FIRST NATIONS LED MENTAL HEALTH RECOVERY IN THE FACE OF ENVIRONMENTAL AND FLOODING JEOPARDY

A Thesis Submitted to the College of Graduate and Postdoctoral Studies

In Partial Fulfillment of the Requirements

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In the School of Environment and Sustainability,

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Canada

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ABSTRACT

Understanding the factors influencing mental and social health after extreme weather events or incremental climate change is crucial to addressing these issues on First Nation reserves in the Canadian prairies. Previous research on an international level has linked climate change to effects on mental health for general populations but, within a First Nations context, the literature base is severely lacking. What little the literature does indicate, however, is that policy in Canada is failing to prevent physical and mental harm to First Nations people from anthropogenically-driven environmental and climate change when compared with general populations. Using interdisciplinary and mixed methodologies, this thesis explores the academic literature linking climate change, disasters, and weather events, and mental health effects, defines and explores environmental mismanagement affecting reserve land, and critically assesses the colonial policies and circumstances that affect First Nations mental health outcomes. The objectives of the present research are executed through systematic review, and qualitative analysis of first-hand experience with flood recovery. The direction of this research is informed by partnerships with Yellow Quill First Nation and James Smith Cree Nation in Saskatchewan. This thesis forms a better understanding of the circumstances of mental health issues in an environmental context and ultimately places itself to inform policy that can reduce environment-related mental health issues in First Nations reserve communities based on an interdisciplinary and community-driven exploration of First Nations led disaster planning, mental health recovery, and environmental management.

Keywords: Mental health, First Nations, scoping review, case study, flooding, disaster, extreme weather, disaster recovery, climate change

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Figure 1.1 Sustainable Economic Development according to Barbier (1987) is reproduced in this thesis with the permission of the author

DEDICATION

This thesis is dedicated to the people of James Smith Cree Nation and Yellow Quill First Nation their unshakeable strength and humour is inspiring.

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ABBREVIATIONS

YQFN: Yellow Quill First Nation

JSCN: James Smith Cree Nation

PTSD: Post Traumatic Stress Disorder

PTSS: Post Traumatic Stress Symptoms

MDD: Major Depressive Disorder

GAD: Generalized Anxiety Disorder

COVID-19: Coronavirus Disease of 2019

PRISMA: Preferred Reporting Items for Systematic Reviews and Meta-Analyses

CHAPTER ONE: Introduction

1.1 Climate change and disasters

The threat of climate change and its consequences are beginning to increase around the world, posing great pressures on health for people of all races, cultures, nationalities, and socioeconomic statuses. Growing global temperatures have increasing adverse effects in certain areas with measurable impacts on health, agriculture, forestry, and biodiversity (Hitz & Smith, 2004). Heatwaves, floods, droughts, storms, and wildfire have increased with measurable ability to attribute to climate change (Watts et al., 2021). Climate change has cascading effects of impacting environmental systems, and as a result human health. Food security, spread of diseases, and coastal populations are entering stages of jeopardy because of human driven climate changes (Watts, et al., 2021). Of course, not all disasters are driven by climate change (i.e. earthquakes) but the increase in ecological disasters over the years has specific implications for ramping up disaster preparedness into the future (Morganstein & Ursano, 2020).

People are experiencing the effects of incremental climate change on the natural environment in a variety of ways including crop damage, landscape change, and drought arising from heatwaves, permafrost thaw, melting of ice floe, and rising global temperatures (Middleton et al., 2020; Watts et al., 2021). The health effects of disasters and climate change are also increasing, putting strain on health infrastructure (Watts, et al., 2021). The economic impacts of disasters additionally strain health infrastructure when money and resources are diverted to physical recovery and first aid efforts instead of other programming (Ebi et al., 2021; Daly et al. 2020). Health effects of climate change and disaster are extensive and well documented across the world. Flooding can result in adverse health effects such as drowning, hypothermia, infectious disease, and increased morbidity (Burton, Rabito, Danielson, & Takaro, 2016). Other

natural disasters also result in increased comorbidities such as injury, exacerbation of previously existing conditions, and infectious disease (Mack, Brantley, & Bell, 2007).

In Canada, industry and agriculture also negatively affect the natural environment simultaneously to natural processes, creating nutrient imbalances in water bodies, changing animal populations and habitats, and altering natural environmental processes (Tsoraeva, et al., 2020; Porter, 2023). Pesticides, and fertilizer from agricultural use, and heavy metals from industrial processes make their way into ecosystems in toxic quantities, harming the ecosystem and affecting both people who live in polluted areas as well as those who consume products in which these chemicals accumulate (Alengebawy, Abdelkhalek, Qureshi, & Wang, 2021). Human made disasters, like oil spills, harm the ecosystem, with oil lasting for many years after the spill (see North Saskatchewan Husky oil spill 2016), potentially contaminating aquatic life (DeBofsky et al., 2020, Yang et al., 2020).

Sustainability, as a movement, is designed to help us solve complicated problems around our species' survival amid the pressures of environmental decline, poverty, and social disparities by unifying concerns of social, economic, and environmental under the umbrella of sustainability (Giovannoni & Fabietti, 2013). Sustainability theories focus on these three pillars: environment, economy, and society and the solutions to sustainability problems will often intersect these pillars as in the model of Barbier (1987) below:

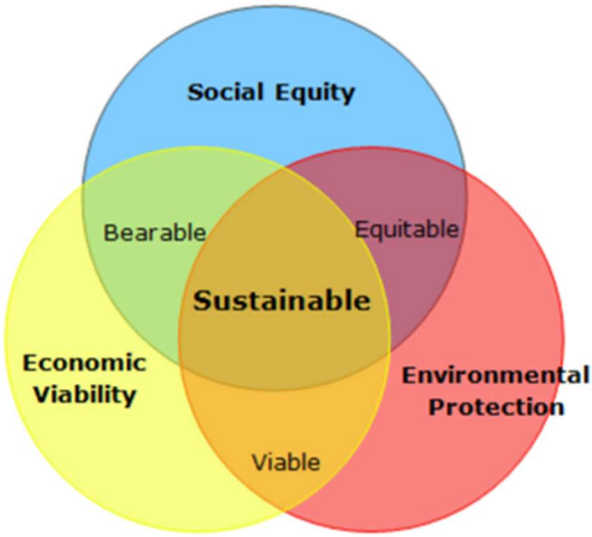

Figure 1.1 Sustainable Economic Development according to Barbier (1987)

The pillared approach simplifies sustainability to allow wider cooperation and understanding by governments, leaders, organizations, and the general public and has become ubiquitous as a result (Giovannoni & Fabietti, 2013). Sustainable development goals (SDG's) as set out by the UN are a good example of the integrative approach these pillars allow (Purvis, Mao, & Robinson, 2018). However, the universal acceptance of the pillars of sustainability can sometimes result in a pigeonholing of each concept in isolation from the others, sustainability being seen as only focused on the environment or only focused on the staying power of a business (Giovannoni & Fabietti, 2013).

One problem from a pillared approach to sustainability is its lack of inclusion of mental and emotional components when contemplating important survival and thrive-able sustainable development for humans (Patel et al., 2018). Sustainable development is commonly defined as "development that meets the needs of the present without compromising the ability of future generations to meet their own needs" (Brundtland commission, 1987). But sustainable development is defined as such to update the colonial concept of economic development used to

justify intervention in “less advanced” countries after World War 2 (Purvis, Mao, & Robinson, 2018). Sustainability as a concept evolved with assumptions of it developing and being sought as an avenue towards a peaceful, stable world. With today’s realities of continuing environmental exploitation, extreme levels of poverty, and the consequences of past and persisting colonial and imperial projects, sustainability’s assumption of continual economic development across the board needs re-imagining given our planetary and human boundaries (Rockström, Sachs, Öhman, & Schmidt-Traub, 2013; Purvis, Mao, & Robinson, 2018). Where the present work fits into this is to improve on the understanding of human dimensions, that is the social, cultural, mental, and emotional dimensions, of sustainability in the context of disaster recovery on First Nations Reserves that can be impacted by changes in the environment and economic determinants of their lives. The human dimensions of sustainability are relevant to First Nations communities because of the prevalence of knowledge systems which include humans as embedded in, and stewards of natural environments, in contrast with Western views where humans are in positions of power over natural environments (Howitt, 2001; Sammel, 2020).

1.2 Disaster recovery

Disasters are one such boundary that needs consideration for the sustainability of life as we know it on the planet. Disaster recovery is a complicated field, involving a combination of planning, procedures, and reaction to the disaster (Alexander, 2015). Those plans and procedures feed each other; that is, resources must match emergency plans with the most urgent and vital needs, and do so in a timely fashion, and emergency plans must be informed by available resources including local human cultures and abilities (Alexander, 2015; Lambert and Mark-Shadbolt, 2021). The local level in a disaster must be the focal point of voice, and operations (Lambert and Scott, 2019). In situations where it is necessary to access resources from higher

levels of response, like provincial or federal responses, and from organizations like the red cross. These outside resources should always reinforce the local leadership (Alexander, 2015).

1.3 Mental health from disaster, climate, and weather

The physical health effects of these disasters, events, and changes are well documented in the literature for general populations across the world and in Canada (Bartholdson & von Schreeb, 2018; Burton, Rabito, Danielson, & Takaro, 2016; Ebi et al., 2021). However, mental health issues initiated or worsened by the same events are more complex and obscure, resulting in a less extensive and definitive base of literature on the topic (Hayes & Poland, 2018; Stanke, Murray, Amlot, Nurse, & Williams, 2012; O'Neill et al., 2018). Mental health effects of disasters are more complex to study than physical health issues due to a number of differences in the way mental health issues present, persist, worsen, and heal (Hayes, Blashki, Wiseman, Burke, & Reifels, 2018). Attributing mental health issues to climate change, disasters, or events is difficult because mental health effects are often invisible, stigmatized, or appear much later than the event that caused or triggered the mental health issue (Hayes et al., 2018). Chapter 2 describes in more detail some of the difficulties with measuring disaster mental health, as well as the mental health effects that arise from various disasters, weather, and climate changes.

1.4 Mental health crisis in First Nations

There are documented mental health crises among First Nations Peoples in Canada (Nelson & Wilson, 2017; Katz, Enns, & Kinew, 2017; Kim, 2019). The mental health needs of First Nations Peoples often go unmet by western health systems (Baskin et al., 2020; Kitching et al., 2020). For example, the prevalence of psychological disorders in urban First Nations adults is 41.7% (Firestone et al., 2015). As per the Canadian census 2011-2016 cohort, the age standardized suicide rate in on and off reserve for First Nations was 24.3 deaths per 100,000

compared with the non-Indigenous people's rate of eight (8) per 100,000 (Kumar & Tjepkema, 2019). First Nations youth aged 15-24 suicides are higher than other age groups at 48.7 per 100,000 (Kumar & Tjepkema, 2019). Additionally, First Nations people living on reserve had suicide rates nearly two times as much as First Nations people not living on reserve (Kumar & Tjepkema, 2019).

There are also issues relating to the collection of health data where, regional health authorities in Saskatchewan do not track ethnicity on hospitalization and coroner reporting, resulting in unknown rates of suicide in Indigenous youth (Tait, Butt, Henry, & Bland, 2017). Stronger surveillance is required at national, provincial, and local levels to inform prevention strategies, in addition to the implementation of First Nations healthcare strategies and leadership (Tait et al., 2017). First Nations mental health is influenced by contemporary conditions as well as the colonial history of Canada and its oppression, assimilation, and relegation of First Nations people to remote communities (Reading, Greenwood, de Leeuw, & Lindsay, 2018). Given the prevalence of mental health issues experienced by Indigenous people and health determinants strongly linked to settler colonialism, Indigenous theorists have looked to the reclamation of sovereignty as a solution.

1.5 Indigenous sovereignty

Common definitions of sovereignty most often refer to Westphalian sovereignty, which refers to territorial authority of the state and emerged through medieval European political development (Bauder & Mueller, 2021). Westphalian sovereignty is a political tool that serves settler colonialism and continued oppression of Indigenous populations by originally justifying settler colonial projects, serving as legal justification in the form of treaties to dispossess Indigenous people of their lands, and placing Indigenous people under the umbrella of the state

(Bauder & Mueller, 2021). Indigenous sovereignty within UNDRIP refers to Indigenous right to self-determination meaning sovereignty over internal affairs but does not allow for sovereignty in external affairs or sovereignty equal to that of the overarching colonial state (Bauder & Mueller, 2021). Distinguishing characteristics of Indigenous sovereignty include cultural identity rather than just legal territorial authority, as well as emphasis on relationships and interdependencies, and natural and spiritual connection to the land (Bauder & Breen, 2022). Indigenous sovereignty rejects colonial sovereignty and supports contemporary efforts of decolonization (Bauder & Mueller, 2021). Examples of these decolonizing efforts include localized efforts for food, health, and data sovereignty, as well as more widespread efforts like the Land Back movement and Indigenous-led disaster risk recovery (Jonasson et al., 2019; Hoss, 2022; Smith, 2016; Pieratos, Manning, & Tilsen, 2021; Lambert and Scott, 2019)

In Canada, the *Indian Act* (1876) is the primary legal basis for settler colonial laws subjugating and controlling all aspects of First Nations life, including sovereignty (Collis, 2021). The *Indian Act's* distinction between First Nations and other Canadian citizens is such that giving up the oppressive policy on the federal government's terms has been rejected, as proposed replacement policies are worse in comparison (Collis, 2021). The *Indian Act* institutionalized policies that isolated many First Nations communities in remote areas that today are located away from quality healthcare, water and food security, education, and economic opportunities (Downing & Cuerrier, 2011; Reading, Greenwood, de Leeuw, & Lindsay, 2018; Tam et al., 2013). Additionally, this precarious access to vital resources is put further into jeopardy by the extraction industry (Stanley, 2016; Jonasson et al., 2019). In some cases, although presented as recognition of First Nations rights, contemporary revisions of land registries, taxation structures, resource development, and governance serve to amend colonial oversight in terms of the

economic interests of the state (Collis, 2021; Stanley, 2016). These continued exercises of subjugation via colonial systems even show through when the state provides aid to struggling First Nations communities, reinforcing the unequal political relationship between First Nations governments and the Federal Government (Bauder & Mueller, 2021).

1.6 Research purpose and objectives

The aim of this research is to use an interdisciplinary and community-driven exploration of First Nations-led disaster mental health recovery to inform policy that can help solve environment-related mental health issues in First Nations communities.

- Objectives and research questions

  With scarce literature on the mental health effects of environmental processes on First Nations Peoples in the Prairies, this project is structured to address four research objectives:

  1. Explore the scope of current literature on climate, disaster, weather, and environmental mismanagement issues with First Nations Peoples in the Canadian Prairies with specific interest of those living on-reserve;
  2. Identify the current trends in research, monitoring, and policy change for the protection of mental health in Indigenous communities facing vulnerabilities due to environmental jeopardy;
  3. Provide opportunity for First Nations community members to speak for themselves and their community about flooding and mental health effects, and inform disaster planning, policy, and further university research partnerships;

4. Clarify the disparity between what is offered to First Nations communities after a disaster and what is needed from First Nation perspectives, for recovery and improvement into the future.

1.7 Methodological overview

Mixed methods were used for this research as a community preference, and was a good fit to cover the different research settings, topics, and triangulate the qualitative and quantitative datasets. The comparison of the two data types was requested by community partners, and integral to the objectives of the research, allowing for academic literature and lived experience to be put into a local context centering a co-designed, community engaged approach, and on the other hand comparing that lived experience with disasters across the world.

A scoping review of the academic literature on environmental mismanagement, disaster, climate, and weather was conducted to discover what had been discussed specifically about mismanagement and mental health on reserves. Articles were gathered using a scoping review protocol as it provides flexibility and allows for insertion of and integration with decolonizing strategies used to critically reflect on colonialism, its impacts, and its influence on research practices and subsequent knowledge (Chambers et al., 2018). A second scoping review was also conducted following the same methodology regarding the capacity of mental health programs of which a majority were not run by the local health authority. A case study was then conducted using qualitative semi structured interviewing to triangulate the findings from the literature with lived experiences. Sharing circles were also used within the community partners to help bring together community members to talk about and share their experiences with others in their community using a conversational method that was known and respected by the community. Sharing circles provided an opportunity to cluster, thematize, and provide another level of

validity to the semi-structured interviews. Participants were recruited by community-based research coordinators via convenience sampling due to the difficulty of finding participants during the COVID-19 pandemic. Data was thematically analyzed (Boyatzis, 1998) through a grounded approach (as per Locke, 2002). Once themes were generated, they were brought back to the community-based researchers to review and combined to develop core themes that framed the final analysis of the data.

Once both data collection periods were completed, and data analysis triangulated with community research coordinators, ideas for formulating knowledge dissemination products from this work were discussed, as well as a plan to structure this thesis. While community members expressed the desire for brief reports and local presentations, the institutional requirements meant that the thesis needed to appear in a form that was acceptable according to academic conventions. It was decided by the author, supervisor, and two research coordinators that two manuscripts for publication would be prepared to share these results with Indigenous and Western scholars, practitioners, and global audiences. The manuscripts were designed to be separate documents that presented the Western academic literature in one, and community-driven qualitative data analysis in another. The manuscripts would then be combined into a thesis document for deposit at the University that would also have an introduction and discussion/conclusions chapter. Because of the desire for a concise read for community members, the decision to transfer the bulk of literature reviewing to the manuscript chapters was made. The discussion and conclusion chapter in the thesis focuses on overall findings, methodological limitations, and connections to sustainability as a requirement of the degree-granting institution.

Three presentations for communities also occurred as dissemination strategies; two in James Smith Cree Nation by invitation, and one at a Water Forum hosted by the University of Saskatchewan's researchers where both communities brought representatives; youth, council members, and Elders. These meetings supported the triangulation of findings, and the dissemination of research in formats that the communities requested – in person presentations. By invitation, both communities also participated in online seminars put on by government agencies about the research (Environment, Climate Change Canada in January and March 2022).

1.8 Thesis structure

This introduction chapter provides a brief overview of the topics and literature relevant to the two content chapters. The purpose of this chapter is to provide background and context to the more specific information in the subsequent manuscripts and tie the two pieces together. Additionally, this section introduces some of the influencing factors on the research topics and covers the research purpose and objectives. Each of the results chapters includes an introduction which highlights the role of the co-authors in producing the manuscripts.

Chapter 2, consisting of the first manuscript, presents a dual scoping review; that is, a first review of the academic literature on the mental health effects of natural disasters, extreme weather events, and incremental climate change on a global scale. Second is the literature which assesses mental health programming in Canada that serves the First Nations population. Using these two lines of research to provide context for one another, the discussion addresses the disparity between what First Nations reserves are equipped to handle in terms of disaster mental health and resources available, and the potential mental health effects of a disaster.

Chapter 3, consisting of the second manuscript, is a dual case study of two First Nations reserve communities central and southern Saskatchewan. These communities have experienced

large amounts of flooding, including floods that required evacuation, giving them the expertise and experience to speak on the recovery process from disasters. A thematic analysis of community members' responses to semi-structured interviews and sharing circles gives insight into how flood recovery can be navigated within First Nations reserve communities.

The final chapter discusses and summarizes the overall thesis project and objectives including the implications of the two manuscripts in tandem. Additionally, suggestions for connecting this work with sustainability as a science and model for survival, future work, and limitations are discussed.

Preface for Chapter Two

The objectives of this chapter were to scope the current literature for climate, disaster, weather, and environmental management issues from disasters for Indigenous people, with specific interest in First Nations on-reserve experiences. Partnered First Nations on-reserve community members were interested in the mental health effects of these events relevant to their recent history of flooding. Unfortunately, research for these specific parameters are scarce so a broadening of search criteria was required to access information on mental health effects. As a result, community coordinators asked researchers to look at a variety of mental illness diagnoses and social health (defined by community coordinators as how well the social dynamics of the community continued to function during an emergency), implications of floods, such as increases of domestic violence, reduced food and water security, and a decrease in cultural practices. A larger set of search terms was used to augment that first search. To augment this gap in the research, and overcome some limitations of the data set, the second objective was to examine trends in research on the protection of mental health in First Nations communities facing vulnerabilities due to environmental jeopardy. This search included mental health related programming that dealt with issues like addictions, intergenerational trauma, and reconnecting Indigenous youth with their traditional culture. This second objective addresses the potential levels of mental health impacts First Nations communities might be equipped to handle, internally, or with external support after a disaster. Scoping review methods allowed for a large variety of mental health reporting to be uncovered, but the results were not necessarily applicable to specific on-reserve First Nations. The results, however, can be used with demographic information, baseline levels of health effects on-reserve, and health data from previous events to make preparation decisions and contribute to social learning. Chapter 2 is currently under review

in the *International Indigenous Policy Journal*. The author contributions were as follows: Kurt Belcher (conceptualization, data collection and analysis, drafting and revising the manuscript), Justin Burns and Myron Neapetung (conceptualization, data collection and analysis, reviewing manuscript), Lalita Bharadwaj (providing funding to collect data, conceptualizing, reviewing manuscript), Graham Strickert and Robert Henry (reviewing manuscript), Dharma Yalamanchilli (data collection), Lori Bradford (conceptualizing, supervising students, reviewing manuscript).

CHAPTER TWO: Scoping Reviews of Mental Health and Disaster

Title: First Nations-Led Mental Health Recovery in the Face of Environmental Jeopardy: A Scoping Review

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Abstract: Understanding factors that influence mental and social health after extreme weather events and incremental climate change is crucial to addressing how Indigenous communities in the Canadian Prairies prepare and react to climate change. Previous research on an international level has linked climate change to mental health for general populations but, within an Indigenous context, the literature base is lacking. What little the literature does indicate, however, is that appropriate and ethical policy in Canada is failing to prevent physical and mental harm to Indigenous people from anthropogenically-driven climate and environmental change when compared with non-Indigenous, or urban populations. This article explores the academic and policy literature linking climate change and mental health effects, defines and explores environmental mismanagement affecting reserve land, and explores the available mental health programs for Indigenous members living on reserve in Canada. Alternatives to colonial policies and circumstances that affect Indigenous mental health outcomes are offered. The objectives of the present research are executed through a multi-pronged scoping review to compare the mental health issues that Indigenous people in Canada are faced with and the

barriers in place when it comes to Indigenous on reserve mental health recovery from floods. The first scoping review shows how people's mental health is affected when they experience a disaster, extreme weather, or incremental changes to the climate and environment. The second shows what resources are available from the perspective of the academic community and the strengths and weaknesses of those resources for Indigenous mental health in Canada. The combination of these two literature bases shows a need for community led and culturally relevant mental health both as a recovery to disaster but also as a standard for Indigenous health sovereignty.

Keywords: mental health, flooding, disaster, climate change, scoping review, holism, First Nations

2.0 Introduction

Extreme weather events are on the rise due to climate change (Hayes, Blashki, Wiseman, Burke, & Reifels, 2018). Disasters like flooding are well documented as having major public health consequences such as injury, disease, and death (Bartholdson & von Schreeb, 2018; Burton, Rabito, Danielson, & Takaro, 2016). Unfortunately, issues of mental and psychosocial health also appear because of environmental disasters and are often overlooked by researchers, health authorities, and recovery efforts (Hayes & Poland, 2018).

Urban and rural Indigenous communities and non-reserve populations in the Canadian Prairies are susceptible to climate change and extreme weather events - including incremental changes - due to community placement as well as human dimensions like underfunding, having little voice in policy making, and poor environmental management (Lemelin et al., 2010). This susceptibility leaves both urban and rural Indigenous communities vulnerable to physical, mental, and social health effects caused by exposure, repeated exposure, and recovery from these events and their cumulative impacts (Ford, Berrang-Ford, King, & Furgal, 2010). Contributing to the environmental and connected issues that rural reserves face is the overarching colonial policy and systems that fail to meet the diverse and traditionally sensitive needs of the Indigenous Peoples in Canada (Downing & Cuerrier, 2011). Mismanagement of resources and the environment in the rural lands surrounding Indigenous reserves add to the negative environmental effects these communities face (Fuentes, Asselin, Belisle, & Labra, 2020; Tam, Gough, Edwards, & Tsuji, 2013).

Defined as a state of wellbeing in which an individual realizes their own abilities, copes with the normal stresses of life, works productively and fruitfully, and is able to contribute to their community (World Health Organization, 2004), mental health is influenced by many

factors. Among the determinants of mental health, factors related to environmental disasters, climate change, and extreme weather have been receiving increasing attention with the increase in awareness of anthropogenically driven climate change (Hayes et al. 2018). Mental health issues that have been studied in relation to these climate, weather, and environment factors range in severity, duration, and in the varied populations they afflict (Hayes & Poland, 2018).

Well documented are mental health issues that can be linked to climate or weather events, including post-traumatic stress disorder (PTSD), depression, anxiety, and addictions as coping mechanisms (Hayes & Poland, 2018; Stanke, Murray, Amlot, Nurse, & Williams, 2012; O'Neill et al., 2018). Reports of indirect mental health effects of climate events and incremental climate change are also emerging in the literature (Table-2 below). Suicidal ideation, substance use, prolonged bereavement, behavioural issues in children, and domestic violence can arise after extreme climate events due to indirect stressors such as personal loss, economic stress, food and water insecurity, displacement, and property loss or as comorbidities with the traumatizing event (Fisher, 2010; Hayes et al., 2018; Stanke et al., 2012). Lower representation for these issues in the literature stem from the difficulty in attributing them to either acute or incremental climate events compared to issues like PTSD, which is additionally easier to report as a clinical diagnosis or self-reported measure as opposed to something like domestic violence (Hayes et al., 2018). Tyler and Hoyt (2000) found that greater exposure to a flood event both predicts higher levels of depression but also exacerbates existing depression. Anxiety increases in prevalence after a disaster, in anticipation of further disasters, or even the overarching threat of climate change (Brewis, Choudhary, & Wutich, 2019; Hayes & Poland, 2018). Mental health effects from incremental climate change are difficult to document due to the lack of an acute period of

traumatization, and thus health issues that are connected to the event are more difficult to associate (Rataj, Kunzweiler, and Garthus-Niegel 2016).

While environmental racism is "racial discrimination in environmental policymaking and enforcement of regulations and laws…" (Chavis, 1994 as stated in Holifield 2001, p.83), environmental mismanagement is when uncoordinated behaviours of individual nations with respect to common resources result in reduced stocks of resources, or poorer quality stock of resources for another nation-state (Andersson, 1991). This difference is important in the context of the present study as it leads to awareness of unequal voice, and thereby governance across a shared water system. The resulting inequalities faced by individual communities and persons is related to environmental mismanagement, but when the unequal governance disproportionately affects Indigenous communities, it is environmental racism. Not only are Indigenous communities in the Prairies subject to this racism, there is also discrimination on another level, that of colonization and colonialism which gives these communities little power to change systems (Muller, Hemming and Rigney, 2019). Thus, in combination with environmental mismanagement and environmental racism, which is experienced by marginalized groups worldwide, colonization and colonialism are also linked specifically to Indigenous communities in Canada and their inability to move Canada towards reconciliation of environmental management wrongdoings.

2.0.1 Climate and mental health: Difficulty with attribution and subsequent marginalization

A series of factors influence the mental health effects that arise after a disaster. Three of the most important include how to attribute mental health effects to the event, overcome health inequities, and reduce the compounding of mental health effects. Attribution issues arise because mental health effects often have no visible physical symptoms, are stigmatized, and are not

always consciously connected to the experience from which they stem (Hayes & Poland, 2018). Underdiagnosing mental health effects of climate change, pathologizing common responses, considering timing of mental illness onset, and the complexity of mental health makes it difficult for researchers and healthcare providers' ability to attribute mental health to climate events (Hayes et al., 2018).

Health inequity plays a large role in the health status of marginalized communities. Group's marginalized by socioeconomic status, culture, gender, race, employment, ability, and education are in more danger from climate change and extreme climate events as the toll of these events are added on to existing social inequities (Hayes et al., 2018). Incremental climate change interferes with cultural practices over time, taking an immeasurable health and mental health toll on reserve communities (Hayes & Poland, 2018). The ancestral lands of Indigenous Peoples are crucial to the sustaining of livelihoods, cultures, and languages (Downing & Cuerrier, 2011; Lemelin et al., 2010). Climate change and environment mismanagement make it difficult for communities to continue a well-established way of life (Fuentes et al., 2020; Tam et al., 2013). Permafrost thawing, rising sea levels, shorter winters, and changing animal migration habits are beginning to adversely affect Indigenous communities in the Canadian north (Downing & Cuerrier, 2011). In the future, many rural Indigenous communities in Canada will have to relocate due to issues of climate and environment (Downing & Cuerrier, 2011).

Indigenous Peoples in Canada face numerous injustices when it comes to seeking positive health outcomes. Due to the remote locations of many reserve communities, food supply is easily disrupted, and food variety and freshness are limited either by supply line duration, or lack of access to safe traditional food sources (Lemelin et al., 2010; McNeill, Binns, & Singh, 2017; Reading et al., 2018). Clean water supply is often precarious in reserve communities and climate

events, or environment mismanagement puts supplies in further jeopardy. Morrison, Bradford, and Bharadwaj (2015) show that reserve communities often do not have access to clean water despite federal promises to provide communities with clean, drinkable water. Settler policy also plays a role here with the contrast of Shoal Lake #40 First Nation being under a boil water advisory for 24 years (ending in 2021 with a water treatment plant; Petz, 2021) while the city of Winnipeg, Manitoba draws its clean drinking water from the same source (Liu, 2015). In addition to disruptions from climate change, water insecurity is linked to mental and psychosocial health issues in these communities (Bradford, Zagozewski, & Bharadwaj, 2017; Brewis et al., 2019).

Further complicating Indigenous health status is the tendency of researchers and health organizations to assess Indigenous peoples' health via western conceptions of health (Allen et al. 2020). Westernized social determinants of health do not include Indigenous ones like proximal, structural, and intermediate factors, yet all three are shaped by historical and settler colonialism. Proximal factors like the physical environment, social status, gender, and race of individuals influence how environmental changes affect health (*vis-a-vis* an individual's connection to the land or a community's ability to live in harmony with resources). Intermediate factors like social support, access to services and relationship to the land show how structural determinants can connect to the specific health outcomes of individuals (Fuentes et al., 2020). Structural factors like historical and political foundations are the basis of all other determinants acting on well-being. For example, the *Indian Act* (1876) institutionalized policies that located Indigenous communities in remote geographies isolated from quality healthcare, water and food security, education, and economic opportunities, which resulted in reduced individual and community health (Downing & Cuerrier, 2011; Reading, Greenwood, de Leeuw, & Lindsay, 2018; Tam et

al., 2013). Since Western conceptualizations of health did not include those factors, Indigenous groups faced inequities in seeking care that was culturally appropriate and would lead to sustainable treatment of illness.

2.0.2 Colonial policy is not sustainable: Mental health as one indicator

Despite some Indigenization of health services, the implementation of those services in Canada still does not overcome historical and settler colonial structures (Downing & Cuerrier, 2011; Hayes & Poland, 2018). The literature recommends that healthcare needs to take a holistic approach, not only consisting of markers for poor physical and mental health but also good health, wellbeing, psychosocial health, and emotional resilience (Hayes, 2019; Hayes & Poland, 2018; Stanke et al., 2012). From an Indigenous perspective, health also includes spirituality, fluency in traditional languages, ability to contribute to one's cultural sustainability, leadership and direction in one's community, and connection to nature (Downing & Cuerrier, 2011; Fuentes et al., 2020; Stephanie Montesanti, Thurston, Turner, & Medicine Traveler, 2019; Tam et al., 2013). These conceptions of health and mental health need to be made dominant in reserve communities to develop decolonizing policy, promote adaptation and social sustainability, and best serve the community members.

Suggestions for adaptation to climate related health and mental health include monitoring, education, preparation, sustainable development, and even relocation (Hayes et al., 2018). Examples of mitigation and adaptation focused on mental and psychosocial health include behavioural and community interventions, health worker training, participation in tribal activities, learning on the land, and therapeutic interventions (Downing & Cuerrier, 2011; Hayes et al., 2018). A community's ability to adapt is affected by its governmental, economic, infrastructure, and technological circumstances (Hayes et al., 2018). Additionally, the perceived

levels of equity in a community influences the capacity for that community to adapt. Policy is an important aspect of adaptation, determining funding for health care, healthcare planning and approach, and adaptation and resilience planning (Downing & Cuerrier, 2011).

Stanke et al. (2012) found that the best approach for maintaining wellbeing post disaster involves communities and agencies collaborating in planning and recovery activities. Although many needs can be met by friends and family close to affected individuals, mental health and psychosocial services should be provided to reduce long-term negative outcomes (Fothergill, Disney, & Wilson, 2021; Villarreal & Meyer, 2020). Researchers recommend policy writers, social services, and emergency planners work to address "recovery gaps" or shortage of recovery services once extra disaster services revert to pre-disaster normals (Bollin & Khanna, 2007).

Hayes and Poland (2018) reviewed mental health, psychosocial health, and climate change literature to determine how mental health can be integrated into climate change and health vulnerability and adaptation assessments (CCHVAA). CCHVAAs technically include mental health assessments for climate change related events but due to difficulties attributing mental health issues to climate change these mental and psychosocial problems are often overlooked. The emergent vulnerability table for use by health authorities in CCHVAAs fits in with the current assessment framework to place emphasis on the acute mental health problems that arise after an extreme climate event (see Table-1 in Hayes and Poland, 2018 on page 12).

Good outcomes for Indigenous-led adaptation and governance initiatives are present in the literature but scarce. Water security research shows that Indigenous initiatives for controlling water rights and sovereignty can help validate the sociocultural relationship reserve communities have with traditional waters and lands (Wilson, 2014). For example, Siksika First Nation in Alberta employed a holistic model of health and well-being within the recovery and mitigation of

a flooding disaster on the reserve (Stephanie Montesanti et al., 2019). After the 2013 Bow and Elbow River floods the Siksika First Nation was forced to evacuate 1000 people and declare a state of emergency with only a 30-minute warning. The leadership responded using a community based and culturally appropriate framework for supporting the health and mental health needs of members of the Nation affected by the flood (Patrick, Machial, Quinney, & Quinney, 2017). The plan put forward was considerate of Indigenous determinants of health, and prioritized attention to children and youth, traditional ways of life, and cultural protocols. Focusing on these community led initiatives for recovery without neglecting unique community and mental health needs, Siksika First Nation and their University of Calgary collaborators were able to create an important Indigenized framework for disaster and emergency planning (Lynes & Rushton, 2020; Patrick et al., 2017). In contrast, western or settler approaches to flood recovery are based around protection from risks, and insurable claim frameworks (Doberstein, Fitzgibbons, & Mitchell, 2018; A. Morrison, Noble, & Westbrook, 2019). Neither of those risk protection or insurable claim foundations include psychosocial health concerns, or cross-cultural harmony, reducing the implementation opportunities for lessons learned (Kuang & Liao, 2020).

2.0.3 Environmental Mismanagement: A precursor to worse mental health outcomes?

Over the past three decades, much literature has emerged declaring many environmental disasters as caused by poor governance and mismanagement (Andersson, 1991; Irshad, 2015; Longhurst, 2010; Mainguet, 2012; McMichael, Nyong, & Corvalan, 2008). Where there have been post-disaster inquiries, environmental mismanagement has played a causative role in reduced health, cultural, community, and social recovery (Hanna Salman Sawalha, Eid Jraisat, & Al-Qudah, 2013; Parker, 1992; Shaluf, Ahmadun, & Mat Said, 2003).

In Canada, environmental management regimes that are identified as lacking inclusion of local and Indigenous voices are linked with environmental racism (McGregor, Whitaker, & Sritharan, 2020; Waldron, 2018). These regimes are also associated with slower recovery, increased mental health burdens, and disaster recurrence (S. Billiot, Kwon, & Burnette, 2019; Kovesi, 2019). Evidence is emerging that environmental mismanagement is a precursor to poorer mental health recovery from disaster – and climate change induced threats to marginalized people, and that alternative management strategies exist and could be implemented (i.e., Billiot, Beltran, Brown, Mitchell, & Fernandez, 2019), but this is an understudied area.

Given the complexities of relying on current policy to lessen vulnerabilities to mental health issues because of environmental mismanagement, this study aimed to establish:

1. The scope of current literature on environmental mismanagement and mental health issues in Indigenous communities in the Canadian Prairies; and,
2. The current trends in research, monitoring, and policy change for the protection of mental health in Indigenous communities facing vulnerabilities due to environmental jeopardy.

2.1 Methods

A large-scaled multi-year research-driven partnership has been established between the authors of this work, and Indigenous communities in Treaty Areas 4, 5, and 6 since 2008. While each community approached the researchers initially with interest in unique water security issues specific to their communities, and requests for support for data gathering, and co-analyses, the commonalities among the community-driven needs led to discussion around how environmental issues and their fallout have contributed to community wellbeing. A project focused on modeling potential impacts to community day-to-day life from flooding was undertaken with Band Council Resolutions and research agreements in 2018, which had a subcomponent of investigating

impacts to mental health. A Master's student was hired to undertake an engaged scholarship program with two First Nation communities to investigate mental health effects of flooding, however, pandemic restrictions meant that project was adapted to include a scoping review followed by interviews and group interviews via online technologies, and in person as restrictions were lifted. A final meeting with community Chief and Council members, as well as youth was undertaken to share and verify results in March 2022. The methodologies and pandemic-driven modifications are described in detail below.

2.1.1 Scoping review

While it was the desire of communities to do more ethnographic interviews, and local discussions and storytelling on the history of environmental mismanagement and resulting mental health impacts, pandemic restrictions meant that research team members could not have in-person interactions early in the research project. As a result, partners agreed to direct the student to scan existing literature to discover what had been discussed specifically about mismanagement and mental health on reserves. Articles were gathered using a scoping review protocol because this method is flexible and allows for insertion of and integration with a decolonizing positionality (Chambers et al., 2018). Reports for mental health effects of flooding in Prairie Indigenous communities are scarce so the process of partially decolonizing this scoping review involved a thorough comparison of scoping review findings with the lived experiences of the community partners. A community-based research coordinator in each reserve community participated in the scoping review, scrutinized the analysis during community presentations by the Master's student, and took part in the writing of this manuscript. The reporting of the scoping review in conjunction with other data collection methods stemmed from an understanding that westerns analysis needed to be verified by the worldviews and

perspectives from the people who shared their stories (Chambers et al., 2018). Holistic understandings of health and mental health were desired from coding and reporting, and were developed with help from the community partners to ensure lived experiences were reported correctly and without bias toward western conceptions of health.

Scoping reviews are exploratory studies that systematically map literature on select topics with the goal of determining a feasibility of conducting a systematic review, summarizing and disseminating research findings to knowledge users and identifying gaps where further research may be required. As a form of synthesis, or systematic reviewing, scoping reviews are still nascent and methodological frameworks are still being refined (Gough, Thomas, & Oliver, 2012). This scoping review employed the methodological framework put forward by Arksey and O'Malley (2005) and Levac, Colquhoun, and O'Brien (2010). They involve six stages, which include:

1. Identifying the research question
2. Identifying relevant studies
3. Selecting the studies
4. Charting the data
5. Collating, summarizing, and reporting of the results, and
6. Conducting consultation exercises (optional)

The review methodology helped provide flexibility for synthesis of a variety of study designs and article types (Arksey & O'Malley, 2005; Levac et al., 2010). Although presented in steps, the process was not linear as some steps were repeated to ensure a comprehensive assessment of the study. Next, we describe the search strategies beginning with search engines, terms, and inclusion criteria. We focused our efforts on six key search engines which combined key western

science databases with Indigenous repositories: Scopus, Psych Info, Informit Indigenous Collection, iPortal, Medline, and PubMed.

The search criteria included three broad areas of mental health effects, environmental jeopardy, and Indigenous representation (and synonyms of these terms) as displayed in Table-2.1 below

Table-2.1 Scoping review #1 search terms

Concept A: Mental Health Effects	Concept B: Environmental Jeopardy	Concept C: Indigenous Representation†
Mental Health	Flood*	Indigenous
Social Health	Natural disaster	First Nation*
Mental Well-being	Climate change	Native*
PTSD	Extreme weather	Aboriginal*
Depression		Métis
Anxiety		Inuit
		Islander

† Terms for Indigenous were selected based on what has been used in academic and government documentation in colonized nations. Islander was used to recruit literature from Pacific Island nations such as Maori, Samoan, Hawaiian, Rapa Nui (Easter Islanders), and others.

2.2 Results Part 1: Primary Scope

Over the course of two years, two Master's students, and two faculty members contributed to the collection of articles and reports. Approximately 2217 articles were scoped from six databases and other sources (Figure-1 PRISMA 1). The final sample included 118 papers that satisfied these inclusion criteria:

1. Published after 1996 in English in a peer-reviewed journal
2. Relevant to Indigenous communities on reserves
3. Spoke directly to mental health effects of natural disasters, extreme weather, or climate change

To summarize the particulars of the reviewed studies, first the general characteristics of the studies are listed, followed by the methodologies, and finally the specific content of the studies, the themes, and gaps in the research examining mental health outcomes after disasters, extreme weather events, and climate changes.

2.2.1 Descriptive characteristics

Articles were published in 76 unique academic journals from across the world. Some common journals were “Frontiers in Psychiatry”, “Journal of Traumatic Stress”, “Science of the Total Environment”, “International Journal of Environmental Research and Public Health”, “BMC Public Health”, “Frontiers in Public Health”, “Social Science and Medicine”, “Disaster Medicine and Public Health Preparedness”, & “Journal of Affective Disorders”. Most articles were published after the year 2018 (85/118). Separated into categories by disaster, 46 papers were on flooding, 21 on hurricanes, 17 on earthquakes, 12 on various or multiple disasters, 8 on wildfires or bushfires, 7 on temperature, climate, or heat, 6 on tsunamis, 3 on tornadoes, and 1 each on volcano eruptions, typhoons, dust storms, and cyclones.

Reported methods and data collection

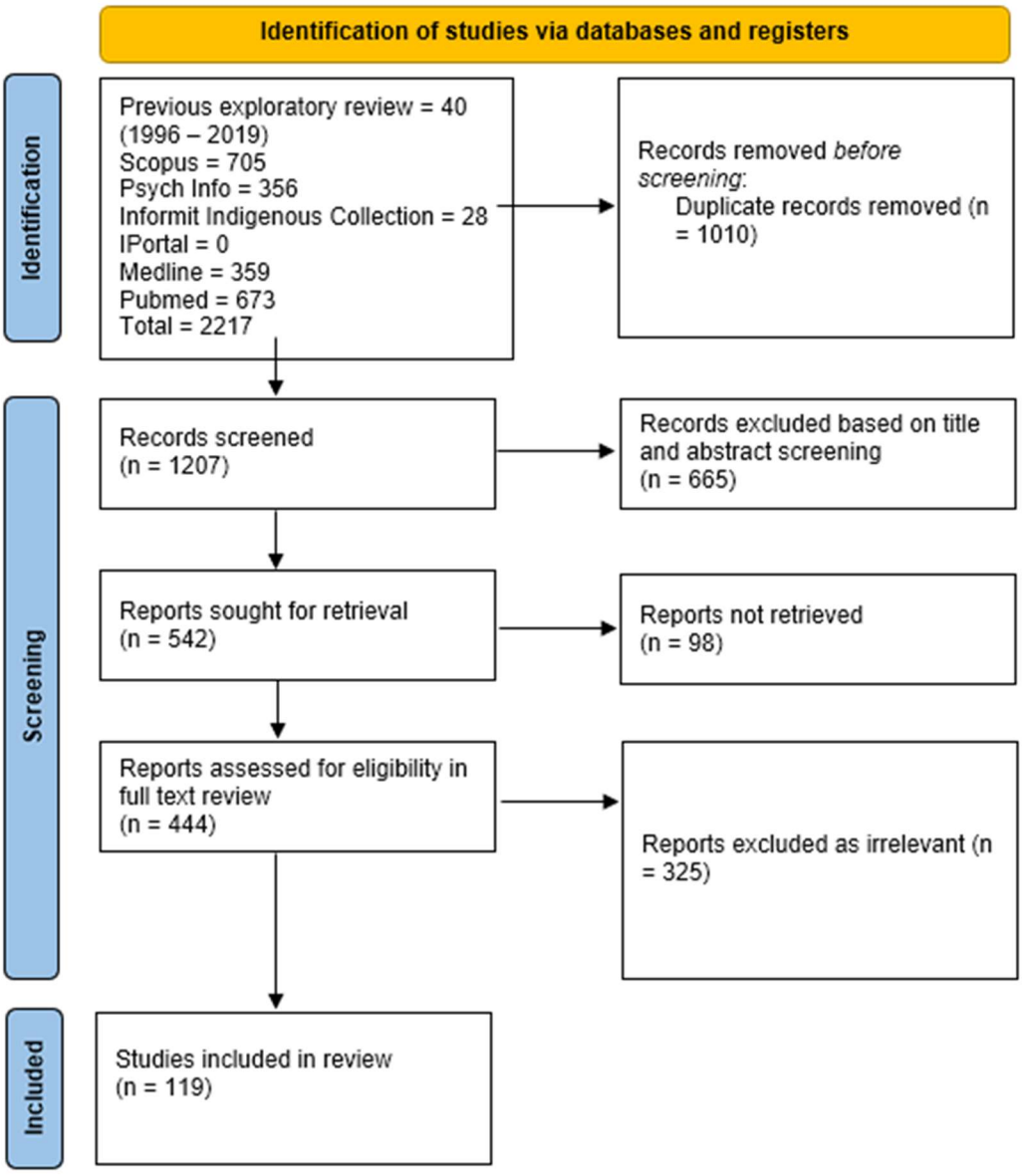
Out of the 118 articles, 113 used quantitative datasets, 4 used a mixed quantitative and qualitative dataset, and 1 used a purely qualitative dataset. 74 studies used cross sectional designs with questionnaires or surveys to collect data. 1 study used a qualitative interview method with an open-ended format. 9 studies used a longitudinal format either using health cohorts or questionnaires and surveys. 18 studies used health data or repurposed data. 6 studies were reviews or meta-analyses.

2.2.2 Methodological strengths and limitations of the sample

The strengths of the sample as a whole stem from the sheer amount of data that was assessed from a large variety of disasters and events across many countries worldwide. Sample sizes are included in Appendix A: *Study Characteristics* for applicable studies along with the country of study. Strengths of the survey and questionnaire cross-sectional studies include the ability to act quickly after a disaster and administer questionnaires while the disaster is still fresh in people's minds. Additionally, surveys allow for a large amount of data and participants even with low response rates. Strengths of the longitudinal studies include the ability to track how a cohort of disaster survivors fares after the event and monitor the progression or healing of the mental health issues they experience. The longitudinal studies included in this review each had the limitation of participant attrition. Strengths of the health or repurposed data include the ability to match changes in health data to times of disaster or climate and weather events. Strengths of the review and meta-analyses include the ability to examine mental health effects across events and locations as well as evaluate the quality of the research reviewed. Finally, strengths of the qualitative study include the depth of data and the ability to measure aspects of disaster mental health not reachable by quantitative inquiries.

Limitations listed by the authors are included in Appendix A.

The Sample inclusion process is summarized in Figure-2.1 below:


Identification of studies via databases and registers
Identification
Previous exploratory review = 40
(1996 – 2019)
Scopus = 705
Psych Info = 356
Informit Indigenous Collection = 28
IPortal = 0
Medline = 359
Pubmed = 673
Total = 2217
Records removed *before screening*:
Duplicate records removed (n = 1010)
Screening
Records screened
(n = 1207)
Records excluded based on title and abstract screening
(n = 665)
Reports sought for retrieval
(n = 542)
Reports not retrieved
(n = 98)
Reports assessed for eligibility in full text review
(n = 444)
Reports excluded as irrelevant (n = 325)
Included
Studies included in review
(n = 119)

What results showed:

Table-2.2 Mental health and psychosocial effects of climate events (flooding and hurricanes) as reported in the literature

Mental Health Effects	Citing Literature	Summary
Maternal, and Parental Stress	A1 - Simcock et al. (2016) A2 - Tong, Zotti, & Hsia (2011) A3 - Abel, Hambrick, & Vernberg (2021) A4 - Carillo (2020) A87 – Lafortune et al. (2021) A90 – Lee et al. (2021) A102 – Nomura et al. (2019) A22 - Bountress et al. (2020) A56 - Felix et al. (2020)	● Higher levels of prenatal maternal stress were positively related to infant motor development, yet at 6 and 16 months of age there was a negative association, particularly if flood exposure occurred later in pregnancy and if mothers had negative cognitive appraisals of the event ● Residents giving birth after the disaster had increased odds of having a low birth weight infant or preterm delivery ● Maternal acknowledgement of children's remembrance of tornado moderated children's use of both negative and positive emotion words such that emotion term use was unrelated to child posttraumatic stress symptoms when mothers engaged in frequent acknowledgement of their children's verbal expressions, but related to higher child posttraumatic stress symptoms when mothers engaged in lower acknowledgement ● Prenatal exposure to adverse rainfall conditions results in poorer long-run health (first trimester), educational (first trimester), and employment outcomes (third trimester). ● Prenatal maternal stress from natural disasters effects birth outcomes, cognitive, motor, physical, socioemotional, and behavioural development. ● Disaster related PTSD in children linked to PTSD in parents ● Prenatal depression directly influences infant temperament, interaction effects for mothers who were exposed to hurricane sandy during pregnancy ● Disaster exposure is associated with both parental distress and adolescent PTSD symptoms, parental distress additionally shown to impact adolescent PTSD symptoms ● Topic avoidance after a disaster by parents had appositive association with child anxiety and depression
PTSD	A6 - Chen, et al. (2015) A7 - Hu, et al. (2015) A8 - McLaughlin, et al. (2011) A9 - Peng, et al. (2011) A10 - Huang, Tan, Liu, Feng, & Chen (2010)	● Chronic PTSD was significantly associated with disaster stressors, nervousness, and social support ● The rate of current probable PTSD was 15.4 %. The current occurrences of re-experiencing, avoidance/numbing, and hyper-arousal symptom groups were 69.3 %, 17.2 %, and 50.2 %, respectively ● An estimated 17.1% of respondents had a history of hurricane-related PTSD at baseline and 29.2% by the follow-up survey. Of the respondents who developed hurricane-related PTSD, 39.0% recovered by the time of the follow-up survey

	A11 - Li, et al. (2010) A12 - Taft, et al. (2009) A13 - Bokszczanin (2007) A14 - Feng, et al. (2007) A15 - Liu, Tan, Zhou, & Li (2006) A16 - Norris, Slone, Baker, & Murphy (2006) A17 - Norris, Murphy, Baker, & Perilla (2004) A18 - Stepień, Hadryś, & Kantorska-Janiec (2005) A19 - Bakic & Ajdukovic (2021) A20 - Bandla, NR, & Gopalasamy (2019) A21 - Blanc et al. (2020) A22 - Bountress et al. (2020) A23 - Andrades, Garcia, & Kilmer (2021) A24 - Aurizki, Efendi, and Indarwati (2020) A25 - Agyapong et al. (2020) A26 - Felix et al. (2019) A27 - Fitzpatrick (2021) A28 - Fu et al. (2021) A69 – Gissurardottir et al. (2019)	● 144 (2.05%) children were classified as PTSD-positive. Prevalence of PTSD was highest among children from flash flood areas (4.52%) and lowest among children from soaked flood areas (0.59%) ● A total of 2336 (9.2%) subjects were diagnosed as probable PTSD-positive individuals among a total of 25,478 study subjects. Seven independent predictive factors (age, gender, education, type of flood, severity of flood, flood experience, and the mental status before flood) were identified as key variables ● A total of 4,327 children and the parents of 3,292 families were included for analysis; 203 (4.7%) of 4,327 children and 740 (11.2%) of 6,584 parents were diagnosed with PTSD ● Participants reported experiencing an average of almost seven PTSD symptoms ● 94 students (17.7%) could have been fully diagnosed for PTSD related directly to the flood ● Out of a total of 25,478 subjects interviewed, 2336 (9.7%) were diagnosed as having PTSD. PTSD was significantly associated with total social support, subjective support, and support utilization ● 2875 (8.6%) had symptoms that met the diagnostic criteria for PTSD ● 24% of study participants met all 6 DSM-IV criteria for current disaster-specific PTSD; an additional 41% met 4–5 criteria. The strongest correlations were between age and education, severity of exposure and post disaster PTSD symptoms, and post disaster PTSD and past-week depressed affect ● 24% of study participants met DSM-IV criteria for disaster-specific PTSD at 6 months post-event ● PTSD was diagnosed in 30.9% of those interviewed. Individuals displaying PTSD symptoms were mainly unemployed, with low educational level, and older. Men were more often affected (39.5%) than women (25.4%) associated with their low level of education and poverty. In 15.5% of those interviewed fully developed PTSD was still present 60–63 months after the flood ● Rates of probable PTSD in flooded community were higher than an unaffected community with 32% of the community at risk for PTSD ● 26.9% of a flood affected sample had symptoms of PTSD with more of these PTSD affected individuals being elderly, Christian, exposed to higher water level, relocated due to flood, or perceived they were affected by PTSD ● Haitian earthquake survivor children experienced very high rates of PTSD, with 34.9% in children aged 10–13 years and 39.1% for ages 14–17 years ● Disaster exposure is associated with both parental distress and adolescent PTSD symptoms, parental distress additionally shown to impact adolescent PTSD symptoms ● Disruptive experiences and losses after the disaster were significantly associated with both posttraumatic stress symptoms (PTSS) and post traumatic growth 2 years after earthquake and tsunami disasters ● Elderly people more likely to suffer from PTSD especially if also dealing with chronic illness ● 10.2% PTSD prevalence after wildfire jumping from 0% before wildfire ● PTSS more prevalent with increased exposure to flood at similar levels for both parents and youth

	A70 – Gonzalez et al. (2019) A75 – Inoue et al. (2019) A82 – Kim, Kim, & Lim (2021) A83 – Kim & Lee (2021) A91 – Li et al. (2021) A104 – Powell, Wegmann, & Backode (2021) A40 - Caldera, Palma, Penayo, & Kullgren (2001) A96 – Matthews et al. (2020) A107 – Raker et al. (2019) A17 - Norris, Murphy, Baker, & Perilla (2004) A59 - North, Kawasaki, Spitznagel, & Hong (2004)	● PTSS higher for younger, nonwhite hurricane survivors than older, white survivors ● In earthquake survivors about 15.48% of men had diagnosed PTSS whereas the corresponding prevalence among women was 26.97% ● PTSD severity decreases with decreasing exposure ● Lower PTSD occurrence in first responders than victims of hurricane ● PTSD less likely in those who had adverse childhood experiences than those without ● Decreased sleep duration after a disaster was associated with risk of PTSD ● 23% of participants showed poor sleep quality, and poor sleep quality was related to PTSD, low social support, and anxiety ● Higher quality neighborhood greenspace was associated with lower likelihood of PTSD ● PTSS related to internalizing, externalizing, rumination, and avoidant coping strategies ● 39% reported a close relative to be dead or seriously injured and 72% had their house partly or completely destroyed. Prevalence of PTSD ranged from 9.0% in the worst afflicted area to 4.5% in a less damaged area. 8.5% reported that they had thought of taking their lives. One year after hurricane, half of those identified as PTSD cases at 6 months still fulfilled the criteria for a PTSD diagnosis ● One in five respondents still distressed 6 months after the flood, one in seven had probable PTSD, higher prevalence in Aboriginal participants ● 12 years after a hurricane, PTSS declined but symptoms remained in 16.7% of participants, psychological distress also persisted after 12 years ● The PTSD rate and other potentially traumatic events of people who lived in Tezuitlan were higher than those in the other city. The frequencies of major depressive disorder (MDD) relatively declined from 6 months to 2 years after flood, from 9.1% to 5.9% ● Fewer than one third of those diagnosed with PTSD at index or follow-up had fully recovered from it. The recovery rate for major depression was 62%
Financial/ Income	A29 - Lamond, & Proverbs. (2015) A100 – Mulchandani et al. (2019)	● Household income, depth of flooding; having to move out during reinstatement and mitigating actions are related to the prevalence of psychosocial symptoms in previously flooded households. ● Those who experienced flooding but did not have insurance on their home were more likely to experience depression, anxiety, and PTSD
Anxiety	A30 - Hetherington, Mcdonald, Wu, & Tough (2018) A31 - Galea, et al. (2007) A20 - Bandla, NR, & Gopalasamy (2019) A25 - Agyapong et al. (2020)	● Elevated anxiety before the flood was associated with 2.49 increased odds of experiencing high levels of post-traumatic stress, regardless of whether respondents lived in a flood-risk community or not ● Pre-hurricane residents of the New Orleans metropolitan area were estimated to have a 49.1% 30-day prevalence of any DSM-IV anxiety-mood disorder ● 27.4% of a flood affected sample had diagnosable anxiety with more of these individuals being elderly and exposed to higher water level. Christians, Hindus, and divorced people experienced higher anxiety than other groups

	A108 – Reifels et al. (2019) A109 – Rodney et al. (2021) A33 - Sahni, et al. (2016)	● 15.7% generalized anxiety disorder after wildfire compared with lifetime prevalence of 5% for Canadians ● Multiple natural disaster exposure associated with increased risk of panic disorder ● 55% of those who experienced bushfires or bushfire smoke reported symptoms of anxiety or feeling depressed, 45.3% and 21.4% respectively ● Mental health impacts in High River residents were observed among women through an increase in new prescriptions for anti-anxiety medication and sleep aids respectively
General psychological distress	A5 - James, Welton-Mitchell, Noel, & James (2019) A32 - Paranjothy, et al. (2011) A34 - Yadav, et al. (2019) A35 - Mason, Andrews, & Upton (2010) A36 - Abramson, & Garfield (2006) A37 - Kessler, Galea, Jones, & Parker (2006) A38 - Assanangkornchai, Tangboonngam, Sam-angsri, & Edwards (2007) A39 - Hutton (2004) A41 - Heo, et al. (2008) A42 - Turner, Alderman, & Tong (2012) A43 - Taukeni, Chitiyo, Chitiyo, Asino, & Shipena (2016) A44 - Apel & Coenen (2021) A45 - Baryshnikova & Pham (2019)	● Disaster exposure was positively correlated with mental health measures (depression, PTSD, anxiety, and functional impairment) ● The prevalence of all mental health symptoms was higher among individuals affected by flood water in the home. People who perceived negative impact on finances were more likely to report psychological distress, probable anxiety, probable depression, and probable PTSD ● 68% experienced agitation, anxiety, depression, or nightmares since the flooding ● The prevalence rates of anxiety, PTSD, and depression were 24.5%, 27.9%, and 35.1%, respectively ● One hundred thirty-seven (68%) of 202 of the female caregivers who responded to the survey indicated having a mental health disability due to symptoms of depression, anxiety, or other psychiatric disorders. Since Hurricane Katrina, caregivers reported that 106 (44%) of 242 children had symptoms of new mental health problems ● Respondents to a post-Katrina survey had a significantly higher estimated prevalence of serious mental illness than respondents to the earlier survey and mild-moderate mental illness. The prevalence of suicidal ideation and plans was significantly lower in the post-Katrina survey ● 40% prevalence mental health problems at Time 1, with decreasing trend over time and increase at flood's anniversary in rural and lower SES sites. Prevalence associated with severity of loss and negative coping styles ● Indicative of psychological distress were the sociodemographic variables of household income, gender, age and education. Respondents who found the flood more stressful, and who perceived themselves to be worse off than others, also exhibited higher levels of distress ● The largest reductions in health-related quality of life were noted in physical and social functioning. 53% of the subjects were over mildly depressed, and 17% had severe depression. In addition, 22% had PTSD ● Worse overall health since floods, increased psychological distress, problems with sleeping, and probable post-traumatic stress disorder ● 55.2% of learners aged 12 and below and 72.8% of learners aged 13 and above reported experiencing symptoms of trauma from the floods 2 years after the event. ● Over 12–24 months, a total of 50.6–20.5% of participants showed a positive screening for depression or anxiety disorder but reducing over time

	A46 - Bozick (2021) A47 - Brown et al. (2019) A48 - Belleville et al. (2021) A49 - Bundo et al. (2021) A50 - Cenat, McIntee, & Blais-Rochette (2020) A51 - Cherry et al. (2021) A52 - Cowlishaw et al. (2021) A53 - Di Nicola et al. (2020) A54 - Elkins et al. (2022) A55 - Fatema et al. (2021) A57 - French et al. (2019) A71 – Graham et al. (2019) A72 – Hayes et al. (2019) A74 – Hraboket al. (2020) A76 – Isaac et al. (2021) A77 – Itoh et al. (2022) A79 – Jang et al. (2021) A80 – Karaye et al. (2020) A81 – Kawakami et al. (2020) A84 – Kino et al. (2020) A85 – Kino et al. (2021) A86 – Labarda et al. (2020)	• A natural disaster, damaging to an individual's owned home, in the previous 12 months is associated with a 0.37 drop in mental health score on a mental health component instrument • A community health survey before and after a hurricane showed an increase of 1.31 days a month of poor mental health for people who experienced flood effects • In comparison of schoolchildren who experienced a devastating forest fire to those who did not, the target group showed higher depression scores, suicidal thinking, and tobacco use, lower self esteem and quality of life, and higher anxiety scores • Increased prevalence of PTSD, MDD, and generalized anxiety disorder for evacuees after wildfire • Risk of hospitalizations due to mental disorders increased linearly by 4.0% for every 10˚C increase in daily mean temperature • The proportion of survivors and rescue workers of the 2010 Haiti Earthquake who experienced severe symptoms of PTSD and depression was more than 25%, while more than 20% experienced severe anxiety symptoms • PTSD and depressive symptom severity was higher for those with flooded homes and properties compared to the nonflooded groups • 10.4% of residents from communities characterized by high bushfire affectedness scored above the provisional criterion for significant anger problems compared to 3.5% in regions exposed to low or medium levels of bushfire impact. • Higher susceptibility to weather and climatic changes in bipolar disorder patients compared to healthy controls • 32% percent of hurricane surviving parents endorsed PTSD symptoms at or beyond the clinical cutoff, 31% of participants met the threshold of significant depression symptoms, and 35% met the threshold of significant anxiety symptoms • Women more vulnerable to negative psychological or mental health outcomes after disasters compared with men • Higher odds of probable depression, anxiety, and PTSD among flooded participants compared with those unaffected • Damage to a person's home or property increased the risk of a common mental disorder • Climate change related to PTSD, anxiety, depression, grief, suicidal ideation, stress, substance use, aggression, and violence • Children and youth uniquely susceptible to mental health effects • Sleep disturbances more common after wildfires especially with cumulative trauma like pre-existing or new PTSD • Insomnia prevalence increased from 11.7% to 21.2% after the disaster (4 months) • PTSD and depression prevalence increased for children especially, factors that increased chances of PTSD were losing their home or being displaced • Older people, higher education, and higher perception of risk had higher mental health scores • Among disaster survivors in temporary housing for 3 years or longer, 3.3% experienced new mental health disorders in the first year

	A91 – Liu et al. (2021) A92 – Mahmud et al. (2021) A94 – Mattei et al. (2022) A95 – Matthews et al. (2019) A97 – McCann-Pineo, Taioli, & Shwartz (2021) A98 – Middleton et al. (2021) A99 – Monsour et al. (2022) A101 – Mulchandani et al. (2020) A103 – Pazderka et al. (2021) A105 – Qi et al. (2020) A110 – Shao et al. (2020) A111 – Shih et al. (2021) A112 – Sonpaveerawong, Limmun, & Chuwichan (2019) A114 – Thomas et al. (2021) A115 – To, Eboreime, & Agyapong A116 – Walling et al. (2020) A118 – Yoo et al. (2021) A119 – Zhou & Wu (2019)	• Approximately 40% of survivors experienced PTSS or depression symptoms more than 5 years after the earthquake and tsunami • 29% prevalence of depressive 5.5 years after disaster, 11.1% prevalence of PTSS 2.5 years after disaster • PTSD, depression, and anxiety prevalence of 12.7%, 28.9%, and 46% respectively for those displaced by the typhoon • Association between high temperatures, and mental health. For each 1 degree increase in temperature, mental health related mortality and morbidity increased with a relative risk of 1.022 • Most extreme PTSD, anxiety, and depression cases found in closest proximity to river • Prevalence after hurricane for alcohol use was 47.9% compared with before 26.1%, binge drinking was 17.9% compared with 12.1%, depression and depression symptoms were actually lower post disaster • 16% of flood victims reported being distressed about the flood, 16% had probable anxiety, 15% had probable PTSD, 15% had probable depression, and 7% were suicidal. 20% reported 2 or more of the previous mental health issues • 8% of participants exposed to hurricane were high risk for opiod abuse, 16.0% moderate risk, and 75.8% low risk. Opioid abuse likelihood increased with the number of hurricane exposures • Significant association between warm temps over -5 and an increase in the rate of daily mental health related clinic visits • Higher risk of PTSD, MDD, and anxiety from high intensity tropical cyclones compared with lower intensities • 5.7% prevalence depression, 8.1% anxiety, and 11.8% PTSD • Comparing previous trauma to wildfire trauma, previously traumatized adolescents were more likely to have higher rates of depression and PTSD, but comparable levels of anxiety and suicide risk • 46.3% of adolescents reported PTSD and 64.5% reported depression after an earthquake • Higher temperatures are associated with increased psychiatric conditions with a higher effect for first time patients compared to recurring patients • Compared to non-elderly, elderly people had a higher proportion of insomnia, anxiety, depressive disorders, PTSD, episodic mood disorders, and adjustment reaction • Prevalence rate of probable PTSD was 44.48%, probable depression was 31.29%, psychological distress was 29.45%, alcohol abuse was 17.18%, and suicide risk was 4.60% • 66.7% of flood victims showed symptoms of psychiatric problems • Increased rate of PTSD, depression, and GAD after wildfire • Survivors of hurricane Katrina who were relocated had more PTSD and depression symptoms than controls and worse cognitive processing, mental flexibility, and sustained attention • Short term exposure to extreme heat associated with increased ER visits for mental disorders including substance use, mood disorder, anxiety, schizophrenia, and dementia • 41% of earthquake affected adolescents were identified as probable PTSD cases after 1 year and 40% after 2 years. For depression the prevalence was 64.4% and 66.4%

Major depressive disorder	A58 - Norris, Baker, Murphy, & Kaniasty (2005) A17 - Norris, Murphy, Baker, & Perilla (2004) A59 - North, Kawasaki, Spitznagel, & Hong (2004) A19 - Bakic & Ajdukovic (2021) A20 - Bandla, NR, & Gopalasamy (2019) A25 - Agyapong et al. (2020) A60 - Chen, Lin, & Guo (2019) A28 - Fu et al. (2021) A73 – Hikichi et al. (2021) A93 - Mamun et al. (2019) A106 – Prencipe et al. (2021) A109 – Rodney et al. (2021)	● There was minimal mobilization of help from family and friends (received support) and substantial deterioration of perceived support and social embeddedness ● The PTSD rate and other potentially traumatic events of people who lived in Tezuitlan were higher than those in the other city. The frequencies of major depressive disorder (MDD) relatively declined from 6 months to 2 years after flood, from 9.1% to 5.9% ● Fewer than one third of those diagnosed with PTSD at index or follow-up had fully recovered from it. The recovery rate for major depression was 62% ● Rates of probable depression in flooded community were higher than an unaffected community with 36% of the community at risk for depression ● 45.29% of a flood affected sample were found to have depression in some form: 10.8% mild, 12.6% moderate, and 22% severe. Lower socioeconomic status, relocation from flood, and higher exposure to floods were indicative of depression ● 18.3% prevalence of MDD after wildfire compared with provincial lifetime prevalence of 9.7% ● Exposure to high temperatures for a long period of time is associated with MDD, median yearly temperature of 20–23 °C has the lowest risk while temperatures greater than 23 °C had higher incidence of MDD ● In earthquake survivors, 20.6% of men had major depression, whereas the corresponding prevalence among women was 29.11% ● People relocated after a earthquake and tsunami had higher probability of depressive symptoms ● Approximately 65% of participants experienced depressive symptoms, more common in younger women, women with no children, those who were injured in the disaster, and those who had to miss work due to the disaster ● Depressive symptoms increased in adolescents in the presence of economic shocks, droughts, and floods ● 55% of those who experienced bushfires or bushfire smoke reported symptoms of anxiety or feeling depressed, 45.3% and 21.4% respectively
Psychosis	A61 - Selten, Van Der Graaf, Van Duursen, Gispen-de Wied, & Kahn (1999) A117 – Wei et al. (2020)	● The relative risk of non-affective psychosis for those exposed during gestation was 1.8 ● There is an association with flooding and the admission to hospitals for schizophrenia patients with a lag time of approximately 10 days
Violence	A88 – Lai et al. (2020) A113 – Subedi, Davidson, & Bartels (2020)	● Around 50% of females and 41.68% of males experienced violence in the aftermath of an earthquake compared to 7% pre-disaster for parents that didn't use alcohol and 39% for those who did use alcohol ● Death of a household member due to an earthquake was associated with a child being victim to emotional and severe physical abuse, injury of a household member was associated with lower likelihood of emotional abuse

Suicidal ideation and suicide	A62 - Warheit, Zimmerman, Khoury, Vega, & Gil (1996) A63 - Larrance, Anastario, & Lawry (2007) A64 - Anastario, Larrance, & Lawry (2008) A65 - He (1998) A66 - Kessler, et al. (2008) A67 - Dumont et al. (2020) A68 - Fitzpatrick & Spialek (2020) A78 – Jahangiri et al. (2020) A89 – Lee et al. (2019) A120 – Zuromski et al. (2019)	● Pre-hurricane suicidal ideation and post-hurricane depression were the strongest predictors of post-hurricane suicidal ideation scores ● Fifty percent of respondents met criteria for major depression. Suicide completion rates after displacement were more than 14 times the baseline rates, and attempt rates were more than 78 times baseline ● Among women with sleep dysregulation, the odds of violence were 2.5 times higher in comparison with women without sleep dysregulation. Appetite dysregulation increased the odds by 3.8, low self-esteem increased the odds by 2.3, and suicidal ideation increased the odds by 2.7 ● Suicide rate in the different regions of Yangtze Basin (region with periodic flooding) was up to 173% higher than that of China overall ● Prevalence increased significantly for suicidal ideation (from 2.8% to 6.4%) and suicide plans (from 1.0% to 2.5%) ● Population-wide increased risk of suicide of up to 3% 2 to 3 days after episodes of significantly worsened air quality, association between temperatures above 37°C and suicide ● Suicide ideation among hurricane Harvey survivors was 2.5 times higher than typically reported in the general population ● Prevalence of suicidal ideation of 20.34% at 4 to 96 months after the earthquake, heavily influenced by PTSD and decreasing gradually over time ● Asian dust storms associated with a 13.1% increase in suicides on the day of the storm ● Tornado survivors reported a 5% prevalence of suicidal ideation, adolescents with previous exposure to interpersonal violence were more vulnerable to suicidal ideation

2.2.3 Thematic analysis and study findings

In the following section, the scoped papers are analyzed by frequency of condition and association with disaster. Of note, most papers in the sample included conditions that were diagnosed by medical professionals (psychiatrists, psychologists, general practitioners, nurse practitioners), however, self-report of recurrence of mental health condition was also included in some papers given the difficulty post-disaster to find a diagnostician.

Maternal Stress

Nine papers from the sample described effects on maternal stress including long-term effects, increase in low birth weight, and consequential health effects in mothers and infants. Maternal stress as a result of disasters can cause problems with health and mental health of children even long after birth (A4). Flood disasters are associated with a decrease in birth rate (-.9/1000 people), an increase in low birth weight (.5% increase), an increase in preterm births (.7% increase), 2% increase of prenatal care in first trimester, 2% increase in medical risk, .4% increase in anemia, .1% increase in lung disease, 1.8% increase in eclampsia, .1% increase in uterine bleeding, and a .4% decrease in alcohol use (A2).

PTSD

Thirty-five papers in the sample discussed PTSD. Disaster exposure has been thoroughly associated with PTSD but what the research base is beginning to uncover are the various factors and interactions that affect PTSD in people who experience natural disasters (A5). Prevalence numbers for disaster related PTSD vary among studies but remain above base level for the same or similar areas when compared: 14.4%, 15.4% chronic PTSD after disaster, and flood (A6, A7), 29.2% PTSD prevalence after hurricane, 9.2%, 9.7%, 8.6%, 30.9%, 26.9% after flood, 10.2% after wildfire (A8, A10, A14, A15, A18, A20), 2.05%, 4.7%, 17.7%, of children (A9, A11, A13),

11.2% of parents with PTSD (A11), 34.9% prevalence in children aged 10–13 years and 39.1% for ages 14–17 years (A21), 60% of elderly disaster victims (A24), 15.48% of men had diagnosed PTSS, for women was 26.97% (A28).

Higher rates of PTSD are associated with higher disaster stressors, higher neuroticism, lower social support, higher rate of re-experiencing, higher avoidance and numbing, hyperarousal, flash flood exposure as opposed to soaking floods (A6, A7, A9, A11, A14, A20). PTSD also is more likely in children whose parents experience PTSD, children whose parents experience distress and engage in poorer conflict communication, unemployed people, lower education people, poor people, women, minorities, people with chronic illness, elderly people, working elderly people and people who accessed primary healthcare in the aftermath of the disaster (A11, A15, A18, A19, A22, A24, A27, A28). Comorbidities are also common after a disaster with post disaster PTSD associated with physical and psychological aggression victimization, and physical health symptoms (A12, A16).

Depression

Twelve papers in the sample discussed depression or major depressive disorder (MDD). Disaster is associated with depression with only slightly less representation in the literature (A5). Major Depressive Disorder was prevalent in 18.3% of wildfire survivors, and 14.8% and 20% of flood survivors (A25, A61, A62). Depression was prevalent at a rate of 35.9%, and 45.29% after floods (A63, A64). Depression was associated with disaster victims who were women lower social support, higher exposure to floods, lower socioeconomic status, low service access, low or delayed help, a history of substance abuse, family problems, and material loss (A60, A64, A67). Incremental climate changes like increased heat also influence depression with increased rates of MDD over extended periods of high heat (66).

Anxiety

Seven papers in the sample discussed anxiety or general anxiety disorder (GAD). Anxiety is another mental health issue that can come about as a result of disaster exposure (A5). 31.2% of hurricane survivors were diagnosed with DSM-IV anxiety mood disorder, and flood survivors had a prevalence of anxiety of 27.4% (A31, A32). In a group of wildfire survivors, anxiety prevalence increased from 8.6% to 15.7% (A25). Anxiety is more common is younger people, as well as elderly people according to one article, women, people with lower education levels, lower family income, people who are unemployed or disabled, unmarried people, those who experience a disruption in services, evacuees, those who experience more severe flood effects, and those who experience material loss due to disaster (A31, A32).

Financial/Income

Four papers focused on the impacts of financial or income loss after disasters. Household income, depth of flooding, having to move out for repairs and cleanup, and mitigating actions are related to the prevalence of psychosocial symptoms in previously flooded households (A29). Financial loss emerged as an important driver for additional stress after a disaster, of those who experience financial loss 34.7% experienced psychological distress, 41.8% experienced stress, and 37.3% experienced extreme stress (A41). After a natural disaster, damaging to an individual's owned home in the previous 12 months a 0.37 drop in mental health score on a mental health component instrument was recorded (A47). An increase of 1.31 days a month of poor mental health for people who experienced flood effects was recorded after a hurricane(A48).

Suicide and Suicidal Ideation

Ten papers discussed suicide and suicidal ideation after a disaster. Suicidal Ideation is related to post disaster depression and stress symptoms as well as pre-hurricane suicidal ideation (A69). In people who were displaced by a hurricane, there was a 20% prevalence of suicidal ideation, and a 3% prevalence of suicide attempts (A70). Suicide rate in the different regions of Yangtze Basin (region with periodic flooding) was up to 173% higher than that of China overall (A72). After a disaster there was in increase in suicidal ideation prevalence from 2.8% to 6.4%, and in suicide plans from 1% to 2.5% (A73). There was a population-wide increased risk of suicide of up to 3% two to three days after episodes of significantly worsened air quality, association between temperatures above 37°C and suicide. Hurricane survivors also exhibited 2.5 times increase of the average suicidal ideation prevalence with links to food insecurity, younger ages, women, and lower social membership and community support (A75).

Sleep Issues

Eight papers discussed sleep disturbances as an effect of disaster. A side effect of stress, PTSD, and anxiety after floods and disasters which shows up in this review is sleep problems like insomnia, sleep dysregulation, nightmares (A34), and other sleep issues (A42). Women with sleep dysregulation after a hurricane were more likely to experience violence (2.5 times odds) (A64). Insomnia is more likely in elderly people after a disaster (A111), and with the diagnosis of PTSD, low social support, and anxiety (A82, A83). After one flood, sleep aids were more heavily prescribed to women (A33). In one article, insomnia prevalence increased from 11.7% to 21.2% after a disaster (A77).

General Psychological Distress

53 articles covered multiple, various, or general psychological distress categories that arose after disasters or climate changes. These categories represent a multitude of mental health

issues beyond those addressed above, the stress of experiencing a disaster can cause new or trigger old mental health conditions like insomnia, substance use, or stress disorders (A44, A50). Psychological distress was 69% for people who had flood water in their home compared with just 14% of those who were disrupted by the flood but not flooded (A34). Similarly, after a flood, 68% of households had one person who experienced agitation, anxiety, depression, or nightmares (A36). Women, unemployed people, people with a prior medical condition, those who experience service disruption, and evacuees are more likely to have psychological distress (A34, A57). In one study there was 2.32 times increase in sleep aids prescribed to women, and 3 times increase in sexual assault (A35). After a hurricane one hundred thirty-seven (68%) of 202 of the female caregivers indicated having a mental health disability due to symptoms of depression, anxiety, or other psychiatric disorders, and that 106 (44%) of 242 children had symptoms of new mental health problems (A38). Serious mental illness after a hurricane had a prevalence of 11.3% compared with 6.1% before, mild or moderate mental illness 19.9% vs. 9.7%, any mental illness 31.2% vs. 15.7%, mental illness was more common in white people, unmarried people, and unemployed or disabled people (A39). Flood mental health problems arose at 40% prevalence in one study, reducing over time but increasing at floods anniversary for lower socioeconomic status flood victims, prevalence was associated with severity of loss from flood (A40). After a wildfire 10.4% of residents from communities characterized by high affectedness exhibited significant anger problems compared to 3.5% in regions exposed to low or medium levels of impact (A54).

Incremental climate changes such as increased heat, increase risk of hospitalizations due to mental disorders like schizophrenia, mental and behavioural disorders due to psychoactive substance use, and mood disorders by 4.0% for every 10˚C increase in daily mean temperature

(A51). Even weather fluctuations can have an effect on people with existing mental illnesses with a higher susceptibility to weather and climatic changes in bipolar disorder patients compared to healthy controls (A55).

2.3 Results Part 2: Secondary Scope

2.3.1 Effects specific to on reserve populations in Canada and solutions proposed: Scoping Review

Given the broad reporting of mental health effects of disasters in the primary scoping review, community leaders and the community research coordinators directed the Master's student to look specifically at what occurs on reserve, and which policies, treatments, and social supports were available for on-reserve populations. Hence, the Master's student undertook a second scoping review using the same methodology as above, but with different key terms (Table-3 below).

As with the above review, articles were gathered using a scoping review protocol because of this method's flexibility. The reporting of this scoping review in conjunction with the qualitative data methods will stem from an understanding of the worldviews and perspectives from the participants in the case study portion of the overarching research (Chambers et al., 2018). This scoping review also employed the methodological framework put forward by Arksey and O'Malley (2005) and Levac, Colquhoun, and O'Brien (2010). Although presented in steps (as previously), the process was not linear as some steps were repeated to ensure a comprehensive assessment of the study. Next, we describe the search strategies beginning with search engines, terms, and inclusion criteria.

We focused our efforts on eight key search engines which combined key western science databases with Indigenous repositories: Scopus, Psych Info, Informit Indigenous Collection,

iPortal, Medline, PubMed, Web of Science, and Google Scholar. The search criteria included three broad areas of Indigenous groups, Mental Health, and Canadian location (and synonyms of these terms) as displayed in Table-2.3

Table-2.3 Scoping review #2 search terms

Concept A: Indigenous representation	Concept B: Mental Health	Concept C: Canada	
Indigenous	Mental Health	Canada	Nunavut
First Nations	Social Health	Saskatchewan	New Brunswick
Métis	Mental well-being	Alberta	Quebec
Inuit		Manitoba	Ontario
Native		B.C.	PEI
Aboriginal		Northwest Territories	Nova Scotia
Islander		Yukon	Newfoundland and Labrador

2.3.2 Results of scope

Approximately 1286 articles were scoped from eight databases and sources (Figure-2 PRISMA 2). The final sample included 102 papers that satisfied these inclusion criteria but was further narrowed to 18 on full-text screening because we only included those articles that evaluated or proposed a real intervention for Indigenous mental health:

1. Published after 1996 in English in a peer-reviewed journal
2. Was relevant to mental healthcare in Indigenous communities in Canada
3. Spoke directly to mental health treatment and recovery efforts within the Indigenous community in a tangible way

To summarize the particulars of the reviewed studies, first the general characteristics of the studies will be listed, followed by the methodologies and finally the specific content of the

studies, the themes, and gaps in the research examining mental health treatment and recovery in Indigenous communities.

2.3.3 Descriptive characteristics

Articles were published in 18 unique academic journals. All articles were published after the year 2011. The articles are separated into their intervention type in Table 2 below.

Reported methods and data collection

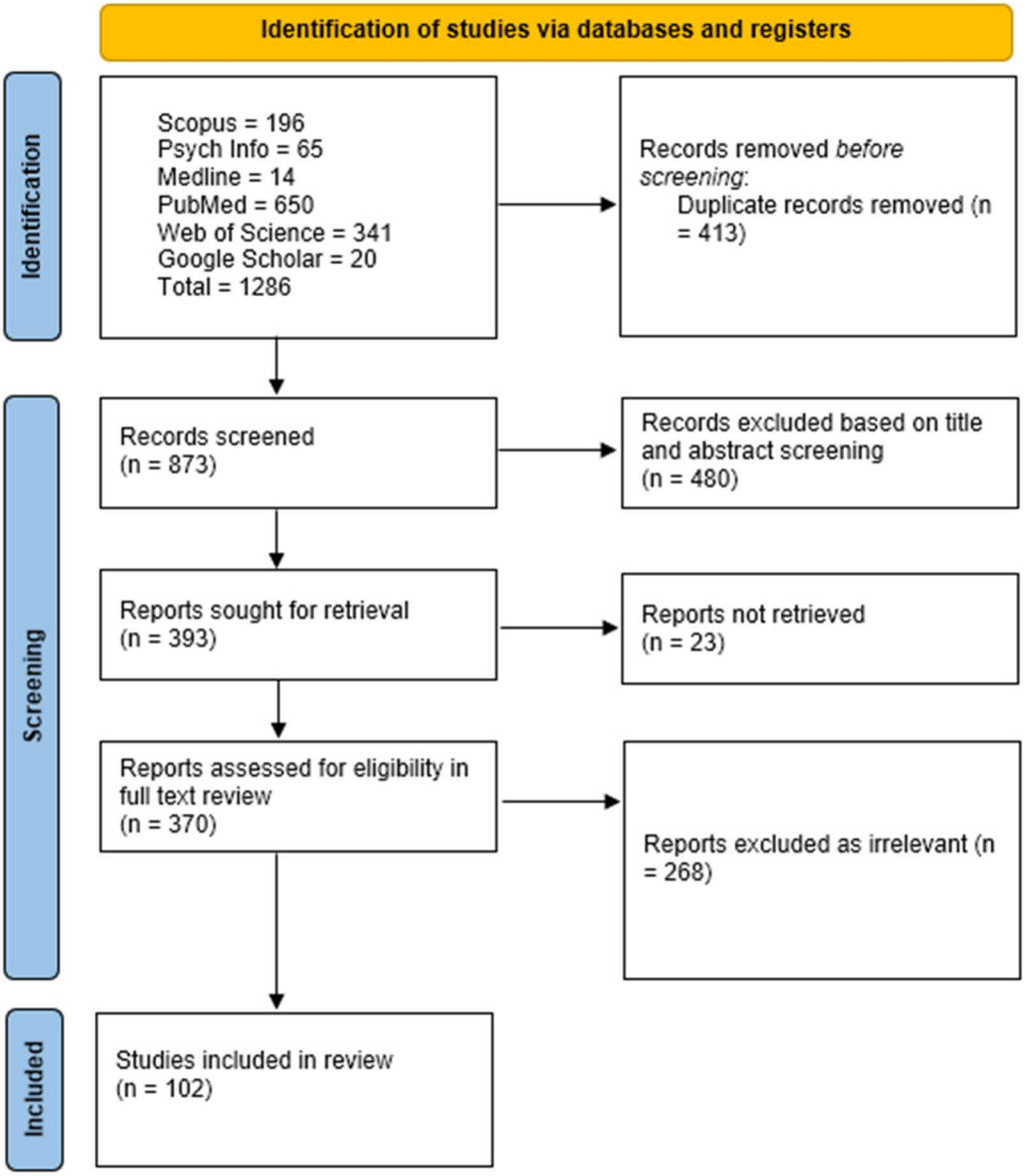
Out of the 18 articles chosen for their interventions, five studies used surveys or interviews (B1, B2, B6, B7, B12), 3 used a Two-Eyed Seeing approach (B1, B2, B5), five studies were explanations of the intervention methods (B3, B4, B15, B16, B18). Seven studies used qualitative methods (B6, B8, B9, B10, B11, B13, and B17). One study was a review (B14).

2.3.4 Methodological strengths and limitations of the sample

The strengths of this sample stem from the vast amount of work on Indigenous Mental Health at a base level but is weakened by the depth of this work. Most of the 102 articles that met the search criteria after irrelevant studies were excluded do not examine or suggest intervention methods for mental health in Indigenous communities in Canada. Four (4) main categories of article arose. 1) Those that evaluated a specific implemented intervention method or healthcare system 2) those that evaluated data and proposed a specific intervention to target the issues indicated by the data and 3) those that evaluated data and made suggestions for potential interventions or strategies to target the issues indicated by the data, usually reserved for the discussion section, and 4) those that evaluated data but did not suggestion potential strategies to mitigate issues examined. Within each category, patterns begin to emerge which illuminate the state of healthcare for Indigenous people in Canada; type of intervention, target issues, program

sources, and discipline. However, only eighteen (18) articles examined or suggested mental health interventions that are fully conceived, currently implemented, or were implemented at the time of publishing. For the sake of comparison with the target communities of a connected case study, only these 18 articles were included for review.

The Sample inclusion process is summarized in Figure-2.2 below:



What results showed:

Table-2.4 Indigenous mental health interventions as reported in the literature.

Intervention type/Suggestion type	Citing Literature	Summary
Cultural	B1 & B2 - Auger et al. (2019), Crooks et al. (2019) B3 - Dobson & Brazzoni (2015) B4 & B5 - Etter et al. (2019), Hutt-MacLeod et al. (2019) B6 - Ninomiya et al. (2020) B7 - George et al. (2018) B8 - Gone (2013) B9 - Gone (2011)	● Cultural adaptation of Mental Health First Aid course: teaches mental health literacy, plan of action for mental health crisis, and creates community network of friends and family for mental health help. Adapts mental health first aid to be culturally safe and culturally relevant ● Adhering to a system of guiding principles that can be used by similar treatment programs across Canada to best meet the cultural needs of clients, Carrier First Nation's addiction recovery program marries addictions counselling, mental health therapy, and traditional exercises in a remote fishing camp on ancestral lands ● Access Open Minds, a youth mental health research network uses community mapping to determine what resources are most needed in terms of mental health care and trained "lay health workers" to meet these needs. These workers guide youth to appropriate services, teach mental health literacy, and organize youth activities ● The Mental Wellness Program aims to decolonize mental health similar to Access Open Minds strategy by giving Indigenous people the tools to take control over their mental health services ● Traditional healing practices are often used by a significant portion of First Nations people's and could be an important aspect of the healthcare needs of a community even without normally being recognized by western healthcare systems ● Traditionally informed mental health treatment focused on healing historical trauma and healing a person's relationship to their traditions and culture ● A community-controlled substance abuse program which incorporated cultural practices into its therapy and counselling activities. Made an adaptation from western medicine into the symbol of the medicine wheel to make spirituality a larger aspect of the program's recovery process
Land based	B10 - Walsh, Danto, & Sommerfeld (2020) B11 - Usuba et al. (2019)	● Project George is an all-season outdoor camp that reconnects youth to the land and Cree culture by teaching traditional bush skills. Produces a connection to a participant's culture that may have been missing before and allows at-risk youth to create relationships with their peers and elders

		● The Outdoor Adventure Leadership Experience (OALE) program involves a youth canoe trip in traditional territory with program staff and community guides to promote well-being and resilience. Shown to improve mental health on a short term time frame
Mobile/Online/Telehealth	B12 & B13 - Gibson, O'Donnell, Coulson, & Kakepetum-Schultz (2011), Gibson et al. (2011) B14 - Hobson, Caffery, Neuhaus, & Langbecker (2019)	● Telemental health can provide continuity of care, access to services for individuals in remote and rural communities, and can be made culturally safe if the service is community guided and incorporates First Nations beliefs ● Mobile health (SMS and App based services) can be used in fields like addictions help, sexual health promotion, mental health help, and suicide prevention. This intervention is not a replacement for other healthcare types but can be useful if culturally sensitive
Training initiative/Treatment adaptation	B15 - Nowrouzi, Manassis, Jones, Bobinski, & Mushquash (2015) B16 - Kirmayer et al. (2021) B17 - Cardona et al. (2021)	● Adapted cognitive behavioural therapy (CBT) targeting anxiety for First Nations youth, aiming for better treatment outcomes. Results showed that both therapists and patients had positive outcomes using the adapted training in a First Nations setting ● Training of cultural competence within the field of psychiatry to better serve Indigenous clients. Only one step of the systemic changes that are needed to make psychiatric care better for Indigenous people ● Growth and Empowerment Measure (GEM) which assesses and promotes wellbeing as an evaluation tool for empowerment interventions adapted to better serve Kenien'keha:ka or Mohawk people aiming for cultural safety and better treatments due to a more culturally relevant assessment process
Resource based	B18 - Toombs et al. (2020)	● Targets homelessness by providing housing, social and mental health support, and increasing wellbeing, employment, and school enrollment. Cultural adaptation of previous non-Indigenous program

2.3.5 Thematic analysis and study findings

Cultural

Two articles evaluated programs described as "culture as treatment" or "culture as prevention". Gone (2013: B8) summarizes some of the cultural treatments being undertaken by various groups and programs. The various practices used across Indigenous cultures or specific to distinct cultures and regions mainly target general mental health but often focus on the historical trauma that many Indigenous people face by healing peoples' relationships with their traditions and culture. Beyond just cultural healing, this approach is therapeutically beneficial for the mental health issues recognized in western psychology as PTSD (B8). Similar to the Carrier Sekani program (B3), a community-controlled substance abuse program incorporated cultural practices into its therapy and counselling activities. This program made an adaptation from western medicine into the symbol of the medicine wheel to make spirituality a larger aspect of the program's recovery process (B9).

One article discussed First Nations peoples use of traditional healing practices (THP) like traditional medicines, healers etc. and why people chose to use or not use these healing practices. This paper shows demographic correlations with THP use, but interestingly also shows that many people who do not use THP would like to use them, indicating that there are barriers of availability to using this form of healthcare (B7). Though this is not technically an implemented program, it does evaluate a system of healthcare beneficial to people's mental health that is active in Indigenous communities regardless of whether it is recognized by the western healthcare system.

Land Based

Three articles described and examined programs described as land-based interventions. Land based interventions are programs that aim to reconnect Indigenous people with their culture and traditions especially in the youth population, creating protective factors for mental health issues (B10). The first approach was developed for the Carrier First Nation's addiction recovery program, which marries addictions counselling, mental health therapy, and traditional exercises in a remote fishing camp on the ancestral lands of the Carrier First Nation (B3). This program is run by Carrier Sekani Family Services, a non-profit organization developed by multiple northern BC First Nations to meet the healthcare needs of their own communities. The program adheres to a system of guiding principles that can be used by similar treatment programs across Canada to best meet the cultural needs of clients. Another of these approaches is the Outdoor Adventure Leadership Experience (OALE) program which involves a youth canoe trip in traditional territory with program staff and community guides to promote well-being and resilience (B11). This program has been shown to improve youth mental health in the short term, which is valuable with the limited mental health resources available in Indigenous Communities. The third approach is Project George, an all-season outdoor camp that reconnects youth to the land and Cree culture by teaching traditional bush skills (B10). This program produces a connection to a participant's culture that may have been missing before and allows at-risk youth to create relationships with their peers and elders.

Mobile/Online/Telehealth

Three articles evaluated telemental health and mobile health, which involves mobile phone interactions and videoconferencing with patients in an attempt to provide more responsive healthcare in rural and remote First Nations (B12). One benefit of these interventions, according to the researchers, is that they can provide continuity of care, and access to services for

individuals in remote and rural communities. Health professionals find this intervention to be useful and easy to use as it can be made culturally safe if the service is community guided and incorporates First Nations beliefs (e.g. traditional medicine) (B13). As long as telemental health is implemented in a way that is sensitive to cultural needs and does not become a replacement for in person mental health services it can increase access to and community control over health care (B13). Mobile health refers to SMS(text message) or smartphone app based health interventions which can be used in fields like addictions help, sexual health promotion, mental health help, and suicide prevention. The statistical efficacy for this type of intervention is limited according to Hobson, Caffery, Neuhaus, and Langbecker (2019: B14) but clients do find these interventions useful given that interventions are culturally sensitive and not a replacement for other healthcare services.

Training initiative/Treatment adaptation

Two papers evaluated mental health first aid programs that were implemented in First Nations communities. Both papers covered the First Nations adapted version of the Mental Health First Aid course (MHFAFN) which adapts mental health first aid to be culturally safe and culturally relevant (B1). The course teaches people mental health literacy and a plan of action if someone comes to them for help: engage and evaluate the risk of suicide or harm, assist the person to seek professional help, give reassurance and information, listen without judgement, and encourage self-help strategies and gather community supports (B2). Participants generally find it effective to have an integration of Indigenous knowledge within the mental health first aid course, however some thought the Indigenous knowledge portions were an afterthought or secondary to the western approach. This reaction to the MHFAFN shows that cultural adaptation of any program needs to be approached in earnest and with community leadership. This type of

intervention is useful because it breaks down the stigma of mental health issues and suicide and opens new pathways for individuals to get help through their friends, family, and colleagues (B1). Once again, the mental health first aid intervention cannot be a replacement for a robust and accessible community healthcare network.

Three (3) articles evaluated programs or methods adapted from western medicine to fit better with Indigenous patients and communities. One adapted cognitive behavioural therapy (CBT) targeting anxiety for First Nations youth, aiming for better treatment outcomes. Results showed that both therapists and patients had comparably positive outcomes using the adapted training in a First Nations setting and tools to therapists and patients not in First Nations communities who received the non-adapted training and tools (B15). The second article discusses the training of cultural competence within the field of psychiatry. The authors argue for a cultural competency curriculum to train psychiatrists to better serve their Indigenous clients but that this curriculum is only part of the systemic changes that are needed to make psychiatric care better for Indigenous people (B16). The final article adapts the Growth and Empowerment Measure (GEM) which assesses and promotes wellbeing as an evaluation tool for empowerment interventions. The tool was adapted to better serve Kenien'keha:ka or Mohawk people aiming for cultural safety and ultimately better treatments due to a more culturally relevant assessment process (B17).

Three articles examined community based and community specific mental wellness programs. Organized by Access Open Minds, a youth mental health research network, the first approach used community mapping to determine what resources were most needed in terms of mental health care and trained "lay health workers" to meet these needs (B4). These workers guide youth to appropriate services, teach mental health literacy, and organize youth activities.

Another approach, also organized by Access Open Minds, created a community space for Eskasoni First Nation Youth. This program followed similar steps to the previous approach but customized to the unique community to spread mental health promotion and reduce mental health stigma (B5). The third approach gives guidelines of setting up a community mental health program to guide those undertaking the same kind of process as the Access Open Minds program. This program, named the Mental Wellness Program (MWP) aims to decolonize mental health care by giving Indigenous people the tools to take better control over their mental health services (B6).

Resource Based

The final article discussing an implemented program focused on the Housing Outreach Program Collaborative, a housing and peer and mental health support program for Indigenous youth. This program targets homelessness or precarious housing by providing housing as well as social and mental health support network for the participants, ultimately aiming to increase wellbeing, employment, school enrollment among other measure of social and mental health (B18). This approach situates itself as a cultural adaptation to an evidence based western program and succeeds in returning healthcare control to indigenous communities.

2.4 Discussion

Given the multi-pronged scoping review approach taken to answer the research questions for this project, the discussion will attempt to address each objective outlined in the opening section to 1) find the scope of current literature on environmental issues, climate change, extreme weather, disaster, and mental health issues in Indigenous communities in the Canadian Prairies; and 2) discover the academic community's currently implemented support for protection of mental health in Indigenous communities facing mental health vulnerabilities.

In Canada, where disaster recovery for remote communities is commonly limited to a short time period for physical and infrastructure recovery, there is a gap left in the recovery stages for mental health recovery (Fitzpatrick, 2021; Fulton, Drolet, Lalani, & Smith, 2020). Authors in the sample stressed the primary importance of long-term community-based supports for recovery from the physical, mental, social, and cultural health effects of disasters. With the wide range of mental health issues arising from disasters, extreme weather, and climate as shown in Table-2, the attribution issues with connecting mental health and climate change could be amended by assuming that the mental health effects of incremental changes are similar but to a lesser degree. This attributable but lesser degree of mental health effects is shown in the minor but measurable changes in mental health that come with minor climate change (Chen, Lin, & Guo, 2019; Dumont, Haase, Dolber, Lewis, & Coverdale, 2020). Authors suggest that the scope of the current literature misses important effects of incremental climate change, and of compounding mental health effects of repeated disasters.

Additionally, the sample indicated that issues with attribution may stem from a lack of mental health literacy among disaster service providers and could be amended by increasing mental health literacy through a wider campaign of culturally safe mental health resources and training as shown in (Crooks et al., 2018). To avoid any missed attributions in the future, authors suggested that disaster recovery should be extended past the point of the physical damage being repaired and all recovery initiatives should include long-term mental health provisions (Fitzpatrick, 2021). Destigmatizing of mental health issues comes with wider provision and more available mental health resources. One main area this could be achieved is in having more inclusive disaster recovery (i.e., ensuring mental health recovery as well as physical) and "building back better" which would include building social, community, and mental health

resources within communities after disasters, rather than bringing them in from afar on a per-disaster basis (Fulton et al., 2020). The latter strategy allows colonialism to persist in disaster-related recovery efforts, and in climate change policy and management by not centering Indigenous voice, values, and conceptions of the determinants of health in planning.

The thematic analysis from both samples also indicated that social inequities cannot be solved by disaster recovery planning alone but improving a community's ability to recover could reduce some of the further inequities that Indigenous communities face in a changing climate. Incorporating culture into mental health recovery is shown to be extremely important to Indigenous People's mental health recovery given the programs summarized in the second scoping review (Dobson & Brazzoni, 2016; Gone, 2013; Usuba et al., 2019). Cultural safety, one approach for addressing racism in the healthcare system, involves understanding historical trauma and systemic racism and the impact they have on Indigenous health outcomes (Urbanoski et al., 2020). This approach is described in the sample as a potential strategy for reducing stigma, discrimination and marginalization surrounding health access for Indigenous people. Unfortunately, current mental health resources are extremely limited and, in some cases, not even sufficient for the non-disaster mental health crises occurring in Indigenous communities (Gibson, O'Donnell, Coulson, & Kakepetum-Schultz, 2011; Hutt-MacLeod et al., 2019).

The scoping review of mental health effects revealed PTSD as the most common mental health issue arising from climate, weather, and disaster, as expected with a traumatic event, but it is also common for these events to exacerbate existing mental health issues (Hayes et al., 2018). PTSD prevalence as shown in the scoping review is both the most reported and most common serious mental health effect of disasters. This becomes additionally concerning given the uniquely Indigenous experience of historical and intergenerational trauma. Historical or

intergenerational trauma is “a collective complex trauma inflicted on a group of people who share a specific group identity or affiliation .... It is the legacy of numerous traumatic events a community experiences over generations and encompasses the psychological and social responses to such events” (Evans-Campbell, 2008 as cited in Gone, 2013, p. 687). Historical trauma often presents similarly to PTSD if measured in a western clinical setting and is at risk to be exacerbated by further traumatic experiences (Gone, 2013). Intergenerational trauma is best treated using a holistic cultural approach, using locally relevant indigenous cultural practices and applying them in a treatment setting to reduce historical trauma and related symptoms of PTSD, depression, addiction and more, healing the relationship between a person and their culture and traditions that has been previously injured due to colonial practices (Gone, 2013)

Settler colonial policy continues to affect Indigenous Peoples inequities in recovery because the solutions to inequities are implemented as incremental changes in existing systems instead of giving reserve communities an opportunity to take control of their own systems of governance, recovery, and healthcare. Part of this decolonization could be undertaken in the disaster preparedness and recovery field with advice from cultural health and mental health treatment communities, with a focus on recovery and health sovereignty (Fitzpatrick, 2021). Revisiting the Siksika First Nation flood recovery framework set out by Montesanti et al. (2019), community control is stressed as one path towards reconciliation and decolonization. Ignoring Indigenous right to self-determination in health, mental health, and recovery is a form of settler colonialism, which makes disaster recovery an important stage for changing the way policy supports these communities (Fitzpatrick, 2021; Montesanti et al., 2019).

As is shown in the scoping review, the addition of cultural options for mental healthcare are often appreciated and well-utilized by Indigenous communities (Dobson & Brazzoni, 2016;

George et al., 2018). Some ideas, and contributions from the scoping review were discussed as potential replacements for intensive healthcare resources, including Telehealth, online chat groups, and text-based therapists, however, in the absence of integrated, community-run health networks with cultural health considerations, traditional health treatment options, and enough resources to provide the care needed locally, authors stated that these ideas fell short. For example, Telemental health options should be available to everyone but not as a replacement for in person therapy or consultation. Criticisms of Telehealth included that there is no guarantee patients will use the service, patients still need to be seen at regular intervals by a practitioner in person, the service depends on high quality communications networks, investors and entrepreneurial providers may risk high-quality care for profit, and that online providers may not be sensitive to the actual context where patients live (Gibson et al., 2011). There was consensus among scoping review authors that cooperation with communities and leadership from communities must be sought to create a working ecosystem of mental healthcare options that meet the unique needs of each community without being used as a cost reducer or "simpler option" from an administrative point of view.

2.5 Conclusions and Limitations

Through the two scoping reviews, results show that the possibilities of poor mental health outcomes after disasters, weather events, and climate change are vast and require sufficient resources for recovery. Common outcomes like PTSD, depression, and anxiety, if present after a disaster in a First Nations community, could exacerbate the existing mental health crisis faced by these communities in Canada. The second scoping review showed that many communities do not have the mental health program capacity to support their members, nor are there many evidence-driven options to transfer from Indigenous communities to others in the case of climate change-

related mental health effects. The strongest recommendations from the scoping reviews were to extend mental health supports over the long-term, and to ensure voice, and in the best case, sovereignty, in planning for climate change and environmental disaster recovery efforts in reserve communities. The scopes also revealed that more research is needed specific to the mental health effects of environmental racism and mismanagement in Indigenous communities.

This research can inform policy in terms of emergency funding allocation: mental health data from this research can be used to estimate the required breadth of support, and mental health funding needed to recover from an environmental emergency and can be included in reports to government for operations funding requests. The community can use mental health access numbers from the past to inform funding requests supplemented with estimated prevalence numbers from this review, i.e., 8.6% prevalence of PTSD normally increases to 30.9% prevalence in general population after a disaster with more specific data available for disaster type and severity. Governments should take a more active role in monitoring mental health resources and crises in Indigenous communities and question whether current capacity for care is sufficient for population sizes. Are there specific resources for demographics in crisis (youth, women, elderly)? Are traditional healing methods offered and are western methods adapted for use in an Indigenous setting which could become exploitative, or are professionals trained in cultural competence available? Are the specific mental health services offered wanted and utilized by the community? Does the community understand the resources offered and how to access them? Additionally, the community should be ready to lead, and guide governments in how to best implement or adapt services for mental health recovery to ensure bureaucracy does not impede the usefulness and relevance of new funding. The community should also partner with the healthcare systems in a campaign to educate community members on the services that

are currently available for mental health recovery, including how to access services, what specific services are offered, whether services can be accessed remotely, on reserve, or in a population center.

This research can also serve to inform changes that the community wants to make independent of governments and other organizations. The communities should consider implementing some sort of mental health first aid program to train laymen how to recognize signs of mental distress and ultimately reduce the stigma of seeking help for mental health issues. To prepare for future disasters, community infrastructure planning should examine climate change models and projections in addition to allowing community members to have input on location history (traditional knowledge) assuming governments are deferring to the community when it comes to infrastructure development. The community should consider training professionals to attribute mental health issues to climate change and disasters when warranted and include that data in health reporting. Partnerships with researchers should continue as well as documentation of health and mental health effects so evidence base grows allowing for more persuasive appeals to governments for funding and change.

The limitations of this multi-pronged scoping review are consistent with those of many scoping reviews. The huge amount of research on disaster health being compared with the relatively small amount of research on mental health programs for Indigenous people makes the ability to compare, contrast, and derive meaning from those comparisons more difficult with a lopsided knowledge base. Additionally, disaster preparedness is difficult to achieve with limited resources so which mental health programs may be implemented as a result of future disasters are largely unknown. Finally, because of the narrow literature base for Indigenous mental health effects of climate change, disasters and extreme weather, the scoping review was expanded to

worldwide research meaning the findings may not be totally representative of the target of this research. However, assuming that First Nations people do experience similar mental health issues of varying severity to other populations the broad generalizability does strengthen the applicability of the findings to other First Nations and Indigenous communities in the prairies, Canada, and even around the globe given the increase in recent years of climate, weather, and environment events.

Preface for Chapter Three

The objectives of this chapter were to a) create opportunities for First Nations community members to speak for themselves and their community about lived experiences of flooding and its mental and social health effects; and b) clarify the disparity between what is offered to First Nations communities on-reserve after a disaster and what is needed for recovery and future improvement form their perspective and experience. These inquiries and the results were compiled to inform disaster planning, policy, and further university research partnerships. The results of Chapter Two are put into context in Chapter Three with the information learned from the case study. Interview methods used in this case study were varied due to community preferences, pandemic restrictions, and community comfort with non-community researchers entering reserve boundaries during the pandemic. Some proposed interview populations were abandoned for the same reasons. The discussion section of this chapter incorporates some results from chapter two to future contextualize disaster, climate, and weather event planning and recovery. The findings also provide recommendations for how to approach First Nations on reserve disaster recovery, from community perspectives and for more sustainable outcomes.

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CHAPTER 3: A Case Study of Two First Nations Experience with Flooding

Title: A Case Study of Two Prairie First Nations Reserves: Community Needs for Flood Recovery

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Abstract: Two First Nations reserve communities on the Canadian Prairies, James Smith Cree Nation and Yellow Quill First Nation, have experienced extensive yearly spring flooding that washes out roads, floods basements, and in some instances has forced evacuations of some or all of the community members. Many First Nations in Canada are disproportionately affected by climate change, disasters, and weather events. Due to colonization and settler colonial policies, many First Nations communities do not have the infrastructure or capabilities to deal with the aftermaths as there are lower quality healthcare and mental healthcare offerings, and socioeconomic issues. This case study explores the recovery process for these two communities through semi-structured interviews where data was thematically organized to see the importance of recovery according to local community members. With support from community partners, the themes most important for recovery were cooperation, funding, and policy. These themes and the content of the conversations that led to their emergence are discussed alongside explanations of the circumstances that lead to the themes, factors that affect them, and implications they have for the future of disaster recovery in these First Nations reserve communities.

Keywords: First Nations, mental health, case study, qualitative, disaster recovery, flood

Treaty Acknowledgment: This research was co-conceived, implemented, and analyzed in Treaty 6 and Treaty 4 Territories and the Homeland of the Métis. The research team and partners committed to working together to become better advocates and take on joint actions to ensure that the environmental pressures brought on by climate change and human development are jointly managed both to provide better stewardship of the land and waters in these territories, and also to support our species to cope with, adapt to, and learn from our experiences of flooding and mental health impacts as a signal from the Creator to remember our connections to place and to each other.

Positionality: The research team consists of two white settler co-authors, an Indian-Canadian settler co-author, two First Nations co-authors, and a Métis co-author. The team is deliberate in its inclusion of two First Nations co-authors who were equal members of the research team and from the First Nations communities throughout the project.

3.0 Introduction

Community placement, lack of proper funding, and poor environmental management from external organizations or individuals, contribute to vulnerabilities of First Nations communities in the Canadian prairies, which increase physical, mental, and social health effects caused by climate and weather events, including incremental changes in climate (Lemelin et al., 2010; McNeill, Binns, & Singh, 2017; Morrison, Bradford, & Bharadwaj, 2015; Reading, Greenwood, de Leeuw, & Lindsay, 2018). Extreme weather and climate disasters like wildfires and flooding are becoming more common due to climate change and many of these disasters and events have substantial public health consequences (Hayes, Blashki, Wiseman, Burke, & Reifels, 2018). Flooding often results in injury, disease, and death, but also post-traumatic stress disorder (PTSD), depression, and anxiety (Bartholdson & von Schreeb, 2018; Burton, Rabito, Danielson, & Takaro, 2016). Indirect mental health effects of flooding include suicidal ideation, behavioural problems, and domestic violence are difficult to attribute to disasters or weather events, but are correlated to acute or incremental climate events (Fisher, 2010; Hayes & Poland, 2018; Stanke, Murray, Amlot, Nurse, & Williams, 2012).

Given the negative effects on mental health because of climate change mediated events, it follows that a robust mental health prevention and recovery system be put in place to support communities and supplement existing recovery systems for infrastructure and physical health. The needs of First Nation communities in Canada are largely unknown, not understood, or simply unmet by settler sources when discussing mental health even without a crisis involved (Baskin et al., 2020; Kitching et al., 2020). Mental health in many Indigenous communities is itself in crisis (Kielland & Simeone, 2014). A 2015 study found that the prevalence of psychological disorder in urban First Nations adults was 41.7%, and most of these participants

were diagnosed between the age of eighteen (18) and thirty-five (35) (42.6%) (Firestone et al., 2015). The suicide rate in First Nations communities is extremely high (24 deaths per 100,000) compared with the general population (12 deaths per 100,000) and youth suicides are higher at five to seven times the rate in the general population (Kielland & Simeone, 2014).

In Canada, Indigenous People's mental health is influenced by historic and contemporary forms of colonialism, assimilation, and oppression (Henry, 2018). This has resulted in inequities in health due to remoteness of reserve locations, discrimination in policy, and social and economic inequality. The remaining policy and aftereffects of the 1876 *Indian Act*, federally sanctioned oppression of First Nations people and neutralization of any resistance to the colonial project, are still felt by First Nations people in Canada (Phillips-Beck et al., 2020). The *Indian Act* places First Nations under the responsibility of the federal government, complicating the distribution of healthcare (Phillips-Beck et al., 2020).

Residential schools, which began closing in the 1950s, the *Indian Act*, and removal-based child welfare, which placed Indigenous children in residential schools and white families, have left a multi-generational scar on the mental health of Indigenous people in Canada, often termed intergenerational trauma or historical trauma (Blackstock, 2011; Hackett, Feeny, & Tompa, 2016). On top of the trauma of being removed from their families and cultures, often by force, the children attending residential schools endured sexual and physical abuse, neglect, discrimination, and racism (Hackett et al., 2016). This pattern continues through discriminatory child welfare, disproportionate imprisonment of First Nations people, and socio-economic vulnerability to crises (Arriagada, Hahmann, & O'Donnell, 2020; Spence & White, 2010). Having worse self-perceived health and self-reported mental distress; and with positive correlations between familial attendance at residential schools and suicide attempts and suicidal

ideation, these population-level findings should be alarming for service providers and lead to increased provision of services (Bombay, Matheson, & Anisman, 2011; Hackett et al., 2016). Yet, at this point, mental health services for First Nations communities remain underfunded, and poorly integrated with cultural needs (Boksa, Joober, & Kirmayer, 2015; Vives & Sinha, 2019). Other factors that influence health disparity and therefore mental healthcare disparity are distrust in Canadian Institutions, disregard for socioeconomic issues by institutions, language barriers, stereotyping, not being taken seriously, cultural insensitivity etc. (Phillips-Beck et al., 2020).

Part of the social determinants of health and mental health in First Nations communities are the complex processes that are involved in providing healthcare services to these communities (Greenwood, de Leeuw, & Lindsay, 2018; Kielland & Simeone, 2014). Complexity with various providers and sources for care reduce equitable access for First Nations people and can result in a lack of knowledge of what treatment is even available (National Collaborating Centre for Indigenous Health, 2019). The federal, provincial, and territorial governments share jurisdiction over First Nations health, while Indigenous Services Canada provides some services to supplement provincially provided healthcare (Government of Canada). Despite the federal government having responsibility for status First Nations healthcare, little has been done to correct health disparities in terms of actual policy (Gouldhawke, 2021). United Nations reports have shown that the Canadian Federal Government blames health disparity on social conditions without mention of the cause and maintenance of those conditions (Gouldhawke, 2021).
A connected systematic review, Belcher, et al. (2022, under review), examined the available mental health recovery programs for status First Nations people in Canada as they are recorded in the academic literature base. This review found that there are some common types of programs available as supplementary to the standard publicly provided healthcare system, which

include: cultural treatment and land/nature-based interventions; mobile, online or telehealth initiatives; training initiatives or treatment adaptations; and resource-based programs. These programs are shown to be appreciated and well-used by First Nations communities specifically in increasing knowledge of the effectiveness of cultural centric geared treatment programs (Dobson & Brazzoni, 2016; George et al., 2018). A common issue however is a lack of smooth integration with the underdeveloped public mental health system, where many of these programs act as cost savers or replacement treatment instead of the intended supplementary or unique problem use case (Gibson et al., 2011).

One proven way for enhancing mental healthcare for First Nations reserve populations is to have available culturally relevant options within mental health recovery programming (Dobson & Brazzoni, 2016; Gone, 2013; Usuba et al., 2019). Improving culturally relevant care includes multiple approaches to improve cultural safety, locally relevant cultural approaches, healing relationships between a person and their culture, and community control over mental health care (Fitzpatrick, 2021; Gone, 2013; Urbanoski et al., 2020). Shown by the utilization of these programs, cultural options can serve to break down at least some of the barriers to high quality, accessible healthcare that First Nations people face; reducing exposure to potential racism in western establishments, reducing the stigma behind receiving care for mental health, and improving a sense of control over one's own healthcare experience (Dobson & Brazzoni, 2016; Fitzpatrick, 2021; George et al., 2018).

According to existing literature, the most effective option to support First Nations is a robust mental healthcare system that has the capacity for adaptation after a disaster to accommodate the increased load the disaster would cause. In the case of many First Nations reserves, this system would be community controlled and culturally specific to sufficiently avoid

as many barriers to health equity as possible. In general, the implementation of mental health first aid, psychological debriefing, or crisis counseling into a disaster recovery plan is an effective approach to addressing the oft overlooked mental health effects of climate disasters or weather events (North & Pfefferbaum, 2013). Integrating this approach into the existing health services also leads to greater coverage and a more seamless recovery process for those experiencing mental health issues after a disaster (North & Pfefferbaum, 2013). For example, in 2013 after the Bow and Elbow River floods in southern Alberta, the Siksika First Nation entered into a partnership with the University of Calgary to undertake and document a community-based response to the flooding (Montesanti, Thurston, Turner, & Medicine Traveler, 2019). The response included a community wellness plan concerned with the health and social needs of community members, wherein a network of supports and services were created to streamline relief and recovery for Siksika community members that included: financial support, counselling, and promotion of resilience. First Nation control allowed for emphasis on traditional ways of life and cultural protocols, and addressed health holistically to include physical, social, mental, emotional, and spiritual health (Montesanti et al., 2019). First Nations control then, from beginning to end should be the priority for disaster and recovery planning, the first step being the informational basis of said disaster planning.

The experiences of two First Nations communities in rural Saskatchewan shape this research to better understand flooding and mental health effects post-flooding. Yellow Quill First Nation (YQFN) and James Smith Cree Nation (JSCN) are First Nation reserve communities located in Treaty Areas four (4) and six (6) respectively. These communities have a long history of flooding as they are located on river flood plains and experience snowmelt and surface precipitation-driven spring flooding on an annual basis. The worst floods at James Smith

occurred from 2012-2016 with evacuations during 2014 and 2015 and the most serious events at Yellow Quill occurred from 2005-2007 with an evacuation occurring in 2007. For James Smith Cree Nation and Yellow Quill First Nation, the peoples' prior experience with flooding puts them in an ideal position to speak on the recovery process, what is missing, what works, and what is needed in the future to ensure the best outcomes for community members individually and the community as a whole.

Using qualitative interviewing (Bessarab & Ng'andu, 2010) and an Indigenous conversational (Kovach, 2020) methods, this study aimed to:

1. Provide opportunity for First Nations community members to speak for themselves and their community about flooding and mental health effects, and inform disaster planning, policy, and further university research partnerships; and
2. Clarify the disparity between what is offered to First Nations communities after a disaster and what is needed from First Nation perspectives, for recovery and improvement into the future

3.1 Methodology

This research was a subproject of a larger decade-long joint investigation by members of partner communities and the Safe Water Research Team at the University of Saskatchewan on a variety of water security issues (i.e., contamination of source water, access to drinking water, flooding and drought, groundwater depletion, etc.) that were brought to the attention of university researchers by First Nations community members. Despite advocating to federal agencies about ongoing concerns about flooding, community members sought the assistance of university researchers to do modeling of the flood risks of their communities, then discussed prevention and response planning. Concerns about mental health provisions were raised at that

time, this project was then conceived as an opportunity for a student interested in environmental issues and mental health. The community coordinators and researchers devised the approach together; then community feasts and blessings were held, and the student was given permission to proceed with the work.

To determine concerns regarding mental health and flooding in JSCN, and YQFN, three data collection methods were proposed. The first were interviews with mental health service providers were proposed to understand needs from the perspectives of front-line workers. However, with the reduction in flexibility and increase in demand for their services from the SARS-CoV-2 pandemic this proved more difficult and ethically challenging given the need for community members to have support from psychological services. This data collection method was thus cut from the plans. Second, semi-structured interviews were conducted with members of the communities in question and also included the use of sharing circles (Graveline, 2000; Lavallee, 2009) when requested by the community. Sharing circles worked in tandem with interviews using the same semi structured interview questions as prompts when participants didn't have anything to say but allowing the researcher to step back and allow participants to bounce of each other's comments, stories, and experiences. Third, verification group interviews were selected as a final step to examine the existing data and ensure cross-cultural understanding among researchers and community members.

Convenience sampling was used for sample selection, and 2018/2022 interviews and sharing circles. Community coordinators recruited members (youth, adults, councilors, Elders) to be present at research sharing events held either in the communities or in Saskatoon in the case of the 2022 data. Saskatoon was chosen because off the relatively close proximity of the two reserves, and the location of the University of Saskatchewan being in Saskatoon. The 2022

interviews were conducted with community members either selected by the community research coordinators or with the coordinators themselves. With the difficulty of finding participants in the height of the COVID-19 pandemic in Saskatchewan (2021), this flexible sampling method proved to be the simplest and safest way to contact participants.

Eleven interviews and two sharing circles were conducted in summer 2018 regarding flooding and health in the two communities. Sharing circles included approximately sixty (60) people from YQFN and twenty-four (24) from JSCN. Further interviews specific to flooding and mental health were conducted when COVID-19 pandemic restrictions were eased in 2022; a single, in-person interview (n=1) was conducted at the University of Saskatchewan; another interview was conducted virtually via Zoom© video conferencing software (n=1), and a third was conducted via phone (n=1). Three more verification group interviews were conducted as part of a research sharing conference with both YQFN and JSCN leadership, and adult and youth members in April 2022 (n=9). These group conversations followed the same semi structured questionnaire but with a more informal tone because of the group dynamic, allowing participants to play off each other rather than simply responding to the interview questions. Each group interview included three or more participants and the conversations lasted around forty-five (45) minutes per group. All participants had some experience with past flooding on the reserve within the last twenty years including the severe floods of 2014-2016 for JSCN, and 2005-2006 for YQFN, but also less severe flooding that has occurred in recent years causing road damage and flooded basements.

The interview guide was co-developed and approved by the community chiefs and council and then approved by the University of Saskatchewan Ethics Board prior to data collection (BEH 16-457, Appendix D). Interview questions are included in Appendix B and the

consent form is included in Appendix C . Interviews consisted of eighteen (18) open-ended questions where interview questions allowed community members to reflect on their experiences and knowledge of floods and flood recovery periods. Interviews and sharing circles were recorded on digital voice recorders and transcribed via online automatic transcription services (Rev.com). Transcripts were then returned to community members for verification and approval for use in collective data analyses.

Data was coded in NVivo using thematic analysis (as per Boyatzis, 1998). On sharing the initial data from the earlier interviews, the community coordinators determined the direction of coding focus. The saturation of data is shown in figure 3.1 below

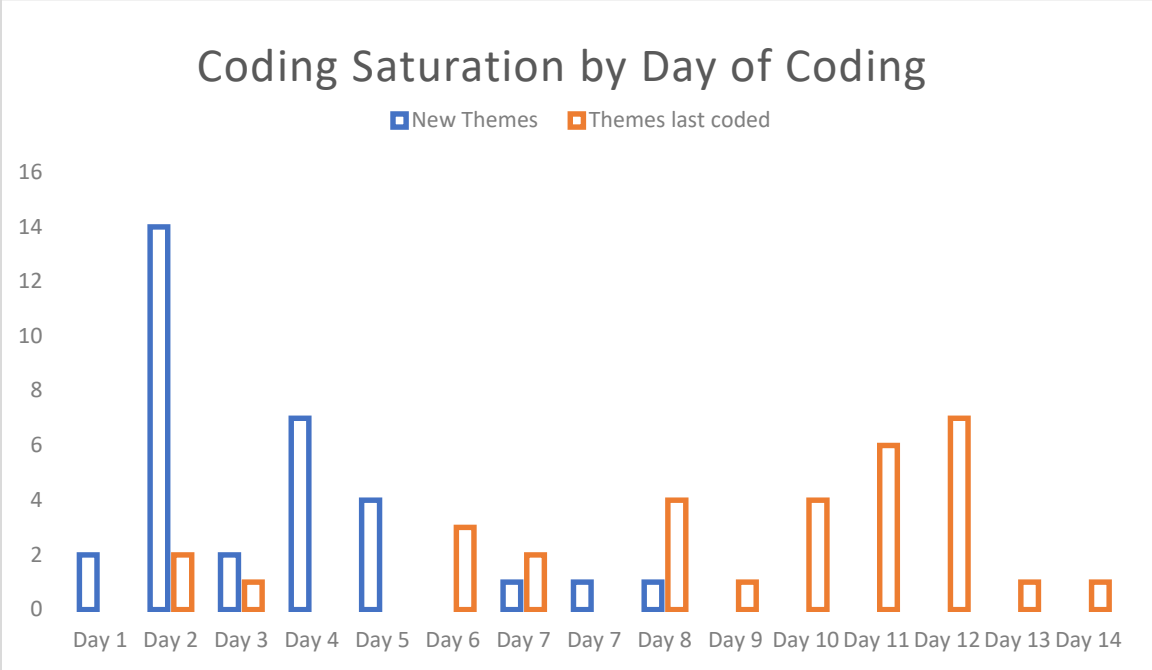

Figure 3.1 Coding Saturation explained by new themes created and themes last used

This saturation graph shows code use by day: the number of new codes being used decreasing as the coding days progress and the number of codes used for the last time increasing as the coding days progress.

First Nations community coordinators additionally discussed the emergence of policy recommendations as new or tried, and how new policy should address community needs. Topics of interest in sharing circles were guided by community members' ideas via cross-cultural 'sense-making', which is recommended for organizations operating in postcolonial settings (Karikari & Brown, 2018; Maitlis, 2005). Sense-making is the social process by which individuals understand and navigate confusing or difficult issues within an organizational framework (e.g., a watershed organization) (Maitlis, 2005). In the case of community-guided research, cross-cultural sense-making provides an understanding of the processes and positionality of community leaders and their leadership while navigating the relevant issues (i.e., flooding and mental health policy) (Karikari & Brown, 2018). For this project, the implementation of cross-cultural sense-making involved four steps; first, the co-creation of interview guides and sharing circle topics occurred with councilors and staff of YQFN and JSCN involved in flood management and health care services. Second, the verification sharing circles at the knowledge sharing workshop involved members from partnered communities (youth, adult members, Elders) verifying researcher-presented findings, and providing nuance and expansion of themes. Third, recommendations arising from findings were discussed with community coordinators to understand barriers and potential successes for the recommendations as well as historical information on whether similar recommendations had been tried. Fourth, community reports, and manuscripts such as this included community coordinators in the authorship team.

3.1.1 Analyses

Data output was qualitative and transcriptions were returned to the participants to check for quality and accuracy. After transcripts were provided to participants, they had a period of two weeks to ask more questions, request involvement in analyses, or withdraw from the study before

data analysis began. Community research coordinators were involved in all data collection methods and data analyses. This was set up through access to the aggregated and de-identified data (i.e., names removed, date, time, and place of interview removed, and other identifying information removed such as referring to other people by name in interviews). Interpretation occurred during monthly presentations where cross-cultural sense-making was sought throughout the analyses period. This procedure verified and contextualized the findings through community engagement and conceptualized the process with the community researchers (Ford, Rasmus, & Allen, 2012). The community research coordinators strengthened the validity of data interpretations with their greater understanding of community nuance and cultural implications (Bell, Tumilty, Kira, Smith, & Hale, 2016).

3.2 Results

The first author completed the initial thematic analysis, liaising with community coordinators with theme name, exemplar, coverage, and relationship to policy each month as new themes emerged. While recovery (its definition, its process as laid out in policy versus enacted within communities) was a main theme, nuance, such as connection to ongoing trauma and recovery, exacerbation of ongoing mental health concerns, and access to culturally relevant care were built in by the community coordinators. Three other themes (cross-jurisdiction and cultural cooperation, funding disparities, and policy shortfalls) emerged with examination of axial codes (Vollstedt & Rezat, 2019). Each will be discussed with example quotes below.

3.2.1 Theme 1: Recovery: process and promise

Recovery from a flood in JSCN and YQFN often involves the community coming together to make-up for the lack of funding, resources, and outside help to ensure everyone is safe and that daily life returns to usual as quickly as is possible. Participants revealed that

recovery (i.e., defined by community coordinators as healing as an individual, as a family, and as a community) from flooding and other disasters or events in both reserve communities is a complicated and often lengthy process. Participants highlighted the importance of healing by their own strengths and that recovery could be an uncomplicated process if cultural values could inform the process. However, many felt trapped at the current set-up of recovery systems, just as they felt trapped during a flood when their roads wash out.

> You know, I guess we, we had to use our own resources and, and pump out these basements on our own. There was no set sandbagging involved in trying to protect these houses because it was already in the low zone [] there was no sandbagging or trenching when, when that happened and [it sure] might have made a difference, but it already had been a low spot. With the aftermath of it, you know, you have a lot of mold issues with the housing. So that was a big concern. Um, again, you know, dollars weren't coming to help us, you know, kind of, deal with that. (P2: YQFN).

Participants also expressed that if the community did not have the ability or immediate resources, vital infrastructure, or service needs would go unmet for extended periods.

> And uh but also at that time was all the roads flooding. All the [roads], they were all crumbling, washing away, impassable too. They need to be resurfaced but there's still a lot of roads that need to [be repaired], we do have a schedule but unfortunately, we don't have the financial resources to [do it]. (P3; JSCN).

> The largest obstacle [to] recovery is, um, I guess it would be, it would be in like, um, operations and maintenance, you know, um, getting properly funded for that, but by, by the government, federal, uh, government to help communities, you know, um, to install extra dollars for that, you know, I know it's, it is always jumping through hoops to get,

> extra monies for, for, for anything, let alone, uh, emergencies, I'll give you an example. Uh, when I first started, there was a 2012, 2014 in that area, we had a big power outage and we were, uh, everybody went out there. I think it was at least a week ever got the power going out there for, and a lot of people's food spoiled, you know, and there was no help from the outside coming in. (P2: JSCN).

Amidst the discussion around physical recovery efforts, participants revealed that mental health recovery was not included in primary conversations with outside agencies on how to best support community members. Mental health recovery was overlooked in operational plans for flooding, despite being brought up by community members at local band meetings. Recovery efforts were monitored and measured against the functioning of community infrastructure; rather than community social dynamics where Participants referred to healing through a community holistic lens, which was often linked to intergenerational colonial trauma endured from residential schools which operated in the area until the 1990's. As described by one participant:

> … It's all the effects of what the residential schools… closed in like that. I think that also ties into the, you know, the trauma of, … You know, experiencing a flood, but like that, you know, [inaudible] any re-traumatization is gonna bring up those old, those old issues (P4; YQFN).

Mental health effects for these participants were not limited to the reopening of old wounds but about the social health of the entire community. The effects on youth mental health were made clear, specifically in relation to the ability to socialize with their peers:

> And, uh, the, the younger people, that's where it hit the most because they were with, they were so used to socializing and everything that, but it was, it was just a, like a dark, dark place in our, in our history (P1: JSCN).

> So, especially around, so, so socializing, like the social impacts of that. And it was just like, like I said, especially with our younger people, it was just emotional for them because they really couldn't do nothing. So that was, uh, and that's when they started contemplating with like drugs and alcohol, like all these other social, social gatherings they, that they utilize usually have, but that is all taken away from them (P2: JSCN).

Participants expressed the importance that Elders, knowledge keepers and cultural leaders had on supporting positive mental health recovery post-flood.

> Speaker 1: "Yeah. They [our Elders] are [in charge]. They, um, they're the ones who be straightening us out. So lot of layers in the flood, you know? [inaudible] Yeah. And then there's like a earlier, everyone has their own Elders they go to."
>
> Speaker 3: "Yeah."
>
> Speaker 1: "Our headmen and their families. Yeah." (P4 and P5; YQFN)

> There would be more [more Elder support service takers], but they'd have to take it in [the Elders prescribed] protocol, right? Yeah. You know, what they feel is right…Especially because like, you know, that's the type of mental health care that people are accessing more often than, you know, the Western types and it's more relevant as well. So like, I think that there should be, you know, funding for that, but obviously it doesn't necessarily exist (P2, YQFN)

When asked how to improve responses to flooding on reserves, participants stated that working with other local communities is needed, as they were seen to have more access to resources than JSCN and YQFN.

When, when it, yeah. [inaudible] When it comes to natural disasters, the travel council doesn't get that support. There are deaths, suicide something often that's when they bring a team. (P4; YQFN).

Speaker 1: “The extent of the, the flooding was so bad …at one point we didn’t know if we’re gonna have a community to go back to. But the, the rain let up that summer, … started coming back, but still the impact to the, to the infrastructure was still happening, uh, that's when I realized that, I gotta try and do something to improve the roads, improve the drainage. And that's kinda where, our story is now. So we did a proposal, uh, Chief and I, we went to the Ottawa at that time. We went to, met INAC, uh northern affairs, but also we went met with the, uh, AFN, uh, Chief. They were”

Speaker 3: “[] but, uh, yeah, he entertained us, we told him what the situation was. And uh, he sent letters to the feds, um, off the *Indian Act* to the federal government and getting our, our situation fixed. And that's”

Speaker 1: “Guess that led to, you know, the improvement in the roads. But now we are looking at it again, and even more... Well still, still today, like with all the stuff that we've had its really bad, plus through COVID situation this past couple years… it shelved everything, but now that we're getting out of this COVID thing, trying to get back into kind a normal, or normalcy, we don't even know what normal was. Cause we… there was no normal for good 10 years, and 10 years before that normal wasn't really good…” (P1 & P4; JSCN)

The repeated issues focus on infrastructural repairs, the lack of resources, the length of time to recover, the effects on youth and Elders, abandonment and feeling trapped, and the anxiety associated with re-traumatization were present in almost all interviews and sharing circles. The

lack of economic sovereignty to support culturally aligned recovery efforts for mental health was also highlighted in the data. These discussions of the work that it takes individual First Nations to get help from governments, leads us into the next theme: Cooperation.

3.2.2 Theme 2: Cooperation across jurisdiction and governments

Cooperation arose as a common code in the analysis of the data but many different forms of cooperation, the expectation for cooperation as culturally important, and the lack thereof among agencies supporting First Nation communities were described. These differences all supported the theme that cooperation is needed for there to be progress on the disaster recovery planning and action that First Nation communities want to see. Some participants expressed frustrations with past levels of cooperation from outside organizations and governments for many aspects of flood response, and recovery such as policy creation, communication, and provision of health services:

> Um, I would say what changes is, you know, the community and the leadership have to be involved with that policy writing. They have to be involved with that, that change, you know, it, it can't just come what, from these bureaucrats anymore. It has, it has to be a, a team effort, an equal uh, equal, I guess, uh, say in… in how those policies are gonna be, I guess, uh, created. Right (P2; YQFN).

> So there's not a lot of communication then coming from [the government]. Well, we have good communication with our, our internal team that we have, but when it comes to dealing with, um, federal government stuff like that no, there's not really much to go [through]. Like we just depend on health services more or less (P9; JSCN).

These expressions of frustration come from a lack of cooperation from outside organizations but also with the quality and timeliness of cooperation and even communication efforts. Participants

also explained their vision of scenarios where cooperation could be mutually beneficial with outside organizations:

> Uh, it's coming, it's coming together like with the surrounding communities, you know, you have the, [nearby community], you know, coming, sitting down together. And how can we help one another, you know, is there cost that we could put aside to, to help one another out, you know, um, to sit down with, with, with the experts involved and, and coming together with a, with a really detailed plan. Right. And… and again, organizations that are meant to help communities, you know, like the Red Cross, places like that, that come in and, and help. Right (P2; YQFN).

The participants explained that they are frustrated with past experiences of poor cooperation in the past, but they are tentatively hopeful for a future where positive and productive cooperation with off-reserve organizations and governments will be commonplace and allow community members to meet their goals for disaster recovery.

3.2.3 Theme 3: Funding disparities

Some participants felt that increased cooperation would bring funding opportunities for flood recovery and mental health, but others were skeptical, mentioning that in the case of First Nation reserve communities, a lack of opportunities or adequate funding was more common. Funding was a large point of concern for participants, with some mentioning that it was fresh in mind from the pandemic and years of coping in isolation from networks. Participants told us about past flooding, and how they struggled to secure funding from the government and other organizations:

> Well, we can wish in one hand, and we can crap on the other. Yeah. And that's the kind of situation that we have, especially, it's not only us, it's, it's other First Nations right

> across the board. Like we have been living with our own funding agreements since, since 1982. And since 1982, a lot of Bands have tripled or quadrupled in size. And yet their funding agreements have, have never changed. Inflation has changed, but nothing has ever been really changed on these, on these agreements like funding wise. So we have to deal, we have to scrape and more or less from Peter to pay Paul when it comes to a lot of the funding issues (P1; JSCN).

Regarding funds and policy provided by the government for emergency response at present one participant explained the lack of any emergency help received in the past:

> None, absolutely none. No. Uh, we had to find our own resources, you know, uh, with our own economic development, um, branches to kind of cover those costs. Again, you have, [Indigenous and Northern Affairs Canada] saying, oh, well, we'll, uh, we'll reimburse you, you know, but there's nothing set aside, you know, because we're all, all our, funding's all pretty much set and fixed funding right. For, or for each department. And, and they might have a, you know, a few dollars for emergency, but nothing that catastrophic. And again, it'd probably be, you know, it'd probably take a miracle to sit down with them and say, Hey, look, can we get this X amount of dollars right now to help? But in most cases, it's, we covered a cost and we, or reimburse you get the same. Yeah (P2; YQFN).

These communities found themselves dipping into their own limited operational accounts to deal with infrastructure damage with no guarantee those funds would be reimbursed. Additionally, participants said that earned distrust of the government makes even the funds that are secured from the government unsatisfying due to the implications it might have for the future. There was, however, uncertainty about taking what was provided. One participant said that as relief from the

COVID-19 pandemic the Canadian government gave stimulus money to help First Nations deal with the crisis, but they had anxiety over that money:

> I said, no, I wouldn't be jumping [on the money] for certain. I wouldn't be jumping for joy right now. I told him, I said, we don't know the outcome of what this, what this funding is gonna come back. I said, maybe the government's gonna want it back. I said, look at the survey that they gave. I said, I said a lot of that money that was given out this and now some of them are, have to pay it back. I said, so that's. I said, we don't know the, the extent of what's gonna happen yet. I said, if it's going, maybe it'll impact our agreements. I don't know. Who knows. And that's the scary part about it. Like we're already running on a tight budget as it is right now, something like this and maybe call back some of the funding. So that's what's a scary thing to think about (P9; JSCN).

The caution spoken of here could be found among other participants as well and was verified at sharing circles. Participants stated that their funding levels hadn't changed much in decades and that they were told to provide services and wait to be reimbursed. Participants revealed that non-First Nation communities, however, seemed to be funded adequately for any needed services:

> Speaker 3: "Uh, just more support, you know, I know that in the farm world they get all these supports, You know, uh, why, why can't we get the same supports? Right. Um, I don't get to insure my land, it gets flooded…. farmers get insurance… get to take the crop off and still sell it. Yeah. Um, it's all win, win, win there. And plus, it's a battle all the time. Right. Downhill, just to be sure."
>
> Speaker 4: "Yep. And said to make it sit at the table and make it policy for this, you'll get you set amount of money. You know, they set amount of money for aftercare, clean up,

boom. You know, and it isn't like, they'll say it's onetime payment, but no, we want that." (P3 and P4, YQFN)

Participants spoke of more differences in provision of services, for instance, health care during floods. Reserve communities were still expected to get chronic illness sufferers to specialist appointments, losing their place on waiting lists when they couldn't. The participants spoke about needing to invest in equipment such as four-wheelers to be able to move about the communities and check on Elders or vulnerable members. While these equipment purchases ensured community connectivity, the costs were not always reimbursed. Participants felt limited by the policies that dictated who could spend money, and on what:

> We got these tractors and got these big pump and, and then we brought a bunch of other pumps that we got to with the provinces help, but we had to pay for them. And we were pumping out roads and ditches. Uh, so we had to use our funding to, to pay for those because really we couldn't provide water services anyway, if we tried to, because of the closure or roads. So at that time, like, yeah, I was the said, okay, well do what you have to do. So that's, that's what, that's what we basically did (P3 YQFN).
>
> [The funding model] is not benefiting the grassroots people themselves in any way. Because, uh, we are dealt with, with the outcome of what they shook hands on. Like even with our [social service funds], that should have been given directly to the bands themselves. And instead they gave it, they gave the money to the overseeing program, its own entity and to have arm's length away from, from the, from the band and from politics… that should have never happened. Right now this is where all the corruption, this is where all the negative stuff comes in when it comes, when you hear about [social services program] and things like that. So right now there's a lot of bands that are going

> for their own, like there's scrapping new, old method of [social service program] or [provincial counterpart] and we're gonna be utilizing it to get it under [our Band management]. So there's, there's a couple of bands that are out there that have, that have successfully done it. And they, they have their own unique way of doing [social service program] of how they need it. So I think it's up to each, each of the bands to do their own thing on how to achieve that, to achieve the goal. So, yeah, but that's, it's, it's it's gonna happen I think anyways (P7, JSCN).

Overall, participants verified that they wanted more sovereignty over controlling funds for flood recovery, that funds were inadequate compared with non-First Nation settings, and that funds needed to be provided for services and programming that was preferred by, and more culturally aligned with their members. They felt that policies got in the way of helping their communities recover from flooding and other issues on reserves.

3.2.4 Theme 4: Policy shortfalls

Participant concerns when it comes to policy and how it affects their preparedness and recovery processes tend to link back to a lack of control felt when dealing with and relying on out of reserve governments and organizations. Regarding a housing area of the reserve that has yearly flooding and chronically wet basements, one participant expressed the issues with how the housing was planned:

> Simply because they thought it would be a nice area to ... I haven't seen anybody come here. And then I haven't heard anybody come here, say, well, build a house over here. It'll be good. No. But, oh. That looks good over there. Build a house there. Doesn't make sense. So information like if you were to take somebody from the reserve and say that's where to build a house. That's where it's not okay to build a house. Mold issues wouldn't

> be a problem. So everything ... If they'd actually get off their lazy butts to actually come out, talk to a, let's say a, a scout who knows where all the floods out were ... Say yeah. It'd be okay here. That'd make much more sense than sitting at your desk office and saying oh, this is a good area (P8: YQFN).

There is also concern that specific or unique First Nations issues are being overlooked by regional or conglomerated First Nations organizations in dealings with provincial and national governments.

> It seems like the federal government are actually listening to them more than the actual grassroots people, where, where it's, where it is supposed to mean the most. Cuz right now a Chief has, should have more authority to, to see over what's going on in this community than, than the provincial Chief or the, the national Chief. They're just organizations. That's all, they're, they're supposed to be a helping hand to the, to the First Nations, but, uh, they kind of lost focus on that. And right now they're kind of signing, signing their own declarations and everything like that to benefit them (P1: JSCN).
>
> And at the end of the day, the government's gonna listen just to, just to whoever has a, a better plan, I guess, on, on [Assembly of First Nations], they don't really see what's actually happening in communities and that's all they see is what they see on TV. So they don't really come out to the communities and visit communities like, oh, this is what you guys need. They don't do that. Right. So they're kind of like a bureaucrats in their own, in their own way (P9; JSCN).

Participants also had experiences where policy or planning that directly affects water flow on the reserve was decided outside of the First Nation's awareness and led to increased impacts on the community:

> Uh, we dealt dealt with that years ago, we, we tried to have controls set up, but they set 'em up outside the reserve, and over, on the North side where we had no control. You talk about control, we're never in control of anything on this, somebody else decides it, what's gonna happen (P7: YQFN).
>
> …but we did cover up the, um, the farmer's trenches because that's was the major problem that we had with our flooding was due to farmers actually illegally trenching onto our community and the farmers, the, land leasees themselves were actually doing this stuff without, without knowing to the, to the, to the Chief and Council. So they were actually flooding well, creating their, um, their trenches in order to dry off some of the reserve, but it was, it was all coming into one area and that's where the major ones that were affected (P7: JSCN).

Participants verified that in addition to a lack of adequate funding and provision of resources to address the impacts of flooding in the inclusive sense (physical, emotional, cultural, social) was sometimes compelled by poor policy, or by not having voice in that policy. They felt that those implementing policies were removed from the lived experience of members of their communities, and thus, were uninformed of how policies created barriers instead of support.

3.2.5 Summary of Results

The four themes of recovery, cooperation, funding and policy were verified by community youth, leaders, and Elders in a knowledge sharing event in April 2022. During that event, it was emphasized that the four thematic needs do not exist separate from each other but interact with and influence each other. One participant expressed that if a community has the cooperation and resources to respond to disasters themselves, physically as well as socially through tradition, they can provide more help; “to go back to ceremony, you know, to go to the

knowledge keepers and ask for prayers and whatnot. But definitely there was a high stress point with, with people in the community. Yeah." (P2, JSCN). An example given by the same participant was that this excess stress, brought on by disruptions such as flooding, led to a feeling of lack of control (because of mold, living in crowded quarters, caregiving for children or Elders, losing belongings, having to spend money on cleaning supplies and water pumps), and thus led to choices about how to cope or seek support which can sometimes mean turning to substances;"You know, a lot of them, a lot of our people, lot of that [stress] leads to addiction. I'm sorry to say that, but, uh, that that's rampant in, in our First Nations communities, you know." (P2, JSCN). The participants ultimately underscored how important they felt that having control over the communities' recovery efforts, timeline, and resources would be, and having sustained cultural integrity, could overcome shortfalls in the funding provided and policies they have to abide by.

3.3 Discussion

Addressing the needs of First Nations communities post-flooding is of utmost importance. When provided opportunities to talk about their experiences First Nations community members and leaders were interested in how exposure to environmental disasters was affecting the mental health of its members, and the perceived barriers to, and pathways for enhancing wellbeing post-flood. Through a co-designed approach, semi-structured interviews and sharing circles were used to engage the broader community to share their knowledge. The four dominant themes that arose include: 1) recovery is a long and complex process; 2) the importance of cooperation within and across jurisdictions; 3) inadequate funding; and 4) the erasure of First Nations approaches and services post-flood through bad policy.

Interestingly, there was a lack of participant comment on specific mental health concerns (i.e., technical names of mental illness, impacts of stress on health) following the flooding of the past despite the weighting of interview questions toward that end. This absence does not indicate that mental health recovery is taken care of in these reserve communities however, because more critical needs like transportation, evacuation, and infrastructure are not being met either. The mental health effects of the events that can put these communities into crisis are, understandably, taking a back seat to what are deemed more pressing issues from a funding standpoint. The needed improvements in cooperation, funding and policy that are explained by the participants are also the first step towards improving specific mental health recovery for reserve communities (Boksa et al., 2015).

A recent history of recovery from disaster has supported people in Yellow Quill First Nation and James Smith Cree Nation to understand what is needed to recover from similar events in the future. From experience with relying on limited resources and limited organizations to recover from flooding, these communities learned to prioritize the infrastructure that protects their homes and roads from damage as the most crucial for personal protection and sustaining the movement freedom for evacuations or to access services. Participants see cooperation and relationships with neighboring communities, governments, and organizations as crucial for improving recovery from disasters and weather events (as reported in other contexts: Woods and Deaton, 2014; Manno, 2011), in part because of their experiences with times of poor and good cooperation in the past. The problems that can be solved though cooperation were also important for participants: funding and policy. Adequate funding could solve infrastructure problems through fortified roads and better drainage, but also provide better health and mental health recovery care in the recovery period (Emrich, Tate, Larson, & Zhou, 2020). Policy was

understood as preventing sovereign control of recovery from the point of view of the participants; that is, having a say in policy decisions could reduce some of the negative effects of current policy (reduced funding, outside land regulations). This has been echoed by other researchers too (Doberstein, Fitzgibbons, & Mitchell, 2018; Sayers et al., 2015).

With the high prevalence of health and mental health issues in First Nations reserve communities, the focus of participants on cooperation, funding, and policy is explained by the more obvious problems yearly flooding causes like road closures, and reduced integrity of homes and infrastructure. However, they felt solving these underlying problems can often be the first step towards solving a mental health crisis in First Nations reserve communities (O'Gorman, 2021). The mental health crisis for First Nations people in Canada is a multifaceted issue and is related to factors of socioeconomics, race, and colonization specifically the cultural genocide carried out by residential schools from the 1600's to the 1990's (Hackett et al., 2016). It follows that the layered effects of the growing climate crisis do not aid this mental health crisis, but as found in this work, triggers more impacts, and thus solving only mental health effects caused by disaster does not solve the mental health crisis in totality (Smith, Dingley, & Roux, 2019). This research found that what can change things, however, is improvements in cooperation, increased and more accessible funding, and policy changes towards more sovereignty which could amend the socioeconomic difficulties faced by these communities. More inclusive disaster recovery (i.e., ensuring mental health recovery as well as physical health and infrastructure recovery) and "building back better" which would include building social, community, and mental health resources within communities after disasters, rather than bringing them in from afar on a per-disaster basis could serve as a way forward for First Nations reserves (Fulton, Drolet, Lalani, & Smith, 2020). The use of non-localized resources by organizations during recovery phases allows

colonialism to persist in disaster-related recovery efforts, and in climate change policy and management by not centering Indigenous voice, values, and conceptions of the determinants of health in planning.

In addition to the historical trauma of residential school attendance, colonial policy continues to negatively affect First Nations reserve communities in other ways. The *Indian Act* (1869) a policy of colonialism and assimilation which shaped First Nations identity in Canada, remains in various forms in present day policy for First Nations people (Milloy, 2008). Federal control over status, gender discriminant in the case of Bill-C31, and funding hinder First Nations ability to self-determine and create sovereignty for themselves on the reserve and in urban spaces (Lawrence, 2003). The importance of the *Indian Act*'s distinction between First Nations and other Canadian citizens is such that giving up the oppressive policy on the federal government's terms is unanimously rejected (Assembly of First Nations, 2010). The only way forward for changes to this oppressive policy is through First Nations participation in the crafting of a new policy.

As is explained by the participants, the mental health issues on reserves and subsequent risk of escalation to further mental health crises are not solvable directly without addressing the underlying problems. A robust mental health system with supplementary programs that works together to address issues of mental health at base level or after a disaster will improve good outcomes for these communities; however, it is essential that the underlying issues of colonization, and marginalization are addressed. Using policy and funding opportunities along with supplemental programs can serve as an opportunity for improving First Nations control over what happens in reserve communities for infrastructure, food and water security, and healthcare.

There are a number of successful examples along the lines of improved local control that can be adapted to individual First Nations reserves. First Nations in the Yukon are attempting to decolonize water governance by drawing on not only Indigenous relationships to water as knowledge to inform governance but also pushing for legal personhood for their waterways, and prioritizing First Nations knowledge and practice, including legal and governance approaches as a pluralistic water governance system (Wilson & Inkster, 2018). First Nations control over health care or health sovereignty is a field that is emerging and has seen some promising results (i.e., Jordan's Principle). Many of these positive results have to do with the inclusion of cultural relevance to these health care programs. Cultural considerations like including Elders as someone to meet with in a counseling experience in primary care for mental health, reduced the symptoms of depression, suicidal ideation, and emergency department use (Tu et al., 2019). Indigenous-led health partnerships have been shown to improve care quality, access to care, and adherence to care programming (Allen, Hatala, Ijaz, Courchene, & Bushie, 2020). Recommendations for further development of health partnerships include valuing traditional medicine equally with biomedicine, consulting with Elders and traditional practitioners, learning local languages to engage better with community members, and supporting efforts of Elders, Knowledge Keepers, and healers to have Indigenous-led health come to fruition (Allen et al., 2020). Another lane for culturally relevant First Nations-led health are land-based interventions. Land based interventions are programs that aim to reconnect Indigenous people with their culture and traditions especially in the youth population, creating protective factors for mental health issues (Walsh, Danto, & Sommerfeld, 2020). An example of this is part of the Carrier First Nation's addiction recovery program, which combines addictions counseling, mental health therapy, and traditional exercises in a remote fishing camp on the ancestral lands of the Carrier

First Nation (Dobson & Brazzoni, 2016). This program is run by Carrier Sekani Family Services, a non-profit organization developed by multiple northern BC First Nations to meet the healthcare needs of their own communities and can serve as a good example of First Nations health sovereignty in Canada.

Siksika First Nation in Alberta employed a holistic model of health and well-being within the recovery and mitigation of a flooding disaster on the reserve (Montesanti et al., 2019). After the 2013 Bow and Elbow River floods the Siksika First Nation was forced to evacuate 1000 people and declare a state of emergency with only a 30-minute warning. The leadership responded using a community based and culturally appropriate framework for supporting the health and mental health needs of members of the Nation affected by the flood (Patrick, Machial, Quinney, & Quinney, 2017). The plan put forward was considerate of Indigenous determinants of health, and prioritized attention to children and youth, traditional ways of life, and cultural protocols. Focusing on these community-led initiatives for recovery without neglecting unique community and mental health needs, Siksika First Nation and their University of Calgary collaborators were able to create an important Indigenized framework for disaster and emergency planning (Lynes & Rushton, 2020; Patrick et al., 2017). With this framework for disaster response, community control is stressed as one path towards reconciliation and decolonization. Ignoring Indigenous right to self-determination in health, mental health, and recovery is a form of settler colonialism, which makes disaster recovery an important stage for changing the way policy supports these communities (Fitzpatrick, 2021; Montesanti et al., 2019).

3.3.1 Limitations

Because this research is a case study, generalizability of the findings is weak. Additionally, limitations of participation are present with problems like reluctance of people to

participate, bias in participant selection as there were a relatively low number of interviews conducted compared with population sizes, and the awkwardness of conducting semi-structured conversational interviews via the internet. Due to limits in the scope of this study, the focus of the analysis kept to the four themes most commonly brought up as concerns for participants: Cooperation, funding, policy, and recovery. This is not to say that participants did not have other important but more specific or narrow themes of concern such as lifestyle and livelihood impacts of disaster and climate changes, and infrastructure.

3.3.2 Recommendations

Recommendations for community members and leadership include:

1. Co- creating disaster mental health recovery plans as part of community disaster plans with local health providers, Elders, and other health services that are accessible to communities.
2. Preparing a list within that plan of culturally relevant service providers, as well as other service providers so that is available and certifiable as expenses for flood recovery to government agencies.
3. Keeping informed of specific vulnerabilities to mental health in the community, including groups at risk, those already experiencing mental health struggles, and those who may be able to provide alternative forms of support (i.e., meals, childcare, Eldercare) while certified caregivers are busy.

Recommendations for government agencies include:

1. Governments should reconsider how they handle funding for First Nations reserves and facilitate preemptive measures for infrastructure, healthcare, and environment adaptations.

2. Any amendments to policy or new policy that could have impacts on First Nations people should include First Nations leaders in the development process.

3. Governments should take a more active role in monitoring mental health resources and crises in Indigenous communities and question whether current capacity for care is sufficient for population sizes.

Recommendations for further research in this context, and for researchers doing this work:

1. Researchers should explore the integration of a community-led culturally relevant health network into the existing traditional health network informally conducted by individuals in the community (i.e., Elders, Knowledge Keepers, healers, etc.).

2. There should be further exploration of mental health effects of disasters with timely data collection in close proximity to disaster occurrence in First Nations Reserves as this is an understudied area.

3. Any research that puts pressure on governments to improve conditions for First Nations in Canada is valuable.

3.4 Conclusion

Participants from James Smith Cree Nation (JSCN) and Yellow Quill First Nation (YQFN) have extensive experience with flooding and recovering from said floods and therefore know best what is needed to improve recovery in the future and prepare for flooding and other disasters. Participants brought up themes of recovery, funding, policy, and cooperation when talking about the past flooding their communities have experienced and the changes needed to have better outcomes in the event of future floods or other disasters. Past issues with recovery inform the way forward for these two First Nations reserves. In past flooding, there has been issues securing funding for infrastructure and healthcare supports, issues with finding

cooperative partners in outside communities and organizations, and struggles with policy that unfairly affects JSCN and YQFN. Despite these issues, participants hope for futures where funding meets community needs, partners join their open invitations for cooperation in disaster recovery, and policy developments that fully include First Nations people in the process. Ultimately people in JSCN and YQFN want the opportunity to take control of their recovery process and the opportunity to retain recovery resources through the recovery period and further into improving their material conditions. This research can be used as a tool for pleading the case for these and other First Nations reserve communities in their mission to secure what should have been provided by the Canadian government in the first place. Finally, new plans for community-based disaster recovery plans can use this information as a guide for what is most important to people as they navigate the recovery process.

CHAPTER 4: Overall Discussion and Conclusion

4.0 Introduction

The two articles that make up this thesis work together to explore the state of disaster mental health recovery in on-reserve First Nations communities in Saskatchewan. The first manuscript scoped the literature to find the prevalence of specific mental health effects from disasters, climate, and weather events on a global scale and examines academic accounts of mental health programs available to First Nations living on-reserve. This inquiry provides the basis for planning for the prevalence of mental health effects a First Nations non-urban reserve community might experience and what they may need to be equipped to deal with for better social and cultural security over time. The second manuscript places these findings in context with a qualitative study of two non-urban First Nations reserve communities in Saskatchewan with a record of flooding. Participants expressed their hopes, concerns, and ideas for the future of recovery in their community if a disaster were to occur again, as informed by their past experiences. The pairing of the two manuscripts serves to create the basis for a discussion on the future of disaster recovery for a First Nations reserve community given the increasing pressures of climate change, and the inequitable circumstances on reserves due to the persisting effects of colonialism.

Objective 1: Identify the scope of current literature on climate, disaster, weather, and environmental mismanagement issues on Indigenous people in the Canadian Prairies with specific interest in First Nations reserves

Key findings: The first objective, fulfilled through the scoping review, uncovered the extreme gap in literature for specific research into how disasters, weather, climate changes, and environmental mismanagement affect Indigenous Peoples in Canada, and more specifically, First

Nations peoples in the Prairies living on reserve. Out of 2217 papers on mental health effects of disaster, climate, and weather events that were scoped, and 444 papers full text reviewed, there were few papers that specifically discussed the effects of environmental disasters on-reserve. It was necessary to conduct a global scope because of how few relevant articles including empirical data were found when including filters for Indigenous groups in Canada, and even Indigenous groups globally beyond a surface level of considering Indigenous Peoples an equity-deserving group (Hayes & Poland, 2018). Only one relevant paper was identified, which studied climate change and resulting mental health clinic visits in an Inuit community. The lack of literature relevant to First Nations rural reserve communities required a second strategy to attempt to apply the findings of the scoped articles to the demographic in question.

Objective 2: Understand the current trends in research, monitoring, and policy change for the protection of mental health in Indigenous communities facing vulnerabilities due to environmental jeopardy

Key findings: For the second objective the goal was to compare the mental healthcare capacity available for select First Nation Peoples in Canada to the expected mental health effect prevalence if a disaster event was to occur. To get a better picture of the state of mental health programming for Indigenous Peoples in Canada a scoping review was conducted and found that academic literature assessing mental health programming either from a third party or academic source was scarce. For the search criteria of First Nations only, Métis and Inuit targeted programs are excluded, but also programs that did not specify Indigenous groups for generalizability reasons especially with adaptive programming. Therefore, the Indigenous category was chosen to increase the number of articles from only programs that specified First Nations patients/clients, to wider offerings including Métis, Innu, and others. There is cross-over

in relevance to the target population, but it is important to reiterate here that Indigenous and First Nations are not interchangeable and there are distinctions between status and non-status First Nations, between urban and rural First Nations, and Nations with self-governance. This review showed that often the public health system and the supplementary mental health programs of other organizations, and programs within the communities themselves had difficulty keeping up with the load of current mental health issues in the communities where they operated. This finding is a signal that in the event of a disaster, many First Nations rural reserve communities may not be equipped to handle the mental health needs of such an event. However further contextualization was sought for the findings of the two previous objectives to apply the information gained to real First Nations rural reserves with experience in recovering from disaster.

Objective 3: Provide opportunity for First Nations community members to speak for themselves and their community about flooding and mental health effects, and inform disaster planning, policy, and further university research partnerships

Key findings: Qualitative, semi structured interviews, sharing circles and group interviews prompted participants to recall their experiences of flooding and disaster in past years in their reserve communities. These experiences showcased some of the complex problems First Nations on reserve must deal with to cope with and adapt to changing environmental and climate conditions. Intersecting factors of socio economics, historical oppression and colonialism, racism, unmet governmental obligations, local relationships, and unhelpful policy affect a reserve community's ability to cope with, recover quickly, and maintain good physical, mental, and cultural health as a community. This information is extremely useful for mental health related disaster planning as it shows the entangled roots of mental health issues and provides a

path to a solution. Future research should focus on developing a plan to amend obstacles for flood recovery that can be adapted to specific First Nations communities.

Objective 4: Clarify the disparity between what is offered to First Nations communities after a disaster and what is needed from First Nation perspectives, for recovery and improvement into the future

Key findings: From the perspective of participants, cooperation and funding from outside governments is required to fix and improve vital infrastructure and provide continual health and mental health support. Additionally, First Nations control of said health, mental health, and recovery efforts, and First Nations input for all policy that could affect them is vital to the sustainability of future recovery planning and preparation. First Nations reserve communities have access to limited resources even in times of normality and are often underserved by public, mental and physical healthcare systems. First Nations input and control at all levels of disaster recovery was the overarching message from qualitative data, this includes healthcare and mental health care through relevant First Nations treatments and traditional knowledge.

4.1 Methodological summary

The research methods used for this thesis are characterized by interdisciplinarity (Newell, 2001). This was a concurrent mixed methods project involving scoping review methods taken from public health, and production and analysis of primary data gathered through qualitative methods as would occur in conventional social science methodologies. Additionally, this project brought together typically western methodologies (data from scoping review, thematic coding, risk management, and sustainability theory) and linked them with approaches informed by Indigenous methodology like the use of sharing circles in one community as their preference. The engagement approach also ensured the direct involvement of First Nation community

coordinators in the design, data collection, analyses, verification, and writing of findings as manuscripts, as well as providing their definitions of health, social health, and mental health to include alongside traditional healthcare programs that were discussed and needs for Indigenous disaster recovery sovereignty. My own background in undergraduate psychology worked together with sustainability science, hydrology, and emergency preparedness to create a multidisciplinary understanding of disaster, climate, and weather event preparedness and recovery in Yellow Quill First Nation and James Smith Cree Nation.

Scoping review results provided relevance for Yellow Quill and James Smith by comparison and confirmation with a) intervention programs available to First Nations and Indigenous people in Canada according to academic literature, and b) firsthand experience with floods and flood recovery recalled by participants from Yellow Quill and James Smith. Interview, sharing circle, and group interview methods were chosen to both use the various strengths of each method for triangulating results, as well as meet community needs for comfort with methodologies that were intuitive to them, in the case of group interviews and sharing circles. Semi-structured interviews conducted through a variety of media served to isolate single participant's narratives, yet, within the qualitative data these interviews allowed for adaptation in questions and prompts to explore novel topics brought forward by participants and produce depth in the descriptions of problems people face during flood recovery in the two reserve communities. Sharing circles were conducted by request only in Yellow Quill First Nation, under the management of a Yellow Quill Elder and the Yellow Quill community research coordinator, using a traditional object (talking stick) and procedures (starting with a blessing and feast, taking a circle formation, speaking in age-order, and providing time for all who wanted to share to do so) and paralleled semi-structured interview topic areas. The strength of this method though was

the involvement of participants who may not have been available or interested in participating in individual interviews, and allowed participants to build on each other's comments, experiences, and recollections. Finally, group interviews had the similar strength of allowing participants to play off each other in smaller groups and involved people in the conversation who might not have been interested in participating in a one-on-one interview.

Sharing circles are not relevant to all First Nations cultures but in this case, they were relevant and requested by Yellow Quill First Nation. Interviews can be conceived as a western methodological approach when they are researcher-driven and structured, however, co-development of the interview guides, and validation of results with community research coordinators increased relevance to the partnered communities. While it could be argued that mixed methods makes it difficult to validate results against each method and complicates the research process, the variety of methods used in this study has the advantage of being able to get a more well-rounded view of community perspectives, and more connections to other parts of the research and even other research fields (Doyle, Brady, & Byrne, 2009). The downsides of having varied interview methods are that there are also varied depths that the data can reach or less organic conversation in the case of a phone interview or internet video call. Sharing circles and group interviews were more conversational compared with in person one-on-one interviews, lending both to the comfort of the participants and the interviewer and thus potentially being able to achieve more rich data. In the case of in-person compared with phone or video interviews, unfamiliarity with the technology or between the participant and interviewer could amplify the awkwardness of the interview process and result in less richness of data than desired.

4.2 Limitations

This research is likely affected by the cohort effect (Keyes, Utz, Robinson, & Li, 2010) because interviews and group interviews happened at a time during the COVID-19 pandemic where restrictions limited personal interactions, and therefore cannot be easily compared with interviews and sharing circles that were conducted prior to the pandemic. With the pandemic, many First Nations reserves closed down operations beyond their essential services in order to contain the spread of COVID (Issawi, 2020). Isolation and states of emergency with a population vulnerable to the pandemic, forced communities to rely on their own wellness systems (Neeganagwedgin, 2020). This pattern was possibly echoed by the participants of this research with their focus shifting from earlier interviews where the focus was on road and home infrastructure protection, to a more recent focus on the factors determining community ability to address flood and health related issues overall, and in the long-term recognizing climate change pressures. Additionally, Yellow Quill and James Smith First Nations are unique, and, in many of their service provisions, sovereign, increasing the potential for a cohort effect and reducing generalizability to other First Nations communities.

Researcher bias is another possible factor in this project, but steps were taken to prevent bias within the results. My supervisor and interdisciplinary committee – which included an Indigenous scholar and First Nations community members - helped develop the research tools at key points in the process. Community research coordinators were heavily involved in crafting research objectives, interview questions, and verifying and analyzing data to support a co-designed approach.

Social desirability bias (see Bergen & Labonte, 2020) is always a factor in research that includes any level of self-report in the data collection. People may have become more familiar with me as I visited the two reserve communities multiple times from 2018 to 2022 with the

exclusion of the March 2020 to summer 2021 pandemic restrictions period, so I may have become more trusted and appeared as less of an outsider allowing for participants to feel more comfortable to tell me about their beliefs more freely (Bergen & Labonte, 2020).

Scoping reviews are snapshots in time of the literature and did not include any unpublished or grey literature sources. Thus, it is possible to have missed important information that exists in grey publication forms such as disaster reporting from health authorities. Scoping reviews are also typically broad at the expense of depth, and tend to point to research that needs to be conducted rather than contributing essential research. In this case, the near absence of peer-reviewed research in the specific context of First Nations on-reserve communities recovering from mental health effects of flood disasters points to an inequity in research, as well as a lack of frameworks taught, and resources provided to researchers to undertake such research in a good way.

Cross-cultural research has limitations in that myself and many of the research team are not familiar or embedded in the culture, language, and traditions of the participants in the case study or the reserve communities to whom where the research was conducted. This disconnect is amended through close work with community research coordinators as well as the continued development of a partnership between the University of Saskatchewan, Yellow Quill First Nation, and James Smith Cree Nation. A Métis scholar as a member of the thesis committee was also instrumental in identifying opportunities for cross-cultural theorizing and data analysis in this thesis.

4.3 Contribution

First Nations community research coordinators were integral to this research for their contributions and guidance on the projects and the manuscript. Their knowledge of their

communities as well as the research itself lends to the useability of the findings for future research, and developments in disaster recovery planning in the communities. The findings of this thesis are therefore useful in the development of a First Nations controlled disaster plan that can be adapted to fit the needs of other First Nations communities.

Sustainability in disaster recovery

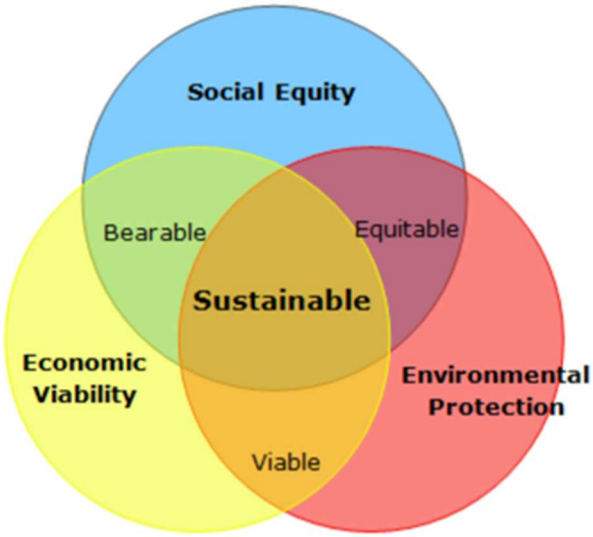

Figure 1.1 Sustainable Economic Development according to Barbier (1987)

Sustainability does not only refer to the protection of the environment but also the sustainability of the social and cultural aspects of existing in the holistic environment on reserve. The most sustainable recovery plan for a disaster is one that involves deeply engaged preparation with community member input, and the embracing and support of recovery systems that emerged organically from community knowledge systems, may already exist, and can persist long after a disaster or in perpetuity. Results show that mental health impacts of disasters, climate, and weather events last long after the immediate recovery aid, showing that the most socially sustainable recovery is one that repairs and protects the social and cultural dynamics of a community. In the case of a First Nations reserve community that means the continuation of supports for non-emergent ongoing treatment of mental health impacts, and support for the

normal continuation of community social and traditional events, alongside having capacity to scale-up when a disaster occurs. Current "sustainable" policy from governments often adheres only to the economic and environmental pillars of sustainability and neglects the social pillar of sustainability despite its key role in the economic development of a community (Cuthill, 2010). Additionally, the remoteness of many Indigenous communities results in being excluded from the benefits of non-Indigenous sustainability practices, amplified in some instances for Métis people who do not have the same access to services as First Nations (Howitt, 2012). As a whole, Indigenous peoples find themselves excluded from planning and policy in terms of disasters and sustainability (McGregor, Whitaker, & Sritharan, 2020; Lambert, 2022), which means disaster recovery plans do not benefit from local knowledge of social and cultural factors that enhance mental health and thus deserve support.

Social sustainability as a movement also tends to be ignored by funding agencies, researchers, in federal and provincial reporting systems, and in impact measurement in favour of economic and environmental sustainability (Woodcraft, 2015). Preparation and recovery planning for environmental jeopardy and climate change effects must include attention to mental and social health if it aims to enhance social sustainability for more sustainable growth and resurgence in First Nations reserve communities (Williams, 2017).

This thesis fills this common gap of sustainability by refocusing sustainable disaster recovery on the human elements of recovery. The most sustainable recovery for a community would be one in which mental health recovery is handled swiftly and addresses as many of the preexisting problems that lead to poor recovery outcomes after a disaster or weather event. First Nations reserves understand the compounding factors that result in not being able to properly recover from a disaster but are often hindered in their efforts by infrastructure, funding, and

limited resources. Economic sustainability is characterized by increasing economic opportunities with minimal impact on the environment, social, or cultural aspects of a company, organization, or community. Unfortunately, outside organizations often have little to gain economically from sustainable practices in First Nations reserves and First Nations people are relegated to the sidelines of sustainability conversations directly affecting them (i.e., policy) (Tsosie, 2014).

4.4 Conclusion and future directions

Future research should continue to explore the mental health effects of disaster, climate and weather events in First Nations communities, both on and off reserves. More primary data in this field is needed to affirm the results of this work and make an undeniable case for improving disaster recovery for First Nations in Canada. Additionally, future research should use strength-based examples of First Nations controlled recovery processes that have been successful in the past to develop a framework that can be applied and customized to the unique needs of First Nations in Canada that are seeking this information. Continuing pressure on the government to make good on their obligations and improve conditions and promoting sovereignty for Indigenous people is something Indigenous people in Canada are used to, and is recommended by UNDRIP, but the academic community needs to support and add to that pressure through research partnerships, joint actions in sharing results and providing recommendations, and raising awareness more widely of inequities.

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Appendix A: Study Characteristics

Citation #	Journal	Method	Data type	N	Response rate	Study setting	Disaster	Limitations
A3	Child and Youth Care Forum	Open ended promting, scheme based coding	Qualitative	49 age 8-12 plus their mothers	not listed	Missouri, US	Tornado	no causal inferences, only looked at mothers and not fathers
A36	Report for National Center for Disaster Preparedness & Operation Assist	Rapid assessment of health and social service needs of displaced populations	Quantitative	668 households	not listed	Urban Louisianna, US	Hurricane	disaster relief communities are not meant to be permanent and thus should not be treated as such
A25	Frontiers in Psychiatry	Online questionnaires	Quantitative	197	13.60%	Fort McMurray, Alberta, CAN	Wild Fire	low response rate, no baseline data for participants
A64	Journal of Womens Health	health assessment survey	Quantitative	194	63%	Louisianna and Mississippi, US	Hurricane	data repurposed from general health data
A23	International Journal of Psychology	longitudinal at 1yr after earthquake and 2yr after earthquake	Quantitative	325 children and adolescents	not applicable	Chile	Earthquake	lack of additional correlates
A44	International Journal of Disaster Risk Reduction	self report questionnairre	Quantitative	104	not listed	Germany	Flood	only partially representative of general pop
A38	Stress and Health	questionnaires	Quantitative	100 households	not listed	Thailand	Flood	hard to apply methodology to disaster aftermath
A24	Working with Older People	questionnaires	Quantitative	152	not listed	Indonesia	Earthquake	convenient sampling method

A19	European Journal of Psychotraumatology	Questionnaires	Quantitative	223 study, 224 comparison	not listed	Croatia	Flood	no causal relationships, self reported
A20	International Journal of Social Psychiatry	questionnaires	Quantitative	223	not listed	India	Flood	sample size, no long term follow up
A45	Economic Letters	questionnaires	Quantitative	22201	not listed	Australia	Various/multiple	Not listed
A48	Frontiers in Public Health	Phone survey	Quantitative	1510	40.20%	Fort McMurray, Alberta, CAN	Wild Fire	data not recorded by health professionals
A21	Current Psychiatry Reports	Review	quantitative	not applicable	not applicable	Haiti	Earthquake	Not listed
A13	Journal of Traumatic Stress	questionnaires	Quantitative	533	not listed	Poland	Flood	correlational
A22	Social Science and Medicine	questionnaires	Quantitative	1271	not listed	Alabama and Missouri	Tornado	confounding variables
A46	Health and Place	Health survey data	Quantitative	5694	32.80%	Houston Texas	Hurricane	differences in before and after hurricane data sample
A47	BMC Psychiatry	questionnaires	Quantitative	3070 plus 2796 comparison	72%	Fort McMurray, Alberta, CAN	Wildfire	Difference in collection time for comparison group
A49	PLoS ONE	individual hospitalization data and meteorological data	Quantitative	88996	not applicable	Switzerland	temperature	did not assess individual difference type of factors like ses
A40	Soc Psychiatry Psychitr Epidemiol	questionnaires	Quantitative	496	96%	Nicaragua	Hurricane	none listed
A4	American Historical Review	birth cohort data	Quantitative	15,049,738	not applicable	Colombia	Heavy rainfall events	not listed

A50	Science of the Total Environment	Review	Quantitative	28 studies	not applicable	Haiti	Earthquake	observational studies reviewed, self report
A6	Disaster Med Public Health Prep	questionnaires	Quantitative	123	not listed	Hunan China	Flood	self report
A60	Science of the Total Environment	health records	Quantitative	1000000	not applicable	Taiwan	temperature	some confounding variables not taken into account
A51	Psychology and Aging	questionnaires	Quantitative	223	not listed	Louisianna	Flood	no baseline
A52	Journal of Traumatic Stress	questionnaires	Quantitative	736	76.1% retention rate	Victoria, AUS	Bushfire	self report, and missing data
A53	Frontiers in Psychiatry	interview and questionnaire	mixed	352	not listed	Rome, Italy	weather and climate changes	didn't use objective measures of weather change
A67	Journal of Nervous and Mental Disease	review	Quantitative	not listed	not applicable	Not applicable	Various/multiple	not listed
A54	Child and Youth Care Forum	questionnaires	Quantitative	130	not listed	Texas	Hurricane	no baseline data
A55	Environmental Research and Public Health	review	Mixed	16 studies	not applicable	South Asia	Various/multiple	No grey literature
A56	Journal of Abnormal Child Psychology	questionnaires	Quantitative	581 parents, 510 children	not listed	Texas	Flood	not longitudinal
A26	Journal of Traumatic Stress	questionnaires	Quantitative	581 parents, 510 children	not listed	Texas	Flood	Not listed
A14	Ann Epidemiol	questionnaires	Quantitative	25478	not listed	Hunan China	Flood	not listed

A68	Journal of Affective Disorders	questionnaires	Quantitative	316	not listed	Texas	Hurricane	possible confounding variables and missed indicators
A27	Social Science and Medicine	questionnaires	Quantitative	316	not listed	Texas	Hurricane	possible confounding variables and missed indicators
A57	BMJ Open	questionnaires	Quantitative	590	24,4%	Cumbria, England	Flood	not listed
A28	Journal of Psychiatric Research	longitudinal questionnaires	Quantitative	3522	not listed	Wenchuan, China	Earthquake	high attrition rate
A31	Arch Gen Psychiatry	questionnaires	Quantitative	1043	not listed	Louisianna	Hurricane	mental issues not clinically determined
A69	Scandinavian Journal of Public Health	questionnaires	Quantitative	697	71%	Iceland	Volcano eruption	no baseline information
A70	Occupational and Environmental Medicine	questionnaires	Quantitative	1648	not listed	New York City	Hurricane	data taken from previous studies
A71	International Journal of Environmental Research and Public Health	questionnaires	Quantitative	7525	57%	England	Flood	no baseline data
A72	International Journal of Environmental Research and Public Health	review	Quantitative	276 studies	not applicable	Canada	Various/multiple	not listed
A41	Psychiatry Invest	questionnaires	Quantitative	83	69.90%	Korea	Flood	not listed

A30	Disaster Med Public Health Prep	questionnaires longitudinal	Quantitative	923	77% retention rate	Calgary, Alberta, CAN	Flood	no control for baseline levels
A73	Proceedings of the National Academy of Sciences of the United States of America	health cohort tracking	Quantitative	2495	not listed	Japan	Earthquake and tsunami	confounding variables
A74	Journal of Anxiety Disorders	review	mixed	not listed	not applicable	Canada focus	Various/multiple	not listed
A7	BMC Public Health	Questionnaire	Quantitative	25478	not listed	Hunan, China	Flood	low followup rate
A10	BMC Public Health	Questionnaire	Quantitative	25478	87%	Hunan, China	Flood	low followup rate
A39	Environments	Survey	Quantitative	176	not listed	Manitoba, Can	Flood	did not assess pre existing conditions or life patterns
A75	Epidemiology and Psychiatric Sciences	epidemiological survey	Quantitative	580	not listed	Japan	Earthquake and tsunami	self reported
A76	International Journal of Environmental Research and Public Health	review	Quantitative	5 studies	not applicable	world	wildfire	doesn't reflect how sleep changes over time
A77	Nature and Science of Sleep	3 surveys	Quantitative	1224, 1259, & 1289	55.5%, 55.9%, & 57.6%	Japan	Earthquake and tsunami	not longitudinal despite 3 time surveys, cant compare results directly
A78	Iranian Journal of Public Health	Review meta analysis	Quantitative	8 studies	not applicable	World(mainly China)	Earthquake	gendered data not available

A5	Psychological Medicine	intervention	Quantitative	480	not listed	Haiti	earthquake and flood	high attrition rate
A79	Disaster Medicine and Public Health Preparedness	Data review	Quantitative	6 studies	not applicable	Southeast Asia	Various/multiple	5 of 6 studies on same disaster
A80	Journal of Community Health	questionnaire	Quantitative	3030	not listed	Alabama, Florida, Louisiana, Mississippi, Texas	Hurricane, tropical storms	self reported
A81	BMC Public Health	health interviews	Quantitative	1089	not listed	Japan	Earthquake and tsunami	not randomly selected
A37	Bulletin of the World Health Organization	survey	Quantitative	9289	70.90%	Alabama, Louisiana, Mississippi	hurricane	sampling not random
A66	Mol Psychiatry	survey	Quantitative	815	not listed	Alabama, Mississippi	hurricane	disorders estimated with screening scales
A82	Sleep Medicine	survey	Quantitative	2951	not listed	Korea	Various/multiple	self reported
A83	International Journal of Environmental Research and Public Health	Survey	Quantitative	1358	not listed	Korea	Various/multiple	no causal realtionship
A84	JAMA Network Open	cohort study	Quantitative	2781	not listed	Japan	Earthquake and tsunami	no immediate short term results
A85	Journal of Psychiatric Research	cohort study	Quantitative	5058	59%	Japan	Earthquake and tsunami	self report
A86	Psychological Trauma: Theory, Research, Practice, and Policy	survey	Quantitative	345	not listed	Philipines	Typhoon	self report

A87	International Journal of Environmental Research and Public Health	meta-analysis	Quantitative	30 articles	not applicable	World	Various/multiple	no causal correlations possible
A88	Journal of Affective Disorders	Survey	Quantitative	1457 female and 1459 male	85.6% and 82%	Haiti	Earthquake	no causation
A29	Environ Res	survey	Quantitative	280	12.10%	England	Flood	only focused on houses that received direct damage (skewed towards homeowners)
A63	Ann Emerg Med	survey	Quantitative	366	not listed	Louisiana and Mississippi	Hurricane	not generalizable
A89	Environment International	database study	Quantitative	not listed	not applicable	Korea	dust storm	possible confounding variables and missed indicators
A90	Behavioral Sciences	survey	Quantitative	169 families	87%	Missouri, US	floods and dioxin	Old Data
A11	Australian and New Zealand Journal of Psychiatry	retrospective investigation	Quantitative	3698 families	not applicable	Hunan, China	Flood	not listed
A91	Social Science and Medicine	survey	Quantitative	272	not listed	Houston Texas	Hurricane	cant track trajectory of PTSD
A15	Canadian Journal of Psychiatry	retrospective study	Quantitative	33340	not listed	Hunan China	flood	not listed
A91	Environment International	systematic review	Quantitative	53 studies	not applicable	world	hot weather	No grey literature
A92	Geospatial health	Questionnaire	Quantitative	106	not listed	Bangladesh	flood	not listed
A93	Psychiatry Research	Questionnaire	Quantitative	111 families	not listed	Bangladesh	cyclone	no control group

A35	Psychol Health Med	Questionnaire	Quantitative	444	not listed	UK	flood	assessed symptoms not actual diagnoses
A94	JAMA Network Open	cross sectional	Quantitative	90	69%	Puerto Rico	hurricane	data from multiple studies
A95	International Journal of Environmental Research and Public Health	cross sectional	Quantitative	2180	not listed	Australia	flood	self report
A96	Frontiers in Public Health	cross sectional	Quantitative	2046	not listed	Australia	flood	relatively low number of aboriginal respondents
A97	Substance Use and Misuse	cross sectional	Quantitative	1687	not listed	NYC	hurricane	retrospective data
A8	Recovery from PTSD following Hurricane Katrina	survey	Quantitative	1043, 723, 1322	not listed	Louisianna	hurricane	PTSD estimated via screening scale
A98	Environmental Research	Health data	Quantitative	228104	not applicable	Labrador, Canada	temperature change	exploratory research
A99	Journal of Affective Disorders	reused datasets	Quantitative	not listed	not applicable	Miami, Florida	tropical cyclones	didn't account for migration
A101	BMC Public Health	cohort study	Quantitative	896	63.70%	UK	flooding	low number of cases in unaffaceted group
A100	Infant Mental Health Journal	survey	Quantitative	1064	76.00%	UK	flooding	confounding variables
A102	Infant Mental Health Journal	longitudinal study	Quantitative	408	not listed	New York City	Hurricane	infant temperment based on mothers reports
A17	Journal of Traumatic Stress	survey/questionnaire	Quantitative	561	not listed	Mexico	flood	not listed

A58	Am J Community Psychol	Survey	Quantitative	658	not listed	Mexico	flood	didn't capture qualitative observations
A16	Anxiety, Stress & Coping	interview and questionnaire	Quantitative	666	87%	Mexico	flood	self report
A59	Journal of Nervous & Mental Disease	survey	Quantitative	162	not listed	St. Louis Missouri	flood	not a random sample
A32	BMC Public Health	survey	Quantitative	2265	19.60%	UK	flood	differences in socioeconomic status for compared areas
A103	Frontiers in Psychiatry	comparative	Quantitative	1035	not listed	Alberta	Wildfire	no socioeconomic variables
A9	Med Princ Pract	retrospective study	Quantitative	7038	not applicable	Hunan China	flood	not listed
A104	International Journal of Environmental Research and Public Health	Review	Quantitative	18 articles	not applicable	world	Various/multiple	scales not consistent between studies
A105	Journal of Epidemiology and Community Health	cross sectional	Quantitative	2458	not listed	Tanzania	droughts and flooding	only used data from extremely poor areas
A106	Journal of Affective Disorders	questionnaire	Quantitative	1241	89.80%	Jiuzhaigou, China	Earthquake	only chose adolescents from 2 schools in the earthquake area
A107	Social Science and Medicine	questionnaire	Quantitative	438	not listed	Louisianna	Hurricane	not representative of pre hurricane population
A108	Epidemiology and Psychiatric Sciences	survey	Quantitative	8841	not listed	Australia	Various/multiple	self report
A109	Frontiers in Public Health	survey	Quantitative	2095	6.40%	Australia	bushfire, smoke	self report

A33	Can J Public Health	surveillance data	Quantitative	100000	not applicable	Alberta	Flood	multiple datasets
A61	Schizophrenia Research	psychiatric registry data	Quantitative	not listed	not applicable	Netherlands	flood	not listed
A110	Frontiers in Psychiatry	outpatient data analysis	Quantitative	not listed	not listed	Shanghai China	temperature	not listed
A111	Journal of the Formosan Medical Association	database study	Quantitative	897689	not applicable	Taiwan	typhoon	no unaffected reference group
A1	Developmental Psychobiology	Questionnaire	Quantitative	230 mothers	83%	Australia	flood	self report
A112	Walailak Journal of Science and Technology	Questionnaire	Quantitative	326	not listed	Thailand	flash flood and landslide	no preflood data
A113	Child Abuse and Neglect	health survey data	Quantitative	13181	not listed	Haiti	earthquake	cant assume causality
A12	J Fam Violence	questionnaires and semistructured interviews	Quantitative	205	not listed	Illinois and Missouri	flood	cant assume causality
A43	Jamba	questionnaire	Quantitative	429	not listed	Namibia	flood	based on childrens recollections two years past
A114	Clinical Epidemiology and Global Health	survey	Quantitative	171	not listed	India	flood	self report
A115	Behavioral Sciences	review	mixed	54 studies	not applicable	world	wildfire	only used two databases

A2	Matern Child Health J	birth data	Quantitative	57007	not applicable	North Dakota	flood	cant pinpoint those who experienced floods
A116	Child Psychiatry and Human Development	questionnaire	Quantitative	33	not listed	Louisianna/Oklahoma	hurricane	small sample size
A62	J. Child Psychol. Psychiat.	longitudinal	Quantitative	4978	not listed	Florida	hurricane	not listed
A117	Science of the Total Environment	hospitalization data	Quantitative	36607 cases of schizoophrenia	not applicable	Hefei, China	flood	only one hospital used
A34	Disaster Medicine and Public Health Preparedness	survey	Quantitative	210 households	not listed	India	flood	self report
A118	Science of the Total Environment	ER records	Quantitative	2.8million records	not applicable	New York	high temperatures	socioeconomic variables confounding
A119	Child Psychiatry and Human Development	questionnaire	Quantitative	295	not listed	Wenchuan, China	Earthquake	short period to measure long term effects of earthquake
A120	Psychological Trauma: Theory, Research, Practice, and Policy	questionnaire	Quantitative	2000	not listed	Alabama and Missouri	tornadoes	demographically limited

Appendix B: Interview Questions

Interview Guide

1. Were you living or working in the community during the flood years (2012-2016 for JSCN, 2005-2006 for YQFN)

Community Members

1. Tell me about the risks to health and wellbeing in your community related to flooding?
2. Tell me about the threats to mental health that flooding can create in your community?
3. Tell me about the threats to social health that flooding can pose in your community?
4. Tell me about the environmental issues you can see as a threat to your community?
5. What do you see as the largest obstacle for recovery after flooding or another environmental event in your community?
6. Tell me about the resources your community has available to recover from flooding? What do you feel could improve recovery resources and efforts?
7. Tell me about the resources your community has available for mental health recovery after flooding? What do you feel could improve mental health recovery?
8. Given the mental health resources you have available after a flood, do you feel the people in your community accessing these resources to the full extent?
9. What does culturally relevant healthcare look like to you?

Community Leaders/Administration (policy focused questions – need better knowledge of policy)

1. What do current government funds and policies cover when it comes to flood recovery in your community to the best of your knowledge?
2. What does current government policy and funds cover when it comes to mental health recovery after floods to the best of your knowledge?
3. What changes to current recovery related government policy and funds would you like to see for your community?

Community Health Workers and Mental Health Workers

1. What trends have you seen in the use of health services in the community after flooding events?
2. What trends have you seen in the use of mental health services in the community after flooding events?
3. What mental health needs are met or go unmet with the current services available for in your community after flooding?
4. What resources would you like to see made available to healthcare workers or community members for flood recovery?
5. What does culturally relevant mental healthcare look like to you?

Appendix C: Consent Form

School of Environment and Sustainability

Room 323, Kirk Hall
University of Saskatchewan
117 Science Place
Saskatoon, Saskatchewan
S7N 5C8
(306) 966-1851

Participant Consent Form

Project Title: First Nations Led Mental Health Recovery in the Face of Environmental and Flooding Jeopardy

Researcher: Kurt Belcher, graduate student, School of Environment and Sustainability, University of Saskatchewan, 306-260-4923, kmb700@usask.ca

Supervisor: Lori Bradford, School of Environment and Sustainability, University of Saskatchewan, 306-341-4260, lori.bradford@usask.ca

Purposes and Objectives of the Research:
The primary purpose of this research is to compile previous research on the mental health effects of flooding, collect new data on the effects, and apply the findings to the experiences of two First Nation communities in Saskatchewan. James Smith Cree Nation and Yellow Quill First Nation have past experience with annual spring flooding, many of the past years being dire enough for evacuation. The literature base shows a pattern of poor mental health effects following natural disasters, including effects like depression, post-traumatic stress-disorder, and anxiety. Mental health effects from natural disasters can be difficult to diagnose and attribute to the initiating event and therefore mental health issues are often overlooked and untreated during the community recovery. First Nations communities are susceptible to the negative effects of flooding due to their remote locations, limited access to health services, inadequate infrastructure, and historical colonial impacts and policies. A qualitative examination of the experiences of community members and community mental health workers in comparison with systematic review findings and policy mapping will allow for better disaster recovery planning, mental health recovery, and policy within these communities.

Procedures:

- You will be asked to answer a few open-ended questions in a semi structured interview and conversation. The questions themselves pertain to your experience with flooding in the community in the past and the potential health effects and mental health effects they have had on yourself and others. Additionally, some questions will pertain to the use of, funding, and policy surrounding mental health recovery for a flood crisis in the community.
- Please feel free to ask any questions regarding the procedures and goals of the study or your role.

Potential Risks:
There are no known or anticipated risks to you by participating in this research. However, there are possible psychological and emotional harms from the nature of the questions asked and reliving memories of psychological and emotional stress during the interviews. Questions will enquire about the individual's wellbeing at times of flooding in the past which could bring up upsetting memories for some participants.

- If any part of your participation in this study has made you feel uncomfortable, distressed, or upset, we encourage you to contact the mental health supports phone numbers if desired (306) 864-2454 (James Smith) / (306) 322-2041 (Yellow Quill), and an Elder will also be made available for support should it be requested.
- At the end of the study you will be given a sheet that better explains the nature of the study and you will be given a chance to ask any further questions that you might have.

Potential Benefits:

- You may receive no personal benefits from participation in the study.

Compensation:

- Participants will be provided honourarium at the Band's specified rate, and the Band will be compensated.

Confidentiality:

- Your data will be kept completely confidential and no personally identifying information will be linked to your data outside of the interview session. Data will be coded using arbitrary participant numbers that will not be associated with any names or personally identifying information. Consent forms will not be linked with the data. All data will be summarized in aggregate form.
- If participants contact the researchers by email or by other means that provides identifying information, confidentiality of the participant will remain protected as any emails will be destroyed beyond recovery immediately after a reply has been sent.

Right to Withdraw:

- Your participation is voluntary and you can answer only those questions that you are comfortable with. You may withdraw from the research project for any reason, at any time without explanation or penalty of any sort.
- Should you wish to withdraw, any data that you have contributed will be destroyed beyond recovery.
- Transcripts will be provided after the interview, and you will be able to make and changes you wish and respond to follow up questions. Your right to withdraw data from the study will apply until **two (2) weeks** after transcripts are provided.

Follow up:

- To obtain results from the study, please email the researcher using the information at the top of page 1. Results will not be available until January 2022 at the earliest.

Questions or Concerns:

- Contact the researcher using the information at the top of page 1;
- This research project has been approved on ethical grounds by the University of Saskatchewan Research Ethics Committee. Any questions regarding your rights as a participant may be addressed to the Behavioural Research Ethics board through the Research Ethics Office ethics.office@usask.ca (306) 966-2975. Out of town participants may call toll free (866) 966-2975.

By signing and submitting the consent form or providing verbal consent via the recorded interview, **YOUR FREE AND INFORMED CONSENT IS IMPLIED** and indicates that you understand the above conditions of participation in this study.

_____	_____	_____
Name	Participants's Signature	Date

I read and explained this consent form to the participant before receiving the participant's consent, and the participant had knowledge of its contents and appeared to understand it.

_____	_____	_____
Name of Participant	Researcher's Signature	Date