

CLIMATE MIGRATION IN CANADA: A CASE STUDY OF LENNOX ISLAND, PEI

by

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Abstract

The community of Lennox Island, Canada will require relocation due to climate change-induced erosion and sea-level rise. The Canadian government is not yet prepared for climate migration events. There are varying social and economic challenges to community relocations. For this reason, it can be useful to learn from past forced relocation events within Canada and climate migrations abroad. This study uses the precedent of Newtok, Alaska's climate migration to determine measures that should be used during Lennox Island's climate migration. Three measures are discussed throughout this paper: government coordination, community ownership and financial constraints. The first measure, government coordination, notes that the collaboration of all stakeholders involved can substitute for a lack of designated government agency assistance. The second measure, community ownership, emphasises that for prior cases of community relocation, it has been found that community-led initiatives resulted in the best outcomes in terms of improving residents' livelihoods. The third and final measure, financial constraints, finds that resourcefulness is required to receive funding. These financial constraints exist because of a lack of financial security in place for climate migration events in Canada. In time, Lennox Island will inevitably be lost to the sea. It is best to acknowledge this reality and begin to taking immediate action to ensure an effective relocation.

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Chapter 1: Introduction

1.1 Statement of Problem

Lennox Island is expected to be one of the first Canadian communities requiring relocation due to climate change. Situated on the northwest coast of Prince Edward Island, Canada, Lennox Island is located in the Malpeque Bay. The Malpeque Bay is enclosed by a chain of sandy islands that act as a barrier protecting Lennox Island from the strong Gulf of St. Lawrence tides (Lewis & Peters, 2017). Lennox Island is reserve land that the Lennox Island First Nation call home. The Lennox Island First Nation and Abegweit First Nation are the only indigenous groups in the province, both part of the greater Mi'kmaq First Nation community (MC PEI, 2018). The Mi'kmaq First Nation have lived in the northeastern region of North America for over 10 000 years (Ramjattan, n.d.).

The British colonial governance of the late 18th century aimed to deter the presence of the Mi'kmaq First Nation on the mainland and on Prince Edward Island. This was conducted in order to further colonize the area without First Nation influence. The Mi'kmaq had historically maintained migratory livelihoods; however, in the 1770s the colonial governors forced them to become sedentary. The governors saw Lennox Islands' evident geographical detachment from the mainland as an ideal way to limit First Nation contact. This geographical detachment was the reason why Lennox Island became designated for Mi'kmaq First Nations' permanent settlement (Upton, 1976).

From the 1770s to the present, the waters surrounding Lennox Island has provided the locals with subsistent fishing and harvesting of lobster, crab and oysters (Lennox Island, 2013). The Lennox Island residents use this harvesting as their main source of economic revenue. In the past century, Lennox Islanders have established both fishing and lobster companies that are

owned and operated by the residents. The other notable economic revenue is the community's eco-tourism industry, which exhibits the local indigenous art, traditions and history (CED, 2004). Although the residents have these economic industries, two-thirds of residents income are on the verge of Canadian low-income status (Stats Can, 2016). This 323-person population of Lennox Island earns a median income of \$22,848 per person annually. (Stats Can, 2016).

The Lennox Island First Nation are governed by an overarching organization entitled the Mi'kmaq Confederacy of PEI (MCPEI). MCPEI works to represent the First Nation people of Prince Edward Island. For local governance, the Band Council represents the off and on-reserve population of Lennox Island (MC PEI, 2018). The Band Council is a combination of tribal and formal governance, consisting of one chief and three councillors (Matawa, 2014). Each member is democratically elected and holds a term for three years (Lennox Island, 2013). The Band Council members are responsible for all major decisions for the Lennox Island people. These major decisions include: policy, environmental initiatives, budgets, services and programs for the Lennox Island population (Majeed, 2015). The Band Council's office is located centrally in the Islands' small urban center.

The small urban center of Lennox Island is located on the islands' southern coast, facing inland and away from the direct ocean tides (FAO CAN, 2013). The urban center consists of a cultural centre, historic church, elementary school, boat wharf, fire department and health center. There are 110 residential homes that line the outskirts of the islands urban center; all built prior to 2011 (Stats CAN, 2016). A handful of short roads take visitors and residents outside of the urban center and into the islands residential areas. The housing is located both inland and along the islands' coast. The main road of Lennox Island provides a direct connection from its urban center onto the mainland of Prince Edward Island, via a short vehicle causeway.

The geographical size of Lennox Island is approximately 2 kilometres at its greatest width and 3 kilometres at its longest length (Filho & Keenan, 2017). The maximum ground elevation sits approximately eight metres above sea-level. However, the half kilometre that spans the coastal perimeter is only 3 metres above sea-level (Topographic Map, 2018). The geology of Lennox Island mainly consists of a distinctive red-colored sandstone which is an easily erodible bedrock (Coldwater Consulting Ltd., 2011). This erosive sandstone increases the islands vulnerability to environmental threats that are being exacerbated by climate change, such as saltwater intrusion (Charles et al. 2012).

Saltwater intrusion poses an infiltration threat to the groundwater of Lennox Island (Charles et al. 2012). Other environmental threats include sea-level rise, erosion and storm intensification (ParCa, 2016). These threats are decreasing the long-term viability of the island's infrastructure, such as the causeway and sewage lagoon (CBC, 2015). Erosion is causing the islands coastline to recede, which is gradually encroaching inland towards the islands historic church, residential housing, traditional pow wow grounds, cemetery and archaeological sites (Majeed, 2015). Coastal vulnerability assessment tools such as CLIVE¹ (Fenech, Chen, Clark, & Hedley, 2017), flood-risk mapping, and LIDAR (Light Detection and Ranging) are being used to predict the islands' future environmental vulnerabilities (Majeed, 2015).

A 1-metre sea-level rise (Hedley, 2014), or a major storm surge (CBC, 2015) is capable of breaking down the islands' multi-million-dollar sewage lagoon (INAC, 2011). This breakdown would result in the contamination of the Malpeque Bay and the groundwater of Lennox Island. This degree of sea-level and storm intensity could render the causeway unusable due to flooding or infrastructural damages. This provides a safety concern for the residents. The

¹ Coastal Impacts Visualization Environment

community has emergency plans in place in the event the causeway is damaged. However, the last time the causeway was damaged, it took nearly six months to repair (CBC, 2015). With the combination of sea-level rise and soil erosion anticipated to continue (Majeed, 2015), the emergency plans to protect the causeway and sewage lagoon, are only temporary. The island is already pursuing development on reserve land, on the mainland of P.E.I, in nearby East Bideford (Fraser, 2016). Residents themselves are increasingly acknowledging relocation as the only long term solution. With these gradual environmental threats, Lennox Island is anticipated to be one of the first Canadian communities requiring relocation due to climate change (Beaumont, 2016; Fraser, 2016).

1.2 Purpose of Study

Canada is predicted to be a producer of climate migrants. In order to prepare for these climate migrant occasions, it is important to understand their effects and implications. This study aims to grapple with the dynamics associated to the relocation of the Lennox Island community. Community relocation is a complex issue, therefore this paper will be informed by lessons learned from prior forced and climate migrations. An evaluation of these precedents will allow the author to glean best practices that can be applied to the relocation of the Lennox Island community.

1.3 Problem Context

Current anthropogenic greenhouse gas emissions and activities are causing alterations to long-term ecological cycles. These alterations are unprecedented environmental events such as changes in local weather patterns and increases in ocean temperature. The effects of climate

change are becoming increasingly prevalent as climactic tipping points are being reached (IPCC, 2014). These changes are causing climate migration: migration of people negatively-affected by environmental changes (Sherbinin et al, 2011). Compelling them to leave their homes either temporarily or permanently and within the country or abroad (IOM, 2007). The UNHCR (2009, p.4) has identified five types of climate-related migration: hydro-meteorological related events, environmental degradation, designation of areas deemed high-risk, island state submersion and resource conflict. Examples of this include populations affected by flooding in Bangladesh (Mallick & Sultana, 2017), entire submersion of small island states (Park, 2011) and desertification in China (Zhang & Huisingh, 2018). Since 2008, there have been approximately 26.4 million people per year whom have become classified as climate migrants (IDMC, 2015). Total climate migrant estimates show projections of 25 million to 1 billion by 2050 (IOM, 2009). Of these migrants, the populations most affected are those residing in low-lying areas (IPCC, 2007)— many of whom are living in low-populated rural communities (Torres & Casey, 2017, p.3).

Canada is often portrayed only as a recipient of climate migrants (Becklumb, 2010; Murray, 2010). Canada is gradually becoming home to climate migrants from countries such as Bangladesh and Haiti (Dickson, Webber & Takaro, 2014; Kueng, 2016). Canada will soon also be a producer of climate migrants; for instance, communities affected by sea-level rise along the west, east and Arctic coastlines (Andrachuk, Dillon & Pokiak, n.d.; Wilson, Trenholm, Bronemann, Lieske, 2012), and flood and drought relocations in the Prairie provinces (CIER, 2006). Migration is not a new phenomenon for the country (Burns, 2006). Prior to colonial contact, many of Canada's indigenous tribes migrated according to seasonal patterns (Oliver, 1998). Canada's more recent history demonstrates instances of forced migration of the countries'

indigenous communities (People, R. C. of A. 1996). These relocations were poorly planned and traumatic for communities. These relocations resulted in psychological impacts that people are still grieving to this day (Schiffer, 2016). More recent community relocations have shown signs of improvement through increased consultation (Oliver, 1998; Bartlett, 2017). Other instances include relocation for reasons of public safety (Burns, 2006), economics (Bartlett, 2017) and environmental hazards (Rasid & Haider, 2002).

Despite occasional relocation occurrences in Canada, plans for community-wide relocation are still undeveloped (Dickson et al., 2014). These prior relocations offer insight into defining best practices for use in future instances of migration, such as Lennox Island. However, these cases of migration were not precipitated by climate change. Examining Canadian relocations and international examples provides insight for future climate migrations in order to develop standards and frameworks.

1.4 Organization of the Study

Chapter 2 provides literary context from the disciplines of forced migration and climate migration studies, to provide background information necessary for this study. Chapter 3 defines the methodology used to conduct the study. Introducing insight into comparable case studies and addresses limitations of the study. Chapter 4 describes how the insight and precedent of the case study applies to the context of Lennox Island. Chapter 5 summarizes the findings, discusses how they contribute to defining a framework for relocation and suggests areas for future study.

Chapter 2: Literature Review

2.1 Overview

Within both forced migration and climate migration studies, authors overwhelmingly agree that migration from one's residence should be considered an option of last resort. Migration is particularly avoided in the case of community relocation (Leckie & Simperingham, 2015; Torres & Casey, 2017). Community relocations can insight various challenging dynamics exist such as: conflicting opinions among residents, financial needs and cultural misunderstandings. Throughout this paper, *community relocation* will refer to the involuntary and permanent movement of a community to a new location (Campbell & Warrick, 2014). This chapter will provide insight into the scholarship on forced migration and climate migration in order to show how the specific case of Lennox Island figures within these global debates. The bulk of the chapters' content will provide both forced migration and climate migration case studies. This content will be used in Chapter 4 towards anticipating dynamics associated to Lennox Island's relocation.

2.2. Forced Migration

Authors contributing to the literature on forced migration define the subject as the involuntary movement of a population for a permanent or extended period of time. Within forced migration literature, there is an emphasis on the importance of the migrants' association to place (Barua, Hafizur Rahman, & Hossan, 2017). Place is associated with identity, culture and community; therefore, migration from any place can have adverse effects on these associations (Barua, Hafizur Rahman, & Hossan, 2017). The multitude of adverse impacts on migrants is why forced migration scholars view relocation as having multi-faceted effects—not just financial

ones (Wilmsen & Webber, 2015). It must be acknowledged that financial implication is a major issue for forced migrants. Research also shows migrants overall mental health is worse than that of non-forced migrants (Davidson & Carr, 2017). Forced migrants' poor mental health is incurred as an effect of the physical and psychological displacement (Naidu, 2016; Wilmsen & Webber, 2015). This reality has authors working to improve resettlement practices.

In Canada, First Nations communities are those overwhelmingly affected by forced migration (Gov. Manitoba, n.d.). Historically, the enforced relocation of First Nations by Canadian and colonial governments was poorly executed with improper motives. These relocations are categorized as developmental or administrative (Oliver, 1998; People, R. C. of A., 1996). Developmental relocations were those conducted for the benefit of the government, such as hydroelectric projects and urban development. Examples of these can be seen through the resettlement of the Swampy Cree and Metis to Easterville in 1964 (Waldram, 1980) and Grass Narrows Reserve to Kenora in 1961 (Vecsey, 1989). This type of relocation often had minimal government support, receiving no compensation and leaving communities in worse socio-economic conditions than before relocation occurred (Olivier, 1998). Administrative relocations were those pertaining to the centralization projects— projects developed to ease the costs of government provided services— and those created for perceived poor access to economic gain or resources in hopes to alleviate government dependence (Tobin, 1999). Instances of these relocations include the High Arctic initiative, Mushuau Innu to Davis Inlet and Mi'kmaq centralization (People, R. C. of A., 1996).

There is a third category of resettlement that has recently emerged: community-initiated relocation. This refers to communities voluntarily seeking relocation to address problems associated to the location that governments had settled them (Oliver 1998). Colonial governors

failed to have sufficient—if any— consultation when they resettled communities. This often left relocated communities unhappy with their new settlement (Anderson & Bonesteel, 2013). Issues that emerge from these historical resettlements are related to socio-economic condition, poor self-determination, accommodating a growing population and addressing environmental threats. Examples of these include the relocation of the Mushuau Innu from Davis Inlet to Natuashish (Burns, 2006) and Cree nation of Nemaska to Champion Lake (Oliver, 1998).

This legacy of colonial resettlements has had detrimental intergenerational impacts on Canadian First Nations (Schiffer, 2016). Poor execution of resettlement impacts both mental and physical health (People, R. C. of A., 1996). Mental health issues are also correlated to the loss of traditional practices and stress, which lead to frustration, low self-confidence and depression. These can in turn exacerbate issues of domestic violence, substance abuse and suicide (Olivier, 1998). First Nations people in the country are three times more likely to experience physical victimization than non-First Nation (Royal College, 2013). Physical health issues can result from inadequate housing and problems adapting to the climate. This was particularly the case for the High Arctic initiative. Colonial governors referred to this resettlement as an experiment as they moved Inuit of the Southern Arctic regions in the Arctic Circle. This resulted in rampant spread disease such as tuberculosis, which was twenty times more prevalent than southern Canada (Inuit Tapiriit Kanatami, 2007; Grant, 2016; Olivier, 1998).

The impacts of government resettlement and forced assimilation on First Nations have impacts beyond health. Other impacts include the deterioration of traditional culture, which by extension affects language, economy and spirituality (Schiffer, 2016). Much of First Nations culture was interconnected with their migratory livelihoods. Beginning sedentary lives when they were resettled caused their attachment to the environment to be greatly severed (People, R. C. of

A., 1996). First Nation traditionally used hunting as their economy and the area they resided determined other forms of economy. For example, Northern communities benefitted from short-term employment during the High Arctic initiatives which temporarily provided assistance to these communities (Anderson & Bonesteel, 2013) With the exception of bands that already maintain permanent settlements, such as the Haida, Iroquois, Huron and Six Nations, enforced sedentary for traditionally migratory bands found it hard or impossible to maintain their subsistence practices (Olivier, 1998). First Nations instead were left to the emerging capitalist economy, to pursue wage labour. First Nations such as the Mi'kmaq became less dependent on their subsistent practices and increasingly dependent on colonial services and goods. As the Mi'kmaq resided near to these budding colonial towns, its influence lead to the great dissolution of both traditions and usage of the Mi'kmaq language. As the Mi'kmaq entered wage labour, they faced discrimination making it difficult for these First Nation to obtain employment (Tobin, 1999). These challenges contributed to a loss of their sense of identity and values (MacDonell, 2015).

2.3 Climate Migration

There is an emerging field of literature examining the relationship of climactic changes and involuntary migration. Many academics agree that an interdisciplinary understanding of climate migration dynamics is needed (Bronin & Chapin iii, 2013; Oliver-Smith, 2012; Rechkemmer et al., 2016). This interdisciplinary approach can link natural science findings to those in the social sciences (Montz & Gruntfest, 2002). In the United States, there is an existing grant program since 1997 through FEMA (Federal Emergency Management Agency) which is applicable to climate relocation events called the Pre-Disaster Mitigation Program (FEMA,

2018). This program however has not yet approved an application for community-wide relocation due to erosion. Despite having no established framework, there are currently cases of climate migration occurring in the state of Alaska (Bronin & Chapin iii, 2013) and Louisiana (Concordia & CB&I, 2016). Some provinces are beginning to develop protection programs for sea-level rise, however there is no initiative yet addressing climatic-forced community migration (BC Ministry of Environment, 2013).

Practices for community relocation will be increasingly necessary as communities around the globe are undergoing climate migration (Wilmsen & Webber, 2015). Each relocation provides an opportunity to learn how communities respond to the relocation practices used and determine how improvement can be made in the future. In North America, the United States has recently provided USD \$442 million for the first federal funding for a community migration for a population of 277 in Isle de Jean Charles, Louisiana (Katz, 2003). Despite this funding, the government has not yet defined their role in climate migration. Canada has several communities discussing relocation: Salluit, Quebec, Tuktoyaktuk, Northwest Territories and Lennox Island, Prince Edward Island. Provincial governments are beginning to acknowledge climate migration (Wilson et al., 2012; Arnold & Fenech, 2017) however the federal government has failed to acknowledge nor take action on the subject.

While the Canadian governments have not recognized climate migration, some communities have considered the possibility. The First Nation community living in Aklavik, North West Territories was proposed the option to relocation to Inulik, a community 113 km inland by the federal government. This recommendation was made in 1959 in response to Aklavik's geographic limitations to growth, economic opportunities and flood risk. Most Aklavik First Nation were unwilling to move—a common response to enforced relocation—and

chose the motto “never say die” in resistance. This motto was used by the community to reflect that they refused to close down the town— let the town die— and relocate the community as the government advised. There was limited consultation by colonial governments, and it was not community-initiated (Cooper, 2010). More recently, communities such as Tantramar, New Brunswick are anticipated to pursue relocation due to erosion and flood risk. Wilson (et al., 2012) conducted a cost benefit analysis was conducted for this community, finding that relocation was more cost effective than mitigation. This community has estimated that the coordination of policy and funding for the relocation would require thirteen years to approve (Wilson et al., 2012).

It is anticipated that indigenous communities will be at the forefront of requiring relocation due to climate change impacts. This is due to their geographic locations which are often the most vulnerable to climactic changes (ILO, 2016). Authors have analyzed the connection between climate change, forced migration and indigenous livelihoods. Findings show cultural misunderstanding, top-down approaches are common mistakes in dealings associated to relocation (Freeland, 2014). Depending on the level of Western influence, affected indigenous communities may rely on traditional knowledge rather than Western science-based knowledge (Mercer, Kelman, Taranis & Suchet-Pearson, 2010). It has been found that integrating traditional ecological knowledge and science may be complimentary to understanding the context-specific circumstances (Freeland, 2014). Recognizing indigenous knowledge can also empower the community and provide a better partnership with external actors (Hooli, 2016).

Academic scholars have also explored the dynamics and complexity of climate migration. Many authors agree that interdisciplinary work will be need to be involved in these cases (Bronen, R., & Chapin iii, 2013; Rechkemmer et al, 2016). Interdisciplinary work is necessary

because climate migration requires knowledge from varying fields including social, political and economic.

2.4. Prominent climate relocation challenges

Climate migration literature has begun to determine varying points in which the relocation can be bettered in practice. As there is no defined framework of how to best conduct a climate relocation, authors in the field of forced and climate migration agree that a toolbox of best practices would be useful for communities (Davidson, Murray, & Schweitzer, 2012; Hunter et al., 2003; Mercer et al., 2012). In the table below, authors suggestions throughout relevant literature are outlined. These suggestions will be contextualized with the precedent of a relocation that is undergoing in Newtok, Alaska on the right side of the table. This table therefore works to demonstrate how authors suggestions can be realized. These findings are directly attributed to the Newtok communities' relocation plan (Community of Newtok and the Newtok Planning Group, 2011).

Authors suggestions	Newtok
Practices should be customizable to best suit an affected community (Cohen, 2010).	The community defined ‘guiding principles’, such as wanting the relocation to reflect their Yu’pik ² way of life. These principles are central to the entirety of the relocation plan.
Practices should be designated with their level of priority (Renaud, 2011).	An emergency plan has been established in case there is an emergency situation and that housing is provided for residents living closest to the receding coastline.
There should be sensitivity of potential cultural differences with affected communities (Davidson et al., 2012).	Meaningful engagement with the community and diminishing cultural gaps is used, ensuring that communication between all parties is clear.
Extensive participatory consultation should be used with the affected community (Mondal, 2013).	From the initial steps of the communities’ relocation, they engaged the community. They found that this engagement saved time, money and effort in order to ‘make it right’.
Financial mechanisms should be accessible to the climate migrants to allow for reinstatement of economic stability (Oliver-Smith, 2016).	One of Newtok’s guiding principles is to hire community members first and to seek projects that enhance community strengths and improves economy.

Table 1. Comparison of suggestions made by scholarly authors and its usage in the context of Newtok, Alaska.

The suggestions within the table can be expanded to themes of government coordination, community ownership and funding constraints. These also act as prominent themes found in literature of which will be used as this paper’s main means of exploring the dynamics associated to the relocation of Lennox Island.

² The community’s indigenous ancestry and culture.

2.4.1 Government Coordination

It is anticipated that there will be unprecedented populations requiring relocation due to climate change impacts— some predict relocations to impact millions (IPCC, 2013). Many authors see the government as playing a role in these relocations. In preparation for these relocations, experts have recommended the creation of national frameworks to prepare for these events (Mcnamara, Bronen, Fernando, Klepp, 2018). Most countries have agencies prepared for rapid-onset climactic events however many climate change-induced changes are slow-onset. These slow-onset environmental changes can be equally or exceedingly detrimental to communities, therefore agencies and policies must be developed (Renaud, Dun, Warner, Bogardi, 2010). Government coordination is needed to assist and facilitate ease for communities that have to face the implications of climate-change induced threats. As these climate migrations emerge around the world, governments are gradually determining their role within these movements. For Mozambique, Vietnam and Egypt, they have all participated in their countries' climate migrations in one way or the other (Warner, 2010). As learnt from historical instances, the government must not incite these changes however they must be explicit in how and in what capacity they will or will not assist.

2.4.2 Community Ownership

The role of the affected community in their relocation is central to the ensuring the residents wellbeing. In Pune, India, the resettlement of the community was organized by an NGO with high amounts of community participation. Their community participation included surveys, meetings and resident voting. This slum-upgrading project found that community-led resettlements were overwhelmingly positive and improved livelihoods thanks to the use of

consultation (Cronin & Guthrie, 2011). The United States Resettlement Administrations' community relocations in the past have found similar success that a bottom-up approach in which they formed a council which made the decisions for the community's development. This direct community involvement and resident integration acted to unite the community towards positive consequences for those affected. Indigenous knowledge and local knowledge has also been highlighted as key features to incorporate and learn from during times of relocation (Maldonado, Shearer, Bronen, Peterson & Lazrus, 2013).

2.4.3 Funding Constraints

Financial limitations act as a main barrier for communities wanting to pursue climate migration. Native communities throughout rural Alaska such as Kivalina and Shishmaref are facing extremely high costs due to their location and challenging weather patterns. Kivalina, a community of 388, is looking at costs upward of 155 million US dollars for their relocation (USACE, 2006). Previously mentioned Tantramar, New Brunswick, Canada has conducted a cost-benefit analysis report for relocation due to flooding. This report estimates that \$29,252,854 however this will save over 30 million dollars over the next 100 years (Wilson et al., 2012). This expected wait time for funding means that communities facing slow-onset environmental threats must prepare over a decade in advance if they wish to pursue climate migration. For many communities, the relocation may not be able to wait this length of time. A community in Fiji, Vunidogoloa, was lucky to received nearly full funding for their climate relocation from the Fijian government. Vunidogoloa however did contribute a significant amount of the labour and resources to make the relocation possible (Tronquet, 2015). Therefore, community aid may assist in negotiating and compensating when funding constraints exist.

Chapter 3: Methodology

3.1 Method

This study qualitatively analyzes lessons learned from the relocation of Newtok, Alaska, United States in order to explore anticipated dynamics associated with Lennox Islands relocation. This case study will be conducted through the use of a literature review and in-person visit to the Lennox Island community. A study of emerging themes using the precedent of Newtok, Alaska will enable the exploration of those predicted for Lennox Island.

Conducting this study through a qualitative case study approach provides an opportunity to learn from a comparable climate migration event. Qualitatively analyzing the experiences of Newtok will allow reoccurring and prominent themes to emerge. These themes being understood as being potentially replicated in Lennox Islands' relocation. Using this exploratory method provides a wider understanding of implications associated to the island. This method was deemed more appropriate than a quantitative method which would only be able to be concentrated studying limited elements of the islands anticipated relocation.

General search engine Google and scholarly databases Novanet and Google Scholar were used to conduct research for this paper. Historical articles provided the initial context for both Newtok and Lennox Island's past. More timely search engine outputs were reviewed including scientific reports, census data, scholarly and media-released articles. Searches were concluded when articles content became redundant and repetitive.

Visiting Lennox Island confirmed that the literature reviewed accurately represents the community. The visit demonstrated how the community was prideful of their Mi'kmaq heritage. This was seen through regional and cultural flags, the use of Mi'kmaq language on street signs and use of the Mi'kmaq Star—a symbol representing the Mi'kmaq First Nation. Seeing the

coastline brings the urgency of the issue to life by seeing in-person how low-lying the island is and the extent that some areas are at risk. This visit worked as an educational experience to assist in conceptualizing the islands community both in the present and in the future.

A comparable case study was determined by searching the following terms: climate migration, relocation, North America, Canada, United States. The case study chosen— Newtok, Alaska, U.S.A— fit the requirement of having overall similarities in terms of demographics: ethnicity and population size. Newtok was researched in the same manner as Lennox Island to provide historical and recent context of the communities' relocation.

Reviewing scholarly articles related to recent climate migrations around the world determined three overarching themes and outcomes associated to the topic: Government Coordination, Funding Constraints and Community Ownership. These were found to be relevant in the case of Newtok. Their relevance in the context of Newtok provided valuable insight in how the community reacted to these challenges. Lessons learnt applied to the case of Lennox Island are defined in Chapter 4 through these three overarching themes.

3.2 Overview of case study site Newtok, Alaska

Newtok, Alaska, United States, is an Yu'pik village located on the southwest coast of the state (Bitoune, 2014). The community of 388 lives in just 61 houses along the Ningliq River, which feeds into the Bering Sea (Data USA, 2015). The population remains traditional in their indigenous heritage through continued use of the Yu'pik language, subsistence lifestyle and education of their culture (Community of Newtok and the Newtok Planning Group, 2011). The community historically participated in seasonal migration which enabled their hunting practices (Marino, 2012). Sedentary life led the community to relocate initially to Old Kealavik (ASCG,

2008) and again to their current location in 1949 as part of the United States enforcement of children's education (Rawlings, 2015). The location once required a road to reach the river however with Newtok erosion rate of 64 feet per year, the community is anticipated to see the coastline reach the residents' housing as of this year (ASCG, 2004, p.7).

This erosion is caused by a multitude of environmental changes that have been exacerbated by increasing average temperatures. This temperature change is acting as a catalyst for permafrost melt and a decrease in sea-ice which is making the Newtok region more vulnerable to erosion (ASCG, 2004). Over the last 60 years, Alaska has warmed more than double that of the rest of the country (Stewart, Kunkel, Stevens, Sun, & Walsh, 2013). Annual averages have risen by 3 degrees Celsius, while winter averages have risen by 6 from 1976 to present (Stewart et al., 2013). In 1984, the community confirmed their erosion concerns through hiring engineering consultants Woodward-Clyde to conduct an erosion assessment. This erosion assessment found that relocation was likely cheaper and would be eventually required (Woodward-Clyde, 1984). This prompted the community to vote to pursue relocation in 1996 (Bitoune, 2014).

Newtok decided between six different relocation sites and rejected any option of collocation (Bitoune, 2014). Residents felt that pursuing collocation would contribute to losing their autonomy as a community, bringing a loss of identity, values and traditions (ASCG, 2004). Voting to relocate came with consequences, as government funding was no longer being provided to maintain housing and health conditions (Bronen, 2011). The erosion itself is causing a deterioration of community buildings, interrupting subsistence activities, increasing difficulty in receiving services and amplifying mental health issues among the Newtok residents (ASCG, 2004). After votes in 1996, 2001 and 2003 Newtok chose to relocate to Mertarvik, nine miles

north of their current location where no evidence of erosion exists (Bitoune, 2014). As there is no designated agency for relocation in the United States, the community sought the assistance of multiple agencies to assist them, including the Alaska Department of Commerce, Community and Economic Development and Bureau of Indian Affairs. The community created The Newtok Planning Group in 2006 plan and implement the communities' relocation. The Newtok Planning Group consisted of: 9 state government agencies, 12 federal, 6 regional and 2 local organizations (Schenck, 2014).

3.3 Newtok's comparability to Lennox Island

Newtok is a useful precedent to understanding Lennox Islands' relocation. Newtok has comparable community characteristics to those of Lennox Island, making it a valuable case study to learn from. These characteristics can be seen in Table 2. The median age and income levels demonstrate that both communities aim for increased economic gain and requires less government dependency (Madsen, Daumerie & Hardee, 2010). Both communities are indigenous in origin, which provides similar cultural connections to their territory (Kirmayer, Macdonald & Brass, 2001, p. 74). The environmental threats they face are overwhelmingly similar in terms of coastal erosion, flooding and sea-level rise though each also combats specific geographic threats such as saltwater intrusion in Lennox Island, and permafrost melt in Newtok (Data USA, 2015; ParCa, 2016).

Community Characteristics	Lennox Island, PEI	Newtok, Alaska
Median Age	29.9 (Stats CAN, 2016)	22.6 (Data USA, 2015)
Population Size	323 (Stats CAN, 2016)	388 (Data USA, 2015)
Ethnic Origin	87.6% First Nations (Stats CAN, 2016)	99% Native Americans (Data USA, 2015)
Environmental Threats	Coastal erosion, flooding, sea-level rise, storm and tidal surges and saltwater intrusion into drinking water sources (ParCa, 2016)	Coastal erosion, flooding sea-level rise, storm and tidal surges, temperature increase, permafrost and sea-ice melt (Bitoune, 2014)
Median Income	\$22,848 (Stats CAN, 2016)	\$38, 125 (Data USA, 2015)
Speakers of Native language	3% (Stats CAN, 2016)	89.2% (Data USA, 2015)
Colonial enforced settlement	1772 (Upton, 1976)	1949 (Rawlings, 2015)

Table 2. Comparable community characteristics of Lennox Island, P.E.I. and Newtok, Alaska.

The two communities differ in their ability to speak their native language. Newtok remains traditional with their continued use of their Yup'ik language, subsistence-based lifestyle (Bronen, 2011), school curriculum (Nicosia, 2016) and maintenance of being a 'dry' community (ASCG, 2004). These continued traditions demonstrate the level of importance they are to the community. The Newtok and Lennox Island communities are located in different countries with distinctive historical experiences, however they both share histories of governments designating where they live (Bitoune, 2014; Upton, 1976). In sum, the communities have many similar characteristics and provides reason to have Newtok be a comparable case study for Lennox Island.

3.4 Limitations

As a researcher that is of non-indigenous descent, this position as an outsider shapes this finding of both the Yup'ik and Mi'kmaq experiences. Due to the limited time allotted to complete this thesis, an in-depth understanding of the Mi-kmaq and Yup'ik culture and beliefs could not be undertaken. Secondary research was completed to get an understanding of the cultures, however specificities of both Lennox Island and Newtok communities could have been more acquired more comprehensively via embedded qualitative research. This type of observational research could also have generated additional information on the psychological and health implications of forced relocation. This could be a source of future study, as many of the communities affected by sea-level rise will also be remotely-located indigenous communities (Arctic Council, n.d.).

Chapter 4: Synthesis

The three measures of successful relocation previously discussed in Chapter 3 will be analyzed throughout this chapter. The format of this chapter will proceed as followed: First, each of the three measures are applied to the precedent of Newtok, Alaska and secondly, an exploratory analysis is conducted to understand how these same measures could be enacted in the case of Lennox Island.

4.1 Newtok, Alaska's measures of successful relocation

4.1.1 Government Coordination

One of the most restrictive challenges for Newtok's relocation is the that there is no singular agency designated to assist the communities' relocation. No municipal, state or federal government agency has the mandate to manage relocation due to climate change. The Newtok

Planning Group fills this role by bringing together an ad hoc group of government agencies and organizations to assist with the relocation process. This group has been acclaimed by both government agencies and authors for the communities' achievement in the community's relocation efforts so far (Bronen & Chapin iii, 2013; GAO, 2009; Bitoune, 2014).

The Newtok Planning Group was created in order to provide technical assistance to the Newtok Village Council—the governing authority for Newtok, previously known as the Newtok Traditional Council. The Newtok Planning Group was created when the Newtok Village Council approached the Alaska Department of Commerce, Community and Economic Development (ADCCED) about initial assessments and permits about relocation. Upon contacting the ADCCED, the Newtok Village Council quickly found that their council was more knowledgeable of what is required for slow-onset community relocation than state and federal agencies (Iverson, 2013). Without having one agency mandated to assist Newtok, the Newtok community felt that their relocation would not be prioritized. In order to ensure their priorities are addressed they initiated the development of the Newtok Planning Group in 2006.

Headed by the Newtok Village Council, the Newtok Planning Group consists of over 25 members with 9 Alaska state government agencies, 10 federal organizations and 5 regional non-profit groups (Iverson, 2013). More specifically, this includes stakeholders such as the local borough government, tribal government, applicable school districts, affiliated native and non-native organizations—such as the Rural Alaska Community Action Program—, as well as state and federal departments implicated by the relocation such as: transportation, environment, economic development and Indian affairs (ACCAP, 2010). The representation of agencies in the Planning Group is all voluntary with the exception of the ADCCED, which has been appointed as the lead state agency for the relocation effort (Bronen, 2011). Through this multi-agency

group, the agency representatives can educate both other agencies and the Newtok Village Council on the limitations and possibilities regarding funding grants and other logistical needs. As no one state or federal agency has all the answers in regards to this specific kind of relocation, this mix of representation can allow for effective problem-solving among agencies.

As of April 2018, the Newtok Planning Group has completed various environmental studies, completed several infrastructure projects such as the barge landing, some roads, the Mertarvik Evacuation Center, 2 water wells and 6 homes at the relocation site, Mertarvik (Community of Newtok and the Newtok Planning Group, 2011; Trudeau, 2017). The community plans to build twenty-eight new homes in the next construction season and aims to have people living at the new location by fall 2019 (Waldholz, 2018). All of these efforts have been both guided and supervised by the Newtok Village Council and the Newtok community.

In the development of these projects, the group has also completed various plans in which the community was central these efforts. The Newtok Village Council worked with the community to develop guiding principles to be both respected and promoted during the relocation process. These include: ensuring the community has the initial and final say, make decisions openly with the community, turning to elders for guidance, as well as have the new development reflect their culture, be designed based on local input and prioritizing the hiring of community members (Community of Newtok and the Newtok Planning Group, 2011).

The highly integrative process of maintaining Newtok member's constant inclusion in the decision-making process included public meetings, enabling residents to join in via teleconference, site visits and providing special provisions to ensure elders input is implemented. This extent of consultation is defined as meaningful engagement in which culture and language

gaps were addressed and that all people involved are educated, understood and accepted by community members (Community of Newtok and the Newtok Planning Group, 2011).

Within the multidisciplinary Newtok Planning Group, there are key actors that have been attributed to the success of the project. These key actors are those who make up the Newtok Village Council—including extremely determined relocation administrator, Stanley Tom—and Sally Cox, of the Alaska Division of community and regional affairs. Stanley Tom was the initial head of the Newtok Traditional Council and is credited for his pressure on external actors in order to progress the relocation (Marino, 2012). Despite some controversy amongst local residents³, Tom has been highly praised among researchers and agencies for his tenacity and dedication (Marino, 2012). Sally Cox's continuous investment and involvement in the relocation process has eased government dealings as she acts as their constant liaison for many bureaucratic affiliations (Marino, 2012).

4.1.2 Community Ownership

Despite challenges associated to Newtoks' relocation such as government assistance and funding, the community has risen to the opportunity of making the best of the situation. As previously discussed, the Newtok Planning Group is truly guided by the community. The residents seem to all have found a role in contributing the relocation process. Consultation with the Newtok community has been consistent from the beginning of the relocation plan to the present. Thus ensure that it best reflects who they are and what they want it to be, on their terms

³ Community members and agencies questioned the financial management of Stanley Tom in 2013. The community voted Tom off of his position, a vote he failed to acknowledge. The lack of clarity in governance and management led to a freezing of funding. The Bureau of Indian Affairs (B.I.A) uncharacteristically intervened for the sake of the community's urgency to relocation. B.I.A confirmed that Tom was no longer part of the Council and Thom John has since been named the administrator (Enoch, 2015).

(Community of Newtok and the Newtok Planning Group, 2011). The relocation has provided job training for locals to provide them additional skills, to improve the local economy and employ locals (Community of Newtok and the Newtok Planning Group, 2011).

The Newtok community members used the opportunity of the relocation to become more sustainable and true to their culture. This can be seen through their plans for the new community to be based off of new technology for the Arctic and learning lessons for how to avoid having the infrastructure affects the local environment and animal populations. The designs reflect how proud Newtok residents are of their culture through the inclusion of traditional ways of their life such as: steam showers, permafrost chilled cellar and a gravity-fed sewer system (DeMarban, 2009). The involvement of the residents to develop the community and their way of life was through: finding guidance from elders, in-person site visits with residents and allowing residents to be involved in the in-person planning process meetings.

The involvement of the residents enabled the community to use the opportunity of relocating into a chance to address issues ongoing in the Newtok. For example, there is only one source of drinking water, poor housing conditions and high unemployment. These issues are being aimed at being resolved through improved infrastructure, housing improvements and improving job skills of residents through the process of the relocation. Newtok's community-led process of relocation has ensured that these social and economic issues get to opportunity to be addressed. Addressing of these issues may not have been the case if a more top-down approach to the relocation was conducted.

The previously mentioned guiding principles enabled communities to remain distinct and ensure residents have first and final. These principles were unanimously passed by the Newtok Village Council as based of the Yu'pik way of life. Principles were attributed to the development

itself, to have it reflect cultural traditions, be designed with local input, and prioritization of hiring locals (Community of Newtok and the Newtok Planning Group, 2011). These principles were developed by the community with a sense of pride in their culture and aim to maintain their traditional values. These principles have been applied in different ways throughout the progress of the community's relocation.

Hiring locals thus contributing back to the community has been respected throughout the relocation so far. Seventeen residents have become involved through the use of training in various construction-related trades (Bitoune, 2014). Newtok is also planning on sending twenty more residents for training, this time in health related fields. This shows that the community is truly investing in the relocation process and for the future sustainability Mertarvik. Rather than relying on the agency assisted aid, the relocation is community-driven. Their relocation plan states that "(...) the community will drive the relocation efforts and define its own destiny" (Community of Newtok and the Newtok Planning Group, 2011, p. iv). This kind of participation acts in strengthening the village, capacity, skills of the community and is central to developing their future community.

4.1.3 Funding Constraints

Finding funding has been difficult particularly difficult for Newtok. In 2006, the US Army Corps of Engineers estimated that the relocation cost for Newtok was \$80-130 million US (USACE, 2006). Despite no designated funding source, the community pursued the relocation. The high anticipated cost is due to the low-population and host costs associated to rural Alaskan communities. This low benefit-high cost ratio leaves the community in a hard fight to get

competitive funding from agencies such as FEMA (Federal Emergency Management Agency) who prioritize cost effectiveness along with necessity (GAO, 2009).

Newtok relies on incremental grants by tapping into all possible funding streams and any charitable contributions through their non-profit website newtokmoves.org (Iverson, 2013). These grants have been principally from Alaskan state through the Department of Transportation and Public Facilities, Alaska Department of Commerce, Community and Economic Development and Alaska Department of Environmental Conservation. Federal funding has been provided primarily through the Bureau of Indian Affairs and U.S. Army Corps of Engineers (Community of Newtok and the Newtok Planning Group, 2011).

Funding for Newtok's relocation has been erratic and is limited due to the communities lack of incorporated municipal government and type of environmental threat. The two main sources of funding for relocation is through FEMA and HUD (Department of Housing and Urban Development). The most relevant grant program for Newtok is FEMA's Pre-Disaster Mitigation program. FEMA however is restricted to assisting disasters listed on the Stafford Act—a list does not include slow-onset environmental disasters such as erosion (Bitoune, 2014). HUD presents a different restriction in which they will only assist tribes with incorporated municipal governments. As Newtok still maintains a traditional governance, they are only eligible for HUD Indian Community Development Block grant which is far more limited in what finances they can grant communities.

As Newtok is ineligible for the major mitigation grants Newtok, the community is limited to grants that have specific limitations of when finances can be accessed and for which activities (Bronen, 2011). This lack of funding has drastically hindered the progress of the relocation project's implementation (Wilson Center, 2017). The relocation plan and original

implementation of parts of the plan have been delayed due to a funding gap such as for the construction of the Mertarvik Evacuation Center (Community of Newtok and the Newtok Planning Group, 2011). While the community knows that the water supply, school and airport will become underwater by 2020, there is no deadline of relocation because they are so dependent on uncertain funding (Iverson, 2013).

4.2 Newtok, Alaska's measures of successful relocation in the context of Lennox Island

Newtoks' relocation to Mertarvik demonstrated three main measures of successful relocation as previously discussed through: Government Coordination, Community Ownership and Funding Constraints. These same measures of successful relocation will be assessed to ascertain if and how could these best practices could be applied to the relocation of Lennox Island.

4.2.1 Governmental Coordination

As discussed in Chapter 2, there is no designated framework in existence for community-wide climate migration. Environmental reports from the provincial governments of British Columbia, New Brunswick and Prince Edward Island are increasingly mentioning community relocation as an adaptation method to slow-onset environmental threats (Dickonson, Webber & Takaro, 2014; New Brunswick, 2014; Arnold & Fenech, 2017). However, these reports do not detail how these relocations should be assisted by the provincial or federal government. For Newtok, the creation of the Newtok Planning Group helped the community overcome the lack of government assistance or structure. Developing a Lennox Island Planning Group – similar to that

of the Newtok Planning Group – could provide the resources and knowledge required to accomplish Lennox Island’s relocation.

The Lennox Island Planning Group would have to consist of the prominent stakeholders and actors who are involved with the island. The role of resident representation does not have to be great in quantity of representatives but significant in its leadership role. Residents of Lennox Island should elect the members of the resident representatives for the Planning Group. By voting this allows the community to democratically decide who they feel best represents them and what they want to achieve. Similar to the Newtok Planning Group, Lennox Islands’ Planning Group should have the objective to provide technical assistance for the relocation, allowing the Band Council to make informed decisions.

The elected council of resident representatives will be the individuals most centrally in guiding and ensuring that the Lennox Island Planning Group continues to make progress towards the Islands relocation goals. The council of resident representatives should be elected by the community and have a designated term in which re-election occurs. Ensuring that the residents of Lennox Island are supportive of the appointed council members, is important in maintaining community support. Newtok failed to institute a re-election period and as a result they dealt with significant delays in their relocation. This may have been an exceptional circumstance however the election of council members should be considered to avoid this type of occurrence.

The work of the Planning Group will allow the same multi-disciplinary and problem-solving abilities seen in Newtok, Alaska. Without a straight-forward means of making the relocation a reality, creativity and innovative thinking among the members will be necessary when pursuing Lennox Islands’ relocation. Creative thinking will allow to come up with less-straightforward ways that the Island to take advantage of the available resources and assistance

offered by pre-existing agencies. This grant is normally not eligible without a state or federal disaster declaration but they made an exception to assist the 7 homes—home to 50 residents—most directly threatened by the receding coastline (Walton, 2018).

Ideally, members from federal government agencies should be in the Lennox Island Planning Group. While federal representatives have never worked so closely with a community council for a long-term project, government agencies each should provide designated contacts to assist in these efforts. This could be for the purposes of coordinating the dispersal of funding or resources from the agency. Historically, Lennox Island has worked almost explicitly with the federal government. This is because the band believes that the federal government are responsible for First Nations relations in accordance to Section 91 (24) of the Constitution Act of 1867 (Crossley, 1995).

Relevant federal government agencies may include INAC, Natural Resources Canada and Infrastructure Canada. INAC must assist in administering the land management of the Indian Act, providing support for social improvement initiatives and ensuring that Indian Status rights are maintained. Natural Resources Canada work in adaptation for climate change should be applied to assisting in reports, furthering research as well as use Lennox Island as a case study to develop a framework for all future relocations. Infrastructure Canada should assist with the infrastructure and civil works related to decommissioning Lennox Islands lagoon, protecting of bridges, procurement of facilities for the new site. So far, only INAC is the only federal agency that has been involved with the potential relocation of the island. INAC has committed to funding a coastal erosion survey however there has not been any clarification of how the agency may be involved going forward (Beaumont, 2016).

Members from the provincial council should be represented in the Planning Group. The Lennox Island Band Council has been gradually becoming more involved with Prince Edward Island's provincial agencies. This includes initiatives such as the Skills Enhancement Project in 2015, which provided carpentry skill building opportunities to Lennox Island residents (Hierlihy, 2015). With this increase in partnering and dialogue with the provincial government, provincial agencies may be beneficial to have involved in the Lennox Island Planning Group. Some of these provincial agencies include: Department of Agriculture and Fisheries'— a department that recently provided Lennox Island funding for infrastructure— and Department of Communities, Land and Environment, who have been already involved with the province-wide concerns of sea-level rise (Bissett, 2016; CBC News, 2017).

Other members to consider are local organizations. The Mikmaq Confederacy of PEI (MC PEI) should be included as they are the overarching organization for the provinces' Mikmaq people. MC PEI may have access to resources that could assist the Lennox Island Planning Group since their services encompass a wide range of programs including: Integrated Resource Management, Intergovernmental Affairs and Parks-Canada-Mi'kmaq Conferacy Strategic Initiatives (MC PEI, 2018). MC PEI's Intergovernmental Affairs services can provide assistance with the planning groups interactions with the provincial and federal representatives. MC PEI has already been involved and commissioned 10 recent scientific studies on climate change and planning, including sea-level rise research (Journal Pioneer, 2018) and has their Integrated Resource Management research noting the need for relocation on Lennox Island (Mitchell, 2015).

Scientists and interested members of UPEI could be beneficial as well. Lennox Island could likely benefit from the local provincial university as there are potential faculty and students that may be interested in assisting the relocation. Expertise from a varying faculties can contribute social, economic and environmental factors to consider such as specificities of how to decommission infrastructure most vulnerable to sea-level rise, beginning permits and assessments for the relocation site and financial assistance of how to best use the funding. Lennox Island Planning Group could encourage the assistance of students in UPEI's Masters of Island Studies. The most urgently, the island would benefit from assessments that ensure the technical and environmental viability of the new relocation site and a cost study to determine what is needed to ensure the bridge and lagoons protection until the relocation is complete. As interdisciplinary work is deemed as being the most effective, this could be an opportunity to reach out to academics as Lennox Island provides an ongoing experiential learning opportunity.

4.2.2 Community Ownership

The first settlers of Lennox Island were pushed to live on this land involuntarily by colonial governance. A relocation could provide the people of Lennox island with an opportunity of ownership to create their community on their own terms. This relocation plan can be largely based off of Newtoks' relocation plan and complimented by CPP handbook guides. This will allow for meaningful community participation. Similar to Newtok, Lennox Island Planning Group should turn to the elders for guidance, welcome residents to join any meetings and provide the community the opportunity to make the first and last say in decisions. The Lennox Island Planning Group can use the residents' feedback towards how to better the Islands' relocation plan. This feedback should be compiled through community meetings, house visits to

those with accessibility issues and surveys. While an integrative process of having regular consultation with the communities' residents may seem time consuming and costly, in the long run it is the most effective way of ensuring community satisfaction. This community satisfaction coming from meaningful engagement that allows all parties to be considered during the planning process (Community of Newtok and the Newtok Planning Group, 2011).

The creation of a relocation plan for Lennox Island will identify challenges that are unique to the island. This relocation plan should be developed by the community and the band council with the technical assistance of the Lennox Island Planning Group. This relocation plan should include timeline of relocation, basic community infrastructure needs— such as a school and health center— and list of permits and assessments to complete. Similar to Newtok, Lennox Islands' relocation plan can also aim to improve possible issues that currently exist within the community. Lennox Island residents should identify any issues they may feel within the community and the relocation can work to address their needs.

What helped ensure the community ownership in Newtok was having original relocation administer Stanley Tom – a person who can ensuring community needs are met and plans are executed in a timely manner. Lennox Island could potentially benefit from having an enthusiastic member of the community – similar to Stanley Tom - within the Lennox Island Planning Group. A plateau or standstill in the communities' progress could be discouraging and detrimental to the communities well-being. The person that acts as the Stanley Tom of Lennox Island will be tasked with the ensuring constant progress in the relocation. The more time allocated to making the relocation happen will result in more time for the community to make well thought out decisions for the community.

In Newtok, the community used guiding principles as those that were central to the relocation process and community development. Lennox Island should develop their own guiding principles to discover what the community values most and use these principals towards creating a relocation unique to their community. Bringing community individuals together to determine what their communities core values are, could work to unite the community as a whole. Additionally, addressing these core values could allow the opportunity for them to be reflected into the relocation process and their new community. This may also extend to physical infrastructure such as the community's historic Church of St. Anne. Past community migrations use the relocation of prominent buildings to act as a representative aspect of the community that can be preserved and part of the new site (Sjöholm, 2017). These major decisions should be discussed and agreed upon as a community, not simply left to the councils' discretion.

The relocation will have economic challenges as well, which could be detrimental to the community. In order maintain economic and mental well-being, an economic plan must be in place to address any detriment to employment and industries. Lennox Island currently maintains two companies Minigoo Fisheries and Fisherman's Pride. Until recently, only two companies—entirely owned and operated by the Lennox Island First Nation—employed approximately over 125 of the residents (Metcalf, 2013; Lennox Island, 2013). Recently the Lennox Island First Nations acquired land in East Bideford as well as a shellfish hatchery that was closed ten years ago (ACOA, 2016). This is the expected relocation site for the island and has already begun expanding its operations and acts to begin the establishment of the new site to be relocated to (Weatherbie, 2017).

East Bideford is the location that the current Lennox Island chief has already begun expanding to. With the already set up shellfish hatchery, this could mitigate any possibility of

economic detriment to the current industries. In order to ensure some economic viability for the community, employment opportunities must be offered to residents. Skill-development opportunities should also be supported to assist community members to have the capabilities to learn and gain job experience during the process. Prioritizing the hiring of community members will also allow for the money that is provided both internally and externally to be kept within the community.

With financial insecurity, it is vital that the community uses its funding wisely. The Lennox Island Planning Group and the Lennox Island community must determine the rate and relocation phasing for the relocation process. By developing a timeline, prioritization of certain aspects will be adjusted, similar to contractors use of a Gantt chart as seen in Figure 1. For example, the causeway's lifespan was designated as 45-50 years. Using the maximum lifespan, the bridge will need to be rebuilt by 2022 (Majeed, 2015). If the relocation process is to exceed this time, the community must allocate funding for the new causeway. Based on the sea-level and storm surges, the causeway will need to be redesigned to accommodate these new highs. In recent years the sewage lagoon storm surges have nearly reached the infrastructure. For this reason, a determination of how long the relocation will be will determine the amount of fortification is necessary to protect it from being affects by the surges.

Gantt Chart (One Year)



Figure 1. Example of Gantt table (Inspirasign, 2016).

While Lennox Island already has a tourism industry, when the community moves, they will likely face challenges to maintaining the industry. An initiative that some communities – who have undergone climate migration – have done, was to implement educational tourism around their relocation experience. The attraction of witnessing and learning about climate change is increasing tourism particularly in the case of Greenland. The country does not yet have statistics on the increase in climate change-interested tourism however Greenlands' state tourism agency claims that the anecdotal evidence is significant (Associated Press, 2015). This same population could be attracted to learning about climate change-induced relocation processes. This could also be an opportunity to educate the public on more sustainable indigenous ways of living.



Figure 2. Aspects involved in CPP (AANDC, 2015).

The use of Comprehensive Community Planning (CPP) would be a beneficial way of conducting the relocation. This is because it uses a holistic process that allows communities to improve their sustainability, self-sufficiency and governance (AANDC, 2015). The holistic nature of CPP can be seen in Figure 2, as shown it is way of planning with consideration for all aspects of the community.

This type of planning is guided by the entire community rather than a few designated residents to plan and create change on their own terms. This type of planning could compliment the work done by the Lennox Island Planning Group. A CPP handbook for First Nations in British Columbia (BC) Canada was published by Indigenous Services in 2006. This handbook outlines lessons learned, step-by-step instructions and approach's used by five different communities in BC.

The CPP handbook could be easily adjusted for communities requiring relocation due to climate change. Many of the communities in BC are using the opportunity to address infrastructure development, such as the community of Squiala. In just six years, Squiala constructed a new band office which became central to the community. This centrality of the band office was desired by the Squiala residents and the push to have the band council central to the community has successfully improved the sense of community. The CPP handbook was developed out of wanting to document and share their experiences and tools the communities developed. The handbook could act as a resource for Lennox Island to use their guides and tools when applicable, as well as contribute their own innovations specific to logistics associated to climate relocation (AANDC, 2015).

4.2.3 Funding Constraints

As discussed earlier, the lack of agencies or procedures developed by the federal and provincial government is likely to be an obstacle in terms of Lennox Island receiving funding for the relocation. The Lennox Island Planning Group will need to be creative in how they source their funding. Funding limitations can often cause delays in the process of the relocation. Therefore, the community should begin applying for funding and planning their relocation as soon as possible to accommodate probable delays.

The Island should pursue funding sources that have priorities that would align with Lennox Islands' relocation such as: First Nation, coastal management and infrastructural programs. The First Nation Adapt Program perfectly aligns with Lennox Islands' relocation as it is created to provide technical expertise for infrastructural needs in the face of climate change impacts (INAC, 2018). Natural Resources Canada recently has run funding programs related to climate change adaptation, of which is applicable to Lennox Island (NRCAN, 2017). The First Nation Infrastructure program acts as both a funding source for skill development to train residents for jobs that will be needed during the relocation and paying for infrastructure projects (INAC, 2017). If the community is lucky, the government, NGO or an outside donor will provide a sufficient amount of money to complete the relocation. If it is less fortunate— like Newtown who didn't receive ample funding— funding may accumulate in small and infrequent funding provisions from programs such as those previously mentioned.

Don Jardine of UPEI Climate Lab says the island's two options are either moving or protecting the land. In the long term, relocation is inevitable (Beaumont, 2016). When insufficient funding is evident, a cost benefit analysis is the most effective tool in ensuring that

what little money is had is used in the most economical way. Completing a CBA also act as a means of incentivizing donor agencies to contribute to the islands relocation and that it is a worthy investment. This incentive will assist in demonstrating the necessity of the cause which will have a high cost. Most donor agencies are more likely to fund a cheaper, short-term adaptation like shoreline hardening therefor, the evidence for why relocation must occur must be convincing.

As well as the cost benefit analysis, the use of visualizations can can also be highly persuasive in bringing awareness to the urgency of the environmental threats. A team from UPEI and Simon Fraser University developed a geovisual tool called CLIVE (Coastal Impacts Visualization Environment). CLIVE – a 3D GIS tool – simulates the impacts of sea-level rise and erosion anticipated for the next 30, 60 and 90 years (Majeed, 2015). Scholar Maliha Majeed (2015), analyzed the perspectives of populations living on Lennox Island prior and following seeing CLIVES simulation of the island. The study found that participants became far more concerned about these environmental threats after seeing the simulation and began discussing the necessity of relocation. This study demonstrated that CLIVE can be a valuable decision-supporting tool to change perspectives. For this reason, this tool can persuade donor agencies to contribute to Lennox Islands relocation effort.

4.3 Conclusion

Through analyzing the successful measures used during Newtoks' relocation, Lennox Island can be better prepared for its own relocation. This chapter has discussed how government coordination, community ownership and funding constraints can both burden relocation efforts and be overcome. Rather than re-inventing how community relocations are conducted, they can

use aspects of pre-existing resources such as the CPP handbook and compliment them with aspects learned from comparable relocations. This chapter demonstrates that it is possible to conduct a community relocation despite prevailing challenges.

Chapter 5: Conclusions and Recommendations

Throughout this paper, three measures have been explored for the expected climate relocation of Lennox Island: government coordination, community ownership and funding constraints. The precedent of comparable climate migration in Newtok, Alaska provided insight into how these measures could be realized and what lessons could be learnt. These measures and lessons learnt from the Newtok precedent provided the means to better understand how Lennox Island's relocation should proceed. These understandings include: needing to form a group of stakeholders to overcome a lack of government agencies assistance, ensuring that the relocation is community-led, and that funding can be difficult to acquire and therefore should be used effectively.

As the number of climate migrants are inevitably going to rise, it is important that governments and communities prepare for these events. Particular attention should be given to indigenous communities who have histories of being resettled. These indigenous communities deserve adequate means of assistance in cases when climate relocation is necessary. Through completing this study, various recommendations can be made for climate relocation efforts.

Firstly, it is important for the Canadian government to develop a framework defining how community relocations should transpire. This framework must be designed to allow for the relocation process to be primarily community-led. The framework must clearly outline which steps need to be taken to provide the skills for community members to conduct and implement

their relocation goals. This framework should be developed at a federally and allow for adjustments to be made on regional and provincial levels.

Secondly, a Canadian federal agency must be appointed to oversee the work of designated provincial agencies, to assist and implement a developed relocation framework. Community-led relocation efforts require the involvement of multi-level government agencies. For this reason, these agencies must be equipped with the necessary services and knowledge to help enable community-led efforts. Ideally, there should only be one government agency that communities will need to engage with. If this is not possible, all involved agencies must be proficient in coordinating efforts and communicating with other agencies.

Thirdly, the Canadian government should be particularly sensitive and supportive of climate change-induced relocations pertaining to indigenous communities. Historically, the Canadian government has been responsible for the designation of many First Nations settlements. In cases that indigenous communities require relocation, the government should use these opportunities to support the goals of the First Nations. This governmental support should be provided to ease the community's relocation by way of technical and financial resources. This could act as an opportunity for the government to recognize their historically-poor execution of indigenous community relocations.

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