Relocation as a Possible Response to Climate Change:

Exploring Perspectives and Lessons from the Town of Channel-Port Aux Basques

By

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Abstract

Much of the world's population lives in coastal areas situated a few meters above sea level. However, over the past few decades, climate change has modified coastal life through recurrent extreme weather events and other biophysical processes, including erosion and sea-level rise. Together, these phenomena have the potential to make coastal areas less habitable and coastal communities more vulnerable, including displacing people. As a result, relocation has emerged as a potential and proactive adaptation option to climate change. However, planning for relocation is not without challenges as relocation has the potential to disrupt several aspects of individual and community life. Through document review and narrative interviews, this thesis studied climate-related relocation in the Town of Channel-Port aux Basques to explore relocation as an adaptation strategy and to mobilize local stories and perspectives in pursuit of lessons for coastal planning and policy. A strong sense of place, perception of risk, and grief over environmental loss or detachment were among the factors that would have made a voluntary relocation less tenable if Hurricane Fiona had not happened. These remain the reasons people unaffected by Hurricane Fiona are unwilling to move. Factors such as a lack of communication and community participation in the relocation decision-making process, long response time hearing back from officials on compensation packages, and inconsistencies in the determination of compensation packages were cited by participants to have contributed to their dissatisfaction with the relocation process. The research highlights the need for principles to guide future relocation policy development that is robust for varying communities, and relocation programs tailored to community needs and interests. To inform context-sensitive and engaged relocation planning, knowledge about local perspectives is needed in policy and planning. That knowledge should take into consideration the psychological, social, cultural, and economic heterogeneity in communities.

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List of Abbreviations

IPCC	Intergovernmental Panel on Climate Change
NL	Newfoundland and Labrador
ITK	Inuit Tapiriit Kanatami (National Inuit Climate Adaptation Strategy)
ENRC	Environment and Natural Resource Canada
CRR	Climate-Related Relocation
UNFCCC	United Nations Framework Convention on Climate Change
ISDR	International Strategy for Disaster Reduction
NOAA	National Oceanic and Atmospheric Administration
USD	United States Dollars
UNHCR	United Nations High Commissioner for Refugees
UNEP	United Nations Environment Program
IBC	Insurance Bureau of Canada
UNDRR	United Nations Office for Disaster Risk Reduction
DFAA	Disaster Financial Assistance Arrangement
DFAP	Disaster Financial Assistance Program

1. Chapter One: Introduction

1.1 Background to the Research

On September 24th, 2022, The Town of Channel-Port aux Basques, hereafter referred to as Port aux Basques, on the southwest coast of Newfoundland and Labrador (NL), was hit by Hurricane Fiona, which is documented as one of the most destructive storms recorded in Canada (Roy, 2023). What started as a thunderstorm in the tropical Atlantic on the 12th of September, detected by the National Hurricane Centre in the United States, later gained ground and caused damage in Puerto Ricco, the Dominican Republic, Haiti, and several Atlantic Canadian provinces. When it finally made landfall on NL's southwest coast, it caused the most destruction in Port aux Basques and washed several houses into the sea (Roy, 2023). The hurricane claimed one life and rendered several other houses structurally unsafe. Ultimately, the destruction led to the relocation of several homes and their residents following the storm.

Events like Hurricane Fiona and corresponding impacts for Port aux Basques reflect an increasing frequency and severity of extreme weather events associated with climate change. The intensification of climate change impacts has implications for adaptation across coastal communities, including Port aux Basques. This thesis explores one of those adaptations known as climate-related relocation (CRR), which refers to the planned, state-led process of permanently moving people and infrastructure to another place (Marter-Kenyon, 2020). Though the case of Port aux Basques was reactive in response to Hurricane Fiona, CRR, as an adaptation strategy, can be proactive (before a disaster) or reactive (after the disaster). Port aux Basques is now taking steps to utilize CRR as a proactive adaptation measure. As CRR occurred in Port aux Basques, the thesis uses stories and perspectives to explore CRR as a

climate change adaptation, providing a view in hindsight to inform future policy and planning either as a proactive or reactive adaptation strategy.

Like Port aux Basques, many communities along Canada's coast are vulnerable to various climate-related risks and extreme weather events (Vodden and Cunsolo, 2021). Scientific evidence suggests that Canada will undergo significant shifts in its weather patterns within a single generation that will intensify weather events (Richardson, 2010; Bush & Lemmen, 2019).

In NL, the 2022 Vital Signs report by Memorial University's Harris Centre highlighted and projected more extreme climatic conditions. Thus, from the devastating impact of hurricanes to flooding and sporadic weather patterns, NL is already undergoing and is expected to see significant environmental changes (The Harris Centre, 2022). In Port aux Basques, for example, sea level rise (Batterson and Liverman, (2010), coastal erosion (Yirenkyi, 2024), increased frequency and severity of floods, and strong winds are some of the impacts of climate change observed in the community before the hurricane (CBC, 2021a). They are also intensifying in other communities in NL (The Harris Centre, 2022). Climate change adaptation research suggests that without deliberate and well-structured strategies and plans to enhance resilience and decrease vulnerability, climate change impacts could threaten local, provincial, national, and international well-being in unpredictable ways (Blankson, 2021; Richardson, 2010).

Adaptation plays a crucial role in responding to observed or expected climate changes. Adaptive measures can be wide-ranging. Examples include using new technologies such as early warning systems, adjusting planning and investment practices, and revising regulations toward achieving municipal sustainability goals (Government of NL, 2019; Richardson, 2010). As a result, policies for adaptation have rapidly emerged to mitigate the effects of

climate change. In Canada, adaptation to climate change is taking place by different governments creating initiatives to ensure the safety of their jurisdictions, such as Canada's National Adaptation Strategy, National Inuit Adaptation Strategy-ITK, and NL Climate Change Action Plan. Adaptation plans are locally-led (Ford et al., 2016), government-led (Labbé et al., 2017), and/or result from collaboration among various levels of government (Baird et al., 2016) and with non-governmental organizations (Natural Resource Canada, 2023a). Several federal funding programs have been launched to support adaptation measures, such as the Climate Action Fund, Climate Change and Health Capacity Building Contribution Program, Climate Change Preparedness in the North, First Nation Adapt, and Disaster Mitigation and Adaptation Fund (See Environment and Natural Resource Canada-NRC, 2023).

Despite these efforts, Canada still faces significant gaps in its readiness for climate change and a rise in the occurrence and severity of natural disasters (Natural Resource Canada, 2023a). Threats to vital infrastructure and communities are increasing due to continuous environmental changes such as storms and erosion (Natural Resource Canada, 2023a). Extreme weather events have the potential to stretch many response systems beyond their limits and underscore the need for further measures to enhance adaptive capacity and ensure adequate and effective adaptations to these threats.

1.2 Problem Statement

Amidst these changes, coastal communities are more vulnerable and increasingly prone to varying environmental threats (Vodden and Cunsolo, 2021), which creates an urgent need for critical explorations of adaptations. Relatedly, climate change problems and adaptation solutions must draw from the perspectives of people who experience them.

Cabana et al. (2023) described the challenge of climate change adaptation as a "wicked problem," referencing a concept by Rittel and Weber (1973), and reflects the significant complexity, uncertainty, dynamics, and cross-scale issues involved. To address this problem, research highlights the need for diverse context-specific and tailored adaptation solutions (Aguiar et al., 2018). Since extreme events are expected to persist based on climate projections, there are concerns about how safe climate-prone environments, especially coastal environments, are for those dwelling in regions. These areas include communities of different sizes, socio-economic statuses, demographics, and cultural attachments. As such, there have been urgent calls to bolster the adaptive ability of a range of different communities and enhance their ability to better withstand the existing and anticipated impacts of climate-related hazards (Lie et al., 2023). Put differently, the sustainability of human systems and communities and the ability to circumvent and overcome an uncertain climatic future hinge on effective and timely climate mitigation and adaptation techniques. Questions remain about what timely and context-sensitive adaptations should look like, who should be involved, and how to develop effective policy and planning processes (Aguiar et al., 2018; Arnall, 2019; Bronen, 2021).

Planned relocation, also referred to as managed retreat or relocation in the literature, has emerged as a response initiative over the past few decades. The potential role of planned relocation, and the focus of this research, planned climate-related relocation (CRR) as a climate change adaptation measure, has received attention from both national and cross-national governments and the international policy community (Arnall, 2019; Bower et al., 2023). CRR is often highlighted when it becomes the only available option before or after adverse threats where other adaptation options have proved ineffective or insufficient (Montreux et al., 2018).

Available evidence suggests that planned relocation is happening in different places globally (Ferris & Bower, 2023), usually as a preventive measure against unplanned displacement. For instance, Ajibade and Siders (2022) posited that approximately 480 million people have been displaced by climate change and related disasters over the past two decades across the globe. The International Organization for Migration has projected that an estimated number of people, between 250 million and 1 billion individuals, will experience some form of mobility by the year 2050 due to climate change (Garimella, 2022). Also, Katonivualiku (2020) argued that between 67 and 187 million people will be at risk of coastal flooding by 2100, and if the global mean sea level goes up by just one meter, more and more people will require relocation. For Richardson (2010), proactively anticipating climate change effects and acting before significant impacts occur can save lives and help individuals, households, and communities effectively manage climate risks and reduce vulnerability to the sudden onset of extreme weather events. This is where the discussion on relocation as a proactive climate change adaptation strategy comes in.

However, relocation as a climate adaptation strategy is challenging and complex. CRR programs can yield both positive and negative outcomes depending on a host of factors, with the potential to exacerbate existing inequities. Ajibade and Siders (2022, p.1) argue, “while some planned [relocation] programs [may] empower and benefit individuals and communities, others ignore people’s rights, entrench inequalities and perpetuate risk, vulnerability, and harm on already marginalized communities and groups.” Sometimes people in communities anticipate these negative outcomes, with implications for effective future community planning and relationships with government. CRR efforts may be faced with stern opposition, especially in regions where awareness of climate change-associated risks may not be well understood (Khatibi et al., 2021) or where previous histories of relocation have left unresolved issues stemming from how relocation programs were carried out in the past (see

Cote & Pottie-Sherman, 2019). CRR also may not work, people may not relocate, and even if they do, the policy process may result in dissatisfaction with government policies, lead to resentment against government officials, harm relationships among actor groups who do not agree, and threaten future collaboration[1] and policy development (Arnall, 2019). Poor outcomes may happen if relocation policies do not acknowledge and consider the interests, values and priorities of the parties involved.

Despite the challenges, certain areas face increased risks of becoming uninhabitable under conditions of intensifying climate change impact and may prompt the need to consider measures such as relocation as an adaptation strategy (Dan & Burton, 2022). In an interview with CBC News in 2022, Canadian Environment Minister Guilbeault pointed out the need to be proactive and consider relocation as a climate response in anticipation of change. Guilbeault argued "If we know that an area is going to be flooded or very exposed to hurricanes, is it a reasonable thing for us as governments …to work with people, to maybe have to relocate them" (Raffy Boudjikanian, 2022).

While there is increasing focus on CRR as an adaptation strategy in other parts of the world (Arnall, 2019; Boege, 2016; Ferris, 2015; Ferris & Weerasinghe, 2020; McMichael & Katonivualiku, 2020), the topic has not received much attention in Canada. Meanwhile, the topic has emerged in Canada's Changing Climate Synthesis Report as an area that needs further research (Lulham et al., 2023). Also, relocation research in several other jurisdictions has focused primarily on the general narrative of relocation as a climate change adaptation strategy and has not paid much attention to the factors that determine the outcome of this

[1] Collaboration in relocation means the affected population is directly involved in needs analysis and project implementation. They may also contribute to agency-led projects with labour and other skills (e.g. displaced persons supply labour for the construction of their new houses in an agency-sponsored project) (McAdams & Ferris, 2015).

strategy when its use becomes necessary. Thus, the willingness of individuals to relocate in the case of climate emergencies is a critical yet understudied aspect of climate-induced relocation in Canada and elsewhere.

Previous climate adaptation solutions have mostly focused on the physical needs of sudden natural disasters such as hurricanes and slow-occurring ones such as sea level rise and coastal erosions and have seldom addressed the deep implications that transcend physical needs. It is important to note that the impacts of climate change go beyond the loss of physical assets. Often, the psychological and mental trauma associated with the loss of property, including the detachment from the natural environment and fragmentation of the social fabric, are not well attended to during the adaptation process.

Research on relocation more broadly indicates some important factors to consider for CRR. For example, researchers discuss the implications and ongoing impacts of former relocations in NL, an effort led by the provincial government to move people from small, costly-to-serve communities to larger so-called growth centres (Pottie-Sherman & Côté, 2020; Hoggart, 1979; Matthews, 1975). D. Xu et al. (2017) also intimated that attachments to place are relevant when considering relocation as an adaptation strategy. Sense of place is important for understanding coastal communities, and in NL, place attachment tends to be strong (Reid & Vodden, 2020). Statistics Canada (2024) data show, for instance, that a very strong or somewhat strong sense of belonging to the local community is higher in Atlantic Canada, particularly in PEI, NB, in NL, than in any other provinces in Canada. Understanding the strength and implications of these attachments is relevant when considering relocation as a climate change adaptation solution.

Some other variables that may affect the willingness to move are perceptions of climate-related risks (Dachary-Bernard et al., 2019) and grief (Cunsolo & Ellis, 2018). All these may

culminate in people's willingness or objection to relocate during climate emergencies and are thus worth investigating. Given the limited number of CRR examples in Canada and the experiences associated with these examples, including a dearth of evidence about the motivations involved, there is a need for research on CRR. This need is urgent as additional CRR programs and policies may be considered with intensifying climate change impacts. Since gaps in understanding remain about how to develop effective and context-sensitive CRR, research incorporating community perspectives can inform sound adaptation policy and community planning.

1.3 Research Aims and Questions

This research aims to better understand the complexities surrounding climate-related relocation (CRR), including the experiences and perspectives that influence willingness to relocate and its implications for the well-being of coastal communities using Port aux Basques as a case study. By shedding light on the complexities that underline relocation as an adaptation strategy, including the implications of relocation, this study contributes to the literature on relocation as a climate adaptation strategy and provides insights for policymakers, organizations, and communities in designing more effective strategies for preventing climate-induced displacement. It takes into consideration what relocation means as a last resort, from whose perspective, under what circumstance, and to what extent communities are made an integral part of those decision-making processes. This research serves as an entry point for critical, timely, but complex dialogue around topics like relocation as an adaptation strategy, particularly in geographies with a dynamic history of relocation (such as in the case of NL). Gaining insights into the psychological, emotional, social, and cultural reasons behind people's choice to remain in or leave areas vulnerable to climate change risks is valuable information for advancing strategies that require communities to relocate in service of bolstering resilience and adaptation within communities

(see Lie et al., 2023).

Considering that Port aux Basques has experienced and is susceptible to climate change impacts, and there is a global recognition of relocation as a climate change adaptation strategy, the overall objective of this thesis is to better understand relocation as a climate change adaptation strategy using Port aux Basques as a case study. To achieve this above objective, three research questions were formulated to help provide an understanding of the situation in Port aux Basques:

a. What are the major changes in climate in Port aux Basques, and what are people's perceptions about these changes?
b. What are the main reasons for individuals' willingness or unwillingness to relocate in the face of climate change impacts?
c. What are residents' experiences with the relocation process in Port aux Basques, and what lessons can be learned for future relocation programs?

The justification for the research questions is premised on the idea that research can look at a relocation that has taken place to inform policy development and planning for prospective CRR in other coastal communities. The first research question is about grounding exploration of CRR in the impacts of climate change that are specific to Port aux Basques, and community perceptions of those changes. The second question focuses on the factors and potential determinants underlying CRR in the context of these changes. The final research question is about residents' experiences with and perspectives of CRR as a process. Together, the three research questions connect perceptions, underlying motivations shaping CRR, and experiences with a CRR, contributing to an understanding of what is required to make CRR policies and plans effective for addressing the needs of communities.

1.4 Organization of the Thesis

The thesis is structured into five chapters. The first chapter is the introduction, which provides a description of the topic and the main arguments supporting investigation. Within this chapter, existing issues are introduced to provide a scope for the research, along with the questions that are answered by this thesis. The second chapter reviews existing literature on climate change within Canada, with a focus on Atlantic Canada and NL, more specifically. Literature on CRR is reviewed, including documented factors that influence people's decisions to move in the face of climate threats, particularly the risk of a climate-related emergency. Chapter Three shares the methodology and methods employed in the study, including the case study, research design, sampling, data collection, analysis methods, and the justification behind the method selection. The fourth chapter presents the findings and discusses what those findings mean for climate change adaptation, especially CRR and relocation in Port aux Basques, more specifically. The final chapter summarizes the key gaps and findings and makes recommendations for future research, policy and planning based on lessons learned from the research.

2. Chapter Two: Literature Review

2.0 Introduction

The previous chapter of this thesis established the overall objective that underpins the thesis as well as the significance of the thesis. It introduced the current and future climate change trends and impacts in Canada and NL and highlighted the importance of proactive policy and planning in response to climate change impacts, especially extreme weather events like Hurricane Fiona. It also introduced CRR, including gaps in literature and practice for CRR as a viable adaptation strategy.

To deepen understanding of climate change and CRR, this chapter discusses three areas of scholarship and practice: (1) climate change and climate change impacts in Canada and NL, (2) relocation as climate response strategy, and (3) determinants of relocation. The first section provides an overview of climate change and its impacts in Canada, especially on the island of Newfoundland. Emphasis is not placed on the Labrador portion of NL due to differences in climatic conditions and other socio-economic and governance differences. The section also documents various proposed and ongoing adaptation solutions in Canada as well as climate adaptation prospects, particularly those specific to NL and other coastal areas in Canada. The chapter further discusses issues related to CRR. These include the need to contextualize planned relocation, drawing from examples from other parts of the world, and challenges and prospects for planned CRR as an adaptation strategy. The third section explores the potential determinants of CRR, focusing on factors that inform relocation decisions, including the willingness to relocate. Concepts such as place attachment, risk perception, and ecological grief or anxiety are discussed, providing a basis for empirical investigation.

2.1 Climate Change and Climate Change Impacts

2.1.1 Climate Change in Canada

The evidence available suggests that Canada is warming faster than the rest of the world and at a rate twice the global rate (Flato et al., 2019). This is happening through a phenomenon known as Artic Amplification, which describes the enhanced warming of near-surface temperatures for Canada and the entire Artic relative to the globe (see Previdi et al., 2021). Computed temperature averages for Canada revealed that the mean annual temperature has risen about 1.7ºC between 1948 and 2016 (Zhang et al., 2019). From 1948 to 2016, the annual mean temperature over northern Canada rose by 2.3ºC, approximately three times the global mean warming rate[2] (Bush and Lemmen, 2019). Climate projections have indicated similar patterns of change in the future (Bush & Lemmen, 2019). Rising temperatures will also increase the likelihood of precipitation across Canada, falling more often as rain rather than snow (see Jeong & Sushama, 2018). The extremes of precipitation events are expected to become widespread across Canada. Extreme precipitation events that happen once every 20 years are expected to become frequent and occur approximately once every five years by the end of the century (Zhang et al., 2019).

High temperatures are expected to make Canada's vast coastline prone to sea level rise through unconventional precipitation and melting of ice (Lemmen et al., 2016). Extreme sea level rise has the potential to significantly impact human settlements, economic activities, and coastal ecosystems and present substantial challenges for adaptation (Mercer Clarke et al.,

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[2] Under a low emission scenario that aligns with the global temperature goal in the Paris Agreement, Canada is projected to experience an additional 1.8ºC increase in annual mean temperature by mid-century, remaining relatively stable thereafter. Conversely, a high emission scenario characterized by limited emission reductions would lead to a more substantial annual mean temperature increase of over 6ºC by the late 21st century. Across all scenarios, northern Canada is expected to warm more than southern Canada, and winter temperatures are projected to rise more significantly than summer temperatures (Bush & Lemmen, 2019).

2016). Among the consequences of sea level rise are high coastal water levels and flooding events. These occurrences are commonly linked to storm surges that coincide with high tides (Ma et al., 2015; Han et al., 2012). In areas where the relative sea level is projected to rise[3], it is anticipated that extreme high-water levels, resulting from the combination of tide and flood, will be higher and more frequent (Greenan et al., 2019), which could pose a threat to community infrastructure and other community ways of life.

Already, these changes are affecting critical infrastructure in various municipalities. In Canada, approximately two-thirds of fundamental public infrastructure is owned and maintained by municipal governments, and more than one-third of this infrastructure needs upgrading or replacement to keep it up to standard with changing conditions (Brown et al., 2021). Extreme weather conditions may increase the rate of failure of these critical infrastructures and put them in a state where they are no longer "climate safe", defined as "infrastructure that is sustainable, adaptive and that meets design criteria that aim for resilience in the face of shocks and stresses caused by the current and future climate" (Brown et al., 2021, p.38). Critical infrastructure, according to Public Safety Canada (2020), includes health, food, finance, water, information and communication technology safety, energy and utilities, manufacturing, government, and transportation, most of which can be vulnerable to extreme weather events.

2.1.2 Climate Change in Atlantic Canada and NL

In Atlantic Canada, including in NL, though climate change impacts are not so different from that of the rest of coastal Canada, the sub-region is prone to climate change impacts such as

[3] The most significant projected SLR, surpassing 75 cm under a high emission scenario by 2100, is predicted in regions of Atlantic Canada where the land is presently sinking due to Glacial Isostatic Adjustment (GIA) (Greenan et al., 2019). SLR and erosion has resulted in the community of Lennox Island, a Mi'kmaq community in Prince Edward Island, to explore relocation options (Savard et al., 2016).

flooding and strong winds due to its proximity to the Atlantic Ocean. Atlantic Canada has seen a rise in average temperature, with climate change projected to result in 'warmer, wetter, stormier' weather in NL (Turn Back the Tides, n.d). Between 1948 and 2005, Atlantic Canada experienced a general warming trend that was notable through significant temperature variations, resulting in winters becoming colder and summers getting warmer (Catto, 2006). Zhang et al. (2019) posit that between 1948 and 2016, the region saw a 0.7°C rise in mean temperatures (Zhang et al., 2019) as well as an increase in sea level (Greenan et al., 2019). In NL, average yearly temperatures are around 0.8°C higher than historical averages, contributing to several coastal flooding events (Government of NL, 2019). Further, temperature differentials are projected to be more noticeable around coastal regions of the Island (Fennis, 2013). A combination of high temperatures and sea levels also means a rise in average sea level up to about 40 centimetres by 2100 in some areas (Turn Back the Tides, n.d). Precipitation levels have also seen an uptick across the province since 1948, with considerable local variations in coastal regions influenced by the North Atlantic Oscillation[4], displaying distinct differences from inland areas for current and future variations (Catto, 2006). Warming of the ocean may increase the likelihood and frequency of extreme weather events like Hurricane Fiona (Ryan, 2022), an event which caused significant destruction along the southwest coast of the Island with the most impacts felt in Port aux Basques (Ryan, 2022). Storms and coastal flooding will continue to pose significant threats to infrastructure and impact various aspects of life and socio-economic activities both directly and indirectly, as discussed below.

[4] The North Atlantic Oscillation (NAO) is a large-scale alternation of atmospheric mass between subtropical high surface pressure and subpolar low surface pressures. The NAO exerts a dominant influence on wintertime temperatures across much of the northern hemisphere and determines the speed and direction of the westerly winds across the North Atlantic, as well as winter sea surface temperature. The term 'North Atlantic Oscillation' is used by meteorologists to refer to variations in the large-scale surface pressure gradient in the North Atlantic region

Hurricanes and tropical storms have increased compared to the previous century, contributing to increased coastal erosion, rising sea levels, and surges that affect coastal and marine environments (Bush & Lemmen, 201). Several areas across the province are currently grappling with high instances of flooding and damage to infrastructure (see Government NL, 2019). For instance, between 2000 and 2009 alone, 17 cases of coastal flooding were recorded in NL (see Batterson and Liverman, 2010), costing several millions of dollars in property and infrastructure damage. With high temperatures being the main driving factor for most environmental events, increasing temperature is expected to reduce the winter season by as much between 4-5 weeks in certain locations of the Island. This has implications for certain parts of the province that depend on ice for transportation (see Government of NL, 2019).

2.1.3 Impacts of Climate Change

Climate change can influence several aspects of life. For instance, according to Warren and Lulham. 2021), 93% of respondents interviewed in selected communities across Canada believe that climate change is either currently affecting their health or will do so in the future. Climate change and related disasters can result in mental health problems and anxieties (Hayes et al., 2018; Woodhall-Melnik & Grogan, 2019; Hrabok et al., 2020; Schwartz et al., 2023), especially when it results in displacement (Woodhall-Melnik & Grogan, 2019).

For instance, climate change was found to have contributed to increased cases of depression disorder and general anxiety[5] disorder (Schwartz et al., 2023). There is compelling evidence that climate change can adversely affect mental health and heighten the risk of engaging in

[5] Climate change anxiety is defined broadly as negative cognitive, emotional, and behavioural responses associated with concerns about climate change (Schwartz et al., 2023).

suicidal behaviour (Burke et al., 2018; Schwartz et al., 2023). The risk of climate-related suicide could come about, for example, through the hopelessness that arises when climate-driven extreme weather events result in the destruction of personal belongings and places of abode.

Climate change (high temperature) also increases the likelihood of heat-related illnesses, especially in youth and infants, people with some chronic pre-existing conditions, and seniors with mobility challenges. In July 2023, Newfoundland Health Services advised people to stay indoors following a heat warning for the region when the combination of heat and humidity is expected to pose significant health risks (Newfoundland Health Services, 2023). These climate-related health risks may be mitigated or exacerbated by other social and economic factors that influence health outcomes, understood as the social determinants of health (Mikkonen and Raphael, 2010; Friedman, 2024; Padda et al., 2024, 2024).

Access to health services is one of these determinants (Chaturvedi et al., 2024; Padda et al., 2024). Most communities in NL, including Port aux Basques, are remote and a bit far from some vital services, such as hospitals that can respond to certain types of emergencies. Among ten provinces in Canada, NL is among those with low life expectancy and a striking proportion of older people with chronic health conditions. Over the past few years, life expectancy has fallen for(Chaturvedi et al., 2024) three consecutive years, although the full suite of reasons is not fully known (Antle, 2023). Many aged populations are spread across several remote communities, with sometimes long hours of driving required to access health care in larger municipalities. In the northern parts of NL for instance, where some people rely on a snowmobile to get around and meet their day-to-day needs, rising temperatures mean thinner ice conditions on which people will not be able to transport themselves around and lead to the feeling of being trapped. This feeling of getting stuck (trapped) may result in anxiety and higher levels of depression (Fabian, 2017). Collectively, conditions such as

access to services, as well as income, education, unemployment, food security, housing and others can complicate climate change impacts (Chaturvedi et al., 2024; Padda et al., 2024; Mikkonen and Raphael, 2010).

Schwartz et al. (2023) posit that one way to deal with the hopelessness that comes with climate change anxiety is to engage in pro-environmental behaviour. Participating in collective climate action can bring a sense of empowerment and increased social support (Schwartz et al., 2023). Pro-environmental behaviour in the context of climate change could also lead to reduced fear through increased feelings of connection. Bringing people who are going through the same experience together to connect and talk about issues bothering them can support a feeling of connectedness and empathy, which could help heal and empower them to act toward collective healing. On the contrary, the mental and psychological requirements of this collective climate action and dialogue could be overwhelmingly draining and depressing, particularly during times when people are dealing with severe loss (see Schwartz et al., 2023). Again, when actions fall short of desired outcomes, heightened levels of anxiety may occur (Albright & Hurd, 2023; Schwartz et al., 2023).

Weather events such as floods, extreme temperatures and hurricanes can also reduce the perceived living standard of people (Lignier et al., 2023) when they alter leisure and recreational environments. Climate change can modify the intricate connection within ecosystems and change opportunities for recreational behaviours and related benefits (Hille Ris Lambers et al., 2021). For instance, research has found that changes in the wildflower season have changed hiking behaviour and resulted in people reducing the number of times they go hiking (Hille Ris Lambers et al., 2021), which means some recreational activities that rely on favourable environmental conditions could eventually be given up.

Several tourism activities in NL, for instance, depend on the ocean (Government of NL, 2021). Boat tours for whale watching, bird watching, or iceberg viewing are among the largest operators within the NL tourism sector. However, these activities could be significantly affected by climate change through a shift in species habitat and changes in iceberg distribution and or concentration (Government of NL, 2021). Extreme weather events could also impact NL's seafood tourism sector, which is one of the largest draws for summer recreational fishing tourists (Government of NL, 2021) and can modify recreational lifestyles for locals and tourists, potentially affecting economic outcomes from tourism. Climate change can also lead to the introduction of invasive species, especially into the ocean environment (Government of NL, 2019), which could be detrimental to the recruitment and survival of native species of both recreational and commercial importance (see Bojko et al., 2018; Simonson, 2015).

2.1.4 Climate Change Adaptation in Atlantic Canada and NL

Adaptation plays a crucial role in enhancing community resilience against current and future climate change impacts. It encompasses the creation of plans and policy options either through reactive or proactive approaches (Warren & Lulham, 2021). Various organizations, including non-governmental organizations, academic institutions, municipal and provincial governments, as well as Indigenous-led organizations, have all played pivotal roles in shaping both past and ongoing adaptation efforts in their respective jurisdictions (Lulham, 2021). Most of these groups have expanded on initial efforts geared towards advancing the development of adaptation programs, with an emergent emphasis on building capacities, creating and executing adaptation plans or strategies, and designing tailored risk assessments that address their specific climate needs (Lulham, 2021). Some have used programs and initiatives from The Atlantic Climate Adaptation Solutions Association (ACASA) and CLIMAtlantic. For example, CLIMAtlantic provides advice to communities to identify and

prioritize both current and possible climate risks and helps find financial resources and technical assistance to support future adaptation (see CLIMAtlantic, n.d).

Throughout Atlantic Canada, regulation, policy, and planning at provincial and municipal levels are being developed to promote adaptation, such as by using land use planning regulations to restrict the development of infrastructure in critical areas. In Nova Scotia, the recent Coastal Protection Act, if passed, will restrict development, renovation, and expansion in areas along the coast that are deemed vulnerable (Nova Scotia Legislature, 2019). Precise flood hazard maps are also planning tools essential for mitigating or preventing future flood risks to communities and infrastructure (Deitz & Arnold, 2021). Flood hazard maps can help identify areas susceptible to seasonal or projected flooding and serve as valuable tools for public outreach and engagement (Fisher & Stanchev, 2022; Natural Resource Canada, 2024). The information provided by these tools enables communities to undertake thorough vulnerability assessments by considering projections for their region. The aim of these assessments is for individuals, municipalities, planning authorities, as well as infrastructure and utility owners, to be better equipped to make informed adaptation decisions related to assets and properties at risk (Deitz & Arnold, 2021). In Nova Scotia, the province is creating detailed floodplain maps with inputs from communities in response to devastating floods following a torrential rainfall that claimed four lives in July 2023. The $10 million project draws on lidar technology to create detailed maps for flood-prone areas that rely on climate change projections (Tuton, 2023). The purpose is to guide individuals and communities on where to situate critical infrastructure. Several municipalities in NL have updated their floodplain maps to reflect new flood zones (Flood Maps, n.d). Tuton (2023) has argued, however, that there is the possibility of community leaders and residents putting too much trust and confidence in floodplain maps and ignoring risks missed in the maps.

Put differently, no one is exempt from floods regardless of where they are on floodplain maps. This is because weather events happen with magnitudes that outpace predictions. As such, locations further away than anticipated can be affected during the rapid onset of storms and other weather-related events. Coastal defence infrastructure, such as shoreline restoration with armour stones, dikes, and breakwaters, and nature-based approaches, such the sea forestation, also offer significant prospects (Water Institute, 2021).

In NL, several municipalities will benefit from enhanced shoreline protection and erosion control measures through a joint investment of $4.3 million from the federal government and the Government of NL (Government of Canada, 2024). The funding was announced on the 20th of February 2024 to safeguard municipal parks, water and wastewater systems, roads, and homes from the impacts of shoreline erosion and extreme weather conditions (Government of Canada, 2024). At the end of the project, armour stones and other necessary infrastructure retrofits will be installed in these communities to protect the coastline and other critical infrastructure from storm surges and erosions (Government of Canada, 2024). These approaches are being complemented by nature-based approaches in some instances.

Nature-based approaches are intended to provide solutions that protect the coastal environments and contribute to biodiversity conservation (Environment and Climate Change Canada, 2022). The Government of Canada, in conjunction with the NL government, has committed to establishing the Eagle River Watershed protected area in NL by 2025, exploring the feasibility of the Coast Fjords National Marine Conservation Area and redesignation of the Sandbanks Provincial Park as a National Park, and advancing an Inuit Protected Area in Labrador (Environment and Climate Change Canada, 2022). Nature-based solutions have the potential to significantly protect homes and critical infrastructure from sea level rise in NL (Prevention Web, 2016). Other organizations have also begun to explore the possibilities of using seaweeds for coastal protection in NL alongside the several opportunities seaweed

offers (Gear, 2023). Currently, Memorial University's Marine Institute is piloting a program aimed at understanding how to grow kelp locally (Gear, 2023). Eelgrass restoration projects (coastal restoration) have also been carried out in the Bay of Islands and Placentia Bay (Department of Fisheries & Oceans Canada-DFO, 2024). In the Bay of Islands, transplanting 700m^2 of eelgrass has reduced erosion and increased biodiversity in the region (DFO, 2024).

2.1.5 Future Climate Change Adaptation Prospects for Canada and NL

In addition to the above measures, Canada can leverage timely planning and early warning systems to minimize disaster risk. Planning for climate change and other environmental events can drastically reduce the risk and severity of impacts. Early warning systems and the effective dissemination of impending disaster alerts are critical for timely response interventions (Haque et al., 2024). Early warnings give people ample time to take cover, flee to safety, or prepare for a disaster such as a hurricane or tsunami; they also give local authorities enough room to plan for evacuation[6] and other preparedness efforts to reduce injuries or fatalities. Early warning systems were found to have reduced disaster-related fatalities and injuries by 44 and 40 percent, respectively, between 1986 and 1999 in the United States (Rogers & Tsurkunov, 2010). Similarly, countries such as Bangladesh and Cuba have also significantly reduced disaster-related mortalities through the introduction of early warning systems, a clear demonstration of the importance of such systems for the times ahead (see Rogers & Tsurkonov, 2010). Such systems would not single-handedly eradicate all disaster risks but can complement other interventions, such as the development of critical

[6] Evacuation refers to the emergency transfer of people from a dangerous area to avoid or reduce the impact of a disaster; under normal circumstances, they can return to the original area after a certain period (Qing et al., 2022).

infrastructure and environmental buffer zones to collectively reduce risk propensity to a great extent. (see Arnall, 2019; Ash et al., 2012; Brown et al., 2017).

Nonetheless, as climate change impacts continue to increase both globally and within Canada, together with the associated risks (IPCC, 2022; Deitz & Arnold, 2021), it will have implications for adaptation efforts needed to provide sufficient safeguards consistent with the rates of impact (IPCC, 2022; Arnal et al., 2019). Even with the implementation of all the available adaptation measures, there is the likelihood that significant impacts will persist, and old adaptation plans may be abandoned in pursuit of new, unconventional ones. As such, last-resort measures such as CRR may become one of the few available options in unavoidable circumstances (Boege, 2016; Bronen & Chapin, 2013; López-Carr & Marter-Kenyon, 2015). Such proactive actions are consistent with the Sendai Framework for Disaster Risk Reduction 2015-2030 targets (Ferris et al., 2015), which predict that various individuals may require relocation moving forward. This includes individuals in areas prone to sudden-onset natural disasters, individuals whose livelihoods are threatened by the gradual effects of climate change, and people in specific regions within a country subject to destruction (Ferris, 2012). The Sendai Framework for Disaster Risk Reduction 2015-2030 was the first major agreement of the post-2015 development agenda and provides Member States with concrete actions to protect development gains from the risk of disaster to which Canada and 186 other countries are signatories (United Nations Office for Disaster Risk Reduction, n.d). Relocation or managed retreat is an adaptation strategy in areas faced with increased vulnerability (Dannenberg et al., 2019). This is especially so for areas where other preventive measures are almost impossible or cost-restrictive.

Nature-based solutions, engineering approaches such as building coastal defence infrastructure, and technological developments like early warning systems may help protect coastal regions to some extent. It is worth noting that the success of such approaches largely

depends on the extent to which critical contextual issues are taken into consideration in designing and implementing the policies. When effectively planned and executed, the synergies of and partnerships between scientific, local and Indigenous knowledge can promote the co-creation of adaptation plans that are specifically tailored to address specific community needs (Deitz & Arnold, 2021). Collaborative community-engaged research involving researchers, stakeholders, and the public can play a significant role in assisting municipalities and local government units in the development of adaptation plans, strategies, and solutions across Atlantic Canada (Chouinard et al., 2017).

2.2 Planned Relocation as a Climate Change Adaptation Strategy

The above section provided an understanding of the climate change threats in Canada, NL and Port aux Basques, as well as the various ways through which governments, communities, and other groups are contributing to the development of adaptation strategies. The next section reviews relevant literature on climate-related relocation.

2.2.1 Definition and Contextualization of Planned Relocation

The term relocation, and more specifically planned climate-related relocation (CRR), is used as an overarching term in this thesis to include other forms of movement such as managed retreat, resettlement, strategic withdrawal, and other permanent forms of movement. A look at the relocation literature reveals different concepts which are collectively synthesized and presented in this research to provide a more wholesome understanding of the concept within the context of climate change and CRR. For instance, relocation has been widely defined in the literature, with some researchers using it as synonymous with resettlement. Referring to definitions of relocation (or resettlement), McAdam & Ferris (2015) argued that it is crucial to clarify the use of such terms, especially when their interpretations are important for making policy decisions. They defined relocation as a “physical process of moving people,”

which “can be voluntary or forced, large-scale or small-scale” (p. 140), distinguishing it from resettlement. McAdam & Ferris (2015, p. 141) added that while “relocation’ [is] the physical movement of people… ‘resettlement’ [is] the process of restoring communities and socio-economic conditions”. They argued that relocation can be devoid of resettlement (the reconstruction of livelihoods and lifeways), but resettlement is never without relocation.

Planned relocation is often focused on the technical and engineering effort of providing physical needs like new houses and infrastructure to individuals rather than the non-technical dimensions (Arnall et al., 2019; Bronen & Chapin, 2013). In the context of this research, relocation entails both, highlighting physical movement but also the psychological, social, cultural, and economic dimensions of restoring communities and socio-economic conditions. In this vein, for Dannenberg et al. (2019, p.12), “relocation…is not about moving houses, it’s about moving lives.” As such, since relocation is about moving lives and not houses, those who are moved are supposed to be at the centre of relocation decision-making, and this brings to question who determines relocation as a last resort within the context of climate change. Ferris (2015) also noted that relocation outcomes hinge on other crucial factors, such as recreating livelihoods, restoring public services, and actively involving communities in decision-making processes. It is worth noting that the reconstruction of livelihoods is an important component of a whole community relocation to a totally new area rather than the relocation of neighbourhoods to other locations within the same community. This is because, in inter-neighbourhood relocation programs, people are still a part of the original settlement and experience minimal to less disruption to their livelihoods.

Amidst these nuances and complexities regarding relocation, however, within the context of climate change, relocation[7] involves moving people who have been affected or are anticipated to be affected either by slow occurring events like sea level rise or rapid onset ones like hurricanes. In such instances, the goal is to move people from harm's way into safer locations before a disaster happens or after the disaster, where reconstruction or re-establishment in the disaster environment is deemed dangerous or outrightly forbidden. Relocation can be a whole community movement or just a section of the community (neighbourhoods) that is affected or projected to be more prone to natural disasters. For instance, in Port aux Basques following Hurricane Fiona, neighbourhoods that had been severely affected were deemed no longer safe, necessitating the movement of all persons living in the buffer areas identified by government officials.

Taking the above reasons into consideration, CRR can be informed by related concepts such as resettlement, relocation, managed retreat, and planned retreat, which involve either the movements of whole or parts of communities and may be temporary or permanent. Planned relocation for environmental change reasons and CRR are similar in meaning and are used outside of this thesis interchangeably. Thus, this thesis draws on Ferris et al.'s (2015) planned relocation to help define CCR:

> A planned process in which persons or groups of persons move or are moved away from their homes, settled in a new location, and provided with the conditions for rebuilding their lives. Planned Relocation is carried out under the authority of the state, takes place within national borders, and is undertaken to protect people from risks related to disasters and environmental change, including the effects of climate change. Such Planned Relocation may be carried out at the individual, household, and/or community levels (Ferris et al., 2015, p. 9).

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[7] The terms "managed retreat" (Hino et al., 2017), "planned retreat" (Abel et al., 2011), "planned relocation" (UNHCR, 2014), managed re-alignment and resettlement are used interchangeably in the literature. Koslov (2016), however, noted that some communities might prefer the latter two terms, "planned relocation" and "managed realignment due to the potentially negative connotations associated with the term "retreat."

What distinguishes CRR from other forms of movement like evacuation is that relocation is intended to be permanent (McAdam & Ferris, 2015; Qing et al., 2022). People who relocate are seldom allowed to return to their areas of origin for any length of time (Qing et al., 2022). In most cases, relocation programs require that the land in the affected areas be designated as open space for recreational or other public purposes in perpetuity after the structures are removed (Bronen & Chapin, 2013).

As noted in the definition above, CCR may take place at individual, household, and/or community levels. Forsyth and Peiser (2021) present two approaches, including (a) the movement of an entire neighbourhood to a carefully planned area in what they call a whole community retreat and (b) the creation of a comprehensive new town accommodating people from one or more towns referred to as 'new community retreat'. Other approaches exist where individuals or families are allowed to move in a less coordinated manner to any location within a safe region. Disadvantages of this approach can include loss of livelihood and social ties and difficulty finding affordable accommodation. Dispersed relocation has the tendency to create sprawl around the fringes of neighbouring towns, while the cost of developing entirely new towns makes the dispersal approach often preferred since it requires less government funding or intervention (Forsyth & Peiser, 2021).

2.2.2 Increasing Recognition of Relocation as an Adaption Strategy

In recent years, CRR has garnered significant attention as weather-related events have increased both in frequency and severity, with the potential to make many places uninhabitable (Marter-Kenyon, 2020). Various levels of government are considering CRR for coastal communities within their jurisdictions (Arnall et al., 2019; McAdam & Ferris, 2015), ranging from permanent movement of small populations to large-scale relocations (McAdam & Ferris, 2015). International agencies, such as the United Nations Environment Programme, the United Nations High Commissioner for Refugees, and the Asian Development Bank, have

given their endorsement to relocation as a response to climate change (Marter-Kenyon, 2020). According to López-Carr & Marter-Kenyon (2015), the official recognition of relocation by the United Nations Framework Convention on Climate Change (UNFCCC) did not occur until 2010, when the Conference of the Parties to the (UNFCCC) reached an agreement and acknowledged that relocation and other forms of mobility constitute adaptation to climate change (Arnall, 2019; Boston et al., 2021; Ferris, 2015; Garimella, 2022). As synthesized by Ferris (2015, p. 110), the agreement implored countries to take action to "enhance understanding, coordination, and cooperation with regard to climate change induced displacement, … and planned relocation".

Thus, planned relocation is captured in the Cancún Adaptation Framework as an adaptation strategy that qualifies for climate change adaptation funding. The Framework uses the term 'planned relocation' to highlight the need for preparation for greater climate change impacts (Ferris et al., 2015). Again, CRR is also reflected in the Sendai Framework for Disaster Risk Reduction 2015-2030 targets (Ferris et al., 2015), which predicts that various individuals may require relocation moving forward. This includes individuals in areas prone to sudden onset of natural disasters, individuals whose livelihoods are threatened by the gradual effects of climate change, and people in specific regions within a country subject to destruction (Ferris, 2012). The Sendai Framework "was the first major agreement of the post-2015 development agenda and provides Member States with concrete actions to protect development gains from the risk of disaster" (UNDRR, n.d).

2.2.3 Relocation as a Climate Change Adaptation Strategy

2.2.3.1 Community-initiated Relocation

In certain instances, communities have concluded that they need to relocate due to the impacts of climate change (Ferris, 2015). In Alaska, for example, several Indigenous

communities have proactively devised plans to relocate. The communities of Kivalina, Newtok, and Shishmaref have concluded that the only way to protect themselves and reduce vulnerability is to relocate (Bronen & Chapin, 2013), with Newtok becoming the first community to collectively move to a new location in November 2022 due to climate change (Beaumont, 2022). The other two communities are still in various stages of the relocation planning process (Beaumont, 2022; Rossen & Beacon, 2024).

In Isle de Jean Charles, Louisiana, in the United States, residents were actively involved in planning for a relocation due to the compounding effects of climate events such as coastal erosion, hurricane-related flooding, and sea level rise that was making the community almost uninhabitable (Dannenberg et al., 2019). Relocatees[8], predominantly of American Indian descent (Biloxi-Chitimacha-Choctaw Tribe), applied for funding for the move through a National Disaster Resilience Competition and helped develop The New Isle, a new community about 40 miles north of Isle de Jean Charles over more than six years (Sherriff, 2024).

While examples of community-initiated relocation programs are limited, Hino et al. (2017) argued that there are best results for relocation if the move is initiated by communities themselves rather than being imposed on them by an external entity. For instance, in their assessment of eight different relocation examples around the world, they found that the programs were largely successful —which they attributed to strong community ownership of the relocation process, although some faced significant financial, legal and institutional barriers during the process (Hino et al., 2017).

[8] Relocated persons/relocatees means persons or groups of persons who take part in a planned relocation, or who have agreed to take part in a future planned relocation, or both, as relevant (Ferris et al., 2015).

2.2.3.2 State-led Relocation

Some governments have taken a leading role in making relocation decisions following major catastrophic events in several jurisdictions. For instance, following the river basin flooding in Upper Mississippi in 1993, the state government, through a participatory approach, moved several communities in the affected areas of Illinois and Missouri with funds from the federal government (Forsyth & Peiser, 2021). However, during the process of relocation planning, some residents decided to move to neighbouring communities due to the lengthy process of planning and administrative bureaucracy (Knobloch, 2005). Another example is the flooding in Queensland, Australia, between 2010 and 2011, which displaced roughly 370 residents and destroyed about 90 percent of homes (Forsyth & Peiser, 2021). The Regional Council of Lockyer Valley took the initiative to purchase 377 hectares of neighbouring land and implemented a land-swap program that enabled residents to voluntarily exchange their damaged land for new properties within the designated relocation site (Okada et al., 2014; Sipe & Vella, 2014).

In Japan, in March 2011, a magnitude 9.0 earthquake and resultant tsunami killed approximately 18,500 people and destroyed 130,000 homes (Pinter et al., 2019). In response, the Japanese government barred the reconstruction of residential development in the hazard-prone areas and resettled several communities (Pinter et al., 2019). Forsyth and Peiser (2021) observed that as of 2019, the Japanese government was still actively engaged in reconstruction from the disaster, with emphasis on a ‘whole group’ relocation strategy. Unlike previous examples, the Japanese government worked with communities. A typical example is the community of Kitakami. Here, a grassroots planning committee played a crucial role in providing “the government with design and planning input for the new communities" (Pinter et al., 2019, p.7). This approach allowed survivors from each original village to relocate together, preserving the social cohesion of each community (Pinter et al., 2019). In another

example, a population survey of older individuals was conducted in the community of Iwanuma before and after the disaster. With 3,594 survivors, 175 had been compelled to relocate following the event (Hikichi et al., 2017). Survivors had the option to relocate as a group into temporary housing units or individually into public and private housing (Hikichi et al., 2017). Hikichi et al. (2017) noted that those who chose to relocate together experienced improved informal social ties, though not an overall increase in social cohesion. This is because residents engaged in activities such as regular check-ins with affected victims' families, organizing disaster preparedness drills, and collaborating with local and government officials to assess community needs (Forsyth & Peiser, 2021; Hikichi et al., 2017).

Other successful examples are evident from Vunidogoloa, Fiji, which traced its success to effective public involvement in decision-making processes, the use of both government and community resources, the presence of community-owned land, support from churches, and an adjustment of community livelihoods (McNamara & Des Combes, 2015). The example of Vunidogoloa has been instrumental in shaping the development of national relocation guidelines for Fiji (Dannenberg et al., 2019; Garimella, 2022), with other successful relocation examples since that time. Currently, other adaptation strategies, like sea walls and other engineering approaches, are viewed as temporary solutions, with increasing attention on relocation as a preferred adaptation strategy (Dannenberg et al., 2019; Garimella, 2022). Despite acknowledging that relocation is to be considered a last resort due to the challenging and time-consuming processes involved, the Fijian government is still actively pursuing this strategy and has initiated the preparation of National Relocation Guidelines that aim to establish the necessary legal and governance framework, specifically focusing on the relocation of coastal communities impacted by climate change and natural disasters (Dannenberg et al., 2019). Countries such as Papua New Guinea also have success stories of relocation initiatives, and several other developing nations, such as Uganda and Bhutan, have

drafted national climate change adaptation strategies that include provisions for relocation (López-Carr & Marter-Kenyon, 2015).

2.2.3.3 Implementing State-Led Relocation Programs

With the proliferation of relocation as a climate response strategy, it is important to learn how different forms of relocation have been applied, including the approaches and tools used in NL and elsewhere. Past examples can provide background into understanding and gauging the receptivity of new relocation policies.

Over the past five decades, relocations have involved corporate and government buy-outs for the purpose of large-scale infrastructure developments such as the construction of dams for hydroelectric power projects, agricultural purposes, or other projects (Ferris & Bower, 2023; McAdam & Ferris, 2015). In certain instances, driven by various political considerations, governments have intervened by either encouraging or coercing communities to relocate for perceived public interest and individual welfare (Arnall, 2019; Mortreux et al., 2018). In Canada, for example, driven by the motivation to gain sovereignty over the High Artic Region, the Canadian government resettled Inuit families to Resolute Bay and Grise Fiord in the 1950s (see Grant, 2016).

In Laos, the government's relocation program has been driven by five distinct objectives: “opium eradication, addressing security concerns, enhancing access and service delivery, fostering cultural integration and nation-building, and eliminating or reducing shifting agriculture” (Arnall, 2019, p. 256). Furthermore, resettlement initiatives such as those in Tanzania and Ethiopia portrayed explicit goals centred on rural development and poverty reduction alongside underlying objectives that align with government interests in consolidating rural populations (Arnall, 2019).

In NL, there have been three different resettlement programs. The first government-led resettlement program (also known as the Centralization Plan) was driven largely by the need to reduce the administrative cost of managing communities scattered across the province (Cote & Pottie-Sherman, 2020). Instead, a regionalized system of administration was envisaged by the then-premier Joseph R. Smallwood as a catalyst for growth, development, and collective prosperity through the establishment of growth centres (Côté & Pottie-Sherman, 2020; Matthews, 1975). This resettlement program operated between 1945 and 1956 and saw a total of 115 communities resettled in the process (Côté & Pottie-Sherman, 2020). The second program was introduced after the collapse of the cod fishing industry, known as the Newfoundland Fisheries Household Program or The Resettlement Scheme, which operated between (1970-1977). Both programs collectively resulted in the movement of 20,614 people (or 4,094 households) (Côté & Pottie-Sherman, 2020). The third resettlement program, the Community Relocation Policy, succeeded the Resettlement Scheme in 2009 (Côté & Pottie-Sherman, 2020). This Policy, which is still operational, was mainly motivated by the economic difficulties brought on by the declining fisheries industry and resulted in several outport communities tending in applications for resettlement, especially after the government increased the buyout package offered to families from $100,000 to $270,000 per household (Government of Newfoundland and Labrador, 2013). To qualify for relocation/resettlement after going through all the due processes, at least 90 percent of the permanent residents of the community must demonstrate acceptance to move, determined through voting (Côté & Pottie-Sherman, 2020).

Similarly, in recent years, government development strategies that entail the resettlement of populations are now being re-structured as climate change adaptation measures (Mortreux et al., 2018). Both China and Vietnam's governments have undertaken significant relocation efforts, driven at least partially by environmental motivations (López-Carr & Marter-Kenyon,

2015). In Vietnam, communities have been relocated not only to mitigate the risk of flooding but also as a component of the country's climate change adaptation strategies (Ferris, 2016). State-led relocation programs were done in the Northern regions of Vietnam between 1961 and 1975 by moving people away from regions with a high risk of flash flooding and landslides and also reducing poverty (Ferris & Weerasinghe, 2020). The primary aim was not only to address disasters but also to aid individuals from economically disadvantaged regions, including nomadic populations and those in border areas, potentially for national security interests (Ferris & Weerasinghe, 2020). Rogers and Xue (2015) have highlighted how existing state-led relocation initiatives, initially designed to alleviate poverty and prevent environmental degradation in China, are now being rebranded as climate change adaptation measures.

Examples in NL and elsewhere suggest that non-climate relocations can undermine the effectiveness of CRR when the need arises. Further, they highlight the importance of community input and context-sensitive relocations. It is apparent that the best results are achieved when the community drives the relocation process and when provisions are made for the contextual complexities in the process.

2.2.4 Advantages of Climate-Related Relocation

CRR, if effectively carried out, can benefit vulnerable communities in several ways and could be used both as a preventive and responsive tool that will become increasingly important in mitigating the risks associated with disasters and displacement (Ferris & Weerasinghe, 2020). Relocation can ensure the safety and security of communities by moving them from harm's way (Arnall, 2019). One predominant rationale is to safeguard vulnerable citizens (Montreux; Ferris & Weerasinghe, 2020; Hino et al., 2017; McAdam, 2015); Hanna et al., 2019), sometimes as a product of the rapid onset of events and other times in preparation before a situation becomes catastrophic (Ferris & Bower, 2023). Further, "as a tool for preventing and

responding to disasters, [CRR] can help prevent climate sprawl, scattered new development on the urban urge, climate gentrification or increased housing demand and prices in attractive established areas" (Forsyth & Peiser, 2021, p.1). Strategic planning for relocations can help governments take proactive measures to prevent potential crises arising from climate emergencies (Garimella, 2022; McNamara & Des Combes, 2015).

The provision of new housing is a critical component of the relocation process. Depending on resource availability, Dennenberg et al. (2019) stated it may result in better quality housing than those in the retreating areas. In the case of Newtok, relocating to the new site in Mertarvik was reported to have significantly improved the living conditions of residents (Rosen & Beacon, 2024). One of the residents whose daughter experienced health issues in the previous location reported an improvement in her health situation after moving to the new site. "After moving over to the new village site, we noticed all of our health improved, especially for my daughter who grew up with asthma; after we moved over to our new home, she grew out of her asthma problem" (Rosen & Beacon, 2024).

Relocation can present developmental prospects and improve the quality of life for individuals, especially for those residing in very remote areas by connecting them to essential physical and social amenities, including roads, schools, and hospitals (Arnall, 2019). It can also become an avenue for preventing poverty and vulnerability in rural areas. For instance, in the Ningxia Province of China, relocation was used as an adaptation strategy to reduce climate-borne poverty, involving 786,000 people (Zheng et al., 2013). Relocation programs are believed to have better outcomes and benefits than forced displacement during emergencies and present the opportunity to protect lives and maintain family ties at the same time (Mbiyozo, 2021). In New Zealand, government-led relocation programs following earthquakes resulted in enhanced quality of life for women and their families (see Hoang & Noy, 2020). Similarly, in the climate-induced relocation in coastal Vunidogoloa, Fiji, women

expressed significant advantages from the process due to their active participation in planning processes. It also allowed the villagers to preserve their physical, socio-cultural, ancestral, and spiritual connections to their homeland while ensuring continued access to land and livelihood resources (see McMichael et al., 2019).

2.2.5 The Downsides of Climate-Related Relocation as an Adaptation Strategy

Regardless of the above-mentioned benefits of relocation, it is not without challenges. Garimella (2022) summarised these challenges into five main areas, including political, technical/planning, human rights, socio-cultural, and health challenges. He further noted that these layers of challenges could arise at any stage during the relocation process (Dannenberg et al., 2019). A major challenge in relocating communities is the availability of land. Finding land for the construction of new settlements can be very difficult, especially in locations with limited available land or strict zoning regulations. Available lands may be designated for other purposes or as no-development zones due to various risk factors (Geisler & Currens, 2017). In Oceania, for example, due to the land-person relationship and the cultural and customary regulations governing the ownership of land, finding land for the reconstruction of new dwellings is often difficult (Boege, 2016). This is because "most land is customary land and cannot be bought, sold or even given away unless sanctioned by traditional forms of land exchange which are relatively rare" (Boege, 2016, p. 63). This makes it difficult to find land for community relocation, especially for whole-community relocation (Forsyth & Peiser, 2021). In Carteret Islands, Papua New Guinea, a community faced with sea level rise, several attempts to relocate the community since 1960 have been futile due to the absence of suitable land (see Edwards, 2013).

There is also a sense of anxiety over how relationships will play out between new settlers (relocatees) and residents (Boege, 2016). Interactions between relocatees and receiving communities could be a significant source of potential conflict as relocation affects not only

relocatees but also receiving communities. Ferris (2015) reported unwillingness to relocate due to fear of the inability to make a living in a different location, fear of being a burden to other communities, and the need to compete for jobs with the local people (López-Carr & Marter-Kenyon, 2015).

Relocation can also result in the loss of cultural heritage (Boston et al., 2021) and weaken community ties and resilience (Forsyth & Peiser, 2021). In several instances, the most effective approach to safeguard cultures and social connections will involve relocating entire communities (López-Carr & Marter-Kenyon, 2015) which is often very cumbersome. Forsyth and Pieser (2021) argued that, socially, individuals often form strong attachments to specific places, encompassing both the physical and social dimensions. Boege (2016) argued that the unwillingness of people to relocate is influenced by fear of losing their cultural and social support, cohesion, and community resilience and that to mitigate this problem, any relocation attempt must include entire communities. Relocation can undermine social capital, particularly among residents with a strong sense of attachment to their place (Torres & Casey, 2017). This was evident in Northern Australia, where several people opposed the relocation ideas when faced with rising sea levels and cyclones, and a number of displaced communities returned soon after the immediate threat (Black et al., 2013).

The prospect of relocation can be traumatic, especially when individuals are compelled to make such decisions and when coupled with other previous traumas (Sherriff, 2024), through the loss of connection to one’s original place and severing of ties that people relied on. Social ties present within communities play a crucial role in mental health outcomes and influence an individual's ability to manage stress and overall well-being. Strong social connections and support systems can contribute significantly to a person's mental resilience and coping mechanisms in difficult situations (Forsyth & Peiser, 2021). Dannernberg et al. (2019) cited that relocation has been identified to have disruptive impacts across various dimensions,

including disruptive health and sociocultural and economic consequences experienced by populations that relocate. It can also be a potential trigger for mental health issues, including anxiety, depression, substance abuse, and even suicide (Dannenberg et al., 2019).

Direct health impacts of relocation that relate to mental health, according to McMichael et al. (2010), include water and sanitation, food security and injury. Recent instances from the literature on natural hazards indicate that relocation as a strategy for disaster risk reduction may impede the sustainable formation of livelihoods among relocatees (Arnall, 2019). Food security concerns may arise for relocatees, especially those reliant on subsistence fishing and agriculture (Dannenberg et al., 2019), through the loss of access to fishing sites and suitable agricultural land. Additionally, displaced residents may face challenges in accessing clean drinking water, which could exacerbate the vulnerabilities of displaced people (Dannenberg et al., 2019).

The previously discussed examples of relocation in NL are also believed to have contributed to trauma and other psychological reactions among several of the people that moved which came about over the insufficiency of the resettlement packages to enable them to re-establish themselves, among a host of other difficulties they faced integrating into their new communities, including discrimination (Blake, 2023). Arnall (2019) added that “relying on relocation as a response measure can foreclose other less drastic adaptation options, such as the construction of sea walls or the installation of early warning systems that, by themselves, can do much to avoid climate change impacts” (Arnall, 2019, p. 254).

2.2.6 Principles of Relocation as an Adaptation Strategy

Arnall (2019) identified three core principles that should govern any relocation process. For him, relocation must be (a) a last resort, (b) voluntary, and (c) Developmental.

First, he argued that relocation as an adaptation strategy must be done as a last resort and only when it is completely necessary (Arnall, 2019; Marter-Kenyon, 2020).This is to forestall the use of relocation by governments for political and economic gains and protect communities against the indiscriminate use of government power (Arnall, 2019). As such, relocation should only be deployed as an adaptation strategy when it becomes imperative to forestall its abuse.

Second, relocation as an adaptation strategy must be voluntary. The process should allow affected communities to decide if they want to relocate and whether they want to stay behind. Obtaining the voluntary and well-informed consent of impacted communities regarding decisions on relocation, the terms and conditions of movement, acceptance and integration into new societies significantly shape the long-term success of such initiatives (Arnall, 2019). In cases where relocation is involuntary, McAdam (2015) argues, it almost always results in failure. Voluntary relocation helps prevent issues linked to resistance from relocatees since incorporating the perspectives and ideas of relocatees in an inclusive manner can result in better-designed programs that more accurately address the needs and expectations of those being relocated (Arnall, 2019).

One problem with voluntary relocations is that sometimes what is branded voluntary may not actually be. Incorporating a partial element of voluntary participation in a relocation program allows governments and aid agencies to often characterize the operation as entirely voluntary when, in fact, it presents a grey area, and there may be a somewhat ‘artificial’ distinction between voluntary and forced relocation (Arnall, 2019; Ferris, 2015). The truth is that even if a community decides to relocate on their own, they are compelled by one thing or the other, often by environmental forces. One could argue that individuals engaged in planned relocation are compelled to move due to factors beyond their control (Ferris et al., 2015). As one resident of Isle de Jean Charles, Louisiana, explains, "This was not a forced resettlement…

This was all done on a voluntary basis. But I do feel forced by climate change…We did not leave the place because we wanted to. We left because we felt we had no choice. We left because of coastal erosion" (Brunet in Sherriff, 2024).

Third, relocation must be developmental. Those moved should ideally experience an enhancement in their long-term well-being in the new settlements. Regardless of whom the relocation idea originates from, the process should be comprehensive and make provision for the needs of people to be moved. For Arnall et al. (2013), restoration of livelihoods is the most crucial determining factor in evaluating the effectiveness and success of relocation initiatives. According to Arnall (2019), under no circumstance should relocation make relocatees worse off than they were. The relocation program must ensure that livelihoods and other critical needs are provided, such as a smooth transition to and integration into their new environment. However, it is also important to acknowledge that developmental relocations are often difficult to achieve due to resource constraints. Achieving effective restoration of livelihoods typically demands significant resources. For the millions of people facing climate displacement in Africa and Asia, for example, the costs associated with resettlement in these regions are expected to exceed all financial transfers under multilateral and bilateral development cooperations (Arnall, 2019).

These principles in the context of CRR are important for several reasons. Principles can serve as guidelines that inform CRR policy and planning processes in different contexts. They bring clarity to difficult decisions and contribute to the justifiable execution of relocation and related government policies. For this thesis, these principles provide an appreciation of the salient issues that need to be considered and a backdrop for understanding community perspectives on the case study. Despite their importance, some missing links exist regarding these principles. Clarity is needed, for example, on who determines relocation as a last resort and under what circumstances. The principles also hinge on an understanding of the context

of CRR, including what important contextual elements might exist in communities and what relocation might look like if driven by community/local context. The notion that relocation may lead to development also needs to be understood through the lens of community, as what constitutes development for policymakers may not mean the same for communities. These gaps highlight that 'community' must be at the centre of relocation decision-making and create space for empirical exploration of potential and additional principles to those outlined by Arnall (2019):

- Context sensitive (in its determination/use as a last resort, should reveal local perspectives, interests, opinions, needs, and situations, including intra-context differences).
- Empowering for participating communities (through the use of community knowledge and decision-making power for action).
- Devoid of indignity (respect human rights, human dignity and the right to self-determination as it relates to climate change adaptation and CRR).

In addition to Arnall's principles, Ferris (2017) identified five guiding elements that he believes are imperative for the smooth execution of any relocation project. These include (a) establishing and complying with an appropriate legal framework, (b) understanding and addressing the needs and impacts of planned relocations on affected populations, (c) providing information to undertake consultation[9] with and ensuring the participation of affected populations, (d) understanding and addressing complexities related to land issues, and (e) undertaking monitoring and evaluation and ensuring accountability. He further

[9] Consultation means affected populations are asked to offer their opinions, suggestions, and perspectives during relocation decision making process. Consultations can take multiple forms, including focus group discussions and interviews (McAdams & Ferris, 2015).

identified three stages of the process and argued for careful consideration of the five guiding principles at each stage (see Table 1 below). Though the policy planning process is in stages, some of the activities in the process may sometimes overlap depending on the nature and type of activity. Again, the difficulty and lengthy process of some activities may sometimes warrant that different activities spanning multiple stages are undertaken simultaneously.

Table 1: The Relationship between the Five Cross-cutting Elements and Three Key Stages of the Planned Relocation Process

	Stage 1: Deciding to relocate a group or community	**Stage 2: Pre-move planning**	**Stage 3: Implementation: before, during and after relocation**
1. Legal framework	Provides a legal basis for undertaking planned relocation and identifies who has the authority to make relocation decision	Provides a safeguard against arbitrary displacement and relocation to high-risk areas, identifies who is responsible and the rights of the affected population	Identifies how to comply with the prohibitions against non-discrimination and other rights of affected populations throughout the implementation process
2. Needs and impacts	Assessment of vulnerability and risk to the affected population is an essential component of making the decision to relocate	Detailed analysis of the socioeconomic and cultural characteristics, the needs of and expected impacts on people and communities is needed to plan appropriately	Relocation plans should be tailored to the cultural and socioeconomic characteristics of the affected population, include measures to mitigate or compensate for any adverse impacts to ensure success
3. Information, consultation, and participation	Engagement of the affected population is needed in making the decision to relocate	Engagement of the affected population is needed in the planning process	Continuous involvement by the affected population is crucial during plan implementation
4. Land	Determine if land is available for relocation before deciding on planned relocation	Understand the land tenure system, decide the use of vacated land, and acquire or prepare land for settlement	Continuous assessment of the suitability of land is needed during implementation, resolve any disputes over land
5. Monitoring, evaluation, and accountability	Risk assessments are key to making a relocation decision	Determine baselines and set up monitoring, evaluation, and accountability mechanisms as part of the plan	Experiences of implementation feed into monitoring, evaluation, and accountability process, including modifying those mechanisms as necessary

Source: (Ferris, 2017, p. 9).

Table 1 shows that the first step in the relocation process is to establish a legal basis for the relocation process, which will help ensure that successive governments stick to the original plan and intent of the relocation initiative. This is important as relocation programs often span several generations, involving different successive governments with divergent views and differing political priorities and agendas (Ferris, 2017). Ideally, this legal basis will outline project details. A well-defined, cohesive, and inclusive framework that incorporates human rights principles not only ensures that the decision-making, planning, and execution of CRR align with human right principles but also stays true to original intent, objectives, and vision (Ferris, 2017). This will minimize community resistance through particular attention to community perspectives, views and needs and safeguard against the (re)creation of maladaptive outcomes. Thus, relocation must address human dignity issues in its design and implantation where communities are seen as decision makers than decision 'takers or accepters'. Legal frameworks that spell out the details of community engagement and compensation packages and how those packages are determined can help prevent poor execution of relocation and give affected individuals immunity against sudden changes. For instance, following a landslide in Myanmar in 2015, the government's framework for the recovery of the flood victims stressed the need for communities to be well-consulted in the relocation decision-making process. This includes their inclusion in the development of compensation packages, the selection of relocation sites as well as a grievance and appeal system that allows dissatisfied residents to appeal the process (Thomas, 2016). Apart from being a part of the decision-making process, the ability to appeal the process is yet another important layer to ensure affected residents do not feel suppressed by government decisions.

The development of a legal framework is followed by the needs and impacts assessment/consultation stage, as suggested by the Myanmar example above. This involves the assessment of individual needs and how relocation may impact people's lives. Here,

Ferris reasoned the need to actively engage with communities to understand the concerns of people who will be affected by relocation (Ferris, 2017). According to Ferris (2017), issues such as the homogeneity among people in a specific location, the strength of their socio-cultural and economic ties, the level of social cohesion, collective identity, and their attachment to the place they reside should all be considered before rolling out relocation policies (Ferris, 2017). This will ensure that policies are tailored to the specific needs of specific people. Similarly, relocation may involve neighbourhoods and groups of individuals that reside in close physical proximity but do not share a sense of collective identity; thus, engaging with the different groups will likely require different approaches. From the initial decision to relocate, to carrying out the relocation program and after, proper information, participation, and consultations are necessary for the success.

For instance, in doing collaborative community research, Andress et al. (2020) argued that not only are collaborations necessary, but the quality of such collaborations has a bearing on the success or otherwise of research outcomes, and the same can be said for any government policy. The quality of engagement is important because sometimes institutions looking to execute policies may hide under the guise of engagement to execute their programs and policies, though those engagements may not be the best quality in real terms. According to Hernández et al. (2016), engaging communities in meaningful horizontal and inclusive dialogue can determine the success of relocation processes and distinguish them from those that do otherwise. Meaningful, quality communication can induce social change throughout the participating community for a collective benefit (see Servaes, 2022). A study to understand the importance of communication and other relevant factors in community-based disaster preparedness and prevention meetings (CBDPP) in the city of Kitakyushu revealed how indispensable proper communication and relationships were for desirable outcomes. Findings from the research suggest that effective relationships and communication within

local communities were crucial components of (CBDPP). These meetings provide a platform that facilitates the establishment of a system where local residents can develop a robust awareness of disaster prevention and can voluntarily evacuate when necessary (Nakamura et al., 2017). This is achieved by boosting residents' motivation, goal intentions, and behavioural intentions through regular meetings and also by crafting a tangible and suitable community-based disaster prevention plan, which is essential for realizing the objectives (Nakamura et al., 2017). In the case of relocation, being well-informed about the reasons for relocation, potential benefits, and the overall process helps individuals and communities understand the necessity of moving.

Effective communication channels facilitate transparency and build trust between the relocating parties and the affected community by allowing community members to actively participate in the decision-making process, thereby creating a sense of ownership and control when their concerns and preferences are considered, increasing the likelihood of successful relocation outcomes. Bringing affected people together also provides avenues for emotional and psychological support through the sharing of concerns and a feeling of connectedness with people experiencing the same circumstance and a resultant improved mental health while going through the situation (see Hernández et al., 2016). Effective communication also eliminates the spreading of rumours and misinformation that could breed anxiety (UNHCR, n.d). Sometimes, building communication blocks for effective collaboration may not yield the intended outcomes. Nonetheless, they are still imperative. In Malawi, for example, relocation planning involves local community groups, national government committees, and other international organizations, and communication or information is expected to flow in a top-down and bottom-up manner. Nicholson (2022) noted that reaching a consensus on resettlement processes through the various committees proved challenging as community priorities do not appear to align with government priorities, leading to resistance to

government resettlement efforts among some community members. Howbeit, effective communication and community inclusion have led to a smooth implementation of relocation programs in other jurisdictions (Hino et al., 2017).

The involvement of various stakeholders and individuals is important to ensure that relocations do not (re)produce undesirable outcomes. Studies that have evaluated the methods used in the 1990s Upper Mississippi relocation process found best practices (Forsyth & Peiser, 2021) such as active participation of residents and collaboration with government officials to develop the master plan for the relocated community (Okada et al., 2018). This helped maintain strong social and communal connections within the displaced town, although it is worth noting that not everyone expressed satisfaction with the outcomes (Okada et al., 2018; Sipe & Vella, 2014). Proper information and details about the process must be conveyed to, and potentially by the persons to be relocated in meetings held at reasonable intervals agreed on by all parties involved. See Appendix A for suggested details for organizing meetings with relocated persons and Appendix B for a list of stakeholders and institutions to be consulted and involved in relocation planning.

Throughout the information and consultation process, one critical issue that will surface is the selection of the relocation site. Finding and acquiring land for relocation projects can be a very complex endeavour, partly due to land availability, customary land tenure issues, and zoning regulations (Boege, 2016; Ferris, 2017). Concerns could also arise regarding the eligibility of certain categories of people, such as renters, squatters, and landless people, including women, to own land, all of which may require careful consideration (Ferris, 2017).

The last element in the relocation process is monitoring and evaluation. Monitoring and evaluation processes serve various purposes within the context of CRR. They enable the government, relocated persons, and other stakeholders to assess progress, make necessary

adjustments, and identify effective practices and lessons that can enhance both current and future planned relocations. Being the final element does not mean it should only be done at the end of the process but throughout the entire process. This will also ensure that issues that emerge during each stage of the process are recognized and addressed. Program evaluations act as a mechanism to hold state authorities accountable and ensure the proper use of financial resources (Ferris, 2017). The application of monitoring, evaluation, and accountability measures help address fundamental questions such as whether relocated persons and other affected individuals are in a better condition—or at least no worse off than before the relocation occurred. Answers to such questions are crucial in determining when a planned relocation has concluded and when relocated persons no longer require assistance related to the relocation (Ferris, 2017). As illustrated in Table 1, the actual relocation process is divided into three stages. See Appendix C for more on the stages in the relocation process and the associated requisite actions.

2.2.7 Contextual Complexities and Factors in CRR

Relocation is informed by many factors at play in communities, ranging from resource availability, levels of risk, citizen engagement, cultural connections, local leadership, and the presence of requisite agencies and institutional frameworks to govern the process (Hanna et al., 2019). According to Ferris & Weerasinghe (2020) and Marter-Kenyon (2020), relocation is a very complex endeavour and requires careful planning and research to realize its benefits. Meanwhile, Marter-Kenyon (2020) argued that the complexity of relocation transcends the attention it currently receives within the research and policy domains. In many developing nations, for instance, relocation can be a highly political process in connection with communities with fundamental questions regarding rural-urban interrelations —and can lead to uneven distribution of cost and benefits among relocatees (Arnall et al., 2019), which, when not properly addressed, could result in internal conflicts that will subsequently

undermine the pursuit of other relevant government policies (Boege, 2016). This underscores the need for due diligence in implementing such policies.

In Isle de Jean Charles, Louisiana, for example, following government funding to relocate the community and despite community involvement in the planning process, relocation efforts have faced impediments due to various factors in communities, including a strong sense of place attachment among the affected communities, lack of consensus regarding the necessity and location for relocation, limited job opportunities in potential relocation sites, and a general distrust of government interventions (Davenport & Robertson, 2016). Some of the most frequently noted factors in the literature reflect institutional and structural barriers, mistrust, and financial barriers.

2.2.7.1 Institutional and Structural Factors

The presence of designated agencies empowered to execute relocation programs with communities and the availability of comprehensive plans and frameworks to assist with policy implementation are all very imperative for a holistic, fair, and equitable relocation process. However, these are non-existent in many jurisdictions including in Canada. In the United States, for example, Bronen & Chapin (2013); Garimella (2022); López-Carr and Marter-Kenyon, (2015) contended the lack of organizations or frameworks authorized to relocate communities and rebuild their livelihoods. They further argued that deciding an appropriate strategy for relocating communities requires navigating the various complexities of community processes, including their social, political, and economic exposure to climate-related risk, as well as their adaptive capacities. Unfortunately, there is no authorization or funding for the conduct of such assessments (Bronen & Chapin, 2013; Garimella, 2022). The absence of designated agencies means communities willing to relocate have no specific place to direct their concerns as different agencies operate with their own rules and priorities. As such, the community of Newtok in Alaska, for example, has had to engage with around

twenty-five distinct federal, state, local, and civil society organizations as part of its efforts to undergo relocation (Garimella, 2022).

There is also no universally accepted governance approach for the conduct of relocation (see Dan and Burton, 2022). As with the principles outlined by Arnall (2019), which are not universally accepted and require fine tuning in the context of communities, effective governance approaches in relocation should reflect diversity of communities and heterogeneity within communities. Thus, the absence of universally agreed-upon governance frameworks for relocation, coupled with the complex nature of climate change decision-making, hinders adaptation planning and, more specifically, planning for relocation. In the United States, for instance, this has led to the slow execution of relocation plans in the community of Islands Jean Charles (Garimella, 2022). Although the Obama administration initiated the institutional and governance framework for the relocation of the community, the transition of authority and funding to empower the involved institutions to carry out the relocation did not occur before a change of government (Bronen, 2021; Garimella, 2022), resulting in a slow pace of events and an eventual abandonment of the program for a long time. Similarly, the Immediate Action Workgroup established as part of the Alaskan Climate Change Sub-Cabinet to identify communities impacted by climate change within the State of Alaska was dissolved following a change of the governor before the group could deliver on its mandate (Garimella, 2022). The Funding Agency, The Alaska Climate Change Mitigation Program, established to provide funding and other logistical support mechanisms for communities in planning for relocation was inadequate in the discharge of its duties (Garimella, 2022).

In Canada, despite the availability of a National Adaptation Strategy, there is no consideration for relocation as an adaptation strategy, and Canada is yet to have a framework and authorized funding stream for relocating communities exposed to climate risk despite the

increasing recovery cost paid by the federal government, particularly to flood victims. For example, the estimated annual cost of disaster recovery in Canada has increased to $902 million between 2017 and 2022, while projections suggest these costs could rocket to a range of $2.6 billion to $5.4 billion in the next few years and surpass $48 billion by 2080, mainly due to rising sea levels (Cameron, 2022). Despite this escalating cost of disaster payments, relocation plans are still reactive, with the Government of Canada trying to find cost-effective insurance programs for homeowners threatened by floods (Cameron, 2022; Public Safety Canada, 2022). This led to the creation of the Task Force on Flood Insurance and Relocation. The Task Force was asked to explore cost-effective flood insurance solutions for high-risk areas and assess the feasibility of strategic relocation in regions prone to recurrent flooding (Public Safety Canada, 2022). The outcome is to aid the formulation of a nationwide action plan to protect homeowners and aid them in possible relocations. However, the mandate of the Task Force does not include options for the relocation of entire communities and voluntary relocation of individuals in response to anticipated threats, nor does it make provision for other threats like wildfires and extreme temperature events (Cameron, 2022). Similar barriers were identified by Bronen & Chapin (2013) in their study of four Alaskan communities facing climate-induced threats.

2.2.7.2 Trust and Legitimacy

One significant problem with previous relocation activities that may hinder the acceptance and effective implementation of future relocation plans is the issue of trust and legitimacy. It is often difficult to distinguish between government intentions to carry out relocation programs purposefully for community benefits and those for other ulterior government ambitions, as discussed earlier. In jurisdictions with weakening state-community relations, the lack of trust/clarity of real government intentions could further ruin already fragile relations and stifle relocation plans. When there is a deficit in legitimation or trust, it

significantly erodes public support and commitment to change initiatives and hampers the ability of those in positions of power to mobilize resources effectively to promote cooperation and partnership (Hanna et al., 2019; Ferris & Bower, 2023). A lack of legitimacy or trust acts as a barrier that undermines the effectiveness of programs seeking to bring about change and highlights the importance of establishing and maintaining trust and legitimacy to foster collaboration and garner public support for such policies (Ferris & Bower, 2023). The presence of good governance will likely increase the likelihood that the population will trust the government machinery when it undertakes significant decisions like CRR and make people more inclined to believe that sufficient mechanisms are in place to prevent CRR from being used to achieve mischievous government intentions like land grabbing, economic exploitation, and other motives (Ferris et al., 2015).

Marter-Kenyon (2020) documented compelling evidence of relocation programs that satisfy hidden economic or political government objectives. In Mozambique, for example, flood resettlement programs were seen as a continuation of historical resettlement efforts aimed at exerting control and modernizing rural communities (Ferris & Weber, 2023). These examples demonstrate that planned relocation doesn't solely stem from the necessity to mitigate natural hazard risks. Instead, it almost invariably mirrors preexisting plans and power dynamics. Such disguises or nuanced government rationale could be problematic when climate change is used as a cover-up to perpetuate or re-invigorate unpopular government programs. In these cases, the inclination toward relocating populations introduces a potential layer of complexity to the political challenges associated with implementation and defeats the principle that relocation must be considered a last resort (Arnall, 2019). When the need truly arises for it to be considered a viable means of adaptation, those past experiences of its false use may make their acceptance less probable.

2.2.7.3 Financial Factors

According to Boston et al. (2021) there is gradual progress in establishing comprehensive national policy frameworks for climate change adaptation. However, in developed and developing countries, funding for proactive climate response responses is mostly ad hoc, poorly coordinated, and limited in scale and scope (Boston et al., 2021). At the same time, despite compounding evidence of the economic rewards associated with proactive resilience building and adaptation efforts (Boston et al., 2021; Cameron, 2022), global funding for proactive climate responses remains very insufficient (Boston et al., 2021). Existing national laws and funding streams are also mostly focused on addressing rapid-onset disasters, with little attention to gradual and prolonged events like sea-level rise (Boston et al., 2021; Noy, 2020). There are also concerns over the incidence of relocation costs (who really pays for relocation). While the cost of relocation is mostly paid by federal and national governments in developed nations, in developing countries, it is covered through foreign aid or a combination of foreign aid and domestic support, as in the case of the Philippines following Typhoon Haiyan (Boston et al., 2021). Such funds are usually in reaction to recovery or reconstruction efforts. In the absence of sufficient foreign/domestic support in the aftermath of such events, reconstruction and recovery responsibilities often fall back to individuals, particularly in less endowed nations, with ‘patches’ of assistance from small corporate or religious agencies in some cases. The financial need related to property loss, the demolition or relocation of structures, and the rehabilitation of the affected site is often high when relocation is required (Hanna et al., 2019).

In NL, funding allocations are in place for those relocated, but this policy has been focused on resettling small remote communities rather than a climate change response initiative. Individuals are guaranteed a resettlement amount of 270,000 Canadian dollars, an amount that was previously increased from 100,000, almost three times the initial amount (Roberts,

2021). Ad-hoc relocation funding programs for climate related issues have surfaced lately where the Government of NL offered to provide financial aid to some communities impacted by floods. In 2022, the government provided relocation funding to Mud Lake residents. The amount payable to affected property owners was determined based on the number of people dwelling in the home. Homes with one person were eligible for $250,000, those with two $260,000, and those with more than two qualified for $270,000 (Atlantic Briefs Desk, 2022). Similarly, following Hurricane Fiona, affected individuals in Port aux Basques, for instance, were paid relocation settlement amounts determined per square kilometre of their homes. One thing that cuts across both situations is that the amount of the financial compensation was inadequate to re-construct new homes without supplements from other sources. Ferris and Bower (2023) noted that relocation programs are very expensive to undertake and can cost several millions of dollars to be effectively carried out. In Isle De Jean Charles, relocating 35 families in 2022 cost 48 million dollars. The cost of relocating the Village of Kivalina is estimated at $400 million and translates to approximately $1 million per resident. (Ferris & Bower, 2023). Effective implementation, well-crafted policy frameworks and strong funding mechanisms are all essential for pre-anticipatory interventions at both the international and national levels.

2.3 Determinants of Relocation Behaviour

An important suite of factors for relocation reflects determinants of relocation willingness, an area of research requiring examples in the context of CRR. Several factors influence the willingness of people to relocate in the face of risk or climate events. These include their perception of the event in question, sense of place/place attachment, and other perceived challenges they foresee relocating will expose them to. When people juxtapose the challenges of relocation against the outcomes, they may either be deterred or willing to relocate.

2.3.1 Sense of Place or Place Attachment

Individuals are intricately connected to their environment, called “place” (Long & Perkins, 2007), a construct developed over time through various levels of social interaction (Feng et al., 2022). This connection develops over time through various levels of interaction and shapes communal relationships and social capital on which people depend. According to Long & Perkins (2007), this connection to ‘place’ can manifest at various levels such as blocks, neighbourhoods and the community at large based on the satisfactions people derive from the unit of interest, though a strong sense of connection to a block or neighbourhood may not automatically result in a strong sense of community. The extent of attachment to or satisfaction with place shapes how individuals cope and either motivates or discourages adaptive responses like relocation (Lie et al., 2023). Some consider place as the extension of the ‘self’ which arises from residents' strong connections to their homes and communities or the closeness to the environment, landscape or the ocean (Dachary-Bernard et al., 2019). Such strong connections make abandonment of those environments especially difficult because the distortion in place is seen not just as a distortion of the physical environment but also a distortion of a person’s living fabric and support system and could induce mental or psychological reactions (Hanna et al., 2019; Woodhall-Melnik & Weissman, 2023) and grief (Cunsolo et al., 2018). Thus, the self and place are entangled, making separation (permanent abandonment) emotionally tasking (Neef, 2022). This makes people eagerly willing to return in instances where they have left those places regardless of whether it is voluntary or forced (Holley et al., 2022).

Place attachment is defined as an “emotional bond between individuals or groups and their environment, catalysed by the social and physical characteristics of the location” (Holley et al., 2022, p. 617). For Willox et al. (2012) “this (…) attachment to place is (…) a physical feeling, a psychological (…), and socio-cultural process defined through history, ancestry,

and the sense and meaning individuals and collectives apply to a particular place" which collectively influences how a place is experienced (Willox et al., 2012, p. 539). Despite varying conceptualizations, there is a consensus among most researchers that place attachment encompasses physical, socio-cultural, symbolic, and psychological dimensions (Bonaiuto et al., 2016). People establish bonds with places over time for a number of reasons. Factors such as place meaning, place satisfaction, place knowledge and beliefs all contribute to how attached a person will be to a place (Bonaiuto et al., 2016; Holley et al., 2022), and a 'topophilia', which is the bond between people and the environment, may be formed (Feng et al., 2022). How a place is experienced determines behavioural outcomes when that place is threatened (Willox et al., 2012). Factors such as place identity, place dependency, family bonding, friend bonding, and nature bonding contribute to a stronger sense of place (Lie et al., 2023; Woodhall-Melnik & Weissman, 2023; Stedman, 2003) with less likelihood of engaging in risk-averting behaviour (Bonaiuto et al., 2016; Feng et al., 2022).

A strong sense of community and high community experience outcomes are likely to make members come together in times of crisis to collectively combat whatever situation is threatening their community, which could make abandoning that place very difficult (in essence, unwillingness to relocate). Feng et al. (2022, p. 2) put it this way, "Individuals who are attached to a place are more likely to protect it and participate in civic activities conducive to the local environment". Also, Woodhall-Melnik and Grogan (2019) find that communities come together after disasters to cope and that this is a positive thing in the face of disasters. However, the scholarship on place attachment as a prohibiting factor for living in environmentally threatened environments has yielded contrasting outcomes, with some research suggesting that place attachment does not always manifest in positive environmental behaviour. Some researchers have found place attachment to increase risk perception

(discussed further below) and pro-environmental behaviour, while others have found it to deter both (Bonaiuto et al., 2016; Holley et al., 2022; Willox et al., 2012).

Bonaiuto et al. (2016) contend that place attachment is often linked to heightened awareness of environmental risks but a reduced inclination to engage in coping behaviours. Negative relationships have also been found for emergency response initiatives, including relocation and evacuation (Willox et al., 2012), including a higher propensity to return to the risk environment after threats subside (Holley et al., 2022). Boon (2014) found a strong sense of place/place attachment to have increased the resilience of communities following flood disasters and reduced their desire for relocation. This resonates with the findings of Xu et al. (2017), where households that exhibit stronger place identity and place dependence were more resistant to the idea of relocating within farming households in China.

Research has found that a strong attachment to place was associated with a heightened concern about potential future flooding, but also an increased likelihood of choosing to remain in the same location to undertake reconstruction efforts (Haney, 2019). In fact, “those who rated their pre-disaster neighbourhoods as “excellent” places to live are 94% more likely to fear future flood events—almost twice as likely as those who rated their neighbourhoods as less than excellent” (Haney, 2019, p. 230). Strong place attachment has been found to have led to an increased intention to evacuate temporarily rather than relocate (Ariccio et al., 2020). Real or perceived place satisfaction is a disincentive to relocation plans (Haney, 2019). For instance, following Hurricane Katrina in the US, Holley et al. (2022) recounted a strong correspondence between place attachment and return behaviour. Individuals who exhibited strong levels of place attachment typically returned to the evacuated areas, predominantly driven by the perception of the environment's cultural and physical distinctive nature.

Place attachment affects relocation behaviour, including the willingness to return to the evacuated sites, which could also be explained by the kind of activities residents are engaged in with the natural environment. Other individual differences and specific characteristics may also be deciding factors in relocation decisions (Haney, 2019; Morss et al., 2018). Farming communities and lower-income residents, for instance, who are directly dependent on the environment for their livelihoods, are more likely to return to evacuated sites to continue their means of livelihood than middle and upper-level-income residents who returned to the community after retirement. This is consistent with the results of (Jansen, 2020) in the Netherlands, which depicted a higher sense of place for the aged and less educated.

2.3.2 Perception and Risk Perception

Several factors influence peoples' knowledge and perception of climate phenomena, including age, education level, income status, etc. One critical topic of discussion, however, in the environmental psychology literature is whether awareness or perception of climate change induces positive environmental behaviour. In other words, does knowledge and perception of climate change cause people to be pro-environmental or engage in activities that protect the environment or promote their safety? For instance, Chuvieco et al., (2021) studied the linkage between climate change knowledge and perception and how that influences the desire to reduce personal carbon footprint (positive environmental behaviour) They found that people with better knowledge and understanding of climate change were more likely to engage in consumption and behaviour patterns that reduce their overall carbon footprint.

Risk perception is people's beliefs regarding potential harm and the likelihood of a loss in the event of harm. Perceived risk refers to an individual's evaluation of the likelihood of encountering threats (Qing et al., 2022). Individuals' behavioural intentions are determined by their assessment of an impending risk, the likelihood of its happening, and their appraisal

of the associated perceived risk. Evidence from the Protection Motivation Theory suggests two main predictors of intentions: threat appraisal and coping appraisal (Holley et al., 2022). Threat appraisal is an individual's perceived susceptibility to risk, including the perceived seriousness of its outcomes. Conversely, coping appraisal involves the perceived effectiveness of specific risk-reducing behaviours (Holley et al., 2022). This relates to perceived efficacy, which reflects an individual's assessment of their capability to mitigate perceived threats (Qing et al., 2022).

Several factors influence risk perception and the resultant response behaviour. A higher coping appraisal may result in less likelihood of considering relocation options, even with a high-risk perception. Prior exposure to natural hazards also increases risk perception (Holley et al., 2022; Jansen, 2020) and can foster environmental awareness behaviour, though not always the case (Holley et al., 2022). For instance, Bergquist et al. (2019) found that Hurricane Irma increased risk perception and pro-environmental behaviour in Florida with an increased willingness to relocate. Conversely, Lie et al. (2023) argued that experience and awareness of risk do not always result in feeling at risk —which is counterintuitive. Some victims of the 2013 Florida floods felt they would be better prepared to deal with it the next time it occurs, for example, and were neither worried about the possibility of reoccurrence nor had any plans to leave the flood-prone area (Haney, 2019). Experiences with past severe weather events and coping behaviours can yield a false sense of security and perception of reduced risk as people think they are better prepared to handle future events because they have weathered similar in the past, as observed elsewhere by Haney (2019). For people who have experienced such events before, the tendency to downplay the possible severity of similar forecasted events is high. People who have not suffered any significant impacts in the past are likely to consider impending events as just another one.

As noted above, risk perception is also believed to be sometimes influenced by place attachment. Some research indicates a positive correlation between place attachment and risk perception, though others found a contrasting relationship between the two. Jasen (2020) found that place attachment has resulted in reduced risk perception in an earthquake environment in the Netherlands, for example. Even with a higher awareness of environmental threats, the possibility of moving out of the threat-prone areas was found to have diminished. These suggest that knowledge and risk awareness do not always result in a feeling of threat and support for relocation decisions.

2.3.3 Ecological Grief or Anxiety

Naturally, people mourn the loss of loved ones and things dear to them. Often, grief is manifested through the behaviours that portray how a person feels about a loss, including how they anticipate their lives to be impacted or modified by the occurrence. The same applies to climate change impact and ecological loss and/or when people lose access to their usual place of residence (Bergquist et al., 2019). Mourning and grief associated with climate change and ecological loss are often left unconsidered in climate change research. Cunsolo and Ellis (2018, p. 275) call this "disenfranchised grief," or grief that is not publicly or openly acknowledged. As discussed earlier, people often develop close relationships with their environment through interaction and use and a stronger sense of place or place attachment may result in a higher sense of grief when places and place attachments are damaged or even lost. Cunsolo and Ellis (2018) noted, for instance, that the close relationships Inuit people have with their environment have been found to be increasingly threatened by climate change. This means that in the near future, most Inuit will be unable to relate to the environment as they did hitherto. This will (and has already) given rise to different dimensions of grief and mental/psychological health issues.

Cunsolo and Ellis (2018) found three ways climate change contributes to grief. These include grief associated with physical environmental loss, grief associated with loss of environmental knowledge, and grief with anticipated future ecological losses. The first two result in grief over either past or current threats, as in the case of many disaster-prone areas, while the last leads to continually 'being on the edge kind of feeling' because past experiences with natural disasters breed anxiety over possible re-occurrence (Haney, 2019). In Alberta, for example, residents whose homes got flooded in the 2013 floods were found to be five times more likely to worry about future floods in their neighbourhood than those who didn't experience floods (Haney, 2019). Those with anxiety over the reoccurrence of floods were found less likely to remain in the area (Haney, 2019). Such events can cause anxiety about the future and disruptions to sense of place and place attachment (Cunsolo & Ellis, 2018). Thus, while the experience of flooding prompted certain residents to consider options for moving, it solidified the attachment of others to their communities, which in turn increased their motivation to remain. For those who chose not to relocate, the flood was thought to have served as a catalyst for the community to connect and assist each other, leading to the formation of place-based social networks that were deemed too valuable to give up through relocation (Haney, 2019).

2.4 Chapter Summary

The chapter has established that there are a lot of climate changes happening in Atlantic Canada and NL with several associated adaptation plans and approaches and contended the need to understand these problems and suites of solutions from local perspectives. It further argued that more climate change adaptation is increasingly needed with CRR as an option, requiring examples in Canada. The chapter has also established that CRR may be controversial if state-led, suggesting the need for greater consideration of context, including

communities, as suggested by a range of related concepts and literature. Again, while principles exist, they need grounding in the human experience of CRR through attention to context-sensitivity, community input, and community heterogeneity and the relevant range of factors shaping CRR outcomes, including emphasis on those underlying CRR willingness. This will help understand CRR and contribute to effective policy and plans through empirical investigation of these factors from community and policy planning perspectives.

3 Chapter Three: Research Design and Methods

3.0 Introduction

This chapter provides an overview of this study's research design, including the case study site, background, and primary and secondary data collection methods. The primary data was collected from narrative interviews. Therefore, a detailed description of participant selection procedures is provided. Additionally, this chapter presents describes how data were analysed.

3.1 Research Design

A research design is a blueprint that outlines the techniques and steps involved in collecting and examining data or information. A good research design should lay a roadmap consistent with achieving research goals and establish a relationship between research questions and the approaches that are best to answer the questions as comprehensively as possible (see (Creswell & Creswell, 2017; Vogt et al., 2012). This study adopted a case study approach drawing on narrative and phenomenological methodologies. It employed three data collection methods, which included document review, narrative interviewing and observation. Both thematic and narrative data analysis techniques were used. Together these approaches helped in meeting the research goal. Narratives were implemented to collect stories, observation was about looking for understanding in stories, and the data presented are mostly in narrative form, supplemented by thematic analysis.

3.1.1 Case Study Methodology

This study follows a qualitative research design using a case study approach to gather and analyse detailed narrative descriptions of respondents' personal encounters and experiences with the subject of inquiry (see Andrews et al., 2021), and in this case, personal experiences with Hurricane Fiona and the relocation initiative. This case study methodology incorporates researcher reflexivity (i.e., ongoing reflection, responsiveness, and iteration based on

a deepening understanding of data) while collecting, interpreting, and presenting data about the lived experiences of others (Simons, 2009). Reflexivity acknowledges that the knowledge represented in data and the knower who shares the data are interconnected and embedded within historical, contextual, cultural, experiential, and cognitive dimensions (Etherington, 2004).

A case study approach was deemed appropriate for this research and was driven by the interest to obtain an in-depth understanding and appreciation of the topic of enquiry, in this case, climate change and relocation, in the setting in which it occurred (Crowe et al., 2011; Priya, 2021; Yin, 2009, 2017). A case study is often suitable for narrative-related research as it allows for the uncovering of detailed information about a topic, a situation or an individual (Crowe et al., 2011). Case studies are used to describe, explain or explore events in the context in which they occur and are therefore suitable for answering exploratory kind of questions like how, why, and what (Priya, 2021). Port aux Basques was deemed a suitable case for this thesis due to its most recent experience with Hurricane Fiona and the relocation initiative undertaken in the community following this extreme weather event, making it an ideal example to learn about CRR in NL.

3.1.2 Research Stage Setting and Case Study

3.1.2.1 Research Stage Setting

Exploring the possibility of research in Port aux Basques, I visited the community in August 2023 to familiarize myself with the setting and meet with people who might be interested in participating in the research. I learned about the town, which set the stage for my conversation with the officials at the Town Office. During the first visit, I saw weather-related infrastructure damage during a heavy rainfall event, met a CBC interviewer doing a story on Hurricane Fiona one year after the storm, and introduced myself, along with my supervisor,

to Town officials. During the second visit, I attended a climate change workshop organized by CLIMAtlantic and The Harris Centre. At this time, I got the opportunity to interact with and learn from other people present at the workshop, including officials from the Town Office about the challenges and ways forward related to climate change and Hurricane Fiona in Port aux Basques. Later, I had a discussion with an official from the Town Office, beginning a conversation about research generally and exploring future opportunities. She expressed interest and commitment to potential research in her capacity or through the Town Office, setting the stage for an ethics application. Following this visit and the support from the Town Office, I obtained ethical clearance from the Grenfell Campus Research Ethics Board (#20241107) to allow me to collect the data for the thesis. Ethics approval details can be found in Appendix E.

3.1.2.2 Case Study Site

Port aux Basques is situated on the southwest coast of the island of Newfoundland and serves as the primary western gateway to the province. It is the endpoint for the Marine Atlantic Ferry Service to and from North Sydney, Nova Scotia, providing a link to the Trans-Canada Highway. This modern town is a consolidation of former communities of Channel, Port aux Basques, Grand Bay East, Grand Bay West, and Mouse Island (Pitt, 2015). Figure 1 shows the map of Port aux Basques, which encompasses an area of approximately 41.4 square kilometres and caters to a catchment area of about 9,000 individuals who use municipal services (see Fig 1). This catchment area extends east, reaching the Town of Rose Blanche, approximately 42 kilometres away. The town is divided into four distinct districts: Mouse Island, the Channel, Grand Bay East, and Grand Bay West. Notably, the town is recognized as a hub for tourism activities in the province due to its ferry port (Town of Channel-Port aux Basques, 2019; Roy, 2023).

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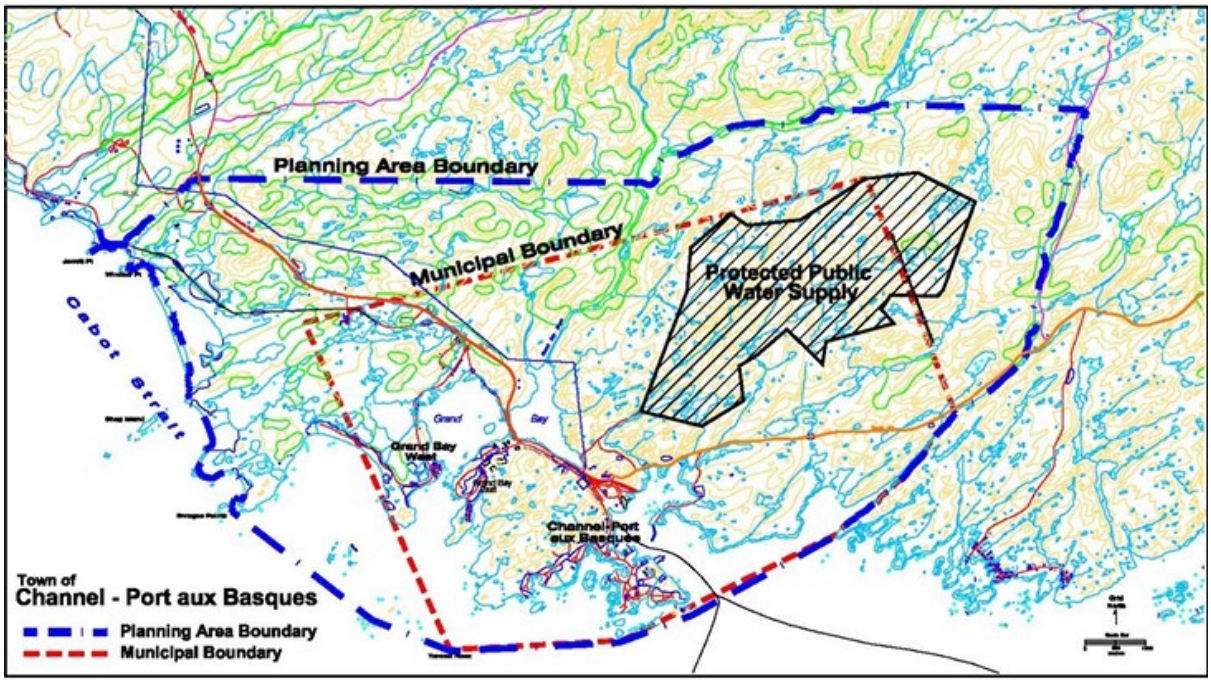

Fig 1 Map of Port aux Basques

Source: Town of Channel-Port aux Basques (2019)

Based on the 2016 Census data, the estimated population of Port aux Basques was 4,067 individuals (Statistics Canada, 2016). As of 2021, the population fell to 3,547 (Statistics Canada, 2021), lower than the 4,113 people in 2006 and 4,637 in 2001 (Town of Channel-Port aux Basques, 2019; NL Department of Finance, Economic and Statistics Branch, 2007). Shifts in population are largely attributed to both a natural decrease (i.e., when deaths outnumber births) and out-migration, especially among young people in search of attractive, high-paying employment opportunities in other provinces (Town of Channel-Port Aux Basques, 2019). The town experienced a negative population growth of 12.8 percent between 2016 and 2021, almost a 100 percent decline rate from 2006, nine years prior (Statistics Canada, 2021).

The population trend of Port aux Basques shows a gradually declining and aging population, with about 88 percent of the population above the age of 50 (Statistics Canada, 2021). Females are in the majority with no significant difference. The architecture of Port aux

Basques, much like many other Atlantic Canadian coastal communities, is built close to the water, which reflects the communities' history and current attachment to coastal life. During my field visits, I noticed several houses situated just a few meters from the ocean and some others right at the foot of the water, reflecting how intricately connected the residents are to the ocean. Of the total dwellings in Port aux Basques, 83% were built within the last century between 1960 and 1990 (Statistics Canada, 2021).

3.1.3 Hurricane Fiona and the Relocation Program

3.1.3.1 Hurricane Fiona

When Hurricane Fiona hit this small coastal community in September 2022, it became the greatest storm documented in the community. At its onset, it swept through parts of Nova Scotia, destroying power lines and some other infrastructure before heading for the Southwest coast of Newfoundland, where it had the most impact in Port aux Basques. It resulted in infrastructural damages, including damage to storm drains and culverts, as waves powered by high winds swept through the coast, rendering the coastal defence infrastructure ineffective and washing several houses to sea (Weather Underground, 2022; CBC, 2022). For a community that has lived on and around the coast, Fiona provided clear evidence of climate change and a wake-up call for some to reconsider their proximity to the ocean moving forward. For others, it presented a difficult reality of starting their lives all over as Fiona destroyed everything they had, leaving rubble (Coletta, 2023).

Hurricane Fiona holds the title as the strongest storm in the history of Canada, the second most costly weather-related disaster the country has experienced, and the costliest on record in Atlantic Canada (see Roy, 2023; The Canadian Press, 2022; Mcclearn, 2022). The total insured damage of Fiona currently is over $800 million (Insurance Bureau of Canada-IBC, 2023), from the initial anticipated amount of $660 million when the storm first happened

(IBC, 2023; Coletta, 2023). Houses that stood along the coast for several generations are no longer in existence. Several others will be pulled down. These include houses washed to sea during the storm and those demolished by town officials having been deemed unsafe to inhabit following the storm. Over 20 homes were destroyed during the storm (CBC, 2022b). Several others were deemed structurally unsafe following evaluation after the storm. In total,100 homes were deemed damaged beyond repair after the evaluations concluded (Chughtai & O'Neill, 2022). From a combination of homes and municipal infrastructure damages, there were more than $7 million in damages in Port aux Basques (CBC, 2023),

3.1.3.2 Background to the Relocation Program

Following the storm, the provincial government established an impact zone[10] and moved all houses in the delineated impact zone away from the coast. The two-phase relocation program removed 140 houses, including 83 in the first phase and 57 in the second phase. The first phase includes houses significantly damaged by the storm, either through structural damage, water intrusion into the basement, or on the basis of environmental safety protocol. The second phase includes houses in proximity to the coast. Some of these houses had little to no damage, but their location makes them susceptible to destruction in future events. Most of those houses were not damaged by Hurricane Fiona, luckily, because of the direction of the waves and protection from houses around them at the time of the storm. All affected persons are expected to receive financial packages to enable them to rebuild elsewhere. A more

[10] The impact zone is the area designated by state officials which has been impacted by Hurricane Fiona or risk of being impacted in the future. All houses in impact zone will be removed and future redevelopment will be prohibited in this area. In the case of Port aux Basques, the relocation was compulsory for everyone within the impact zone. The impact zone was determined by government officials and includes areas that have been obliterated by the storm and areas that were not heavily impacted but still fall within proximity to the ocean and could likely be affected in future storms.

detailed explanation on the determination of compensation packages is provided in Chapter Four.

3.1.4 A Focus on Narratives

This study focuses on narratives, especially through primary data collection and reporting. Narrative specifically refers to a style of communication in which events are structured into a chronological sequence through a thematically organized plot (Polkinghorne, 1995). According to Carless and Douglas (2017), "narrative is both a research method and a way of theorizing psychological and social phenomena". In this case, narratives emphasized phenomena in the context of rapid environmental change to learn about the multiple dimensions of change including psychological aspects that are intimately linked to change. A focus on narratives encourages a natural flow of information from respondents without directly asking emotionally sensitive questions (Carless & Douglas, 2017; Andrews et al., 2021). A narrative researcher begins with a stance of curiosity rather than certainty (Moen, 2006), concentrating on inquiries and seeking observations that guide the narrator to address the cultural backdrop, sensory and emotional involvement in events, thoughts, attitudes, ideas, beliefs, and intentions that yield depictions of experiences. In narrative research, the objective is to uncover how individuals attribute meanings to their experiences while acknowledging that these meanings are diverse and influenced by the surrounding context (Etherington & Bridges, 2011). Narrative research is about situating the research in a context informed by people's stories they tell one another and themselves, and from this standpoint, other forms of learning and observation can be used to look at the stories from different perspectives (e.g., other data collection methods, analytical techniques, data sources). Ultimately, from a narrative research perspective, the goal of this research was to position myself as "not knowing" and to seek understanding from people who feel free to share and express their experiences and personal views that have contributed to their current

understanding of the research topic, including their own position in it. In this case, the focus was to use narratives to learn about experiences with extreme weather events, including Hurricane Fiona and the relocation initiative, and to build an understanding of their context from the perspective of the research participants.

3.2 Data Collection Methods

3.2.1 Document Review and Web Scan

The first method was a review of relevant literature on climate change and CRR. The review of the literature and other government and policy documents was conducted in two parts: literature and documents pertaining to locations outside of Newfoundland and Port aux Basques, and documentation related to climate change and extreme weather events in Port aux Basques. CRR literature search was done through the Memorial University Library website, Google Scholar, Scopus and other relevant government websites to obtain examples of relocation case studies in other parts of the world alongside the examples in Canada. Information on extreme climate events in Port aux Basques and the southwest coast more broadly was found by reviewing the Municipal Action Plan of Port aux Basques, new articles, and websites.

The use of information both within and outside Canada provided insight and additional context into climate change and CRR across the globe, Canada and the Atlantic, more specifically, NL, since they shape understanding and the stories being told where the study was situated. The review identified the climate change situation within the region more broadly alongside current adaptation strategies and future prospects. It also provided an understanding of relocation as a climate response strategy, unearthing best practices and successful relocation projects carried out in other jurisdictions.

3.2.2 Observation

The second method was observation, a qualitative technique involving field observation and informal conversation with both prospective participants and others. As mentioned by Yin (2009), observation, either through casual or formal data collection activities, presents an additional source of evidence for the research. In addition to looking and talking, observation included taking photographs, helping to convey and document pertinent contextual information regarding the case study (see Yin, 2009). During my time in the community, I visited the Hurricane Fiona sites to observe how the places looked compared to pictures of those places when Hurricane Fiona first happened. I also visited the new subdivision where some of the affected residents now reside to observe any potential changes in their ways of living. Field notes and pictures were taken during field observation and interviews (including those obtained from the Town Office) to augment the understanding of narratives (excluding photos of people as this was not part of the research design or ethics approval). Observation also included taking field notes of the actions and behaviours of participants during the interview process (Cresswell & Cresswell, 2017). For the purposes of my narrative interviews, observation gave me the opportunity to experience the emotional nature of the interviews as a way of immersing myself in the research context.

3.2.3 Narrative Interviews

Narrative interviewing is a qualitative technique employed to encourage individuals being interviewed or involved in a study to share their perspectives and experiences regarding the subject under investigation by recounting stories known as ‘narratives’ (Jovchelovitch & Bauer, 2000). A narrative interview adopts the structure of a dialogue, where individuals share their personal experiences, “incorporating aspects they deem significant with the primary idea of reconstructing social events from the perspective of the informant as directly as possible” (Jovchelovitch & Bauer, 2000, p. 59). The narrative approach uses this

conversation as a means of producing narrative information and communicates with any potential respondents the intention to learn about their stories (Andrews et al., 2021; Mueller, 2019; Stuckey, 2013).

According to Mueller (2019), narrative interviews concentrate on the narrative dimension of communication and offer informants the chance to describe things as they see them in their own language (Anderson & Kirkpatrick, 2015a; Jovchelovitch & Bauer, 2000). As opposed to structured interviews (see Harper, 2011; Hammarberg et al., 2016; Creswell & Creswell, 2017), narrative interviews introduce the topic and allow the respondent to speak with little or no interruptions until the respondent is done telling their stories (Anderson & Kirkpatrick, 2015; Andrews et al., 2021). The stories are interpreted as reflections of an individual's life encounters, woven together in a manner that shapes a cohesive narrative, featuring an introduction, continuation and an end of the story (Mueller, 2019). Narrative interviews position the interviewees as central participants, capturing their personal stories as a way of gathering individuals' firsthand accounts of their experiences and contributing to a deeper comprehension of their behaviours and perspectives for researchers (Anderson & Kirkpatrick, 2015; Stuckey, 2013). While narrative interviews may use diverse types of question structures, narratives are often elicited in the use of probing questions like: How? Why? What? This is common for qualitative research to place the storyteller at the heart of the research without imposing the interviewer's specific agenda (Anderson & Kirkpatrick, 2015). The application of storytelling or conversational methods is especially important for community-based research. Through narratives, participants act as storytellers and consciously or unconsciously provide insights into their perceptions of their communities, interpretation of past events, their understanding of current and future risks, and the implications of climate change and their personal experiences with the relocation process through the narratives they share (Lie et al., 2023). In this context, a key objective is to allow

research participants to share their stories since sharing stories is often an important way for people and communities to share their lived experiences (Bates, 2004). Hence, during the narrative interview, the interviewer poses questions aimed at comprehending and interpreting the participant's expressions rather than attempting to predict those words (Giovanna et al., 2019).

3.2.4 The Narrative Interview Process

Typically, a narrative interview would commence with open-ended questions. Narrative methods can also be harmonized with semi-structured interview tactics to ground the respondent in the topic (Anderson & Kirkpatrick, 2015). Using semi-structured question elements helps delineate areas of interest, raising focal points related to the research questions and previous discussions in the community. They also provide prompts for participants who may need assistance telling their stories. Throughout the narrative interview, if the interviewer comes across something warranting further exploration, they take note for subsequent investigation. Follow-up questions are asked when it becomes necessary to encourage the sharing of stories relevant to the research question(s) (Jovchelovitch & Bauer, 2000).

For the purposes of this research, the narrative interview was achieved using an interview guide with mixed narrative (e.g., “Can you tell me about your experiences?”) and semi-structured elements (e.g., “What changes did you observe?”) to ensure the dataset was manageable since in some narrative research, where the research participants are freely expressive of themselves with only brief topic introductions, stories can transcend research questions and cover entire life spans. Thus, I focused as much as possible on Hurricane Fiona as an event (see Mueller, 2019), resulting in an ‘Episodic Narrative Interview’ which could also be viewed as a topical narrative study rather than a personal narrative, and offered

participants the opportunity to recount past events (in this case other climate events that date back to Hurricane Fiona) (see Avidan, 2017; Bates, 2004; Giovanna et al., 2019).

3.2.5 Advantages of Narrative Interviews

Bates (2004) argues that narrative research not only encourages the ability to discuss past events but also interpretations of these events and how they connect to their broader encounters in daily existence (Bates, 2004). In this research, narratives offered me a window into how the participants comprehend their ordinary existence in connection to the overarching research subject of climate change and relocation (see Bates, 2004). The narratives provide deep insights into real-life experiences rather than focusing on abstract concepts, opinions, or generalizations; narrative methods prioritize participants' firsthand encounters with concrete situations. Instead of maintaining a distant perspective from lived experiences, narratives embrace the unique intricacies and complexities of an individual's encounters (e.g., Carless et al., 2014). Narrative approaches illuminate the significance of personal experiences by recounting stories about life events as a primary method through which meaning is constructed and shared (Carles & Douglass, 2017) by offering glimpses into a person's life trajectory over time (Giovanna et al., 2019). Thus, rather than presenting a fixed snapshot of life at a specific moment, narrative techniques provide a sort of understanding in motion that follows a substantial portion of the storyteller's lifespan (see Thyer, 2010). Though not the primary focus of the study, this offered significant insight into how respondents' experiences with climate change and the environment, in general, have evolved over time. One disadvantage, however, is that the duration of a narrative interview is hard to predict and hinges on factors like the subject matter, context, and the diverse manners in which individuals construct their stories. Such interviews can be as brief as half an hour or over several hours. In cases where an interview is ended abruptly due to emotional or other reasons, the interview can be completed another time if the participant is interested in

continuing the conversation. In the case of this research, the narrative interviews lasted, on average, between 45 minutes to 1 hour.

3.2.6 Sampling Procedure

This research relied on a non-probability sampling method (Creswell & Creswell, 2017; Taherdoost, 2016; Berndt, 2020), which is usually suitable for qualitative case study research (Taherdoost, 2016). Both purposive and snowball sampling techniques were used. The purposive sampling technique was used to obtain information from individuals deliberately due to their potential experience and knowledge of the subject of inquiry. For the topic under study, purposive sampling was ideal because the intent of the research was to find out people's experiences with Hurricane Fiona and relocation, as well as feelings surrounding an anticipated climate-induced relocation. Thus, the sample included people who have either moved already due to Hurricane Fiona or who live in 'close proximity' to the coast, which may warrant moving further away from the coast in the event that climatic conditions become unfavourable. The snowball sampling technique was used to complement the purposive sampling technique, where the researcher used those that have been identified to obtain information about and access to other potential participants (Etikan & Bala, 2017).

3.2.7 Interview Participant Selection and Data Collection

The research adopted a small-n approach to delve deeper into the experiences of people with Hurricane Fiona and the relocation process using participants' interviews as the primary data source —as is the case of most qualitative research (see Holloway & Freshwater, 2009). Mason (2017) stated that there is no specific requirement for it to be a small sample size. The ideal sample size varies based on the research questions and whether the questions can be conveniently answered with the chosen sample size (see Mason, 2017).

Data collection occurred in two parts. The first part was over a three-day period from the 18th to the 20th of December 2023, where I had the opportunity to interview two officials from the Town Office and to obtain details of community members who were involved in the relocation process, including those who had already relocated and those who are yet to relocate in the program's second phase.

The second phase of the data collection occurred over two weeks, from the 10th to the 24th of January 2024. During this period, I spent time in the community interviewing research participants while also having informal conversations with people who were not (or not yet) recruited for the research (see below for interview selection criteria). I talked to anyone I ran into in the community, such as in shopping centres and coffee shops, who shared their opinions on Hurricane Fiona after I explained why I was present in the community. I also spoke with high school students during a discussion with a class on climate change that I was asked to lead. However, these individuals did not meet the age requirement to be interviewed and included in the research. The different groups of people interviewed for this thesis is captured in the table below.

Table 2 Grouping of respondents.

Group 1	People who have moved already (This includes persons that have been relocated in the first phase, including their family members and anyone tied to them that the relocation has impacted.)	Participant P1 P2 P3 P4 P5 P6 P7 P8
Group 2	People who are yet to relocate (This includes those in the second phase of the relocation program due in spring 2024 and those still living near the coast but in neither phase.)	Participant P9 P10
Group 3	Officials from Port aux Basques (Key Informants)	Participant P11/official 1 P12/official 2 P13/official 3

Different groups of people were interviewed. This includes ‘group 1’, people who had already moved following Hurricane Fiona (those in the first phase), ‘group 2’ people who were due to be moved in the Spring of 2024 (those in the second phase), and ‘group 3’ officials from the Town Office in Port aux Basques. A total of 34 affected community members were originally contacted to participate in the research, but only five responded. On a second attempt, two more people responded and agreed to participate in the study, following a snowball technique. The final participant was an individual who was not faced with relocation but still stays close to the ocean and accepted the interview. In all, 13 participants, including 10 community members and 3 officials from the Town Office, were interviewed in the timeframe available. Meanwhile, several attempts were made unsuccessfully to interview other non-governmental organizations, rescue agencies, mental health professionals, and representatives from the provincial government while I was in the community.

3.3 Data Analysis

The data collected was analysed using qualitative analysis. Two types of analysis were used: narrative analysis and thematic analysis. These were considered the most suitable methods for extracting meaning from the data (see Elo et al., 2014) and allowed results to be presented through narratives related to themes to convey a more holistic representation of the participants' ideas in relation to the research questions. This approach is typical of interpreting data to understand the lived experience of research participants regarding a topic from the participants' perspective while aiming to mobilize stories in policy and planning venues where themes and related evidence may be preferred. During the interviews, conversations with participants were recorded and subsequently transcribed. These transcripts were thoroughly reviewed multiple times to gain a deep understanding of their contents from both analytical perspectives.

3.3.1 Narrative Analysis

The data went through a narrative analysis. This was to allow for data interpretation beyond the themes. Thus, rather than solely concentrating on the precise words employed in an interview, narrative analysis encompassed the collection of information regarding how individuals conveyed their thoughts, the language they employed in articulating specific events or emotions, as well as the underlying thoughts and motivations behind them (Kaluza, 2023). Narrative analysis considers how research participants formulated and presented their stories, arriving at a narrative meaning regarding particular behaviours or situations, as different behaviours have different connotations and significance. By narrative meaning, we mean diverse aspects of experience that shape or affect human actions —and, by extension, human beings. The aim of the narrative analysis was to understand the emotions and feelings of respondents captured through pauses and sighs during the interview, for example, as captured in field notes (see Andrews et al., 2021).

3.3.2 Thematic Analysis

In thematic analysis, the analyst creates themes to categorize and condense the raw data, making it more manageable (Elo et al., 2008). The thematic analysis process involves open coding and theme generation across data in relation to research objectives (Clarke & Braun, 2017; Kiger & Varpio, 2020). While reviewing the transcripts, I identified codes by highlighting text in different colours to represent various codes. This process was repeated until all data had been reviewed and the codes were established. Codes derived from the transcripts were later organized into themes in relation to study objectives and to organize stories shared by participants. I then systematically reviewed the codes in comparison with the stories to ensure that important insights and meanings were captured. This approach allowed for the identification of the most commonly occurring codes, capturing different

approaches employed by participants to address specific questions and highlighting potential relationships and similarities between codes.

After thoroughly exploring the data, a robust foundation was established for reporting the findings. Findings are represented by themes capturing the main objectives and organizing the stories shared. Throughout the interviews, additional subthemes emerged within each category and across the stories, offering a more broadly detailed expression of people's experiences with climate change, Hurricane Fiona, and the relocation program.

3.3.3 Data Triangulation

Data from the narrative interviews and those from government documents and news articles were combined throughout the results and discussion section to provide a more holistic understanding of the topic and the stories shared. In some cases, data from news articles was used to complement the information gathered through narrative interviews. In other cases, especially with regard to aspects that have to do with the determination of the compensation packages and participants' perspectives on the relocation process overall, the secondary data sources provided an opportunity to cross-check the data gathered from interviewees since details may be difficult to remember, for example (see Carter et al., 2014). The inability to obtain information on the relocation program from the provincial officials involved also led to the reliance on documents and news releases on the program.

3.4 Challenges During the Interview and How They Were Addressed

The topic addressed in this research is emotionally sensitive and charged. I realized that discussions about movement from one’s place of residence, which participants have always called home, can be very difficult to explore. I recognized in advance that for some people who have lost their property to Hurricane Fiona, this conversation may be emotionally taxing and affect the interview process and respondent comfort. I also acknowledged that for others

who may have been affected by relocation in the past, the interviews could bring back old memories and unpleasant associated feelings and emotions, although past experiences with relocation (or resettlement) turned out not to be an apparent factor in the interviews. Again, keeping in mind how devastating it may have been for people who lost their properties and had to be relocated away from the coast, I assured respondents of the freedom to withdraw from the interview at any point should they become uncomfortable with the process. Some of the countermeasures used to address these possible issues included having a prior discussion with a mental health and psychology expert to learn how to navigate the interview process and reading best practices and approaches for conducting interviews on sensitive topics like Hurricane Fiona and relocation. I also provided participants with information regarding how to seek help if emotions arising from the interview process become unmanageable. This included providing them with contact information for counselling and psychological health facilities they could get in touch with if they needed help. In another case, when a participant became emotional after recounting losing some of her children's childhood pictures and other memories to the storm, we paused for a while, and then she resumed the narration after assuring me that she was okay.

4 Chapter Four: Results and Discussions

4. 0 Introduction

This chapter presents research findings and discusses those findings to answer the research questions. By providing results from the thematic and narrative analyses and evidence from the document review, the chapter reports on three key topics: understanding the impacts of climate change in Port aux Basques and perceptions of those changes —focusing on participants' stories about the impacts of and lived experiences, the determinants of relocation (un)willingness in the community in the face of climate change, experiences with the relocation process and Port aux Basques' response approach to the hurricane. Quotations are used to highlight elements of stories, supplemented and further contextualized by government documents and other grey literature. Thus, narratives are discussed alongside findings from the secondary literature (e.g. media reports, provincial and municipal documentation) and observations to provide a more holistic narrative on CRR.

4.1.1 Climate Change Impacts in Port aux Basques

This section presents the results and discussion on climate change impacts in Port aux Basques, capturing stories and dominant themes from the interviews. These include the impacts of climate change on the physical environment, such as erosion and sea level rise, and changes in several other weather-related phenomena, such as storm surges (Hurricane Fiona), precipitation, and temperature changes. The impacts on leisure and recreational activities, as well as health and well-being, are also presented.

4.1.1.1 Background

Vodden and Cunsolo (2021) stated that the most sensitive locations to climate change in Atlantic Canada are coastal areas. Like most coastal communities in Canada, Port aux Basques has seen a drastic change in climate over recent decades. A Google search using

keyword terms “climate change” AND “Port aux Basques” revealed several news articles, which indicate that the impacts of climate and extreme weather events are not new to the community. The Municipal Plan of Port aux Basques and other documents indicate that in 1974, the community experienced a storm that destroyed a couple of houses along the coastline (Town of Channel-Port aux Basques, 2019; Roy, 2023).

Climate change projection for the Atlantic and the Southwest coast of NL, where Port aux Basques is situated is indicative of the changes happening. In NL, about 90 percent of people prefer living on the seafront, often considered attractive (see Coletta, 2023), which is evident through the number of houses located close to the ocean. The emergence of climate change and the increase in extreme weather events such as hurricanes, tropical storms, and sea level rise (Government of NL, 2019), coastal erosions, and flooding (Batterson & Liverman, 2010) in the region means the feasibility of living close to the ocean may be thwarted as these weather events become widespread (see Warren et al., 2021).

Field observations and interviews in Port aux Basques provided insights consistent with the general narrative of climate change along the Southwest coast of NL and, more broadly, across Atlantic Canada, as discussed in Chapter Two (see Government of NL, 2019). In Table 3, major themes and corresponding codes developed by synthesizing interview and document review data provide an overview of the impacts of climate change in Port aux Basques. These results are elaborated on in this section, addressing Research Question 1: What are the major changes in climate in Port aux Basques, and what are people’s perceptions about these changes?

Table 3: Summary of climate change impacts

Major themes	Findings (Codes)
1. Physical and environmental impacts of climate change	- Coastal erosion - High temperatures - Sea level rise - Increase in precipitation - Strong winds and storms (including Hurricane Fiona) - Reduced snow and ice cover
2. Impacts on environmental aesthetics, satisfaction, recreation and leisure, and other aspects of community	- Disappearance of some species - Changes in species route and timelines - Introduction of invasive species - Outmigration
3. Impact on health	- Anxiety/nervousness - Mental and psychological health - Depression - Suicidal thoughts

4.1.1.2 Physical and Environmental Impacts of Climate Change

The physical and environmental effects of climate change and variability on the natural landscapes of Port aux Basques encompass several significant impacts, including increasing incidence of coastal erosion (see Yirenkyi, 2024), rising sea levels (see Batterson and Liverman, 2010), fluctuations in both winter and summer temperatures, precipitation (CBC, 2021a), and the likelihood that severe weather events will become more frequent and intense (Government of NL, 2019).

Significant changes in several aspects of the community's weather and landscape were observed before Hurricane Fiona (see CBC, 2021a Catto, 2010). Speaking to participants about these changes, the most notable changes recounted were high temperatures, high sea levels, increased frequency of hurricane-level wind, and increasing rainfall volumes. These observations are supported by the documents reviewed (see also CBC, 2021a; Bauer et al., 2010; Catto, 2010; Catto, 2006). It was revealed by participants that record-breaking weather events have increased (see CBC, 2021) and pose a threat to the community's critical infrastructure (see CBC, 2021b; Government of NL, 2019).

Changes in the environment have been so striking that even those who previously paid very little attention to changes expressed how, over the past couple of years, significant environmental changes were too obvious to go unnoticed. For example, several participants (N=9) observed a drastic decline in the quantity of snow. Participant 5 discussed how she never really took notice of the changes in climate growing up, but that changed a couple of years ago. Her first observation of climate change was how mild the winters were getting and how when her "kids were small, [she] could take them [for] slid[ing] and build snow houses [because there was] a lot of snow but that has since changed in the past 10 years". Participant 3 confirmed these sentiments that "[their] winters have definitely changed." Stories were common of people getting trapped in their homes and the town shutting down because of snow build-up in the past but participants explained that does not happen much anymore. Two participants recounted similar stories. For example, Participant 1 grew up in the community but travelled outside for work. They recalled their childhood memory of winters in the community and expressed how much of that has changed over the years. They highlighted the drastic drop in snow amount since they returned home with their partner five years ago:

> We both grew up here, so we came from the days when you have …. memories of the town shut down for almost a week because there's too much snow and you can't get around. I remember once when we were kids, we couldn't even get out through the front door because there was that much snow, so we had to go upstairs and go to the window slide down to shovel ourselves out. So, we came from a generation when we had lots and lots of snow. So, coming home in the last five years [I have seen a] huge difference in [our] winters, which means we're still getting snow, but we get way more snow up where we came from in Ontario than we do here, which is surprising because you know my memories of being home are lots and lots of snow (P1).

High temperatures have led to the disappearance of sea ice. According to Participant 3, they used to play on the ice pans when she was a kid, but for a long time, they have not seen that happen in the community as changes are experienced in both snowfall and ice conditions:

> Our winters when I was little was… we use to get a lot of snow [and] the… ocean had ice pans on the water all the time. We used to play on them as well; we used to play on the ice pans; we used to jump on the ice pans on the ocean. And then all of a sudden, that never ever came back (P3).

These stories are representative of others shared by several participants who spoke about the changes they have seen in the community. These stories demonstrate how climate change has affected the amount of snow and ice Port aux Basques currently gets compared to the past. Reports of sea ice disappearance from the community align with the findings from Canada's Changing Climate Report (see Batterson & Liverman, 2010; Connolly, 2019; Bush & Flato, 2019).

Some participants also spoke about fluctuations in the duration and distinctness of seasons. As reported, some of the seasons have become shorter compared to what they used to be. Participants also stated that the snow season used to start at the beginning of October. Now, it does not start until the middle of November, a weather pattern inconsistent with their memories of weather during that time in the past. Commenting on the summer period, Participant 1 stated that "the time most people used to return to the community for its beautiful summer weather was between July and August every year, but that time window has also been fluctuating quite a bit lately" (see also Weather Spark, n.d).

Significant temperature changes were also reported, again consistent with the general projection for the region (see Dietz & Arnold, 2021). Participant 3 recounted how unconventional weather patterns have become widespread and how temperatures unfamiliar in the community have become commonplace. This observation is similar to documented changes in the rest of coastal NL (see Dietz & Arnold, 2021; Fennis, 2013). Participant 8 stated, "I have noticed that the temperatures are changing. Our summers have gotten a lot hotter than they used to. Temperatures that we're not used to anymore," a reflection of what is happening along the southwest coast (see ECC, 2021) and in other areas in Newfoundland

(see CBC, 2023; Fennis, 2013; The Harris Centre, 2022). Record-breaking temperatures were recorded in certain areas of Newfoundland in Summer 2023. According to several participants (N=6), the seasonal variations in temperatures in the community have far surpassed what people were used to, with both winter and summer extreme temperatures becoming “common and more noticeable” (P3).

Changes in sea level were also experienced by several participants (N=8) acknowledging how the ocean, meters away from the homes, had gradually moved closer in certain parts of the community. This is in line with the perspectives from the literature, which suggests that much of the Island of Newfoundland is experiencing a general rise in sea levels, notwithstanding that area-specific variations exist. Batterson and Liverman (2010) projected a rise in sea level of 1 mm per year for the southwest coast where Port aux Basques is situated, with the possibility that actual variation may surpass projections. The average sea level has seen an appreciable increase. More specifically, a 3.3 mm rise in sea level annually was reported by Catto (2011) for Port aux Basques over the last 50 years. Sea level is expected to rise further, as high as 40 centimetres by 2050 and 100 centimetres by 2100, in comparison to the 1990 base year levels (Turn Back the Tides, n.d; Batterson & Liverman, 2010). Others project a 2.5 to 3 mm rise annually (Coletta, 2023). Participants reported that high water levels during storm surges have become common, as well as water levels that used to be storm surge water levels occurring more regularly. Several participants discussed sea level rise, but in different ways. One participant talked about a shortening distance between the ocean and their home, for example:

> [I] noticed the difference in the ocean [to be] going up…when I was a kid...the ocean was further away from your home. And when I got old...the ocean was very close to the homes like within 30 feet from what used to be 100 feet. So yeah, there was a difference in the ocean (P3).

Another participant remarked how tides were becoming higher:

> It seems the tides are getting higher…. the tides have been a little bit of an issue. Seems like we are getting a little bit higher tide all the time (P4).

While another participant discussed the proximity and height of waves:

> In January before Fiona, so that would have been January of 2022, my husband was in the backyard just walking around with the dog and it wasn't even a storm perse, but the water was so high that it actually splashed on him in the yard and that was the first time I could recall that happening. So, we have noticed quite a few differences [in the] waves (P5).

Scientists are predicting more intense waves, which can contribute to high water levels, in part due to reduced sea ice and coastline protection: "Wave heights and the duration of the wave season are expected to increase in the Newfoundland […] coastal area during winter because of reduced sea ice extent" (Connolly, 2019).

In addition to the changes in snow/ice amounts, higher temperatures, and higher sea levels, participants (N=7) expressed that they had also seen a change in the frequency and severity of winds. All participants expressed that wind had never been an issue and the town had always been windy generally. However, participants spoke about hurricane-level winds in recent years and mentioned the increase in the number of wind warnings issued for the region, described as a 'regular occurrence.' Several participants expressed concerns about high winds. One participant spoke about the speed of wind:

> Winds in our area…. like when we get the wind warning, you know it was kind of commonplace, but you know, now it just seems like we are getting wind warnings more frequently. I've never recalled having a hundred and fifty, a hundred and seventy kilometres per hour wind growing up. I know a hundred, a hundred and ten, but like even last week in the wreck-house here, they had like a hundred and ninety… that is category three hurricane wind…. that seems to be occurring more and more (P5).

Another participant discussed intensifying windstorms:

> The weather pattern seemed to be a little bit more intense when it came to the winds and stuff like that, the windstorms were more frequent and a little bit more intense (P2).

One participant who lived along the coast for several years connected sea levels with winds and expressed concerns about being washed out to sea and preparing to evacuate even before Hurricane Fiona:

> First, when we moved into that house, there were always winds and sea and…but in the last so many years, the seas have gotten higher, the winds have gotten stronger. The last year we lived in our house, I packed my suitcases and some personal belongings four times, thinking we were going to get washed out to sea. The waves were high, and the winds were fierce. We'll be awake all night long checking. So, we did find a big, big difference last so many years, yes!" (P7).

Another participant attributed the increase in storms to ocean warming:

> I think what's happening is the ocean is warming up. So, what's happening is those tropical storms that bypass all the time…because oceans were too cool, [and] so they stay further out…. They're not going to bypass; you're going to see more [storms] hitting [Port aux Basques] (P1).

Further, according to Participant 1, tropical storms that used to pass over the community in previous years were not passing over anymore due to the warming ocean, "I think because our waters are getting warmer, […] you're going to see more and more over the years." (P1).

The level of detail captured in the stories above is striking, especially for a community that has been known for winds. The extent of concern regarding winds was especially noteworthy, demonstrating the reality that the extremes of climatic conditions have become noticeably common to the participants. These stories emphasize rising winds, waves and sea levels, resulting in the ocean encroaching into new coastal areas, causing concern and even considerations of retreat.

The stories also align with literature about the area, corresponding with findings that have predicted that these changes and events will become widespread not only in areas that are known for them but also in locations that do not normally experience them (Catto 2011; Zhang et al., 2019; Masson-Delmotte et al., 2021). For people living in regions such as Atlantic Canada, which are already experiencing weather changes and extreme events, the

frequency and severity is expected to intensify (Petracek, 2022). Changes in environmental conditions will make it more likely that what is considered extreme events will now occur more often, necessitating the development of adaptation techniques that are specific to different regions to address context-specific problems. Thus, Hurricane Fiona is an example that might be common in the future, leaving lasting impacts in communities, as it did in Port aux Basques (see Fig 1).

Fig 2 Pictures showing sections of Port aux Basques during and after Fiona

Source: Town of Channel-Port aux Basques 2024 (Used with permission)

For now, the document review and interview data highlight the unique intensity of Hurricane Fiona. As noted by several of the participants interviewed, despite being close to the ocean and having experienced strong winds and high tides at certain points before, storm surges were not common, and neither did the magnitude of Hurricane Fiona reflect anything they have ever imagined possible in the community.

However, it was apparent that Hurricane Fiona was not the first storm the community had ever recorded.

> "In January 2000 a major storm surge caused significant damage to the southeasterly facing portions of the town – Mouse Island and Channel. It seems that most of the damage occurred up to the 8 metres above sea level elevation, with some damage occurring up to the 12 metres elevation." (Town of Channel-Port aux Basques, 2019, p. 26).

Two participants recounted the storm from 2000 but were quick to add regardless that Hurricane Fiona[11] remained the most destructive they have witnessed. For some, the scale at which Hurricane Fiona happened and the devastation it has caused is a reality they have not since come to terms with. They shared their experiences:

> I mean there have been storm surges here before where people have lost windows out of their houses, but they never lost their houses. Things like that have happened in the channel [area] before but…with like one or two people…affected but not as many as on the scale that [Fiona]did. Fiona was out of this world" (P9).
>
> There was a similar event to Fiona in 2000. It wasn't quite as bad. There were houses damaged. A lot of fishing infrastructure was destroyed. Wharves and boats were all destroyed (P4).

These stories depict the reality that people are used to winds and/or storms that cause minimal damage. However, it was evident that none of those previous experiences came close to their experience with Hurricane Fiona. This is because, as Colletta (2023, p.4) argues, a "very bad combination of factors was responsible for Fiona's damage in the town." Similarly, one participant described the hurricane as "a perfect storm of systems". According to this participant, they "...had a peak high tide…a full moon [and] the storm hit at the same time as the peak high tide, so all of those things when it had happened at one time is what made Fiona so destructive" (P4).

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[11] Port aux Basques was not the only community affected by Hurricane Fiona along the Southwest coast. Other communities, such as Mouse Island, Margeree, Rose Blanch, and Burgeo, were affected, but none of those communities were hit as hard as Port aux Basques.

The footprint of Hurricane Fiona is evident along the beach of the community where the waves swept in. Metal poles that used to be almost buried on the beach are now exposed, showing the magnitude of erosion and damages caused to the beach by the storm (see Fig. 2). These physical changes also affect aesthetics, satisfaction, and leisure in the community, as discussed in the section that follows.

Figure 3 Before and after pictures of a section of Grand Bay West Beach

Source: Provided by interview participant 5, January 2024. (Used with permission)

4.1.1.3 Impacts on Environmental Aesthetics, Satisfaction, Recreation, and Leisure

Climate change, and particularly Hurricane Fiona, has also affected how most people relate to the environment around them, including their perceptions of aesthetic beauty, the satisfaction that people have with the place, as well as the recreational and leisure experiences the environment provides. As discussed in Chapter Two, people obtain satisfaction from the environment as they interact with its various elements on a day-to-day basis and bond with it (see Feng et al., 2023; Stedman, 2003). When climate change or extreme weather events

modify these elements, it can hamper the ability of the environment to provide the environmental utility people desire (see Lignier et al., 2023). For instance, the disappearance of ice comes with the disappearance of species that will normally float by on the ocean on ice pans, as recounted by some of the participants (see also Government of NL, 2021). One of the reasons most people reside close to the ocean is because of the intrinsic satisfaction that comes with watching marine life pass by. Some participants stated that they want to be able to look out their window and see the ocean, enjoy the breeze from their patios or be able to watch out for sea animals. For example, participant 10, bought their house, which was basically hanging over the ocean, because they could not have gotten anywhere nearer to the ocean. This proximity is influenced by the affinity for the ocean environment (see Bonaiuto et al., 2016; Holley et al., 2022; Coletta, 2023), which most use for relaxation. But climate change has changed the extent to which the ocean environment can serve relaxation purposes for most people in the community especially after the hurricane, especially for those who had to move away from the ocean following the storm.

Some people also expressed interest in watching sea animals, for which reason they preferred living close to the ocean. However, some participants expressed that due to climate change, sea animals that used to show up at certain times of the year that most people loved watching do not show up anymore. Meanwhile, breeds of certain species not known to the local waters have surfaced over the past few years, as recounted by Participant 5:

> Another thing we notice over the past few years probably related to climate change is orcas and humpbacks, dolphins, great white sharks like we [have] seen so many different types of animals that is not normally associated with our waters but one time, I mean that year you could go on and see certain breeds, some are white. One was behind our house a full week and we could see its fin at times (P5).

This quote reveals two things. Firstly, climate change has led to the late or non-appearance of sea species that most people watch for relaxation, for which reason they prefer living close to

the ocean. Secondly, it reveals the fact that climate change has resulted in species unknown to most people (mostly invasive species) drifting into nearby waters at a rate and magnitude that was worrying for the participant. Thus, species that show up at certain times of the year, which supports relaxational needs and other recreational fishing benefits to residents, now either show up late or not at all. At the same time, species that local communities rely on will now have to compete in the already challenging ocean environment with invasive species that may be genetically acclimatized to the changing conditions (see Government of NL, 2021; Matheson et al., 2016). The changing ocean conditions, coupled with competition from invasive species, may lead to a gradual decline in the native species numbers which could impact recreational fishing outcomes for tourists and residents.

Climate change can also disrupt the timing of natural phenomena that support and enable recreation, such as the time for fall colours, the migration patterns of salmon, and the blooming of wildflowers (see Hille Ris Lambers et al., 2021). For instance, to go "skidooing" or skiing, one needs enough snow. In Port aux Basques, some participants argued that much of this recreational activity (skidooing) is becoming a situation of the past due to the lack of sufficient snow. This has resulted to several people giving up 'skidooing' which could likely be the case for other activities like hiking due to erosion of the trails or boat tours for whale and iceberg watching (Government of NL, 2021). Participants linked the lack of sufficient snow to people selling their snowmobiles. According to Participant 5, she sold her skidoo about eight years ago because there was not enough snow.

Changing demographics is another factor affecting recreation:

> Darts is a big thing here. There are a lot of people who play darts in teams and stuff, and various sports, actually, too. I mean, some of our players are leaving, so that's going to affect the recreation around here as well. Unless we get a lot of people move back in here, I don't see that happening. Most people seem to be getting out of here. So yeah, I think it's going to affect the games…. I've got a friend of mine that used to go bowling, but she's not going to go bowling

> anymore now either because her team has basically cut down by half. So, it's not the same" (P8).

The story demonstrates the impact of climate change on leisure in a community where climate change threats have necessitated some moving away, especially after Hurricane Fiona. As documented in Chapter Three, the community's population has seen a constant decline over the years due not only to climate change but also as people move out to pursue higher education and in pursuit of other opportunities (see Statistics Canada, 2016; 2021). For smaller communities such as Port aux Basques, connecting with nature and other communal sporting and social activities is important to fulfil recreation and relaxation needs, which is necessary for well-being.

When climate change leads to a reduction in both the quality and level of such activities, it could lead to the build-up of stress arising from non-engagement in leisure and increased risk of mental impairment or well-being. Research has found that increasing leisure activities reduces stress accumulation and improves health outcomes and general well-being (Elsden et al., 2022; M. Xu et al., 2023). Engaging in recreational activities can also impact survival rates, especially among adults (Cai et al., 2023). However, the outmigration of some members due to climate change may reduce the number of people needed to accomplish some recreational activities, such as darts, as in the quote above. Therefore, the complex realities of Hurricane Fiona, particularly when combined with other factors, are likely to have a lasting impact on several aspects of the community, including leisure and recreation.

4.1.1.4 Impact on Health

Along with the impacts of climate change on the physical environment, aesthetic and recreational outcomes, research has increasingly shown that there are dire implications for mental and psychological health (see Hayes et al., 2018; Hrabok et al., 2020; Woodhall-Melnik & Grogan, 2019). Climate change outcomes can precipitate feelings of hopelessness,

especially when catastrophic events occur, and render houses uninhabitable through the destruction of personal belongings. This feeling of hopelessness can result in anxiety, mental health concerns, depression or suicidal thoughts (see Burke et al., 2018; Hayes et al., 2018; Schwartz et al., 2023). Conversations with one of the respondents revealed perspectives consistent with those captured in the literature when she recounted the thoughts of ending her life after losing her house and all her belongings to Hurricane Fiona. She recalled, “And…for me, that first two weeks…. I was in a really dark place. I just didn't want to be here…I was very lethargic. I didn't want to get up, I don't want to see anybody, I just wanted to die…why didn't I just die with house….” (P1).

Memories like Participant 1’s reflect the intense cognitive, emotional, and behavioural reactions to the hurricane. Others reported general uneasiness, psychological distress, or sleep disturbances, which could have affected their ability to carry out their everyday life (see also Clayton & Karazsia, 2020).

One other way climate change produces mental health anxiety and related problems is nervousness over the possible recurrence of extreme weather activities. Anxiety-related outcomes are often higher for people who experienced severe impacts (see Clayton, 2020). For a community that was not very concerned with weather events, people in the community are now nervous whenever extreme weather forecasts are issued for the region, as described by one of the town officials and other residents interviewed. According to Official 3, when most people residing along the coast were informed to leave in advance of the hurricane, they said they were going to be all right. That feeling of safety and confidence while going through varied weather conditions has since been replaced with nervousness and anxiety. For other participants, Hurricane Fiona has led to the feeling of anxiety staying close to the water throughout the year due to fears of the possibility of such an event happening again. Participant 1, now residing several miles away from the ocean after the hurricane, expressed:

> After Fiona, I don't think I could ever live anywhere near [the ocean]. This is probably as close as I'd want to be because I respected and I realized it's reclaiming what it owns, you know, so I had a lot of respect for it. I think they're beautiful but at the same time you know, I respect the fact that you know, you don't take chances…you know, they just wait and reclaim what it owns" (P1)

Extreme weather conditions can also affect access to health care (see CBC, 2021b) and the supply of other essentials (see CBC, 2021c) and lead to a feeling of being trapped. In Port aux Basques and nearby communities, due to the wreck house winds, it is difficult to either drive in or out of the community during high winds unless the wind dies down (see CBC, 2021b). For instance, following a rainstorm in November 2021 that "dumped more than 200 millimetres of rain on the region and washed out the Trans-Canada Highway which connects the region to the rest of NL", there was a resultant shortage of essentials like gas and other food items (CBC, 2021c). Some residents described the situation as "being stuck".

CBC (2021b) detailed that during the period of repair works on the road, helicopter services were only available for emergency situations, causing some community members to miss out on medical appointments and family visits outside the town. One of the participants described the feeling of being secluded or isolated:

> We are almost secluded on this coast and that's the scary part for a lot of people especially us getting older you know like emergencies and our hospital can't deal with them…like you can't born a baby here now so what if somebody is in labour you know and we can't get out because of the wind…..or something emergency, someone has a heart attack…it's a crazy thought is a scary thought and I think Fiona has made more people realize you know in this area what's capable of happening...(long pause)...(P5)

The depth of emotions contained in this narrative, and several others, focused on the fears regarding climate change, worries about their safety in emergency situations, and the dread of future events after experiencing the wrath of Hurricane Fiona. For example, the LeGrow Hospital, like several smaller hospitals across NL, does not perform surgeries. In emergency situations, people have to be moved to either Stephenville or Corner Brook, which may not be possible if wreck house wind warnings are in effect. The spectre of this possibility has

resulted in heightened levels of anxiety and mental and psychological stress among some of the interview participants. This was confirmed by one of the participants interviewed, who shared how they noticed some sort of a change in the general 'aura' around the community following Hurricane Fiona whenever there is inclement weather. According to some participants, this feeling will be something they might have to deal with for some time or perhaps not get over.

4.1.2 Knowledge and Perceptions of Climate Change in Port aux Basques

Community members tend to demonstrate awareness of shifts in climatic conditions and be keen observers of any alterations in their immediate environment, as their livelihoods, culture, spirituality, and social structures are often interconnected with their local surroundings (see Rankoana, 2018). Some locals quickly notice a change in temperature, rainfall volumes, wind speed and direction, and other salient environmental conditions through their direct interaction with the natural environment since they depend on the environment for diverse needs. According to Natural Resource Canada (2019), 87% of respondents surveyed in selected communities have acknowledged the effects of climate change in their communities. This attests to their knowledge and awareness of climate change and its impacts on their surroundings. An understanding of the extent of public knowledge and perception of climate change is essential to forging plans and policies for the times ahead. Awareness and perception of climate change among the general public can lead to a better understanding of the opportunities and challenges on which their decisions will be based. Awareness and perception also offer valuable insight for national and transnational governments in developing viable and effective national and transnational climate policies that meet their needs.

In Port aux Basques, mixed results emerged when participants shared their perspectives and knowledge on climate change generally and to what extent they attributed the environmental

changes they were observing to climate change. Some of the respondents were very sure that the environmental changes they were witnessing were due to climate change, whereas others were indifferent. For some, major differences they have seen in the environment resonated with the general trends on climate change and its impacts, as they have seen on television in other parts of the world where storms were occurring and heat waves were frequent. “I figured it was climate change; I mean the mild winters for sure...” (P5). Other respondents attested that they had heard about climate change, but the extent to which the things happening around them are caused by climate change, they did not know. Others did not think it was too serious. One person stated:

> “I’ve heard that the climate [is] chang[ing] to the extent of it, I'm not sure how bad it really is. But I do believe in climate change. It is changing… but for seeing it when I came home, at least, other than a few windstorms and stuff like that, it was nothing, nothing too serious in my eyes” (P2).

Affirmatively, another participant highlighted how the rising sea levels have claimed areas where wharves and other fishing infrastructure were built in the past. Founded on their awareness and acknowledgement of climate change, they reinforce their defence walls every year to protect against the higher waters:

> Oh, definitely, of course! I could see that when first over the years, we didn't even imagine it was climate change. It was like, oh my God, our weather is getting windier, our weather is getting sunnier but we...didn't ever consider it as a climate change. But as I got older…living next to the water…we knew...this is not right. …[because] our house was right here, [and] the ocean was right here. So what we used to do every year is we would buy rock and stuff from the construction company and fill in the cove behind our house. Because as the waves in the ocean were getting rougher…we wanted to feel more secure. So, we used to get loads and loads of rocks and try to protect ourselves. So we knew that was a concern then because every year we would say, oh my God, the winds are getting higher, they're getting worse. The waves are different. So, we were buying rocks to put beyond our house, to protect the waves [from] coming in and to protect our house (P6).

The quote above speaks to their knowledge, awareness, and actions in response to climate change, which were developed over time due to observed changes in the environment as well as experience with extreme weather events.

According to several respondents, after Hurricane Fiona, they are more aware of changes such as storm surges and associated water levels, but the understanding of storm surges for the average person is still limited, and perceptions of climate change do not directly result in people wanting to move away from the coast. Thus, while most of the participants interviewed agree that we are experiencing climate change, the understanding is that some people still prefer to live along the coast and would not have moved if their houses were not located in the impact zones.

4.1.3 Handling Weather Events: Port aux Basques' Response to Hurricane Fiona

Tragically, Hurricane Fiona claimed one life. In the context of the destructive nature of the storm, the fact that only one life was lost can be credited to the prompt response from the Town Office and the timely evacuation of people ahead of the storm. Thanks to the early weather updates provided to the community, relevant actors were brought together the day leading up to Hurricane Fiona to evaluate their preparedness, identify lapses in the emergency preparedness plan, and share ideas to enhance capacity. The Hurricane Fiona Response Team was formed, and the agencies involved, listed in Table 4, convened the night before the hurricane hit to deliberate on how best to prepare for the impending weather events. This included all the relevant organizations/agencies within the community.

Table 4 Hurricane Fiona Response Team

1. Town office of Port aux Basques
2. Fiona Relief Centre (Department of Justice and Public Safety)
3. RCMP
4. Canadian Red Cross
5. Salvation Army
6. Newfoundland Power
7. The Lions Club
8. Western Health
9. LeGrow Health Center
10. Bell Alliance

Source: Field Notes January 2024

According to official 3, the meeting was convened after the Town Office received a call from the NTV meteorologist Eddie Scheerr, who informed them to approach the impending storm with extreme caution. This is an example of how important coordinated, early warning systems will be in the future in helping communities prepare for climate phenomena like Hurricane Fiona. Despite being already aware of the forecast, official 3 noted that the call from the NTV meteorologist took their preparation to a new level as they convened and called all those living close to the ocean and sent out mass messages and Facebook posts warning people to leave their homes that night. The warning tip received played a crucial role in the preparedness of the Town Office ahead of the hurricane and in reducing fatalities, according to Official 3.

The municipal officials and councillors, including local first respondents, rolled out a full-scale evacuation within the early hours of the day of the storm for those who did not heed the message the night before. Seniors and others with limited capacity were moved from their apartments to safety, a situation that would probably not have been possible if the officials had not convened the night before. Official 3 recalled. “We had our local Volunteer Fire Department along with first responders, our public services, our public works department going door to door and trying to get people out.”

Official 3 noted that the storm hit hardest in the community, which they described as the most vulnerable. “Because it is the oldest section [of town] …we had a lot of retirees, we had a lot of seniors, we had a lot of low-income families that were living in a lot of these areas…” The participant argued that most of the seniors residing in those areas were living alone, coupled with the fact that most of them did not have vehicles. Thus, the difficulty of moving them was not something they believed would have been possible in the wake of the hurricane if evacuation efforts had not begun the night before. The participants added, “We would have been scrambling that morning if we hadn’t taken the actions we took that night.”

Several participants interviewed (N=10) commended the effectiveness of evacuation efforts and expressed satisfaction with the approach, including how the Town office has been supportive after the storm. The interview participants were largely satisfied with all the interventions over which the Town Office had an oversight responsibility, which highlights the preference for locally-led interventions and for that matter, locally-led adaptation strategies headed by people in direct contact with the community.

4.1.4 Section Summary

Most of the people interviewed largely agree that the climate is changing and that impacts were felt in the town, even before Hurricane Fiona. Participants discussed climate change's impacts on the physical environment, recreation and leisure, as well as health. Most of the participants also attribute most of these changes to climate change, reflecting their perception and knowledge of the changes around them. The importance of early warning systems was shared by participants, who noted that they contributed to success in limiting the impacts on human life to the best of the response team’s ability. Thus, when timely information regarding the likelihood of such events is communicated to and by local authorities in time, they can help ensure the safety of their communities as much as possible.

4.2 The Determinants of Relocation (Un)Willingness in Port aux Basques

This section discusses the determinants of relocation in Port aux Basques. In particular, the roles of climate risk perception, place attachment, and the concept of ecological grief in the willingness and unwillingness of participants in Port aux Basques to relocate in the face of climate emergency are presented. Table 5 presents the summary of key findings regarding relocation (un)willingness in Port aux Basques as captured through the narrative interviews, synthesizing interview and document review results related to Research Question 2: What are the main reasons for individuals' willingness or unwillingness to relocate in the face of climate change impacts (including demographic, socio-economic, cultural, risk perceptions, place attachment/sense of place, ecological grief, past experience with relocation, or other)?

Table 5: Summary of determinants of relocation (un)willingness

Major themes	Findings (Codes)
1. Place attachment	- Neighbourhood preference - Love for the ocean/environment (topophilia) - Family bonding (social connection) - Place satisfaction
2. Risk perception	- Proximity to the disaster-prone environment - Experience with extreme weather events
3. Ecological grief/anxiety	- Loss of property/ memories (heritage) - Detachment from the environment (ecological disenfranchisement)

4.2.1 Place Attachment

> When we thought about retiring…… we've got a lot of family here, and so this is the draw, plus NL is one of those places a little unique; people are very kind and caring and compassionate … a little more noticeable here, so we just wanted to come back and be where we grew up and be around familiar things and people and family (P1).

The above quote depicts how place satisfaction and attachment arise from previous experiences with a particular environment, drawing meaning and interest to continue experiencing particular areas. Some of the participants interviewed in this study (N=3) returned to the community after retiring elsewhere to settle close to relatives and the ocean,

with the desire for close bonding with family and nature acting as an entrenching factor to that environment (see also Bonaiuto et al., 2016; Feng et al., 2022). Participant 3, for instance, returned because of the attraction to the ocean and to be close to their aging father. As such, anything that disrupts the possibility of these realities was not desirable to them. Asking about the perceived impacts of relocating from the ocean environment after the storm, most of the participants expressed concerns about how it will affect their lives. For most participants, the detachment from the environment and the inability to engage in familiar activities were among the main reasons voluntary relocating would have been especially difficult. As explained by Participant 3, who is moving to a new place located 20 minutes' drive away from town, "being able to get up in the mornings and go down and check out on my dad, who just finished cancer treatment and surgery, being able to go drop by my buddy's place and have a game of darts and beer is not going to happen the way it did before". For this participant and several others who moved, it negatively affected proximity to family, social connection and other activities.

In small coastal communities like Port aux Basques, people depend on one another for diverse kinds of support as mentioned by Participant 3 above, for example. The depth of social connections woven into the daily living fabric of such types of settlements makes it desirable even for people who have spent most of their lives away from home. The preference for home is motivated by the intrinsic and external benefits of being attached to the natural environment and the availability of reliable support systems (family) that can be leveraged (see Lie et al., 2023; Stedman, 2003), especially among older adults (see Jasen, 2020), as revealed by some through this research.

4.2.2 Risk Perception

Respondents were uncertain whether they would have taken advantage of a relocation program if offered had they not experienced Hurricane Fiona the way they did. Those who

were not heavily impacted by the hurricane but were scheduled to be relocated were found to be less willing to move and would have stayed in their home locations if they had their way. Participant 4, for instance, described the situation of the uncle and his family, who he explained “have a beautiful home, never had any damage, never had no mess to clean up after the storm. They [him and the wife] don’t want to go; they want to spend their last few years in their house, [but] they have to leave their house in the spring of 2024” since their house falls within the impact zone. The same participant who is not in the designated impact zone but lives close to the ocean stated, when asked whether he has considered moving away from the ocean after the storm, that he would not like to move. In his opinion, “nowhere is really safe enough [and] this might never happen again, or maybe it'll happen next week, maybe tonight, I don't know. You can move in the woods and there is forest fire right, you move next to a river and there is flood. It's natural disasters, so it's really no safer anywhere” (P4).

Risk perception can be related to place attachment, with perceptions of risk sometimes leading to place detachment and a willingness to engage in risk-averting behaviour, in this case, relocation (see Bonaiuto et al., 2016; Feng et al., 2022). Individuals with a strong sense of place may also have an increased perception of risk that stems from their interest in protecting the environment with the hope of making it conducive to continually supporting their lifestyle (see Feng et al., 2022). For example, some of the participants have taken notice of the continual increase in the frequency and severity of weather events and resorted to protecting their environments as a response instead of planning to move. According to Participant 7, “For all the years [they] lived [at their spot], …[they] were building a [sea] wall behind [the] house…which was almost completed, so [they] thought [they were] safe [there] forever no matter what with the sea, but Fiona came and cleaned it all up.” This supports the observation by Holley et al. (2022) that sometimes, coping strategies provide a false sense of hope with a possibility of compounding long-term problems. In the case of the

aforementioned participants, the sea defence wall they had built over the years provided what was later realized to be a false sense of security. In this case, resources may have otherwise been directed to other proactive measures, such as moving to a safer place, rather than being spent on building a seawall, which was ultimately ineffective in protecting them against the storm.

Several factors influence how people perceive risk. Among those most commonly mentioned by interviewed participants were past experiences with extreme weather events and the length of time people have lived in disaster-prone areas, both factors that are also mentioned in the available literature as discussed in Chapter Two. One factor commonly referenced by interviewees to influence their perception of risk was their proximity to the locations that had been significantly impacted by the storm. Proximity has led to some, though having not been impacted directly by the storm, to have expressed interest in relocating away from the coast. This confirms the findings of Koerth et al. (2017) that a positive relationship can exist between proximity to natural hazards and risk perception and argued that the closer a person is to a natural hazard site, the more motivated they will be to avoid it. On the other hand, not everyone close to the ocean in Port aux Basques felt the urge to move back after Hurricane Fiona. This is consistent with the position of Holley et al. (2022), which elucidated that risk-averting behaviours like relocation may not necessarily be influenced by proximity to a natural hazard site. In the same way, risk perception may not translate directly to behavioural motivations like relocation (Holley et al., 2022).

4.2.3 Ecological Grief

Another critical reason for the unwillingness to give up certain environments is the grief that arises over the loss of such places due to the bonding between the self and place. Regardless of whether people self-detach to make relocation more acceptable or make those decisions under some form of duress (whether natural or man-made), grief over the environment may

sometimes arise. Removal from such environments is often associated with the loss of one's heritage, sense of place, emotional/mental well-being, traditional knowledge and/or sometimes the self-dignity that comes with priding oneself in a host of benefits obtained through the connectedness of the self and place (Neef, 2022). When relocation decisions are made following very destructive events like Hurricane Fiona's, the grief seems stronger. Expressing feelings over the loss of her former dwelling, one participant narrated:

> I raised my children in that house (sobs). I just felt that it took a lot of mental strain. It's gonna be a long time getting over it. I just feel that it took a lot…I know I can carry my memories with me. But I love the scenery where I lived, I loved watching the boat come in, I loved the ocean, my kids always played around, it wasn't a noisy, noisy area. It was a very private area and (pause), yeah, there's a lot of memories there (P3).

According to the same interviewee, based on the fact that she raised all her children in a house that got washed to sea, it was very difficult to come to terms with the reality that most of the memories she made with her children growing up were gone. This includes childhood pictures of her children, her children's writings on the walls, and some other historical artifacts and pictures of her parents.

Grief-related concerns were expressed by the participants interviewed, as in the case of Cunsolo & Ellis (2018), but it was found to be strongest among those who lost everything, including their houses and contents, to Hurricane Fiona. For such individuals, the grief includes the loss of memories as well as a detachment from the environment where they had lived. This category of people was found to have accepted the relocation initiative with more openness amidst the grief, perhaps due to the acceptance of the reality that nothing is remaining for them to hold on to, though some still go back to sit at the evacuated site at times as a way of reconnecting to that environment. Meanwhile, others find the environment upsetting and avoid it completely. According to one of the participants, she does not go back there anymore because anytime she goes, she asks herself how on earth she thought she was

safe where she was. Emotional response to climate-related environmental threats and how it influences the decision to either move or stay put, as evident through the Port aux Basques case, aligns with examples from New Brunswick regarding the discussions on flooding (Woodhall-Melnik & Weissman, 2023).

Amid the emotional reactions over the loss of place and concerns over residing close to the ocean, not everyone is ready to give up the ocean environment for anything. One person interviewed who is in neither phase of the relocation project reiterated how he would not give up his place for anything.

> I wouldn't really want to [move]. Because I am here. I have been here for 30 years... For me to leave here looking at all that [the ocean] and go over to the new subdivision and look at scrap car yard, because that where it's to, right. You are up on that hill looking down to a scrap car yard, a garbage dump, an industrial park. That's…was supposed to be in industrial parks, not subdivisions. So why would I give up here to go over there to live? (P4).

The stand of the above participant exemplifies the connection to place and corroborates the findings of Dickson & Burton (2022) that such decisions to give up place may not be made until the last minute, perhaps not at all of one's own volition. Because the above participant was not impacted by Hurricane Fiona, it was not clear whether he would have made the decision to move if he had been impacted and was in the impact zone.

4.2.4 Section Summary

The section provided an understanding of the factors that influence relocation (un)willingness in Port aux Basques, particularly through the lens of perception, place attachment and ecological grief/anxiety. Factors such as neighbourhood preference, topophilia, social connections and place satisfaction were identified by participants as reasons for their preference for the ocean environment (place), thus affecting their relocation willingness and consequences in terms of "ecological grief". It was also realized that previous experiences with extreme weather events, a contributor to risk perception, have led to contrasting

positions regarding the willingness to relocate. After carefully considering the position of various participants on these factors, it can be concluded that the decision to move, while it might be dependent on the factors mentioned above, may also depend on the process itself and how it is done. Details on such perspectives, as uncovered in Port aux Basques, are presented in the next section.

4.3 Participants' Perspectives on the Relocation Program

This section begins by presenting an overview of the relocation program put in place in Port aux Basques. This is followed by a review of the discussions, stories, and experiences shared by participants related to the program.

4.3.0 The Relocation Program and Compensation Packages

As discussed in section Chapter Three, all houses in the community that fell in the impact zone were given some financial compensation to enable them to rebuild from the storm. In NL, when the Government of NL initiates a provincial disaster financial assistance program (NL-Disaster Financial Assistance Program-DFAP) in response to a particular emergency or adverse weather event, the Emergency Services Division within the Department of Justice and Public Safety oversees the administration of the federal government's Disaster Financial Assistance Arrangements-DFAA (Department of Justice and Public Safety, 2020). The compensation packages in emergency situations, including extreme weather events like hurricanes, are determined by the NL-DFAP in compliance with the DFAA to include: (a) a replacement value for the home at a minimum of $200 per square foot and based on a detailed assessment by an insurance adjuster, (b) replacement value of property contents in accordance with the DFAP program Schedule of Loss, and (c) a value for land or provision of a suitable land option (Department of Justice and Public Safety, n.d). The amounts payable for contents are based on the adjuster's recommendation (Department of Justice and Public

Safety, 2022), and the establishment of maximum payout amounts subject to the determination by the province (Department of Public Safety, 2020).

According to one of the officials from the Town Office, the compensation package for affected persons in Port aux Basques covered land and houses for the first batch of people who were affected. It also covered a certain amount of the contents of the house. But in the second phase, “those in the impact zone whose houses were not destroyed would only get money for land and houses but not for the contents as they could take the contents and move it” (Official 1).

The section below discusses participants' perspectives and experiences with the relocation process, including their concerns regarding the determination of the compensation packages they received. Table 6 presents a summary of the main themes and findings of Research Question 3: What were peoples’ experiences with the relocation process undertaken by Port aux Basques, and what lessons can be learned for future community relocation programs?

Table 6: Summary of perspectives on the relocation program

Major themes	Findings (codes)
1. Power dynamics and a lack of community participation	- Power imbalance - Lack of sympathy and compassion - Non-involvement of affected parties in relocation decision process
2. Lack of communication and long response time	- Long waiting time for compensation package - Absence of feedback - Absence of communication channels
3. Inconsistences in compensation packages received	- Compensation package differences - Questions about package determination criteria - Absence of explanation on how actual packages were determined

4.3.1 Power Dynamics and a Lack of Community Participation in Decision-Making

> "…the assessment that I got on my house, I had a couple of questions that I was not happy with a couple of things and sent the government an email after a couple of days, I got a phone call, in a very nice way, the government official told me to take it or leave it. There is no appeal process; you can ask all the questions you want, but this is what you're getting…., if you don't want it, then we'll close the package, and you're stuck where you are. So, like I said, there is no compassion, there is no sympathy" (P2).

The relocation initiative in Port aux Basques was compulsory for all persons in the impact zone, which already defeats the principle outlined by Arnall (2019) that relocation programs must be voluntary. Though it is acknowledged that sometimes governments may step in to ensure people no longer reside in certain environments deemed unsafe, as was the case in Port aux Basques through the delineating impact zone (see Coletta, 2023), the quote above from P2 demonstrates the rather unfortunate stand of government officials when dealing with affected people in Port aux Basques. The language and tone suggest a lack of sympathy and compassion in dealing with affected people by the higher-level government officials, apparently without seeing individuals recovering from emergency events as stakeholders who should be involved in making critical decisions regarding their lives, most especially in this case, where to live.

Another participant stated she felt like they were blackmailed into taking the compensation package they were offered. "I was talking to one of my friends …. who lost everything. She was basically told that if she wasn't happy with what they got, if you don't take this, you go on the bottom of the pile, and we don't know when we'll get to you" (P1). Again, this quote suggests a lack of empathy in dealing with environmentally threatened individuals.

Concerns also emerged regarding the involvement of the affected parties in the decision-making process in the post Hurricane Fiona relocation programs. According to interviewees, they were met only once throughout the process, "with limited opportunity for questions and feedback" (P1). This is in contrast to previously established good practice, which

demonstrates that involving the population at every stage yields more favourable outcomes by ensuring that community needs are not only heard but also integrated into program implementation for more positive and satisfying outcomes through quality engagement (Servaes, 2022); Andress et al., 2020) as discussed in Chapter Two.

4.3.2 Lack of Communication and Long Response Time

Effective and timely communication is pivotal in dealing with people impacted by disasters. Effective channels of communication serve as building blocks between decision-making bodies and affected communities, where information regarding rebuilding pathways and intervention measures are communicated. This provides opportunities for the expression of views, providing and receiving meaningful feedback from authorities (see Hernández et al., 2016). Yet another concern mentioned by research participants regarding the relocation process was the absence of communication and the length of time it took them to hear back from the government provincial officials concerning their compensation package (see also Chughtai & O'Neill-Yates, 2022).

Immediately after Hurricane Fiona happened, an influx of people came into the community, including the Premier. According to one participant, they didn't receive any information regarding the process until April 2023 (P1), after this initial meeting and following the evaluation of the properties to determine compensation packages. Another participant confirmed, "…they did meet with us and said that we [would] receive our packages [and] inspections were going to take place…but there's been very little follow-up from the government..." (P2). During that period of more than six months following the event, people felt like they were in the dark concerning their next course of action and oblivious to how much compensation they would get and whether that amount would be enough to rebuild (see Chughtai & O'Neill-Yates, 2022). The absence of communication and information regarding

the process resulted in several of the affected people being left in a state where they did not know what to do.

4.3.3 Inconsistencies in Determining Compensation Packages

Another critical concern expressed by participants was how the compensation packages were determined. According to several participants (N=10), the packages they received did not come close to what they were told they would receive by provincial officials, nor did the criteria with which the packages were determined. The original criteria for the determination of the compensation package, according to several participants and confirmed by Town Office officials, was that compensation package amounts were to be determined per square foot of the property with a base amount of $200 dollars per square foot (see also Chughtai & O'Neill-Yates, 2022; Department of Public Safety, n.d, Government of NL, 2022). Then "if you have upgrades that would be higher" (P1), which was to be decided after the properties had been evaluated by insurance adjusters (Department of Justice and Public Safety, 2020; 2022; Government of NL, 2022).

However, several participants discussed inconsistencies in the way their properties were evaluated, which, according to them, did not reflect the worth of their property. For instance, in measuring the square footage of a property, one of the participants stated, "…for myself, if I am going to measure, I will use the outside measurement…you take the width multiplied by the length and that will be your square footage" (P2). In contrast, the officials measured from inside the building, and people lost some square footage as a result. One of the respondents who did the measurements for his property said he got 1950 feet, whereas the government officials using the inside measurement came up with 1856 square feet, yielding a difference of 94 square feet. The participant was provided with no explanations for such a shortage.

The same participant who also got a detailed appraisal of his property mentioned how the prices of things differed significantly from what the government officials quoted. The interviewee (P2) explained that he did not understand where they got certain prices. “They said the assessed value to replace all my windows and patio doors was $4300. I priced out a patio door yesterday, which alone cost $3000, just one. So, I got 1300 dollars to replace my big window and six other windows in my house, and we don’t understand where they are getting the prices from.” One of the participants argued that there is a possibility that the values were based on prices in St. John’s rather than in Port aux Basques, where prices are higher.

In the construction of homes, some had used gyprock while others used panel boards. Panel boards cost 20 dollars per sheet, while gyprock is priced at 60 dollars per sheet. While one might expect a higher per square foot valuation for a person who used gyprock than one constructed with a panel board, one participant narrated how a friend of his whose house was constructed from a panel board got 220 dollars per square foot while he, having built his home with gyprock, was given 200 dollars per square foot. Overall, participants expressed concern about a lack of transparency in how prices were calculated.

Another participant commenting on the inconsistency in the determination of compensation packages expressed how she chanced upon the paperwork of another person whose house was not valued nearly what hers was but ended up getting 250 dollars per square foot, whereas she got 200 dollars for her property. Meanwhile, she said she had spent a lot of money the previous year on upgrades, but none of that was factored into deciding her package. Other participants expressed similar sentiments.

The results emphasized an overriding desire for transparent assessment, including explanations about how they were conducted. One participant felt that bigger properties were

being disadvantaged and those with smaller properties were given higher per square price to enable them to build back or purchase new property. According to him, a lack of explanation was what he found the most upsetting. The lack of clear communication of government intentions regarding policy implementation appeared to lead to information gaps, erode trust and a questioning of the legitimacy of government decisions by aggrieved individuals, as noted in previous literature (e.g., Ferris and Bower, 2023; Hanna et al., 2019).

4.4 Satisfaction Dynamics Among Interviewees

A careful analysis of all interview responses revealed contrasting perspectives regarding satisfaction with the relocation process, and differences in perspective can be attributed to several reasons. Aside from the concerns captured above, several participants (N=6) reported they were largely satisfied with the process and the compensation packages they received. They emphasized empathy in the process, stating it was the first time the community and the province as a whole had to deal with something of that magnitude. Others, however, expressed strong dissatisfaction, largely influenced by a perceived lack of responsiveness and transparency.

Among the first to be moved, some had their houses completely washed to sea, whereas others whose homes had only infrastructural damages had either all or most of their contents intact. The latter category of people was found to be more content with the package than the former, who had to start life from scratch, including building back their houses and buying new content. Among that group, one participant stated, "…we had to start, we had nothing! We didn't have a fork and knife, a plate, we had no clothes" (P1).

People's financial status may have affected their satisfaction with relocation. Those who were actively working or had some money saved up were able to start their rebuilding process. Others had to wait until they heard back from the government to determine whether they

were going to get enough compensation to rebuild or if they were going to rent. The situation was also different for those who owned their homes outright than those who had mortgages. “We only built back because we owned our home. I can't imagine anyone with a mortgage having to pay off the mortgage and then build. They will never be able to build” (P3). Again, some decided from the onset that they would not rebuild. These individuals either rented apartments or bought houses with their compensation packages. This group of people seemed generally more satisfied than those who had to rebuild.

Regarding the choice of location to rebuild, people had the option to receive “a value for land or [be provided with] … suitable land option” (Department of Justice and Public Safety, n.d) in accordance with the NL- Disaster Financial Assistance Program Policy Statement (Department of Justice and Public Safety, 2020). According to one of the officials from the Town Office, affected individuals could either build in the newly developed municipal subdivision or purchase land elsewhere. Those who decided to rebuild in areas other than the sub-division did so for several reasons. Some didn’t like the location of the new subdivision or the actual spots available. Some did not want a neighbourhood where their houses would be surrounded by other houses, while others also decided to move further away from town due to personal reasons.

One official from the Town Office explained, “For land, if you are going to buy, you will get a flat rate of $30,500, but if you are going to develop a new house in the subdivision, they will buy a piece of land there for you because the [price of the] land in the subdivision is more than that. Some pieces are 35-45,000” (Official 1). It is worth noting that there is no specific amount stated in the Policy Statement. Government officials can decide the maximum amount to pay for land (Department of Justice and Public Safety, 2022), though details on how that amount is determined is not explicitly documented. One participant who decided to buy land elsewhere stated that the amount was barely enough to purchase land,

coupled with the fact that the land in the subdivision was already cleared, whereas those who purchased elsewhere had to pay for clearing. One participant recounted limitation in compensation:

> We didn't get very much for the land…not enough that we could come up here and buy a piece of land. So it wasn't very much for the land. And then they gave you a little bit for your contents. So, if we wanted to build, we never would've been able to afford it. There's no way we could afford to build with what they gave us (P1).

Another discussed added costs of land clearing:

> They gave a flat rate of 30,500 for your land but they were selling land up there for 45,000 and 55,000. And you know my land wasn't cleared, and I had to pay 12,000 dollars to get it cleared, and the government didn't give me money for that (P5).

Given that land in the subdivision was already cleared, interviewees suggested that it would have been best to provide enough funds so that those who decided to go elsewhere to be able to afford and prepare their land for construction. They argued that this would have enhanced the general satisfaction level among the study population.

The difficulty in rolling out such policies was acknowledged by participants, some of whom remarked that it would be practically impossible to address every single concern. One of the officials from the Town Office acknowledged that it was not a perfect process and was never going to be. The official stated that during the process, they ensured that no one was left stranded and remarked that "insurance companies abandoned people who had paid their dues for over 50-60 years" (P12), a situation most respondents complained bitterly about. According to the official,

> This is not…a make-rich project...this was about giving you what it takes to build back a house or get a house, to get to start, to move into where you are and to get some things back that you might have lost. If, in the end, that's what it circles around, and that's what happens, well, that's what I was meant to do. And you know, I just bear the fact that if we weren't able to help or governments weren't able to help, where would we be?…I wouldn't have been here. I would probably have resigned now because I don't know how I would have been able to stand the pressure of no help for people (P12).

The Town Office did the best in its capacity to respond to the needs of the people, which all participants confirmed. The response included managing and distributing all the donations received in the aftermath of the hurricane and providing affected residents access to mental and psychological health services. Both financial and other material donations the community received after the hurricane were received by the Town Office, which supervised their distribution to affected individuals. Despite the challenges with the process, some of the interviewees have seen an improvement in their overall quality of life, as in the case of Newtok, through the provision of new and better-quality houses (see Dannenberg et al., 2019) and an overall improvement in their living standards (see Rosen & Alaska, 2024).

4.5 Chapter Summary

Overall, this chapter has established that the impacts of climate change in Port aux Basques are evident through changes in the physical environment, changes in leisure and recreation, and the impacts of a changing environment on health. It also highlights determinants of relocation behaviour. In Port aux Basques, the affinity to the ocean environment (strong sense of place), the social networks and the grief over the loss of place were among the dominant factors that would have made a voluntary movement impossible if Hurricane Fiona had not happened. Experiences with the relocation process, which include the inconsistency in the determination of the compensation package, the lack of communication on the program, and the long response time hearing back from provincial officials on the compensation package, were the main factors that have contributed to participants' dissatisfaction with the process.

5 Chapter Five: Conclusions and Recommendations

5.0 Introduction

The final chapter of this thesis discusses major conclusions and recommendations, including contributions to literature and policy arising from the study. It begins by revisiting the objectives and questions of the study and then summarizes the main findings according to the questions. Recommendations for relocation policy and planning are presented. The chapter concludes with reflections on the way forward for climate change adaptation in Port aux Basques and other similar coastal communities.

5.1 Revisiting Research Questions, Objectives, and Methods

This study sought to better understand relocation as a climate change adaptation strategy through appreciation and understanding of issues and experiences in Port aux Basques. The study aimed to address research and practice gaps. CRR has yet to receive much consideration within the Canadian context despite its increasing recognition in other parts of the world. In response, this study looked at CRR in Canada, particularly in NL, a dynamic setting with a tumultuous history of resettlement (see Cote & Pottie-Sherman, 2019). The study examined perspectives and lessons learned from the relocation program applied in Port aux Basques after Hurricane Fiona. The study gathered empirically-based insights, especially through narrative research, to inform future climate change adaptation planning in southwestern NL and other coastal regions.

To achieve these aims, the study addressed three questions:

a. What are the major changes in climate in Port aux Basques, and what are people's perceptions about these changes?
b. What are the main reasons for individuals' willingness or unwillingness to relocate in the face of climate change impacts?

c. What were people's experiences with the relocation process in Port aux Basques, and what lessons can be learned for future relocation programs?

To answer the questions, data were gathered from news articles, government documents and narrative interviews. Scholarly articles on climate change and relocation were also reviewed to provide the basis for data presentation and discussion. Data were analyzed using both narrative and thematic analysis.

5.2 Summary of Major Findings

The first question of this study was related to examining the impacts of climate change on the community, including people's perspectives on those changes. Findings highlight considerable climate change-related changes occurring within the community. Changes in temperature coupled with a reduction in snow cover were among the main changes reported by participants. Strong winds and increasing storm surges were also reported in the community, with more frequent hurricane-like situations, a critical example being Hurricane Fiona. Such climatic changes and occurrences were found to have interacting impacts on several other aspects of community life, including the enjoyment of leisure, health, and other concerns emanating from the stress and anxiety over the frequency and likelihood of recurrence of such extreme weather events. Generally, most people were found to have the perception of intensified environmental changes and have attributed these changes to a change in climate. This perception and attentiveness to climate change in the community was found to have been heightened by the occurrence of Hurricane Fiona.

Based on an understanding of changes in climate and awareness, the study then explored the willingness or unwillingness to move in response to climate change-related risks. (The relocation program from Port aux Basques was not a whole community initiative but rather for people impacted by Hurricane Fiona as well as those still residing in areas that were deemed high-impact zones). Such persons were made to move from those areas, with no

control over the determination of whether they would move or not, to prevent the redevelopment of those areas deemed as high-risk. Divergent perspectives emerged among this group of individuals, with some expressing concerns about the move while others had few concerns except, in some cases, for the way the relocation process was done. It was apparent that moving on one's own volition would have yielded diverse outcomes. Some were fearful about the recurrence of another event, such as Hurricane Fiona, while others were not concerned. Nonetheless, everyone who participated in the study expressed a strong sense of place and concerns over the loss of that connection (examined in this study through the lens of place attachment and ecological grief), which were among the major reasons that a voluntary relocation initiative could prove difficult.

Further, the relocation program was examined alongside the concerns that arose concerning its implementation. Despite the attempt to provide all affected residents with some level of support to build back their lives after Hurricane Fiona, the way the program was designed and implemented left behind some unintended outcomes. Considerable concerns emerged over the power dynamics in the decision-making process and a lack of adequate communication during the process, which left many wondering about their fate for months following the hurricane. Several participants also expressed concerns, particularly over inconsistency and lack of transparency in the determination of compensation packages. However, a critical assessment of all the main concerns that emerged revealed that the lack of communication was the characteristic of the process most people found upsetting. Again, the general level of satisfaction was found to differ from person to person based on factors such as whether they wanted to build back or rent and had supplemental funding in the cases of those who wanted to build, among the other factors discussed. All research participants expressed satisfaction regarding policy decision areas where Port aux Basques had an oversight responsibility, which underscored the preference for bottom-up government policies as opposed to top-down

approaches and policies. Table 7 provides a summary of the major findings based on the research questions.

Table 7. Summary of findings

Research Questions	Main findings
a. What are the major climate change impacts in Port aux Basques, and what are people's perceptions of these changes?	1. Physical and environmental impacts of climate change • High temperatures • Reduced snow amount • Sporadic rainfall patterns • Erosion 2. Impacts on recreation, leisure and environmental satisfaction. 3. Impact on health (mental stress and anxiety).
b. What are the main reasons for individuals' willingness or unwillingness to relocate in the face of climate change impacts)	1. Fragmentation of social ties 2. Ecological grief 3. Sense of place/place attachment 4. Risk perception 5. Knowledge on climate change
c. What were peoples' experiences with the relocation process, and what lessons can be learned for future community relocation programs?	1. Power dynamics in the decision-making process 2. Lack of communication and lengthy response time 3. Inconsistencies in compensation packages

5.3 Discussion of Gaps and Contributions

Lessons from Port aux Basques on how Hurricane Fiona was handled draw attention to and emphasize the importance of planning and warning systems in minimizing fatalities of extreme weather events. Reflecting on the findings of Haque et al. (2024) and Rogers and Tsurkunov (2010), the results from Port aux Basques demonstrate the importance of early warning systems in reducing disaster injuries or fatalities, although tragically, one person lost their life in this case. Not only do early warnings allow for information dissemination to people to respond ahead of disasters, but they also provide emergency response units and officials ample time to move the most vulnerable in the community.

This research has also revealed that understanding changing conditions and climate change adaptation needs, especially from local perspectives, can inform CRR corresponding policy planning and implementation. Outcomes from this study reveal the importance of grounding CRR decision-making in the community to improve outcomes and align with perspectives in the literature (Arnall, 2019). It also reveals key lessons in Port aux Basques, consistent with perspectives in the literature on factors that influence knowledge and perceptions of climate change and related relocation experiences (see Lie et al., 2023; Holley et al., 2022) . As suggested by the Port aux Basques case, people who have experienced extreme weather events in the past perceive climate change and attribute the changes around them to it, compared to those who have not, as reported by others elsewhere (Haney, 2019; Viscusi & Zeckhauser, 2015). Again, such individuals may be more willing to leave those places than others who have not experienced extreme weather events (though not always the case as contrasting results emerged from Port aux Basques). Consistent with the perspectives of Bergquist et al., (2019), experience with past events may induce a higher sense of perception and knowledge of climate change-related risks but may not necessarily mean that individuals comprehend what those perceived changes represent, nor their implications that may warrant relocating, as evident in Port aux Basques. Reasons such as a strong sense of place may influence people's decision to remain in or return to such area, as suggested by previous research that indicates most people "won't leave [those] place[s] until the very last minute" (Dickson & Burton, 2022, p. 34), due to the satisfaction they derive living in those environments. These provide a better understanding of the reasons why people may decide to stay in certain places under certain conditions and could also be partly due to how relocation programs are done as highlighted in this research.

One factor that cuts across the relocation literature is the need for relocation programs to be delivered through effective communication and community engagement (see Servaes, 2022;

Nakamura et al., 2027; Hernández et al., 2016; Nicholson, 2022). Community engagement and collaboration[12] promote community participation in relocation decision-making. This yields a sense of community ownership of relocation plans for collective community benefit (Hernández et al., 2016; Servaes, 2022). These were evident in the example from Kitakami, for instance, as discussed in Chapter Two. Grassroots planning played a crucial role in the acceptance of the relocation initiative. This was because the development of plans in conjunction with the community allowed provision to be made for relocation in groups, which was believed to greatly help in maintaining community social ties (Pinter et al., 2019). In Fiji, community ownership and effective public involvement in the decision-making process accounted for its success (McNamara & Des Combes, 2015; Hino et al., 2017). Results from Port aux Basques, on the other hand, indicated limitations in community engagement, community participation, and meaningful and timely communication, as reported by several participants. In turn, these experiences were connected to dissatisfaction with the CRR program.

Observations suggested that in the absence of effective communication, speculations and rumours arose, which may have led to uneasiness and anxiety among community members who participated in this study (see also UNNHCR, n.d). The absence of involvement in the process and the dearth of information may have also eroded trust and legitimacy, as observed in projects elsewhere (see Ferris et al., 2015; Marter-Kanyon, 2020; Ferris & Weber, 2023) although some participants acknowledged the complexity of effective communication and

[12] Collaboration in relocation means the affected population is directly involved in needs analysis and project implementation. They may also contribute to agency-led projects with labour and other skills (e.g. displaced persons supply labour for the construction of their new houses in an agency-sponsored project) (McAdams & Ferris, 2015).

program administration, a finding was highlighted elsewhere (Nicholson, 2022; Hino et al., 2017).

Policy gaps concerning the design and implementation of CRR in NL were identified in this study, informed by insights from the literature on past government relocation programs in NL as well as other government programs (Chapter Two) and the narratives shared by participants (Chapter Four). As with Mortreux et al. (2018), there are situations like in Port aux Basques when government intervention for CRR is needed to save lives and mitigate damages. However, for geographies like NL, with an already tumultuous history of several government-led programs, including relocation, this could pose a challenge to future policy and planning. The policy landscape related to relocation and other policy issues in the province includes policy discord where government decision-making processes have been implemented amid resistance, such as the Smallwood resettlement program and the recent wind energy project (see Cote & Pottie-Sherman, 2019; Moore & Cooke, 2024; Roberts, 2021; Terra, 2022). Both examples come with evidence of inadequate communication and consultation and the eagerness of participants for a more collaborative decision-making process. While the CRR program for Port aux Basques is a different situation and context, echoes of past relocation programs were observed in the CRR when it was imposed on the individuals in the impact zone established by government officials in consultation with insurers without any input from the affected residents. Again, many participants recognized the urgent need to relocate but pointed out that past experiences can inform future acceptance and willingness to participate in potentially urgent climate change adaptation. As shown in Chapter Four, CRR culminated in mixed perspectives and opinions on the program, highlighting the need to re-imagine how these types of programs can be designed and implemented in policy landscapes such as NL that already have long histories of contestation with government and also where contentious relocations have taken place (see Cote & Pottie-

Sherman, 2019). As demonstrated in the climate change literature, mobility is an increasing response to climate change (I. Ajibade et al., 2022; I. J. Ajibade & Siders, 2022; Ekoh et al., 2023). Thus, learning from past mobilities is essential to support fewer negative expectations and experiences.

Outcomes from this study highlight the preference for community-led programs and the importance of grounding CRR policy and planning in the community context. The situation in Port aux Basques looked different than those in other jurisdictions and contrasts the findings of Waters and Barnett (2017) in Australia, for example, there is an increased preference for higher-level government involvement as opposed to locally-led approaches. Port Aux Basques is a small community with a homogeneous population with strong community ties, presenting a lower chance for divergent views/interests, and this may have accounted for the increased preference for locally-led policies as opposed to those led by higher levels of government that are not in direct contact with the community. This highlights the need to ground climate change adaptation and related relocation programs design and implementation in the community context, guided by mutually agreed upon principles and guidelines to reduce undesirable outcomes.

While CRR principles exist, as discussed in Chapter Two, they need grounding in the human experience of CRR, which could be done by drawing on ideas in the literature related to issues such as context sensitivity, community input, and community heterogeneity to increase acceptance. Thus, associated principles and CRR may be controversial if government-inspired or led, suggesting the need for greater consideration of community context, as suggested by a range of related concepts and literature (see Arnall, 2019; McAdam & Ferris, 2015). The case of Port aux Basques falls short of several best practices suggested in the literature. As stated in the previous chapter, for example, relocation was compulsory for all persons living in the established impact zone. This goes against the principles outlined by

Arnall (2019), who maintains that relocation must be voluntary and considered a last resort when all other options have been exhausted (see Arnall, 2019; Marter-Kenyon, 2022). Even though relocating homes in the impact zones may have seemed like the best option considering their proximity to the shoreline (vulnerability), relying solely on relocation forecloses other less drastic options, such as sea walls and early warning systems, which can in themselves reduce climate change impact significantly (Arnall, 2019).

Arnall (2019) further argues that relocation must be developmental and that under no circumstances should relocatees be worse off than they were prior to relocating. Despite challenges with the process expressed by participants, all relocatees will generally see an improvement in their living conditions, at least in terms of housing, as they will benefit from the construction of new homes compared to where they lived prior, most of which were fairly old. This confirms the findings of Dennenberg et al. (2019) that relocation sometimes may lead to the provision of better-quality housing (see Rosen & Beacon, 2024).

After completing this research and acknowledging the complexities and contextual issues surrounding relocation decision-making, relocation as a last resort is presented to refer to the idea that moving people from homes and communities should only be done when all other options for adapting to climate change and other environmental threats have been exhausted. This approach should recognize the profound social, cultural, and emotional impacts of relocation in its implementation and seek to address them as best as possible. As such, the following additions are made to consider relocation as a last resort.

Exhausting Other Adaptation Options: Before considering relocation, all other possible strategies—such as building protective infrastructure (e.g., seawalls), improving disaster preparedness, or adapting homes and communities to withstand environmental changes—

should be thoroughly explored and implemented if feasible. This is necessary to ensure that relocation does not foreclose other less drastic measures, as discussed in Chapter Two.

*Recognizing the Impact of Relocation**:*** Relocation is acknowledged as a measure that can disrupt social networks, cultural ties, and the sense of place that people have with their environment. It can cause significant emotional and psychological distress, as well as practical challenges like loss of livelihood. Therefore, these should be considered in the discussion about making relocation decisions as a last resort.

Community Involvement: The decision to relocate should involve extensive consultation with the affected community, ensuring their voices are heard and their preferences are considered. Ideally, relocation should only proceed with the community's consent.

Providing Support and Resources: If relocation is deemed necessary, it should be done in a way that provides adequate support to the affected individuals and communities. This includes financial compensation, assistance in rebuilding lives in a new location, and efforts to preserve cultural heritage and social connections.

Long-Term Sustainability: Relocation should be planned and executed in a manner that ensures long-term sustainability and resilience in the new location, considering the future impacts of climate change and other environmental factors so that people are not moved to areas which may be prone to other climatic threats that may warrant them being moved again to a different area.

5.4 Study Limitations

This study had three limitations. First, there was a small number of participants, likely due to interview fatigue. Following Hurricane Fiona, numerous news outlets were in the community to interview affected individuals about their experiences with the storm. At the time of the research, those who would be ideal to contribute to the research had already been interviewed

more than once. Some potential participants expressed disinterest in participating in the research because they were overwhelmed by difficult emotions and memories involved or repeated questions about Hurricane Fiona. When potential participants were contacted for the research, just a few consented to participate. With gratitude for participation, the researcher decided to focus on depth of understanding from participants, supplemented by background research.

The second limitation related to sample size, but understanding the nuances of experiences across phases of relocation, especially from community perspectives. Later, after talking to a few people, it became evident that most people were sceptical about the interview request due to past experiences, where some people almost fell prey to scammers soliciting financial information following Hurricane Fiona. It emerged that some individuals, perhaps with intentions of robbing affected residents who required financial assistance, called and portrayed themselves as government officials to take advantage of the situation. For those in the second phase, most of them were unhappy with the different ways things were done and so were unwilling to speak about it. Several attempts to reach people in this category proved unsuccessful.

The third limitation related to understanding relocation programs and policies from governmental perspectives. Attempts were made to get input from officials from the provincial office regarding the program and some of the concerns expressed by participants. Several emails were sent to the Hurricane Fiona response centre for comment but were unsuccessful. Therefore, this research was not able to look at the relocation program and policy from multiple perspectives, including government, nor was able to comment on the rationale for some of the decisions from the perspective of provincial officials beyond the official sources (e.g. websites, documents) that were assessed.

5.5 Recommendations for CRR Policy and Planning

A reality underlying CRR is that "in the face of increased and repetitive climate-induced disasters, it is becoming clear that some climate change impacts are unavoidable and that it will not be possible to protect certain communities from damage in their current locations" (Dan and Burton, 2022, p 37). Amid all the complexities around relocation discussed throughout this thesis, a key takeaway from Hurricane Fiona, for example, is that mitigating extreme natural disasters caused by climate change is not always feasible. Building taller seawalls along all vulnerable coastlines in Atlantic Canada to defend against exceptionally high waves or fortifying all structures to withstand high-degree winds is very costly. This limited opportunity for mitigation of disaster in some situations suggests the important role for adaptation, including potentially CRR. Given the reality of CRR as discussed in this research, perspectives and lessons highlight the need for continued learning about past experiences as well as ongoing collaboration and reflection about how to consider and develop CRR as an anticipatory, contextual and community-led process.

In Chapter 1, this thesis positioned climate change adaptation as a wicked problem and later revealed that CRR is an incomplete solution. CRR has many of the hallmarks of a wicked problem, including underlying issues, contradictory perspectives, and a dynamic and complex setting in which CRR is applied (see Ritter and Weber 1973). CRR is fraught with concerns and has a no-stopping rule: CRR as a solution to one policy problem may create a host of other subsequent policy issues that warrant understanding and redress. However, the perspectives of participants in this research emphasized the need to move away from top-down, government command and control policymaking to bottom-up, locally-led context or case-specific solutions. If CRR can be anticipatory and proactive, there may be more time and resources for sound policy design. This is especially important since CRR can affect many aspects of the lives of relocatees, particularly when not done right. In the context of

sound policymaking for CRR, the following policy recommendations are put forward to aid the smooth execution of future relocation programs, with contingencies for a more rapid rollout of policy and planning. Effective community participation is presented as a central theme for the policy recommendations, which cuts across the set of policy recommendations presented below. These recommendations are aimed to serve as an entry point for dialogue and research in CRR in NL and beyond and are applied at scales appropriate for effective anticipation and response.

Recommendation 1: Creation of a Relocation Framework and Guidelines

This research and evidence from the literature have demonstrated that CRR requires well-crafted policy frameworks and guidelines to ensure effective implementation (see Dickson & Burton, 2022). Framework and guidelines will ensure relocation programs follow some laid-down protocols and can provide clarity for all involved while being aware of specific community differences. As noted by the Fijian president, "guidelines provide us with a blueprint for engaging our communities in the process of relocation, ensuring proper coordination between our various agencies, sensitizing the process along the lines of gender, and taking into account how marginalized groups, such as children, the elderly and those living with disabilities should be catered for" (Ruggieri, 2022, p. 116). The use of principles and other guidelines will help inform the co-development of context-sensitive CRR policy and planning.

At the same time, it is necessary to acknowledge that frameworks can sometimes be a barrier to critical and timely decision-making, especially in situations where CRR may need to be urgent. The guiding principles and framework should be flexible enough, with mutually agreed upon contingencies, when early warning systems suggest urgent action is needed and should also be adaptable to peculiar community situations. Thus, developing frameworks and

guidelines should also include a blueprint for emergencies in communities, with their input, considering the time, scope and scale of urgent reactions.

Recommendation 2: Policy Learning on Climate-Related Relocation

One of the most important stages in the relocation process, as described by Ferris et al. (2015), is the evaluation stage. This helps to address any unintended outcomes of the process. The experiences from Port aux Basques present a significant and ongoing opportunity to inform the development of policy for future comprehensive relocation programs, as several lessons remain to be learned from its implementation, as stated by Participant 1:

> I think there's a lot to be learned. I understand that we were the first to experience this kind of thing. With climate change and the way things are going, I think it's time that somebody sits down and does a plan for future events, how to handle, how to take into consideration mental health, you know because that's a big part of it too, right? (P1).

The extent to which lessons arising from the implementation of the Port aux Basques case are carefully considered and factored into the development of a comprehensive relocation strategy development will go a long way in determining the nature and success of future CRR programs in NL. Policy learning should include a range of scientific and experiential inputs from communities related to the social, psychological, emotional, health and other related possible dimensions of relocation outcomes as it relates to how different people will respond to relocation. This could be done through careful consideration of successful examples in the literature from other jurisdictions to inform practice here in NL.

Recommendation 3: Establishment of Consolidated Climate Change Relocation Fund

Relocation planning and execution require substantial financial resources. Creating consolidated financial streams for climate-related relocation initiatives informed by research and dialogue is critical going forward as a pre-emptive preparatory strategy. Putting such financial commitments in place will ensure contingency plans do not rely on resources slated

for other equally important endeavours or risk lacking the necessary resources required in unavoidable situations. Based on financial considerations, thinking of planned relocation as a last-resort adaptation strategy may be problematic because it may not provide an equal platform for relocation to be weighed against other adaptation strategies in the early decision-making stages for the necessary budgetary allocations.

In NL, though existing funds are available through the Community Resettlement Program for communities that opt to be resettled, there is the need to prioritize and add specific consideration for climate-related relocations so that communities feeling the brunt of climate change can be supported if they want to move. The funds can be contributed through the community resettlement program, or the provincial government could establish a separate fund specific to climate-related relocation with the possibility of federal support for this purpose, given the federal interest in climate change mitigation and adaptation efforts.

Recommendation 4: Respect for Coastal Communities and Life on Coasts

Future community relocation policies and programs should be based on a fundamental respect for the lives, histories, and experiences of those living in coastal communities, which can be carried through multiple generations. Policies should be overwhelmingly positioned to be developed with communities rather than for communities. To achieve this, there is a need to better balance decision-making power in relocation decision-making by enabling the sharing of opinions, ideas, interests and perspectives. Policies should also consider the implications of a range of non-economic dimensions in their application. This will help clarify and support rights and priorities and ensure that the values of individuals and communities are not disregarded in the process. It will also contribute to mutual understanding and even trust-building among relocatees and the government, especially if they must work together to implement CRR policy. When people feel disrespected or

unheard, as some have in this study, they may question the legitimacy and the use of such authority to implement CRR. In the case of relocation, this may also contribute to further the unwillingness to adapt or, more specifically, relocate. Inclusion in decision-making and respect for affected people can enable collaboration and minimize overall dissatisfaction with CRR, which, as this study highlights, is already emotionally charged and complex to navigate.

Recommendation 4: Collaborative Climate Change Governance

Another critical recommendation from this research is the need for collaborative climate change governance, with CRR as a key topic of dialogue and policy analysis. Climate adaptation strategies in NL must lean toward a collaborative governance approach (see Baird et al., 2016; Hamilton & Lubell, 2018). The Government of NL plays a key role in climate change adaptation and CRR, even if envisioned as a co-developed policy and planning process. Under these conditions, research and policy processes should focus on understanding and learning to bridge barriers to effective public engagement and participation in climate change decision-making. This would mean looking at the various channels and platforms for participation to assess the quality of feedback loops and information sharing and working with all parties to devise the most effective ways to improve climate adaptation policy development and planning. As this research suggests, climate change adaptation, especially CRR, requires people to communicate and work well with one another across different experiences and responsibilities. When collaboration is done properly, it has the potential to be empowering and lead to positive outcomes for communities (see McMichael et al., 2019; McMichael & Katonivualiku, 2020)

5.6 The Way Forward for Climate Change Adaptation in Port aux Basques

The findings of this study highlight the widespread impact of climate change, which extends beyond the study area and is affecting communities across NL and the broader Atlantic region. Both current and anticipated changes indicate that other coastal communities will inevitably face significant climate change challenges in the coming years, making it essential to take proactive measures to enhance their climate readiness. After all these observations and insights from this research, the two key takeaways for action are presented. This includes increasing climate change awareness and enhancing adaptive capacity.

5.6.1 Increasing Awareness of Climate Change and Related Issues

Many people are becoming increasingly aware of climate change, particularly due to the rise in extreme weather events in recent times. However, awareness and perception do not always come with understanding the causes of climate change or what it means for the future. A wholesome understanding of climate change causes and pathways for adaptation among communities can help get people ready for uncertainty in the future. Unfortunately, climate change and adaptation information is overly technical and difficult to understand. This makes it difficult for communities to make meaning out of the information in the context of their own lives. There is a need for more community-level understanding of climate change to supplement those already done through Turn Back the Tide and the CLIMAtlantic (see Turn Back the Tide, 2035; Econext, 2023). The current programs could also be expanded to provide more avenues for awareness creation and understanding both within communities and government, including avenues where the government can meet with communities to understand climate change problems from their perspectives and how these problems and proposed solutions like CRR tie back to bigger issues like emotions and general well-being.

Access to and understanding of insurance information is also needed so that people are aware of what is covered by insurers and what is not. This will help people decide where to situate their properties moving forward. For instance, most people interviewed in the Town of Port aux Basques expressed concerns over being neglected by insurance companies. However, a review of the information on the website of the Insurance Bureau of Canada (IBC) revealed that though some level of insurance coverage is available for wind damages during hurricanes under certain insurance policies, there are generally no coverages for damages caused by storm surges. The destruction in Port aux Basques resulted from the combination of high winds and storm surges; therefore, insurance companies did not cover the damages. Access to these details and technicalities will help individuals know what to expect under different circumstances.

5.6.2 Community Empowerment and Adaptive Capacity Building

For Port aux Basques and other coastal communities threatened by extreme weather events, engaging communities and diverse researchers and practitioners in assessing and supporting adaptative capacity is an important way forward. In Port aux Basques, the satisfaction with the issues over which the Town Office had oversight responsibilities as opposed to those by higher levels of government speaks to the increased preference for grassroots/local initiatives. Communities believe their local officials have their best interest due to periodic communication and interactions with them. But Port aux Basques and other municipalities must be empowered and resourced to oversee climate change adaptation initiatives, especially given the need to take into consideration context-specific circumstances in their implementation. As part of efforts to enhance adaptive capacity, small communities like Port aux Basques can be supported to regularly update community-specific disaster preparedness and response plans, including evacuation routes, emergency shelters, and communication strategies that will be needed in times of emergency while they wait for external support as it

may sometimes take a while to arrive. Offering training to community members and city officials on effective disaster risk management techniques and how to deal with climate emergencies can offer significant benefits in helping communities deal with them. Though this is already happening in some communities, there is a need for more in keeping with the current rate of climate impacts and adaptation needs.

5.7 Areas for Future Research and Recommendation

This research has revealed the increasing need for community-led relocation initiatives in addressing climate change issues. Firstly, the mix of emotional responses and opinions from this research reveals that CRR involves many potentially contradictory perspectives and responses. Further, understanding the factors determining willingness to relocate and satisfaction with relocation can inform policy and research on what to expect in a context-sensitive and community-led relocation in which different groups of people have needs and expectations in CRR decision-making.

The results of this study provide insight into the stories and experiences of the specific individuals interviewed, which are valuable in their own right. More exploration in other situations can help understand potential differences in understanding CRR, such as the role of age or gender in the perception of climate change and willingness to relocate. The research highlights the importance of exploring the perspectives of people who relocate. A possible avenue of research is to learn more about mobility in climate change adaptation, including whether outmigration happened due to environmental changes that can be associated with climate change and, if so, the reasons underlying it.

Since the need for context-sensitive CRR is a key finding of this study, future research related to the experiences of other communities where CRR has occurred or climate-vulnerable

communities considering relocation could add to the knowledge base regarding CRR as an adaptation option in Canadian coastal communities.

In view of the above issues, some significant questions that remain to be answered are:

1. What does CRR policy for NL look like that is context-sensitive and considers the complexity and uncertainty involved in more anticipatory, proactive, community-led CRR planning?
2. To address the historical dimension of relocation, how can CRR policy and planning processes be restorative, addressing the emotional needs of various affected groups, acknowledging the harm caused by past relocation programs, and committing to ways forward?
3. To set the stage for community engagement and leadership in having urgent critical but difficult conversations such as CRR, what are the best ways to have those conversations about CRR as an adaptation strategy, especially with those most directly affected, considering the emotional and psychological implications of CRR?
4. What is required to enable community leadership and engagement in CRR decision-making, especially regarding complex policy processes, avoiding conflicts of interest, addressing misinformation and limited awareness?

The example under consideration and several others referenced throughout this study reveal the difficulty in carrying out CRR; however, given the number of homes affected, a case-based approach would appear more suitable for the Port aux Basques situation to improve outcomes. Therefore, as we move forward, understanding context-sensitive and community-informed CRR requires considering various factors that influence its outcomes, particularly those that affect the willingness to engage in CRR efforts. To achieve successful outcomes and develop effective policies and plans, it is essential to empirically investigate these factors

from both community and policy or planning perspectives. This approach empowers individuals and communities by ensuring policies and practices align with their views and interests.

Many of the affected participants interviewed still visit the Hurricane Fiona impact zone occasionally to reconnect with the environment. They have expressed a desire to see the area transformed into a memorial park that includes images of how the place looked before and after Hurricane Fiona. However, conversations with Town Office officials indicate a preference for turning it into a green space with minimal infrastructure. Some affected individuals return to the site to reconnect with the environment. Others avoid it entirely, saying that it brings back memories of Hurricane Fiona and emotions they have been trying to overcome. This highlights that experiences with CRR continue long after people relocate, as does the importance of good dialogue and collaboration to determine the most appropriate use of the site, ensuring it meets the needs and interests of everyone involved.

5.8 Final Thoughts

This research suggested important perspectives and lessons to consider CRR a complicated alternative to a wicked problem and navigate diverse and contradictory perspectives, concerns, and considerable complexity and uncertainty. This thesis has demonstrated that the impacts of climate change in coastal communities like Port aux Basques are already apparent and are likely to intensify in the coming years. While relocation can be a viable option for ensuring community safety, it presents several challenges. However, if CRR policy and plans are designed with careful attention to the needs and interests of the affected communities, they can reduce risks to life and property and avoid harm to individual and community well-being. Consequently, this research can serve as a basis for constructive dialogue and future research on climate-related relocation in NL and elsewhere, particularly given the uncertain climate futures for coastal communities.

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Appendix A: A guide on organizing Meetings with Relocated People

Organizing Meetings with Relocated Persons: Guidance from the World Bank

Community meetings should be held only for important milestones. Frequent meetings should be avoided to avoid deterioration in relations with communities and loss of interest. Community meetings should be held at different points in the Planned Relocation process.
Meetings should be held in launching the Planned Relocation plan to:

- Introduce the team of professionals.
- Inform the community of activities and studies to be carried out in preparing the relocation resettlement program, the objective of each activity, the type of information to be compiled and its purpose, the timetable envisaged for information compilation, alternatives that will be explored, and the schedule of upcoming meetings and matters that will be discussed; and
- Establish communication channels through which information may be obtained and provided (for example, reaching agreement on the approach to implementing the other mechanisms discussed below).

Meetings should be held upon completion of the census and socioeconomic study to:

- Present and validate the results of the census and socioeconomic study; and
- Establish the census closing date.

Meetings should be held when the relocation alternatives have been identified to:

- Present the different alternatives, their advantages and disadvantages, and the rights and obligations in connection with each;
- Reach an agreement on how more detailed information can be obtained on each alternative (visits to sites, etc);
- Establish the time communities will have to choose between the alternatives offered and
- Define the types of participation depending on the alternative selected.

Finally, meetings should be held during the preparation and implementation of the plan to provide information on:

- The progress and status of the different activities.
- Budgetary execution; and
- Problems faced and potential solutions.

Source Ferris, E. (2017). A toolbox: Planning relocations to protect people from disasters and environmental change. Institute for the Study of International Migration, UNHCR, The UN Migration Agency: Georgetown University, Washington DC.

Appendix B: Institutions that May Be Involved in Planning Relocations

Institutions/sector	Role in relocation process
Risk Management (Emergency and disaster prevention and relief)	• Monitors risk and manages early warning system to determine whether the population must be moved on an emergency basis, even before relocation housing options are available; • Issues a technical opinion regarding the uses that may be made of the at-risk area after the population has been moved
Planning	• Regulates land uses
Housing	• Participates in obtaining the housing supply for the population to be relocated
Health	• Provides health services to the population in the at-risk and relocation areas and coordinates actions for changing the health service jurisdiction when a group is moved from one place to another • Participate in adding or expanding health centers in the relocation area • Provides emergency assistance if a hazard occurs
Education	• Provides education services for the population in the at-risk and relocation areas • Coordinates actions to ensure that there are school places in the relocation area for school-aged children. • Participate in adding or expanding education centers in the relocation area
Public services	• Provides power, water, sanitation, refuse collection, transportation, and communication services in the at-risk and relocation areas. • Reviews with service delivery companies the status of user accounts • Coordinates actions to cancel domestic public service accounts immediately after the population is moved • May build public service network infrastructure either directly or through contractual agreements with others
Social and economic programs	• Implements different types of social programs (such as for the elderly, children, or women) and offers training, credit and productive projects, among other services, which may be useful in reestablishing and improving the socioeconomic conditions of affected populations
Control and oversight duties	• As independent and autonomous entities, participate as observers in the relocation planning and implementation process. Ensure proper use of public resources and assets, conduct of public officials and protection of the public interest
Conciliation and Dispute Resolution Centres	• Typically, specializing in a specific type of dispute help to resolve disputes arising from relocations

Appendix C: Stages in the Relocation Process and Required Actions

Stages	Required Actions
Stage 1 **Plan the move**	Determination of relocation pre-requisites
	• Scientific evidence to back the need for relocation • Analytical studies and relocation need assessment, including: a. demographic and health characteristics. b. socio-economic characteristics c. membership of a marginalized group special dependency on, and/or attachment to, d. land or local/localized resources/opportunities e. direct and indirect impacts of disasters or environmental change; or f. prior experiences of displacement • Cross-sectoral collaboration and community consultation and engagement (participatory) • Formulation and drafting of relocation plans, including (legal framework, relocation packages, timeline, etc.)
Stage 2 **Execute the move**	Preparation for the physical movement
	• Land acquisition and building of infrastructure • Involvement of affected communities/individuals both in host and relocating communities • Provision/restoration of livelihoods (restore living standards)
Stage 3 **Evaluate the move**	After the move
	• Program evaluation [through feedback from both receiving communities and those relocated to ascertain that] • Relocates are better off than they were before relocation • Host communities are not experiencing any challenges because of hosting new members • Mitigate all adverse impacts affecting: a. Relocates b. Those in living in close proximity

Table 2 Stages of Relocation and Required Action

Adapted from Ferris et al, (2015)

Appendix D: Narrative Interview Guide

Section A: General/Climate Change and Extreme Weather Events

1. Please tell me a little about yourself and your connection to Port aux Basques. (e.g., history of connection with the community e.g., length of time they have lived in the community and in their current location? multiple generations of family from there? etc.)
2. What kinds of changes in the area have you seen or experienced throughout the time since you first settled here?
3. Do you attribute those changes to climate change? If yes please explain.
4. Have you had past experiences related to extreme weather before Hurricane Fiona? Can you tell me a bit about those experiences and how they affected you or your family?
5. Could you tell me about how Hurricane Fiona affected you? your family? the community as a whole?
6. Do you feel adequately informed now about the potential risks and impacts of climate emergencies in your area and beyond?
7. Did you feel adequately informed before Hurricane Fiona?
8. How are you currently adapting or preparing for future climate events?

Section B: Relocation (for coastal residents not yet relocated)

1. Have you had any previous experience with relocation in the past? Or have any close relations that have experienced relocation in the past? If yes, can you tell me a bit about those experiences and how they have affected you?
2. Are you aware of the relocation initiatives or plans in response to Hurricane Fiona? If yes, can you tell me a bit about those and how you feel about them?
3. Have you thought of moving further from the coast in the future?
4. What factors would motivate you to consider relocating to a safer region due to climate change? (Are there any specific conditions or criteria that would make you more inclined to move to a different area?)
5. How willing are you to move from your current location if the situation becomes even more risky in the future?
6. Are there any factors that would prevent you from relocating, even if you felt it was necessary due to climate and weather-related risks? (e.g., is past relocation history a factor)
7. What are some of the ways you think relocation might affect you? (e.g. social fabric, grief over the environment, disintegrated family ties etc. – prompts that could be used if no response)

Section D: For those Relocated

8. Could you please tell me about your experience with HF (How has it impacted you?) (Your experience with Fiona, including how it has affected you, your family, and other organizations you know of)

9. What is your general opinion about the relocation process following HF?
10. Do you feel adequately involved in the relocation process?
11. What are some of the ways you think relocation has impacted you? (e.g. social fabric, grief over the environment, disintegrated family ties etc.)
12. How do you perceive the role of your local community in responding to climate emergencies and potential relocations? Were you involved in the relocation decision-making process? Did you feel adequately included in the process? Did you agree with moving or did you feel compelled to?
13. Do you think the Town office and other agencies have been supportive enough in this? What are some of the ways they've been of support?
14. In your opinion, what strategies or policies could be implemented to better support individuals affected by a climate emergency, particularly during relocation or willing to relocate (is there anything you wished the officials had done differently).
15. Finally, what message or advice would you give to policymakers, community leaders, and individuals regarding climate change, the challenges, and opportunities of relocation in the face of the climate emergency?

Section D: Town Hall Officials/Support Organizations

16. What has been some of the main challenges of HF in the community? (Which sectors were the most affected?
17. Do you have an emergency plan? / are you preparing one?
18. Do you feel it prepared you sufficiently for HF?
19. What led you to pursue relocation as a strategy? Did planning for this start before HF? if yes, how did HF change your approach/plans for looking at and/or pursuing relocation as an adaptation strategy?
20. How are areas to be relocated identified? How are affected residents involved in these decisions? How many are to be relocated?
21. How much time did you give people to decide? Was it enough time in your view?
22. What kind of supports are available for those affected?
23. Is there anything else you are doing post-Fiona in preparation for future events? If so, what are they?
24. What were/are some of the challenges of the relocation initiative, including unintended consequences of the process? how can they be mitigated in future? is there anything you would have done differently?
25. Aside from the relocation program, what other ways are you preparing for future extenuating events? What do you think you are doing differently to safeguard against future events?

Appendix E: Research Information Form

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Recruitment Letter/Email/Telephone or Verbal Script

My name is *Mr. Lawrence Nditsi*, and I am a student in the School of Science and Environment at Memorial University of Newfoundland. I am conducting a research project called *Relocation as a Possible Response to Climate Change: Exploring Perspectives and Lessons from Port aux Basques* for my Master of Arts in Environmental Policy degree under the supervision of Dr. Kelly Vodden. The purpose of the study is to investigate the current relocation of homes and families in Port aux Basques as a result of Hurricane Fiona and plans to minimize damage from similar events, to draw lessons and implications for future relocation initiatives both in Port aux Basques and other coastal communities.

I am contacting you to invite you to participate in an *in-person interview* in which you will be asked to respond to questions on the impacts of Hurricane Fiona and your experience with the relocation process. Participation will require *between 30-60 minutes* of your time and will be held at any location that is the most convenient for you.

If you are interested in participating in this study, please reach me at (709) 632-1030 or via email at lnditsi@grenfell.mun.ca for us to schedule a time and location that is the most convenient for you.

If you have any questions about me or my project, please contact me by phone or through the email provided above.

If you know anyone who may be interested in participating in this study, please also feel free to give them a copy of this information.

Thank you in advance for considering my request,

Mr. Lawrence Nditsi

The proposal for this research has been reviewed by the Grenfell Campus Research Ethics Board and found to be in compliance with Memorial University's ethics policy. If you have ethical concerns about the research, such as your rights as a participant, you may contact the Chairperson of the GC REB at gcethics@grenfell.mun.ca or by telephone at (709) 637-7193.

GRENFELL CAMPUS, MEMORIAL UNIVERSITY
20 University Drive, Corner Brook, NL, Canada, A2H 6P9
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Appendix F: Ethics Approval Form

GRENFELL CAMPUS | MEMORIAL UNIVERSITY
Research Ethics Board
University Drive, Corner Brook, NL Canada A2H 5G4
Tel: 709-639-2399 Fax: (709) 637-2885 http://www.grenfell.mun.ca/research-ethics-board

December 1, 2023

Reference number: 20241107

Dear Lawrence Nditsi,

Thank you for your application for ethical clearance for your proposal *Relocation as a Possible Response to Climate Change: Exploring Perspectives and Lessons from Port Aux Basques*. The Grenfell Campus Research Ethics Board (GC-REB) has reviewed your application and finds this application in ethical compliance with the Tri-Council Guidelines.

On your consent form the wrong ethics board is given. Please correct this to GC-REB and our contact information. You do not have to resubmit this change to us.

Your approval for this project expires on December 1, 2024. To remain in compliance with Article 6.14 (Continuing Research Ethics Review) of the Tri-Council Policy Statement on Ethics in Human Research (TCPS2), should your project continue past that date, you are required to renew your ethics approval before that time. As well, please note that any changes to the proposed study will need to be cleared by the GC-REB first.

The Board wishes you success with your research.

Best wishes,

John Bodner, Ph.D., Chair

IMPORTANT REMINDERS – PLEASE READ:

Important Notice regarding COVID-19: As the situation changes and develops with COVD-19, it is up to the PI to ensure that the research team remains in compliance with Memorial's current status on in-person data collection. You can follow information on the current status of policy here: https://www.mun.ca/research/.

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Appendix G: Consent Form

Informed Consent Form

You are invited to participate in the research project entitled: "*Relocation as a Possible Response to Climate Change: Exploring Perspectives and Lessons from Port aux Basques*."

Researcher: Mr. Lawrence Nditsi, School of Science and the Environment, Grenfell Campus, Memorial University of Newfoundland. 20 University Drive, Corner Brook NL, A2H 5G4, Canada. lnditsi@grenfell.mun.ca
Supervisor: Dr. Kelly Vodden, School of Science and the Environment- Environmental Policy Institute, Grenfell Campus. kvodden@grenfell.mun.ca

This form is part of the process of informed consent. It should give you the basic idea of what the research is about and what your participation will involve. It also describes your right to withdraw from the study. In order to decide whether you wish to participate in this research study, you should understand enough about its risks and benefits to be able to make an informed decision. This is the informed consent process. Take time to read this carefully and to understand the information given to you. Please contact the researcher, Mr. Lawrence Nditsi, if you have any questions about the study or would like more information before you consent.

It is entirely up to you to decide whether to take part in this research. If you choose not to take part in this research or if you decide to withdraw from the research once it has started, there will be no negative consequences for you, now or in the future.

Introduction: I am a graduate student with the Environmental Policy Institute at Grenfell Campus of Memorial University, Newfoundland. I am conducting research under the supervision of Dr. Kelly Vodden in fulfillment of my program requirements. The goal of the project is to explore perspectives and lessons from Port aux Basques regarding relocation as a climate adaptation strategy.

Purpose of the study: The research seeks to understand people's perspectives on relocation as a climate adaptation strategy. Coastal communities are increasingly threatened by climate emergencies, and it has become important to explore new ways of securing these communities. In this regard, relocation (moving communities to safe grounds) is becoming a common strategy in adapting communities to climate change. Therefore, this research seeks to explore perspectives and opinions on the relocation activities in Port aux Basques due to Hurricane Fiona. This is expected to provide insight into the procedures of the relocation process as well as the difficulties encountered during relocating houses as a climate response plan.

What you will do in this study: You will be asked to participate in an individual, semi-structured, narrative interview lasting approximately 30-60 minutes. With your permission, your answers will be recorded using an audio recorder and in the form of summarized written notes. You may skip any question you are not comfortable with or stop responding to the whole interview at any point that you become uncomfortable with the interview. You will be asked

questions on Hurricane Fiona and your experiences with the relocation process, how you feel about it, and what you wished had been done differently.

Withdrawal from the study: Your participation in the study is completely voluntary, and you may choose to withdraw at any time. Your decision not to participate will not influence the nature of the ongoing relationship you may have with the researcher, nor the nature of your relationship with Memorial University, either now or in the future. In the event you withdraw from the study, all associated data collected will be immediately destroyed wherever possible. You may withdraw until March 31, 2024, when my draft thesis is expected to be completed.

Possible benefits: Given the location of Port aux Basques and the projected trend of climate events for coastal communities, this research has the potential to inform climate change adaptation policies in Port aux Basques. Your experiences with Hurricane Fiona and the relocation process are all invaluable in advising policymakers on what they need to do differently in preparation for climate events both for your community and other coastal areas.

Possible risks: The researcher understands the sensitivity of the topic and the emotional implications that could arise during the interview process as people recount their losses to Hurricane Fiona. As such, the researcher has done extensive research and reading on how to approach such discussions and has also consulted with focal persons who have provided inputs on approaching emotionally difficult discussions. There are various channels available for you to talk to if during the process of this interview, you become uncomfortable with the questions, or if you realize responding to the questions has aroused some past unpleasant feelings. Details on assessing and using this avenue will be available to you commencing the interview. Every effort will be taken to avoid any risk that this research will expose you and/or the organization to represent during this research.

Confidentiality and storage of data: All information you provide during the interview will be held highly confidential and your name will not appear in any written report or publication of this research work. Your answers will be recorded (using an audio recorder) and compiled in a written report solely for the purposes of this research. Your data will be safely stored in a locked facility, and only the primary researcher and supervisor will have access to this information. The data will be kept for a minimum of five years, as required by Memorial University's policy on Integrity in Scholarly Research, after which all information will be permanently deleted.

Reporting the results. The collected data will be used for my thesis paper. It will also be used in academic journal articles and conference presentations. Names or personal identifying information will not be attached to any information published from this data collection but rather in quotations. Upon completion, my thesis/dissertation will be available at Memorial University's Queen Elizabeth II library and can be accessed online at: http://collections.mun.ca/cdm/search/collection/theses.
Results from this research will be shared with you through a presentation at the end of the study at a date that will be determined later based on local availability. This will take the form of a workshop and should allow you to provide feedback and further suggestions and an avenue to reiterate the message you would like to convey to the requisite authorities.
Questions about the research: If you have questions about the research or require further clarification on anything regarding your role in this study, please feel free to reach out to the principal investigator Mr. Lawrence Nditsi by telephone at (709) 632-1030 or by email at lnditsi@grenfell.um.ca or the supervisor, Dr. Kelly Vodden at kvodden@grenfell.mun.ca

GC-REB Ethics Approval: The proposal for this research has been reviewed by the Interdisciplinary Committee on Ethics in Human Research and found to be in compliance with Memorial University's ethics policy. If you have ethical concerns about the research, such as the way you have been treated or your rights as a participant, you may contact the Chairperson of the ICEHR at icehr@mun.ca or by telephone at 709-864-2861

Consent: Your signature on this form means that:

- You have read the information about the research.
- You have been able to ask questions about this study
- You are satisfied with the answers to all your questions.
- You understand what the study is about and what you will be doing.
- You understand that you are free to withdraw participation in the study without having to give a reason and that doing so will not affect you now or in the future.
- You understand that any data collected from you up to this point will be destroyed.

By signing this form, you do not give up your legal rights and do not release the researchers from their professional responsibilities. *(please check all that apply)*

- I have read what this study is about and understood the risks and benefits. I have had adequate time to think about this and had the opportunity to ask questions and my questions have been answered.
- I agree to participate in the research project understanding the risks and contributions of my participation, that my participation is voluntary, and that I may end my participation.
- I agree to be audio recorded during the interview process.
- A copy of this Informed Consent Form has been given to me for my records.

_____ _____

Signature of Participant Date

Researcher's Signature:
I have explained this study to the best of my ability. I invited questions and gave answers. I believe that the participant fully understands what is involved in being in the study, any potential risks of the study and that he or she has freely chosen to be in the study.

_____

_____

Signature of Principal Investigator Date