

RE-CONCEPTUALIZING THE REDEVELOPMENT OF RURAL COMMUNITIES  
THROUGH THE LENS OF AN ECOLOGICAL FRAMEWORK

by

Penelope Slight

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for the degree of Master of Environmental Studies

at

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DALHOUSIE UNIVERSITY  
SCHOOL FOR RESOURCE AND ENVIRONMENTAL STUDIES

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Dated: December 7, 2012

Supervisor: \_\_\_\_\_

Readers: \_\_\_\_\_

\_\_\_\_\_

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This thesis is dedicated to my mom and dad who have always encouraged me to pursue my life's passions personally, professionally and academically. I would like to give special recognition to my mom for her enthusiastic interest in my master's research. Thanks Mom for your supportive ear and thoughtful advice during our countless phone conversations on the topic.

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## **ABSTRACT**

Today, Canada's population is over 80 percent urban as exemplified by our growing cities. As a result of outmigration to urban centres, many rural economies in Atlantic Canada are struggling socially and economically. This research examines the redevelopment of rural communities through a lens of continuous cycles of adaptive change - based on Holling's ecological concept of panarchy. By drawing on the characteristics of ecological communities, this panarchy-based theoretical framework uses a novel approach to reflect on a community's position along its own adaptive change cycle and identifies leverage points where policy intervention may be most advantageous. This research also examines the practical application of this framework via interviews with economic development officials. Overall, the results of this research suggest that the panarchy-based framework offers constructive guidance to policy makers seeking to push or pull rural communities into positions of higher resiliency and to expedite times of economic uncertainty.

## **LIST OF ABBREVIATIONS USED**

CBDC – Community Business Development Corporation

PBA – Place-based Approach

PEI – Prince Edward Island

NB – New Brunswick

NL – Newfoundland and Labrador

NS – Nova Scotia

RDA – Regional Development Agency/Authority

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## CHAPTER 1 INTRODUCTION

### 1.1 Problem Statement

The global decline of rural populations is well documented and is expected to intensify in the coming decades (United Nations, 2012). In North America, remaining rural areas are experiencing ageing populations, outmigration of youth, reduction in public services, inefficiencies in local industries and a continued dependency on government programs (Polèse and Shearmur, 2006; Ward and Brown, 2009; Halseth et al., 2010; Kilkenny, 2010; Ryser and Halseth, 2010; United Nations, 2012). In Canada, the country's rural population continues to decline (Martel and Chagnon, 2012). This is particularly concerning for Atlantic Canada that has some of the largest rural populations in the country (Reid and Savoie, 2011; Statistics Canada, 2012a). The economic performance of Atlantic Canada lags behind much of the country as a result of its larger seasonal workforce, higher unemployment rates and greater dependence on the Federal employment insurance program, all exacerbated by the economic struggles of its rural areas (Gray and MacDonald, 2010; Busby and Gray, 2011; Reid and Savoie, 2011).

The current condition of rural Canada is in sharp contrast to the history of this nation, a nation that was built on the successes of its small rural communities. Rural communities were founded across Canada as a result of the country's extensive natural resources and vast geography (Petigara, 2012). Unfortunately, due to changes in worldwide commodity markets, industrial restructuring and lack of steady investment, rural areas have been experiencing significant social and economic challenges over the past 30 years (Polèse and Shearmur, 2006; Petigara et al., 2012). Despite these challenges rural areas remain important locations for food production, natural resource extraction, environmental conservation, leisure activities and cultural heritage (Halseth et al., 2010; Reid and Savoie, 2011). Some are calling for the development of a new rural economy, one that builds on the legacy of traditional rural assets while at the same time reorganizing these assets to drive new growth through more innovative resource exploitation that goes beyond mere supply of primary resources to the export market (OECD, 2006; Halseth et al., 2010).

Given the challenges facing rural communities over the last few decades interest in rural economic development research and policy advancement remains high (Ryser and Halseth, 2010). There is recognition that existing strategies to tackle rural problems will require ongoing evaluation and modification to address emerging issues (Halseth et al., 2010). This research is designed to address the continued need for new rural economic development strategies in light of persistent rural economic challenges. It offers an ecological framework as a new policy tool for examining the redevelopment of rural communities. In addition, key informant interviews were conducted with economic development officials in Atlantic Canada to gain insight into the current difficulties faced by rural communities in the region and evaluate the practicality of the framework. Overall, this research offers constructive guidance to policy makers seeking to push or pull rural communities into positions of higher resiliency, in order to better withstand economic fluctuations, and to expedite times of economic uncertainty.

## **1.2 Topic Evolution**

A brief explanation is warranted of how this topic evolved, as it had two previous but closely related incarnations. The initial goal of this thesis was to examine strategies that could be employed to support the long-term sustainability of small businesses and the local communities where they reside. Specifically, this thesis sought to offer new research in the field of industrial ecology (Erkman, 1997; Ehrenfeld, 2007; Lifset, 2008; Ashton, 2009) by completing a comparative analysis (Pickvance, 2001) between the redevelopment processes exhibited in secondary succession ecology and sustainable community redevelopment. Industrial ecologists believe that successful models existing in nature, a 4.5 billion year old system, can be used to effectively re-engineer human systems (Krones, 2007). It is this belief, and the acknowledgment that countless analogies between ecological and industrial systems remain unexplored (Wright et al., 2009), that propelled this research field forward.

Early research considered whether the predictable, well-studied patterns of secondary succession ecology (Clements, 1916; MacArthur and Wilson, 1967; Odum, 1969) could provide an approach to facilitate the study of similar patterns in community economic-redevelopment. Akin to the characteristics found in secondary succession,

human communities are often inflicted by either gradual changes in resource availability (e.g., fish stock decline - analogous to the impacts of climate change over time in an ecological setting), or unpredictable but acute catastrophic events (e.g., a mill closure - analogous to an ecological disturbance such as a hurricane). Both the decline of a natural resource or the collapse of a primary industry can have profound social and economic impacts that can jeopardize the long-term viability of a community (Polèse and Shearmur, 2006; Markey and Heisler, 2010; Ryser and Halseth, 2010). Local residents and businesses in a community, which could be referred to as the species that populate this human community, must adapt to these changes in order to survive.

Succession ecologists try to explain changes in species composition in an ecosystem (Horn, 1974; Young et al., 2001; Smith and Smith, 2006) through a better understanding of existing conditions that can act as barriers or drivers to species colonization (Young et al., 2001). The preliminary focus of this early research considered whether analogous predictions could be made for businesses establishing in human communities.

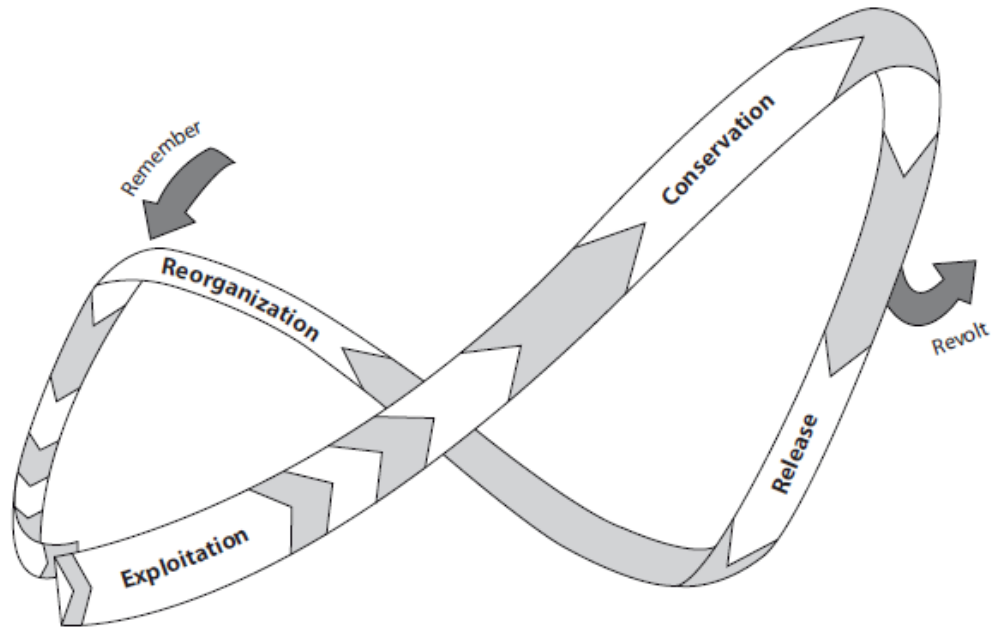
Preliminary research questions included: What businesses initially populate a community after the collapse of a primary industry? Do these businesses belong to a sector not previously supported by the community? Do these 'opportunistic' businesses share similar qualities? Are these businesses successful in the long-term or are they only able to achieve short-term market success (high turnover rates)? Which businesses outperform their competitors in the long-term? Do these 'highly-competitive' businesses share comparable characteristics? It was anticipated that this research could provide indicators to economic development officials regarding business establishment in the short and long-term recovery of communities rebounding from industry collapse. Its objective was to define the specific characteristics of businesses that help communities recover over time, as well as the barriers and drivers experienced by such businesses as they join a community. This was in an effort to support the development of a business 'community', optimally suited to succeed after such a 'disturbance'.

Over time refinements were made to the initial research topic and research questions. The main research question was refined to examine whether the predictable patterns of forest succession after a disturbance (e.g. forest fire, pest infestation, hurricane damage) could be used to re-conceptualize community economic redevelopment after the collapse

of a primary industry (e.g., mill closure, fishery collapse, mine shutdown). Two hypotheses were prepared that addressed this question: (1) businesses establishing in the early stages of a community's recovery will be characterized as fast growing, with high turnover rates, analogous to r-selected species that have higher reproductive rates and shorter lifespans in secondary succession (MacArthur and Wilson, 1967); and, (2) businesses establishing in the later stages of a community's recovery will be characterized as slower growing, with low turnover rates, analogous to K-selected species that have lower reproductive rates and longer lifespans in secondary succession (MacArthur and Wilson, 1967). The anticipated outcomes of this research became more detailed as the topic and research questions were refined. Specifically, this research angle sought to develop a strong analogy between forest succession (Clements, 1916; Odum, 1969) and typical community redevelopment. It was anticipated that this ecological lens could be used to develop a refined list of characteristics that would be exhibited by businesses that would be preferential to support, due to their increased likelihood of succeeding in recovering communities. This information, in turn, would be valuable to economic development officials for allocating incentive funding to the right businesses at the right time.

Further refinements were made to the research topic and research questions after a literature review on the topic of succession ecology was completed. During this review, another ecological model, panarchy, was discovered. Panarchy seeks to examine complex systems using a four-stage adaptive change cycle (Holling, 2001; Holling and Gunderson, 2002). Adaptive changes can include long periods where various forms of capital are built leading to growth and stability, or it can include short periods where rapid reorganization takes place leading to change and innovation (Holling and Gunderson, 2002; Simmie and Martin, 2010). What was beneficial about the panarchy model was that it incorporated features of succession and secondary succession as part of the 'front loop' of its adaptive change cycle (Figure 1.1). It also lessened the focus on direct comparisons between the characteristics of r/K-selected species and businesses at each stage of the cycle, an analogy that academic colleagues suggested had limitations and required further thought. The 'back loop' of panarchy's adaptive change cycle offered a new addition to this research.





**Figure 1.1** Four stages of the adaptive change cycle including features of remember and revolt (diagram adapted from Holling and Gunderson, 2002, p. 34, Figure 2.2-1)

Using this newly expanded understanding, a theoretical framework was developed to illustrate the potential application of Holling’s panarchy model to rural economic redevelopment and to determine if it provided a different set of recommendations to rural policy makers than those from existing approaches. The focus on rural communities was explicitly stated as part of this topic refinement and included any rural community that had experienced an economic disturbance, not just those that had been impacted by the decline of a natural resource or primary industry collapse. In evolving this research from the application of secondary succession to panarchy’s more comprehensive adaptive change cycle the focus also shifted to drawing general parallels between the characteristics of ecological communities and rural communities as a whole, with less attention to business characteristics at each stage.

### 1.3 Research Questions

This primary aim of this research was to determine if the redevelopment of rural communities could be informed by the application of an ecological framework that draws

parallels between the traits of ecological communities and the traits of rural communities.

Two hypotheses were proposed:

- (1a) Panarchy can be used as a novel framework to identify and reflect on a community's position along the adaptive change cycle; and,
- (1b) Leverage points exist along the adaptive change cycle where policy intervention could be most advantageous by specifying the timing of policy instruments on the cycle.

The secondary aim of this research was to examine the practical application of this panarchy-based framework in an attempt to:

- (2a) Evaluate the framework's alignment with rural development strategies in Atlantic Canada using insights from economic development officials in the region; and,
- (2b) Identify policy gaps and/or disconnects between existing policies/strategies and the best timing of their deployment as suggested by the framework, that offer potential opportunities for new knowledge generation.

#### **1.4 Outline of Thesis**

This thesis has been divided into four chapters. This first chapter provides a background on key themes and a summary of research methods used. The second and third chapters contain individual manuscripts as prepared for journal publication. Chapter Four is the concluding chapter of the thesis. It provides summaries of the key findings from chapters two and three, individually and collectively. Chapter Four also recommends further research avenues that could be pursued.

Chapter Two has been submitted to a journal focusing on urban and regional research and describes how panarchy could be used to provide insight for rural economic development strategies. The introduction of Chapter Two outlines the current challenges faced by rural communities and provides a brief background on sector-based versus place-based economic development policies. This is followed by a primer on the ecological model of panarchy. The bulk of Chapter Two draws parallels between the characteristics of an ecological community and an archetypical rural community at each stage of panarchy's adaptive change cycle. Four policy intervention positions, three major and one minor, are also described along the adaptive change cycle. These positions

illustrate moments on the cycle where policy instruments could be used to slow down or reverse the ‘front loop’ or speed up the ‘back loop’ to position the community into an area of higher resilience. Chapter Two concludes with recommendations for continuing research including examining the practical application of the framework presented.

Chapter Three has been submitted to a journal focusing on rural issues and builds on the theoretical framework developed in Chapter Two by investigating its practical application for rural communities in Atlantic Canada. The introduction of Chapter Three reiterates the struggles of rural communities and provides arguments for using Atlantic Canada as an appropriate case study for examining the framework. This is followed by a concise summary of the key informant interviews that were conducted with economic development officials in the region. A brief recap of the panarchy-based framework is also provided. Additional details are provided on panarchy’s nested feature - not included in Chapter Two - but revealed to be relevant to the discussion in Chapter Three. The remainder is a summary and discussion of the key informant interview results. These results are categorized under three headings, functioning regions, encouraging provincial competitiveness and reassessing global positioning. The results and discussion sections examine areas of compatibility between the viewpoints of economic development officials and the features of the panarchy-based framework. It also identifies potential gaps in existing strategies/policies and/or disconnects between these policies and the best timing of their deployment as outlined in the framework.

It should be noted that the words ‘we’ and ‘our’ are used in sections of this thesis. This is in recognition of the contributions of my thesis supervisor and committee member who have provided guidance, support, and valuable input throughout this process. This first person narrative also adheres to journal guidelines used when preparing the second manuscript. It must be stressed, however, that the entire research for this thesis was completed by myself in partial fulfillment of the requirements of this degree.

## **1.5 Background**

To provide context for the remaining chapters three topics deserve further explanation. Succession ecology and panarchy are the two ecological concepts used to assemble the theoretical framework in this thesis. This framework is then used to provide

guidance to rural communities and therefore what constitutes ‘rural’ in this research must be defined.

### **1.5.1 Succession Ecology**

Succession is a core ecological theory that has been studied for over 100 years (Smith and Smith, 2006; Walker, 2012). Succession ecology documents the change in species composition over time in both terrestrial and aquatic environments (Horn, 1974; Smith and Smith, 2006) and is defined as being either primary or secondary. Primary succession occurs when colonization occurs on a site that previously had little to no vegetation (Walker and del Moral, 2003; Smith and Smith, 2006). Sites of primary succession can include recently exposed rocks, cliffs and sand dunes (Smith and Smith, 2006). Secondary succession takes place when a previously vegetated site becomes disturbed and its species composition changes (Smith and Smith, 2006). Examples of secondary succession include weeds that invade a previously plowed agricultural site or changes that occur in a forest community after a fire (Walker, 2012). In a forest community, a single succession sequence from grass to shrub to forest is referred as a sere (Clements, 1916; Smith and Smith, 2006).

Classic succession theory suggests that succession is orderly, directional and a relatively predictable process (Clements, 1916; Odum, 1969; Young et al., 2001). This holistic view of succession ends in a stable, mature, climax community (Walker and del Moral, 2003). Under this viewpoint, each sere is defined by a series of stages from the first pioneer species up to climax species (Clements, 1916). One seral stage sets the conditions for the next seral stage to survive (Clements, 1916; Walker, 2012). An alternative view of succession is referred to as reductionism. Under this definition of succession a community is constantly changing as a result of disturbances and never reaches a single climax community (Walker and del Moral, 2003; Walker, 2012). Species change occurs but the final composition of the community can take many trajectories (Walker and del Moral, 2003; Young et al., 2001)

Secondary succession is one of the theories focused on in this thesis. In secondary forest succession, early successional species or pioneer species colonize a disturbed area initially (Horn, 1974; Smith and Smith, 2006). In early successional species photosynthesis exceeds respiration; biomass and organic matter thus accumulate in the

ecosystem (Odum, 1969). Early successional species are characterized as having high growth rates, high dispersal, quick maturation and simple life-histories (Horn, 1974; Odum, 1969; Smith and Smith, 2006). Over time these species are replaced by later successional species that outcompete pioneer species for resources. Late successional species are characterized as long-lived species that compete well for resources, have better resource-storage capabilities and more complex life-histories (Horn, 1974; Odum, 1969). In later succession respiration exceeds photosynthesis and eventually no new biomass accumulates (Horn, 1974).

MacArthur and Wilson (1967), in their study of island colonization, defined characteristics of species with direct parallels to succession (Odum, 1969). They defined early-successional species as r-selected species after the intrinsic rate of growth calculation (Pianka, 1970). Such species emphasize quantity over quality (MacArthur and Wilson, 1967) and are characterized as small in size, having high reproductive and growth rates and being strong colonizers. They also typically have high turnover rates and short lifespans (MacArthur and Wilson, 1967; Pianka, 1970). In forest succession, r-selected species include species such as herbaceous plants, grasses, and shrubs (Smith and Smith, 2006). MacArthur and Wilson (1967) defined later-successional species as K-selected species referring to the carrying capacity of an ecological community (Pianka, 1970). K-selected species are characterized as large in size, having low reproductive and growth rates and being poor colonizers (MacArthur and Wilson, 1967; Pianka, 1970). They also typically have low turnover rates and longer lifespans (MacArthur and Wilson, 1967; Pianka, 1970). K-selected species are better able to withstand environmental changes than r-selected species (Pianka, 1970). In succession, K-selected species include species such as softwood and hardwood trees including canopy species (Smith and Smith, 2006).

### **1.5.2 Panarchy**

A background on r- and K-selected species from succession and their characteristics is necessary for understanding panarchy, an ecological model used for studying complex systems in simpler terms (Holling, 2001; Holling and Gunderson, 2002). Holling (2001) suggests that complex systems in ecosystems, societies and cultures can be examined

using nested adaptive change cycles. Slower, larger adaptive change cycles help resources to accumulate and achieve stability in a system, while at the same time facilitating the dynamic recombination of those resources in faster, smaller cycles (Holling and Gunderson, 2002).

Each adaptive change cycle is composed of four stages, exploitation, conservation, release and reorganization (Holling, 2011; Holling and Gunderson, 2002). In the exploitation stage, resources accumulate in the system. In the conservation stage, rigidity can build in the system, increasing its vulnerability to a disturbance. In the release stage, also known as the creative destruction stage, the system experiences rapid change and novel recombination of its components begins. In the reorganization stage, system components combine in new ways as innovations and experiments are tested. The exploitation and conservation stages of the cycle define the ‘front loop’ of the cycle while release and reorganization define the ‘back loop’ (Figure 1.1, p.5). The ‘front’ loop of the adaptive change cycle leads to slow and incremental growth and accumulation of resources in a system (Holling and Gunderson, 2002). The ‘back loop’ of the cycle leads to rapid change and reorganization of resources in a system (Holling and Gunderson, 2002). Each stage of the adaptive change cycle must occur in sequence. Growth and accumulation in the ‘front loop’ sets the stage for release and reorganization in the ‘back loop’. Holling and Gunderson (2002) draw parallels to succession ecology in the ‘front loop’ of the model’s adaptive change cycle. Characteristics from r-selected species, early-successional species, are used to define the exploitation stage of the cycle. On cycle diagrams ‘r’ is thus used as a label for the exploitation stage (Holling and Gunderson, 2002). Characteristics from K-selected species, late successional species, are used to define the conservation stages of the cycle. On cycle diagrams ‘K’ is thus used as a label for conservation (Holling and Gunderson, 2002). The panarchy model’s link to r- and K-selected species is described further in chapter two.

The panarchy model is defined by three important properties: connectedness, potential and resilience. Connectedness refers to internal controls in a system that determine how flexible the system is to change. Potential describes the capacity of a system to change as a function of its resources and includes features such as ecosystem structure and productivity (Holling and Gunderson, 2002). Resilience refers to a system’s

vulnerability to change. The levels of potential, connectedness and resilience of an ecological community change along its adaptive change cycle. The panarchy model recognizes that an ecological community will not indefinitely remain in the conservation stage analogous to a climax community in classic succession. Eventually, a community will become overly connected, its potential for change will increase and it will become more vulnerable to disturbance (Holling and Gunderson, 2002). This will lead to radical innovation and a fundamental change in the system (Biggs et al., 2010). Additional details on the stages and properties of the adaptive change cycle are described in chapter two.

This thesis hypothesizes that rural policy makers and community leaders can examine complex rural development problems by superimposing the model of panarchy on these systems. Research by Simmie and Martin (2010) and research for this thesis both suggest that regional economies adhere to certain features of panarchy's adaptive change cycle, including times of growth and stability, rigidity and release, innovation and restructuring. The panarchy model and basic succession ecology theory are used to develop a panarchy-based framework in this thesis that provides policy guidance for the economic redevelopment of rural communities.

### **1.5.3 Definition of 'Rural'**

In simple terms urban populations are defined as clustered populations with high density while rural populations are the opposite, dispersed with low density (Statistics Canada, 2011). Since Canada's 1971 Census, Statistics Canada has been defining urban and rural populations based on population size and density. Using these characteristics, an urban population was described as a population of at least 1000 people with a density of 400 people or more per square kilometer (Statistics Canada, 2011). Rural populations were defined as any population outside of these parameters. Recently, Statistics Canada (2011) modified its definition of an urban population in recognition of the great variety of towns and cities captured under the old definition. Urban populations are now referred to as small, medium and large population centres. Small population centres have 1000 to 29,999 individuals, medium population centres have 30,000 to 99,999 individuals and larger population centres have 100,000 individuals and over (Statistics Canada, 2011).

Statistics Canada's definition of rural populations remains unchanged (Statistics Canada, 2011).

Based on the Statistics Canada definition of rural, the proportion of the Canadian population considered to be rural has changed dramatically over time (Martel and Chagnon, 2012), 2012). In 1851, 9 in 10 Canadians lived in rural areas (Martel and Chagnon, 2012). Over the past 160 years there has been a significant decline in this demographic. Between 1921 and 1931, Canada's rural population fell below 50 percent (Martel and Chagnon, 2012). Today, less than 20 percent of the Canadian population lives in rural areas (Statistics Canada, 2012a). This is considered one of the lowest rural population proportions among the world's Group of Eight (G8) countries (Martel and Chagnon, 2012). The highest proportion of the country's rural population lives in Atlantic Canada and the northern territories (Martel and Chagnon, 2012).

Although Statistics Canada's current definition of rural communities is based on population size and density, many other definitions exist for policy analysis (Plessis et al., 2002). Definitions of rural can be based on characteristics such as a perceived way of life, distance from an essential service, distance from an urban area, culture, and geography (Plessis et al., 2002). Rural population numbers and the characteristics of rural citizens will vary depending on the definition used. Plessis et al. (2002) note that it may be beneficial to some researchers and policy makers to avoid using a single definition of rural but rather assign one or more 'degrees of rurality' to a chosen definition. For the purposes of this study Statistics Canada's current definition of rural populations may be too narrow. We feel that many communities in Atlantic Canada that are considered by their residents as 'rural' would fall outside of the definition's scope. Therefore, the Statistics Canada definition of rural will be used primarily in this thesis to explain population figures the agency provides. However, we will include citizens and communities that self-identify as rural residents and rural communities even when they are not captured by this narrow definition (Halseth et al., 2010; Plessis et al.; 2002). This will allow our panarchy-based framework to be used as a potential policy tool for a broader number of communities.



## **1.6 Methods**

This research used two qualitative research methods, a content analysis and key informant interviews, to develop and analyze the panarchy-based framework. The interviews were undertaken with oversight and approval from Dalhousie University's Social Science and Humanities Ethic Board. Details of the qualitative methods used are discussed individually below.

### **1.6.1 Content Analysis**

To analyze whether the redevelopment of rural communities could be examined through the application of an ecological framework, a content analysis was performed to develop the framework. A content analysis is defined as a systematic look at the content of oral, written or visual material from literature sources that are relevant to a research question (Beins, 2004). This examination can be conducted qualitatively, in which overall patterns are extracted, or quantitatively, in which the frequency and duration of ideas is recorded (Beins, 2004). One type of content analysis, a directed-content analysis, is used in particular to extract details about an existing theory or body of research and can help validate a new theoretical framework (Hsieh and Shannon, 2005). For this research a qualitative, directed-content analysis of the literature was performed to extract patterns. Three literature searches were conducted to: (a) define common characteristics of r-selected and K-selected species and to identify their roles in the redevelopment of a forest ecosystem; (b) summarize key features of panarchy and its adaptive change cycle; and (c) examine the current economic development strategies/policies in Atlantic Canada to identify areas of alignment with the proposed framework.

### **1.6.2 Framework Development**

To develop the panarchy-based framework we described what an archetypical rural community would look like at each stage of the adaptive change cycle. A summary table was first created that identified typical characteristics of an ecological community at each of the four stages. Comparable characteristics were then drafted for an archetypical rural community at each stage. For example, an ecological community in the release phase was characterized as reacting to a disturbance with species die-off and resource release. An

archetypical rural community in the release phase was characterized as having business closures and a migrating workforce. Three properties of the adaptive change cycle - potential, connectedness, and resiliency - were also described for a rural community at each stage of the cycle.

Once a general link between the panarchy model and rural communities was established, moments were identified along the adaptive change cycle where policy instruments could be applied to change a community's position in its trajectory. The exact positioning of these moments was determined in consultation with my thesis committee and academic colleagues during early framework development. It was hypothesized that these policy positions could be used to slow down or reverse the 'front loop' of the cycle by pulling the community back from the conservation to the exploitation stage or speed up the 'back loop' of the cycle by pushing the community forward from the release to the reorganization stage. Three major policy positions - *Seeds of Innovation*, *Cultivation of Creativity* and *Colonization of Ideas* - and one minor policy position - *Laying Fallow* - were identified along the adaptive change cycle. A summary table was created that described whether each position slowed down/reversed the 'front loop' or expedited the 'back loop' of the cycle. This last table also listed sample policy instruments that could be applied at each stage. For example, possible policy instruments at the *Cultivation of Creativity* position included worker retraining programs, funding for public-private partnerships to promote research and development and support for the development of value-added products. These tables are presented and discussed in Chapter Two.

### **1.6.3 Framework Application**

Once the basic components of the theoretical framework were identified, including the archetypical characteristics of rural communities at each stage of the adaptive change cycle and the policy leverage points on the cycle, the practical application of the framework was considered. In the original research that focused on succession ecology the aim was to examine the application of this ecological model to rural community redevelopment using two Canadian community case studies. As the study evolved to examine the application of the panarchy-based framework, the focus shifted to a broad

case study involving Atlantic Canada. To analyze the practical application of the framework, semi-structured key informant interviews were undertaken with economic development officials. The study targeted economic development officials from Newfoundland and Labrador (NL), Prince Edward Island (PEI), Nova Scotia (NS), and New Brunswick (NB).

### ***1.6.3.1 Key Informant Interviews***

Key informants provide researchers with insight based on a formal role that they hold in their community (Marshall, 1996). In qualitative research key informant interviews can produce rich descriptive data that is often difficult to acquire from other methods such as questionnaires (Tremblay, 2005). Semi-structured interviews are a common interview format that can be used to test hypotheses using standardized questions and methods of analysis (DiCicco-Bloom and Crabtree, 2006). The intention of the semi-structured key informant interviews in this study was to seek insight from economic development officials who would have expert knowledge on the struggles of rural communities in their regions. Key informant interviews were performed with economic development officials from government departments and community development agencies in the four Atlantic Provinces. The key informant interviews were carried out to obtain data in the form of anonymous quotes. These anonymous quotes were used to examine the compatibility of viewpoints from economic development officials with the proposed framework.

Tremblay (2005) suggests that there are five main characteristics that should be considered when selecting informants. These characteristics include: holding a formal role in their community, having access to the information required, demonstrating a willingness to provide this information, revealing an ability to communicate this information effectively and acknowledging any personal biases when participating to ensure impartiality. The first three characteristics of key informants in this study were considered when preparing a shortlist of participants based on position titles. The latter two characteristics were determined during the interviews. In all cases participants were able to communicate their ideas clearly and indicated any personal biases they had when answering a particular question.

Three representatives from each province were interviewed for a total of twelve interviews. Telephone interviews were chosen as the best way to interview participants in this study. Telephone interviews are helpful for interviewing hard-to-reach participants, for conducting research on a limited budget and for offering participants a feeling of anonymity that is often desired (Marshall, 1996; Greenfield et al., 2000; Sturges and Hanrahan, 2004). Although all participants in this study were public officials and may be less concerned with anonymity, participants appeared comfortable being recorded over the telephone without the visual cue of the recorder reminding them of the formality of the conversation. Many provided personal stories as examples, showing their ease with the informal telephone conversation.

Participants were initially recruited for the study using employee and position lists available on provincial government websites and development authority/agency websites. The initial recruitment process identified four of the participants in the study and a snowball sampling method was used to enlist additional participants. Snowball sampling is a simple qualitative research technique useful in interviewing where participants are asked to provide names of other individuals that could be recruited into the study (Atkinson and Flint, 2001; Sadler et al., 2010). The snowball sampling technique was very productive in this study as the remaining study participants were identified in this manner. Early participants provided contact information or in some cases emailed or phoned colleagues in their province to encourage their participation.

In each province one official was interviewed who was employed in the government's economic development department. These officials were targeted based on their knowledge of current and past economic policies/strategies created to address rural development challenges. The two remaining participants from each province were employed in local development groups such as Regional Development Authorities/Agencies (RDAs) and Community Business Development Corporations (CBDCs). All hour-long interviews were conducted over the telephone from April to June 2012. To maintain consistency in the interview process all 'local' informants were contacted by telephone as well. Participants were provided with a series of twelve indicative questions that would be used to frame the telephone discussions prior to the

interview (Box 1). Where required additional province-specific questions were added prior to the interviews (Appendix A).

Minimal risk or discomfort to participants was expected when participating in the interview process. Public officials are often called upon to answer questions from the public and private sector to provide justification for government strategies and program offerings. The probability of risks was expected to be particularly low for these participants as they were sent interview transcripts to provide corrections/comments to ensure that the information collected accurately reflected their responses. Public officials are asked to follow-up on public inquires as part of their job duties and the time spent participating in this study could be justified under this mandate.

**Box 1.** Indicative interview questions used to structure phone discussions with economic development officials in Atlantic Canada

1. What key elements does your department/organization believe are needed to achieve strong rural economies
2. What are the initial steps your department/organization takes when an important industry in a rural community is experiencing a downturn? What medium and long term steps are taken to address this issue?
3. How often will your department/organization intervene to assist a struggling industry? What is the protocol for this intervention?
4. What is your department/organization's strategy for prioritizing the needs of multiple rural communities facing economic decline?
5. How long is your department/organization willing to wait to see positive results from interventions created to promote the stabilization and growth of rural economies? After this timeframe is surpassed what are the typical next steps for intervention?
6. What results have recent rural policies/strategies achieved to date and what areas does your department/organization believe still need more attention?
7. What are the most struggling rural communities your department/organization has identified in your province/region and why?
8. What are the most successful rural communities your department/organization has identified in your province/region and why?
9. What strategies have worked in the past to revitalize rural communities in your province/region and what strategies have failed and why?
10. What sectors does your department/organization predict will be important to rural communities in your province/region in the future? How is your department/organization currently supporting the development of these sectors?
11. What percentage of department/organization resources are spent on maintaining current rural industries and what percentage of resources are spent on emerging industries? Do you expect these percentages to change in the future? Why or why not?
12. What problems does your department/organization predict will impact rural communities in the future? Alternatively, what future provincial/regional problems might be alleviated through the increased support of rural communities?

### ***1.6.3.2 Informed Consent***

A consent form was prepared for the study that provided a background on the study and indicated to participants that their participation in the study was voluntary and could be withdrawn at any time (Appendix B). The consent form also outlined the participant's role in the study and the potential risks and benefits to their participation. Participants were initially contacted using an introductory letter (Appendix C) and the consent form for their review. When participants agreed to take part in the study they were asked to fill out the consent form and fax or scan it back. At the beginning of each interview the consent form was reviewed with participants, emphasizing their voluntary participation, the fact that the interviews would be recorded and transcribed to pull anonymous quotes for the results, and that they could pull out of the study at any time. Given that participants could be directly identified based on the limited number of positions that exist in economic development departments, by province, quotes were kept anonymous to maintain confidentiality.

During the interviews, detailed information on the proposed framework was not disclosed to participants. It was felt that most participants would be unaware of the panarchy model and discussing the model at the onset of the interview could influence their responses to the interview questions. The goal was to avoid responses where participants tried to relate their answers back to the model being studied. Any compatibility of comments with the panarchy-based framework was intended to occur organically. Participants were simply told that the interviews were being conducted to examine current strategies for improving the resilience of rural communities. At the end of interviews some participants asked for further details on the thesis topic. At this point participants were told that their responses would be analyzed to determine their compatibility with a theoretical framework being developed.

### ***1.6.3.3 Data Analysis***

Each interview was transcribed using Express Scribe (NCH Software, n.d.) into a Word document. Once transcribed each interview was replayed in full to check the transcription for errors. A copy was then sent to participants for them to make fact corrections and change phrasing – if wished. Preliminary quotes were highlighted during

a third reading of the transcript. Once all transcripts were complete and voluntary feedback from participants was incorporated, all transcripts were compiled into a single document.

Analysis of interview data can take on a structured or less structured approach (DiCicco-Bloom and Crabtree, 2006). Using a structured approach, the researcher identifies patterns in the text using codes (Corbin and Strauss, 1990; DiCicco-Bloom and Crabtree, 2006). Similar coded text is organized into categories and from these categories major themes from the research are developed (DiCicco-Bloom and Crabtree, 2006). Qualitative analysis software such as ATLAS ti and NVivo can be used by researchers to help manage their coded data thereby aiding in the analysis process (DiCicco-Bloom and Crabtree, 2006). Using a less structured approach the researcher reviews the text repeatedly each time reflecting on patterns that are emerging (DiCicco-Bloom and Crabtree, 2006). Formal coding software may not be used in this less structured approach.

For this thesis a less structured approach was taken for assessing the interview results. No data analysis software was sourced for managing the interview data. When reviewing the interview transcripts, preliminary categories were developed to group similar quotes together. Preliminary categories developed included: elements of strong rural communities; short, medium and long-term intervention steps for primary industries; government intervention protocols; prioritizing the needs of rural communities; economic development results from recent strategies; examples of struggling rural communities; examples of thriving rural communities; past economic development strategies that have worked and failed; important future sectors; allocation of government funding; future rural problems; comments on topical issues including employment insurance reform and government decentralization; lessons for other provinces; and, overall concluding remarks on the fate of rural communities.

A refined list of discussion categories and subcategories were developed after reviewing comments and quotes that had been grouped under preliminary categories. The first category identified was functioning regions. Subcategories included: fewer, more vibrant regions; focus on local assets; and managing community expectations. The second category identified was encouraging provincial competitiveness. Subcategories included: support for small business; supply chain diversification; education and

employment insurance; and, transition of sunset industries. The final category identified was reassessing global positioning. Subcategories included: value-added products; importance of rural communities; and, wider societal mindset. A discussion of results under these categories is presented in Chapter Three.



## **CHAPTER 2 AN ECOLOGICAL GUIDE TO POLICY SUPPORT FOR COMMUNITY ECONOMIC DEVELOPMENT BASED ON HOLLING'S CONCEPT OF PANARCHY**

### **2.1 Introduction**

A number of key challenges are influencing the economic vitality and sustainability of today's rural communities. Common characteristics of rural communities such as their ageing populations, outmigration of citizens to urban centres, lower wage labourers with limited education, and public service cutbacks are all factors that have contributed to the declining economic performance of these regions (OECD, 2006; Polèse and Shearmur, 2006; Ward and Brown, 2009; Halseth et al., 2010; Ryser and Halseth, 2010). To address these challenges, rural communities are in search of new innovation and growth opportunities to reinvigorate their economies.

Regional economic policies and development funding have been devoted to tackling challenges in rural areas for many years, yet true solutions to these challenges are elusive (OECD, 2006; Barca, 2012). Study into regional economic policies and development funding remain important in countries such as Australia, Canada, and the United States where rural communities continue to rely heavily on primary industries to drive their economies (Ryser and Halseth, 2010). The same is also true of rural economies in countries belonging to the Organization for Economic Cooperation and Development, where rural areas still represent three-quarters of their landmasses and one-fourth of their populations (OECD, 2006; Ward and Brown, 2009).

A debate in the literature exists regarding the relative value of urban and rural areas to economic development (Markey et al., 2008; Ward and Brown, 2009; Seto et al., 2010). Some scholars and policy makers suggest that rural decline is an unavoidable symptom of global pressures towards urbanization (Markey et al., 2008). Rural areas are sometimes considered minor contributors to innovation and growth compared to their urban counterparts (Ward and Brown, 2009). By contrast, other scholars and policy makers point to mounting negative social, economic, and environmental issues associated with urbanization (Wheeler, 2009; Seto et al., 2010). They suggest that rural areas offer a better quality of life, sense of place and community (Ward and Brown, 2009), and that rural renewal is a necessary alternative to urbanization at a scale that is increasingly

viewed as an impediment to sustainable development (Grimm et al., 2008; Wheeler, 2009). Moreover, rural redevelopment remains important in countries dominated by primary industries (Ryser and Halseth, 2010; Savoie, 2011).

This paper works from the supposition that there is benefit to be gained in sustaining rural contributions to regional economic development. The goal is to examine the economic redevelopment of rural communities through the application of an ecosystem analogy that draws parallels between the traits of rural communities and the traits of ecological communities (Clements, 1916; MacArthur and Wilson, 1967; Odum, 1969). Of particular relevance are the characteristics of their development and adaptation cycles. The lens for this examination specifically uses the continuous cycles of adaptive change based on Holling's (2001) concept of panarchy.

Adaptive changes within ecological communities can include long periods where various forms of 'capital' are built leading to growth and stability, or it can include short periods where rapid reorganization takes place leading to change and innovation (Holling and Gunderson, 2002; Simmie and Martin, 2010). By likening this pattern to the development/redevelopment patterns of human communities, this paper suggests that Holling's concept of panarchy can be used as a novel framework to identify and reflect on a community's position along this cycle. In doing so it permits practical leverage points to be identified along the cycle where specific policy interventions may be most advantageous. The intent of this investigation is to understand the potential for Holling's (2001) model to aid rural policy makers to develop a different (perhaps more targeted) set of recommendations than those resulting from existing approaches. Specifically, this ecologically based decision framework could be used by policy makers to more effectively target economic instruments that are more community/regionally specific by identifying the state of a community as it relates to its position on its cycle and responding accordingly.

## **2.2 A Transition from Sector to Place**

In the past, rural development policies focused on the development of natural resource sectors, as the two went hand-in-hand. This was particularly true for the agricultural sector (Partridge et al., 2009). Traditional policies employed government

funds to stimulate agricultural research and development and support any necessary infrastructure (Partridge et al., 2009). Although well intentioned, there has been increased debate over the utility of rural policies having a single-sector focus: particularly contentious is the issue of sector-based economic subsidies (Goldenburg, 2008).

Policy interventions continue to focus on single sectors although the needs of rural communities have changed societally, economically, and technologically: rural policies may now need to evolve as well (Partridge et al., 2009; Ward and Brown, 2009; Barca et al., 2012). For example, the use of traditional farm policies has continued even as the labour employed in the agricultural sector has decreased. Large-scale support of the agricultural sector to drive job retention and growth increasingly appears to be unproductive (OECD, 2006). Additionally, support for traditional resource sectors has continued despite trends such as industrial consolidation and the employment of labour-shedding technologies (Ryser and Halseth, 2010). Subsidies to traditional resource sectors may take resources away from innovation opportunities needed to transition the economies of rural areas (Partridge et al., 2009). Dependency on subsidies and employment in traditional industries makes rural communities more vulnerable to the inevitable times when these industries experience downturns (Simmie and Martin, 2010).

Governments are now seeking to move away from traditional, sectoral approaches to more community-led, place-based approaches (PBA) (OECD, 2006; Ryser and Halseth, 2010; Halseth et al., 2010). When it was assumed that rural communities were on a trajectory of decline there was little expectation that communities could change this course (Eversole, 2011). PBAs offer communities control over their futures (Eversole, 2011) as it helps move attention away from a single facet of the rural economy and allows more support to other sectors such as tourism, production and manufacturing, and information and communication technologies (OECD, 2006; Reimer and Markey, 2008). PBAs represent a shift from top-down subsidy-based policies to policies that improve regional competitiveness through diversification (OECD, 2006). This shift in focus can re-engage communities in economic development and gain buy-in from important local actors (Markey et al., 2008). It acknowledges local knowledge and skills, and helps use local assets more effectively by holistically examining many aspects of a community, such as cultural, economic, environmental and social issues. This can lead to the creation

of policies that succeed and last in an area (Markey et al., 2008), as place-based approaches put places ahead of sectors and strategic investments over subsidies (Goldenburg, 2008).

Engaging communities in place-based policy development is not easy as it requires a shift from traditional top-down governance to a more horizontal approach that builds new relationships with community groups (Eversole, 2011). For place-based policies to be effective, managers need to understand the future pressures that may influence rural communities, and hold local knowledge about those places, people and assets (Reimer and Markey, 2008; Ryser and Halseth, 2010). Place-based policies do not, however, replace traditional policy approaches. Instead, traditional policies continue to play a role in new rural development as part of a toolbox of policy interventions (Goldenburg, 2008). For example, support must remain for policies that help existing industries add-value and gain market recognition for new products (Ryser and Halseth, 2010).

### **2.3 Panarchy as a Place-based Policy Catalyst**

Panarchy, a model originating in ecology, is helpful for understanding complex systems and problems. Holling (2001) observed that a common pattern exists behind complex ecological, social and environmental systems and their interactions, and suggested that understanding a complex problem requires its examination using a four-stage adaptive change cycle. The model of panarchy specifically examines how complex systems respond to change at different scales and paces (Holling and Gunderson, 2002). Referred to as nested adaptive change cycles, Holling and Gunderson (2002) argue that larger, slower adaptive change cycles help resources to accumulate and achieve stability in a system, while at the same time facilitating the dynamic recombination of those resources in smaller, faster cycles. The motivation for using nested adaptive change cycles is to emphasize that complex systems have periods of predictability and persistence as well as periods of unpredictability and change (Holling et al., 2002a).

Panarchy is particularly helpful for examining the vulnerability and resiliency of systems to disturbances. In ecosystems, these disturbances can be events such as droughts, hurricanes, forest fires, and pest infestations (Holling and Gunderson, 2002).

The model corresponds well with the concept of *ecological resilience* as it describes the ability of a system to adapt to such disturbances, often improving upon its previous state (Simmie and Martin, 2010). However, the model corresponds less to engineered resiliency: a system that responds to a disturbance by returning to its previous state and continuing on the same growth path without adapting as a result (Dawley et al., 2010; Simmie and Martin, 2010). As such, throughout the rest of the paper, the term resiliency will be used from an ecological resiliency perspective.

Beyond theorizing about the vulnerability of systems to unexpected disturbances, the panarchy model also provides a framework for understanding the connectedness and potential in a system. *Connectedness* refers to internal controls in a system, which determines how flexible the system is to change. *Potential* describes the capacity of a system to change as a function of its resources and includes features such as ecosystem structure and productivity (Holling and Gunderson, 2002).

The adaptive change cycle is composed of four stages: exploitation, conservation, release, and reorganization, shown in Figure 1.1, p.5 (Holling, 2001; Holling and Gunderson, 2002; Simmie and Martin, 2010; Bensen and Garmestani, 2011). To understand how human communities would cycle through these four stages one must first comprehend the concept of secondary succession in ecosystems as this process defines the cycle's 'front loop' (Figure 1.1, p.5, lower left to upper right). Secondary succession occurs when opportunistic/pioneer species exploit a niche created in a previously stable ecosystem impacted by a significant disturbance (Clements, 1916; Odum, 1969; Holling and Gunderson, 2002). As the species grow, the ecosystem develops into a new climax community (Clements, 1916; Odum, 1969). Early secondary succession characteristics define the **exploitation** stage of the adaptive change cycle (Figure 1.1, p.5, lower left). Resources begin to accumulate in an ecosystem, e.g. the accumulation of biomass (Beier et al., 2009), as species effectively exploit resources made available from the previous disturbance and become well adapted to their surroundings (Holling and Gunderson, 2002). As resources continue to accumulate, the ecosystem moves towards increased stability and connectedness, i.e. it matures (Holling, 2001). Connectedness is increasing through the formation of complex food chains and food webs between species (Odum, 1969). Potential in the system also increases as the accumulation of natural capital sets

the ecosystem up for many potential future directions should a disturbance take place (Holling and Gunderson, 2002). Resilience is high in the exploitation stage due to species diversity and a lack of competition between species (Holling and Gunderson, 2002). From this point, the ecosystem moves toward the conservation stage of the adaptive change cycle (Figure 1.1, p.5, upper right).

In the **conservation** stage of the cycle (Figure 1.1, p.5, upper right), an increase in ecosystem rigidity can occur. Fewer species dominate the ecosystem – those that have competed successfully against their competitors and have acquired a larger share of the available resources e.g., when trees reach maturity in a forest (Beier et al., 2009). In secondary succession, this transition to fewer species that dominate the ecosystem represents the development of a climax community (Horn, 1974). Eventually, changes in species composition slow or stop at the climax community stage (Horn, 1974). At this stage, species have built complex networks between one another (Odum, 1969). Near the end of the conservation stage, this network of interrelations can become overly connected (Holling and Gunderson, 2002), decreasing resilience commensurately. Such ecosystems can thus become vulnerable to unexpected disturbances such as forest fires and insect outbreaks. Exposure to such disturbances can lead to the release of resources and an unravelling of structure in the system (Holling and Gunderson, 2002). In secondary succession when a disturbance causes species to die, a forest patch opens up for recolonization (Horn, 1974).

In the **release** stage of the adaptive change cycle (Figure 1.1, p.5, lower right) or the creative destruction stage, opportunities exist for rapid change in the ecosystem, and novel recombination of ecosystem components, e.g. dominant species in the ecosystem decrease in number or die off, releasing resources for other species to exploit (Holling and Gunderson, 2002). The system's connectedness begins to decrease with fewer linkages between species. Resiliency and potential in the system are also low as resources and species in the ecosystem have become unorganized (Holling and Gunderson, 2002). Until resources and species can become reorganized and contribute to growth of the ecosystem, resilience and potential in the ecosystem will remain low (Holling and Gunderson, 2002).

In the **reorganization** stage of the adaptive change cycle (Figure 1.1, p.5, upper left) ecosystem resources combine in new ways as innovations and experiments are tested. New species begin to re-colonize the landscape and capture available resources (Holling and Gunderson, 2002). Initially, pioneer species precede late successional species to the new opening, effectively exploiting released resources (Horn, 1974). As succession proceeds and competition increases between species, late successional species replace pioneer species (Horn, 1974). Connectivity remains low as the outcomes of innovations and experiments are pending. Resilience and potential in the system are high as species are adapting to new conditions and the future direction of the ecosystem remains open (Holling and Gunderson, 2002). Uncertainty makes the reorganization stage of the adaptive change cycle the least understood. Whichever direction the system does take, however, recombination of system components at this stage prepares the system for future growth, accumulation, and storage of resources (Holling, 2001). The system then moves into the exploitation stage once again.

The adaptive change cycle thus has two key ‘loops’ to understand (Figure 1.1, p.5). Growth and stability in the ‘front loop’ of the adaptive change cycle, from exploitation to conservation, set the stage for change and variety in the system (Holling, 2001). This ‘front loop’ of the adaptive change cycle is typically characterized by incremental innovation - systematic changes of a smaller order that are less risky and are more likely to succeed (Biggs et al., 2010). Incremental innovation builds on current conditions in a system and helps strengthen it (Biggs et al., 2010). By contrast, the ‘back loop’ of the adaptive change cycle, from release to reorganization, is typically characterized by radical innovation - large unpredictable changes in the adaptive change cycle, where changes, while necessary, are more risky and outcomes are uncertain. Radical innovation adds additional components to the system and can therefore lead to the fundamental transformation of the system (Biggs et al., 2010).

## **2.4 Overlaying Panarchy on Rural Economic Development Strategies**

Rural policy makers and community leaders can examine complex rural development problems in a new way by superimposing the model of panarchy on these systems. Previous research has already demonstrated that regional economies can reflect the adaptive change cycle with sequential cycles of growth and stability, rigidity and release, innovation and restructuring (Simmie and Martin, 2010). Rural policy makers and community leaders are regularly examining how rural communities respond to local and global business competition, local and global markets, general and industry specific technological improvements, and government policies (Simmie and Martin, 2010).

Panarchy and its adaptive change cycle represent ‘resilience thinking’ concepts (Walker and Salt, 2006; Strunz, 2012) that offer a new way for examining the impacts of these changes. Despite arguments that suggest that original meaning of resilience can be lost when it is claimed by too many disciplines and interest groups (Brand and Jax, 2007; Park, 2011), this paper supports the use of general and open-ended ‘resilience thinking’ by drawing parallels between ecosystems and regional development. This allows the concepts to be used creatively across disciplines and facilitates straightforward inter- and transdisciplinary communication of their potential application (Brand and Jax, 2007; Strunz, 2012). Although models from natural systems do not map perfectly to human systems they have some useful offerings that are worth considering.

This section overlays panarchy on regional economic development strategies, mapping its stages to archetypical community characteristics and identifying appropriate policy settings for particular points of leverage on the adaptive change cycle. While a real world community may not reflect all of the characteristics identified these characteristics remain useful for pinpointing the community’s likely position on the cycle. Table 2.1 provides an overview of the characteristics of an archetypical community at each stage.



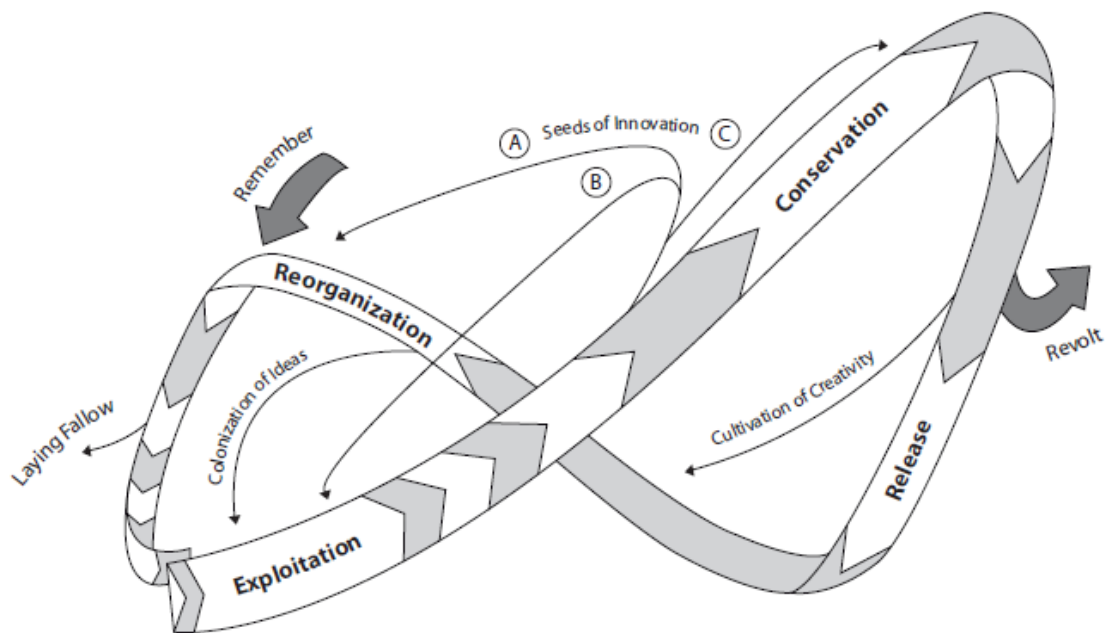
**Table 2.1** Characteristics of ecological and rural communities along the adaptive change cycle

<b>Community type</b>	<b>Cycle stages</b>			
	<i>Release</i>	<i>Reorganization</i>	<i>Exploitation</i>	<i>Conservation</i>
<i>Ecological community</i>	Species die-off Resource release Destabilization Creative destruction phase Reacting to disturbance	Pioneer species Resource recombination Experimentation Innovation phase Rebounding from disturbance	Younger species Resource acquisition High-turnover rates Growing community Resilient to disturbance	Older species Resource sequestration Low-turnover rates Climax community Vulnerable to disturbance
<i>Rural community</i>	Business closures Retiring / migrating workforce Neglected infrastructure Declining population	Business start-ups Recruiting workforce Infrastructure upgrades Returning population	Younger businesses Re-trained workforce New infrastructure Reinvesting population	Older businesses Senior workforce Ageing infrastructure Stagnant population

### 2.4.1 Release Stage

The most important stage in a rural community's change cycle to predict is a trajectory toward economic decline. Similar to Holling's (2001) model for ecosystems this same scenario takes place in the release stage of the 'back loop' of the cycle (Figure 2.2, lower right). Just prior to release stage, businesses in the community can become increasingly rigid due to conditions such as stagnant product development or reduced competitiveness. Connections between the businesses and their supply chains may begin to unravel at this stage. Disturbances affecting businesses may include economic recessions, growth and technological advancements of distant business competitors, and unexpected closures of major employers (Simmie and Martin, 2010).

An archetypical community in the release stage (Figure 2.2, lower right) has decreasing connectedness, low resiliency, and low potential similar to ecosystem characteristics at this stage (Holling and Gunderson, 2002). The community is experiencing business closures and a retiring workforce and/or a workforce migrating in search of new employment opportunities. Infrastructure in the community is becoming outdated and/or neglected as businesses close. As population declines in the area and the tax base shrinks it becomes more difficult to secure government funding for upgrades. This mirrors the characteristics found in a mature forest, for example, one that accumulates rather than recycling a significant amount of biomass (Beier et al., 2009). Holling and Gunderson (2002) argue that a disturbance such as a pest infestation or forest fire could exploit this accumulated biomass, killing off species or causing other species to leave the area.



**Figure 2.2** Four community stages and four policy leverage points identified on a rural community's adaptive change cycle

**Notes:** *Seeds of Innovation* (A) – Averting the 'back loop' (B) – Slowing down or reversing the 'front loop' (C) – Expediting the 'back loop'; *Cultivation of creativity* – Expediting the 'back loop'; *Colonization of ideas* – Expediting the 'back loop'; *Laying fallow* – Resource outflow

### **2.4.2 Reorganization Stage**

As the community enters into the reorganization stage of the ‘back loop’, the rural community is ripe for innovation (Figure 2.2, upper left). At this point the creative reorganization of community resources can occur. Policy makers have the opportunity to apply new thinking to the reorganization of a community’s resources; i.e. its natural, financial, built, social and human capital. Similar to resource reorganization in ecosystems (Holling and Gunderson, 2002) business reorganization and innovation can occur at this stage in response to the decline of existing business structures. Holling and Gunderson (2002) emphasize that similar to pests running out of foliage during infestation of a forest, businesses confronting tough financial times a reorganizing community may begin to lay off workers and fire senior management to save money and trigger the restructuring process.

An archetypical rural community in the reorganization stage (Figure 2.2, upper left) has higher resiliency and potential for change, but reduced connectedness as the supply chains of existing businesses begin to dismantle and reorganize. This is consistent with Simmie and Martin’s (2010) suggestion that the potential of a reorganizing community is high as alternative futures open up for the community. The resiliency of the rural community is also high if the creative ideas and entrepreneurial spirit of business start-ups are supported to create new paths for the community to take. For example, the skilled labour once locked into particular businesses can be available to relocate to other businesses if there is support for the development of these new ‘niches’ that can take advantage of the availability of this resource. A community at the reorganization stage experiences entrepreneurial start-ups that can recruit labour made available during business closure and collapse from release stage (Table 2.1). Business leaders and government officials should be evaluating infrastructure upgrades needed to support new businesses and enter the early stages of project planning and capital acquisition for particular upgrades. The community starts to attract new citizens as job opportunities develop in start-up businesses and this infuses new investments back into the community. The population decline in the community is likely leveling off (Table 2.1).

### 2.4.3 Exploitation Stage

The reorganization of the ecological community opens up new niches for exploitation by opportunistic species (Figure 2.2, lower right). The same could apply to a human community, where the reorganization presents the opportunity for the development and exploitation of new business niches and available 'resources'. The new direction of the rural community can begin to take shape now. Businesses in a community in the exploitation stage of the 'front loop' are analogous to species colonizing an ecosystem soon after a disturbance, e.g. r-strategists colonizing a disturbed area during the secondary succession process of a forest ecosystem (MacArthur and Wilson, 1967; Pianka, 1970). Odum (1969) describes the early stages of succession as times of growth and quantity over quality. In secondary succession, r-strategists are opportunistic organisms that are numerous, short-lived, rapidly producing and exploit newly available resources in a relatively uncompetitive manner (MacArthur and Wilson, 1967; Pianka, 1970). R-strategists in nature take risks by putting all of their energy into reproduction rather than into their own maintenance (MacArthur and Wilson, 1967). R-strategists are also highly sensitive to changes in their environment. In the exploitation stage, new businesses in a rural community would ideally take on similar characteristics: be willing to take risks to build their product or service and compete strongly in the market. They must take advantage of the availability of resources, but with an understanding that their existence in this initial form may be short-lived, as their competitive advantage dwindles with fluctuations in easy access to resources.

An archetypical community in the exploitation stage (Figure 2.2, lower right) has a low but increasing connectedness, high resiliency, and lower potential similar to the characteristics of an ecosystem at this stage (Holling and Gunderson, 2002; Simmie and Martin, 2010). Connectedness in the community is increasing as new networks develop between businesses and resiliency and the diversity of new businesses grows. Finally, the ecological analogy suggests that it is challenging for the community to embark on another redevelopment direction now that the new direction of the rural community is taking shape (Holling and Gunderson, 2002; Simmie and Martin, 2010). A community in the exploitation stage is experiencing the growth of younger businesses and the re-training of workers present or entering the area to acquire skills required for employment

in these young businesses (Table 2.1). The government and private developers in the community are investing in new infrastructure in the community such as new commercial buildings and homes. The community's new and existing citizens are reinvesting in the community by purchasing homes and goods from local businesses. The population is growing (Table 2.1).

#### **2.4.4 Conservation Stage**

As the community gradually redevelops, its networks and businesses enter into the conservation stage of the adaptive change cycle (Figure 2.2, upper right). Similar to the arrival of K-selected species (late successional species) in an ecological setting (MacArthur and Wilson, 1967; Pianka, 1970; Ashton, 2009), a community in the conservation stage would be characterized by fewer business sectors dominating the area, each with a more typical lifespan and faced with the need to more effectively compete for limited resources. Businesses may place less emphasis on product innovation and more on maintaining existing product markets much in the same way K-strategists (contrary to r-strategists in early succession) take fewer risks by putting energy in their own maintenance rather than reproduction (MacArthur and Wilson, 1967).

An archetypical community in the conservation stage (Figure 2.2, upper right) is characterized by high connectedness, declining resiliency, and high potential analogous to an ecological community at this stage (Holling and Gunderson, 2002; Simmie and Martin, 2010). The rigidity of the rural community increases as supply-chains and other aspects of the business networks such as markets and the internal management structures within the businesses themselves, become more defined. Holling and Gunderson (2002) suggest that conditions such as market saturation, reduced profits, and wage reductions, could characterize businesses at this stage. Similar to ecosystems, the existence of fewer business sectors dominating the area decreases a rural community's resiliency to disturbance. Also similar to ecosystems at this stage, the potential for disturbance and therefore opportunity (or necessity) to change the types of businesses inhabiting the rural community increases. It is important to stress that the continuous nature of the adaptive change cycle that underpins the panarchy model implies that a rural community at the conservation stage can cycle into economic decline when a disturbance occurs again.

However, unlike an ecosystem, human communities could theoretically anticipate these declines and therefore apply appropriate policy instruments to expedite the downturns or avoid them entirely.

A community at the conservation stage has young businesses from the exploitation stage that have been successful over the long term and have employed a consistent number of citizens in the community over time (Table 2.1). Infrastructure in the community is beginning to age and needs renewal in the next disturbance cycle. The community has a stable population with little to no growth (Table 2.1).

## **2.5 Leverage Points on the Adaptive Change Cycle**

Holling (2001) suggests that manipulating leverage points along the adaptive change cycle can help promote resilience and sustainability in a system. Without specific leverage points to act upon, applying ‘one-size-fits-all’ solutions to all communities regardless of their present circumstances may not achieve the desired outcome (Pike et al., 2006; Christopherson et al., 2010). These leverage points are moments that exist along the adaptive change cycle where policy instruments could be applied to change a community’s position in its trajectory. Policy instruments could be used to slow down or reverse the ‘front loop’ of the cycle by pulling the community back from the conservation to the exploitation stage or speed up the ‘back loop’ of the cycle by pushing the community forward from the release to the reorganization stage (Figure 2.2). Slowing down or reversing the ‘front loop’, or speeding up the ‘back loop’, position the community at a point of higher resiliency within its cycle, thus decreasing its vulnerability to disturbance (Figure 2.2, lower and upper left). Based on this research, three main leverage points and one minor leverage point were identified and positioned at specific locations along the adaptive change cycle for policy makers and community leaders to consider: *Seeds of Innovation*; *Cultivation of Creativity*; *Colonization of Ideas*; and *Laying Fallow*. Their locations along the cycle are noted on Figure 2.2, and they are discussed individually below.

### **2.5.1 Leverage Point 1: Seeds of Innovation**

The first leverage point on the adaptive change cycle falls just prior to a community entering the conservation stage on the cycle. At this point (labelled *Seeds of Innovation*, Figure 2.2), policy makers have a good idea of the businesses dominating the economic activity in a community. Many young businesses launched in earlier stages have closed by this point; those that have successfully competed for resources now define the area. The use of traditional policy instruments at this point, such as subsidies and tax incentives, can help successful competitors reach the conservation stage. Programs are important to help build the skills sets of employees in existing businesses and those that provide funding for equipment upgrades to increase a business' competitiveness. However, these instruments should not be the sole focus. Consistent with Markey et al. (2008), policy makers must shift their attention away from primary production industries to other opportunities that may spur economic growth in the community. At this leverage point, the goal is to prepare and implement policies that will 'seed innovation' to expedite or avert the 'back loop' of the community's cycle, when the community is impacted by and reacting to a disturbance, such as the closure of a major industry, e.g. paper mill, fish processing plant, or a military base.

#### ***2.5.1.1 Seeds of Innovation: Expediting the 'Back Loop'***

It is important for policy makers to embrace the continuous disturbance cycles of a rural community when they occur. By being aware of disturbance cycles, they ensure a community weathers each disturbance effectively. Policy intervention must take place in advance of a community reaching the conservation stage, i.e. before: a) business economic successes become stagnant; and/or b) the number of businesses in the community begins to decline. Failure to intervene early enough may prevent the community from realizing its full potential for renewal in the 'back loop' of the adaptive change cycle when a disturbance hits and instead, result in a collapse. The goal is to intervene at the right time, so that the 'back loop' of the cycle, the most uncertain time for the community, can occur quickly and efficiently. Intervening early will help diminish obstacles that could stall or prevent the community from progressing forward. As such, the recommendation is for policy drivers linked to the *Seeds of Innovation* leverage point

to be applied at the mid-point of the ‘front loop’ of the adaptive change cycle and continue to the end of the conservation stage (Figure 2.2). This will allow plenty of time for targeted community policies to develop in preparation for the release stage.

At the *Seeds of Innovation* leverage point, policy makers and community leaders must recognize the intrinsic value of local assets between the release and reorganization stages. This involves recognizing the contributions of all local assets to the competitive advantage of an area, rather than singularly favouring the amount and quality of a particular natural resource (Markey et al., 2008). The goal is to define what makes a place maintain its various capitals despite an increasingly mobile labour force (Markey et al., 2008). These inherent assets of a community may include quantitative elements such as its physical infrastructure and production capabilities, and qualitative elements such as its social capital and institutions (Markey et al., 2008).

Defining unique local assets to ‘seed innovation’ can be a difficult task for a community that has traditionally focused on resource production. However, rural communities should exploit the qualities that make them vital today - including natural amenities, high quality of life for citizens, or lower-cost real estate- and build on these characteristics (Markey et al., 2008). Policy makers need to support these communities to maintain the institutions and services that will be required for new place-based economies to succeed, including adequate healthcare, cultural and recreational opportunities, modern infrastructure, and quality education (Markey et al., 2008). Funding is also required to foster a learning environment in communities that will support a skilled workforce and entrepreneurial success (Christopherson et al., 2010). Supporting ties between higher education institutions (both universities and technical/vocational facilities) and regional economies can also help local businesses and entrepreneurs innovate in their regions (Christopherson et al., 2010). Policy makers and community leaders need to isolate what works for the particular conditions within each community; regional success at one point in time does not guarantee the same success at a later point of time as conditions change (Christopherson et al., 2010). Important policies to help expedite the ‘back loop’ include: blueprints for investment in such things as retraining programs for workers, creating twinning agreements between communities undergoing similar transitions, supporting non-profit organizations involved in community development, and encouraging public-



private partnerships between local universities and businesses to support research and development of regionally applicable technologies and products (Table 2.2).

**Table 2.2** Policy instruments to deploy at leverage points on the adaptive change cycle

<b>Leverage points</b>	<b><i>Cultivation of Creativity</i></b>	<b><i>Colonization of Ideas</i></b>	<b><i>Laying Fallow</i></b>	<b><i>Seeds of Innovation</i></b>
<i>Lever direction</i>	<i>Expediting the 'back loop'</i>	<i>Expediting the 'back loop'</i>	<i>Resource outflow</i>	<i>Slowing down or reversing the 'front loop'</i>
<i>Sample policy instruments</i>	Worker retraining programs  Funding for public-private partnerships to promote R and D  Support for the development of value-added products	Access to government capital for new technology development  Support for private venture capital  Support for infrastructure renewal	Recent graduate retention programs / incentives  Programs to attract immigrants to rural areas  Support for immigrant entrepreneurs	Blueprints for retraining programs  Blueprints for twinning agreements between communities  Support for non-profits  Support for research partnerships between universities and businesses

Previous successes (either within the community in question or in other communities with similar characteristics) can often provide the ideas and released resources needed for the creative and novel recombination of resources in the reorganization stage of a community's adaptive change cycle. The *Seeds of Innovation* leverage point is where one must act to retain these building blocks in the community. For example, in an ecosystem following a disturbance such as a pest infestation or forest fire, leftover foliage and seeds banks in the soil are important building blocks for the reorganization stage (Holling et al., 2002b). This *remember* feature of the panarchy model suggests that resources from a larger scale, e.g. forest seed bank, can provide components for renewal in a faster, smaller scale, e.g. a particular stand impacted by fire (Holling et al., 2002b). In a community, this *remember* feature (Figure 2.2) could

comprise supportive provincial policies that support new business ventures at the municipal level (Holling et al., 2002b). For example, a supportive community renewable energy policy at the provincial level could help increase market opportunities for renewable energy entrepreneurs at the smaller municipal level. Although this paper discusses only a single adaptive change cycle, communities do not exist in isolation and this *remember* feature inherent to panarchy's nested cycles must be acknowledged.

#### ***2.5.1.2 Seeds of Innovation: Averting the 'Back Loop'***

The panarchy model in its original form can provide insight to regional development systems but there are some additions to the model that can provide further value. For example, the model does not implicitly account for the ability of humans to prevent or limit collapse and rebound scenarios, intrinsic to the adaptive change cycle, although Holling (2001) argues that human foresight and intentionality can lessen or in some cases eliminate these cycles. It is possible for policy makers and community leaders to foresee economic crises in a community such as the collapse of a single industry. Left unchecked this collapse leads the community into a stage that in ecological terms would trigger the secondary succession and related processes referred to earlier. However, if future collapses can be forecasted, policy makers and community leaders may be able to avert collapse by putting backward pressure on the cycle, pulling it back from conservation towards exploitation. This could be accomplished by investing in new product development by existing industries to place them in niche markets globally and help them retain their competitiveness as opposed to simply subsidizing a failing industry in its current form; this ultimately only delays the collapse.

If finding new niche markets for existing single industries remains difficult, policy makers and community leaders may still be able to help a community bypass the release stage and go straight into the reorganization stage (Figure 2.2). They can implement policies that support a reduced dependency of the region's supply-chains and industry networks (i.e. its small and medium-sized suppliers) on these single industries. If new diversification opportunities can be identified, either through developing new local assets or leveraging expertise within existing networks to new ends before an existing resource industry enters into decline (the most unsettling stage of the community's cycle)

the release stage may be avoided. Applying policy instruments from the *colonization of ideas* leverage point, described below, may be used in lieu of policy instruments from the *seeds of innovation* leverage point if other assets to diversify the local economy are identified early on (Table 2.2). Even through the possibility of avoiding the release stage may exist, Holling (2001) points out the regardless of human foresight and intentionality not all disturbances to a system can be anticipated. As such, in case of an unanticipated disturbance to a local economy, using an adaptive, cyclical approach to respond still provides a better approach to a linear progression of policies, which often provide only short-term solutions.

### **2.5.2 Leverage point 2: Cultivation of Creativity**

Another leverage point exists just as a community begins to collapse in the release stage of the adaptive change cycle (Figure 2.2). This point, *Cultivation of Creativity*, will ideally create an amenable environment for businesses to test new ideas, develop novel products, and experiment in new markets. Holling (2001) argues that the completion of such experiments must occur in a way that is low-cost, with low failure rates, and with low risk to people's careers. Businesses that survive these early tests could be instrumental in moving the community in a new direction economically. As such, to support this 'amenable environment' policies must be applied at the start of the release stage and be sustained through to the middle of the 'back loop' (Figure 2.2). If one applies the panarchy lens then, to be successful, a policy invention must occur early on, before the collapse is complete. The intent is to ensure ample time and opportunity for experimentation and testing of new business innovations and new directions for the community over the 'back loop', i.e. as it moves from the release to reorganization stage on the cycle. Policy instruments to target at this leverage point include: a) retraining programs for workers laid off during business closures; b) programs that help fund public-private partnerships to allow businesses to access research and development expertise; and c) programs that investigate new value-added products that can be derived from the resources or the infrastructure associated with the existing industries that are in decline (Table 2.2). Ideally, if correctly anticipated, these policy blueprints were developed at the *Seeds of Innovation* leverage point.

Just as a community can *remember* how to succeed in *Seeds of Innovation*, a community's failure can also spread, negatively influencing other communities in a region. Referred to as *revolt* in the panarchy model (Holling et al., 2002b), it is suggested that policy makers must be cautious of this feature at the *Cultivation of Creativity* leverage point (Figure 2.2). In an ecosystem, the revolt feature takes place when a disturbance such as a forest fire or pest infestation in a small patch of forest eventually affects the entire stand (Holling et al., 2002b). The *revolt* feature suggests that a collapse in a smaller, faster adaptive change cycle can transfer upwards into a slower, larger cycle (Holling, 2001). In a community, this *revolt* feature could occur when the collapse of an important primary industry affects the economic success of its supply chain across an entire region. Being aware of the positive impacts of the *remember* feature and the negative impacts of the *revolt* feature are important considerations when applying the panarchy model to regional economics.

### **2.5.3 Leverage point 3: Colonization of Ideas**

The third major leverage point exists between the middle of the 'back loop' and the end of the reorganization stage (Figure 2.2). This *Colonization of Ideas* leverage point is where one should target economic instruments that help move emerging businesses from the reorganization stage into the exploitation stage. The goal of this point is to expedite the 'back loop' and move the community into the 'front loop' of the adaptive change cycle more rapidly. Economic development instruments useful at this point include those that support businesses' access to capital for the development of new technologies, to encourage private venture capital funding, and support infrastructure renewal (Table 2.2). Providing funds to emerging businesses through government programs and support from private venture capital can help attract new revenue to the community and fund important entrepreneurial innovations. Infrastructural renewal maintains the physical capital of the community needed for the success of emerging businesses and will help retain and attract new citizens to the area. Government procurement policies, where possible, should favour new products and technologies emerging from local communities to help build consumer confidence and support the development of a market foothold. Initiatives that

help businesses determine market leads for their new products, locally and internationally, would be most beneficial at the *Colonization of Ideas* leverage point.

#### **2.5.4 Leverage point 4: Laying Fallow**

A fourth minor leverage point exists at the end of the reorganization stage: *Laying Fallow* (Figure 2.2). In ecosystems, it is common for some resources to be lost from the system entirely between disturbance and recolonization such as during soil erosion (Holling and Gunderson, 2002). Fortunately, this loss of resources tends to stabilize (Holling and Gunderson, 2002). An offshoot from the reorganization stage on the adaptive change cycle delineates resource ‘leaky-ness’ on the panarchy model (Holling and Gunderson, 2002). There are scenarios where resource leakage can be significant causing irreversible impacts. In an ecosystem, the loss of soil nutrients or the extinction of an important species can cause severe ecosystem degradation (Holling and Gunderson, 2002). In this scenario, revitalization of the ecosystem may be difficult to achieve. A similar effect could be witnessed with the loss of a primary industry in a community where the community’s economic success is tightly bound to the industry’s success. For example, after a plant closure, a community in the reorganization stage may face the loss of skilled workers who are unable to find work in emerging industries. This loss could permanently prevent the community from recovering from this disturbance. Ultimately, the lesson to be learned is that policy makers and community leaders must accept that some communities may not be able to recover from an economic disturbance and need to disband and ‘lay fallow’- rather than continuing to receive ongoing funding for restructuring that will likely never occur successfully.

To prevent a community from entering this kind of irreversible period of economic decline that results from significant resource leakage, previously used resources, the skills and knowledge from workers and community leaders must be effectively redirected to new activities within the community (Holling and Gunderson, 2002; Simmie and Martin, 2010) at one of the three previous leverage points. This is also the point where policy makers need to be careful not to impede the departure of certain existing resources whose continued presence could impede a necessary change in a community. For example, the skills of workers associated with a previous industry may not be compatible

with the skills needed to develop new businesses that exploit new niches (Simmie and Martin, 2010). Expectation related to land-value and wages created through the experiences of workers within previous industrial sectors stage could negatively affect the development of new industries unable to offer similar benefits (Simmie and Martin, 2010). As such, a critical analysis is required of community resources at the *Seeds of Innovation* to identify what resources should be maintained in the ‘back loop’ of the cycle to facilitate its re-entry into the ‘front loop’. Identifying resources to maintain and monitor throughout the ‘back loop’ could eliminate some of the uncertainty associated with resource leakage as community shifts from the reorganization to exploitation stage. Economic instruments that could be useful for preventing resource leakage include policies that support the retention of recent graduates from community college and university degree programs, help attract and retain immigrants to fill the labour needs of emerging businesses, and provide funding to immigrants interested in starting up businesses particularly in expected high growth sectors (Table 2.2).

The *Laying Fallow* leverage point is useful when considering rural communities that are predicted to have unprecedented population declines. Polèse and Shearmur (2006) emphasize that policy makers cannot assume that a community will be economically successful simply through the reorganization of the community by local actors to encourage innovation and entrepreneurship. They contest that some resource-dependent communities will see continued population declines as the natural resources they have relied on become increasingly limited. Other external pressures that may hurt these communities above and beyond their own economic instability are the successes of nearby communities that have superior institutional capital including schools, hospitals and government services that help attract new businesses (Reimer, 2006). Citizens in these communities will need to accept that population levels will not return to previous levels, even as new business ventures are introduced into their communities (Polèse and Shearmur, 2006). Instead, support could be directed to a regional development initiative that takes a more expansive view to maintaining a rural region than specific remote communities.

### **2.5.5 Recommendations for Continuing Research**

*Seeds of Innovation* is the most extensive and critical leverage point identified on the adaptive change cycle. Policy instruments deployed here on the cycle have the ability to slow down or reverse the ‘front loop’ pulling the community in a more resilient state. If business decline in a community cannot be avoided policy instruments deployed at the *Cultivation of Creativity* and *Colonization of Ideas* leverage points may help to speed up the ‘back loop’ the cycle, the most uncertain time for the community (Table 2.2). Once again the goal is pushing the community to a more resilient state. If policy instruments deployed at these three leverage points are unsuccessful, amalgamating a community’s assets with its neighbours, as indicated by the *Laying Fallow* leverage point, may become necessary for the region’s overall survival.

The identification of these four leverage points on the adaptive change cycle provides the conceptual underpinnings for studying the usefulness of the panarchy model targeting policy instruments to rural communities. Two further courses of study are recommended. The first would be to evaluate the alignment of current economic development policy instruments with the model’s leverage points. Where alignment does not exist, it may suggest gaps in available policies or identify areas for improvements with regards to when and how these policies are applied. Secondly, the effectiveness of policy instruments that do appear to align with the framework should be assessed in terms of the timing of their use as this will aid in the refinement of the model applicability in a practical sense.

## **2.6 Conclusion**

This paper presents a novel framework to guide policy decisions taken to support the economic redevelopment of rural communities; one based on the ecological model of panarchy that could potentially better match specific policy tools to the particular socio-economic conditions of the region/community in question. The adaptive change cycle characteristics of resilience, connectedness, and potential identify where on the cycle a community will be most vulnerable to a disturbance and then offers a mechanism for a proactive rather than reactive response to these disturbances, such as economic recessions and business closures. The cycle implies that once a solution to a current rural

community disturbance has been achieved policy makers and community leaders must recognize a cyclic pattern and make policy decisions that will help the region mitigate the negative impact of future disturbances. The framework also suggests that community collapse could be avoided altogether if the correct levers are pulled.

The four stages of the adaptive change cycle identify particular ecosystem characteristics that can be used to describe general characteristics of rural communities at each stage, and help target policy appropriately. Within the panarchy framework four points (three major and one minor) were identified where policies could be most effectively applied. Understanding the characteristics of communities that exist at these 'leverage points' can help guide policy makers in their decision making with regards to what policy instruments should be applied and when. This framework is useful in providing insight into interventions needed to address the problems facing many rural communities today that include ageing populations, business closures, outmigration of youth, and population decline. The general principles of the model provide a novel and valuable addition to the toolbox of policy interventions currently applied in rural communities.



## CHAPTER 3 CAN ECOLOGICAL LESSONS HELP *CULTIVATE* NEW SEEDS OF CHANGE? A CASE STUDY OF RURAL ATLANTIC CANADA

### 3.1 Introduction

Rural areas in both developed and developing countries are in decline and this trend is expected to intensify in the coming decades (United Nations, 2012). Countries such as China and India are the early stages of urbanization while countries such as Canada and the United States have significantly urbanized (MacDonald, 2008). Two-thirds of the world's population is expected to live in urban areas by 2050 (United Nations, 2012). In North America, despite population and employment declines in rural areas, significant government money continues to be spent to support them (Partridge et al., 2009) to provide services such as business development, education, public safety and sanitation (Kilkenny, 2010).

Researchers have noted two arguments regarding the future of rural areas (Polèse and Shearmur, 2006; Savoie, 2011). The first suggests the wisdom of letting outmigration of rural populations run their course (Polèse and Shearmur, 2006; Savoie, 2011). The other suggests, while rural population levels may never rebound to historic levels, continued investment in rural areas remains justified given the important role they play (Savoie, 2011). This is particularly true in the Canadian economy. Rural areas provide energy, food, mineral and timber resources that facilitate urban economic growth (Halseth et al., 2010; Reid and Savoie, 2011). Rural areas are also highly desirable for conservation, for leisure activities and for maintaining cultural heritage (Halseth et al., 2010). To persist, however, these communities must define new goals and aspirations for their economies (Polèse and Shearmur, 2006).

Policies for rural communities that focus and capitalize on local assets to attract an increasingly mobile workforce are referred to as place-based approaches (PBA). Such approaches represent an alternative to traditional rural development policies that focus primarily on the exploitation of natural resources (Halseth et al., 2010; Markey and Heisler, 2010; Ryser and Halseth, 2010). Under place-based rural development, natural resources are only one asset to be exploited to achieve economic diversification. Place-based policies seek to capitalize on a community's unique characteristics, building local

capacity to leverage assets in a way that attracts long-term strategic investment (Reimer and Markey, 2008; Markey and Heisler, 2010). Place-based approaches emphasize a governance model that involves multiple stakeholders, recognizing that maintaining existing industries will not singularly help communities reposition themselves effectively during difficult economic times.

The ecology model of panarchy can be used to focus attention on the local assets of rural communities before economic disturbances are looming. When used as an open-ended and broad resilience-thinking concept the panarchy model has valuable lessons which extend to other disciplines (Walker and Salt, 2006; Brand and Jax, 2007; Strunz, 2012). Panarchy describes a system's vulnerability to disturbance using nested adaptive change cycles (Holling, 2001; Holling and Gunderson, 2002). Each adaptive change cycle is defined by four stages, exploitation, conservation, release and reorganization (Holling, 2001; Holling and Gunderson, 2002; Simmie and Martin, 2010; Bensen and Garmestani, 2011). The exploitation and conservation stages [or 'front loop'] of the adaptive change cycle are characterized by growth and stability (Holling, 2001) (Figure 1.1, p.5). Over time a system can become rigid and unstable in the front loop of the cycle, which increases its vulnerability to a disturbance. The resulting disruption sets the system up for innovation and restructuring in the 'back loop' of the cycle (Holling, 2001). The back loop of the cycle is composed of the release and reorganization stages.

This research supports the strengthening rural viability and rural contributions to regional economies using tools that support place-based approaches. Previous research (Slight et al., in review) defined a theoretical panarchy-based framework (hereafter called the framework), which identified archetypical characteristics of rural communities at each stage along this cycle (Slight et al., in review). It also identified points on panarchy's cycle where rural policy intervention may be most advantageous by specifying the timing of policy instruments on the cycle. These *leverage points* are effectively periods of transition where policy makers can employ policy instruments to push or a community back into a higher area of resilience or help expedite a community through its most challenging periods of economic disturbance (Slight et al., in review).

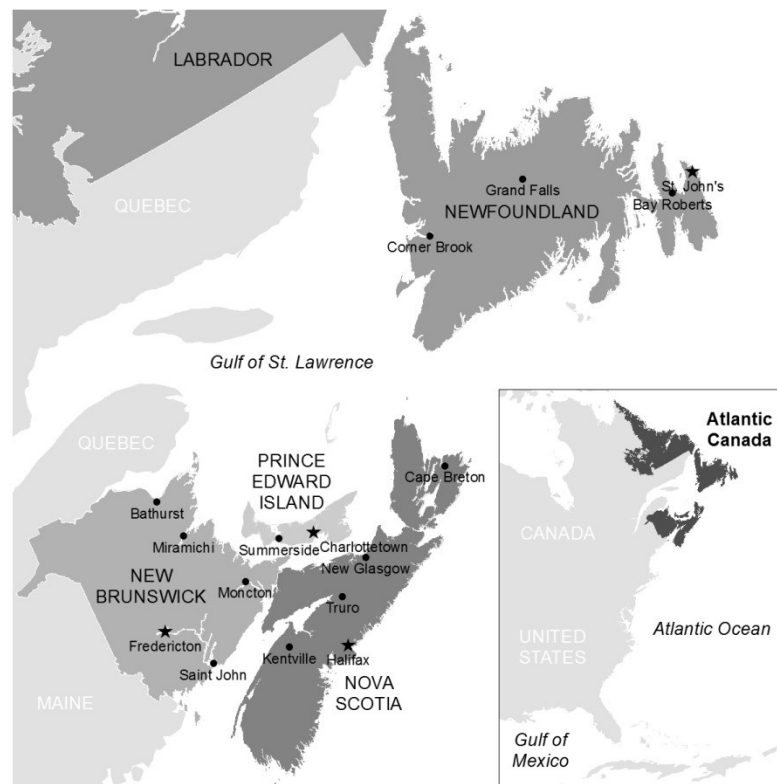
This paper builds on the framework by assessing its alignment with rural development strategies in Atlantic Canada using insight from economic development

officials. Specifically, this paper examines how the comments from these key informants are compatible with: the adaptive change cycle's four stages; the principles of resiliency, heterogeneity, and nested cycles inherent in the framework; and, the four positions identified to guide policy intervention. It also identifies gaps in existing policies and areas for improving the practical application of the framework based on advice from these officials for tackling rural development issues.

## 3.2 Methods

### 3.2.1 Selection of Study Area

Due to unique demographic and economic features (Table 3.1 and 3.2), Atlantic Canada was identified as an appropriate region for examining the applicability of the framework for rural economic redevelopment. Atlantic Canada includes four provinces: Newfoundland and Labrador (NL), Prince Edward Island (PEI), Nova Scotia (NS) and New Brunswick (NB) (Figure 3.1).



**Figure 3.1** Locator map for Atlantic Canada

Atlantic Canada has the smallest population per province in the country (Table 3.1) (Statistics Canada, 2012a), and the highest percentage of citizens living in rural areas compared to the Canadian average. Rural populations range from 41 percent in Newfoundland and Labrador to 53 percent in Prince Edward Island compared to 19 percent nationally (Table 3.1) (Statistics Canada, 2012a); Nova Scotia and New Brunswick fall within this range (Table 3.1) (Statistics Canada, 2012a).

**Table 3.1** Population profiles by province in Atlantic Canada

<b>Province</b>	<b>Population</b> (Canada – 33,476,688) <sup>1</sup>	<b>Urban/rural(%)</b> (Nationally – 81/19) <sup>2*</sup>	<b>Key metropolitan areas</b> (population) <sup>1</sup>	<b>Struggling areas</b> (population decline)
<i>Newfoundland and Labrador</i>	514,536	59/41	St. John's (196,966) Corner Brook (27,202) Grand Falls-Windsor (13,725) Bay Roberts (10,871)	South Coast Northern Peninsula Notre Dame Bay Burin Peninsula <sup>4,5</sup>
<i>Prince Edward Island</i>	140,204	47/53	Charlottetown (64,487) Summerside (16,488)	West Prince Eastern Kings Southeastern PEI <sup>5,6</sup>
<i>Nova Scotia</i>	921,727	57/43	Halifax (390,328) Cape Breton (101,619) Truro (45,888) New Glasgow (35,809) Kentville (26,359)	Digby County Shelburne County Guysborough County Inverness County Victoria County <sup>5,7,8</sup>
<i>New Brunswick</i>	751,171	53/47	Moncton (138,644) Saint John (127,761) Fredericton (94,268) Bathurst (33,484) Miramichi (28,115)	Restigouche County (Northern New Brunswick) Northumberland County (Miramichi) Queens County <sup>5,8,9**</sup>

**\*Note:** Rural areas are defined by Statistics Canada as having populations of fewer than 1,000 people and a density of fewer than 400 people per square kilometer (Statistics Canada, 2011).

\*\* See Appendix D for all table references.

Population declines in rural areas of Atlantic Canada indicate a trend towards urbanization and outmigration to stronger economies in Western Canada (CBC News, 2012; Statistics Canada, 2012b). For example, areas such as NL's south coast and Northern Peninsula, PEI's King's County, NS's Guysborough and Shelburne counties, and NB's Queens and Restigouche countries have experienced population declines ranging from 3.3 to 10.1 percent between 2006 to 2011 (Table 3.2) (Statistics Canada, 2012b).

**Table 3.2** Economic profiles by province in Atlantic Canada

Province	Traditional Industries	Emerging / Growth Sectors	Policy Documents	Recent Headlines	Unemployment Rate (% seasonally adjusted, July 2012)(Cdn ave.7.3) <sup>22</sup>
<i>Newfoundland and Labrador</i>	<ul style="list-style-type: none"> <li>- Fishing</li> <li>- Forestry</li> <li>- Mining<sup>1</sup></li> </ul>	<ul style="list-style-type: none"> <li>- Aerospace</li> <li>- Agrifoods and fisheries</li> <li>- Alternative energy sources</li> <li>- Biotechnology</li> <li>- Communications</li> <li>- Forestry</li> <li>- Information technology</li> <li>- Marine and ocean technology</li> <li>- Tourism<sup>1</sup></li> <li>- Oil and gas<sup>5</sup></li> </ul>	<p>Comprehensive Regional Diversification Strategy<sup>1</sup></p> <p>Innovation Newfoundland and Labrador: A Blueprint for Prosperity<sup>7</sup></p> <p>Innovation Outlook: Building on our Foundation<sup>8</sup></p>	<ul style="list-style-type: none"> <li>- Dunderdale fears EI changes could harm rural workers<sup>10</sup></li> <li>- Long distance commutes the new normal for many Canadians<sup>11</sup></li> <li>- Taking stock: Is rural Newfoundland better off without cod?<sup>12</sup></li> </ul>	12.8
<i>Prince Edward Island</i>	<ul style="list-style-type: none"> <li>- Farming</li> <li>- Fishing</li> <li>- Tourism<sup>2</sup></li> </ul>	<ul style="list-style-type: none"> <li>- Enhancing tourism</li> <li>- Oyster and mussel industries</li> <li>- Value-added agricultural products<sup>2</sup></li> </ul>	<p>Rural Action Plan: A Rural Economic Development Strategy for Prince Edward Island<sup>2</sup></p>	<ul style="list-style-type: none"> <li>- Island businesses have lowest confidence in Canada<sup>13</sup></li> <li>- No ‘common sense’ used when making EI changes, PEI Premier says<sup>14</sup></li> <li>- Morell opposes Canada Post service reduction<sup>15</sup></li> </ul>	8.4
<i>Nova Scotia</i>	<ul style="list-style-type: none"> <li>- Finance and real estate</li> <li>- Health and social services</li> <li>- Manufacturing</li> <li>- Public administration</li> <li>- Retail trade<sup>3</sup></li> </ul>	<ul style="list-style-type: none"> <li>- Biosciences</li> <li>- Clean technology</li> <li>- Defense, security, and aerospace</li> <li>- Film and interactive media</li> <li>- Ocean technology</li> <li>- Seafood and agrifood industries<sup>6</sup></li> </ul>	<p>jobsHere: The Plan to Grow Our Economy<sup>9</sup></p>	<ul style="list-style-type: none"> <li>- Government jobs heading out of Halifax, premier says<sup>16</sup></li> <li>- To rural for our own good<sup>17</sup></li> <li>- The times they are a-changin’ but with our reliance on single resource industries, are we doing enough to keep pace?<sup>18</sup></li> </ul>	9.4
<i>New Brunswick</i>	<ul style="list-style-type: none"> <li>- Aquaculture</li> <li>- Fishing</li> <li>- Forestry</li> <li>- Mining</li> <li>- Tourism<sup>4</sup></li> </ul>	<ul style="list-style-type: none"> <li>- Aerospace and defense</li> <li>- Biosciences</li> <li>- Industrial fabrication</li> <li>- Information and communications technology</li> <li>- Value-added food</li> <li>- Value-added wood<sup>4</sup></li> </ul>	<p>Growing Together: Economic Development Action Plan 2012-2016<sup>4</sup></p>	<ul style="list-style-type: none"> <li>- Acadian shut-down especially hard on rural areas<sup>19</sup></li> <li>- N.B.’s out-migration surging with Alberta economy<sup>20</sup></li> <li>- Unemployment rate hits 10% in New Brunswick<sup>21</sup></li> </ul>	10.0*

\* See Appendix E for all table references.

Employment in primary industries such as fishing, forestry and agriculture remain important economic drivers in Atlantic Canada as do the construction, fish-processing and tourism industries (APEC, 2005) (Table 3.2). Given the seasonality of these industries, variation in employment between winter and summer months is higher in Atlantic Canada than the rest of Canada (APEC, 2005). Typical seasonal workers tend to be young, with lower education and live in rural areas (APEC, 2005; Gray and MacDonald, 2010). The region has the highest seasonal economies in the country and seasonal use of the Federal Government's employee insurance program<sup>1</sup> is also higher than the rest of Canada.

Provincial economies in Atlantic Canada are currently struggling with the highest unemployment rates in the country. NS, for example, has had the lowest economic growth in the country over the last twenty years (Government of NS, 2010). In NL, only recently did the province see its unemployment rate fall to 12.7 percent, the lowest it has been in 36 years, thanks to new offshore oil discoveries (Government of NL, 2012). In this economic and employment climate, rural areas in Atlantic Canada are being confronted by ageing populations, slow population growth, outmigration of youth to urban areas, and industries that struggle to remain competitive in the global marketplace (Government of NS, 2010; Government of PEI, 2010; Government of NB, 2012; Government of NL, 2012). Although Atlantic Canada is the focus of this paper its challenges - including ageing populations, chronic exodus of young people to urban areas for education and job opportunities, rising unemployment, lack of public services, and natural decrease in populations - are common to rural areas across the United States, Europe and Australia (Pašakarnis and Maliene, 2010; de Hoyos and Green, 2011;

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<sup>1</sup> This program provides income insurance to Canadian citizens who have lost their jobs (APEC, 2005). It has been criticized for being overused by recurrent and seasonal workers for income support, creating a scenario where workers resist moving because the program offers a perceived incentive for staying in their community rather than finding employment in another location. This is particularly true in Atlantic Canada (APEC, 2005; Gray and MacDonald, 2010; Busby and Gray, 2011). The Federal government has recently legislated changes to the program, which may require Atlantic Canadians who access the program to commute longer for work and to take jobs that they are qualified for even with a significant pay cut (Government of Canada, 2012; Palmer, 2012)

Johnson, 2011a; McManus et al., 2012; Glasgow and Brown, in press; Walsh et al., in press).

### **3.2.2 Research Questions**

We conducted semi-structured key informant interviews with economic development officials in Atlantic Canada. The goal of these interviews was to answer three major questions:

- a) Are their viewpoints compatible with features of the panarchy-based framework including resiliency, heterogeneity and nested cycles?
- b) Do existing rural development policies/strategies in Atlantic Canada align with policy drivers associated with one of the four policy intervention positions identified within the panarchy-based framework (Slight et al., in review)?
- c) What policy gaps can be identified and/or disconnects between existing policies/strategies and the best timing of their deployment as suggested by the framework, that offer potential opportunities for new knowledge generation?

In practice, informants gave more attention to the first of these, but we also consulted key documents (e.g. economic development strategies) to draw out insights on the latter.

### **3.2.3 Interviews**

Key informants provide insight based on a formal role that they hold (Marshall, 1996). The intention was to seek insight from economic development officials who would have expert knowledge regarding struggles of rural communities in their regions. Three representatives were interviewed from each of the four Atlantic Provinces for a total of twelve interviews.

Telephone interviews were chosen as the best way to interview participants in this study. Telephone interviews are typically useful for accessing hard to reach participants and for completing studies with a limited budget (Marshall, 1996; Sturges and Hanrahan, 2004). Participants were initially recruited using employee and position lists available on

provincial government websites and development authority/agency websites. The initial recruitment process identified four participants in the study and a snowball sampling method was used to enlist additional participants.

In each province, one official employed in the government's economic development department was interviewed. These officials were targeted based on their knowledge of existing economic policies/strategies created to address rural development challenges. The two remaining participants from each province were employed in local development groups such as Regional Development Authorities/Agencies (RDAs) and Community Business Development Corporations (CBDCs). These officials were targeted based on their knowledge of on-the-ground implementation of government rural development policies/strategies. RDAs help coordinate and advance local development activities in their regions; their goal is to increase the local business competitiveness and market share (Government of NS, 2009). CBDCs are non-profit development groups that work with governments and the private sector to address small business needs (CBDC, 2011).

Specific participants were targeted in an effort to choose those from authorities/agencies working in economically disadvantaged areas in each province, and to ensure a good cross section of opinions would be represented. Selections were based on anecdotal knowledge, recent provincial media coverage, and recommendations from provincial administrative staff contacted at the beginning of the recruitment process. Although key informant interviews do not require data saturation, converging viewpoints emerged after three interviews in each province suggesting information most pertinent to this study had been captured.

All hour-long interviews were conducted over the telephone from April to June 2012. To maintain consistency in the interview process any 'local' informants were contacted by telephone as well. Participants were provided with a series of twelve indicative questions that would be used to frame the telephone discussions prior to the interview (Box 1, p.17). Where required, additional province-specific questions were added after reviewing: (a) provincial documents recommended by the participants; and (b) provincial news coverage on topics such as industry closures, government decentralization initiatives, and employment insurance adjustments. Signed consent forms from participants permitted the recording of the telephone interviews for



transcription purposes. Once transcribed, all transcripts were sent back to participants for review and approval. The consent form also provided permission to pull anonymous quotes from the transcripts to support the research findings.

### **3.2.4 Document Analysis**

To supplement the insight gained through the interview process, pertinent economic development policy/strategy documents were also reviewed. The intent was to identify major provincial goals and to complete a broad analysis to assess alignment with the framework. These included the NS government's recent economic strategy, *jobsHERE: The Plan to Grow our Economy* (Government of NS, 2010) and the PEI government's rural economic development strategy, *Rural Action Plan: A Rural Economic Development Strategy for Prince Edward Island* (Government of PEI, 2010). Over the course of the interviews NL and NB officials recommended more relevant or recent documents than those previously reviewed. These included the *Comprehensive Regional Diversification Strategy* (Government of NL, 2005), *Innovation Newfoundland and Labrador: A Blueprint for Prosperity* (Government of NL, 2006) and *Innovation Outlook: Building on Our Foundation* (Government of NL, 2012), and New Brunswick's *Growing Together: Economic Development Action Plan: 2012-2016* (Government of NB, 2012). For Newfoundland, participants suggested multiple documents be reviewed. For the other three provinces one main strategy/action plan was identified. New Brunswick's most recent economic development action plan was released after two out of three interviews with NB officials were completed. The timing of the document's release was beneficial as it provided the opportunity to gather perspectives on both old and new economic development strategies for the province.

### **3.2.5 Framework Refinement**

In the framework, we avoided introducing the complexity of panarchy's nested cycles, covering only *remember* and *revolt* features to suggest phenomena that occur internal to the system can influence phenomena external to the system and vice versa. However, during the interviews these influences were deemed to be much more significant than had been anticipated, so this bears further explanation here. Adaptive

change cycles can occur at different scales and speeds and can interact with one another to promote stability and adaptability in a system (Holling, 2001). The *remember* feature of panarchy describes how a slower, larger cycle can provide components of stability to a faster, smaller scale (Holling et al., 2002b). For example, a strong rural development policy at a provincial level could provide support to rural development actions undertaken at a municipal level. Although not implicit to the original ecological model, for human systems a larger scale such as global market influences could offer stability to urban economies while at the same time weakening rural economies. In the opposite way, the *revolt* feature of the panarchy model describes how a faster, smaller scale can lead to adaptation/change in a slower, larger scale (Holling et al., 2002b). For example, the loss of rural communities could have negative economic repercussions at a provincial or regional scale. Again, while not implicit to the ecological model, in human systems advancements at a smaller scale such as value-added products created in local industries could offer positive changes to a province's global competitiveness. Policy decisions clearly do not exist in isolation; their possible influences across different scales must be considered.

### **3.3 Results**

The interviews revealed common themes at local, provincial and national/international scales. These scales were classified into three broad categories: functioning regions, encouraging provincial competitiveness, and reassessing global positioning. The intent was to determine: a) the compatibility of the viewpoints of economic development officials with the adaptive change cycle and the framework; b) the alignment of existing rural development policies/strategies in Atlantic Canada with policy drivers associated with one of the four policy intervention positions identified in the framework; and c) the gaps and/or disconnects between existing policies/strategies and the best timing of their deployment as suggested by the framework. This section synthesizes key messages drawn from the interviews regarding the future of rural areas in Atlantic Canada.

### 3.3.1 Functioning Regions

Interview participants predicted that there will be fewer rural communities in Atlantic Canada in the future; locations will be determined based on clusters of economic development in each province. Communities looking to be a part of these regional clusters will need to define and leverage local assets effectively. They will also need to adjust service expectations to align realistically with these changes. Details of this evolving local reality and its impact on rural Atlantic Canada are discussed individually below.

#### 3.3.1.1 Fewer, More Vibrant Regions

With aging populations, fewer businesses, lower private investment, a smaller number of government jobs, and outmigration of the rural workforce to urban areas (*NL Official 2, PEI Official 3*), interview participants expected to see far fewer rural communities across Atlantic Canada in the future. Although this change in rural demographics has been taking place for some time many predicted that this trend will intensify in the coming years (*NB Official 1, PEI Official 3*). Peripheral areas away from the main provincial economic drivers will be the most at risk (*PEI Official 3*). A certain amount of rural decline appears inevitable:

*There is urbanization of our population and with services that are being focused on certain communities the outlying areas seem to get to a point where they cannot longer sustain themselves. I don't think that any strategy or government initiative is going to change that. It is just going to happen. It has been happening that way for a number of decades and it is going to continue to occur... (NB Official 1)*

Many study participants felt that policy makers should focus less attention on the survival of individual communities and instead focus on building strong, functional regions. The difficult reality is that rural communities with the highest growth potential in a functional region will become the priority. As one participant (*NS Official 2*) indicated, a successful regional approach requires the identification of a few rigorous rural communities to receive investment. Others agreed:

*I think where government should be focusing their effort is on functional regions. There are certain natural regions that occur because of the way that people move; the way people live, the way they shop, the way their families are distributed, the natural movement of people and within those functional areas there has to be an economic engine. (NL Official 2)*

*To the extent that you can, build clusters in rural areas on a reasonable geographical range and distance so that you can exploit required infrastructure to support and build out small and medium-sized enterprises. (NL Official 3)*

There may be fewer individual communities in the Atlantic region going forward but it is clear from participant comments that building strong regional clusters of economic activity is needed to ensure that rural contributions to the Atlantic Canadian economy continue. However, they noted that focusing on fewer rural communities can be politically unfavorable.

### **3.3.1.2 Focus on Local Assets**

The success of a rural community has always been reliant on the local capitals available. It is vital to define all local assets and the options for diversifying the business base using these assets (*NL Official 1*). As some participants indicated, a full inventory of local assets should be documented for all rural communities (*NB Official 1, NS Official 1*). This inventory will help policy makers and community leaders attract businesses with the right ‘fit’ to each community. Failure to align available assets - including local skills and available infrastructure - with suitable businesses could inhibit the businesses’ long term success. One informant commented on the importance of ‘fit’ between local assets and new business ventures:

*The term that I use in very simple context is fit. Do you have the fit to make this happen? If you do not have all the pieces that are necessary then it is probably not going to be successful. It might be in the short term but in the long term it won't be. (NB Official 1)*

*It really comes back to fit. Absolutely, unequivocally, is that the right business, with the right skill set, with the right programs, in that community to allow that operation to survive? That is the crux of the diversification question. (NB Official 1)*

Another representative summed up the importance of utilizing local assets to drive community success:

*[It is about] not wishing for something that you don't have but embracing and promoting what you do have. (NS Official 1)*

Numerous participants indicated that the success of rural communities in the future will depend on strong community leadership, which has not always been present (*NL Official 1, NL Official 3, NS Official 3*). Such leaders are the catalysts of change in rural communities (*NB Official 3, NS Official 1*). Some participants expressed concern that

volunteer community leaders are already overworked and this is causing burnout (*NS Official 3, PEI Official 1*). They also observed that current volunteers are getting older and there will be a lack of young people in rural areas to continue their important work (*PEI Official 1*). One participant shared a prediction about which rural communities will survive long term:

*I think it is going to come down who has the strongest community capacity....These communities really have to chart their own futures through investing in innovation and really look over their shoulders at the competition and trying to stay one step ahead. Those community leaders that are able to mobilize their populations around that sort of thing, I think are the ones that will come out successful. (NB Official 3)*

Defining the local assets of a community is important but may not have been a priority for rural communities tied to a successful primary industry. With success in some primary industries (in their current form) diminishing, strong community leaders will be needed to help identify future economic prospects using local assets.

### **3.3.1.3 Managing Community Expectations**

Recognizing that there will be fewer rural communities in Atlantic Canada, participants also acknowledged that the expectations of citizens in rural communities must shift with this new reality (*NB Official 2, NS Official 3*). A rural community with a smaller population will have a smaller tax base to support the services its citizens expect such as a hospital, recreation centres and schools. As one participant described it:

*There needs to be a critical mass and people need to view expectations more realistically. Nobody wants to lose their post office, nobody wants to lose their school but the reality is that government cannot afford to run that sort of infrastructure when it is not viable....If you want your rural way of life be realistic and recognize that you may have to commute further for employment, you may have to commute further for your services, health care and schools and the like. It is going to be a reality. It already is. (NS Official 3)*

Managing service expectations in rural communities will be difficult but necessary. Many have overbuilt infrastructure – more than is needed for their current populations (*NB Official 2*). Although this infrastructure was justified when populations were larger and economic prosperity was higher, maintaining this infrastructure into the future may be unproductive. Instead, participants recommended that services be increasingly shared among neighbouring communities (*NS Official 1, NS Official 3, PEI Official 3*). They

believed this will create a united force for acquiring government funding and the best possible services in a region.

### **3.3.2 Encouraging Provincial Competitiveness**

Interview participants suggest that rural communities in Atlantic Canada must reposition their assets if they are to compete better in the global marketplace. Such repositioning calls for increased support for innovative small businesses in rural areas with the hope that they can grow organically and build strong ties within local communities. Provincial governments will also need to help supply chains based on the extraction and provision of primary resources to diversify, either through the development of value-added products, or through expansion into burgeoning applicable industries. Small-business support and supply-chain diversification will require skilled human capital facilitated by higher literacy and grade-school completion levels. Finally, financial support for large primary industries that remain stagnant in their current business model must come under increased scrutiny. Details of this evolving provincial reality and its impact on rural Atlantic Canada are discussed individually below.

#### ***3.3.2.1 Support for Small Business***

Interview participants are vocal in their support of attracting more small businesses to rural communities (*NB Official 2, NS Official 1, NS Official 2, NS Official 3, PEI Official 1*). They believe that the days of single-industries that provide hundreds of jobs in rural communities are over. As two participants remarked:

*We have definitely identified that it is not a good plan to put all of your eggs in one basket, to have 300 people in one area employed in food processing or fish processing. If we took every small business on Prince Edward Island and grew it by one employee that would make a huge change. (PEI Official 1)*

*We would be far happier bringing small companies and building from within. I would be happier looking out and seeing 20, 15 person operations than I would seeing one 300 person plant. (NS Official 1)*

Although larger industries sometimes still develop in rural areas, past industry collapses have made officials wary of significant employment tied to one industry. They note that governments often have had to artificially support these industries when they experience downturns (*NB Official 2, NS Official 1*) as massive layoffs have huge economic and social ramifications in rural communities and are politically undesirable. Such subsidies

are particularly undesirable, when such industries are linked to outside investors who have fewer ties to the local community and are thus more likely to pull out of an area when times are tough (*NS Official 3*). Participants would prefer to see more support given to small businesses in high growth sectors particularly those having local investors who they believe will be more willing to ride out economic uncertainty over time (*NS Official 2, NS Official 3*). Comments included:

*I think that history has proven with the different transition teams that we were required to set up to deal with these hot spots, these industry closures...they can just rip at the heart of a region or community. It is a much safer bet to be more diversified. (NS Official 3)*

*I think that you have to stay away from the maintenance of industries or artificially maintaining those industries and focus on growth. I think that it is going to be difficult for the 200 to 300 job type of opportunities in the future. I would rather see smaller more profitable and wealthier companies than the larger ones that have to be artificially sustained. (NB Official 2)*

Another participant complained about unrealistically high thresholds required of small businesses seeking support:

*I look at some of the programs that the province offers for employment incentives for investors. Usually the threshold is 50 jobs. There are so few developments in rural areas that would create 50 jobs. Why does that threshold have to be there? Why do we have to say no to a company that is looking to expand and add 5 or 10 jobs in a rural area? Because those jobs here will have just as big an impact as 50 [jobs] in urban [areas]. (NS Official 2)*

The political motivation to support single industries will always be a challenge but diversification and transferability of skills to other businesses is definitely being considered by economic development officials in Atlantic Canada.

### **3.3.2.2 Supply Chain Diversification**

In addition to creating small business opportunities to stimulate economic diversification, some participants highlighted successful government programs aimed at diversifying the markets for businesses involved in the supply chains of primary industries. Often businesses in rural communities can become heavily dependent on single primary industries to drive their activities. When the industry then experiences a downturn the industry's supply chain is heavily impacted. For example, metal fabricators were highly dependent on the declining pulp and paper sector in northern New Brunswick (*NB Official 1*). A diversification initiative for small- and medium-sized business was undertaken to support a broadening supply chain. This has reduced metal

fabricators' dependency on the forest industry and created an emerging metal fabrication industry in the area (*NB Official 1*).

Recognizing the transferability of skills from one industry to another is also necessary for evolving the business profile of a community and often starts with a 'skills inventory'. One official noted the benefit of completing a skills inventory for an emerging industry:

*The purpose was to try to get as many jobs that we could into the operational basis in the [oil and gas] project. When it was completed I started looking at the data one thing that stood out and I guess it should not have been a surprise was that a lot of the skills that really popped out were on the fishery side. It was an area that I think everyone kind of assumed were people that were unskilled [for the oil and gas industry] but in fact they were used to going offshore for extended periods of time, they were used to operating in a marine environment, they were used to operating vessels and a lot of them had the certifications to operate some of the largest vessels in the world. (NS Official 2)*

This parallels the 'local assets' message at the regional scale.

### **3.3.2.3 Education and Employment Insurance Challenges**

Another important issue raised by participants was education levels within each province. Officials in Nova Scotia and New Brunswick cited literacy rates and high school enrolment numbers as ongoing concerns in rural areas (*NB Official 1, NS Official 1*). An official from New Brunswick remarked that having natural and built capital in a rural area without a literate workforce could easily deter entrepreneurial startups (*NB Official 1*). Ensuring that youth in rural communities complete their high school education can help; one official observed that youth have often been drawn to primary sector jobs in their rural communities such as fishing and forestry and have left school early to chase these opportunities (*NS Official 1*). Programs that encourage higher educational achievement across all Atlantic Provinces will need to continue as primary sector jobs become fewer. Such basic programs will support later industry-specific programs that enhance the workforce skills of these individuals once hired.

The Federal Government's employment insurance program is also top of mind amongst participants. Although most recognize the necessity of the program, they argued that it can at times compete with job opportunities offered in rural communities (*PEI Official 2, NS Official 3*). One comment on the loss of an employer in the province due to competition with employment insurance:



*People became accustomed to working five or six months a year and that became an issue for the contractor and unfortunately the centre ended up closing because he could not get the 12 month commitment or the qualified workforce. (NS Official 3)*

Participants recognized that the Atlantic Provinces have a lot of seasonal workers with fewer options for employment in the off-season. They understand that the seasonal jobs needed to catch fish and grow crops are valuable and that these activities can only occur during certain times of the year (NB Official 3, PEI Official 1). As one official described it:

*With these adjustments that they are talking about with the EI program it is challenging because we do have a very seasonal province. Ideally, it would be nice to convert a lot of these seasonal jobs into full time positions but it is a challenge given by nature you can only work in the woods a certain time of the year, you can only catch fish a certain time of the year. (NB Official 3)*

However, participants were also open to changes to the employment insurance program provided the provinces have more input to these adjustments (PEI Official 2, NL Official 3). This viewpoint was reflected in a comment by a Newfoundland official:

*...once we got to the point where people were using EI to support their families then that would mean that they had even less reliance on their neighbour and I think that helped break down that connectivity that used to be there, those bonds that used to be there and things that the federal government has been talking about over the last little while are probably going to be painful for some people but I am not so sure it is going to be a bad thing. (NL Official 3)*

Participants supported changes to the program that would help local businesses meet their labour needs more easily. Such changes link back to changing the expectations of rural communities, and leveraging local assets, including human capital, more strategically.

#### **3.3.2.4 Transition of Sunset Industries**

Many participants recognized the difficulty of supporting small businesses over larger businesses in rural areas. Large, single-industry plants have been the foundation for many rural communities in Atlantic Canada for decades; provincial governments remain reluctant to reduce support for these ‘one-horse’ towns. Some participants noted that governments must be willing to let some aptly named ‘sunset industries’ die-off (NB Official 2, PEI Official 3). They believed that government intervention will only be useful for those industries that are trying to reposition themselves further along the value-chain. Support for industries to maintain their status quo despite global market changes will lead to frequent and lingering government assistance (NB Official 2, PEI Official 3).

Participants stressed the ongoing dilemma affecting today's rural economies; letting sunset industries 'sink or swim' on their own versus the political and public pressure to keep them going:

*At what point is it a lost cause to throw more money at that mill or mine or whatever it is....The political will is generally there to put more financing to try to salvage it but at the end of the day you still need to make a business decision. Are you prolonging it enough that it can come through the commodity cycle in order to survive again? Are you going to have to do that again in five to seven years? (NB Official 1)*

*...we have to stop artificially supporting [sunset industries]. We have to allow them to evolve to what they will be. Drive the growth opportunities that are there and drive them hard.... If a pulp mill is going down because of elements that are outside of your control and you are going to lose 200, 300 jobs it is going to happen anyway at some point in time. You may be able to delay it a year or two but at the end of the day it is going to happen anyway. (NB Official 2)*

*What the government has done with a policy of trying to keep every community with a fish plant, what it does is put pressure on our margins, no one can reinvest in equipment... (NL Official 1)*

Despite recognizing that subsidies to failing industries may only extend these industries a few more years, the political notion that large external industries are inextricably linked to a rural community's survival is difficult to overcome.

### **3.3.3 Reassessing Global Positioning**

Interview participants noted pressures that are hurting the long-term success of rural communities. They discuss the reduced competitiveness of primary industries, and the need to create value-added products and identify new niche markets. They also noted that there is a need to refocus attention back to rural areas as vital contributors to the overall economy, a mindset they believe has wavered in the drive towards urbanization. Finally, they list worldwide issues of unfettered globalization and material acquisition as ongoing trends cutting away at the fabric of rural societies. Details of this evolving global reality and its impact on rural Atlantic Canada are discussed below.

#### **3.3.3.1 Value-added Products**

The change in the global marketplace over the past thirty years or more has meant that many Canadian industries including those in the Atlantic Provinces have struggled to remain competitive (*NB Official 2*). In some cases, competitors in other countries have been able to produce goods at a cheaper per-unit price than their Canadian counterparts. As one participant characterized it, there has been a 'perfect storm' of factors such as

trade agreements, the value of the Canadian dollar, electricity prices, and wages, that have made Canadian industries less competitive over the last three or four decades (*NB Official 2*).

To regain international competitiveness and market share Atlantic Canadian companies need to create value-added products and find niche markets to set themselves apart from their competitors. Participants suggest that by creating high quality, more specialized products, struggling industries can become reinvigorated (*NB Official 3, PEI Official 1, PEI Official 3, NS Official 3*). New product and market development can be aided through partnerships with researchers at major universities and colleges. Many provincial governments have also instituted innovation funds to help with this transition, e.g. Northern New Brunswick Economic Development and Innovation Fund (Government of NB, 2010) and the Nova Scotia Productivity and Innovation Voucher Program (Government of NS, 2010). Creating value-added products also involves leveraging local expertise that has built up in a region, e.g. modular and industrial fabrication in New Brunswick (*NB Official 1*) and the ocean sector in Newfoundland (*NL Official 1*). Participants provide examples of value-added products in many sectors in the Atlantic region: individual servings of fresh cod from Newfoundland's fishery (*NL Official 1*), value-added wood products from New Brunswick's forestry sector (*NB Official 3*), and specialized crops from Prince Edward Island's agricultural industry (*PEI Official 2*). One Prince Edward Island participant commented on the development of value-added products:

*There also seems to be [interest] ... in looking at value-added products for traditional industries. e.g., mussels, how can they be value-added? We have companies down here who are vacuum-sealing fresh mussels so that they last longer. Freezing them, pre-seasoned. We have farmers that are looking into different crops that could be exported into China and Japan....people are looking at how they can add value to what they are already doing. (PEI Official 2)*

All participants acknowledged that resource sectors need to be revitalized to stay competitive. Developing value-added products in these industries, particularly with international appeal, is one avenue to make this happen.

### ***3.3.3.2 Importance of Rural Communities***

All participants contend that rural communities, through fewer, will have an ongoing and essential role to play in the Atlantic Canadian economy. They are supportive of

value-added products in primary industries, diversification of primary industry supply chains, and small business expansion (*NL Official 1, NB Official 2, NS Official 1, PEI Official 1*). They recognize the importance of defining and leveraging community assets, particularly the skills of local citizens. Although some are cautious of long-term political support for possible sunset industries, numerous participants recognize that governments must view rural communities as assets rather than liabilities if they are to be successful going forward (*NS Official 3, NL Official 2*).

There is recognition that government funding is increasingly limited for economic development in both rural and urban areas and that future investment must be efficient and strategic. One official remarked on this challenge in their government's latest economic development strategy:

*There is recognition that there are not a lot of new dollars to be spent on economic development....it means that we need to work smarter, to work together to do this....the big differences of this strategy is there is more of a focus on collaboration, getting rid of duplication. (NB Official 3)*

Other officials warn of government policies and programs that increasingly miss out on rural needs, suggesting that this mindset needs to change:

*Who defines emerging industries? For rural communities the emerging industries are somewhat different than they are in an urban area....If they place too much of a level of importance on government programs being based on that [urban] definition of emerging industries I think rural areas are going to get less than they need...(NS Official 2)*

More than other provinces PEI officials emphasized the importance of rural communities in driving the economic activity of the province (*PEI Official 2, PEI Official 3*). One emphasized a recent survey that indicated that the majority of the province's citizens want to maintain strong rural communities because they recognize that local business success relies on keeping rural PEI alive and relevant (*PEI Official 1*).

### **3.3.3.3 Wider Societal Mindset**

One overarching theme was the average person's acknowledgement that the perceived services and goods provided by rural communities has diminished over time with the major shift towards urban living and reliance on foreign goods (*PEI Official 3, NB Official 2*). Some argue this disconnect between what people buy and where it comes from places support for the survival of rural communities at increased risk. One official summarized that disconnect:

*Today's society, we go to the grocery store and get our jug of milk and our loaf of bread and go home. Today's children have no idea where milk comes from and if they want to know they go to the internet as opposed to going out to a farm and seeing what goes on. (PEI Official 3)*

Another noted that important rural qualities such as a clean environment, better security and a greater sense of community compete against society's desire for wealth and material goods:

*The generation of wealth is more important than the well-being of humans and...until that mentality changes it is quite possible that our rural areas are not going to do much differently. Obviously economies of scale will always supersede economically over well-being. Well-being does not make a lot of money but well-being creates a healthy society, a healthy government, a healthy nation. I think that aspect of our world is disappearing. It is not about people and the quality of their lives it is about how much money they have in their pocket...(NL Official 2)*

These discussions speak to a much broader set of external factors jeopardizing the vitality of rural communities and will continue to be part of evolving discussions on issues such as buying local, overconsumption, and urbanization.

### **3.4 Discussion**

Regional economic themes discussed across provinces were very similar although some responses from PEI participants were distinctive. Given the province's reliance on industries such as agriculture, fisheries, and tourism, its seasonal rural workforce, and a small population size compared to other Atlantic provinces, the dependence on the rural economy was more apparent in these interviews. This increased rural focus, compared to the other Atlantic Provinces, is consistent with the province's Rural Action Plan - its current economic development strategy tailored to rural areas (Government of PEI, 2010) - and its economic development one-stop-service centres (Rural Action Centres, 2010), both of which appear unique in the Atlantic region. Other provinces may benefit from examining PEI's focused approach to its rural economy.

Despite some unique comments on the province's reliance on its rural economy compared to the larger group, overall viewpoints expressed under the themes of functioning regions, encouraging provincial competitiveness, and reassessing global positioning allowed for an evaluation of their compatibility with the stages of panarchy, its principles (e.g. resiliency, heterogeneity, nested cycles) and policy leverage points from the framework. Further examination of policy documents by province identified

general areas of agreement and disagreement with key elements of the panarchy-based framework (Slight et al., in review). Each of these will be discussed in turn.

### **3.4.1 Alignment with Panarchy and its Principles**

#### ***3.4.1.1 Adaptive Change Cycle***

Our framework emphasizes the need for rural communities to move into stages of higher resilience, specifically the reorganization and exploitation stages of the adaptive change cycle. We suggest that communities that are artificially held in the conservation stage of the cycle, a stage of lower resilience, will experience more serious economic and social consequences when an inevitable economic disturbance hits. We also suggest that rural communities that stall in the ‘back loop’ of the adaptive change cycle will have a more difficult time rebounding from economic disturbance and will continue to struggle in today’s global marketplace. Results from the interviews appear supportive of moving rural communities into stages of higher resilience and expediting times of economic uncertainty. Participants’ comments regarding support for small businesses and supply chain diversification align well with moving rural communities into more resilient stages along the adaptive change cycle. The framework and participant comments agree that having more business heterogeneity in a rural community can help buffer the community against economic disturbance. Participant comments on the value of strong education and worker retraining programs to fill labour needs in emerging industries are also supportive of expediting the ‘back loop’ (Figure 2.2, p.30) and preventing this human capital from being lost to other communities and regions.

Participant recognition that propping up ‘sunset industries’ might inhibit long term community success is consistent with the framework as well. Panarchy acknowledges that disturbance cycles are inevitable and necessary for infusing change into a system (Holling, 2001; Slight et al., in review). Holding a system in the conservation stage of the adaptive change cycle can have negative repercussions long term. Participants conceded that support for single-industries that offer significant employment can impact a community to a greater extent when an economic disturbance leads the industry to decrease its labour force or to close. Focusing resources on these industries take resources away from identifying new assets and attracting new businesses into a

community. It may also reduce business heterogeneity in a community. Often, this artificial support of existing industries simply pushed the inevitable declines a few years down the road; officials hope that local governments have learned from these outcomes. By prolonging an eventual collapse, a community may be left with fewer opportunities for economic growth, slowing or indefinitely halting its progression along the ‘back loop’ of the adaptive change cycle.

#### *3.4.1.2 Nested Cycles*

The ease at which participant comments were classified into three scales, functioning regions, encouraging provincial competitiveness, and reassessing global positioning, suggests a connection with the nested feature of adaptive change cycles that was overlooked in earlier work (Slight et al., in review). Adaptive change cycles can occur at different scales; collapse/change in faster, smaller cycles can spread to slower, larger cycles (Holling, 2001; Holling et al., 2002b). Alternatively, stability in slower, larger cycles can lead to renewal in faster, smaller cycles (Holling, 2001; Holling et al., 2002b). We see three nested cycles at global, provincial and regional scales. The global viewpoint represents the slower, larger cycle and functioning regions represent the faster, smaller cycle. Encouraging provincial competitiveness lies between.

At the larger scale, the global scale (Section 3.3.3, p.62), a number of officials suggested that support for rural areas by the general public has diminished over time as a consequence of urbanization and globalization. Goods are acquired from all over the world and the connections to local resources are fewer than generations past. If this trend continues, the growth of local urban economies may be maintained at the expense of local rural economies. ‘Buying local’ campaigns (Province of NS, 2007; PEI Culinary Alliance, 2012) are one example of provincial or national incentives that might place more emphasis on maintaining rural communities in Atlantic Canada. Moreover, it is likely that acquiring goods internationally will be increasingly expensive over time e.g., high transportation costs due to increasingly variable fossil fuel prices and rising standards of living/wages in the developing world. Continued discussions such as these might lead to favorable policies that place a renewed emphasis on the value of local assets and the rural communities that manage them.

Under functioning regions (Section 3.3.1, p.55) the conclusion by numerous officials is that there will be fewer rural communities in Atlantic Canada in the future. What was not discussed in depth were the consequences of rural community collapses on provincial and global realities going forward. This invites a number of important questions: As the urbanization trend continues to draw human and financial capital out of rural areas in Atlantic Canada, how will this impact the regional economy or the larger Canadian economy? Will a tipping point be reached where producing food and extracting resources at the local level is impeded? What is the acceptable number of rural communities needed to maintain heterogeneity in a regional economy? What policies should be introduced or supported more vigorously to maintain that acceptable number of rural communities in Atlantic Canada? More optimistically, can we learn from rural communities that have developed strong economies through novel approaches to help other rural communities, and regional economies, in Atlantic Canada survive long-term?

Two adaptive change cycles that were not discussed in depth occur at the individual community and national scales. Although participants discussed rural communities that had struggled and succeeded in their provinces, many emphasized policies and strategies that would create functional regions rather than addressing individual community challenges. This does not preclude individual communities from being discussed in this nested approach. Local community leaders may benefit from examining their community using this framework and how their community interacts with regional and provincial adaptive change cycles. Similarly, a national adaptive change cycle was not the focus except for a single discussion on employment insurance program and its impacts at the provincial level. Provincial leaders will benefit from examining national scale policies that support or undermine rural development in Atlantic Canada.

### **3.4.2 Alignment with Policy Intervention Positions**

The four policy leverage points from the framework include: *Seeds of Innovation*, *Cultivation of Creativity*, *Colonization of Ideas*, and *Laying Fallow* (Slight et al., in review). Policy instruments applied during the period of transition encompassing this *Seeds of Innovation* leverage point help slow/reverse a community's position from the conservation to the exploitation stage of the adaptive change cycle if an economic



disturbance is sufficiently foreseen by officials (Figure 2.2, p.30). For example, policies that help existing businesses in a community develop new products decrease their vulnerability to market pressures from competitors. Policy instruments at *Seeds of Innovation* can also help businesses reduce their dependency on primary industry supply chains. In this scenario the release stage of the cycle is avoided and a community is pulled to the reorganization stage (Slight et al., in review) (Figure 2.2 A, p.30). Even lacking foresight into community disturbances, policy instruments applied at *Seeds of Innovation* can also help expedite the community's position from the release to the reorganization stage after a disturbance (Figure 2.2 C, p.30). For example, policies that help a community define and exploit its local assets in new ways push a community from the release to reorganization stage. Policy instruments applied at *Cultivation of Creativity* create an amenable environment for businesses to test and develop novel products in the reorganization stage (Slight et al., in review) (Figure 2.2, p.30). This includes policies that facilitate research and development initiatives between local businesses and local universities. Policy instruments applied at *Colonization of Ideas* help emerging businesses transition to the exploitation stage (Figure 2.2, p.30). This includes policies that support access to capital for the development of new technologies (Slight et al., in review). Finally, the *Laying Fallow* on the cycle acknowledges that some communities will not survive economic disturbances. When this occurs policies are necessary that consolidate assets among neighbouring rural communities to ensure the success of the region (Slight et al., in review) (Figure 2.2, p.30).

Comments from participants were compatible with the leverage points identified in the framework. Specifically, Slight et al. (in review) identified *Seeds of Innovation* as the most important intervention point and the most compelling in the ways it can act (Figure 2.2 A, B & C, p.30). This was reaffirmed by participants whose comments support the three possible scenarios identified at this leverage point. For example, participants described the value of identifying niche markets and products for existing businesses to help them diversify. These comments were compatible with *Seeds of Innovation* (Figure 2.2 B, p.30) where a community is pulled back from the conservation to the exploitation stage through innovation and productivity enhancements in existing businesses. They also acknowledged the need to identify local assets to attract businesses with the right

'fit' to rural communities. These comments are also compatible with *Seeds of Innovation* (Figure 2.2 A, p.30) where the release stage is avoided by defining community assets that invite new business opportunities before an economic disturbance impacts existing businesses. Finally, participants acknowledged that successful rural communities will be those that are able to reposition themselves successfully after an economic disturbance and focus less on maintaining sunset industries. These comments imply the need for quick transition through the 'back loop', a transition is aided by policy instruments initiated at *Seeds of Innovation* when economic disturbances cannot be adequately foreseen (Figure 2.2 C, p.30).

Although participant comments are most easily linked to *Seeds of Innovation*, other comments were also compatible with the three other leverage points (Figure 2.2, p.30). For example, participants described the importance of neighbouring communities working together to share assets rather than trying to maintain duplicate services. Defining a longer list of assets that could be exploited by community partnering aligns well with policy instruments recommended at the *Cultivation of Creativity* and *Colonization of Ideas*. A research and development agenda focusing on optimally leveraging local assets during *Cultivation of Creativity* and then focused attention on the marketing and development of new products during *Colonization of Ideas* will support a community's more rapid transition through the 'back loop' (Figure 2.2, p.30). Finally, participants acknowledged that there will be fewer rural communities going forward as some communities will have insufficient quantity or quality of assets to attract new businesses to diversify their economies. They suggested that policy makers will need to focus on rural communities with the highest potential. These comments are compatible with the final position on the cycle, *Laying Fallow*, which recognizes that some communities will be unable to rebound from economic disturbances and that policy instruments that help consolidate their resources to the benefit of other rural communities will be needed. Participants did not discuss in details how the resources of communities that amalgamate are retained. Policy instruments that help preserve resources/assets to the benefit the broader region may require further attention.

### **3.4.3 Alignment of Provincial Strategies with Both Cycles and Policy Instruments**

The challenges and visions outlined in provincial economic development documents align well with panarchy's adaptive change cycle. The programs listed therein could be easily tailored to the policy intervention positions identified. Comments from all four provincial governments emphasize the challenges facing the Atlantic region both socially, e.g., ageing populations, outmigration of youth, slow population growth, and economically, e.g. pressures of globalization and the need for business innovation and productivity to remain competitive (Government of NL, 2006; Government of PEI, 2010; Government of NS, 2010; Government of NB, 2012). The future visions in each province are also very similar and include: creating jobs, improving the innovation and productivity of existing businesses, investing in high-value, high growth sectors, competing globally, developing, investing in and retaining a highly-skilled workforce, and overall quality of life for citizens (Government of NL, 2006; Government of PEI, 2010; Government of NS, 2010; Government of NB, 2012). The challenges recognized in all provinces adhere to basic stages of the adaptive change cycle and the framework: provincial economies can and will be impacted by external economic disturbances; investment is needed in innovative, productive businesses supported by a skilled workforce in local communities to avert these disturbances; or investment is needed in research and development, asset development and worker retraining in local communities to expedite these disturbances.

Participants highlighted a number of programs and services offered by provincial governments that have been valuable to rural communities: the Business Retention and Expansion and Community Capacity Building Programs in NL (*NL Official 1, NL Official 2*), the Rural Action Centres in PEI (*PEI Official 1, PEI Official 2, PEI Official 3*), the Business Retention and Expansion, Labour and Advanced Education, and Productivity Investment Programs in NS (*NS Official 1, NS Official 3*), and the Miramichi and Northern New Brunswick Innovation and Economic Development Funds (*NB Official 2, NB Official 3*) in NB. Programs focusing on improving business expansion, innovation, labour advancement and productivity would all be supportive in pulling rural communities back from the conservation to exploitation stage or pulling

them to the reorganization stage on the adaptive change cycle at the *Seeds of Innovation* leverage point. It is clear from this emphasis on successful programs that policy intervention is commonly occurring at *Seeds of Innovation* to help rural communities avert or bypass collapse. The number of other successful programs mentioned by officials, such as community capacity building, educating citizens, and Rural Action Centres, would be supportive of pushing rural communities from the release to reorganization stages of the cycle at *Cultivation of Creativity*.

Although officials did not focus as much on successful policy instruments that might be applicable to *Colonization of Ideas*, a review of policy documents reveals provincial programs that would align. For example, Nova Scotia's *Exporter Prospector Program*, the *Clean Tech Fund*, and *Venture Capital Fund* (Government of NS, 2010) and New Brunswick's focus on six priority growth sectors and its NB Growth Program (Government of NB, 2012; *NB Official 3*) would help emerging businesses transition from the reorganization to exploitation stages of the cycle. There was also less focus on programs that would help consolidate resources from collapsing rural communities as noted at *Laying Fallow*. One Nova Scotia official mentioned the need for stronger succession planning for rural businesses and mentorship programs to help fill in business succession gaps (*NS Official 1*). Filling these gaps may be another avenue for avoiding the *Laying Fallow* position.

### **3.5 Conclusion**

This rural economic development framework uses the panarchy model to provide insight into appropriate mechanisms for the economic redevelopment of rural communities. The framework describes characteristics of an archetypical rural community at each stage so its position can be identified, and then highlights leverage points where specific policy instruments should be initiated for optimal effect. This paper demonstrates the utility of the framework by highlighting its compatibility with the views of economic officials in Atlantic Canada. Their comments were consistent with the stages of the adaptive change cycle and its basic principles. Specifically, participants' recognized the importance of the 'back loop', the release and reorganization stages of the adaptive change cycle, the back loop's speed, and the need to push or pull rural

communities into stages of higher resilience. Also, we noted that many comments are linked to nested cycles, a concept largely neglected in the original framework. For example, how will the loss of rural communities impact provincial and regional economies? Can initiatives such as ‘buying local’ help reinforce support for rural communities? These dynamics are compelling and require further study to revisit the framework. Identifying rural communities that have rebounded from economic disturbances and those that have not represents another avenue for further study. Research could also be conducted in order to further identify the specific characteristics of businesses in communities from each scenario. Defining the characteristics of businesses from rebounded communities would provide further insight to policy makers and community leaders about businesses that have the right ‘fit’ for rural communities in transition within Atlantic Canada.

This research revealed general alignment with the framework’s policy leverage points as well. Specifically, successful programs discussed by participants lend themselves well to *Seeds of Innovation*. We encourage provincial policy makers to evaluate current rural development policy instruments in more detail to determine the most appropriate timing of their use and to identify any new policy instruments that could be applied within the framework. This approach could help tailor the framework to a specific region and provide another tool for improving regional economic development in jurisdictions with a significant rural component. We also encourage the investigation of further policy instruments for the *Laying Fallow* position. If the amalgamation of rural communities is expected to continue as suggested herein, consolidating the resources from these communities to benefit those that remain will be essential to a successful regional approach.

Although Atlantic Canada was used as a case study to evaluate the practical application of this framework we suggest that it can be applicable to other rural regions in Canada, the United States, Europe and Australia. We encourage policy makers to use the guiding principles from the framework to analyze the strengths and weaknesses in their own rural economic development policies/strategies. Emphasis should be placed on the optimal timing of policy instruments that will help rural communities face economic disturbances head on and rebound effectively where possible.

## CHAPTER 4 CONCLUSION

### 4.1 Summary and Recommendations

As previously stated, urbanization is a demographic trend occurring at varying speeds in both developed and developing countries around the world. In North America, both Canadian and American populations have already significantly urbanized. Atlantic Canada's rate of urbanization is lower than the Canadian average. However, as urban populations in these provinces continue to strengthen, rural populations are experiencing the negative repercussions of this population shift. Rural populations in Atlantic Canada are aging as youth move to cities or to western Canada for better education and job opportunities. Rural areas are suffering from cutbacks to education, recreation, health care and postal services as the tax base diminishes that support these public services diminish. Securing private investment in many local industries is a challenge and government bailouts of primary resource sectors are continuing.

The social and economic challenges faced by rural communities across Canada, including those in Atlantic Canada, are not new. Changes to external commodity markets, the valuation of the Canadian dollar, industrial inefficiencies and increased global competition have contributed to economic gains and losses in rural communities across the country over the past 30 years. With economic unrest expected to continue in rural communities for the foreseeable future, policy makers and community leaders have two choices. One option is to allow outmigration of rural communities to run their course and help rural communities that survive to stay viable. The alternative is to identify creative solutions for reinvesting in rural communities in an effort to maintain the diversity of the country's regional economies.

Despite years of research aimed at identifying these creative solutions, many rural communities continue to struggle. Novel approaches for studying this unrelenting social and economic problem are welcomed. This thesis offers an ecological lens that draws insight from secondary succession and panarchy's adaptive change cycle to inform the redevelopment of rural communities. Three outcomes are identified from this research: (1) the development of a framework that identified the characteristics of an archetypical rural community at each position along panarchy's adaptive change cycle; (2) the creation of four policy positions, three major and one minor, to help push or pull a

community into an area of higher resilience; and, (3) an analysis of the compatibility between the viewpoints of economic development officials in the Atlantic region and the framework features of resilience, heterogeneity and nested cycles. This also involved an examination of current provincial economic development strategies/policies to identify gaps and/or disconnects between these policies and the best timing of their deployment as outlined in the framework.

We have determined that the characteristics of ecological communities at each stage of the adaptive change cycle can easily be used as a model for identifying the characteristics of rural communities at the same stages. We have also found that the vulnerability of a rural community to a disturbance at the conservation stage mirrors the vulnerability of an ecological community to disturbance at the same stage. Finally, we offer that the continuous cycling between the ‘front loop’ and ‘back loop’ of the adaptive change cycle provides guidance to policy makers and community leaders: once solutions to current economic challenges are found, system rigidity and potential for change can redevelop in a rural community, once again increasing its vulnerability to future economic disturbances.

The addition of policy leverage positions to the framework acknowledged that unlike in natural systems, in human systems the ability to foresee economic disturbances creates policy opportunities that can be used to avoid these disturbances and pull a community into an area of higher resilience. When economic disturbances cannot be adequately foreseen, policy opportunities also exist to push a community quickly through the back loop of the adaptive change cycle to a position of higher resilience. In the framework, the type of policy instruments employed and their timing along the adaptive change cycle are essential to achieving desired policy results. The one minor leverage point that we identified, *Laying Fallow*, recognizes that not all rural communities will remain viable in the long term. It is important to state this explicitly: simply reorganizing the assets of some rural communities will not alter their sustained trajectory of decline.

Comments from economic development officials in the Atlantic region show many areas of compatibility with the framework. Most interesting is how simply comments can be grouped at regional, provincial and national/international scales. It allows for the analogous link to the nested feature of the panarchy model that had been overlooked early

on and by other scholars. Specifically, a slower, larger cycle can offer stability to a faster, smaller cycle, e.g. strong provincial rural development policies help sustain functioning regions, and a faster, smaller cycle can promote adaptability in a slower, larger cycle e.g., local value-added products created in rural communities can increase a province's competitive advantage. We also demonstrate alignment between current economic development strategies/policies in the Atlantic region and the policy leverage positions of the framework, particularly the *Seeds of Innovation* leverage position.

Throughout the development of the framework and consideration of its practical application using interview and policy document analysis, a number of important conclusions concerning the redevelopment of rural communities can be drawn:

(1) Artificially holding a rural community and its businesses in a position of lower resilience can cause serious social and economic consequences when an economic disturbance hits. For example, the ongoing political will to financially support 'sunset' industries that have outdated product and market development is a risky approach for solving rural economic challenges.

(2) For struggling industries requesting public and private support, there is a great need for these industries to develop value-added products and to identify niche markets for their products to improve global competitiveness.

(3) Support for small businesses and diversification of supply chains, particularly those tied to volatile primary industries, can help push or pull communities into higher areas of resilience. This goes hand-in-hand with retaining strong human capital in rural communities through strong literacy and high school level competencies as well as worker retraining programs. Policy makers and community leaders then must attract businesses that 'fit' with the labour skills available in each community.

(4) Defining all of the local assets in a community is essential for determining the future economic direction it could take. Communities that will be a part of the fewer,



functioning economic regions in the Atlantic Provinces, as suggested by key informants, will be determined by the number and quality of assets and the ability of these communities to bring economic opportunities from these assets to fruition.

(5) Finally and more generally, societies around the world will need to forecast what their economies will look like with dwindling rural contributions. Are the economic contributions provided by their rural communities too important to lose and if so, what policies must emerge to support an ongoing rural economic presence?

The guidance provided by the panarchy-based framework, which demonstrates compatibility with the viewpoints of economic development officials and current provincial economic development strategies/policies, also calls for a number of recommendations:

(1) Governments should consider the guidance offered through this unique ecological lens by applying the framework to their specific rural challenges. This could involve examining the policies they currently have in place and considering their appropriate use and timing in light of the adaptive change cycle. This could also involve a more detailed examination of gaps that exist in current strategies/policies that may be preventing rural communities from avoiding serious economic disturbance or from rebounding quickly from these disturbances.

(2) Additional attention should be given to the *Cultivation of Creativity*, *Colonization of Ideas*, and *Laying Fallow* leverage positions, as many current policies in the Atlantic region appear to favour *Seeds of Innovation*. Particular attention should be given to strategies/policies that prevent the leakage of valued resources e.g., the loss of human capital to outside regions, particularly when rural communities are forced to amalgamate or become insolvent.

(3) Given that community and national scales were not raised extensively by participants when analyzing the practical applicability of the framework, these

important scales to the nested cycles of regional economies should be examined in more detail.

(4) Most importantly, political leaders, policy makers and rural citizens must continue to have frank and open conversations about the economic and social contributions provided by rural communities now and in the future. These conversations need to identify rural communities that have the highest growth opportunities and must consider how to capitalize on them. These stakeholders will also need to identify rural communities that face the toughest economic challenges and define the realistic costs and benefits of sustaining them.

#### **4.2 Research Opportunities**

This research offers a broad and open-ended resilience-thinking framework with secondary succession and the panarchy model as its basis. The framework provides valuable guidance to disciplines including public policy and rural studies. The practicality of the framework was studied using viewpoints from key informant interviews in Atlantic Canada. Although information from these key informants was extremely valuable, obtaining the viewpoints from other groups would also be desirable. For example, telephone interviews with community leaders, community volunteer groups, and local politicians could add important insight to the framework. Alternatively, focus groups with these stakeholders to learn how the framework could be applied to an individual community could also be helpful. In addition to this focus on individual community perspectives, future research could also incorporate the viewpoints of federal economic development officials to ensure that a national perspective on rural issues and their compatibility with the framework are covered. As indicated in chapter three, rural economic challenges are not unique to Atlantic Canada and comparable challenges can be found in the United States, Australia and countries across Europe. Key informant interviews with representatives from these regions could provide additional insight.

In Chapter One, the evolution of this thesis topic was introduced. One research avenue that was discussed was the characterization of businesses that populate a community after an initial economic disturbance, analogous to r-selected species from

secondary succession, and those that populate the community later on in its recovery, analogous to K-selected species. Although this research pursuit was replaced by the broader panarchy investigation, now that the framework has been built this research could be revisited. Of particular interest would be the characteristics and/or desirable business profiles of communities at each stage of the adaptive change cycle. It would also be interesting to examine case studies of individual communities that have collapsed and rebounded from economic disturbances. In the case of rebounded communities, what local assets were used to rejuvenate the community and what businesses capitalized on these assets? These case studies could provide useful evidence in support of the framework.

In Chapter Two, a basic picture of the challenges of rural communities in Atlantic Canada was presented. Focusing less on these challenges and more on creative solutions for change, future research could create detailed asset maps of each Atlantic province. The goal would be to identify what each rural community in each province has to offer and provide suggestions on how these assets could be developed. These details could feed into the framework needed to help policy makers determine where a community falls on the cycle perhaps based on a multi-criteria decision analysis. Knowing the basic characteristics of a community from the original framework as well as assets it holds could help position the community more accurately on the framework. If information on the business profiles of rebounded communities is also incorporated into the decision matrix it might also help determine with more accuracy what businesses to support in the community and the policy instruments to leverage.

Finally, as indicated at the beginning of this thesis there are many lessons from ecology that might offer new ways of examining problems in other disciplines. In this thesis the focus was to use this ecological lens to provide guidance to rural redevelopment. In brainstorming concepts such as succession ecology and panarchy, a number of other ecological concepts were considered including: biodiversity, food webs, invasive species, and nutrient cycles. Although these ecological concepts were never integrated into the framework these analogies continued to come up in discussions on the resilience of regional economies. Future research into the struggles of rural communities

may benefit from drawing additional parallels between ecological concepts such as these and rural redevelopment.

### **4.3 Final Thoughts**

Throughout history, rural communities have been the economic driving forces in countries around the world. The Canadian economy is no exception. Canada was founded on its rural communities, fueled by the extraction of its abundant natural resources. Rural communities were once booming centres of activity providing job opportunities and a way of life for multiple generations of rural families. Over the last several decades, however, the rural way of life has been slowly eroded by global competition in industry. This strain on local rural industries has resulted in the outmigration of rural citizens to urban areas in search of better job and education opportunities and access to adequate public services.

In discussions with economic development officials in the Atlantic Canada not one official questioned the importance of rural communities to the success of provincial economies and the country's economic prosperity as a whole. At the same time they noted two important truths: (1) there will be fewer, vibrant rural communities in Atlantic Canada, and (2) the success of the rural communities that remain across Canada will depend on changing the mindsets of rural and urban citizens. This change involves: (1) recognizing rural communities as economic assets rather than liabilities, (2) reaffirming long-term solutions to rural challenges, and (3) acknowledging that the maintenance of rural communities as sources of local goods and services is crucial to improving provincial self-sufficiency in an increasingly unstable global marketplace.

Research for this framework and comments from economic development officials also indicate that no 'silver bullet' has been found for ending the struggles of rural communities in Canada and other developed nations. Practically, this implies that examining these same rural challenges in new ways, such as through the ecological lens proposed in this thesis, is a necessary contribution to the current rural development discourse. It also invites researchers, including students, to continue to learn about the rural communities around them. As a student who has never lived in a rural community, this thesis has taught me the vital economic and social role rural communities play in the

Atlantic region. I have come to appreciate the strong sense of place rural residents feel in the communities they call home. I have also learned that even though urban and rural citizens appear more connected than ever before there is an underlying social divide that remains between these two groups. Rural citizens must increasingly appeal to the general public to acknowledge the relevance of their communities and for provincial programming to back up this sentiment. This appeal calls for support to rural communities beyond the piecemeal approach of industry bailouts - to a more holistic development approach that capitalizes on rural assets in innovative ways ensuring communities thrive in the long term.

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## APPENDIX A. Sample Province Specific Questions

**Box 2.** Sample province-specific questions added to phone discussions with economic development officials in Atlantic Canada

<b>Province</b>	<b>Questions</b>
<i>Newfoundland and Labrador</i>	<ol style="list-style-type: none"> <li>1. In recent years Newfoundland has lost many skilled workers to the west. What are your thoughts on this trend and how it can be mitigated?</li> <li>2. The unemployment rate in Newfoundland in 2011 was the lowest it has been in at least 36 years. Do you think rural communities are seeing benefits from this advancement or are city centres reaping the benefits disproportionately?</li> <li>3. The federal government has indicated that it might make changes to the EI system that could change the definition of suitable employment and reasonable efforts to find work to get more unemployed Canadians in the workforce. Critics say that this could make people have to move unnecessarily to where the jobs are and have people work in positions where their skills are underutilized and underpaid. How do you think changes to EI could impact Newfoundland?</li> </ol>
<i>Prince Edward Island</i>	<ol style="list-style-type: none"> <li>1. How successful do you think the Rural Action Centres have been to date and what achievements do you expect from them in the future as they become more established?</li> <li>2. Do you think the current Rural Action Plan places too much emphasis on traditional industries such as agriculture and fisheries?</li> <li>3. How supportive do you believe people in the larger city centres in PEI are of the Rural Action Plan?</li> </ol>
<i>Nova Scotia</i>	<ol style="list-style-type: none"> <li>1. How successful do you think the province's jobsHERE strategy has been so far and what areas could be approved on? Do you think it is helping to improve the skills of Nova Scotians, grow our economy through innovation, and help us compete globally?</li> <li>2. What do you think of the government's recent announcement that is decentralizing 100 government positions out of Halifax and the potential for similar announcements in the future?</li> <li>3. What is your opinion about the recent bailout of pulp and paper mills in the province? Do you think that this is a useful strategy? Why or why not?</li> </ol>
<i>New Brunswick</i>	<ol style="list-style-type: none"> <li>1. What do you think is the next big economic driver for New Brunswick and why?</li> <li>2. How do you think the Northern and Miramichi Economic Development and Innovation funds, past and present are doing to help businesses in those regions?</li> <li>3. Can you talk more about initiatives that are needed by businesses when they enter the 'valley of death', the start and late stages of growth?</li> </ol>

## APPENDIX B. Consent Form



School for Resource and Environmental Studies  
Dalhousie University  
Kenneth C. Rowe Management Bldg  
6100 University Avenue, Suite 5010  
Halifax, NS B3H 4R2

Project Title: Exploring Ecological Lessons for Supporting Community Economic Development Policy

Dear [Economic Development Official],

We invite you to take part in a research study being conducted by Penny Slight, a Master of Environmental Studies Candidate in the School for Resource and Environmental Studies at Dalhousie University. The study is described below. This document tells you about any risks or inconvenience you might experience by participating, which as public officials we expect to be minimal. Though this study may not be of any direct benefit to you, you would be indirectly benefitting new research into the study of rural economic challenges and policy intervention as guided by ecological lessons. Please discuss any questions you may have about this study with Penny Slight and/or her academic supervisor Dr. Kate Sherren, whose contact information you will find below.

Your participation in this study is voluntary and you may withdraw from the study at any time before publication of the results by contacting one of us. Each participant will receive a copy of their interview transcript to provide corrections/comments. Should you consent to being anonymously quoted in the study, you will be sent a copy of quotes to be included in the study for corrections/comments. This will provide you with a final opportunity to remove any of your anonymous quotes from the study.

There may be future opportunities for participants of this study to take part in further research in this area; you may be contacted about these opportunities as a public official in this area. In the unlikely event that we want to use the raw interview data we collect in this study for future studies, we will seek your permission at that time.

### **Purpose of the Study**

The purpose of this study will be to examine current strategies for improving the resilience of rural communities and to explore ecological lessons for supporting community economic development policy.



## **Study Design**

This research is intended to be a fully developed project to examine unexplored analogies between ecological and industrial systems, analogies that propel the field of industrial ecology. This research builds on existing research that suggests that lessons from ecology could be used to examine complex community development issues. This study will use in-depth key informant interviews. If you agree to participate in our study, the steps will be as follows.

- a. I will call you over the phone at a time and date of your choosing to discuss a series of questions on economic policy development and implementation in your province. The interview should take approximately 45 minutes to an hour. If you consent, audio recording will be used to ensure that the content of the interview is thoroughly captured. If you do not consent to an audio recording, I will take detailed notes of the interview. Initial and follow-up phone calls and emails are expected to take 30 minutes.
- b. I will send you a copy of the interview transcript within two weeks of the interview to make any corrections/comments you feel are appropriate. I will request that you send corrections/comments within one week of receiving your interview transcript. If you do not reply with corrections/comments within this time frame your interview transcript will proceed to analysis without revisions. You will have the opportunity to withdraw your interview responses from the study if you wish. Should you consent to being anonymous quoted a copy of these quotes will also be provided to you to make any corrections/comments. Review of interview transcripts/quotes is expected to take approximately 30 minutes.
- c. The interview notes will be analyzed to understand how current economic development policies are developed and implemented in rural communities and if ecological lessons could help support these policies.

## **Who Can Participate in the Study?**

You may participate in this study if you are a current economic development official from one of the four Atlantic provinces and have either worked on the development or implementation of your province's current economic policy/strategy. We are seeking a minimum of eight participants, two each from the four Atlantic Provinces. The principal investigator may ask interview participants to provide names of other public officials who could be interviewed, a process known as a snowball sampling method. If this method is used for participant recruitment, participants identified through this method would be known to one another. In other words, prospective interviewees will be told if someone has referred them, and the name of that person.

### **Who Will Be Conducting the Research?**

The principal investigator (PI) of this study is Penny Slight who is currently a Master's candidate with the School for Resource and Environmental Studies at Dalhousie University. She holds an Honours Bachelor of Science degree in Biology and a Bachelor of Science degree in Environmental Studies. Penny has worked full-time or part-time with Dalhousie University's Eco-Efficiency Centre over the past five years. This work has involved interactions with economic development officials in Nova Scotia, PEI and New Brunswick at meetings, conferences and workshops. Penny is the lead researcher of this study and will be conducting the participant interviews. She holds no conflict of interest related to the study.

This research is funded by the by the Social Science and Humanities Research Council of Canada through a graduate scholarship.

### **Possible Risks and Discomforts**

Possible risks and discomforts are expected to be minimal to negligible for this study. Participants will be known to the researcher. However, all personal data will be kept confidential as described below. The PI of this study will be conducting face-to-face or phone interviews at the convenience of participants during the month of April. There is an opportunity cost associated with this study only in the time spent participating in the study. We believe that public officials are asked to follow-up on public and private sector inquires as part of their job duties and therefore time spent participating in this research can be justified as a component of these duties.

### **Possible Benefits**

This study is not expected to provide any direct benefits to the participants. However, the conclusions drawn from this research could indirectly benefit rural communities in Atlantic Canada by contributing to future policy interventions in rural communities. We believe this research would be of particular interest to public officials whose daily work seeks to find solutions to rural economic challenges.

### **Compensation/Reimbursement**

No compensation will be offered to the participants.

### **Confidentiality & Anonymity**

The participants of the study will remain unidentified in all reports or publications released and will be referred to only by the province they work in. Your name and personal information will not be released. These and all other data that we will collect in the interview will be kept on a password protected computer. Dalhousie University

Policy on Research Integrity requires that data be securely maintained by the institution for 5 years, post publication. After this time, the primary data will be destroyed.

### Questions

If you have any questions concerning this study, please contact Penny Slight by email at [p.slight@dal.ca](mailto:p.slight@dal.ca) or by phone at (902) 461-6704 or her academic supervisor Kate Sherren by email at [kate.sherren@dal.ca](mailto:kate.sherren@dal.ca) or by phone at (902) 494-1359.

### Problems or Concerns

If you have any difficulties with, or wish to voice concern about, any aspect of your participation in this study, you may contact Catherine Connors, Director of Dalhousie University's Office of Human Research Ethics Administration, for assistance at (902) 494-1462, [catherine.connors@dal.ca](mailto:catherine.connors@dal.ca).

**Project Title:** Exploring ecological lessons for supporting community economic development policy

### Informed Consent

I have read the explanation about this study. I have been given the opportunity to discuss it and my questions have been answered to my satisfaction. I hereby consent to take part in this study. However I realize that my participation is voluntary and that I am free to withdraw from the study at any time. I consent to participate in the interview process under the conditions stated above, with the specific permissions indicated below.

Participant:	Signed:	Date:		
In order to back up written notes, I consent to an audio recording being made of this interview.			YES	NO
I consent for direct <b>quotes</b> from our interview to be to be used <u>anonymously</u> in project outputs such as reports, articles and seminars.			YES	NO
I am interested to receive information about future studies regarding the application of ecological models to rural community challenges			YES	NO

Researcher:                      Signed:                      Date:

## APPENDIX C. Letter of Introduction



School for Resource and Environmental Studies  
Dalhousie University  
Kenneth C. Rowe Management Bldg  
6100 University Avenue, Suite 5010  
Halifax, NS B3H 4R2

Dear [Economic Development Official],

My name is Penny Slight and I am currently pursuing my Master of Environmental Studies degree at Dalhousie University. I have degrees in Biology and Environmental Studies and have been working over the past five years with Dalhousie's Eco-Efficiency Centre, a non-profit group that seeks to improve the environmental and financial performance of small- and medium-sized businesses in Nova Scotia. As part of my thesis research I am attempting to integrate both my academic and professional knowledge through the application of ecological lessons to rural economic challenges. **Specifically, my study will be examining current strategies for improving the resilience of rural communities and will explore ecological lessons for supporting community economic development policy.**

**Would you like to participate in my study?** It would involve:

A semi-structured phone interview to discuss a series of questions on economic policy development and implementation in your province. The interview should take approximately 45 minutes to an hour.

I will send you an interview transcript for you to make any corrections/comments you feel are appropriate. You will have the opportunity to withdraw your interview responses from the study if you wish. Should you consent to being anonymously quoted a copy of these quotes will also be provided to you for you to make any corrections/comments.

I hope to conduct this interview this month. The attached Consent Form provides more information; a copy will need to be signed and faxed or scanned back to me before our interview, if you decide to participate. If the interview is conducted in person the consent form will be signed in person. If you have additional questions, and/or if you know another economic development official in your province that I could approach, you can reach me by email at [p.slight@dal.ca](mailto:p.slight@dal.ca) or by phone, at (902) 461-6704. I will follow up shortly with a phone call to see if you would be interested in participating.

Sincerely,  
Penny Slight  
Master of Environmental Studies Candidate

## APPENDIX D. Table 3.1 References

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