations were made to the British Columbia Ministry of Forests and Range to “collaborate with other provincial ministries and agencies responsible for economic development and resource management to develop a provincial strategy for NTFPs and to allocate funds to support research, extension, professional education, policy development, infrastructure and other activities necessary to support the incorporation of NTFPs into sustainable forest management” (Cocksedge, Titus and Mitchell 2010).

In response to the conflicting objectives seen between timber and NTFP management (e.g. forest management geared towards timber development and economic objectives that outweigh social objectives) the British Columbia Inter-agency Non-timber Forest Resources Committee (IANTFRC) was established in 2006 by the Ministry of Forests and Range and the Ministry of Agriculture and Lands (Davis 2011). The Committee was established to facilitate a coordinated approach to non-timber forest resource management throughout British Columbia. The committee is a collaborative management effort between governmental and non-governmental bodies. Goals of the committee are to improve communication and coordination within the provincial

government and to advise the government on issues related to NTFP management in British Columbia (Davis 2011).

Mitchell and Hobby (2010) presented the results of a three year study carried out in 2001 that identified factors required for the successful commercialization of NTFPs. Many rural and First Nation communities rely heavily on NTFPs as a source of food, tradition and income. It has been recognized that recreational, aesthetic, traditional and cultural values of NTFPs are often more important than the proposed commercial values (Mitchell and Hobby 2010). Results presented by Mitchell and Hobby (2010) strengthened the case for NTFPs and their importance to forest management, and rural and First Nation livelihoods. Issues often arise as conservation and development objectives become conflicting and restrict sustainable development of NTFPs. Four management scenarios were presented as to their potential for sustainable NTFP development. The four scenarios include: traditional forest management, special management scenarios, NTFP management or rights, and management for emerging values (Mitchell and Hobby 2010). Although NTFPs are not likely to become the primary objective of forest management, they have the potential to be jointly managed with primary forest production. Land tenure was suggested as the most critical factor to sustainably developing the NTFP industry. NTFPs were recommended for management in private woodlots, community forests and First Nation communities, and in cultivated agroforestry systems (Mitchell and Hobby 2010). It was concluded that no single approach could be applied to all scenarios. Sustainable NTFP management must follow a production-to-consumption approach in which NTFPs are developed using a whole

systems approach. Such systems recognize and appreciate the relationships existing between NTFPs and local communities.

In Northern Manitoba, employment opportunities are limited to mining and forestry. Economic diversification and the creation of local natural resource-based opportunities has become the main focus of community development (Belcher et al. 2010). The Northern Forest Diversification Centre (NFDC) was established in 2000 by the Keewatin Community College to support the development and trade of NTFPs in Northern Manitoba. NFDC was highly successful and trained local people in harvesting, resource management, post-harvest processing and trade; coordinated the collection of products; processed and packaged products; and developed markets in which to sell the products (Belcher et al. 2010). Although the centre is no longer operational, from 2001 to 2006, more than two million dollars was invested by Western Economic Diversification and the provincial and federal governments to carry out training, support, and research and product development. During peak production, NFDC had eight full-time employees, marketed four hundred different products and generated a gross profit of \$28,000 (Belcher et al. 2010). In 2006 after funding was cut, NFDC was shut down and NTFP activities reduced. Most NTFP harvesters stated that they appreciated the services offered by the centre and would likely continue harvesting if it were reopened.

1.4 THESIS OBJECTIVES

The overall purpose of this research is to explore the viability both economic and social, of wild blueberries as a natural resource-based development opportunity for Ignace, Ontario. Specific objectives of this study are to: (i) identify the current structure of the wild blueberry industry in Ignace and surrounding communities; (ii) explore

through a community case study how a complexity theoretical lens can facilitate an understanding of the challenges associated with alternative development opportunities in communities of Northwestern Ontario; (iii) explore how concepts of resilience and adaptation facilitate understanding why sustainable diversification can smooth out the lows and highs of cyclical boom and bust; (iv) demonstrate that through a complexity's approach, such challenges may be better understood and overcome; (v) conduct consumer willingness-to-pay and market demand surveys; (vi) establish and operate a pilot wild blueberry picking/selling business; and (vii) conduct a basic marketing plan.

1.5 PRELIMINARY DATA COLLECTION METHODS AND RESULTS

Social networks in natural resources management is a way of promoting collaboration and knowledge sharing in a particular decision making process among a diverse range of actors interested in a common issue (Prell et al. 2009). Social networks in themselves are complex adaptive systems, where diversity among actors and viewpoints builds resilience and sustainability within the system. This project is to a large extent based in the context of complexity theory whereby actors are engaged in the emergence and self-organization of a wild blueberry co-op. The advantage of working in an emerging and self-organized system is that both resilience and robustness is enhanced by the maintenance of social, economic, cultural and ecological diversity (Prell et al. 2009). In a top-down management approach, a system may fall into a rigidity trap or a dominant view thereby reducing diversity in the system (i.e. one-industry towns) and essentially creating social, cultural or biological monocultures (Pretty 2011).

Data collection occurred primarily in Ignace, Wabigoon Lake Ojibway Nation and Sioux Lookout. The project however, was not limited to communities included in the study area, and further co-op development will be inclusive to any interested people and/or communities. While no official inventory exists to support the location and extent of the wild blueberry industry in the area, the study relied heavily on local knowledge from community members including historical and local, traditional ecological knowledge from community members. Blueberries are associated with many different values and such inherent diversity must be acknowledged and incorporated into data collection. Data was collected using a variety of different methods, including: individual interviews/questionnaires, open focus group discussions, informal discussions with community members, online surveys, community visits, attendance and participation at local farmers markets, festivals and other community events, and visits to blueberry picking sites. In order to incorporate multiple views associated with blueberries in the data collection procedure, surveys were administered to a wide range of participants, including: community members, blueberry pickers, economic development officers, school teachers and the principal, mayor, chief, town and Band councillors, conservation officer, OMNR employees and community development and facilities coordinator. Peoples' behaviour as well as their associated responses may differ between group and individual settings. It is, therefore, essential to collect responses from a variety of different settings as to better understand local patterns of interaction.

In the context of complexity theory, the methodology used in this project promotes the engagement of participants in the research process by: utilizing a snowball technique to identify and engage a maximum number of participants; discussing with

participants their perceptions on this initiative; completing the quantitative and/or qualitative analysis of discussion data; and engaging participants in collective development strategies. In Ignace, initial contact with blueberry pickers was established through the township office with further assistance from the economic development officer. Potential participants were contacted by phone to arrange individual gathering times. During each gathering, participants' were asked to identify other potential participants. Similar techniques were carried out in Wabigoon Lake Ojibway Nation and Sioux Lookout.

1.5.1 INDIVIDUAL INTERVIEWS AND FOCUS GROUP DISCUSSION

Individual interviews were arranged with blueberry pickers and community members in Ignace, Wabigoon Lake Ojibway Nation and Sioux Lookout. Individual interviews were voluntary meetings designed to discuss with individual participants, the potential for the area to support a wild blueberry co-op (as was suggested by community members to be a suitable business model) as well as to suggest possible strategies for business development. Questionnaires (Appendix A and B) were open-ended and administered to any willing person. In Ignace, responses were collected from the general public, blueberry pickers, the Conservation Officer, the Economic Development Officer, town councillors and the mayor. In Sioux Lookout, responses were collected from the general public, blueberry pickers, and town councillors, the Economic Development Officer and the Community Development and Facilities Coordinator. In Wabigoon Lake Ojibway Nation responses were collected from the general public, blueberry pickers, the Wabigoon Lake Training and Employment Corporation director, band councillors and the chief. Participants involved represented a diverse range of social networks.

An open focus group discussion was held in Ignace and designed as a group gathering to discuss the potential for Ignace and surrounding communities to support a wild blueberry co-op as well as to suggest possible strategies for business development. To encourage maximum input and participation from all participants as well as to ensure that no topics of interest were excluded from discussions, surveys were not strictly question/answer but designed more as open discussions. Issues covered during individual interviews and the open group discussion included: quantity of blueberries picked per day and in a given season; common pests and blueberry mortality; average distance traveled from town to blueberry picking sites; picking site accessibility; blueberry site characteristics; price per quantity of blueberries sold; number of people involved; interest in developing a co-op; services a co-op facility could offer; business development and marketing strategies; and other social, environmental, economic concerns. (Appendix D for newspaper articles related to researcher's time in Ignace area).

1.5.2 VISITS TO BLUEBERRY PICKING SITES

Field visits were arranged to observe firsthand blueberry site characteristics. Approximately forty sites were visited within the township of Ignace from which blueberries are or have been picked. Visits to picking sites were based strictly on what was seen and no set sampling procedure was followed. Site characteristics observed included: abundance of wild blueberries; extent of blueberry growth; general site characteristics; distance from town; relative accessibility and site disturbance.

1.5.3 VISITS TO WABIGOON LAKE OJIBWAY NATION

In communities such as Wabigoon Lake Ojibway Nation where an open focus group discussion could not be organized within the available time, several visits were made to the band office to discuss the potential for developing a wild blueberry industry in the area. Wabigoon Lake Ojibway Nation is another community where wild blueberries represent an important socioeconomic asset. People from Wabigoon Lake Ojibway Nation organize an annual blueberry picking camp north of Dryden and supply blueberries by contract to several buyers in Winnipeg. Details regarding the operation of this camp were focal points for the visits. Similarly to the questionnaires administered in Ignace, discussions in Wabigoon Lake Ojibway Nation were equally open ended and designed to elicit unrestricted responses from respondents.

1.5.4 VISIT TO NORTHWEST FARMERS MARKET, SIOUX LOOKOUT

Alternative and more informal methods were equally used to promote the project and capture information from a wide range of people. An information booth was set up at the Northwest Farmers Market in Sioux Lookout. The goal of this approach was to: raise awareness about the project; distribute information sheets regarding the project; provide additional information about the project; take in suggestions and concerns; answer any questions; and meet blueberry pickers or people interested in the project.

1.5.5 VISIT TO LAC SEUL FIRST NATION

On March 22 2012, a meeting was arranged between GCK Consulting, the Chief of Lac Seul First Nation, Lac Seul First Nation band councillors and employees, two professors from the Faculty of Natural Resources Management at Lakehead University and two natural resource management students. Lac Seul First Nation is currently in the

process of becoming interim managers of the Lac Seul Forest. They plan on managing a portion of the forest for blueberry production and have expressed great interest in participating in a co-op.

1.5.6 ONLINE SURVEYS

Online surveys were designed using Survey Monkey and distributed via (Appendix B) email in order to collect responses from respondents over a wider geographical area. Communities of Northwestern Ontario are often widespread, limiting the number of possible visits. The online survey was similar to the survey questionnaire and designed to capture thoughts and concerns regarding the development of a wild blueberry co-op in the area. The online survey was administered as an alternative to the use of open group discussions and individual interviews in cases where such methods were not feasible. Online surveys were mainly directed towards distant communities such as Savant Lake, Pickle Lake, Sioux Lookout and Lac Seul First Nation.

1.5.7 NEWSPAPER ADS

Three newspaper ads were posted in the Ignace Driftwood and one in the Sioux Bulletin (Appendix D). Newspaper ads were used as a promotional tool for raising project awareness and increasing the potential for input from all interested people.

1.5.8 PRELIMINARY RESULTS

Most respondents were comfortable with the idea of developing a wild blueberry co-op provided that it would not infringe on their picking rights or result in the implementation of a permit system. It is thought that during an average blueberry season, the quantity of wild blueberries could support a viable business, especially when

including blueberries from several communities and expanding over a large area. While most pickers are of the baby boomer generation (i.e. men and women born between the years 1946 and 1964) and tend to pick blueberries for personal use or to supplement their income, it is expected that more pickers would be needed to supply such a business. It was thought that students or anyone interested in picking blueberries could be encouraged to pick blueberries for the co-op. While a typical blueberry season lasts for six to eight weeks, and considering the unpredictable nature of wild blueberry supply, it was recommended for pickers to remain independent from the facility. In this way, pickers would be able to apply for other employment opportunities if needed. Hiring employees would likely be cost prohibitive and complicate the establishment process as the facility would become responsible for the health and safety of its employees. As an employer, the facility would be required to pay standard labour wages and benefits associated with employment. The facility is expected to act as another alternative outlet for blueberry sales. Pickers could become members of the facility but would still remain independent from the facility and would not be paid or treated as employees. This would allow people of varying picking abilities to pick at their own rate.

Issues raised during individual interviews, group discussions and online surveys are summarized in Table 1.

Table 1. Issues regarding the current wild blueberry industry

| |
|--|
| <p>Marketing and economics</p> <ul style="list-style-type: none"> • Local wild blueberries are currently limited to sale at roadside, farmers markets or through individual orders. • Lack of storage space and inability to store excess blueberries. • Lack of processing facilities for value added product development of wild blueberries. • Picking as individuals increases competition and leads to pickers being undercut by others. • Need for consolidation of blueberries harvested from many pickers. • Need for marketing as a single brand name to access larger niche markets. • Need for collaboration between pickers of different scales in order to leverage bargaining power while maintaining individual harvesting levels. • Sale of blueberries by many individual pickers saturates local markets and drive prices down. |
| <p>Wild blueberry yield and availability</p> <ul style="list-style-type: none"> • Variable distance to blueberry patches from town- requires improved coordination for picking to reduce mileage of individual pickers. • Inconsistent and relatively unpredictable nature of wild blueberry growth. |
| <p>Communication and collaboration</p> <ul style="list-style-type: none"> • Need for consultation with the Ontario Ministry of Natural Resources (OMNR) to obtain some licensed areas designated for Blueberry picking. • Lack of depletion maps (i.e. logged areas, burned areas) and maps of previously sprayed areas available for blueberry pickers. • Intercommunity licensed regions for blueberry harvesting that can minimize market risk from localized frost disturbance. • Lack of collaboration between OMNR and blueberry pickers to establish non-spray zones licensed for wild blueberry harvesting. |

1.5.9 PICKING SITES

Approximately forty sites were visited from which wild blueberries are picked. The sites varied in distance from town between one and fifty kilometres or more. Wild blueberries occurred most commonly on previously logged areas of which most are in close proximity to some type of built road. The majority of picking sites were accessible by vehicle as a result of their proximity to logging roads. Some people make use of all terrain vehicles (ATV) to access blueberries growing in more difficult terrain. Individual patch sizes varied greatly between sites, from 0.1 hectare (ha) to several hectares in size and occurred most commonly on previously logged areas. To account for blueberry yield variability between sites, people will pick from 1 or 2 to 30 plus sites in a given year

making mileage an important and possibly limiting factor when travelling alone. Blueberry picking seems to be an individual oriented industry with very limited collaboration between pickers for rides, collective picking or help finding productive blueberry patches. It is thought that developing an organized wild blueberry industry will encourage more collaboration between pickers as pickers of all scales will have equal opportunity in consolidating their blueberries to reach markets of scale.

1.5.9.1 ENVIRONMENTAL CONCERNS

Wild blueberry picking is a low impact activity and not expected to hinder the local environment. Most berry patches are accessible by road and in most cases vehicles don't leave the roadside in search of blueberries. Soil disturbance is also expected to be minimal as blueberries are a long lasting plant and spread via underground rhizomes. There is no risk of overharvest as berries grow in consecutive years regardless of the amount picked. Perhaps one of the greatest concerns was the risk of forest fire related to human recklessness. Cigarettes may be improperly discarded and act as an ignition source for fire. Forest fire severity risk is monitored by the OMNR and people intending on picking blueberries should be familiar with such risks and warnings. Since blueberry growth is disturbance driven, areas from which blueberries are picked are not likely supporting any areas of concerns. Blueberries are spread out over a large range and only a small portion of that range is actually picked. Although bears, birds and other animals consume wild blueberries, picking is not expected to interfere with animal consumption.

Spraying was a major concern expressed by respondents. Although OMNR has reported no risk of herbicide accumulation in the soil, concern is still prominent as to its potential long term effects. OMNR is responsible for ensuring that Ontario's forests are

renewed after logging. Herbicides are often applied as a method to promote the growth of newly planted conifers by destroying competitive deciduous species such as alder, poplar, pin cherry and raspberries. Unfortunately this practice kills blueberry plants. Public notices are posted 30 days before spraying is to occur (MNR n.d.). Since the effects of herbicide can be seen within a few days and blueberry plants are killed by this herbicide, the potential for picking contaminated blueberries is minimal during the season in which herbicide is sprayed. However, blueberries, with perhaps the exception of velvetleaf, will rebound. It is more difficult for a picker to know where spraying has occurred in previous years unless the picker can discern lack of other vulnerable deciduous species that in subsequent years are absent in the picking area indicating that herbicide sometime in the past has been used. If organic certification is the objective, knowledge of previously sprayed areas is essential. Transition to organic certification requires a crop to be managed organically for 36 months prior to any application for organic certification (Canadian General Standards Board 2011). Knowledge of the site's history is therefore needed.

2. PAPER I

WILD BLUEBERRIES AS AN ALTERNATIVE ECONOMIC DEVELOPMENT OPPORTUNITY IN RURAL AND FIRST NATION COMMUNITIES OF NORTHWESTERN ONTARIO

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2.1 ABSTRACT

Food security is increasingly being recognized as an important factor in community health. In an expanding 'green movement', people are now becoming more conscious about eating locally sourced and environmentally sustainable products more than ever before. Wild blueberries, a source of high nutrition, are abundant in the Boreal forests of Northwestern Ontario. This paper demonstrates the economic viability of wild blueberries business by exploring the market demand and willingness-to-pay for wild blueberries picked by rural and First Nation communities, and developing an economic profile of a pilot wild blueberry picking and selling business in and around the township of Ignace in Northwestern Ontario. A market survey is conducted and conjoint analysis is used to evaluate consumer preference and willingness-to-pay for locally-sourced wild blueberries. Cash flow statements and breakeven analysis demonstrate the economic feasibility of a pilot wild blueberry business established and operated in Ignace, Ontario during the summer of 2012. It is found that consumers like wild blueberries because of their good taste and overall high level of nutrition. Adults aged 55-64 years demonstrate the highest level of preference for wild blueberries, with women having a higher preference than men. Consumers having an average household income of \$50,000 to \$60,000 show highest preference for wild blueberries. The pilot business, Ignace Wild blueberries, sold 549.36 liters of blueberries in Kenora, Dryden, Ignace and Thunder Bay, generating net revenue of \$4,036.70. The results of this paper support wild blueberries as a viable food source for economic development and strengthening food security in the region.

2.2 INTRODUCTION

Fresh produce is often limited in Northwestern Ontario and fresh locally sourced produce is even less abundant (Nelson and Stroink 2013; Harry Cummings and Associates Inc. 2009). In many cases, local food is limited to sale at farmers markets or its point of production. Industrial food systems are largely driven by the principles of economics (i.e. quantity over quality) (Nelson and Stroink 2012; Allen and Wilson 2008). As a result, majority of food products available in grocery stores are imported from abroad, albeit being locally available in many cases (Allen and Wilson 2008). Not only does most of the money paid to purchase imported products leave the community, it also increases dependence on often unsecure sources of food; leaving communities vulnerable to inconsistencies in food supply and fluctuating market prices. Communities often face issues of food insecurity, although being rich in both local food resources and knowledge related to their use (Hamilton 2012; Belcher 2010; Mitchell and Hobby 2010; Duchesne, Zasada and Davidson-Hunt 2001). Local communities in Northwestern Ontario rely heavily on imported foods, as agriculture is restricted to a short growing season and fruit growth and production is limited (HCA 2009). However, in recent years, there has been an increase in demand for locally produced foods (Donald 2009; Irshad n.d.). Wild blueberries, a source of high nutrition, are abundant in the area and can be frozen or preserved for long periods of time (Sims et. al 1997; Baldwin and Sims 1997; Duchesne, Zasada and Davidson-Hunt 2001).

Literature pertaining to the Canadian blueberry industry has focused primarily on commercial production of blueberries. Central and Eastern Canada mostly produce lowbush blueberry (*Vaccinium angustifolium* Ait.), while Western Canada produces highbush blueberries (*Vaccinium corymbosum* L.) (Agriculture and Agri-Food Canada

2010 and 2012). The unregulated wild blueberries sector in the Boreal Forest of Northwestern Ontario has not attracted much attention of researchers as an economic development alternative for local communities. Economic development opportunities in communities of Northwestern Ontario have been limited to primary resource industries such as mining and forestry. However, the recent downturn of the forest industry has heavily impacted these communities with mill closures and out-migration. Wild blueberries, occurring naturally throughout the region can provide an additional source of income and food security for local communities (Sims et al. 1997; Hall et al. 1979; Smith 1969). There is an abundance of naturally occurring wild blueberries around the township of Ignace and its surrounding First Nation communities, including: Wabigoon Lake Ojibway Nation, Pickle Lake and Sioux Lookout in Northwestern Ontario. The current wild blueberry industry in the region around the township of Ignace is mostly made up of individual pickers and sellers. There is little or no collaboration among pickers. While the combined produce of all wild blueberry pickers may be substantial, the quantity collected by individuals is minimal. As a result, wild blueberries are often limited to sale at roadside, farmers markets, at home or by order. The price paid for wild blueberries varies and depends on the average sale price in the area as well as quality of the product in the growing season. Lack of collaboration among pickers has saturated local markets and forced individuals' prices to conform to the lowest market price. If individual pickers could consolidate and further process or develop their blueberries into secondary products, marketability and sales price could be greatly increased. Therefore, there is a need for organizing the localized wild blueberry sector through collaboration of local communities for the purpose of increasing business efficiency and profit margins.

This paper addresses the viability of developing a successful business based on wild blueberries in the township of Ignace in Northwestern Ontario. Specifically, this paper: (i) explores the market demand and willingness-to-pay (WTP) for wild blueberries picked by rural and First Nation communities in and around the township of Ignace in Northwestern Ontario, and (ii) develops and reports on the economic profile of a pilot wild blueberry business as an alternative natural resource-based economic development opportunity.

2.3 WILD BLUEBERRIES IN NORTHWESTERN ONTARIO

Although wild lowbush blueberries are also commercially grown in plantation-like settings, for the purpose of this paper the term ‘wild blueberry’ refers to blueberries occurring naturally in the Boreal Forest of Northwestern Ontario. Wild blueberries are being recognized for their economic value as a non-timber forest product in the Boreal Forest region of Canada (Natural Resources Canada 2011; Keefer et al. 2010; Barfoot 2006; Duchesne, Zasada and Davidson-Hunt 2001). About 50 species of NTFPs are commercially harvested in Ontario, whereas about 500 species are harvested throughout Canada (Natural Resources Canada 2011). Wild mushrooms, wild fruits and maple sap products make up the bulk of the industry (Duchesne, Zasada and Davidson-Hunt 2001). No official figures exist to support the annual growth yield of wild blueberries. However, the annual output of a managed lowbush blueberry field can range from \$3,360 to \$8,967/ha/yr depending on management intensity (Duchesne, Zasada and Davidson-Hunt 2001).

The commercial blueberry industry of Canada consists primarily of commercial, intensively managed lowbush and highbush blueberries, with an individual farm cash

receipts (FCR) value of 112 million dollars, representing 16.3% of Canada's fruit sector FCR (Agriculture and Agri-Food Canada 2010). Wild blueberries, picked from entirely natural stands, are unregulated and are not represented within Canadian fruit sector statistics. No official statistics exist to support the extent of wild blueberry growth in Northwestern Ontario (i.e. naturally occurring wild blueberries as a NTFP). However, local, traditional-ecological-knowledge (TEK) is well developed and suggests an abundance of wild blueberries in the region. Blueberry production yield varies greatly from year to year and between sites as a result of fire, weather, forestry activities and natural plant cycles (Baldwin and Sims 1997; Hall et al. 1979; Smith 1969). The Field Guide to the Forest Ecosystem Classification for Northwestern Ontario has well documented the presence of wild blueberries in many vegetation types (V-types). Each V-type represents a specific forest ecosystem based on observed patterns of vegetation and soil. In Northwestern Ontario, there are approximately 23 V-types in which wild blueberries occur as a common understory species (Sims et al. 1997). These V-types include, V4, V10 to V11, V13, V16to V20, V22, V25, and V27to V38. Wild blueberries are high in nutrition and contain beneficial amounts of Vitamin A, Vitamin C, Vitamin E, Vitamin B6, Magnesium, Manganese, Iron, Thiamine, Niacin, Phosphorous and Zinc Calcium. Furthermore, the blueberries contain no fat, sodium or cholesterol (WBPANS 2007; WBANA 2010). The pigments that give blueberries their distinctive colour, known as anthocyanins, contain the highest concentrations of antioxidants of any fresh fruit or vegetable. Antioxidants are vital components in helping the body combat free radicals known to cause cancer, heart disease and premature aging (WBPANS 2007; WBANA 2010). The antioxidants also improve the brain during aging and increase short term motor skills. Blueberry compounds including tannins and polyphenols aid in the

prevention of urinary tract infections as well as have anti-inflammatory benefits (WBPANS 2007; WBANA 2010).

2.4 DEMAND FOR WILD BLUEBERRIES

Wild blueberries have a growing reputation as a super-fruit and are heavily demanded in local, regional, national and international markets for their sweet flavour and nutritional benefits (WBANA 2010; WBPANS 2007). The Canadian wild blueberry sector experienced an increase of 45% and 11% in total marketed volume and acreage respectively over 2010 values (Canadian Horticultural Council 2011). Blueberries (commercially propagated blueberries) are now Canada's number one fruit crop, with a total blueberry industry market value of 203 million dollars, and total exports of 335 million dollars (Canadian Horticultural Council 2011). The consumption of fresh blueberries has nearly quadrupled in Canada since 1981, while newly developed specialty markets are still emerging (Agriculture and Agri-Food Canada 2010). Core fresh blueberry markets (70%) include adults aged 55 and older, Asian consumers and dwellings with an annual household income of at least US\$50,000 (Agriculture and Agri-Food Canada 2012). Undeveloped blueberry markets include teenagers and men aged 35-44, middle and low income households (Agriculture and Agri-Food Canada 2012). Although underdeveloped segments represent potential room for market expansion, income seems to greatly influence on blueberry consumption. Regardless of the health benefits associated with blueberry consumption, middle to low income households are not likely to consume blueberries unless the price falls within their household budgets.

2.5 METHODS

2.6 MARKET DEMAND AND WILLINGNESS-TO-PAY SURVEYS

Prior to the picking season, market demand and WTP surveys (Appendix C) were conducted to determine whether viable demand existed for Ignace wild blueberries. The survey was designed to elicit largely dichotomous (yes or no) and open-ended written responses. The surveys were administered to 68 volunteer respondents between the ages of 18 and 65 at the Thunder Bay country market between May 26 and June 13, 2012. The respondents consisted of 23.5% males and 76.5% females. Since the objective of this survey was to support the development of an actual wild blueberry picking and selling business, survey questions were designed for the purpose of identifying consumers' expectations from wild blueberries and products made with blueberries, their willingness to pay, and their preferred purchasing location. WTP is the maximum amount that an individual states they are willing to pay for a product or service, wild blueberries in this case (Griffith and Nesheim 2008; Carpio and Isengildina-Massa 2008; Wedgwood and Sansom 2003). Generally WTP refers to a hypothetical situation, and it must be noted that when the consumers are presented the product in real life, they may not actually be willing to pay their previously stated price. Moreover, when comparing blueberries from two different suppliers with the same characteristics, the cheaper of the two will almost always be purchased, even though the price paid was lower than their stated WTP (Griffith and Nesheim 2008; Gooch 2007; Carpio and Isengildina-Massa 2008; Wedgwood and Sansom 2003).

Consumer preferences were evaluated using the statistical method of conjoint analysis. Consumers were asked to make decisions about purchasing the Ignace wild

blueberries based on what they value and how they reconcile trade-offs. We used conjoint analysis to determine the combination of characteristics that is most influential on consumers' purchasing choice (Prairie Research Associates n.d.). The wild blueberries with multiple traits were deconstructed into individual traits, each having an associated utility. The sum of all part-worth utilities allows for a total utility determination for any combination of attributes. Therefore, the conjoint analyses helped in evaluating Ignace wild blueberries acceptance among consumers and consumer WTP for different traits of the product (Yue and Tong 2009; Fields and Gillespie 2008; Bernard et al. 2007; Harrison et al. 2005; Manalo et al. 1997).

2.7 BUSINESS DEVELOPMENT

A pilot wild blueberry business in Ignace was developed using a small business summer company grant awarded by the Ontario Ministry of Economic Development and Innovation. Although the business operated as a sole proprietorship as per the requirements of the grant, the local residents of Ignace and its surrounding First Nation communities, who have been involved in picking wild blueberries for a long time, collaborated in the development of marketing plan and business operation. In order to demonstrate the profits from this pilot business, a cash-flow statement was developed for Ignace Wild Blueberries. Finally, a break-even analysis (BEA) was done based on actual business sales. BEA represents the number of units needed in order for total revenue received to be equivalent to total costs associated with the sale of the product (Gutierrez and Dalsted 2012; Tutor2u 2012). Since the business was in operation only for one season, no depreciation was incorporated into the calculations of BEA.

2.8 RESULTS AND DISCUSSION

2.9 MARKET DEMAND AND WILLINGNESS-TO-PAY ANALYSIS

Table 2 represents the age distribution of the respondents. The market segments of young adults (18-24 years) and those aged 35-44 years were found to be underdeveloped in the literature, and therefore, represent great potential in terms of total blueberry consumption.

Table 2. Age class distribution of respondents

| Age class | Number of respondents | Percentage (%) |
|-----------|-----------------------|----------------|
| 18-24 | 8 | 11.8 |
| 25-34 | 20 | 29.4 |
| 35-44 | 8 | 11.8 |
| 45-54 | 12 | 17.6 |
| 55-64 | 16 | 23.5 |
| 65+ | 4 | 5.9 |

All the respondents claimed eating fresh and frozen blueberries, and other blueberry products including: beverages, pastries and desserts. 47% of the respondents claimed their blueberries were sourced from Northwestern Ontario, while 29.4% of the respondents were unaware of the geographic location from where their blueberries were sourced (Figure 1).

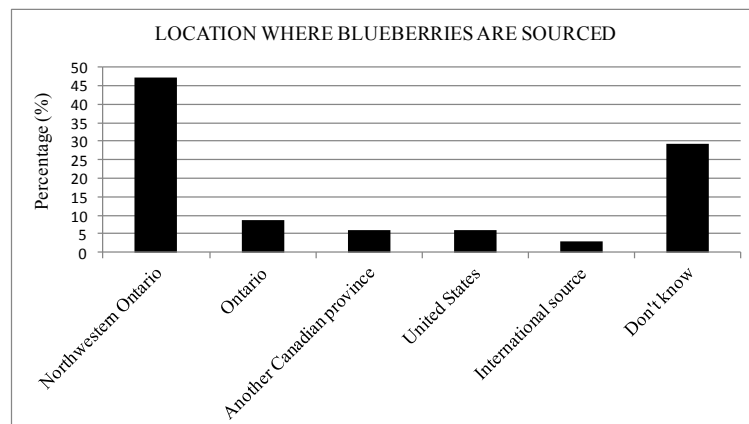


Figure 1. Geographic location where blueberries are sourced

Such a trend would suggest that many people are making an effort to locate and purchase locally sourced wild blueberries. The majority of respondents claimed paying from \$7.50-8.33 per liter. 82.4% were willing to pay more for wild blueberries sourced from Northwestern Ontario, 5.9% were not willing to pay more, and 11.8% of respondents did not answer the question. Those willing to pay a price premium for locally sourced (Northwestern Ontario) wild blueberries were willing to pay a premium of 15% (\$8.6- 9.6 per liter) to 25% (\$9.4 to \$10.4 per liter). Respondents' willingness to pay more indicates an overall interest in locally sourced wild blueberries. Primary reasons given by respondents for their willingness to pay more for locally sourced wild blueberries include: locally produced, supporting local businesses, better taste and freshness, and decreased carbon dioxide (CO₂) levels through shorter transportation distances. The respondents also stated that the specific characteristics they were looking in wild blueberries were: freshness, sweet and firm, chemical-free, full of flavour and clean. 66.7% of respondents claimed eating wild blueberries for their good taste and health benefits (high level of nutrition). Most convenient locations to buy wild blueberries included: farmers markets, cooperatives, roadside vendors and direct delivery. Respondents also commented on the importance of locally sourced food products and stated that benefits gained from sourcing wild and possibly chemical-free blueberries from Northwestern Ontario outweigh the benefits of sourcing organic blueberries from national or international sources or the consumption of conventionally farmed blueberries from any source.

Table 3 provides a measure of relative importance for a number of attributes. Importance values, expressed as a percentage, are computed by taking the utility range for each factor separately and dividing by the sum of the utility ranges for all factors.

The importance values are computed separately for each subject, and results are then averaged over all the subjects. Age and income were found to be the attributes that indicate the greatest consumer preference.

Table 3. Relative importance of each attribute

| Importance Values | |
|-------------------|-------|
| Age | 26.37 |
| Income | 18.23 |
| From where | 13.89 |
| Eat why | 13.44 |
| Gender | 7.09 |
| Percentage | 6.31 |
| Eat | 6.14 |
| Pay more | 6.02 |
| Price | 2.51 |

Adults aged 55-64 years demonstrate the highest level of preference for wild blueberries. This is consistent with a report released by Agriculture and Agri-Food Canada in 2012, which concluded that blueberry consumption is highest among adults aged 55 and older. Other age classes showing preference for wild blueberries but to a lesser extent include adults aged 45-54 years and adults aged 35-44 years. Annual household income also influences consumption of wild blueberries. Although preference for wild blueberries did not increase exponentially with increasing income, preference was highest among households with an annual income of \$50,000 - \$60,000 followed by households with an annual income of \$30,000 - \$40,000. Wild blueberries are known for their nutritional benefits. The antioxidants properties of blueberries have been found to help the body in combating free radicals known to cause cancer, heart disease and premature aging. The geographic location from where blueberries were sourced was the third most important factor. Respondents preferred wild blueberries sourced from Canada as compared to other international sources. The next important factor in

consumer preference was “Why do people eat blueberries?” The health benefits and taste were the most influential attributes in this category. Gender was the next most influential factor dictating the consumption of blueberries. We also found that females are more likely to consume blueberries as compared to males (Agriculture and Agri-Food Canada 2012). Most respondents were willing to pay a price premium of 25% (\$8.00-12.00 per litre) for locally sourced wild blueberries. The conjoint analysis also reported Pearson's R and Kendall's tau, measures of correlation between observed and estimated consumer preferences, as a check on the validity of individual utilities. Pearson's R of 0.5 and Kendall's tau of 0.3 were found with p-values of 0.000. Therefore, respondents' preferences are significantly related to specific product attributes.

2.9.1 IGNACE WILD BLUEBERRIES BUSINESS DEVELOPMENT

The pilot wild blueberry business (named Ignace Wild Blueberries) was started with a summer company grant of \$1,500. The business operated as a sole proprietorship with help from local (Ignace and surrounding communities) blueberry pickers from May 2012 to August 2012. The business offered wild, naturally occurring blueberries locally sourced from the Boreal Forest Region of Ignace Township. The first wild blueberry crop was harvested on July 13, 2012 and continued through August 18, 2012. After August 18, 2012, the wild blueberries began to shrivel and the season came to a relatively abrupt end as a result of poor weather conditions.

Potential wild blueberry patches were explored on Crown land in and around the township of Ignace in June 2012. A number of patches were selected as the wild blueberry yield varies from year to year, and between sites as a result of fire, weather,

forestry activities and natural plant cycles. These patches were monitored over the next few weeks. Wild blueberries were picked by hand and placed into large plastic pails. Full pails were stored in a truck until the end of the workday. Blueberries were then transported to the shop, where these were further cleaned of stems, leaves and dirt, packaged and stored or frozen. Blueberries were stored in a cool dry room and sold within a few days. Blueberries were not further processed or preserved using any chemical products. Blueberry orders were collected prior to the picking season and delivered at a convenient location, as requested by the consumer.

A marketing plan was developed to identify and assess potential wild blueberry business opportunities and outline the business strategy to create, satisfy and maintain customers. Based on marketing research, it was found that wild blueberries are associated with an abundance of nutritional benefits and as such, can be marketed to people in all demographics. Younger age groups consume blueberries for healthy growth and development, whereas older age groups consume blueberries for their high concentrations of antioxidants. Target demographics (people aged 25-69 years) represent a population of 73,729 in Thunder Bay, out of total population of 123,703 (Statistics Canada 2012). Ignace Wild Blueberries were marketed as a locally sourced, naturally occurring product, sold fresh in reusable plastic pails and cardboard baskets (collected from consumers and reused), and frozen in freezer-safe zip lock bags. Blueberries of the best quality were picked, packaged and delivered directly to the customers at a convenient location. A continuous feedback loop ensured that the consumer demands are met.

Wild blueberries were very well advertised in the Thunder Bay Country Market, as most people attending the Thunder Bay Country Market value the importance and

quality of locally sourced products and represent an existing and well developed potential customer base. In addition, business brochures were distributed at various locations throughout Thunder Bay as a promotion and advertisement strategy. An online advertisement was posted on Kijiji Thunder Bay/Ignace website to both promote the product and take orders. The advertisement received about 600 views and about 700 litres worth of orders. A business profile was also created on Facebook that allowed general public to place orders and leave comments.

Wild blueberries were sold for \$25.00 per 3 litre basket and \$30.00 per 4 litre plastic pail. During the berry season of 2012, Ignace Wild Blueberries picked and sold 549.36 liters to consumers in Kenora, Dryden, Ignace and Thunder Bay. Total start-up and ongoing maintenance costs were \$2,928, and net revenue of \$4,037 was obtained at the end of the business. The breakeven point of Ignace Wild Blueberries was found to be 80.5 units, \$2,415 or 322 liters. Although growing conditions during the summer of 2012 were unfavourable for wild blueberry growth, the abundance of picking sites in the area allowed for a consistent supply. On average, we picked 24 to 32 liters of wild blueberries per day. Apart from weather, the cost of fuel proved to be the biggest expense. Prior to the picking season, Ignace Wild Blueberries created a customer list and collected orders. The quantity of orders taken far exceeded the quantity of blueberries actually supplied. Since customers were lined up prior to the picking season, wild blueberries were sold within one to three days.

2.9.2 CONCLUSIONS

People are becoming more health conscious and prefer locally sourced and environmentally sustainable food. With an abundance of wild blueberries in the Boreal

forests of Northwestern Ontario, this local source of food can provide an alternative economic development opportunity in rural and First Nation communities of Northwestern Ontario. In this paper we explored economic viability of the wild blueberries business by rural and First Nation communities in and around the township of Ignace in Northwestern Ontario. The results and analysis of the market research survey indicate that age had the highest influence on wild blueberry consumption, followed by income. The pilot wild blueberry business was profitable, even though the growing conditions during the summer of 2012 were unfavourable for wild blueberry growth. Blueberries were picked from patches at distances in excess of 60 kilometers one way from the town. Apart from weather, the cost of fuel proved to be the biggest challenge. Given the poor yield, only a limited quantity (24 to 32 liters) of blueberries could be picked in a day. However, the quantity of wild blueberries demanded by the customers far exceeded the quantity actually supplied. We offer the following suggestions in order to make wild blueberry business economically viable and sustainable for the local and First Nation communities in the region:

1. The business could be operated as a producer cooperative, an enterprise that is jointly owned and operated by its members. As a collective group working towards common marketing goals, more resources could be made available for the facility. Many blueberry pickers for example have a well developed customer base, but are unable to meet such a high demand. As a collective business, yield could be substantially increased.
2. Knowledge of the land base of other blueberry pickers could be utilized in locating an abundance of productive wild blueberry sites. Furthermore, travelling as a group will reduce individual mileage bills.

3. The wild blueberry cooperative could collaborate with Wabigoon Lake Ojibway Nation to identify picking sites, consolidate blueberries and to share transportation costs. People from Wabigoon Lake Ojibway Nation organize an annual blueberry picking camp north of Dryden and supply wild blueberries by contract to several buyers in Winnipeg. The camp runs for the duration of the wild blueberry season, about 6-8 weeks and is said to support 100 pickers on average. The camp can supply anywhere from 1,000-1,500 pounds of blueberries per day.
4. Wild blueberries, having an important social value for Northwestern Ontario region, should be integrated into forest management planning by the OMNR. The wild blueberry business cooperative should work in collaboration with OMNR to gain secure and long term access to wild blueberry picking sites.

2.9.3 ACKNOWLEDGEMENTS

Financial support from the Ontario Ministry of Economic Development, Trade and Employment Summer Company program is gratefully acknowledged. We greatly appreciate the help of Stefanie Armstrong, Northwest Business Centre, for support in business planning and development, Doug Pronger, Economic Development Officer, Ignace Ontario, for his support and promotion of Ignace Wild Blueberries, and John Graveson, Thunder Bay Country Market, for use of a booth free of charge during at the Thunder Bay Country Market. We thank Emile Desforges, Ignace Wild Blueberries business partner for his help locating productive blueberry patches and for his help picking and marketing blueberries. Finally we thank Dr. Chander Shahi and Dr. Connie Nelson for their help formulating a business plan for Ignace Wild Blueberries, for their

support and guidance in business development and management and in analyzing data and writing and editing this manuscript.

3. PAPER II

COMPLEX ADAPTIVE SYSTEMS PERSPECTIVE: A CASE STUDY OF THE EMERGENCE OF A WILD BLUEBERRY CO-OPERATIVE IN IGNACE, ONTARIO

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3.1 ABSTRACT

Natural resource-based communities have long been characterized as cyclical communities of ‘boom and bust’ shaped by external market forces, state policies and resource supply. From a complexity lens we explore how concepts of resilience and adaptation facilitate understanding why sustainable diversification to smooth out the lows and highs of cyclical boom and bust has been to date so challenging. Resource based communities during the down times often face social, environmental and economic challenges. From a complexity lens these challenges are viewed as connected, interdependent, dynamic, and can either limit community resilience or act as a catalyst to social innovation. This case study of a community in northern Ontario struggling to diversify their economic based through the development of a native wild blueberry cooperative illuminates the complex relationship that exists between people and natural resource development.

Keywords: complexity, complex adaptive systems, social enterprise, community capacity building, non-timber forest products, wild blueberries

3.2 INTRODUCTION

Wild blueberries are abundant in Northwestern Ontario (Sims et. al 1997; Baldwin and Sims 1997). They have been suggested as an alternative opportunity in communities where growth and economic development are often limited to primary resource industries such as mining and forestry (Hamilton 2012; Belcher 2010; Mitchell and Hobby 2010; Duchesne, Zasada and Davidson-Hunt 2001). As food security and social enterprise development are increasingly recognized as essential factors in supporting community wellbeing (Food Secure Canada 2012; Stroink and Nelson 2013; Socha et al., 2012; Metcalf Foundation 2008), the potential for locally sourced and environmentally sustainable products such as naturally growing blueberries becomes evident. NTFPs such as wild blueberries have emerged as an opportunity to encourage community resilience through economic diversification, capacity building, community empowerment and collective management (Nelson and Stroink 2012; Cocksedge, Titus and Mitchell 2010; Keefer et al. 2010; MacPherson 2010). The purpose of this paper is to explore through a community case study how a complex adaptive systems (CAS) theoretical lens can facilitate an understanding of the challenges associated with alternative development opportunities in communities where growth and economic development are limited to primary resource industries such as mining and forestry.

Prolonged dependence on primary commodity resource industries such as mining and forestry (e.g. pulp and paper and lumber) seems to have severely limited community resilience and economic diversity (Prell et al. 2009). Primary resource industries are typically subject to boom and bust cycles whereby a period of increased growth, employment, and economic activity is followed by a period of limited or decreasing

economic growth (Gibbons et al. 2009; Freudenburg 1992; Gramling and Brabant 1990; Freudenburg 1986). Forest policies, land tenure, and forest management as a whole have all been designed to support the development of timber-based products (CFSA 1994; Natural Resources Canada 2011). Although laws guiding such regimes are generally based on well-developed scientific theories, they are formulated in distant cities by people often lacking practical and/or place-based knowledge and are vetted through a centralized political process (CFSA 1994; Natural Resources Canada 2011). As a result, community needs and the complex nature of the system are often ignored. Conventional businesses generally place economic goals at the forefront of their objectives, with social, environmental and other goals being secondary or consequential. In Ontario's forest industry for example, strict adherence to such laws has led to a situation in which a small number of large multinational companies hold sustainable forest licenses (SFL) on the majority of land within the area of undertaking (AOU) (i.e. area of land where forest management is permitted) (OMNR 2011). Such a strong focus on timber-based products has left little or no room for the emergence of alternative natural resource-based opportunities (Keefer et al. 2010; Hope 2011; Folke et al. 2010; Mitchell and Hobby 2010).

From a CAS lens we explore how concepts of resilience and adaptation facilitate understanding why sustainable diversification that can smooth out the lows and highs of cyclical boom and bust has been to date so challenging. Resource based communities during down times often face social, environmental and economic challenges, unemployment and poverty, lack of diversity in employment opportunities, lack of public services, environmental degradation and loss of community control, food security

and on-going dependence on commodity-based natural resource development. From a CAS lens these challenges are viewed as connected, interdependent, dynamic, and can either limit community resilience or act as a catalyst to social innovation (Westley et al. 2007). This case study of a community in northern Ontario struggling to diversify their economic base through the development of a blueberry cooperative illuminates the complex relationship that exists between people and natural resource development. The paper seeks to demonstrate that through a complex adaptive system's approach, such challenges may be better understood and overcome. Following an overview of the case study area, a discussion of the theoretical framework and a presentation of the methodology, we present an analysis of the challenges in developing a wild blueberry cooperative through a CAS perspective.

3.3 OVERVIEW OF THE CASE STUDY

The town of Ignace (population 1,200) is located 250km Northwest of Thunder Bay and is an important service centre for the region (Figure 2 and 3). The abundance of forests, lakes and rivers make Ignace a desirable destination for outdoor tourism activities. The town's location along the Trans Canada Highway and Canadian Pacific Railway line are said to provide numerous economic benefits (Township of Ignace 2007). Ignace has a very high forestry employment dependency ratio and is therefore susceptible to the effects of boom and bust (Lawson 2009). Prior to 2006, twenty one percent of the workforce was employed in the forest sector with nearly twenty one percent of the labour force unemployed (Lawson 2009). In 2006, the Abitibi-Bowater sawmill closed and many jobs were lost. Following closure of the mill, the unemployment rate was slightly reduced. However, this trend was attributed to the

increased rate of emigration that occurred over the past decade (Lawson 2009). Between the 2001 and 2006 Census, the population of Ignace decreased from 1,709 to 1,431 (Lawson 2009). Although forestry still remains an important source of employment in the region, the town is seeking alternative development opportunities.

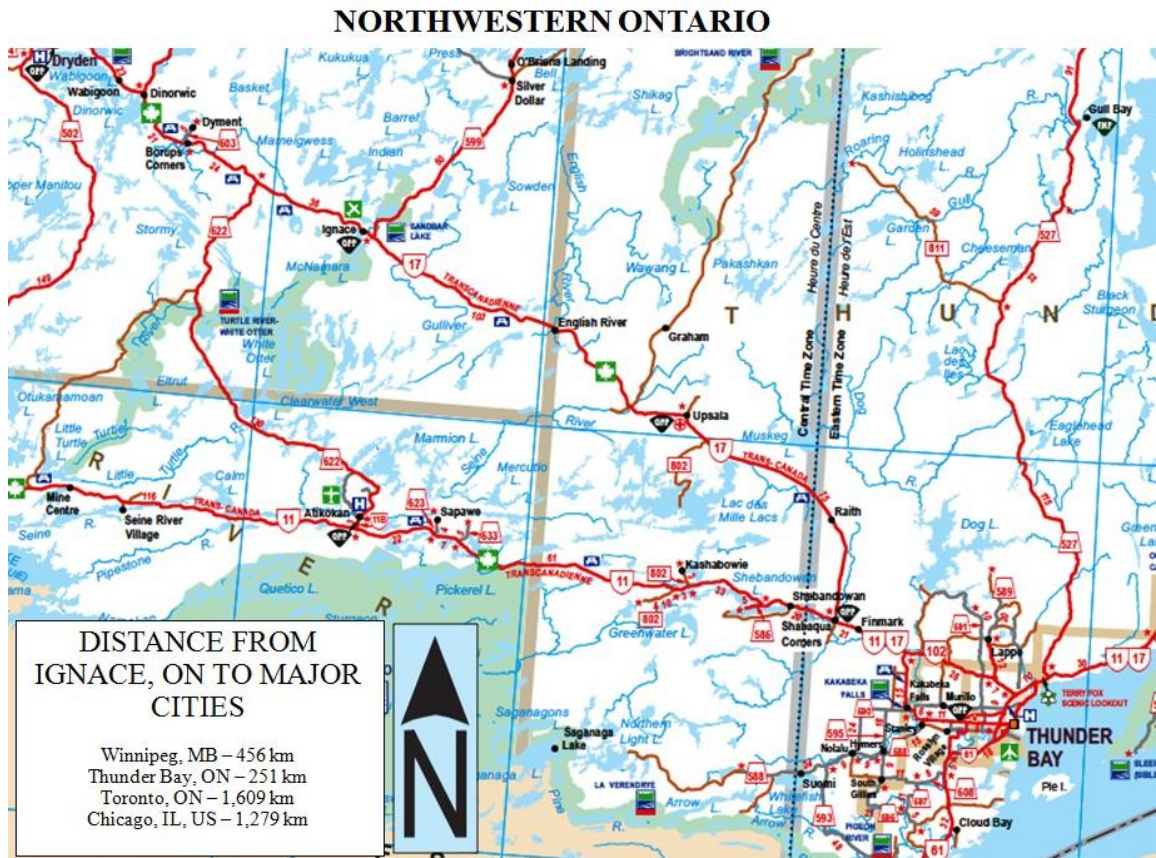


Figure 2. Wild Blueberry Co-op Study Area

Source:

<http://www.mto.gov.on.ca/english/traveller/map/images/pdf/northont/sheets/Map13.pdf>

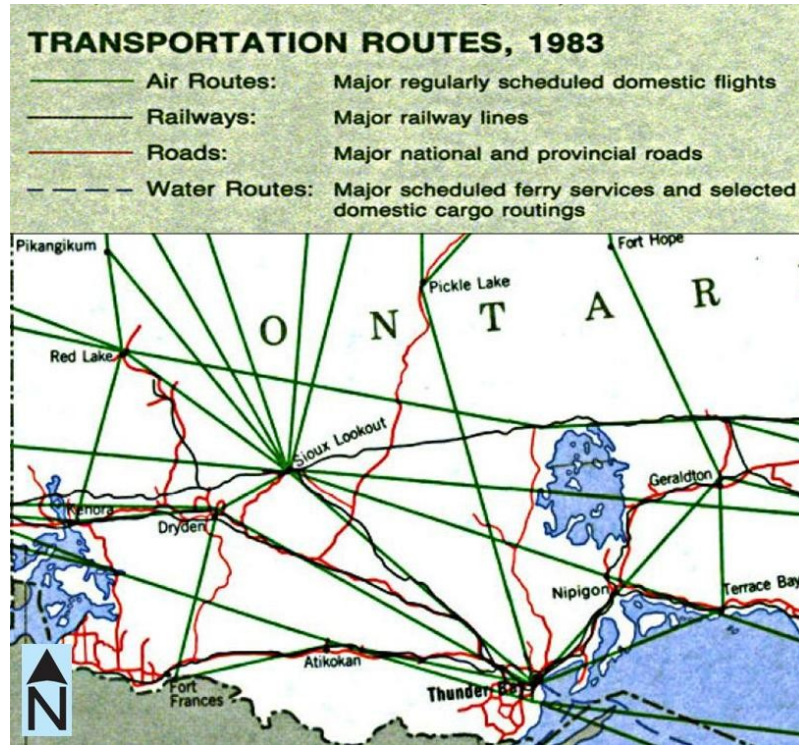


Figure 3. Ontario transportation network

Source:

<http://atlas.nrcan.gc.ca/site/english/maps/archives/5thedition/economic/transportationandcommunications/mcr4070>

Wild blueberries are abundant in Ignace and were identified by community residents as a potential development opportunity that integrates local interests through place-based strengths. From this perspective, the potential for wild blueberries as a sustainable business initiative is evident. In Ignace, wild blueberries have been an important potential socioeconomic opportunity for decades and the area has a well developed albeit small picking community. The OMNR office is located in Ignace and finally, Ignace is in close proximity to other blueberry picking communities such as Wabigoon Lake Ojibway Nation, Dryden, Sioux Lookout, Savant Lake, Pickle Lake and Lac Seul First Nation.

3.4 THEORETICAL FRAMEWORK

Overview. Past research has applied CAS to describe various complex socio-ecological systems (McCarthy et al. 2011; Walker and Salt 2006). This study applies a CAS perspective in relation to complexity existing between people, NTFPs and social enterprise development. Thus, similarly to other research (McCarthy et al. 2011; Simmie and Martin 2010) this study argues through the use of a CAS theoretical perspective, that society, NTFPs and the development of a wild blueberry co-op can also be understood as Complex Adaptive Systems and examined through this lens. From this perspective, the study of NTFPs such as the emergence of a wild blueberry cooperative is nested within the ecological system that includes humans within the environment. The emergence of a wild blueberry cooperative can be viewed as interacting, interdependent and co-evolving nested within this social, economic and political milieu. All nested systems are dynamic and while defined by a distinct set of characteristics, their complex interactions mutually shapes the evolution of these nested systems. Thus, emergence suggests that rather than being planned or controlled, agents in a complex system interact in seemingly random ways (Walker and Salt 2008; Westley et al. 2007). Closely related to the concept of emergence is self-organization. It is important to note that in CASs there is no central command center; but through rich interactions of all components, collective properties of the whole system emerge. This feature is known as self-organization and lacks all top-down command. Through such interactions, patterns emerge that influence the behaviour of agents within the system as well as the behaviour of the system itself. In other words, the system as a whole is much more than the sum of its individual parts (Waltner-Toews 2008; Walker and Salt 2008; Westley et al. 2007). From this co-evolutionary perspective while systems exist within their own environment, they are also

part of a larger collective environment of nested systems (Waltner-Toews 2008). As environments change, individual systems must also change to remain sustainable (Waltner-Toews 2008).

Adaptive Cycle. As Complex Adaptive Systems, all of these nested systems are characterized by connected and diverse entities, interdependent and capable of adapting; and where the outcomes of adaptation are novel and rarely predictable (Page 2009). They produce bottom-up emergent phenomena where what occurs in the dominant system differs in kind from what occurs through the interaction of individual and smaller sub-systems (Pretty 2011; Waltner-Toews et al. 2008; Westley et al. 2007). Thus, a useful concept to understand the emergence of a wild blueberry cooperative is what Holling (1986) first described as the ‘adaptive cycle’ (Figure 4).

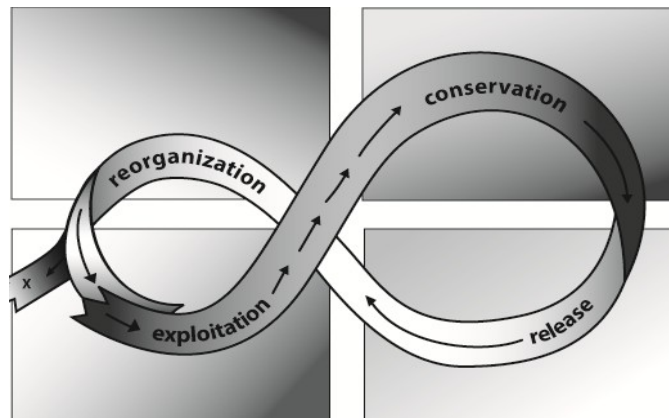


Figure 4. Phases of the Adaptive Cycle

Source: adapted from Nelson and Stroink 2012a.

The adaptive cycle describes how systems change and develop over time and is depicted as having four distinct phases: growth, conservation, release and reorganization (Westley et al. 2007). The growth and conservation phases make up the forward loop; while the release and reorganization phases make up the back loop. A system may

become untenable in the forward loop when people cling to practices that are no longer representative of their needs. Hierarchical and bureaucratic structures can stifle adaptation and change, and when people lack connectivity, comprehension, an open mind and direction, new ideas can have difficulty emerging or gaining impetus (Westley et al. 2007). During the release phase (i.e the development of novel entities or ideas) of the backward loop, one of the main challenges restricting movement into the reorganization phase in the adaptive cycle is known as the poverty trap. A poverty trap occurs when a system is able to exist in a given, limited state but unable to accumulate sufficient potential from larger structures and grow (Westley et al. 2007). Thus, the system may release itself from the rigidity of the conservation phase and move into adaptation to a new emerging idea like a blueberry cooperative but fail to gain the momentum to draw on the capital and resources from the conservation phase to reorganize.

The forest industry of Ontario is a great example to analyze this adaptive cycle. The current forest management system is no longer sustainable and the industry has remained fixed in the conservation phase; a small number of large multinational companies holding SFLs on most of the land. Even though many of these large logging companies have since gone bankrupt or are no longer operating, they have remained primary licence holders. Resources are essentially locked up in long term lease agreements and the effects of the rigidity trap become evident. There is limited room for new actors to emerge and make use of the resources. Persistent and ongoing downturn in the forest industry has triggered release from the dominant regime, where the previously 'organized' system was essentially destroyed so that new ideas may arise (Westley et al.

2007). Next, the reorganization phase, focusing on exploration and innovation, has influenced forest tenure reform and a shift to community-based forest management (Westley et al. 2007). During this phase, NTFPs, and more specifically wild blueberries were identified as a possible development opportunity. The release phase, in which new opportunities are identified, integrated and combined to form the basis for the new system; integration of NTFPs into forest management. Continuous communication and information sharing allows the system to remain adaptive in a changing environment (Westley et al. 2007). While there is no panacea, NTFP-based opportunities represent one potential alternative that are influenced in terms of availability, environmental disturbances, and market demand.

CAS suggests that all systems will eventually move through each of the four phases. However, it is possible for social systems to abort their developmental progress through the adaptive cycle returning to an earlier phase or ceasing to exist before reaching the conservation phase (Simmie and Martin 2010; Walker and Salt 2006). These adaptive cycle phases are explored in greater detail in the case study analysis to follow.

Resilience. From a CAS lens, socio-ecological resilience argues in favour of “people and nature as interdependent systems” (Folke et al. 2010). Rather than conceiving resilience as “a return to normalcy” (Pendall et al. 2010), a perspective that has traditionally been applied to the boom and bust cycles of natural resource industries, a CAS perspective views systems interactions as being resilient through change, adaptation and transformation to disturbances or stressors (Davoudi 2012; Folke et al. 2010; Simmie and Martin, 2010). Resilience is defined as the capacity of a system to absorb

disturbance and reorganize while undergoing change so as to still retain essentially the same function, structure and identity (Walker and Salt 2008). Diversity, modularity and tight feedback loops are three major components of resilience (Walker and Salt 2008). For example, diversity refers to the integration of multiple views, values and/or uses of an individual component into a particular system (Walker and Salt 2008; Waltner-Toews 2008). It is often applied as a mechanism for reducing dependence on any one individual entity. Communities in Northwestern Ontario often face social, environmental and economic challenges related to this lack of diversity. Specifically, challenges might include unemployment and related cyclical poverty due to lack of diversity in employment opportunities and related lack of diversity from the tightening of eligibility requirements and length of time for Employment Insurance (EI). In addition, natural resource management practices have influenced environmental degradation thus limiting the diversity of options for alternative land uses as well as well as legislation mandates that centralize decision-making and control, favour a 'best practices' approach and thus decreases the diversity from community level decision-making for place-based approaches like a wild blueberry cooperative. In CAS, the concept of sub-optimal refers to the notion that complex adaptive systems don't need to be perfect in order to thrive in or benefit their community. Sub-optimal suggests that the system need only be slightly better than competition (Westley et al. 2007).

Modularity in CAS refers to clusters of components that interact with each other and with their environment both as a collective and as a single entity (Westley et al. 2007). Although blueberries have emerged as a potential development opportunity; their development is still interconnected and interdependent on many other components.

Individual components interact in seemingly random ways to form a collective and dynamic system. Forest tenure reform, NTFP harvesters, natural resource managers, logging, and wildfire are some examples of components that through their interactions directly influence the behaviour of patterns that emerge. The third and final component of resilience is the notion of a tight feedback loop, which in its simplest form refers to the importance of communication and knowledge sharing among all actors to promote continual systems improvement (Walker and Salt 2008).

3.5 METHODS

In spring of 2010, the Economic Development Officer from Ignace contacted the Food Security Research Network located at Lakehead University. He was seeking assistance in the development of a cooperative and value-added facility from the abundance of wild blueberries in the area. For the purpose of this paper, the term ‘wild blueberry’ refers to blueberries as a NTFP occurring naturally throughout the Boreal Forest of Northwestern Ontario. In September 2010, as part of a community service learning (CSL) project, Lakehead University Faculty of Natural Resources Management class, Marketing Forest Products visited Ignace, Ontario and met with the Economic Development Committee (EDC) as well as several residents of the area. The purpose of the visit was to discuss the potential for Ignace to support the development of a wild blueberry cooperative. Following the gathering, EDC requested that students explore the viability of developing such an initiative.

To understand how the challenges of a blueberry cooperative can be understood from a complexity lens, observational and interview data were collected by a graduate

student living in the area during the summers of 2011 and 2012. Data collection occurred primarily in Ignace, Wabigoon Lake Ojibway Nation and Sioux Lookout (Figure 2). While national and provincial statistics exist to support growth and market potential for commercial lowbush blueberries (Agriculture and Agri-Food Canada 2012; Agriculture and Agri-Food Canada 2010; Harry Cummings and Associates 2009) no official statistics exist to support the extent of the unregulated wild blueberry industry. Therefore, the study relied heavily on local knowledge from community members. For example, blueberries are associated with many different values and such inherent diversity must be acknowledged and incorporated into the data collection procedure (Belcher et al. 2010; Keefer et al. 2010). Thus, the data used to exemplify how a CAS lens can be applied to the emergence of a blueberry cooperative came from published literature on land tenure, land tenure reform, social enterprises, observations of how the blueberry social enterprise currently operates in the study area, and through on the ground experiences in attempting to grow a wild blueberry cooperative in Northern Ontario in the Ignace area.

3.6 DISCUSSION AND CASE STUDY ANALYSIS

Adaptive Cycle. The wood products industry of Ontario has focused primarily on the production and export of commodity products such as softwood lumber and pulp and paper to the United States (US) (OMNR 2012; Woodbridge and Norman 2003). Lack of diversity in terms of product development and export destination has left Ontario's wood products industry vulnerable to changing market demand and inflexible to meet such change. As global free trade markets continue to evolve, such a uniform system is likely to fail. In relying entirely on the sale of a few major products to markets in one

geographic location, the fate of Ontario's wood products industry has become directly linked to the likely scenario in which demand for such products are reduced or cease all together. This current situation demonstrates an overall lack of resilience through lack of diversity and critical feedback loops. The current state of Ontario's forest industry is no longer viable (Natural Resources Canada 2011; Lazar 2007). Challenges are interdependent, dynamic, and can either limit community resilience or act as a catalyst for social innovation (MacPherson 2010; LePage and Jamieson 2011). Thus, the industry has demonstrated that it is caught in a rigidity trap and the emergence of a potential NTFP as a blueberry cooperative represents release from this rigidity and a movement of the larger system into the release phase of the adaptive cycle.

As a result, many modifications are taking place in response to the changing environment (OMNR 2011). Modernization of Ontario's forest tenure model began in 2009 after the most recent economic crisis exposed major flaws (i.e. rigidity traps) and an overall lack of resilience in the current system. As a result, forest tenure is in the process of reform; from the allocation of conventional single entity SFLs, to now incorporate Local Forest Management Corporations (LFMC) and enhanced SFLs (OMNR 2011). While new SFLs are no longer being awarded to single entities, or at least to a lesser extent, tenure has shifted to a more community or locally-based management approach. Although OMNR remains for all theoretical purposes, in command, there has still been a slight shift to community-based forest management initiatives. Even though timber may still be the focal point of forest management, such a shift to community-based forest management promotes the integration of local interests into forest management planning and promotes emergence of wild blueberries as a social

enterprise. Where the previous tenure model favoured the allocation of timber resources to large, private multinational companies with little or no local social responsibilities or investments; new models such as LFMCs and Enhanced SFLs have the potential to favour a diverse range of locally-sourced natural resource-based initiatives by small-scale collective business companies (OMNR 2011). And where the previous tenure model favoured timber and wood fibre-based development, the new system allows for a multitude of natural resource-based social enterprise opportunities (e.g. timber and wood fibre-based products as well as NTFPs). Through these dynamic interactions, wild blueberries have emerged as a possible social enterprise opportunity.

Forest management initiatives have typically applied a top-down, centralized command and control approach. The notion of an all-knowing leader is widely favoured in western society for development purposes (Westley et al. 2007). That is, a single person or group of people identifying a problem, developing the most appropriate solution, and informing the rest of the population on what needs to be done. People generally fear uncertainty and the absence of control over any scenario. Command and control is in contrast to complex adaptive systems theory, which embraces emergence and self-organization (Westley et al. 2007). From this perspective, the absence of policy shouldn't impair the emergence and self-organization of an initiative (Westley et al. 2007). Blueberries on Crown land are a public resource and no special policy is needed to establish such a business.

Feeling the adverse effects of the rigidity trap brought on by widespread desire for maintaining the traditional way of doing (i.e. conservation phase), many novel alternative development strategies have been proposed by concerned individuals.

Although new ideas are emerging, like the proposed wild blueberry co-op in Ignace, to date there seems to be little cooperation and most blueberry harvesting and marketing are carried out on an individual basis. While wild blueberries provide an additional source of income and food security for many people, nevertheless, the current wild blueberry industry is made up mostly of people picking and selling on an individual basis.

There is little or no collaboration among pickers. In most cases, one or two individuals will pick, clean, transport and sell their own blueberries. Blueberry patches vary in distance from town from one to sixty kilometers (km) from town. One individual reported spending \$1,600 in fuel travelling to and from picking sites during a season of about six weeks. It must be noted that that same individual earned a gross profit of about \$7,800 during those six weeks of blueberry picking. Moreover, it is common for several individual pickers to travel independently in their own personal vehicles to pick blueberries from the same site thus eroding potential profit margins. Little effort has been made to carpool or at least coordinate rides to picking sites to share the cost of fuel. As a result, while the combined quantity of all blueberry pickers may be substantial, the quantity collected by individuals is minimal. Thus, the economic benefits are diminished by the costs of an individual entrepreneurial approach to harvesting and marketing. As a result, wild blueberries are often limited to individual seller volumes at roadside, farmers markets, at home or by order. Moreover, lack of collaboration among pickers has saturated local markets and forced individuals' prices to conform to the lowest market price. The price paid for wild blueberries varies and depends mostly on the average sale

price in the area. Blueberries are generally sold in three liter baskets and four liter pails. Sale prices range from \$20-35 per three liter basket and litre \$25-45 per four liter pail.

Furthermore, picking alone in often poorly accessible sites far from town increases the severity of potential injury or incidence. Black bears were expressed as a major concern among blueberry pickers in the Ignace area. Black bears primarily inhabit forested areas and are common throughout Ignace. In Northwestern Ontario, black bear density ranges from 20-40 bears per 100 km² (OMNR 2009). Black bears are omnivorous carnivores and depending on the season and individual habitat range, may consume large quantities of wild blueberries. Therefore, black bear human encounters are common during picking season. Although black bears don't typically attack humans, problems and incident may still arise. While engaged in blueberry picking and other field activities many black bears were encountered. While most encounters were uneventful, certain precautions followed included working in groups, working close to a vehicle, having a well trained dog, making noise while you work and being aware of your surroundings, and educating yourself about black bears and how to react should you encounter a black bear. In spite of the potential benefits from lessening bear predation, pickers continue to pick independently.

In the absence of secondary and value-added processing, profit margins become very narrow. Thus through time spent working with residents of Ignace, effects of the poverty trap became evident. In order to move into the reorganization phase, community members could carry out blueberry harvesting collectively and blueberries could be consolidated from many pickers and further processed or developed into secondary products. Such organization could greatly increase marketability and overall

sales price. In addition to reducing fuel costs and increasing workplace safety, working as a collective group could allow the wild blueberry as a social enterprise cooperative to evolve into the forward loop growth cycle. In this growth phase of the adaptive cycle, focus can be to increase yield allowing for more suitable markets to be supplied, increasing potential customer base, to increase the identification of productive blueberry patches, and to improve the overall environment for emergence and self-organization. The social enterprise seems stuck in the release phase due to the poverty trap. It seems possible for most challenges to be overcome through increased cooperation among pickers. A wild blueberry co-op is one possible solution to encourage and facilitate such cooperation.

Resilience. In CAS theory, factors that support or maintain resilience in a dominant regime or factors that bring about change are generally referred to as attractors (Table 4). Depending on the system being supported, attractors can be viewed both as having a negative or positive influence. In either case, attractors build resilience in their respective systems. Although NTFPs such as wild blueberries have emerged as a potential development source, many attractors are still maintaining resilience in the current system. The current forest management system has been highly invested in both in terms of knowledge and money. Research and reference materials are well developed for timber resources. Moreover, timber resources are generally quick to generate profit.

Table 4. Emerging Attractors

| Mainstream Attractors Geared To Resource-Dependent Communities | Diversified Resource Use Attractors |
|---|--|
| Forest and mining policies designed to support and maintain the current system. | Decreasing global demand for paper products; increased competition; limited or no mill maintenance. |
| High investment in current forest and mining systems. Generally quick resources for earning profit. | Short-term duration and environmental impacts of many mining projects. |
| Research and reference materials based on timber production and mining. | Increased demand for locally sourced and high quality nutritional food products. Money is not the only factor to consider when developing natural resources. |
| Knowledge base of industry and government staff geared towards timber and mining. | Tenure reform (eg. LFMCs and Enhanced SFLs) and potential for community control of resources. |
| Employment skills related to forestry and mining sectors. | Abundance of NTFPs in Northwestern Ontario; emerging new employment opportunities to replace decline in forest related jobs. |

In Ignace for example, OMNR representatives have expressed little interest in diversifying the natural resource development base. Several informal meetings between June and August 2011 took place with the Ignace Area Forester and the Ignace Area Supervisor of the OMNR to discuss the status of wild blueberries within the realm of forest management. Discussions focused primarily on integrated management of wild blueberries and timber in terms of policy, land tenure and forest management planning. Unfortunately, in the realm of linear top-down management and status quo operations guiding OMNR activities, promoting the integration of intangible natural resources is a challenge. Wild blueberries are abundant in Ignace and have been identified as an important non-timber value both by local residents and the Local Citizens Committee. However, based on local residents' responses during discussions, wild blueberries

haven't been integrated into the English River Forest Management Plan as a key component or indicator to overall plan sustainability.

Although many people pick NTFPs such as wild blueberries, and they do generate profit; businesses generally deal in cash that is not likely recorded and therefore not taxed. OMNR representatives are likely unaware of the actual benefits wild blueberries exert. The wild blueberry industry is currently unregulated and OMNR has limited reference materials to support such development initiatives. Therefore, deviating from a known source of development (i.e. timber) to a potentially unknown source of development (i.e. wild blueberries) strikes fear and uncertainty; why invest in an uncertain system when so much has already been invested in timber resource. The general trend has been to ensure that it remains resilient. Although diversity is recognized as a key factor in building resilient communities, forest policy appears to have been developed to build and maintain artificial 'resilience' within the desired system even when it is no longer sustainable (Natural Resources Canada 2012; Lazar 2007). With primary commodity resource products established as the dominant regime, NTFP initiatives are also required, or at least expected to operate within the laws, monitoring systems of the dominant regime; albeit being unsuitable for such initiatives. In the case of Ontario forest management, resilience hasn't necessarily represented the natural ability of the system to absorb disturbance while retaining its original function and structure, but more the ability of policy to support and promote the conventional way of doing. The challenge for emerging alternative development initiatives is to work amongst such a system borrowing resources (land and berries) and knowledge mobilization (forest management).

Challenges such as those presented in the above paragraph are recognized as attractors which favour and support maintenance of the current system. On the other side of the spectrum but operating within the same overall system are attractors which support and favour an alternative and diversified natural resource-based system. In recent years there has been an increase in demand for locally sourced and high quality nutritional food products. Money is not the only factor to consider when exploring natural resource-based development opportunities. Given the abundance of NTFPs in Ignace the potential for employment opportunities is great. NTFPs have the ability to support both employment and food security thus building a resilient community. In Ignace, many people currently rely on wild blueberries as a source of food and additional income. The ability of wild blueberries to provide employment, a source of food security, and capacity development are strong attractors that support resilience and a transition to diversified resource use.

Emergence, Self-organization and Co-evolution. Linearity in management planning has severely restricted and deterred development of a wild blueberry industry.

Communication and tight feedback loops, both essential concepts in CAS, have been practically absent between Ignace residents and OMNR/industry management planning. Communication is a two-way process and individuals of both systems are responsible for that process. Although blueberry pickers in Ignace are in favour of a system that would see productive blueberry patches designated exclusively for blueberry production, responsibility needs to be collaborative. Attempts at approaching OMNR with regards to wild blueberry management have mostly been done by individuals, one at a time. There has been little effort to organize a collective group. Pickers indicated that on many

occasions, petitions have been available at the OMNR office for people to sign and express concern regarding the detrimental effects of spraying on wild blueberries. Through these numerous petitions OMNR was expected to better identify and manage such non timber-values during herbicide application programs and forest management activities in general. Lack of communication between actors not only restricts resilience between both parties, but undermines the complex nature of the system further limiting progress.

Although OMNR has access to well-developed scientific data regarding a theoretical approach to natural resources management, they often lack practical knowledge and ground truth necessary to understand natural resources management as a complex adaptive system. Ignace residents on the other hand, are exposed to the situation as it is expressed in the field, and are experts in local traditional knowledge. What Ignace residents may lack in terms of scientific theory can be filled by theoretical knowledge available to OMNR and vice versa. Pickers spend countless hours scouting potential blueberry patches. Not only do they become familiar with site characteristics that are most likely to support blueberry growth, they also observe characteristics of surrounding sites. Characteristics might include level of regeneration or green-up attained in certain blocks, condition of roads and overall accessibility and any other issues of concern or interest. Such knowledge and familiarity could be effectively used by OMNR. While it is not possible for blueberry pickers to perform all OMNR field work, it may reduce the number of field trips needed. Resources saved by not having to send OMNR representatives to the field could be further invested into other activities. Management based entirely on the views of a single activity disallows place-based

knowledge and favours the establishment of a dominant regime based on said activity and is unrepresentative of other individual activities. A complexity's approach would promote the integration of science and local knowledge into a shared and collective system. Through diversity, innovation may emerge. Moreover, consideration can be given to the social and other non-financial values of wild blueberries as sources of food security, culture, and tradition and may at times be equal to or of more benefit and importance to communities than direct economic benefits.

Wild blueberries are a disturbance driven species and depend greatly on logging and forest fires for growth (Baldwin and Sims 1997). Many factors, both man-made and natural, can severely limit growth and patch duration. Competition from associated vegetation, herbicide applications and other silvicultural programs can severely limit wild blueberry growth. Apart from weather, spraying was identified as the second most important limiting factor. There are many activities that can prolong and promote patch productivity. Tree planting and natural succession can prolong and encourage wild blueberries during early stages of plant growth. Tree cover can modify and regulate microclimatic conditions in favour of blueberry growth. Controlled burns for example, have the potential to regenerate and promote blueberry growth (Black 1963). Thus, OMNR in collaboration with local residents have the ability to both manage and promote wild blueberry growth. One example raised was the establishment of no-spray zones within a certain radius around town. Since most pickers limit distance travelled to pick blueberries, this would allow for retention of patches close to town.

Another example was to hold off spraying in certain areas until after blueberry patches are no longer productive or are being outcompeted by other vegetative species

(e.g. five, ten or fifteen years, depending). Alternative methods of mechanical vegetation control such as brush-saw release could be applied to competing vegetation to promote blueberry growth. Although the conversion of species composition on Crown land is frowned upon, no law prevents such conversion if it occurs in a desirable direction. Another alternative was suggested in which a co-op (or business of some kind) could gain secure and long term access to a patented piece of crown land for the purpose of managing wild blueberries. Although several potential management opportunities have been identified; they have yet to be initiated. Such responses are indicative of a lack of diversity in attracting key stakeholders needed to move the blueberry cooperative forward – community members, surrounding communities (municipal and First Nations), current blueberry pickers, Ministry staff assigned to the area and industries who hold provincial crown forest licenses. This may be a result of lack of awareness displayed in terms of the actual diversity of actor groups involved, or lack in recognizing the potential opportunities that may emerge when applying a complexity approach in natural resources management. Regardless of the cause, emergence, self-organization and resilience suffer.

3.7 CONCLUSIONS

Social enterprise (SE) (in which co-op business development falls) is being increasingly applied as a business development model to support community development. SEs are similar to conventional businesses, producing goods and/or services for the market economy, however, they are developed and operated for the purpose of redirecting surplus to meet social and community goals (Social Enterprise Council of Canada 2011). While most conventional businesses aim to maximize profit

with social and community development as a secondary or potential beneficiary, SEs are operated through simultaneous management and maximization of social, environmental and economic goals. Since blueberries are a community resource, it is thought that a co-op could best serve community interests. It was suggested for the business to be operated as a producer co-op, an enterprise that is jointly owned by members of the community (Social Enterprise Council of Canada 2011). In operating as a co-op, blueberry pickers could maintain their independence and continue following their usual picking rituals. From a CAS lens, a co-op would allow for interaction among pickers creating an environment from which novel ideas could emerge and self-organize. Furthermore, co-op members would be co-op owners and as such have the freedom to operate in an environment free of command. Blueberries are a community resource; therefore, development must be a collective community effort.

The development of a wild blueberry co-op in Ignace is a CAS that has emerged as a result of an outdated management regime that can no longer support the community as it once could. As a CAS, the initiative is dynamic, self-organizing and exists within a larger CAS that exerts direct influence on its evolution. In exploring through a CAS lens, the current state of forest management in Northwestern Ontario as well as the emergence of a wild blueberry initiative; the challenges and potential solutions of both systems can be better understood. Wild blueberries are an invaluable resource in Ignace as well as in other communities of Northwestern Ontario. Through a CAS perspective, social enterprise co-op model has emerged as a suitable next step. Co-op development follows a bottom-up approach in which opportunities emerge, self-organize and remain dynamic, all from within and based on local patterns of interaction. Furthermore, this

model favours empowerment of local residents to identify, plan, and overcome common challenges and barriers restricting community wealth and resilience. In the current state of natural resources management, wild blueberries, and NTFPs in general are recognized as additional or secondary values. They are not acknowledged as a formal sector and as a result, perhaps have not been given suitable management support. However, indecision and failure to act may be the greatest thief of opportunity.

4. SYNTHESIS

Food security and a diverse economic resource base are integral components in supporting strong resilient communities. Economic development must be based on locally available resources, labour and knowledge. In Ignace for example, as in other communities of Northwestern Ontario, wild blueberries have emerged as a potential development opportunity. Furthermore, blueberries represent a local source for a highly nutritional food that can be developed to increase food security in the region (Martineau et al. 2007; Neto 2007; Ames et al. 1993). In recognizing the complex relationship existing between people, wild blueberries, food security and economic development and through a CAS theory lens; wild blueberry business development cannot be carried out in a top-down command and control environment. Thus, wild blueberries represent one potential economically viable development opportunity that appears most likely to succeed as a business, when the initiative is based on local patterns of interaction and emerge from within the community.

Businesses are often unable to demonstrate the actual social value or importance of their enterprise (McBain and Thompson 2008). It is difficult to place an evaluative number on the importance of social benefits and values. Wild blueberries for example, are often explored as for their economic importance in rural communities. Many studies have been carried out to quantify the economic benefits that wild blueberries provide (Agriculture and Agri-Food Canada 2010; Keefer et al. 2010; Barfoot 2006; Duchesne, Zasada and Davidson-Hunt 2001). However, results based solely on individual components of a more complex system can be misleading and diminish the actual value of the benefits being provided. Although wild blueberries may add little in terms of

gross domestic product or income generation, social and other non-financial values of wild blueberries as sources of food security, culture, and tradition may be of more importance to communities than direct economic benefits. On the opposite side of the spectrum, in certain cases where blueberries may contribute greatly to gross domestic product, it is possible for such development to be socially unsustainable. Developing a wild blueberry business could potentially restrict or change the way in which people had access to blueberry patches on Crown land (i.e. through the introduction of a permitting system). Regardless of the potential for wild blueberries to generate economic, social or environmental benefits, they represent one of many important resources and must be considered within the context of complexity theory and integrated within the larger dynamic system.

Although economic objectives may not be at the forefront of social enterprise business structures such as a co-operative; businesses must still demonstrate economic viability or sufficiency in order to benefit their respective communities. Ignace Wild Blueberries for example generated a net profit of \$4,036.71 in 37 days of operation. Summer Company business grant recipients had specific requirements for Ignace Wild Blueberries to operate as a sole proprietorship. Although the initial intent was to operate as a co-op, Ignace Wild Blueberries as a sole proprietorship collaborated with one other Ignace resident. Two people shared the cost of fuel that reduced overall fuel expenses by 50%. Every additional person involved in the business would further reduce fuel expenses.

Since blueberries are a community resource, it is thought that a co-op could best serve community interests. It was suggested for the business to be operated as a producer

co-op, an enterprise that is jointly owned by members of the community (Co-operatives Secretariat 2012). It is thought that in operating as a co-op, blueberry pickers could maintain their independence and continue following their usual picking rituals. The producer co-op would consolidate blueberries collected from members, and further process and market them. In addition, the co-op would allow for collaboration among pickers of all scales. Co-op members would be co-op owners and as such, have equal control over the business and its development. A co-op design would allow more money to remain within the community. It would equally allow for local control and management while promoting appropriate community investment. It was suggested by community residents that any business development must be a collective effort. Residents further stated that business development must not interfere with other local pickers who are not interested in participating in a co-op. Further supporting the need for collective business management is the fact that wild blueberries are associated with a range of different values. For some people, wild blueberries are valued for economic benefits gained through picking and selling, while for others they may be valued for cultural or nutritional purposes. Even within a similar value category such as economic values, individuals' values may still differ, creating increased complexity and dynamics within the environment. In operating as a co-op or as a social enterprise, blueberry pickers will have the opportunity to work independently from the facility while maintaining their individual picking levels and rituals.

Operating as a co-op with support from many people and possibly several communities is expected to greatly increase knowledge of the land base and blueberry supply potential, as well as promote an inclusive development approach for all

stakeholders. For example, developing a co-op (or another suitable business model) in partnership with the Food Security Research Network and the Faculty of Natural Resources Management located at Lakehead University could increase access to educational resources, business planning, capacity building and an exchange of knowledge.

4.1 MANAGEMENT CONSIDERATIONS

Historical dependence on primary commodity resource industries such as mining and forestry (e.g. lumber and pulp) has severely limited community resilience and economic diversity. Forest policies, land tenure, and forest management have all been designed to support the development of timber and wood fiber-based products. Although laws guiding such regimes are generally based on well developed scientific theories, they are formulated in distant cities by people often lacking practical knowledge. As a result, community needs and the complex nature of the system as a whole are often overlooked or ignored. Conventional businesses generally place economic goals and financial gain at the forefront of their objectives, with social, environmental and other goals being secondary or consequential (LePage and Jamieson 2011; Social Enterprise Council of Canada 2011; McBain and Thompson 2008; Westley 2007). In Ontario's forest industry for example, strict adherence to such laws has led to a situation in which a small number of large multinational companies hold sustainable forest licenses (SFL) on the majority of land within the area of undertaking (AOU) (i.e. area of land where commercial logging and forest management is permitted) (OMNR 2012; Natural Resources Canada 2011; Lawson 2009; Lazar 2007; Woodbridge and Norman 2003). Such a strong focus on timber and wood fiber-based products has left limited or no room

for the emergence of alternative natural resource-based opportunities. With timber and wood fiber-based products established as the dominant regime, NTFP initiatives are also required, or at least expected to operate within the laws monitoring systems of the dominant regime; albeit being unsuitable for such initiatives. While diversity is recognized as a key factor in building resilient communities (or any system for that matter), forest policy has unfortunately been developed to build and maintain artificial ‘resilience’ within the desired system even when it is no longer sustainable. In the case of forest management in Ontario, resilience hasn’t necessarily represented the natural ability of the system to absorb disturbance while retaining its original function and structure, but more the ability of policy to support and promote the conventional methods of working. Canada’s forest policies and regulations are among the strictest globally and have guided sustainable environmental development across the Boreal Forest zone for years (Canadian Council of Forest Ministers 2010). Furthermore, Canada has the highest amount of certified forest land as compared to any other country globally (Canadian Council of Forest Ministers 2010; Lazar 2007). Resource management planning has been evolving for years and is based on a number of environmental, social and economic indicators (Lawson 2009; OMNR 2009; OMNR 2001). Such indicators are used as guidelines to regulate and monitor forest operations. Unfortunately, they have been developed to support timber production. While the forest management planning process is said to be well developed, and with such a strong focus on timber, wild blueberries and other NTFPs have remained in the shadows, unable to emerge amongst the dominant regime.

Within the natural resource management regimes of most Canadian provinces, due consideration is given to NTFPs (Hope 2011). Forest managers are required to consult with rural and First Nation communities in regards to non-timber values. Each forest management plan for example, is developed for a specific forest management unit and will include a set of values identified by local residents (Hope 2011). Forest managers are required to protect such values. However, NTFPs are not explicitly identified as compulsory objectives and are therefore not legally binding.

In Ontario, consideration is given to NTFPs (Hamilton 2012), as required by the Crown Forest Sustainability Act (CFSA). SFL holders must write a forest management plan in accordance with forest policy and various planning manuals set by the OMNR that has environmental sustainability, social sustainability, public participation, First Nation participation and adaptive management as key components (CFSA 1994, c.25, s.8 (2); Lawson 2009). Forest managers are required to consult with rural and First Nation communities with regards to non-timber forest values. Although forest licenses are authorized by the Minister of Natural Resources, other forest resources such as NTFPs can also be made available for harvest by the Minister of the Environment (MoE) (CFSA 1994, c.25, s.24 (1)) through individual and case-specific permits. Such permits may consist of the right to harvest certain NTFPs from a specified unit. Each forest management plan for example, is developed for a specific forest management unit and will include a set of values identified by local residents (Hamilton 2012). Although forest managers are required to protect such values, NTFPs are not explicitly identified as compulsory objectives and are therefore not legally binding.

Resolute Forest Products (formerly Abitibi-Bowater) holds the SFL for the English River Forest Management Unit. As required by the CFSA, Resolute Forest Products must write a forest management plan in accordance with forest policy and various planning manuals set by the OMNR that has environmental sustainability, social sustainability, public participation, First Nation participation and adaptive management as key components (Lawson 2009). By ‘engaging’ multiple actors (although normally considered as secondary) in the planning process, Resolute Forest Products is in part using a complexity approach. However, the way in which secondary actors are involved seems to be more a formality than an embrace of complexity theory. In contrast to CAS theory, Resolute Forest Products would have already pre-planned the way in which actors will participate as well as the roles individual actors will play (through the use of local citizens committees). As a CAS, every actor is vital, and community residents are not ‘secondary’ actors, but essential to the success of any development initiative (Pretty 2011; Walker and Salt 2008). The current forest management planning process is not inclusive, nor does it recognize local patterns of interaction or place-based strengths. Such unawareness of local knowledge restricts beneficial interaction that could otherwise have taken place. In assuming that timber is the only viable development opportunity before even consulting with the residents where development is to occur, immediately ends communication and the overall participatory process. It is possible that a community is better suited for another activity, if only other alternative development opportunities are considered.

4.2 FINAL REMARKS

This thesis is one part of a much bigger system in which forest resource use is being diversified and a community oriented natural resource management regime is emerging. Wild blueberries, society and economic development are all integral and interdependent components of a large and dynamic system. No individual component or nested system can be managed individually from other components. Each has a vital role within the larger system. Natural resource managers must understand and acknowledge such complexity and account for it into management planning. Although wild blueberries are an important resource in rural and First Nation communities of Northwestern Ontario and do represent an economic development opportunity; they are but one development opportunity. Therefore, wild blueberry management must be allowed to be a strong consideration when discussions are held about potential development opportunities within the system. Numbers alone cannot be used to explain and analyze the importance of scientific processes. The influence of one component on a scientific process cannot ignore other independent components of the same process. Wild blueberries for example are often explored as for their economic importance to rural communities. However, results based solely on individual components of a complex process can be misleading and diminish the actual importance of that process. Although blueberries might add little in terms of gross domestic product or income generation, social and other non-financial values of NTFPs as a source of food security and culture are often of more benefit and importance to people than direct economic benefits. Social and other non-economic benefits of NTFPs are often difficult to evaluate. As a result, social benefits are often overlooked by the more easily quantifiable economic benefits. Although NTFPs are highly valued for many purposes, no single

value is more important than another just as no value can be used to describe the entire process.

The sale of timber and wood-based products has historically been one of the quickest activities in generating financial profit, both locally and internationally. Focusing only on the ability of an individual resource to generate profit leads to dependence on a mostly boom and bust resources, overshadows, and ignores the range of natural resources actually utilized by community residents, decreasing community resilience. The success of a conventional business is to a large extent evaluated based on its ability to generate profit. For wild blueberries however, value of the resource is not necessarily generated in terms of economic profit but more in terms of sustaining livelihoods and through other social and recreational values. Such values are generally regarded as secondary or associated values and of no concern to managers and natural resources development. Regardless of the potential for wild blueberries to generate economic, social or environmental benefits, they represent one of many important resources and must be considered within the context of complexity theory and integrated within a larger dynamic system.

4.3 LIMITATIONS OF THE STUDY

Willingness-to-pay surveys were only administered to respondents at the Thunder Bay Country Market. A wider range of respondents might have been collected had the surveys been administered to respondents in several locations around Thunder Bay and Ignace. Although conjoint analysis is an effective tool for determining consumer preference for specific product attributes, consumers stated WTP is often

different from their actual WTP. Consumers may claim that they are willing to pay a given amount for wild blueberries but when given the opportunity to purchase, they may not be willing to pay previously stated prices, especially if the same product can be found for cheaper. Furthermore, consumers may be unhappy paying a price premium but be unsatisfied with alternatives. Economic data and analyses were based on the results of Ignace Wild Blueberries which operated for only one picking season. Therefore, no inferences can be made on long term business sustainability.

4.4 FUTURE RESEARCH NEEDS

Logging and wildfire maps could be used to identify the potential wild blueberry sites in the Ignace area. Since blueberries thrive after disturbance, logging and wildfire maps are sound indicators of potential blueberry sites. Forest Fire depletion data is available through the Land Information Ontario (LIO) data warehouse. Such data includes fire disturbance area for the geographic area of the OMNR Northwest Region. Fire disturbance maps are updated on an annual basis and could be used to identify potential blueberry growth. Maps of previously logged areas are also available. Furthermore, maps of previously sprayed areas could be obtained from OMNR for people seeking chemical-free or organic certification. The maps mentioned above may not be openly available online but could be requested from the OMNR or Lakehead University Library. Further research might also include the establishment of a processing facility that could develop value-added blueberry products. Future research must be inclusive of all actors - community members, economic development committees, mayors and chiefs and town and band councillors, OMNR and other public and private industries.

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4.6 APPENDICES

4.6.1 APPENDIX A**DEVELOPING A WILD BLUEBERRY CO-OP IN IGNACE SURVEY**

In which months do you harvest blueberries?

What is your average harvest yield (per area of land harvested)?

Do you sell your blueberries? (yes / no) If yes, where do you sell them, in what form do you sell them, and for how much are your blueberries sold?

How far do you travel from your place of residence to pick blueberries?

Are there roads or trails leading to where you pick blueberries? Are they easily accessible?

Can your harvest areas be accessed by vehicle?

Are there areas that you cannot access because of terrain?

What problems do you face harvesting blueberries?

How large of an area does your harvesting occur on or how many areas do you pick from in a season?

Have you observed changes to blueberry quantity or quality over the years? If yes, what has caused these changes?

In your opinion, on which type of land do blueberry patches occur (harvested areas, burned areas, natural forest clearings) and how long after such disturbances do they occur?

In your opinion, what causes the most significant damage to blueberry plants (i.e. spraying, insects, and humans)?

In your opinion, could the current availability of productive blueberry sites supply a viable business cooperative?

Do you think a suitable labour force exists to help develop such a business? (yes / no):

Do you think that the local blueberry industry could be improved if pickers secured long term lease agreements?

How could blueberry picking be coordinated between pickers to become more efficient?

Would it be useful to involve students in blueberry picking through summer work programs?

Do you think that establishing a blueberry cooperative could be beneficial to the community? (yes / no):

What social responsibilities do you think could be achieved through the development of such a cooperative?

What benefits and services would you expect from such a cooperative?

Would you be interested in participating in and developing a blueberry cooperative?

Are you interested in participating in such a cooperative?

4.6.2 APPENDIX B
ONLINE SURVEY

1. Where is your place of residence?
 2. What is your sex? Male Female
 3. In which age group are you?
 - 18-30
 - 31-40
 - 41-50
 - 51-60
 - 61+
 4. Do you pick blueberries? Yes No
 5. Do you sell Blueberries? Yes No
- If not, select 'No' and proceed to question number 7
6. a. Where do you sell blueberries?
 - b. For how much do you sell your blueberries?
 - c. In what form do you sell your blueberries?
7. How many blueberries do you pick per day and per season?
 8. How far do you travel from your place of residence to pick blueberries?
 9. Are your picking spots easily accessible? By what mode of transportation do you access them?
 10. How many spots do you pick from in a given year?
 11. What problems do you face picking blueberries?
 12. What stops you from picking more blueberries (e.g. time, space, weather, insects, access, poor growth yield)?
 13. What do you think about establishing a wild blueberry co-op in the area? Could it be beneficial to blueberry pickers?
 14. What services could a co-op offer?
 15. Are there enough blueberries in the region to support a wild blueberry co-op?

16. Does a suitable labour force exist to supply such a business? If not, how could more pickers be attracted?
17. Would you be willing to sell your blueberries to a co-op for a premium price?
18. On what terms would you consider selling blueberries to a co-op?
19. What types of blueberry products could be marketed?
20. Where could blueberry products be marketed?
21. Feel free to express any concerns or comments?

4.6.3 APPENDIX C**IGNACE WILD BLUEBERRIES - MARKETING SURVEY**

THE PRODUCT: “Wild, naturally-occurring hand-picked blueberries from the Boreal Forest Zone of Northwestern Ontario”.

1. Gender: Male Female

2. How old are you:
 - 18 - 24
 - 25 - 34
 - 35 - 44
 - 45 - 54
 - 55 - 64
 - 65 +

3. What is your annual income range (in Canadian dollars)?
 - 0 - 20,000
 - 21,000 - 30,000
 - 31,000 - 40,000
 - 41,000 - 50,000
 - 51,000 - 60,000
 - 61,000 - 70,000
 - 71,000 +

4. Do you eat blueberries? Yes No If yes, from where are they sourced?
 - Northwestern Ontario
 - Ontario
 - Another Canadian province

- United States
- Another international source
- Don't know

5. What types of blueberry products do you consume?
6. How much do you normally pay for blueberries?
7. Are you willing to pay more for locally (Thunder Bay and surrounding area) harvested blueberries? Yes No
8. Assuming an average sales price of \$6.00/ pint (473 ml) of conventional farmed blueberries, how much more money would you be willing to pay for the product described above?
9. Why would you be willing to pay more for the product described above? What specific characteristics do like about the proposed product?
10. In which form would you like to purchase blueberries (e.g. fresh, frozen, dried, puree, etc.)?
11. What specific characteristics do you expect from blueberries?
12. What is the most convenient location for you to purchase blueberries?

4.6.4 APPENDIX D

NEWSPAPER ADS

Blueberry pickers wanted - Exploring business opportunities



Ryan Milne is a candidate for a Master's of Science in Forestry (MScF) graduate program with the Faculty of Natural Resources Management at Lakehead University. This summer he is in Ignace, along with his wife Youma Milne, to carry out research for his master's thesis.

The purpose of Milne's research is to assess the ability of Ignace, Sioux Lookout, Dryden, Pickle Lake and Savant Lake to support the development of a wild lowbush blueberry business cooperative. The study is intended to develop a collaborative, multi-community long-term strategy to increase economic opportunities in harvesting, processing and marketing of wild lowbush blueberries. The research will provide practical decision support information on business management issues.

Wild blueberries have a growing reputation as a

super fruit and are heavily demanded in local, regional, national and international markets for their sweet flavour and nutritional benefits. In Canada, the consumption of fresh blueberries has nearly quadrupled since 1981 while newly developed specialty markets are still emerging. With access to a community airport and its location along the Trans Canada Highway and the Canadian Pacific Railway mainline, Ignace is well positioned to take advantage of the highly demanded fruit and further develop the industry in Northwestern Ontario.

The lowbush blueberry industry of Northwestern Ontario is undeveloped and practically non-existent. Aroland First Nation is an exception, having established a blueberry buying depot in collaboration with the Food Security Research Network (FSRN), and selling to buyers in Thunder Bay.

Last year they purchased 6,000 pounds of fresh blueberries worth an estimated \$36,000.00. The Thunder Bay District Agricultural Economic Impact Study (October 2009) for example, reported no blueberry farms operating within the district. The potential for Ignace, and the surrounding region to at least partially supply Northwestern Ontario's blueberry demand is worth exploring.

While no official inventories have been carried out to support claims on the actual abundance of blueberries within the Kenora District, anecdotal accounts of small-scale blueberry harvesting along with Aboriginal knowledge would suggest potential for development. Data concerning habitat requirements and general characteristics of lowbush blueberries is well documented and would suggest the occurrence of suitable habitat to support abundant blueberry growth.

The study is entirely dependent on community input so Milne will be seeking out blueberry pickers to ask questions and visit sites. He promises to keep confidential any disclosure of those secret picking sites. You can reach Ryan Milne on his cell phone at 807-707-1488.

WILD BLUEBERRIES - A COMMUNITY RESOURCE



Lakehead researchers explore a blueberry patch west of Ignace.

An update on the Blueberry Research Project in Ignace

By Ryan Milne

On Thursday, July 21, 2011 starting at 6:30 p.m. in the multipurpose room at the Ignace Public Library, I will be holding an open group meeting to discuss the potential for Ignace and surrounding communities to support a wild blueberry business cooperative. The meeting is open to anyone interested in participating.

The study is heavily based on community involvement and while so many of you are experts on wild blueberry growth in the area, your knowledge is needed to help develop the research. Lakehead University professors Dr. Chander Shahi and Dr. Connie Nelson, also my research supervisors, will be attending, so come out and share your thoughts and concerns.

Last week, Veronica Berini and Toby Braithwaite, students from Lakehead University, were also in Ignace to carry out wild blueberry research. Ignace was just one stop of several taking place across Northwestern Ontario. They set up a series of sample plots with the eventual goal of observing the effect of microclimate on blueberry growth, blueberry cover, associated vegetation, antioxidant levels, as well as other blueberry qualities.

To date, I have been speaking with blueberry pickers in Ignace seeking their input on the feasibility of developing a business cooperative in the area as well as visiting local picking spots observing the extent of wild blueberry growth. Although blueberry yield is inconsistent and unpredictable from year to year, it is still thought that the availability of wild blueberries is enough to support the development of a local business cooperative.

The goal now is to develop a business model for the area and to locate a suitable labour force willing to pick and supply blueberries.



Blueberries on our minds....

Fifteen people attended an open group meeting to discuss the potential for Ignace and surrounding communities to support a wild blueberry business cooperative. Ryan Milne, the graduate student heading the Ignace Blueberry Research Project, chaired the meeting. His research supervisors, Lakehead University professors Dr. Chander Shahi and Dr. Connie Nelson, were in attendance. Ignacians present represented a wide range of blueberry pickers - from the casual to those who pick to sell. Stay tuned....!

NEWS

Goldcorp fined for failure to provide training

Shayla Cybulski
STAFF WRITER

Ministry of Labour inspection has left Goldcorp Canada,

Ltd., the company running Musselwhite Mine, with a hefty fine. Goldcorp was fined \$50,000 for a violation of the Occupational Health and Safety Act after

a Ministry of Labour inspector visited the mine in November 2009. The inspector, after reviewing the mine's training records, found that one of the workers

was not registered as fully trained in all of the prescribed training programs for work in a hard rock underground mine. Goldcorp pleaded

guilty to failing to ensure that a worker was trained as prescribed. Justice of the Peace Edith Baas imposed the \$50,000 fine, plus a 25 per cent victim fine

surcharge, as required by the Provincial Offences Act. The surcharge is credited to a special provincial government fund to assist victims of crime.

Grad student studying blueberry opportunities

Shayla Cybulski
STAFF WRITER

Ryan Milne, a candidate for the Master's of Science in Forestry at

Lakehead University, is exploring the world of blueberries and he needs your help. Milne, who is spending his summer in Ignace conducting research for

his thesis, is assessing the ability of regional communities to support the development of a wild lowbush blueberry business co-operative. "We're looking at

Ignace, Sioux Lookout, maybe Savant Lake, and some First Nations," he shared. The intent is a collaborative, multi-community, long term

strategy to increase economic opportunities in harvesting, processing and blueberries. "We're looking into the potential for

developing some type of business co-operative," Milne explained. "We're looking to ask pickers if they think there are enough blueberries to support that kind of business."

Milne also wants to know what kind of value-added products pickers think would be successful in terms of sales.

He explained the blueberry industry in Northwestern Ontario is underdeveloped, with just one blueberry buying depot in place at Aroland First Nation.

Milne was in Sioux Lookout last Friday, set up at the farmers market, and has met with Lac Seul economic development officer Sam Manitowabi and Sioux Lookout economic development officer Florence Bailey.

The project is in its early stages. "I just started back in May... this will be ongoing for a couple of years," he said. "I'll go back to school in September but I'll still be calling people."

He hopes to arrange an open group meeting in the coming weeks, with professors from Lakehead in attendance.

"People have seemed pretty interested," he said.

Those interested in the study are encouraged to contact Milne at 807-707-1488 or by email at ramilne@lakeheadu.ca.

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7 - Ignace Driftwood, June 20, 2012

Ignace Community Garden Progress Report

We left off with the three new raised, two-level garden plot/bins in place at the Ignace Food Bank Distribution Centre. By the time *Part 1 - Progress Report* went to press, that project was well on its way to fruition. Again, with weather cycles what they are, the bins were ready for the addition of the liners and earth fill but not fully

operational. finally once topped with earth one week, seeded and planted the next, makes for an impressive progress report! First growth signals came quickly as the little shoots peeked through the moist warm soil in a matter of days.

This Ignace Food Bank Mini Garden in addition to the Ignace Community Garden

primary services, half a kilometre to the east, has provided both functional and creative opportunities. Opportunities not only for those already gardening for themselves and the Food Bank but for the recipients of that labour, by assisting in the expected flow of veggies throughout the season. We welcome their support as they are able in these projects.

Thanks to those who raised the question of

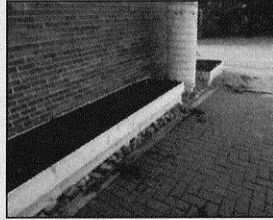
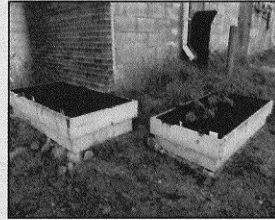
being able to have something outside the door... for fresh "pick-ns" at the centre. Watch for a further report on what was planted there for just that purpose.

Special Request Due to my holding pattern for some of our garden decor materials at the Ignace Community Garden behind the main garden area, our tomato cages may have been thought to be garbage? In the next weeks, most of these re-cycled goods on hold should be used within the site. If someone was going to straighten out the cages for us they are now needed, within the next two weeks or so. Thanks for that service and their return.

To contribute or support these important efforts in any way please contact Yvonne Romas 934-6719 ext 235 or Maurice Mann 1-705-910-1438

URGENT NEED Plant Stakes, Trelisses, Nets, Tomato Cages...!

(Report by Maurice Mann)



The Blueberry Guy is back in Ignace!

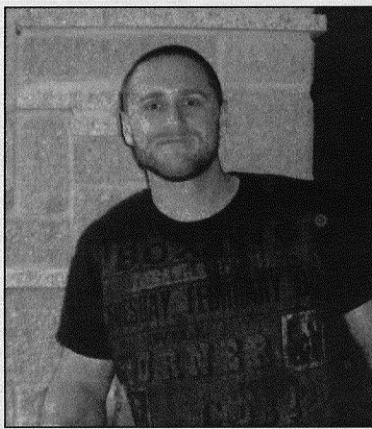
The "Blueberry Guy" is Ryan Milne, a graduate student at Lakehead University. Milne's field of expertise is forestry and he is especially interested in non-timber products that can be harvested from the boreal forest. He spent the summer of 2011 talking to blueberry pickers in Ignace and neighbouring communities to learn more about the potential for a business based on blueberries.

He's back for the upcoming blueberry picking season and wants to connect pickers with buyers in Thunder Bay. This year he has a "Summer Company" grant sponsored by the Northwest Business Centre to help set up a business he's calling Ignace Wild Blueberries.

He's lined up restaurants and fresh market buyers in Thunder Bay who are interested in the high quality wild blueberries that Ignace has to offer. He believes he can get a good price for the product that will encourage pickers to come together to create efficiencies and earn more by reducing transportation costs.

"After researching the market demand for blueberries, I think the best way to earn the most revenue is to sell them fresh and there is a strong demand in Thunder Bay," Milne says. "Local pickers are telling me it looks like we'll have a good blueberry season this year. I'd like to promote the product to buyers who are interested in creating new products using blueberries and there is great potential. One company is thinking about using blueberries in their brewing process."

Ignace residents who are interested in selling blueberries this summer can contact Ryan Milne at 807-707-1488. His e-mail address is ramilne@lakeheadu.ca



This recipe is courtesy of Egg Farmers of Canada
GET CRACKING.
eggs.ca



Quick Egg Wedges Giardinere

Makes: 6 servings
Prep: 15 min. Bake: 10 min.
Oven Temperature: 375°F (190°C)

Nutrients per serving:
Calories 189 Fat 9 g Saturated Fat 4 g Trans Fat 0 g
Sodium 319 mg Carbohydrate 15 g Fibre 4 g
Sugars 4 g Protein 15 g

6 eggs 6
1/2 cup milk (1%) 125 mL
1/2 tsp dried basil 2 mL
1/4 tsp salt 1 mL
1/4 tsp pepper 1 mL
2 cups cooked vegetables 500 mL
1 green onion, chopped 1
1 cup shredded light Cheddar or Swiss cheese 250 mL
Paprika (optional)

Spray 9-inch (23 cm) pie plate with cooking spray. Whisk eggs, milk, basil, salt and pepper in large bowl just until blended. Stir in cooked vegetables and green onion. Spray large non-stick skillet with cooking spray. Heat skillet over medium-high heat. Add egg mixture. As mixture begins to set, gently move spatula across bottom and side of skillet to form large, soft curds. When eggs are almost set but still very moist (about the consistency of soft oatmeal), remove from heat and stir in 2/3 cup (150 mL) cheese. Immediately pour into pie plate. Sprinkle remaining cheese and paprika (if desired) over top.

Bake in preheated 375°F (190°C) oven until eggs are set, 10 to 12 minutes. Cut into wedges and serve hot or at room temperature.

Tips:

3 cups (750 mL) mixed frozen vegetables cooked until tender-crisp yield 2 cups (500 mL) cooked vegetables. Leftovers can be reheated in microwave on HIGH (100% power) for about 1 minute.

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NEWS BRIEF

Your resource about the Resource

Cultural Heritage at Hammond Reef

As one of the components of the Environmental Assessment, Cultural heritage resources are being studied to better understand what exists at the potential mine site.

Cultural heritage is the legacy of physical objects and places that are inherited from past generations, maintained in the present and bestowed for the benefit of future generations. Cultural heritage resources include archaeological sites; Aboriginal hunting and fishing camps; ceremonial sites and spiritual places; villages; battlefields; remnants of pioneer cabins; and cemeteries.

A desktop study was conducted which included a literature review and a search of registered archaeological sites in the area (none exist). The desktop study was followed with a property inspection that confirmed the majority of the proposed mine site area has low archaeological potential. The property inspection was carried out in October 2011, and included a First Nations field monitor.

Archaeological potential is determined through the presence of the following features:

- Water sources
- Accessible shoreline
- Elevated topography
- Pockets of well drained sandy soil
- Distinctive land formations that might have been special or spiritual places
- Resources areas
- Areas of Euro-Canadian settlement and early historical transportation routes

The low potential for cultural heritage at the Hammond Reef site is based on the high amount of disturbed lands, permanently wet areas and lack of sport fish in the small ponds at the site. Several dry upland areas have been identified as having archaeological potential and will be studied further before construction can begin.

Archaeology Survey



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