Fish and Fishing Practices in the Upper Severn River Watershed: Listening to Stories and Exploring Changes Over Time

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Author's Declaration

I hereby declare that I am the sole author of this thesis. This is a true copy of the thesis, including any required final revisions, as accepted by my examiners. I understand that my thesis may be made electronically available to the public.

Abstract

The effects of environmental change and proposed mining in remote northern Ontario has created an immediate need for the Keewaytinook Okimakanak Tribal Council (KOTC) member communities of the Upper Severn River watershed to situate fish as supporters of health and well-being through fish-people-land relationships and fishing practices. While fish are often viewed as a nutritional health support, this research aims to explore fish-people relationships as a determinant of health, while exploring how fishing practices and relationships with fish have changed over time using community-based research methodology and Indigenous methodologies, gathering and analysing qualitative data with the KOTC member communities of the Upper Severn River watershed. Purposeful sampling was used to recruit 18 participants with historic or current experience fishing in the Upper Severn River watershed. Perspectives, stories, and experiences of participants were collected through conversational interviews designed to facilitate storytelling. Interview data was analysed using thematic network analysis resulting in three global themes*:* 1) *Interactions Between Fish, Fishing, Health and Well-being;* 2) *Influences On, and Effects of Changes Surrounding Fish and Fishing*; and 3) *The Future of Fish and Fishing*, as well as 9 organizing themes and 24 basic themes. Findings identify positive effects of fish and fishing on health and well-being and the involvement of fish and fishing in relationships with family, community, and the land. Interconnections of changing needs for fish, fish health and behaviour, environment, available fishing methods, and land-based knowledges are also outlined. This research emphasizes that First Nations Peoples' health and more-than-human relations are linked. Initiatives which increase First Nations communities' ability to engage with, and the health of more-than-human relations, such as the land and fish, increase communities' health and well-being through supporting reciprocal relationships with the more-than-human.

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Table of Contents

Chapter 1: Introduction

Background

Prior to the arrival of European settlers on Turtle Island (North America), First Nations Peoples had sustainably managed and harvested local fish populations and had been doing so for thousands of years (McMillan & Prosper, 2016; Reid et al., 2022). Evidence of these sustainable traditional management and harvesting techniques date back to over three thousand years ago and show practices such as sex selective harvesting and the use of live capture community-built structures such as weirs; a human-made obstruction in water meant to trap fish (Dale & Natcher, 2015; Duffield et al., 2022; Morin et al., 2021). These practices were place-based, locally and regionally adapted to the specifics of the area's environmental and fish population's conditions (Eckert, Ban, Tallio, et al., 2018; Lee et al., 2019; Reid et al., 2022). Although these practices ensured a reliable constant food source from fish, the value of these practices extended beyond food (Ban et al., 2008; Lee et al., 2019; McGregor et al., 2018; Whitney et al., 2020). Management and harvesting practices were a manifestation of the reciprocal relationships' communities had with the fish, supporting not only physical health but also mental, spiritual, and emotional health, and overall well-being (Beveridge et al., 2020). These practices were grounded in cultural values, passed on through ceremonies, storytelling, and time spent on the land with family, facilitating the sharing of knowledges[1] across generations ensuring the sustainable future of these practices and the fish they were meant to protect (Eckert, Ban, Frid, et al., 2018; Eckert, Ban, Tallio, et al., 2018; Morin et al., 2021).

[1] The plural form knowledges is used purposely in this thesis in recognition of the heterogeneity of Indigenous knowledges across and within Indigenous communities (*About SKIPP | Situated Knowledges: Indigenous Peoples and Place*, n.d.).

Teaching youth fish management and harvest practices, and cultural teachings grounded within these management and harvesting practices was interrupted in the 1800's by the arrival of European settlers and the proceeding processes of settler-colonialism (Whitney et al., 2020). The very fishing practices which had ensured thousands of years of continued sustainability were deemed to be unsustainable by European settlers in an attempt to delegitimize First Nations environmental management practices and ways of life, and were subsequently banned (Ban et al., 2008; Dale & Natcher, 2015; Eckert, Ban, Tallio, et al., 2018; Turner et al., 2013). Ceremonies and cultural traditions were also banned, further regulations were implemented on fishing, more recently lakes and rivers were polluted, and fishing was commercialized (Dale & Natcher, 2015; Oloriz & Parlee, 2020) Historical and ongoing settler-colonialism has led to a drastic decrease in fishing by First Nations Peoples, making it difficult to maintain First Nations culture and traditional ways of life (Oloriz & Parlee, 2020). Settler-colonialism is also intrinsically linked to capitalism, heavily founded upon the dispossession of Indigenous Peoples traditional lands (McCormack & Gordon, 2020; Radcliffe, 2020; Shin, 2022). There are ongoing cases of land dispossession occurring through industrial development and commercial activities which are rooted in settler-colonialism with capitalistic goals of extracting natural resources from Indigenous Peoples traditional lands for economic gain, regardless of the negative effects to Indigenous Peoples and the environment (McCormack & Gordon, 2020; Radcliffe, 2020; Shin, 2022).

Fish and fish populations have also changed over time. There has been a massive decline in fish populations, and fish that remain are much smaller than in the past (Beveridge et al., 2020; Frid et al., 2016; McGregor et al., 2018; Oloriz & Parlee, 2020; Reid et al., 2022). The fish that are being caught presently have different colours and taste, and are sometimes deformed and

increasingly unhealthy (Natcher, Brunet, et al., 2020). The quality of spawning locations has declined, and the timing of spawning is shifting leading to an unpredictability in fish population behaviour (Whitney et al., 2020). Alongside the decreasing health of these traditionally harvested species, these fish are also being threatened by an increase in invasive species (Whitney et al., 2020). Additionally, Levkoe et al. (2017) describes how the disconnect in worldviews between western markets which view fish as a consumable resource whose place is a commodity in food markets, and First Nations Peoples view of fish as an integral part of identity and culture, leads to solutions to dwindling fish availability which fail to address First Nations relationships with fish and the land and disregard community-based values, identities, and practices (p. 4).

The combined and cumulative effects of settler-colonialism on traditional harvesting and management practices, environmental change and western fishing practices on physical fish populations and behaviours, and the lack of place-based and culturally appropriate solutions has threatened cultural continuity for First Nations Peoples, and negatively impacted the health and well-being of First Nations Peoples (Blanchet et al., 2021; Eckert, Ban, Tallio, et al., 2018; Levkoe et al., 2017; Natcher, Brunet, et al., 2020). Although First Nations traditional fish harvesting and management practices and relationships with fish and land have been threatened, the values underlying them remain (Abu & Reed, 2018; Cuerrier et al., 2015; Eckert, Ban, Tallio, et al., 2018).

Rationale

First Nations People's concepts of health go beyond a narrow understanding of health as merely physical and include mental, emotional, and spiritual health (*First Nations Perspective on Health and Wellness*, n.d.). First Nations People's health is also deeply relational, with connections to family, community, and the land which includes the water, air, and more-than-

human relations such as animals (*First Nations Perspective on Health and Wellness*, n.d.). Access to, the health of, and a relationship with land, water, and more-than-human relations are thus central determinants of First Nations Peoples health (Greenwood et al., 2018). Fish and fishing are especially important to the Keewaytinook Okimakanak Tribal Council (KOTC) member communities of the Upper Severn River watershed, and thus fish and fishing are a central pathway and opportunity for revitalizing relationships with community, family, land, and more-than-human relations in turn increasing health and well-being (McGregor et al., 2018).

Relationships with fish and the practices surrounding harvesting, consuming, and species management employed by First Nations communities have changed over time due to, in particular, settler-colonialism, environmental change, and industrial and commercial activity (Bélisle et al., 2021; Beveridge et al., 2020; Eckert, Ban, Tallio, et al., 2018; Hoogeveen, 2016; Oloriz & Parlee, 2020; Reid et al., 2022; Todd, 2018; von der Porten et al., 2019; Whitney et al., 2020). While it is apparent that relationships with fish, and fish harvesting, consuming, and management practices have changed, the specific changes over time and the impacts of these changes on health and well-being are not well documented or understood and have not been explored in the context of the Upper Severn River watershed. Moreover, the interconnections between fish, fishing, and the health and well-being of First Nations populations are largely unexplored. Most of the literature surrounding the intersection of First Nations Peoples and fish reduces fish to quantitatively measurable aspects of nutrition and sustenance and often examines fish from a toxicological perspective in relation to food safety (e.g. Chan et al., 2000; Gosselin et al., 2006; Takaoka et al. 2014). Canadian articles that do focus on changes in fishing practices and consider fish and fishing from a more holistic and/or relational perspective have primarily focused on coastal communities of British Columbia (e.g. Beveridge et al., 2020; Dale &

Natcher, 2015; Whitney et al., 2020). As of the 2021 Canadian census, Ontario had the largest population of First Nations Peoples of any other province or territory in so-called Canada[2], however Ontario was largely absent from reviewed articles about intersections of First Nations communities in so-called Canada and fish and fishing (*Indigenous Identity Population by Gender and Age*, 2023). This large population of First Nations Peoples in Ontario, and the lack of research in Ontario with First Nations communities highlights the need for the place-based and community-based research this thesis research carries out.

These knowledge gaps, and the need for place-based research and solutions highlight the importance of research that situates fish as more than a resource to be managed and more than food or sustenance within the KOTC member communities of the Upper Severn River watershed. My research, informed by community-based research methodology and Indigenous methodologies, responds to this need and gaps in the literature, explicitly exploring the nature of changing fishing practices and relationships with fish, and their implications on health and well-being in the remote northern Ontario KOTC member communities of the Upper Severn River Watershed through gathering and analysing qualitative data. This approach is necessary due to the importance of fish and fishing in the KOTC member communities of the Upper Severn River watershed beyond the quantitatively measurable aspects of fish typically used in industrial activity environmental impact assessments.

The KOTC member communities of the Upper Severn River watershed are at a unique point in the continued development of their relationships with fish and fishing practices. While

[2] The term "so-called Canada" is used in this thesis to identify the illegitimacy of the Canadian government sovereignty claims of Turtle Island (Alook et al. 2023). These illegitimate land claims are founded upon the displacement of Indigenous Peoples who have inhabited Turtle Island since time immemorial, who were displaced through concepts of terra nullius, the doctrine of discovery, and ongoing settler colonialism (Beaulieu, 2021).

industrial activity such as mining threatens the Upper Severn River watershed, community-based solutions such as the Deer Lake First Nation walleye hatchery presents the possibility of introducing new fish population management practices as well as renewing the health supporting relationships between the community, fish, and fishing in the watershed. The research goals and questions guiding this research emerged through ongoing interaction with the KOTC ensuring that the methodology and the findings support the needs and interests of the KOTC and communities. Importantly, findings from this research can also help the KOTC and KOTC member communities in finding ways to sustain fish-people relationships in place-based and culturally appropriate manners and to make decisions around land, resources, and economic development that support health and well-being now and in the future. Additionally, findings from this research can help fish and fishing to be protected by identifying the value of relationships with fish and fishing to health and well-being, and to prevent the reduction of labelling fish as a sustenance or resources by industrial development organizations.

Research Goals and Questions

The overarching goals of this project are to explore how fishing practices and relationships with fish have changed over time in the KOTC member communities of the Upper Severn River watershed and to situate the role of fish as more than food and a resource. The specific research questions are:

1) How have fish, fishing practices, and relationships with fish changed over time in the Upper Severn River watershed?

2) How do fish, fishing, and relationships with fish support health and well-being?

3) What are possible ways to sustain fish-people relationships in ways that support the health and well-being of First Nations communities and community members in the Upper Severn River watershed?

This project gathered stories and perspectives from community members from Deer Lake, Keewaywin, McDowell Lake, and North Spirit Lake First Nations about relationships with fish, meanings of fish and fishing, how fish and fishing practices have changed over time, personal importance of fish and fishing, and the role of fish and fishing in promoting health and well-being. After the completion of this research, a summary paper will be created to share key findings of the study with involved communities and KOTC leadership, as well as an infographic for participating KOTC member communities.

Positionality

Prior to beginning this Master's in Health Sciences program specializing in Indigenous and Northern health at Lakehead University, I completed an undergraduate degree in Biomedical Toxicology at the University of Guelph. Although the toxicology program was valuable in my academic journey, I realized that it was not a discipline I wanted to pursue a career in. When looking at job postings in my final year of the program, I realized that I would likely end up working in a large city, stationed at a piece of laboratory equipment, with difficulty seeing any positive impacts of my work on real people. Feeling trapped by this outlook, I realized that I wanted to do more than what my toxicology degree would allow me to do. I felt that there was something missing from the biomedical approach to health I had worked within through my undergraduate degree, reducing health to chemical pathways and focusing on disease, and learning of one size fits all approaches to healthcare which although may work for the majority of people, do not help populations suffering from unique healthcare gaps. In my final semester of

this program, through one of my classes I attended many guest lectures, where I learned that the best way to help populations suffering from gaps in health, is to work directly with those populations to fix these gaps. This appealed to me much more than working with laboratory equipment, showing me a way in which I could work with people in ways that benefit them.

This led to me looking north to Lakehead, at this Master of Health Sciences. When enrolling in this program it was my hope to work directly with First Nations communities and shift away from my background in quantitative data collection and analysis methods to instead working with people and communities using qualitative methods. When I started this master's program, I had no idea what I would be researching. I hoped I would be able to conduct research with First Nations communities, but as to the topic of this research, it was unknown to me. I was okay with this, because I understood that a large part of research with First Nations communities is conducting research with communities, for the communities' benefit, which is what I wanted to do when I applied to this program. Ensuring that the research I would be conducting for this thesis was guided by community interest and would benefit involved communities, and not imposing research processes and goals on communities was more important to me than researching something I had experience in, through research methods I had experience with.

Qualitative research was new to me when beginning this master's program. Lab equipment doesn't have opinions, stories, or biases, and in my undergraduate degree there were definitive right and wrong ways to go about lab work and research. Although bias permeates all research, this is especially true in the case of qualitative research where any person will interpret a phenomenon differently (Finlay, 2002). I try to remain conscious of my biases and identify ways in which they may affect this research. One important way to do this is by recognizing my positionality in relation to the research, data, and findings, and considering how my positionality,

experiences, and perspectives shape my work. For example, my sentiments towards toxicology influenced my choice to not focus on toxicology-based studies in my literature review, due to my view that these studies miss other important non quantitatively measurable health supporting aspects of fish and fishing. Through my undergraduate degree I also took several classes combining food and toxicology, looking at food as a pathway of consuming nutrients and toxins and the effects of this on the body. This led to me developing a reductionist view of food, placing it as adjacent to toxicology. This biased view of mine was identified to me by a member of my thesis committee and required that I reassess my views.

Most importantly, it is important for me to recognize that I am an outsider in the communities with which this research took place. I am a settler who grew up in southern Ontario, over a thousand kilometers from the places the participants in this research call home. I lack the experiences and worldviews of the community members of the KOTC member communities of the Upper Severn River watershed, and I know that there is much about their lives and ways of knowing, seeing, and doing that I will never fully understand. Although there will always be much that I do not know, recognizing this is equally as important to me as making a constant effort to continue to learn how to work better with these communities. I approached this research recognizing that being able to participate in this learning process is a privilege that I do not take for granted. The relationships and experiences which guide a large portion of this research, are not mine to research. Coming into this research it was not my impression that I would be doing research on the KOTC member communities of the Upper Severn River watershed. I understood that research would be done with, and for these communities guided by the needs and interests of the KOTC. I have the tools and skills to conduct research, but without the knowledge, trust, and generosity of these communities, this research would not have been able to occur. It was my

responsibility to ensure that the research was conducted in a culturally acceptable manner, and will give back to involved communities going forward, and I value the guidance constantly provided helping me to ensure this.

As someone who conceptualized health through a biomedical lens for five years of my undergraduate degree, I am thankful for this master's program for opening my eyes to more holistic ways of thinking about and understanding health. When friends and family ask what I'm researching, I am often faced with the question "what does that have to do with health?". It is my hope that by sharing the results of this research and participants' stories, that more people will come to understand the role of fish and fishing in supporting the health and well-being of First Nations communities and Peoples and help more people to see that health is about much more than physiology and biology.

Thesis Overview

Chapter One introduced the research this thesis carried out, provided background information on and conveyed the importance of the research topic, and outlined research goals and questions. Chapter Two summarizes and examines trends and gaps in the reviewed relevant literature surrounding First Nations Peoples, fish, and fishing across so-called Canada. Chapter Three outlines the methodology and methods used in this research, focusing on how the chosen methodologies and methods reflect KOTC research protocols in culturally relevant manners. Chapter Four presents the findings of this research through three global themes: 1) *Interactions between Fish, Fishing, Health and Well-being*, 2) *Influences On, and Effects of Changes Surrounding Fish and Fishing*, and 3) *The Future of Fish and Fishing*. Chapter Five situates the findings of this research in the broader experiences of First Nations communities with mineral development focusing on relationships with more-than-human relations, as well as providing

possible pathways forward in which the KOTC member communities of the Upper Severn River watershed could maintain a relationship with fish and fishing in the face of environmental and landscape change, mineral development, and evolving fishing practices. Chapter Six concludes this thesis presenting the significance and contributions of this research for the KOTC member communities of the Upper Severn River Watershed and the KOTC, and briefly revisits the personal importance of fish and fishing to the participants in this research.

Chapter 2: Literature Review

The purpose of this literature review is to synthesize knowledge and outline the existing literature on how First Nations fishing practices, and relationships with fish have changed over time in so-called Canada and how these changes have influenced the health and well-being of First Nations populations.

For this literature review Web of Science was used as recommended by Lakehead University's Health Sciences librarian. Web of Science is most appropriate for interdisciplinary research areas, and although there are other databases which are less comprehensive but more specific to Indigenous health research than Web of Science, the timeline of this project required a streamlined approach to accelerate data collection from current literature. I searched in Web of Science for articles about studies that took place in so-called Canada, using "Canada" as a topic search term, and containing "Indigenous OR First Nation*" in the title. Restricting the search to contain only articles with these words included in the title filtered out many articles which added in the terms Indigenous or First Nations to their abstract, while involving little to none First Nations involvement or focus. Fish* was used as a search term for article topics, to ensure that any studies about fish, fisheries, fishing, etc. would be included. When reading article abstracts to screen articles, studies with a primary focus on fish as a food source in a nutritional sense or examining heavy metal and contaminant levels in fish were not included. This was done as one of the focuses of this research is to situate fish more than a resource and more than a source of food, and thus nutritional food and toxicology focused studies were excluded. Publication date range limits were not applied as the included body of literature is recent. A summary of the search strategy used for this literature review is included in Appendix A.

While reviewing the articles, for each article I took notes to document key points and looked specifically at challenges experienced by First Nations communities, changing practices and relationships with fish over time, the effects of these changes, and their interactions with health and well-being. After individually reviewing all articles, I grouped my notes into common thematic areas, now reflected by the subsections of this literature review: i) *Sharing of Values and Local Knowledges*, ii) *Identity, Well-being, and Health*, and iii) *Changing Fishing Practices and Downstream Effects of Changing Fishing Practices*.

In the sub-sections that follow I first provide an overview of the values which govern traditional management and harvesting practices, and how these values and practices facilitate a process of intergenerational knowledge sharing. I then review how a sense of identity is built from these values, practices, and relationships and explore how this supports the health and well-being of First Nations communities. The effects of changing practices are summarized after situating health and well-being in these practices. Finally, key gaps and other trends in the reviewed literature are presented.

It is important to note that First Nations knowledges are land-based and place-based and vary by location and community, as do the customs and cultures of diverse First Nations populations across so-called Canada. The findings of this literature search cannot be deemed an accurate representation of all First Nations communities' practices and relationships with fish but are only a reflection of the practices and relationships found in the literature during this search.

Sharing of Values and Local Knowledges

Although cultural continuity has been challenged by settler-colonialism, Eckert, Ban, Tallio et al. (2018) report that that the cultural values guiding traditional fish harvesting and

management practices remain, as reflected in the experiences documented through semi-structured interviews with First Nations knowledge holders from communities across the coast of British Columbia; Wuikinuxv, Heiltsuk, Kitasoo/Xai'xais, and Nuxalk First Nations (p. 4). Within many First Nations cultures, fish have spirits, and fish and humans are not separated into people and animals as they are in western culture (Hoogeveen, 2016; Natcher, Brunet, et al., 2020; Oloriz & Parlee, 2020). When examining First Nations fishing practices, they cannot be looked at without also accounting for the values and culture on which they are built (Warrior et al., 2022). Practices are governed by values of respect, reciprocity, and long-term thinking for future generations (Reid et al., 2022; Whitney et al., 2020). In Turner et al. (2013), Haisla Elders in British Columbia explained that these values are manifested through intimately knowing the land, caring for the fish, not taking more than necessary, and adapting practices as needed thereby ensuring that fish and fish populations will flourish for future generations (p. 565). In this sense, caring for fish and ensuring a future for them, is caring for generations to come, and ensuring a future for them as well.

Fish are shown respect, and in many communities, such as the Cowichan Mustimuhw on Vancouver Island, are honoured through ceremonies and celebrations such as feasts (Ban et al., 2008; Dale & Natcher, 2015; Eckert, Ban, Tallio, et al., 2018; Oloriz & Parlee, 2020). Fishing before some of these ceremonies is not allowed and is considered disrespectful to the fish (Dale & Natcher, 2015). In addition to showing fish respect, these ceremonies also act as a way in which to share knowledge on respectful and sustainable fishing practices (Tallio, et al., 2018).

Ban et al. (2019) carried out a knowledge synthesis in partnership with the Kitasoo/Xai’xais stewardship authority in British Columbia on the topic of the community’s traditional marine governance (p. 1). The goal of this knowledge synthesis was to portray

Kitasoo/Xai'xais marine governance as an effective governance method in a push to regain leadership of local marine management (Ban et al., 2019). A common theme in this knowledge synthesis was the importance of passing down knowledges through generations (Ban et al., 2019). This knowledge synthesis highlights several important ways in which knowledges are shared including stories from Elders, personal stories shared during travel between home and fishing sites, hands-on learning, and learning by example (Ban et al., 2019). Out on the land, younger generations are taught about the environment, culture, and the history of their family in those places (Bélisle et al., 2021).

It has become harder to pass on these knowledges to First Nations youth (Bélisle et al., 2021). Natcher, Ingram, et al. (2020) distributed surveys to First Nations households along the Peace River in Alberta and found that the largest barriers to fishing identified by participants other than dwindling fish populations, were an increased cost and time requirement (p. 5). These barriers, combined with the findings of Bélisle et al. (2021), who conducted semi-structured interviews with two First Nations communities in boreal Quebec, Abitibiwinni First Nation and Ouje-Bougoumou First Nation, and recorded that older community members had a pressing concern about youth losing interest in the land, which means that it is becoming harder to pass on land-based skills, including skills related to fishing and fish (p. 8). This disconnect in youths' connection to the land was also reflected in interviews with Heiltsuk Nation documented by Lee et al. (2019) in which participants expressed that youth have lost their connection to the land and cultural keystone species, specifically northern abalone, a marine snail fished for along the coasts of the northeastern Pacific Ocean (p. 12).

Identity, Well-being, and Health

Many studies expressed the importance of fish and fishing being engrained in time spent with family, ceremonies, time spent on the land, and community life, leading to the centrality of fish for many Firsts Nations communities identity (Ban et al., 2017; Bélisle et al., 2021; Beveridge et al., 2020; Bingham et al., 2021; Capistrano & Charles, 2012; Dale & Natcher, 2015; Eckert, Ban, Frid, et al., 2018; Islam & Berkes, 2016; Lee et al., 2019; McMillan & Prosper, 2016; Nguyen et al., 2016; Oloriz & Parlee, 2020; Priadka et al., 2022; Reid et al., 2022; Todd, 2018; Whitney et al., 2020). The movements of fish dictate where and when people spend their time, and who they spend time with, building a lifetime of personal knowledge and relationships with the land and the species which live in a given community's traditional territory (Whitney et al., 2020). Without fish, there would be no fishing. Without fishing, there would be less time spent on the land and with family. Without this time, there would be less passing on of stories and knowledges. Without this sharing of local knowledges, values are challenged to survive as the practices they inform die out. When all this is gone, a large portion of First Nations identity and culture would be lost. This is why cultural keystone species, such as various species of fish for many First Nations communities, are a cornerstone in health, well-being, culture, and everyday life (Beveridge et al., 2020; Todd, 2018; Whitney et al., 2020). Cultural keystone species are defined as a species on which culture is built, with a key role in aspects of life such as diet, medicine, and cultural and spiritual practices (Garibaldi & Turner, 2004). These species support, and have great influence on people's lives, shaping ceremonies, language, relationships, and worldviews (Garibaldi & Turner, 2004). It is known and well-documented that culture and time spent on the land are important determinants of health for First Nations Peoples (Bélisle et al., 2021; Blanchet et al., 2021; Eckert, Ban, Tallio, et al., 2018; Greenwood et al.,

2018; Priadka et al., 2022). Fish and fishing are an intrinsic part of, and intimately connected to culture and time spent on the land such that fish and fishing should be considered an important determinant of health for many First Nations communities as well.

First Nations People's health and well-being are directly influenced by their food systems; the place-based and culturally appropriate acquisition and consumption of food (Blanchet et al., 2021). For the Syilx Okanagan First Nations communities of British Columbia, traditional food systems are heavily reliant on Okanagan Sockeye Salmon (Blanchet et al., 2021). Blanchet et al. (2021) looked at the self-reported well-being of community members from three Syilx Okanagan First Nations communities in British Columbia, specifically at the differences reported between non salmon eaters, salmon eaters, and Okanagan Sockeye salmon eaters; a cultural keystone species in the area (p. 1). In this study well-being was self-assessed using a survey, examining well-being as a combination of stress levels, mental health status, and life satisfaction (Blanchet et al., 2021). The results of this survey were divided into participant groups based on the type or lack of salmon consumed, determined by responses from a food frequency questionnaire (Blanchet et al., 2021). It was found that Okanagan Sockeye salmon eaters had a significantly higher level of well-being than regular salmon eaters, who once again had a significantly higher level of well-being than non-salmon eaters (Blanchet et al., 2021). This goes to show that the specific species of fish matters. A cultural keystone species cannot be treated as equivalent to another similar species, or an invasive species, even if they offer similar amounts of food from a harvest perspective. This was demonstrated in semi-structured interview responses with four coastal British Columbia First Nations communities (Heiltsuk, Kitasoo/Xai'xais, Nuxalk, and Wuikinuxv First Nations), in which Whitney et al. (2020) recorded that some community members were disgusted at the notion of harvesting an invasive

species (p. 8). Rather than fish for these more accessible and increasingly prevalent invasive species, certain community members stated they would travel much farther than previously required to continue fishing culturally important species (Whitney et al., 2020).

Simply having access to, and the ability to harvest culturally important fish, which is already under extreme stress, is only part of protecting and promoting the health and well-being of the First Nations communities which rely upon them. Settler-colonialism not only challenged First Nation People's ability to harvest culturally important species, but also challenged First Nations People's right to manage the land and culturally important species populations, as they had been doing for thousands of years pre-European contact (Dale & Natcher, 2015; Eckert, Ban, Tallio, et al., 2018; McMillan & Prosper, 2016; Reid et al., 2022; Turner et al., 2013). Many studies highlighted the importance of recognizing the value of, and explicitly allowing as a right, the ability for First Nations communities to exercise land and species management (Ban et al., 2019; Capistrano & Charles, 2012; Dale & Natcher, 2015; Lee et al., 2019; von der Porten et al., 2016). The communities participating in these studies identified this as an important factor in supporting their well-being (Capistrano & Charles, 2012; Eckert, Ban, Tallio, et al., 2018). The values of reciprocity and respect which govern First Nations relationships with fish depend upon their ability to care for the fish (Whitney et al., 2020).

On Vancouver Island, the use of weirs by Cowichan tribes was banned by the provincial government in the late 1800's, and they were provided with nets to fish with instead which were not an effective conservation tool, compared to weirs (Dale & Natcher, 2015). Although Cowichan tribes were still allowed to fish, they had to sit by and watch as European fishing practices decimated the population of their cultural keystone salmon species (Dale & Natcher, 2015). Recently, Cowichan tribes have been reviving the use of weirs, despite the resulting

clashes with fishing officers, and have been using weirs to monitor salmon populations and provide the provincial British Columbia government with more accurate fish counts (Dale & Natcher, 2015). Dale and Natcher (2015) document that this has instilled a sense of pride in the community, knowing they are helping and caring for the salmon (p. 1316). This demonstrates that recognizing First Nations rights to manage local animal populations and land, and in particular culturally relevant species, is an important step in decolonizing environmental management and improving the health and well-being of First Nations communities (Capistrano & Charles, 2012). The ability and right of First Nations communities to once again take the lead in managing cultural keystone species strengthens cultural connectedness, promotes fishing practices and knowledge sharing, and supports relationships with fish and the land, allowing the cycle of reciprocity to occur in its full potential, increasing well-being in these communities (Blanchet et al., 2021).

The official recognition of First Nation's right to manage local fish and fish populations, and the ability for First Nations Peoples to have control over these initiatives, may also help to limit the number of recurring confrontations with non-Indigenous fishers and fishing regulation enforcement organizations which participants in studies reviewed in this literature search expressed concerns over (McMillan & Prosper, 2016; Nguyen et al., 2016; Warrior et al., 2022). Nguyen et al. (2016) examined the root cause of these confrontations and determined that although non-Indigenous fishers and First Nations fishers are each critical of the other groups fishing practices, there exists a large common ground of concern about environmental change negatively affecting fish and fishing (p. 599). Another area of concern highlighted by Nguyen et al. (2016) was that while non-Indigenous fishers are often critical of First Nations fishing rights and practices, non-Indigenous fishers do not understand how these practices and rights came to

be, nor that they are restrictive of First Nations Peoples traditional sustainable harvest methods (Nguyen et al., 2016). It is important to note that the First Nation's practices which non-Indigenous fishers are critical of, are not traditional fishing practices, as traditional practices were banned (Nguyen et al., 2016). Therefore, the recognition of First Nations rights to practice traditional harvest and management methods may de-escalate some of these confrontations.

Changing Fishing Practices and Downstream Effects of Changing Fishing Practices

The literature reviewed identified that changes in environmental factors, physical fish, and fish behaviours, combined with a disruption in intergenerational knowledge sharing due to the residential schooling system and other ongoing effects of settler-colonialism has led to a loss of applicability of First Nations place-based knowledges (McGregor et al., 2018; Whitney et al., 2020). First Nations Peoples have always adapted to changes in the local and regional environment and changing fish populations; however, changes are now accelerating which makes adaptation and responses to these changes more challenging (Whitney et al., 2020). In addition to these challenges, many other barriers exist which are limiting the amount of time First Nations Peoples are spending out on the land fishing (McGregor et al., 2018; Natcher, Brunet, et al., 2020; Turner et al., 2013). Across the literature, a common barrier to fishing was the need to travel farther and farther to fish, which adds risk, financial costs due to fuel use, and takes more time than some people have available to them (Lee et al., 2019; McGregor et al., 2018; Natcher, Brunet, et al., 2020; Whitney et al., 2020). Of those who are still fishing, the vast majority have had to change how they fish to remain successful, and even then, are not catching as much as they used to (Eckert, Ban, Tallio, et al., 2018).

These barriers, combined with declining fish populations and interrupted sharing of knowledges also means that less and less people are fishing now (McGregor et al., 2018;

Whitney et al., 2020). Due to this, traditional foods including fish are not being eaten as often as they once were, and for some people are only consumed at important cultural events (McGregor et al., 2018). Those who do not fish are often still given fish by others through sharing networks; however, research also illustrates that some do not know how to clean and/or cook fish, and in certain cases, younger generations do not eat fish unless it is their grandparents who are cooking it for them (Islam & Berkes, 2016; McGregor et al., 2018).

Islam and Berkes (2016) explored the use of fish sharing networks within the community of Norway House Cree Nation in northern Manitoba using questionnaires, semi-structured interviews, and focus groups (p. 815). This research illustrated that the fish sharing network in the community used to be vast and capable of reaching the majority of community members, ensuring most people had access to culturally important fish (Islam & Berkes, 2016). Those who fished less or could no longer get out on the land to fish, were given fish from others (Islam & Berkes, 2016). Although these sharing networks still exist, community members of Norway House identified that the networks are now less active in terms of people reached and amount of fish shared than they used to be (Islam & Berkes, 2016). This decline in fish sharing was also noted by Natcher, Brunet, et al. (2020) who mapped the sharing networks of 11 First Nations communities in Peace River Alberta and found the fish sharing networks to be low density (p. 7). Therefore, the effects of fewer people fishing are compounded throughout the community, as one person stopping fishing does not necessarily mean only one person is no longer eating fish, rather a branch of a sharing network, affecting multiple community members, is lost.

These effects create an ongoing cycle, in which each step results in the further loss of practices, culture, and identity, jointly negatively affecting First Nations communities and the fish which are important to them. A central theme discussed in the literature was a concern over

the future of relationships between First Nations peoples and fish (Bélisle et al., 2021; Eckert, Ban, Tallio, et al., 2018; Lee et al., 2019; Whitney et al., 2020). Specific concerns identified and discussed in the literature included declining fish populations, youth disinterest in the land, loss of fishing and land-based skills, culture, language, and traditional foods, with the actual act of contemplating these losses evoking difficult emotions such as fear (Bélisle et al., 2021; Eckert, Ban, Tallio, et al., 2018; Whitney et al., 2020).

Overall, the ongoing effects of settler-colonialism and environmental changes have negatively affected fish and influenced First Nations practices surrounding fish, and relationships with fish, causing a cascade of effects on health and well-being. Although not all studies explicitly linked changes to fish and fishing to relationships and health, when looking at the literature overall, these intersections are very clear and particularly relevant.

Trends and Gaps in the Literature

Many of the relevant articles reviewed in this literature search, 20 of 32, were focused on First Nations communities of British Columbia (Ban et al., 2008, 2019, 2017; Beveridge et al., 2020; Bingham et al., 2021; Blanchet et al., 2021; Dale & Natcher, 2015; Duffield et al., 2022; Eckert, Ban, Frid, et al., 2018; Eckert, Ban, Tallio, et al., 2018; Frid et al., 2016; Hoogeveen, 2016; Lee et al., 2019; Morin et al., 2021; Oloriz & Parlee, 2020; Reid et al., 2022; Turner et al., 2013; von der Porten et al., 2016, 2019; Whitney et al., 2020). Although many differences exist among unique First Nations communities across so-called Canada, certain key differences exist between the communities of British Columbia the KOTC member communities of the Upper Severn River watershed. Notably, the cultural keystone fish for coastal British Columbia First Nations communities is salmon. Although salmon and some species of fish important to the KOTC member communities of the Upper Severn River watershed (e.g., walleye, pike) migrate

to spawn, salmon migrate throughout the Pacific Ocean and are thus more influenced by commercial ocean fishing and boating activities, whereas the fish in northern Ontario are more at risk of environmental changes due to industrial activities (Ban et al., 2008, 2017; Beveridge et al., 2020; Bingham et al., 2021; Dale & Natcher, 2015; Eckert, Ban, Frid, et al., 2018; Eckert, Ban, Tallio, et al., 2018; Lee et al., 2019; Turner et al., 2013).

One potential reason for the large body of literature focused on British Columbia in this literature search could be that the commercialization and overfishing of fish in coastal so-called Canada presents a more immediately viewable threat to fish populations than the threats fish face in Northern Ontario. Commercialization and overfishing are easily viewable manifested as a drastic decrease in fish populations, while changing fish behaviours and physical fish health in remote Northern Ontario is harder to see, though just as important. These different threats to fish, fishing practices, and relationships with fish between the two contexts are both important, but likely induce different effects and will require different solutions. Just as Indigenous knowledges are place-based, solutions need to be place-based, place-responsive, and culturally appropriate as well. Although a large pool of literature from British Columbia is valuable, the unique position and experiences of First Nations communities in Northern Ontario needs to be understood and addressed and underscores the value of this thesis' research.

Additionally, the treaty making process which affected northern Ontario and British Columbia contrast each other in terms of both timing and scope (Curry et al., 2014). While most of eastern so-called Canada had initiated the treaty making process prior to the official recognition of so-called Canada as a country, this was not the case in British Columbia (*History of Treaties in B.C.*, n.d.). In 1871, British Columbia recognized the Canadian constitution's outlined rights of Indigenous People, however as a province they failed to accept Indigenous title

(*History of Treaties in B.C.*, n.d.). It was not until 1991 that British Columbia re-initiated the treaty making process through the implementation of the British Columbia Treaty Commission, with the self stated goal of negotiating modern treaties justly in an act of reconciliation (*History of Treaties in B.C.*, n.d.). The exception to this is Treaty 8 signed in 1899 which encompasses the northeastern portion of British Columbia, however many of the studies from British Columbia in this literature review are from coastal communities outside of this Treaty territory (Tesar, 2016).

The subject of Northern Ontario treaties was limited, speaking to land ownership, hunting, and fishing rights, and presented deceptive differences in what was legally written versus what was said orally (Albers, 2011; Curry et al., 2014). British Columbia's treaties however, unsurprisingly as they were created much more recently, encompass a wide range of aspects including provincial government responsibilities, and are in ongoing development and approval with the communities they affect (Curry et al., 2014). This is likely to have led to different effects on fish-people-land relationships across these two regions.

Another important aspect missing from the literature reviewed in this search was information on Indigenous-led fish hatcheries and other community-based capacity building approaches related to fish and fisheries. This specific topic area is of particular interest to the KOTC given the recently initiated walleye hatchery in Deer Lake First Nation. Since the arrival of European settlers on Turtle Island, fish populations have declined, further suffering from the effects of overfishing and environmental change (Chittenden et al., 2010; Galbreath et al., 2014; Huber et al., 2024)**.** To sustain increasing fish harvests in the face of diminishing fish populations and deteriorating fish habitats, fish hatcheries in which fish are reared in controlled conditions and later released into the environment have been turned to as a popular method of trying to increase fish populations (Larocque et al., 2020; Tidwell & Allan, 2001). Fish hatcheries,

however, are a solution to a western created problem, and are regulated by the government of so-called Canada (Chittenden et al., 2010; Galbreath et al., 2014; Government of Canada, 2018; Huber et al., 2024). Fish hatcheries have also faced criticism, including worries that fish released from hatcheries are displacing wild fish, are homogenizing fish species' genetics, and that fish released from hatcheries are overall less healthy than wild fish (Chittenden et al., 2010; Huber et al., 2024; Larocque et al., 2020)**.** While hatcheries can be an effective conservation initiative to restore declining fish populations and revitalize fishing practices, their derivation as a solution to western caused threats to fish and the environment, and regulation by western governments raises some potentially necessary questions: What place does western environmental management have in Indigenous land governance? What role does/could a hatchery play in revitalising and sustaining fish-people relations and well-being? How will First Nations culture and values be maintained within a conservation initiative rooted in western science? These are questions which can be addressed with and by the communities they affect, such as Deer Lake First Nation with their implementation of the 2023 Walleye Hatchery.

As mentioned earlier when outlining this literature review, many papers in the initial literature search were not included due to their primary focus on potential contaminant levels in fish, and toxicology. Although knowledge of these contaminants is necessary for understanding the connection between fish and health in First Nations communities, First Nations concepts of health are more holistic compared to western views of health and incorporate concepts such as ties to the land and mental, emotional and spiritual health (Bélisle et al., 2021; Blanchet et al., 2021; Priadka et al., 2022). Spiritual health is subjective to everyone's experiences and is entwined with each aspect of health and well-being (*Indigenous wellness framework reference guide*, 2020). A simple definition of spiritual health is living a quality life, which is built on

identity, culture, relationships, and having hope for the future (*Indigenous wellness framework reference guide*, 2020). Mental health is having the ability to learn, understand, and think intuitively, as well as listen to one's spirit (*Indigenous wellness framework reference guide*, 2020). Emotional health encompasses how one feels and is related to one's sense of belonging and relationships with family, community, and more-than-human relations (*Indigenous wellness framework reference guide*, 2020). Lacking engagement with mental, emotional, and spiritual health, the contaminant and toxicologically focused studies, although generating relevant knowledge, fail to address the larger picture of First Nations health, fail to recognize fish as a cultural keystone species that promotes health and well-being, and generally conceptualize from a rather narrow perspective: fish primarily as food in relation to nutrition and sustenance or fish primarily as a resource (Hoogeveen, 2016).

Notably, four recent articles reviewed herein explicitly conceptualized and understood fish as more than a resource and more than food in terms of sustenance along with a focus on fish-people relationships. In response to narrow views of fish in the existing literature, Hoogeveen (2016), Levkoe et al. (2017), and Lowitt et al. (2019, 2020) conceptualize and explore broader understandings and values of fish as related to First Nation communities.

From a post-humanist perspective, Hoogeveen (2016) articulated the importance of fish beyond the quantitatively measurable aspects presented in environmental assessment and argues for the imperative of non-reductionist understanding that fish "lie outside of capitalism and how they remain embedded in settler colonialism" (p. 362). Hoogeveen (2016) presents the concept of 'fish-hood' to capture and represent the expansive intrinsic value of fish and importance of fish-people relationships as related to environmental impacts assessments and regulations (p. 357). Hoogeveen (2016) explored a proposed mine in British Columbia on Tsilhqot'in lands that

would have destroyed Fish Lake, an important fishing site for local Tsilhqot'in people (p. 355). The proposal of this mine stated that to make up for rendering Fish Lake incapable of supporting fish life, fish would be removed from Fish Lake and transferred to another lake nearby to stock it, while the remainder of fish in Fish Lake would die (Hoogeveen, 2016). This is a blatant demonstration of disregarding fish-hood, the diverse values of fish from First Nation perspectives, and place-based fish-people relationships (Hoogeveen, 2016). The driving force behind this ignorance of the First Nations values of fish, is that from an industrial perspective fish are viewed through a scientific quantitative lens (Hoogeveen, 2016). Understanding fish through the concept of fish-hood however positions fish as more-than-human entities with important roles in the lives of surrounding communities (Hoogeveen, 2016).

Levkoe et al. (2017), and Lowitt et al. (2019, 2020) have used a fish as food lens in their work with First Nations communities which aims to show the role of fish in food systems and fisheries beyond an economic good. More specifically, conceptualizing fish as a part of broad systems of relationships with the human and the more-than-human world and allowing for fish to be more holistically understood as part of culture, identity, ways of knowing, and well-being (Levkoe et al., 2017; Lowitt et al., 2019, 2020). This approach to analysing the roles of fish beyond a commodity in fisheries was applied to research with Batchewana Bay First Nation located between Lake Huron and Lake Superior (Lowitt et al., 2020). Lowitt et al. (2020) conducted 12 interviews with Batchewana Bay First Nation community members with experience and knowledge of fishing in the community and identified that although fish is a necessary food providing community members with a healthy diet and sustenance, fish and fishing are also part of the community's identity, maintaining intergenerational knowledges, and culture (p. 2). Examining fish within a system, rather than as an end product or resource with

value only in consumption situates fish as having place-based importance in the ways of life of the people that catch and consume fish (Levkoe et al., 2017; Lowitt et al., 2019, 2020).

It is also notable that the Two-Eyed Seeing approach was rarely applied or discussed in the reviewed literature. Two-Eyed Seeing is a concept which was created by Albert Marshall, a Mi'kmaq Elder in 2004, and involves using the strengths of both western and Indigenous knowledges and worldviews to work collaboratively, often in relation to ecosystems and human health (Bartlett et al., 2012). It has since been used widely in collaborative work and research and differs in scope based on the knowledge and backgrounds of those using it (Bartlett et al., 2012). The articles that did mention Two-Eyed Seeing were primarily studies examining marine governance and conservation in and around land/waters local First Nations communities used to fish. Warrior et al. (2022) conducted semi-structured interviews in Nova Scotia with Mi'kmaq and non-Mi'kmaq individuals who had participated in a local marine protection area consultation (p. 1298). Approximately a quarter of participants identified that marine protection areas should utilize Two-Eyed Seeing to recognize and respect place-based Indigenous knowledges' role in environmental management decisions (Warrior et al., 2022). This was reflected by Von Der Porten et al. (2016), as well as Bowles et al. (2022), who both highlighted the value of using Two-Eyed Seeing in marine governance to build respect with local First Nations communities and engage with the views of multiple populations who use the marine areas (p.75, p. 1215-1216).

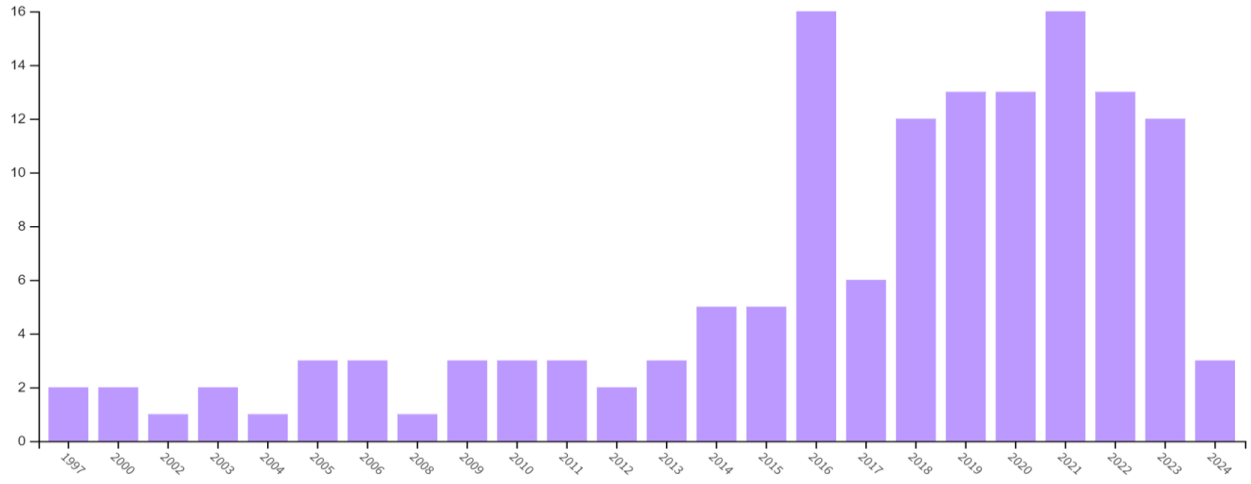
In the literature reviewed, in contrast to the quantitative data collection and analysis methods used in many articles before screening, many studies reviewed after screening utilized interviews with First Nations communities as a data collection method, while some combined this with or used exclusively surveys and policy reviews. Though interviews were widely used,

the structure of them varied, with only some using semi-structured interviews and the conversational method which were used in this research. Although surveys are capable of reaching a large number of people and present less of a time requirement by researchers compared to interviews, surveys collect data based upon a set of predetermined answers to choose from, which is not as accurate a representation of place-based knowledges as interviews are, especially when the surveys used are not made in collaboration with community members.

No publication year cut offs were implemented in this literature search, however all but two relevant articles were published within the past 10 years, with approximately half of them having been published within the past five years. Until 2013, few articles were being published about First Nations Peoples and fish. From 2013 to 2016, the number of articles per year increased by over 500% and has since dropped slightly and plateaued, demonstrated in Figure 1.

Figure 1

Publication Year Bar Chart for Literature Review Prior to Screening



Note. Publication years of articles from web of science literature search "Indigenous OR First Nation* (Title) and Fish* (Topic) and Canada (Topic), before screening. Number of articles displayed on y axis; publication years displayed on x axis. From: Web of Science. https://www-webofscience-com.ezproxy.lakeheadu.ca/wos/woscc/analyze-results/a3375781-a3fe-40f1-9c92-38435d4839aa-92907899

Within the current literature, proposed solutions to these issues and effects focus on recognizing and prioritizing Indigenous land and species management systems, led locally by First Nations communities (Capistrano & Charles, 2012; Eckert, Ban, Tallio, et al., 2018; Natcher, Brunet, et al., 2020; von der Porten et al., 2016). This has the potential to protect and help fish populations and local First Nations culture to recover from the effects of settler-colonialism and environmental degradation, as well as improve the well-being of involved First Nations Peoples (Capistrano & Charles, 2012; Eckert, Ban, Tallio, et al., 2018). This focus may be helpful but will likely vary in terms of effectiveness based on external factors such as industrial activities and specific community contexts and needs thus other measures may need to be taken.

Health and well-being were not always engaged with or situated within the literature. Many studies did not address impacts on health at all nor did they include health and well-being in their background understanding of the ties between First Nations communities, fish, and fishing. Other studies only briefly mentioned health and/or well-being, stating that connection to the land, fishing practices, and management of fish and the land are important to First Nations health and well-being, but did not expand on this short statement or engage with it in their research. Few studies further explored the effects of fish and fishing on First Nations health and well-being, however those that did identified important points.

Bélisle et al. (2021) collaborated with the communities of Abitibiwinni First Nation and Ouje-Bougoumou in Quebec to explore the communities' perceived values of the land (p. 1). Through semi-structured interviews and the use of community maps, participants described and located areas which were important to them and explained why these areas had value (Bélisle et al., 2021). Participants talked with Bélisle et al. (2021) about the term ressourcement, which

means a “reversion to one's sources, finding one's deep roots in order to reach a new balance” (p. 5). One of the ideologies of ressourcement is that having a strong relationship with the land improves health (Bélisle et al., 2021). Participants described aspects of ressourcement as including time spent on the land, having a spiritual connection to the land, spending time with family, and explained that these were needed to maintain good health and well-being (Bélisle et al., 2021).

Another study which robustly explored health and well-being discussed earlier was Beveridge et al. (2020). This study demonstrated that connectedness to cultural keystone species improved well-being of those who fished for and consumed cultural keystone fish (Beveridge et al., 2020). Beveridge et al. (2020) showed that health and well-being are heavily influenced by food systems, and that food systems are one method of ensuring cultural connectedness and relationships with the land and keystone species (p. 5).

Literature Review Summary

In First Nations communities, the respectful and sustainable harvest and management of fish has occurred since time immemorial (McMillan & Prosper, 2016; Reid et al., 2022). This respectful relationship with fish has been maintained over time by passing down local values and knowledges to younger generations, and through learning with family, community members, and the land (Eckert, Ban, Frid, et al., 2018; Eckert, Ban, Tallio, et al., 2018; Morin et al., 2021). Additionally, for First Nations communities who rely on fish, fish and fishing are deeply entwined in ways of life, identity, health, and well-being (Beveridge et al., 2020; Todd, 2018; Whitney et al., 2020). However, fish and the environment have undergone numerous negative changes, influencing First Nations fishing practices and relationships with fish (Bélisle et al., 2021; Beveridge et al., 2020; Eckert, Ban, Tallio, et al., 2018; Hoogeveen, 2016; Oloriz &

Parlee, 2020; Reid et al., 2022; Todd, 2018; von der Porten et al., 2019; Whitney et al., 2020). Changes in fish and the environment are accelerating and becoming larger in scope, however the impacts of these changes on health and well-being are largely unexplored (Whitney et al., 2020). There is also limited research with First Nations communities in Ontario conducted using qualitative research methods which situate fish as more than a resource to be managed or a source of sustenance. This thesis research addresses the current literature gap of Ontario based research examining fish and fishing from a relational and holistic perspective using qualitative research methods. The following chapter, Methodology and Methods, outlines how this research achieves this.

Chapter 3: Methodology and Methods

This chapter introduces the methodology, conceptual framework, and data collection and analysis methods and how they align with the research goals and research process. Background information is then provided on the research context, referring not to the physical location in which the research was conducted but rather the locations of the communities' participants are members of, where the research pertains to. The research processes from recruitment to data analysis are then outlined, followed by ethical considerations of this research.

Methodology

This research draws on community-based research approaches and is informed by Indigenous methodologies. Community-based research helps to address potential power imbalances by situating the researchers and community members as equal parties and works towards improving the well-being of the community/communities with which the research is being conducted (Israel et al., 1998). Community-based research is conducted in a community specific culturally appropriate manner and involves consistent collaboration throughout the research (Israel et al., 1998).

It is important to recognize that although community-based research is regarded as a valuable approach to research involving Indigenous populations, it does not in itself sufficiently adhere to the Indigenous worldviews that should be present in the research unless it is further grounded in Indigenous methodologies. The western understanding of the term community encompasses a group of people who identify with one another through commonalities, creating a collective identity (Israel et al., 1998). Many Indigenous communities however recognize community as extending beyond people, to include animals, the environment, and spirits as well (Ermine, 2004;

Kovach, 2015). Stemming from this broad sense of community, is the value of reciprocity in which there is a collective community responsibility for individuals, and an individual responsibility for the community, extending to all those mentioned above (Ermine, 2004). Therefore, when conducting community-based research with First Nations populations, Indigenous methodologies need to be understood and guide the research. This is not to say that as a settler person I use Indigenous methodologies, but rather the methods chosen for this research are informed by an understanding of Indigenous methodologies. As this research is conducted in and with First Nations communities, Indigenous worldviews need to be present in the research design as to not impose western research methods on the First Nations communities and participants participating in this research.

Community-based research is an appropriate approach for this study, as the goal and research questions were identified by KOTC staff, approved by member communities' Chiefs and Councils, and respond to identified priorities and needs of the member communities and tribal council. The research questions focus specifically on changes in and effects on the KOTC member communities of the Upper Severn River watershed, and the research is dependent upon the local knowledges of community members. The KOTC played a leading role in developing the project goals, objectives, data collection, analysis plan, and data governance via committee meetings, community consultation, and meetings with the KOTC Chiefs Council (this occurred between September 2022 and April 2023). KOTC's department of treaties, lands, and resources works within an ethical space of engagement framework, which offers a suitable platform for community-based research with various partners (Ermine, 2007). Working within the ethical space of engagement means working within a framework of cooperation while recognizing how ingrained cultural differences can contradict each other (Ermine, 2007). The aim of recognizing

these cultural differences is to find ways to understand the other party's views and ingrain them in collaborative solutions moving forward (Ermine, 2007).

Conceptual Framework

I use a post-humanist and social constructivism conceptual framework when conducting this research. Post-humanism recognizes that both humans and non-humans, including the environment and animals, create change that is influenced by the relationships between humans and non-humans (Keeling & Lehman, 2018). These post-humanist views on relational environmental interactions align with the Indigenous definition of, and reciprocity to community mentioned above which is central in Indigenous methodologies (Datta, 2016; *First Nations Perspective on Health and Wellness*, n.d.; Keeling & Lehman, 2018). This post-humanist recognition of the importance of people's relationships with their environment (physical environment, spiritual environment, living and nonliving environment) aligns with the Indigenous worldviews that people and their non-human environment are interconnected, and that the relationships which describe this interconnection between people and the non-human environment is an important aspect of health and well-being (Datta, 2016; Keeling & Lehman, 2018). Post-humanism, as well as Indigenous methodologies further incorporate human and non-human environment relationality in all aspects of life, including environmental management, and the creation of knowledge, both of which are important aspects of this research (Datta, 2016).

Post-humanism, "helps us to understand what human and nonhuman relationships are in practice" (Datta, 2016, p. 55). Thus, post-humanism lies at the root of this research's goals: situating fish as shaping KOTC community members' lives, who's ways of life in turn influences their relationship with and how they affect fish, leading to ongoing cycle in which the relationship between KOTC community members and fish influence each other within the shared

communal environment of the Upper Severn River watershed (Datta, 2016; Keeling & Lehman, 2018). This post-humanist understanding of the influence of relationships between human and non-human aspects of participants' environments was used in developing the interview prompt guide for this research. Prompts were designed to explore how people's relationships with family, community, and fish affect each other within a larger complex web of relationships. Placing fish within this relational web as having equally impactful effects on participants' ways of life as a family member would, adheres to both post-humanism and Indigenous methodologies (Datta, 2016; Keeling & Lehman, 2018).

Post-humanism is also returned to heavily in the discussion section of this thesis when situating the findings of this research within the experiences of other First Nations communities outlined in the reviewed literature. Throughout the discussion, fish, land, and other non-human living beings are conceptualized as more-than-human relations, further emphasizing the strength of relationships present between First Nations Peoples and the environments with which they live in across so-called Canada.

The similarities between Indigenous methodologies and post-humanism, as well as the goals of post-humanism to understand the relational importance and influence between humans and non-humans makes post humanism an appropriate conceptual framework for approaching this research due to this research being conducted with First Nations communities and focusing on the relationships the participating First Nations communities have with their non-human environment, specifically fish.

In social constructivism, there is an emphasis on creating and understanding that knowledges need to be understood culturally and contextually (Kim, 2001). In this sense, social constructivism and community-based research pursue the same goal of creating findings that are

directly beneficial and applicable to the communities with which the research is conducted. Working within a social constructivism framework also means treating learning as a social process (Kim, 2001). Treating learning as a social process is reflected in Indigenous methodologies in which reciprocity and collaboration govern data collection methods such as storytelling which is a culturally important and social method of sharing knowledge that was used in this research to collect First Nations community members' knowledge orally (Archibald, 2008). Additionally, the knowledges collected during interviews includes information regarding changing fishing practices and relationships with fish, which are both aspects that participants' knowledges of will have been acquired through deeply relational, and social activities.

Methods

This research study uses qualitative data collection and analysis methods grounded in community-based research and is informed by Indigenous methodologies to explore changes in relationships with fish and fishing practices, as well as their impacts on health and well-being. Using qualitative data collection and analysis research methods for this study allowed me to incorporate Indigenous oral traditions of passing on knowledge through stories of personal experiences which are influenced by worldviews (Kovach, 2015). Although research with non-Indigenous people may also use stories of personal experience as a data collection method, and all stories of personal experience are influenced by the worldviews of the individual who is sharing the story, it is the cultural value of using stories to share knowledge that makes it important in research with First Nations communities. First Nations knowledges are primarily shared through stories, and this method of teaching is important to First Nations identity and culture (Archibald, 2008). Fish are also primarily examined from a quantitative viewpoint in research and environmental assessments, therefore using qualitative methods in this research

better situates the role of fish and fishing in the KOTC member communities of the Upper Severn River watershed.

Research Context

It was planned that this research would take place in the KOTC member communities situated in the Upper Severn River watershed: Deer Lake, Keewaywin, McDowell Lake, and North Spirit Lake First Nations, as well as in Thunder Bay with individuals who used to live in these communities but have since moved to Thunder Bay or were visiting Thunder Bay at the time of the interview. Travel and timing issues however prevented planned community visits, restricting in-community data collection to only take place in Keewaywin First Nation, with the remainder of interviews occurring in Thunder Bay. Regardless of travel issues, interviews were conducted with community members from each of the KOTC member communities situated in the Upper Severn River watershed. These KOTC member communities of the Upper Severn River watershed are Oji-Cree communities, with Deer Lake, Keewaywin, and North Spirit Lake First Nations being located in Treaty 5 territory (*The First Nations and Treaties Map of Ontario as an Instructional Resource: An Educator's Guide*, 2020; *Treaty 5 Sovereign Nations*, n.d.). While McDowell Lake First Nation is located in the treaty 9 area, and McDowell Lake First Nation membership generally accepts Treaty 9, many McDowell Lake First Nation community members' families come from Treaty 5 territory (*The First Nations and Treaties Map of Ontario as an Instructional Resource: An Educator's Guide*, 2020; *Treaty 5 Sovereign Nations*, n.d.). Deer Lake, North Spirit Lake, Keewaywin, and McDowell Lake First Nations achieved band status in 1985 (*Archived - Mishi Sakahikaniing McDowell Lake First Nation Community Based Land Use Plan Terms of Reference*, 2016; *Deer Lake First Nation*, n.d.; *Keewaywin*, n.d.; *North Spirit Lake First Nation Terms of Reference*, 2018). McDowell Lake First Nation is a seasonal

community (*McDowell Lake First Nation*, n.d.). Community members do not live in McDowell Lake First Nation year-round, and instead many community members live in McDowell Lake First Nation only in the summer months, with some Elders returning to McDowell Lake First Nation for extended periods of time during the winter once the winter road is established (*McDowell Lake First Nation*, n.d.). The seasonal nature of McDowell Lake First Nation was forced upon community members due to a lack of in-community services such as education, resulting in many community members moving to urban areas so their children could access education (*Archived - Mishi Sakahikaniing McDowell Lake First Nation Community Based Land Use Plan Terms of Reference*, 2016). A past Bell Canada diesel spill also polluted regions of McDowell Lake First Nation, delaying community members repatriation to their traditional lands and delaying further community infrastructure development such as running water (*McDowell Lake First Nation,* n.d.). Currently, most McDowell Lake First Nation community members live in Red Lake or Thunder Bay during the majority of the year, however the Elders and Ancestors of McDowell Lake First Nation hope that younger and future generations will be able to return to the community full time (*Archived - Mishi Sakahikaniing McDowell Lake First Nation Community Based Land Use Plan Terms of Reference*, 2016**;** *McDowell Lake First Nation*, n.d.) The remainder of the KOTC member communities of the Upper Severn River watershed are occupied year-round. Community members of these KOTC member communities of the Upper Severn River watershed are heavily influenced by, connected with, and shape their traditional lands (*Deer Lake First Nation Draft Community Based Land Use Plan*, 2019; *North Spirit Lake First Nation Terms of Reference*, 2018). The more-than-human world of these KOTC member communities, such as the landscape and fish are ingrained in community members identity, influencing how communities identify, such as North Spirit Lake First Nation community

members as Maymayquayshwak (cliff-dweller) and Deer Lake First Nation community members as sucker clan (*Deer Lake First Nation Draft Community Based Land Use Plan*, 2019; *North Spirit Lake First Nation Terms of Reference*, 2018). Table 1 summarizes the population size and accessibility of each of these communities.

Table 1

Participating Research Community Populations and Accessibility

Community	Deer Lake First Nation	Keewaywin First Nation	North Spirit Lake First Nation	McDowell Lake First Nation
Members	1164	716	494	59
In community population	977	379	300	Seasonal community, community members live in community only during summer months
Accessibility	Scheduled flights, winter road to Red Lake	Scheduled flights, winter road to Pickle Lake	Scheduled flights, winter road to Red Lake	Accessible by float plane, snowmobile, and periodically by winter road when conditions allow

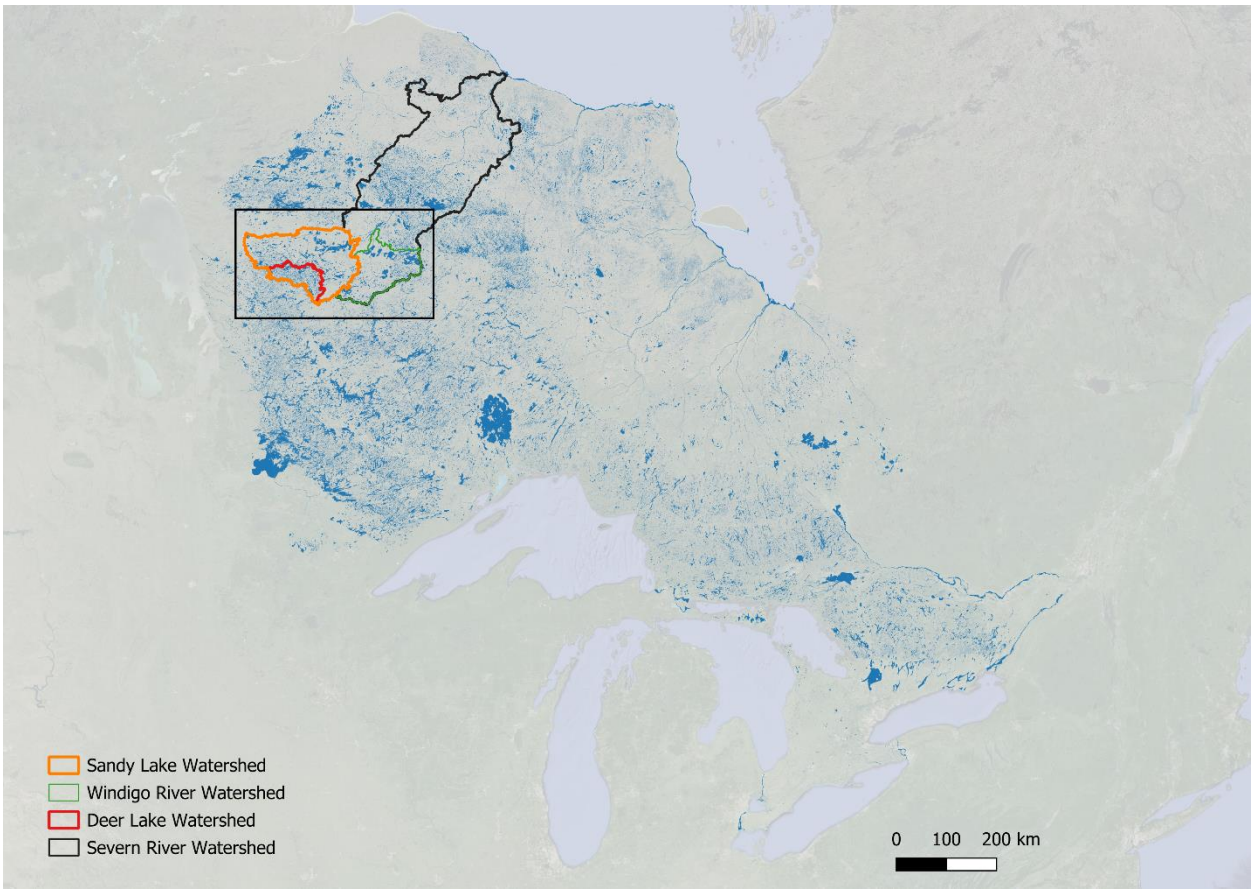
Note. Community population and accessibility data was acquired from the following sources: *Deer Lake First Nation*, n.d.; *Keewaywin*, n.d.; *McDowell Lake First Nation*, n.d.; *North Spirit Lake First Nation Terms of Reference*, 2018.

The Upper Severn River watershed is in the northwestern portion of Ontario shown in Figure 2, flowing northeast from Sandy Lake and draining into the Hudson Bay. Figure 3 shows the locations of the KOTC member communities of the Upper Severn River watershed: Keewaywin, Deer Lake, North Spirit Lake, and McDowell Lake First Nations. Members of these communities rely heavily on the land and water surrounding them for sustenance. The Upper

Severn River watershed is home to many species of fish traditionally consumed by community members, including walleye, whitefish, northern pike, and sucker.

Figure 2

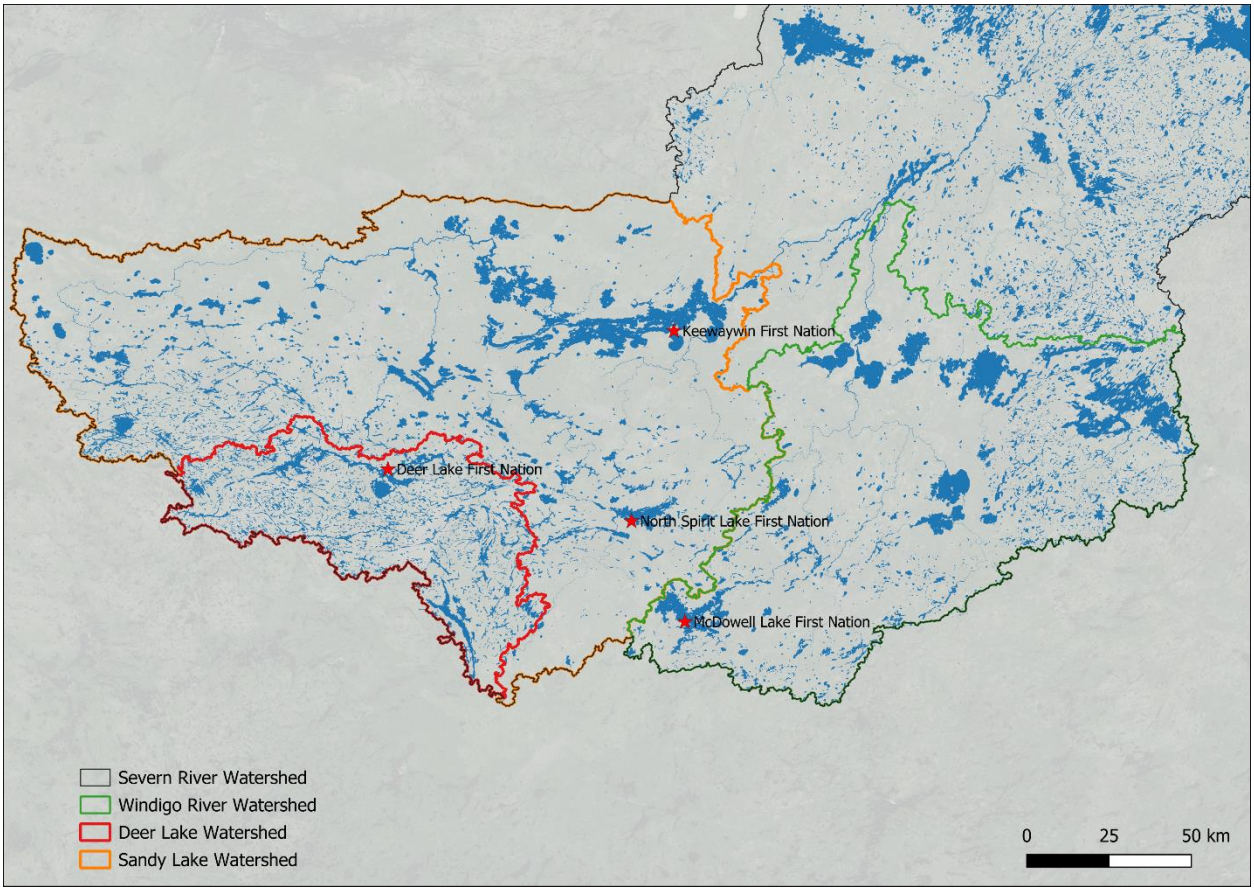
The Severn and Upper Severn River Watershed



Note. Ontario waterway map indicating the location of the Severn River watershed (black), with the Upper Severn River Watershed territory outlined by the black box, divided between the Sandy Lake watershed (yellow), the Deer Lake watershed (red), and the Windigo River watershed (green). From: QGIS (2024). *QGIS Geographic Information System* (Version 3.36.1-Maidenhead). QGIS Association. https://www.qgis.org/

Figure 3

Locations of the KOTC Member Communities in the Upper Severn River Watershed Territory



Note. Map of the Upper Severn River watershed territory indicating the locations of the KOTC member communities. This map presented in Figure 3 illustrates the watershed area outlined by the black box in Figure 2. From: QGIS (2024). *QGIS Geographic Information System* (Version 3.36.1-Maidenhead). QGIS Association. https://www.qgis.org/

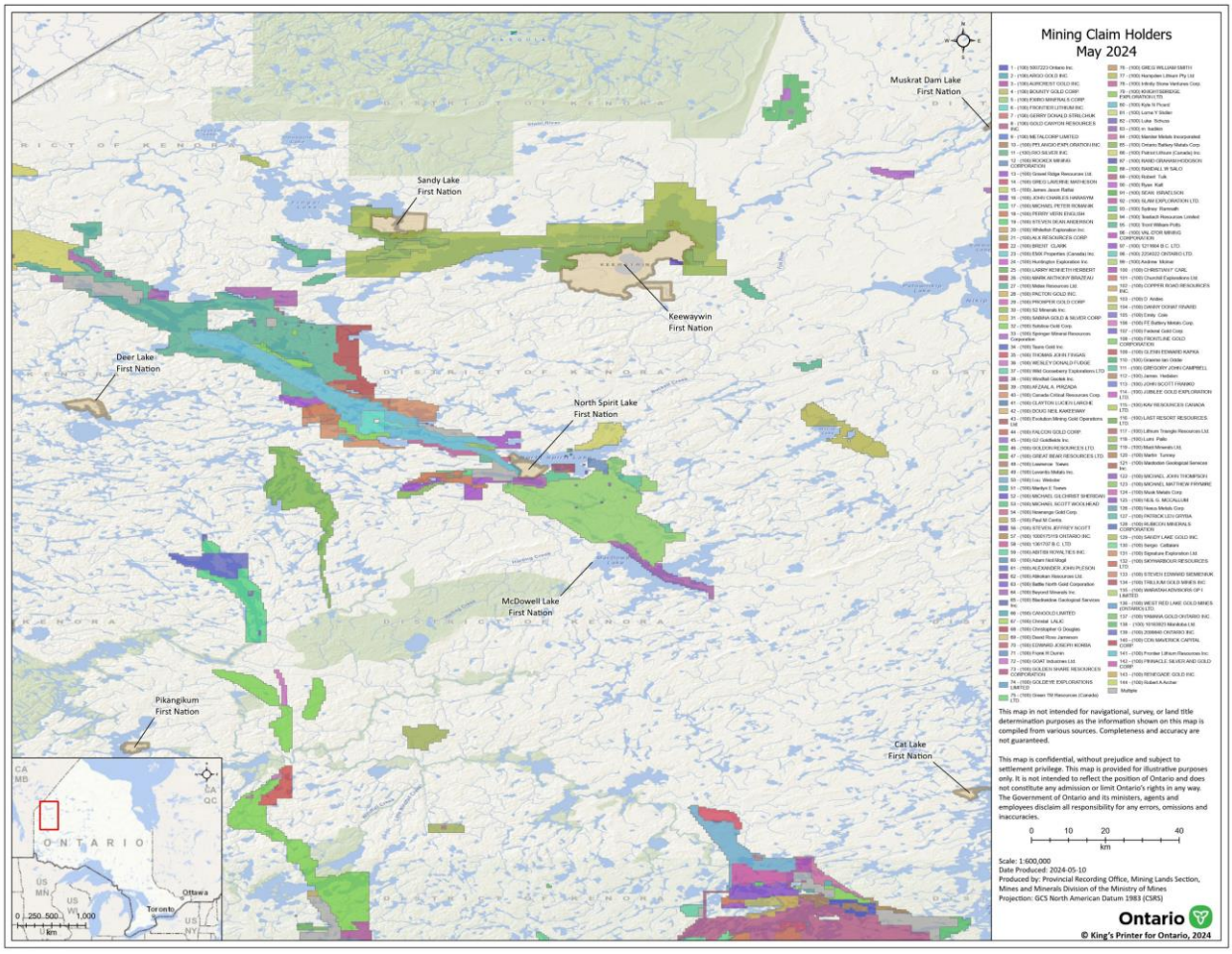
The Upper Severn River watershed, and thus the KOTC member communities and fish which share this watershed are at risk of further negative effects occurring to their lands and waters due to proposed industrial activity in the area, including mineral and power development. The Upper Severn River watershed has thus far remained relatively undisturbed by industrial activity, making potential future industrial developments especially transformative to the

watershed (Haxton & Cano, 2016). The rapidly increasing interest in mining throughout the Upper Severn River watershed is driven by the growing demand for battery grade lithium capable of supporting North America's electric vehicle market (Elbokl, 2024). While thus far no lithium mining has occurred in Ontario, it is predicted that the global demand for lithium will reach three million tonnes by 2030, and Ontario is attempting to position themselves as a global staple in lithium production (Elbokl, 2024). Several lithium mining companies are ongoingly acquiring land in northwestern Ontario, however Frontier Lithium's proposed lithium mine, 25 km northwest of North Spirit Lake First Nation, currently has the most provincial government support, claiming almost half of the funding Ontario Premier Doug Ford has allocated to five different mining projects (Elbokl, 2024; McCracken et al., 2023). Figure 4, page 49, shows the number and proximity of mining claims surrounding the KOTC member communities of the Upper Severn River watershed.

The community of Deer Lake First Nation, the largest of the KOTC member communities of the Upper Severn River watershed, has also implemented a walleye hatchery which began operations for the 2023 spawn, generating community interest in identifying possibilities for sustaining fish-people relationships in ways that support the health and well-being of the members of these communities, while maintaining and revitalizing community culture and values around fish and fishing. The discussions which arise from this community interest, as well as this research, will help to convey the importance of fish and fishing in these communities in the face of mining development.

Figure 4

Upper Severn River Watershed Mining Claims Around The KOTC Member Communities



Note. Mining claims surrounding the KOTC member communities of the Upper Severn River watershed as of November 2023. Sandy Lake First Nation, Muskrat Dam Lake First Nation, Cat Lake First Nation, and Pikangikum First Nation are identified on this map, but are not KOTC member communities. From: *MLAS Map Viewer*. (n.d.). Retrieved June 7, 2024, from: https://www.lioapplications.lrc.gov.on.ca/MLAS/Index.html?viewer=MLAS.MLAS&locale=en-CA

Participants and Recruitment Methods

A purposeful sampling strategy was used to recruit participants for the interviews. Purposeful sampling is a strategy commonly used when collecting qualitative data to identify and

select knowledge and experience-rich research participants (Coyne, 1997). Due to the funding and time constraints of this master's research which limited the number of interviews which could conducted, purposeful sampling was required to select participants who are knowledgeable and experienced with fish and fishing in the Upper Severn River watershed to ensure sufficient relevant data could be collected. Participants were recruited by leveraging the networks of Dr. Duckert, and internal community protocols and cultural practices were followed while recruiting participants to participate in the project. These protocols and practices involved speaking with the KOTC member communities Chiefs and Councils about the project to identify potential participants, as well as discussing the research project with community members who have participated in past or present projects with the KOTC's department of treaties, lands, and resources to determine if they wanted to participate in this research. As identified earlier in the positionality section, I am an outsider to the KOTC member communities of the Upper River watershed. Using Dr. Duckert's networks and speaking with Chiefs and Councils to make introductions between potential participants and I was a more respectful method of identifying participants, rather than I, a researcher with which KOTC community members are unfamiliar with, approaching potential participants directly, and demonstrated to participants that there is trust between the KOTC and I. However, the use of purposeful sampling in this research introduced the potential for an underrepresentation of KOTC community members with little experience with or knowledge of fish and fishing in the Upper Severn River watershed, who would still represent an aspect of overall KOTC member communities' relationships with fish and fishing. Additionally, purposeful sampling can result in selection bias, in which community members with lots of knowledge and experience with fish and fishing may not have been interviewed if they were not a part of Dr. Duckert's networks and not identified by Chief's and

Council. The KOTC Treaties, Lands, and Resources Facebook page was also used to recruit participants through a Facebook post with information about the research, and family members of participants were asked to participate to acquire intergenerational data. Potential participants were provided with an information letter outlining the goals of this research, and a consent form (Appendix B).

I interviewed 18 people who previously or currently engaged in fishing in the Upper Severn River watershed and are members of a KOTC member community (Deer Lake First Nation (n=3), Keewaywin First Nation (n=3), North Spirit Lake First Nation (n=6), and McDowell Lake First Nation (n=6). A successful effort was made to interview community members from each community, although the distribution of participants across communities varied for reasons such as travel issues discussed earlier. The criteria for participation were: 1) Being a member of one of the KOTC member communities of the Upper Severn River watershed (Deer Lake, Keewaywin, McDowell Lake, and North Spirit Lake First Nations); 2) Being older than 16 years of age; 3) Having historical or current experience fishing in the Upper Severn River watershed.

While there is potential for recall bias in this research due to the historical nature of some of the data that was collected, past studies have demonstrated that when tested against archival data, recalled historic First Nations knowledges surrounding fish is very accurate (Eckert, Ban, Frid, et al., 2018; Natcher, Ingram, et al., 2020). Although a large focus of this study is changes in relationships and practices over time, which entails largely historical data and thus mostly Elders from communities as participants, youth were invited to participate in the study if they wished to, which is why the age criteria for participation was set to 16. Youth will inherit the land and knowledges on how to care for the land, and thus their voices are important as well.

However, no youth ended up participating in this research, and thus there is the potential for future research to work specifically with youth in these communities on this topic.

Eighteen participants allowed me to collect data from each community in the time constraints of this master's program while also achieving data saturation indicated by no further new themes arising from interviews with participants (Fusch & Ness, 2015). Participant profiles including a narrative description of each participant are included below as Table 2.

Table 2

Participant Profiles

Pseudonym	Age Range	Community	Current Location of Residence	Narrative Description
Ben	30-40	North Spirit Lake First Nation	North Spirit Lake First Nation	Ben refers to themselves as a hunter and trapper. They grew up on the land, hunting and fishing with their dad, and began working guiding fishing tours at a very young age. They have fished everywhere there is to fish around North Spirit Lake First Nation.
Liam	50-60	Deer Lake First Nation	Thunder Bay	Liam lived in Deer Lake First Nation for most of their life. They have worked as a fishing guide and know the land well enough that they are never worried about finding food when in the bush. They emphasize the importance of learning about the land.
Thomas	60-70	Keewaywin First Nation	Keewaywin First Nation	Thomas has lived in various other communities in the past but now resides in Keewaywin First Nation. They spoke passionately about fish helping them to heal physical ailments.

Jamie	60-70	Keewaywin First Nation	Keewaywin First Nation	Jamie grew up in urban areas, but moved to Keewaywin First Nation before it had any infrastructure or reserve status. Fishing has always been a part of their life, though they identified they learned more land-based skills later in life.
Roger	50-60	Keewaywin First Nation	Keewaywin First Nation	Roger grew up in Sandy Lake First Nation, and later moved to Keewaywin First Nation. They fished with their dad when they were younger and continue to fish in Keewaywin First Nation.
Colton	50-60	North Spirit Lake First Nation	Thunder Bay	Colton feels that it's important to pass on land-based knowledges. They have fished all their life in North Spirit Lake First Nation, since before North Spirit Lake First Nation had an airport or a winter road accessing it. They are very knowledgeable about proposed mines in the surrounding area.
Jake	80-90	North Spirit Lake First Nation	Thunder Bay	Jake is the oldest participant in this research. They have witnessed and have experiences with seven generations of their family on the land, from their great grandparents to their great grandchildren.
Allison	30-40	North Spirit Lake First Nation	Thunder Bay	Allison grew up in North Spirit Lake First Nation with family members who guided fishing. They now live in Thunder Bay and haven't returned to the community but remain in touch with community members. Fishing was an important part of their family's life when they lived in North Spirit Lake First Nation.
Kody	40-50	North Spirit Lake First Nation	Thunder Bay	Kody grew up in a mix of remote First Nations communities and urban areas. They grew up fishing lots with their family and worked as a fishing guide. They now Live in Thunder Bay.

Alana	40-50	North Spirit Lake First Nation	Thunder Bay	Alana lives in Thunder Bay but grew up in North Spirit Lake First Nation. They remain connected to fishing in the community through fish from North Spirit Lake First Nation being brought to them by family members who still fish there. Their family remains heavily involved in fishing in North Spirit Lake First Nation.
Isaac	40-50	McDowell Lake First Nation	Red Lake, McDowell Lake First Nation seasonally	Isaac lived in McDowell Lake First Nation with their parents when they were very young, but moved away when they were old enough for school. They now live in Red Lake and return seasonally to McDowell Lake First Nation.
Elliot	40-50	Deer Lake First Nation	Deer Lake First Nation	Elliot spends lots of time out on the land teaching youth land-based skills. They grew up fishing and still fish lots.
Spencer	40-50	Deer Lake First Nation	Thunder Bay	Spencer lives in Thunder Bay but just moved recently. They've fished all their life, with their grandparents in the past and now their own children. The past 20 years they've fished or hunted almost every day.
Keegan	70-80	McDowell Lake First Nation	Red Lake, McDowell Lake First Nation seasonally	Keegan grew up in McDowell Lake First Nation but moved out of the community when their kids were old enough to go to school. Their dad, grandpa, and themselves commercially fished in McDowell Lake First Nation. They returned to McDowell Lake First Nation for a few years to raise their kids on the land and homeschool them.

Morgan	60-70	McDowell Lake First Nation	Red Lake, McDowell Lake First Nation seasonally	Morgan grew up in McDowell Lake First Nation, and moved out when other community members began leaving. They live in McDowell Lake First Nation seasonally. Growing up they helped their parents to commercial fish, and later commercial fished themselves.
Lydia	60-70	McDowell lake First Nation	Red Lake, McDowell Lake First Nation seasonally	Lydia grew up and worked commercial fishing in McDowell Lake First Nation. They moved out of the community when their kids were old enough to attend school.
Damian	60-70	McDowell Lake First Nation	Red Lake, McDowell Lake First Nation seasonally	Damian did not spend their younger years in McDowell Lake First Nation but later returned to the community and worked commercial fishing. They left when their kids were old enough to go to school.
Alex	70-80	McDowell Lake First Nation	Thunder Bay, McDowell Lake First Nation seasonally	Alex grew up in and out of McDowell Lake First Nation. When they were young, they helped their family working commercial fishing. They now return to McDowell Lake First Nation seasonally leading fishing tourist operations.

Data Collection

Data was collected in the form of in person interviews using the conversational interview method aided by prompts created with input from KOTC staff, designed to facilitate storytelling (Kovach, 2010; Kovach, 2021). The prompt guide used for interviews is included as Appendix C, and the prompt guide and interview method were tested during two pilot interviews with KOTC staff/Upper Severn River watershed KOTC community members. The interview process and interview prompts were revised based on feedback from these pilot interviews. Using the conversational method to speak with and interview research participants aids a better

relationship-building between those participating in the interviews, recognizes the importance of storytelling in Indigenous culture as a method of passing on knowledge, and ensures that responses reflect personal and local community knowledges (Archibald, 2008; Caxaj, 2015; Datta, 2018; Kovach, 2010).

For the initial interviews, Dr. Duckert or Dr. Galway acted as co-interviewers until I was capable of performing interviews solo. Participants had the option to conduct the interview in translation into Oji-Cree or using Oji-Cree words and terms with a translator, however no participants chose to do so and thus no accommodations for translation were needed. 17 interviews with 18 community members of KOTC member communities of Upper Severn River watershed were conducted in person at a time and place chosen with the participants and audio recorded after obtaining oral consent. Two participants requested that they be interviewed together, while the remainder of interviews were conducted with one participant at a time. Interview locations included the community town hall, community band office, the KOTC building in Thunder Bay, private study rooms in the Lakehead University library, and other locations convenient for participants. Interviews usually lasted approximately 45 minutes, with select interviews lasting up to 90 minutes.

The interviews were split into five sections. Interviews began with introductory questions aimed at starting a conversation with the participant and building their comfort level with me, the interviewer. These introductory questions also acted to situate the participant in the larger picture of fishing in the Upper Severn River watershed. After situating the participant, I asked interview questions to develop a baseline of understanding of past fishing practices and fish conditions. Following this I asked participants about changes in present fishing practices and fish conditions which contrasted past fishing practices and fish conditions, exploring why these changes

occurred and what the changes impacts on the participant and participant's community's health and well-being have been. Participants were then asked about specific fish/fishing related goals for the future they think should be focused on in their community. A short series of questions were also asked about the new Deer Lake walleye hatchery. Interviews were concluded by asking participants if there were any other stories they would like to share or topics they wished to discuss. Throughout the interviews prompts were used to further explore participants' stories and develop information rich responses.

During the interviews I took notes when an interview response stood out to me that I felt should be explored further, so that I knew to circle back to supplementary questions about the response rather than interrupt the participant's story. During instances where interviews were interrupted for reasons including the participant receiving a phone call or an individual outside of the research entering the location the interview was being conducted, I took the opportunity to review my notes and interview prompts and formulate additional questions aimed at delving further into the participants' unique experiences which I felt were valuable to the research.

Data Analysis

After interviews were completed, I listened to the recordings and transcribed them verbatim. Transcripts were uploaded into DeDoose software, a qualitative research data analyzing software, and analysed using thematic network analysis (Attride-Stirling, 2001). Thematic network analysis utilizes three types of themes: basic, organizing, and global (Attride-Stirling, 2001). These themes are presented as an intersecting web (Figure 5, p. 63), recognizing the interconnectedness and effects of themes on each other (Attride-Stirling, 2001). This approach suited this research well, due to the deep complexity and connectedness of

relationships with fish and fishing practices to First Nations health and well-being demonstrated in the current literature. After listening to, transcribing, and familiarizing myself with the data, transcripts were analyzed using 6 steps: coding material, identifying themes, constructing a thematic network, describing, and exploring thematic networks, summarizing thematic networks, and interpreting patterns (Attride-Stirling, 2001).

The codebook used for data analysis is included as Appendix D. To begin coding, I started with a general coding framework created based off subjects from the literature review outlined in Chapter 2, interview questions (Appendix C), and my initial reflections on the data (Attride-Stirling, 2001). As I progressed analysing data, I incorporated emergent coding, a coding method in which new codes are created in addition to the original coding framework as data is reviewed (Elliott, 2018). Each time I created a new code using this method, I then went back and reviewed previously coded transcripts, applying the new code where applicable until all transcripts were up to date with my finalized code list. After all transcripts were coded, I reviewed excerpts; sections of transcripts with a specific code applied to them, grouped by individual codes to check for coding accuracy. Any excerpts which I felt would be more accurately coded under a different code were re-coded with this more accurate code. While coding, I also linked memos to select excerpts using the DeDoose software. Using memos during coding facilitates deeper critical thinking and reflections, leading to the identification of more perceptive connections across the data (Rogers, 2018).

After all the interview transcript data had been coded, I exported a list of all codes from DeDoose and began grouping codes based on similarities between them. During the coding process, as it was too early in the data analysis process for themes to emerge, codes were very specific, and later combined into basic themes based on specific shared aspects between codes

(Attride-Stirling, 2001). Once I arrived at a revised list of basic themes, I reviewed the basic themes to determine shared commonalities and sorted the basic themes by these commonalities into organizing themes (Attride-Stirling, 2001). The commonalities shared within organizing themes were broader than those between the codes which were grouped into basic themes. Due to this research having multiple research questions, and exploring changes over time, I knew I would require multiple global themes. Organizing themes were grouped based on big picture ideas, broad summaries of the data, explaining the main findings of the research, into global themes (Attride-Stirling, 2001). During the data analysis process, I had several meetings with KOTC staff and my supervisors to discuss emerging and finalized codes and themes to enhance credibility.

Three global themes, nine organizing themes, and twenty-four basic themes emerged through this thematic analysis process. These themes are presented as three thematic networks; visualizations of how each theme interacts (Attride-Stirling, 2001). Themes within thematic networks, as well as thematic networks themselves interact with each other. A figure of these thematic networks appears in the finding as Figure 5, p. 63.

Ethical considerations

An ethics approval from Lakehead University was acquired prior to the submission of a thesis proposal for approval by my thesis committee, and data collection did not begin until the thesis proposal was approved by my thesis committee. The Research Ethics Board approval letter is attached to this proposal (Appendix E). This Research Ethics Board approval was submitted by my supervisor Dr. Lindsay Galway, and the research process adhered to the protocol outlined in the application.

The Collective Benefit, Authority to Control, Responsibility, and Ethics (CARE) principles were adhered to throughout this research (Carroll et al., 2020). The involvement of the KOTC in the research design and process reflects the CARE principle of ethics, ensuring that the KOTC member communities' rights and well-being are focused on and that the direct benefits of this research to participating communities is maximized (Caroll et al., 2020). Additionally, prior to data collection I began working with the KOTC on other projects as requested as a graduate assistant, building trust and a relationship with the KOTC, and familiarizing myself with the organizations work and research processes, following the CARE principle of responsibility of developing respectful relationships with the First Nations communities with which data is created (Caroll et al., 2020). This relationship with the KOTC is ongoing and does not end with the culmination of this thesis. Going forward I will continue to work in the interests of the KOTC through the creation of a research summary report and community infographic.

Pilot interviews with KOTC staff/Upper Severn River Watershed KOTC community members were utilized to ensure that the interview prompt guide would collect community relevant data while also demonstrating to the KOTC my commitment to adjusting research process based on feedback from and working with the KOTC. Once the interview prompt guide was finalized, Dr. Duckert facilitated participant recruitment, identifying knowledge rich participants based on his experience in the KOTC member communities of the Upper Severn River watershed and with previous KOTC research projects, and with recommendations from the KOTC member communities Chiefs and Councils. Throughout the interview process, Dr. Duckert and Dr. Galaway, each with previous experience conducting research in and with KOTC member communities provided guidance on conducting interviews with participants.

Prior to conducting interviews, consent from each participant was obtained orally; the oral consent script for interview participants is included as Appendix F. I opted to use oral consent as part of the protocol as this approach is more appropriate for the study population and can enable relationship and trust-building for consent and the interview process (rather than using written signed consent which is a Western-centric approach to obtaining consent from research participants). Chapter 9 of the TCPS2 highlights the value of oral consent as an approach that is more respectful to Indigenous worldviews and practices. Prior to beginning interviews, I also read through the project information letter with participants to ensure it was understood and provided an opportunity to discuss any questions participants had. Participants were informed that:

- Their confidentiality will be maintained throughout their participation and after when reporting in the findings
- Consent can be withdrawn at any time without penalty until reports have been written and approved
- Participants may choose not to answer specific questions or discuss certain subjects during the interview or ask that portions of our discussion or their responses not be recorded

Overall, and considering the full participation of KOTC leadership in the development of the objectives and data collection protocol, this research did not offer more than minimal risk to its participants. Potential risks to participants included experiencing emotional distress during interviews, sharing information which may lead to participants being identified in the results, and participants feeling uncomfortable discussing certain interview topics. To mitigate these risks,

the above listed aspects from the project information letter were utilized, in addition to the use of pseudonyms and aggregation of data in this thesis to ensure participant anonymity.

Due to the involvement of the KOTC in identifying the research goals of this project informed by community interest, the findings from this research are directly beneficial to the KOTC and its member communities. The KOTC member communities of the Upper Severn River watershed have expressed a desire to have their history and changing relationship with fish heard and recorded as is achieved through this research. The findings of this research will also benefit the KOTC through helping to inform the development of future research and projects which will support KOTC member communities' relationships with fish, health, and well-being.

Data governance follows the KOTC and community protocols, as well as the Ownership, Control, Access, and Possession (OCAP), and the CARE principles (Carroll et al., 2020; *The First Nations Principles of OCAP*, n.d.). The KOTC holds the data and ensures that the communities in which the participants live have ownership, control over, and access to the interview data. I relinquish claims to ownership of the data and use it in ways that have been discussed and approved by the communities: a thesis and a findings summary report, and a community infographic. Moving forward, the KOTC has authority and control over the findings of this research which will be used by the KOTC and its member communities for collective benefit through supporting and informing mining discussions, land use planning, hatchery operations, and other research and projects aimed at sustaining fish-people relations and land use with the KOTC and member communities, further adhering to the CARE principles of collective benefit and authority to control (Caroll et al. 2020). Page 138 of this thesis, contributions; further describes how data will be shared with community members, and the importance of giving back to First Nations communities during research.

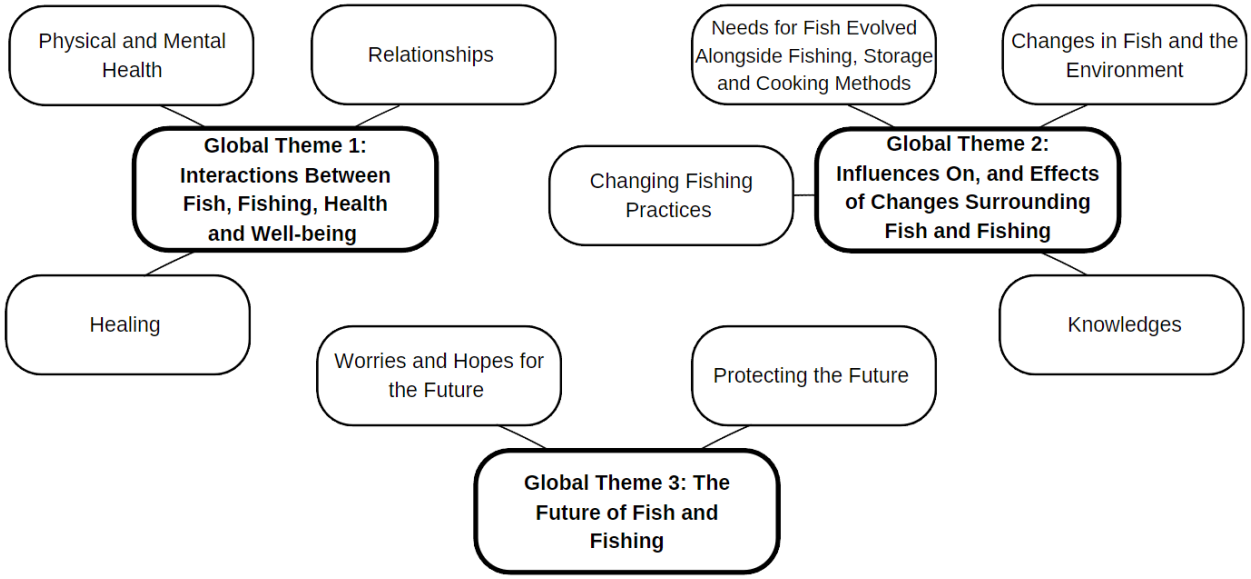
Chapter 4: Findings

Thematic network analysis was used to analyse the interview data resulting in three global themes, each with their own organizing themes further categorizing findings. Global theme 1: *Interactions Between Fish, Fishing, Health and Well-being* describes how fish, as well as activities in which fish and fishing are a part of and give rise to health and well-being. This global theme also explores how changes in fish and fishing, and activities supported by fish and fishing have impacted participants' health. Global theme 2: *Influences On and Effects of Changes Surrounding Fish and Fishing* examines how participants' needs for fish have evolved with changing fishing practices, changing fish, and the changing environment, and how knowledges surrounding these differences between the past and present has changed as a result. Global theme 3: *The Future of Fish and Fishing*, focuses on participants' worries and hopes for the future, while identifying ways participants expressed the future of fish and fishing in their communities can be protected.

Figure 5 visualizes these global and organizing themes, and they are further broken down to include basic themes in a codebook in Appendix D. The findings presented in this chapter are supported by and portrayed using quotes from participants in this research.

Figure 5

Thematic Network of Research Findings



Global Theme 1: Interactions Between Fish, Fishing, Health and Well-being

Participants described several ways in which fish and fishing supports their health and well-being. The manners in which fish and fishing support health and well-being are presented in relation to three organizing themes: *Physical and Mental Health*, *Relationships*, and *Healing*. The specific ways in which fish and fishing are vital to these methods of supporting health are explored below.

Physical and Mental Health

"It's how you feed people is how you can cure them" – Thomas (Keewaywin First Nation)

Participants expressed two ways in which fish and fishing supports their physical health: fish being a healthy food and being physically active on the land while fishing. Participants often identified that fish is a nutritious food and thus eating fish is good for their health. Participants

viewed fish as being especially healthy when compared to store bought food: “fish and wild game are free of preservatives you know, so it's really natural and I think it's one of the healthiest diets, healthiest foods to eat is fresh fish” (Alana, North Spirit Lake First Nation). Thomas (Keewaywin First Nation) also spoke of fish compared to store bought food, stating fish doesn’t have anything bad in it, and “it’ll just make you healthy, the fish”. Participants reflected on health before store bought foods were a part of their diet and how consuming fish kept them healthy. Colton (North Spirit Lake First Nation) described how “When I think about it back then I think there was a lot healthier people back then because we were mostly dependent on wildlife and fish you know to sustain ourselves and fish is healthy”. Morgan (McDowell Lake First Nation) echoed this statement, speaking of how healthy their mother still was in her 80s, saying “I think that’s why they were healthy, because of eating, from eating fish”.

The other way in which fish and fishing was described by participants as influencing health in positive ways was that “you have to be physically active to be able to go hunting and fishing” (Colton, North Spirit Lake First Nation). Morgan (McDowell Lake First Nation) and Jamie (Keewaywin First Nation) echoed this, explaining that fishing was good for people’s physical health because it's hard physical work out on the land. Morgan (McDowell Lake First Nation) moved to Red Lake in the past and now returns to McDowell Lake seasonally. They told me that they don’t fish in Red Lake and that:

> “If I had stayed in McDowell Lake, I think I would have still been still active. I think when I moved out to Red Lake I kind of didn't walk that much anymore and I started having joint pains and arthritis developed but when I was back there if I had stayed I think I would have still been able to walk around” (Morgan, McDowell Lake First Nation).

Most participants discussed ways in which fishing is good for mental health. Thirteen participants described feelings of enjoyment and having fun associated with fishing. For example, Spencer (Deer Lake First Nation) said, “It's fun catching fish”, and Keegan (McDowell Lake First Nation) identified that “it's good for your mental health being out there in the fresh air”. Four participants explained that fishing isn’t always done to catch fish to eat, rather fishing is a way to have fun and be out on the land. Jake (North Spirit Lake First Nation) articulated that even when fish aren’t needed for food, they will still go fishing “just for the fun of it”. Ben (North Spirit Lake First Nation) echoed this, saying that even while out on the land for purposes other than fishing, they “would stop and fish anyways, just to fish cause it's fun”, and Roger (Keewaywin First Nation) explained to me that they fished “for the pleasure of being out there, and I mostly gave out my fish at that time”.

Participant’s stories of experiencing positive feelings and enjoyment while fishing was heavily interconnected with stories of time spent with their families. Morgan (McDowell Lake First Nation) shared stories of growing up going out fishing with their parents, telling me; “I had fun, I remember those are the days that I guess I maybe enjoyed the most, was being out on the lake with them”. Another participant told me a story of taking their grandfather out fishing when their grandfather was too old to fish by himself, and how happy it made their grandfather: “we went fishing you know, just this smile on his face with every cast” (Kody, North Spirit Lake First Nation). When I asked Kody why they thought it was important for their grandfather to go fishing at that time they replied, “just for his own happiness, he was getting too old to do that on his own”. Alana (North Spirit Lake First Nation) similarly explained how fishing is an important way of maintaining their mental health, particularly when fishing with family, saying

> "When I'm out there, it's kind of therapeutic right. When I'm feeling down, I go out with my brother because he's always asking me to go fishing, so I always go fishing with him and I just love being out on the land because it's good for your mental health".

Above I spoke of the benefits participants feel when fishing, however when speaking with the twelve participants who live in communities seasonally or moved away from their home communities and now live elsewhere, it became apparent that the benefits of fishing are primarily experienced by participants when they are fishing in their home communities. Participants shared how fishing in their home communities is a way of connecting to their homelands and territory. For example, Ben (North Spirit Lake First Nation) told me "When I go fishing, I feel like I'm at home". Alex (McDowell Lake First Nation) who lives in Thunder Bay for most of the year identified that they "still like to go up to McDowell Lake to fish because that's your home". Six of the 12 participants who no longer live in their home communities or do not live in their home communities full time described how fishing away from their home communities is different for them. Keegan (McDowell Lake First Nation) who lives in Red Lake for most of the year told me that when they tried fishing in Red Lake, they heard "machinery in the distance which I didn't hear when I'm in McDowell Lake, so it just doesn't feel the way it feels like when you're back at home". Keegan went on to explain that because of this machinery noise they hear when fishing in Red Lake, they "don't feel that same sense of health and peace as when I'm up north". Another participant who now lives in Thunder Bay told me they were excited to soon be able to fish again after getting settled in, however when asked if fishing would be different for them than in their home community, they said it would "because you're on somebody else's lakes and rivers, because like I said in Deer Lake you belong to the lakes and rivers, that's our lake" (Spencer, Deer Lake First Nation).

For the participants who are not living in their home communities, one way they still feel connected to home and the land through fish is from family members living in their home community catching fish there and sending the fish to family members living elsewhere. For example, Allison (North Spirit Lake First Nation) lives in Thunder Bay and spoke of eating fish that had been caught in and sent from their home community, telling me "I felt like I was at home for a while just when I was eating it I guess and I just thought of my dad". Another aspect of receiving fish from home communities' participants spoke of was how they enjoyed eating those fish because they trusted the fish were healthy, unlike fish from the areas they now live in. Four participants identified that they don't like the taste of fish that don't come from their home communities, or they don't trust that other fish won't be contaminated. Kody (North Spirit Lake First Nation) explained that in their home community "there's not much development going on there but there is around here you don't know what's coming what's going into the lakes and rivers". When talking of fishing in Red Lake, Kody explained that they "prefer not to really eat fish from those kinds of cesspools", referring to the industrial development in Red Lake. Kody went on to describe the differences in fish from Red Lake and from communities up north, explaining that the fish in Red Lake are squishy: "northern pike that I catch [in Red Lake] I kind of pick them up on the back, I could feel my hand kind of digging into the flesh", whereas when they fish in a northern community, the pike they catch are "solid almost like cold, cold steel". Kody used this description to emphasize how much healthier and stronger fish from areas in the far north without development are.

As discussed above, participants identified that being out on the land and fishing in their home territories provided benefits to their mental health, however these benefits were not experienced in the same way when participating in the same activities outside of their territory

and community; this was most notable for participants living in urban areas. These positive benefits of fishing on mental health were also reported by participants to be negatively affected by worrying about the future of fish and fishing in their communities and seeing evidence of negative change to their traditional lands. When asked how they felt about fishing being at risk in their home community, Spencer (Deer Lake First Nation) compared a future without fishing in their home community to living in an urban area, saying "well I'm out here in the city so I'm feeling the brunt end of it right now". Nearly all (16) participants spoke of worries about fish or the ability to catch and consume fish disappearing from their communities in the future, with some participants expressing feelings of heartbreak and sadness at the thought of this. These worries are discussed further in Global Theme 3. Colton (North Spirit Lake First Nation) has experienced reminders of these worries of the future while being out on the land fishing and hunting. Colton shared with me that in the past, while out on the land they'd come across: "geologists taking samples of the rock around the area", and that after encountering them the first time, "every time we went down there we always seen from that point on we always seen activity of like a lot of activity evidence of you know of them coming back", going on to describe the evidence as remains of 'their campsite and all that drilling activity". These geologists were conducting exploratory mining tests on the land surrounding Colton's community.

While Colton (North Spirit Lake First Nation) described seeing the evidence of potential large-scale future changes in the land, Morgan (McDowell Lake First Nation) explained how past changes in the land over their lifetime has affected their mental health. Morgan described a place on the land their family would take them to when they were young:

> "There is a land there, an island and we used to camp there and it was a nice ground, level ground so I wanted to show my kids where we used to camp. I took them one time

> when they were small and then when I got there, I was all surprised it was full of Moss like the whole place was moss it was just all moss and you can't really get out without your feet getting wet or even to walk around".

Morgan expressed that seeing this "makes me feel sad because I have good memories of those places and it just seems like they're gone, they're destroyed", because "now when you go stop on those islands there's really nothing it's either washed out or there's really no ground left".

As explored above, fish and fishing directly impact participants' physical and mental health. The following section builds on these direct impacts, describing ways in which fish and fishing indirectly affects participants' health through supporting relationships which are integral to participants' health and well-being.

Relationships

"It also helps bring people together, eating what we love" – Ben (North Spirit Lake First Nation)

Indigenous health is deeply relational, foundationally connected to relationships with family, community, and the land (*First Nations Perspective on Health and Wellness*, n.d.; Greenwood et al., 2018). Early in participants' lives, and the lives of their family members, fishing becomes an important way for participants and their family to spend time together and to foster relationships with each other, with the land, and with the more-than-human. When asked about their early experiences fishing, Elliot (Deer Lake First Nation) shared: "I remember I was a chubby little baby trying to keep up with my grandma and my aunts while they were pulling the net, and I was trying to help". Isaac (McDowell Lake First Nation) and Colton (North Spirit Lake First Nation) spoke of young children going out fishing from the perspectives of parents, with

Isaac explaining: “my son is only four months he can’t fish but I took him out in the boat a couple times”, and Colton reflecting on when their son was young: “I have a photo of him holding a walleye. He was still little he was like in my lap little, and in a car seat. He was probably one [years old]”. Lydia (McDowell Lake First Nation) shared a story of taking their son out even younger, telling me that when they were commercial fishing, they would fill tubs with fish. In the boat would be a place to hold the tubs and Lydia would “make a bed frame in there and that's where [my son] would sleep” when their son was a baby.

Taking family members fishing is a cycle, where parents and grandparents will take young children out as identified above, and later in life when these children grow up, they take aging parents and grandparents fishing who are too old to go fishing themselves. Thomas (Keewaywin First Nation) shared a story of this, telling me: “my mom passed away, before she passed away we went ice fishing last year at Duckling Lake. Yeah, it was really cold and that was fun”.

Participants also spoke of taking other youth and community members out fishing. When asked if they take their kids fishing with them, Spencer (Deer Lake First Nation) replied they “take whoever wants to go”. Ben (North Spirit Lake First Nation) echoed this, saying “I often try to take the youth out as much as I can when I go”. Both these participants are individuals who possess the equipment needed to go fish and are happy to share and bring other youth and community members fishing with them. Jamie (Keewaywin First Nation) does not have fishing equipment, but this doesn’t prevent them from fishing, and they explained: “if a person like me wants to go put out the net, if I don't have no boat and motor and net and all that I'll ask around in the community”.

When asked about the benefits of fish and fishing, many participants emphasized enjoying time spent with their families while eating fresh fish together. Spencer (Deer Lake First Nation), when asked about the best part of fishing, told me “When I take my family out there, I think the best part is the shore lunch”. This was Spencer’s favorite part of fishing because “you get to sit there with your family, your friends, and just enjoy the meal”. Most participants shared with me how special shore lunches are to them after a long day of fishing with their friends and family. For example, Alana (North Spirit Lake First Nation) told me of a fond memory:

> “I went out [fishing] with my niece and her family. Her husband and two kids, two boys, and we were out all day in the boat on Margot Lake just spending the whole day fishing and we got a bunch of fish and we had a fish fry, a big shore lunch and that was so nice spending time with the kids”.

Events where participants and others come together and eat fish are not isolated to only family members, rather eating fish is a way participants’ entire communities enjoy spending time with each other, fostering relationships within the community as a whole. Jamie (Keewaywin First Nation) spoke of community fish fries: “you have a big fry, everybody makes an effort to pitch in their time like cutting fish, filleting fish and everybody gets together here, I'd say that we're a close-knit family, a family reserve”. Fish fries were identified as something looked forward to at community events. Lydia (McDowell Lake First Nation) said: “one thing that they always have is a big fish fry. So that's one of our main meals when we have meetings there. One of the best things we have is a big fish fry, everybody likes that”. When asked why those fish fries are special to them, Lydia replied: “because everybody is eating together, everybody’s working together to make that happen. Like the kids are there too enjoying the function. We're all together eating together, cooking together, that's what makes it special”.

Notably, the relationships participants described were not limited to humans. Participants' relationship with the land, waters, and fish emerged from the data as being an important supporter of their identity, which is fundamental to health. Relationships with the more-than-human world illustrated reciprocity; a give and take relationship. One participant explained to me their community's long-standing dependency on fish being a part of the community's identity: "our people were called . . . sucker clansman. That's where we came from, we survived on suckers, that's who we were that's how we survived" (Liam, Deer Lake First Nation). Elliot (Deer Lake First Nation) also spoke of the importance of fish and fishing, stating fishing is: "a way of life I guess, because you always have to fish, that's the way we eat". One participant in particular spoke of the importance of giving back to the land and fish, telling me "take care of the fish, and it'll take care of you", and that although people depend on fish and the land, "[the land] doesn't belong to us you belong to it, you belong to the land. That's how it was taught to me. You belong to the land, take care of it and that's our lifeline" (Spencer, Deer Lake First Nation). Jamie (Keewaywin First Nation) described their relationship with the land as a responsibility, telling me, "We are the keepers of the land". Respect was explained as an integral part of this relationship with the land to ensure that the land would continue to provide for people in the future. Colton (North Spirit Lake First Nation) expressed the need to "respect the land because it provides for you, and it will always be there for you if you respect it. Respect the water, especially the water because that's where the fish live".

Participants' experiences and quotes presented above illustrate the connections between participants' families, communities, land, and fish in ways that ultimately support health and well-being. The following section identifies that fish and fishing also help participants to navigate hardships and heal.

Healing

“That’s my thing about the fish, is that it does wonders, what it does it heals” – Thomas (Keewaywin First Nation)

Fish and fishing were described by participants as enabling healing from difficulties in people’s lives including loss, grief, and trauma. For participants, coming together as a community and eating fish was identified as being a way of healing. Ben (North Spirit Lake First Nation) explained that “when there's a lot of grief happening, we tried to have a feast together”. One scenario in which grief is felt through the community is when a community member passes away, and to help with peoples healing process there is a memorial supper: “they've had this memorial supper for the last 12 years, cooked on an open fire fish for her son” (Ben, North Spirit Lake First Nation). It is not just the social aspect of coming together to eat that contributes to healing, but the specific food eaten, and the harvesting practice of fishing for the food: “traditional food it heals us” (Ben, North Spirit Lake First Nation).

Going out fishing is another way participants heal. Ben (North Spirit Lake First Nation) told me that the “best part of healing is being out on the land” and that “when you go fishing, you're out there and it's healing for you to go out and be on the land. You connect yourself to nature, the earth, the food”. Other participants spoke of health issues present in their community, and how people would turn to fishing as a healthy coping mechanism. Allison (North Spirit Lake First Nation) specifically spoke of their dad in this context, saying: “fishing was everything for him because when he didn't have it, he fell apart. It seems that way to me anyways, it was his outlet, it helped him live the good life”. Ben (North Spirit Lake First Nation) also spoke of fishing with relation to these health issues present in their community, telling me there were community members suffering from these health issues who wanted to keep busy without

engaging in damaging and unhealthy behaviours. To help these community members avoid these behaviours, Ben said they "would take them [fishing] whenever I go out".

These quotes portray how the benefits of fish and fishing on health do not only promote and protect health and well-being but can also work to repair health and well-being through healing.

Global theme 2: Influences On, and Effects of Changes Surrounding Fish and Fishing

Participants' stories and descriptions of how and why fish and fishing practices have changed over time, and the impacts of these changes were complex and layered. This Global theme maps the interactions between fish, the environment, participants' needs, technology, and the effects changes in each of these aspects and interactions between them have had on participants and their communities.

Needs for Fish Evolved Alongside Fishing, Storage, and Cooking Methods

"If you know how to fish, you feed yourself and your family for a lifetime" – Jamie (Keewaywin First Nation)

Thomas (Keewaywin First Nation) explained to me that in the past "that's how we survived is mostly fish". Fish was an important part of people's diet when living off the land, because although there were other animals that were hunted or trapped and eaten, fish was easily available and could always be depended on. Thomas went on to tell me that "sometimes red meat is hard to catch so you just go get fish and eat fish". Fish was especially important for this reason before the presence of stores in communities. Jamie (Keewaywin First Nation) described the early days of people settling in Keewaywin, around 1980, before there was any infrastructure there. When asked about fishing during this time, they replied "That's how we survived off the

land, fishing" (Jamie, Keewaywin First Nation). Although fish is not depended on as much as it used to be in the past because of the availability of store-bought food presently, Liam (Deer Lake First Nation) stated that they were "pretty confident to say that the community still utilizes about 80%, 85% of what the land provides for sustenance".

Traditionally, fish also supported other land-based activities. Ben (North Spirit Lake First Nation) described how fish is depended upon when they go moose hunting:

> "our main food we ate at night time when we go camping is fish and oftentimes when I go camping, moose hunting, I set a net as soon as I get there at night so while I'm hunting during the day all the fish will go into the net during that night and that day so we don't have to go fishing and spend time fishing. We just have the fish in the net ready".

Elliot (Deer Lake First Nation) and Colton (North Spirit Lake First Nation) also spoke of utilizing fish as food when out on the land trying to get more food, describing how dried fish pemmican is brought out on the land for food. Colton identified that fish was depended upon as a long-term food supply during trapping season while people were trapping and out living on the land for up to a month and a half at a time. Trapping is no longer as common as it once was for participants, however fishing also supported trapping by providing bait. Lydia (McDowell Lake First Nation) explained that when catching fish using a net, they would only eat certain species which were caught. The other fish "you would use that for bait when you went trapping, but we would always use the fish that we were not going to eat"(Lydia, McDowell Lake First Nation).

In McDowell Lake First Nation, fish was also the main source of income for participants from this community while commercial fishing was still operating, which was roughly from 1950 to 1995. When the fish population declined in McDowell Lake and the cost to fly fish out of the community to sell the fish increased, Alex (McDowell Lake First Nation) explained that

“everybody left to go find employment elsewhere”. Although community members left, many still return to McDowell Lake First Nation seasonally, in the summer months. Keegan (McDowell Lake First Nation) returns seasonally and stated that “soon after we closed down for commercial fishing, we had to find another alternative to get some revenue and so we, my brother and I, decided we were gonna look into tourism”. In other communities, fishing also was and remains an important way of earning income through guiding for fishing tourism operations. When asked what fishing meant to their family, Allison (North Spirit Lake First Nation) replied: “for my family in general it was everything because it helped my dad provide for the family”. Generations of community members have worked as guides in their communities for income. Allison (North Spirit Lake First Nation) told me that their dad “was a guide there for as long as I can remember with the North Spirit Lake lodge”, and Ben (North Spirit Lake First Nation) shared with me that they were very young when they began guiding: “I was almost 13 when I started guiding for the fishing lodge in North Spirit”.

As discussed above, fish was, and continues to be, though to a lesser extent, an important dietary staple and source of sustenance for participants due to its dependability and availability. Due to this, participants frequently referred to storing fish for a long-term food supply. Prior to freezers being present in communities however, smoking fish and turning it into pemmican was identified as the primary method of storing fish. Ben (North Spirit Lake First Nation) explained to me what pemmican is and how it was made:

> “[Pemmican is] smoked sucker, you'd pound it with two rocks into a powder almost a dust, and they would add berries into it, blueberries. Often, they would do two white suckers to one red sucker because of the oils in the red sucker would keep it I don't know better I guess it would last longer”.

Not every species of fish could be stored in this manner. Liam (Deer Lake First Nation) identified that “if you wanted to keep fish, we would go for brook trout or whitefish and we would keep them for smoking and we don't do that with northern pike or walleyes. Only whitefish and trout we would smoke, and they would keep longer”. Sucker was another fish species which participants spoke of storing using this method. Smoking and making pemmican to store fish isn’t a commonly used storage method anymore due to being able to use freezers to keep fish longer now. Jake (North Spirit Lake First Nation) reflected on this stating “[a] long time ago we didn't have a freezer. We just smoked everything, that’s the way you can keep [fish] longer”, and Ben (North Spirit Lake First Nation) identified that “people aren't smoking game as much as they used anymore”.

Another practice related to consuming fish which participants described as changing over time was the parts of fish which are consumed. Participants spoke of people in the past eating almost every part of the fish. Ben (North Spirit Lake First Nation) shared a memory of their grandmother: “when I was a kid my kookum I watched her eat the walleye eyes, the eyeballs, and I thought it was so I don't know strange but that was normal for her right because they grew up in a different era”. Liam (Deer Lake First Nation) described how although they always saw their grandparents eating many parts of fish, this wasn’t something that they began doing as well:

> “My grandparents eating sucker heads we would go out and get sucker heads for fish fries or whatever. I've never really developed a kind of a taste for that though. They say it's really good to eat but I think the main thing nowadays that we eat is the pickerel [also known as walleye]. We won't eat everything, we cut out the cheeks, we would cut out the we call them the fish wings, and then the filets”.

Roger (Keewaywin First Nation) also described how the species discussed above which were targeted due to their ability to be stored aren't eaten presently by their kids: "my children they do eat [fish] but the only fish that they eat is pickerel [also known as walleye]". Ben (North Spirit Lake First Nation) explained that in their grandma's "generation of living they had to eat what was available. If you didn't eat the whole animal, you were disrespecting [it]". Colton (North Spirit Lake First Nation) identified another reason why older generations ate more parts of fish than people do today: "they grew up eating like that way because you couldn't go to the store like you can today and decide what you wanna have for supper. So, but for them back then I think that they, that's all there was. There was nothing else". Morgan (McDowell Lake First Nation) referred to another effect of being able to buy food from a store now, identifying that because of store bought food, "we don't eat as much fish as we used to". Alana (North Spirit Lake First Nation) described that they believe the cause of people eating less fish and fishing less now is "because it was almost like a survival thing a long time ago right and now it's more recreational it seems to me".

Participants also spoke of specific fishing methods and locations used to fish for the species of fish targeted in the past for storing. Jake (North Spirit Lake First Nation) described:

> "...in the summertime with a fishnet what I do is I just go around the shores where which way the wind blew that day and then go around the shore there or maybe the Bay and then just look for them. You can see them, their back sticking out of the water, whole bunch of whitefish and then like in the Bay there and then you can set your fishnet over here and you try not to make noise. They can hear you you know, and then after you set your fishnet then you go in behind the Bay there and you scare them away and they go right into your fishnet. They're eating all those flies".

Lydia (McDowell Lake First Nation) spoke of learning the specific locations to go to fish for specific species: “we were taught by the Elders which areas to fish like if you're fishing for pickerel [also known as walleye], certain areas where you can go, and then certain areas where you can get whitefish or big [pike]”. As discussed above, younger generations are eating mostly pickerel/walleye, rather than species traditionally used for smoking for storage. Contrasting the specific fishing methods and locations required for catching species used in the past for storage, Thomas (Keewaywin First Nation) identified that “with pickerel [also known as walleye] it's a different story. You can just go down to the lake and throw a rod in there and that's it they have a dinner”.

While evolving need for fish affected the species of fish consumed and how participants fished, fish and fishing were also altered due to outside influences such as environmental change and industrial activity. The effects of these disturbances are explored below.

Changes in Fish and the Environment

“Water is life and if the water is affected everything else is affected” - Alana (North Spirit Lake First Nation)

Participants identified several changes in fish they have witnessed over time, linking some changes in fish to changes they have observed in the environment. A summary of identified changes in fish and the environment, the effects of these changes, and the communities in which changes were experienced is presented in Table 3 on page 84. While describing changes in fish, participants commonly referred to environmental changes in the water, notably water level and temperature which they believed caused changes in fish. Although water levels and thus water

temperatures have always varied, participants noted that water levels have been changing more drastically in recent years, alongside various changes in fish.

Seven participants identified having started seeing, or observing an increase in parasites in the fish they catch. While describing parasitic worms present in fish, Isaac (McDowell Lake First Nation) explained that "it seems like when the water is really warm that there's more [parasites] in the meat [of fish], in their body, and then when the water is cold or cooler you don't see that as much". Another participant spoke of a specific lake in their community with regards to this, stating "the walleyes in there are filled with worms. I think it has to do with the shallow water and it's always warm" (Ben, North Spirit Lake First Nation). Parasites in fish were cited by participants as the reason commercial fishing ended in McDowell Lake First Nation. Keegan (McDowell Lake First Nation) said that "they found some parasites in the fish that we sold. They found some parasites which would be harmful to some people" which resulted in them not being permitted to sell their fish anymore.

Water level was also referenced as affecting where fish were found. Isaac (McDowell Lake First Nation) shared their experience with fish spawning in new areas:

> "There is one Bay last year that me and my girlfriend went to, and we just hammered the fish for like 4 days, there was one after another and I went to that same Bay in the spring and because the water is lower they weren't in there so they spawned somewhere else just because the water was so low".

Spencer (Deer Lake First Nation) also spoke of the effect of water level on their fishing, telling me they struggled catching fish in places they traditionally had good luck fishing at: "we go to that spot and [the fish are] all gone. Before it would be just we go to a spot on the lake and we'd

be getting all these fish", to account for this, Spencer told me in order to catch fish they "had to find them deeper".

Participants identified that changes in water level have not been a consistent decrease or increase over the past years, rather there have been extreme high and low water levels. Keegan explained that for McDowell Lake First Nation " in the recent years there's some very high waters and some are very low". Isaac (McDowell Lake First Nation) spoke more specifically about this, stating "last year, the water was really high last year, and this year it's like three feet plus lower than it was", also telling me "I've been here for my whole life, past 40 years, and that I remember that's the lowest it's ever been". While Isaac described the lowest water levels they'd ever seen in McDowell Lake First Nation, Ben (North Spirit Lake First Nation) told me of water level changes in the opposite direction, pointing out that a few years ago in North Spirit Lake First Nation "the water level was the highest it's ever been". Liam explained water levels in Deer Lake First Nation based on a pictograph of a rabbit informally used as a water level marker: "when the water touches the rabbit that means the water is high. So, in recent years the water went above the rabbits head, the rabbit ears, and that's very unusual for our community". These changing water levels have also changed the landscapes in participants' communities. As discussed in Global theme 1, Morgan (McDowell Lake First Nation) explained how islands they'd camped on as a child are either washed away or covered in moss and are too wet to walk on, meaning areas where people camped growing up are no longer there to do so now.

No participants reported the size of fish increasing; however, four participants noted a decrease in fish size over time. When speaking of fish getting smaller, participants expressed that in the past when commercial fishing and frequent net use was used in their communities, the fish were bigger. Isaac (McDowell Lake First Nation) told me: "when I was growing up, when they

used to commercial fish it seemed like they used to catch more 25 inchers, 26 inches" and that now "if you catch a 25 incher that's a big one". When asked why they thought fish were smaller now, Kody (North Spirit Lake First Nation) replied "it can't be overfishing anyways that's for sure", going on to explain that this was because nets are not frequently used in their community anymore.

Commercial fishing in the past was also identified by four participants as having likely affected the number of fish. Damian (McDowell Lake First Nation) explained that in McDowell Lake First Nation "its starting to be a lot of fish. You can fish anywhere now. I'm not like, before I used to catch fish, but I mean now you can go to one little spot and catch 10 pickerel [also known as walleye] in one spot. Back in the day [we] used to catch maybe one to two or three and that was it". Lydia (McDowell Lake First Nation) explained that this increase in the number of fish in McDowell Lake First Nation is "probably like that now because before we used to have commercial fishing all summer long. For many many years that was the livelihood of McDowell Lake was commercial fishing every summer and ten guys fishing everyday". Alex (McDowell Lake First Nation) explained that commercial fishing in McDowell Lake First Nation went on for about 50 years, and Isaac (McDowell Lake First Nation) explained nets used for commercial fishing were large, between 100 and 150 feet long each. Other participants from McDowell Lake First Nation identified that towards the end of commercial fishing, the fish population had steadily declined, but now that commercial fishing has been gone for several years, the fish are high in number again. A large fish population however is not necessarily always a good thing. When Ben (North Spirit Lake First Nation) was telling me about the worm filled fish in warm shallow water, they also mentioned that they thought the fish in that lake were overpopulated. Jake (North Spirit Lake First Nation) explained how fish becoming overpopulated is bad for fish:

“when there's too many [fish], if you don't take them, they'll die off. They get sick” and that to make sure this doesn’t happen “you have to balance nature”. For Jake, overpopulating fish is their main concern regarding fish.

Commercial fishing wasn’t the only thing participants identified as affecting the number of fish. Elliot and Spencer both identified that the fish population in Deer Lake First Nation had declined because of too much fishing occurring while the fish were spawning. Spencer (Deer Lake First Nation) explained to me that in the past, because of ice conditions, getting to where fish were spawning was difficult and dangerous, however recent environmental change has affected ice conditions: “It was hard to get to the spawning sites in the springtime because of the way the ice would go and [with] all of this global warming, the ice just goes like that and we'd have easier access to these spawning sites”. This meant that more people were fishing during spawning, leading to a decrease in the number of fish. In Deer Lake First Nation, the Chief and Council made the decision to limit fishing during spawning because of this decrease in number of fish, which Spencer explains has been successful, “ever since the spawning sites have been closed off the fish are coming back”.

Four participants reported seeing physical deformities in fish. Ben (North Spirit Lake First Nation) stated that in the past occasionally they would see deformities on fish, but deformities have become much more frequent in recent times, “if you go fishing now either the third or fourth fish, walleye you’ll catch it'll have warts”. Isaac (McDowell Lake First Nation) also experienced catching deformed fish and was looking for answers about what was wrong with the fish. Isaac showed me a photograph of a walleye with a blunted misshapen head, telling me that in the past,

"We never even saw a fish like that, so I was kind of surprised that I did see that fish. That's why I took pictures of it, and I posted it, and I did wanna talk to someone like a fisheries person about if they had any ideas on why it looks like that. I know it was a small northern, you know what I mean like it was only 18 20 inches something like that it was small. I just killed it and threw it back because I didn't want it reproducing. It was messed up or sick or something".

Table 3

Participant Identified Changes in Fish and the Environment

Change Identified	**Participant Suggested Reason for Identified Change**	**Identified Change's Effect on Fishing Practices**	**Community Where Change Was Identified**
Decrease in fish size	Unsure however identified that fish were bigger during commercial fishing	No reported effect.	McDowell Lake First Nation, North Spirit Lake First Nation
Historic decrease in fish population	Commercial fishing in community	Became difficult to make money commercial fishing, many community members left McDowell Lake First Nation to find new employment. Those who continued commercial fishing changed to longer and deeper nets.	McDowell Lake First Nation
Decrease in fish population	Overfishing during spawning season	Stopped fishing during spawning season. Fish population is now increasing again.	Deer Lake First Nation

Increase in fish population	Commercial fishing no longer operating in McDowell Lake First Nation	It is easier to catch fish now. Nets are no longer used because with the large fish population nets need to be emptied too frequently.	McDowell Lake First Nation
Overpopulation of fish	Whitefish and Suckers are not targeted. Warm water temperatures increasing walleye population	Not eating fish from the warm waters because fish get sick from overpopulating and get worms from the warm water.	North Spirit Lake First Nation
Physical deformities or presence of parasites in Fish	Warm water temperatures and the presence of chemical pollutants in water	Sick fish that are caught are not consumed. McDowell Lake First Nation was not allowed to continue commercial fishing due to parasites in fish. Deformed fish are killed so they don't reproduce.	McDowell Lake First Nation, North Spirit Lake First Nation, Keewaywin First Nation
Fish spawning in new locations	Lower water levels	Past fishing sites are no longer viable, having to find new fishing locations.	McDowell Lake First Nation
Fish present in shallower water levels	Water level overall is shallower	Catching fish at shallower depths.	McDowell Lake First Nation
Extreme levels of change in water levels	Large amounts of snow melt contributing to high water levels. No suggested reason for low water levels.	New boat routes were needed due to shallow depths, and new fishing locations were required.	McDowell Lake First Nation, North Spirit Lake First Nation
Warmer weather and water temperatures coupled with lower water levels	Unknown causes occurring upriver	Warm water is resulting in more unhealthy fish. Unable to drive a boat through certain rapids due to low water level.	North Spirit Lake First Nation

Ice break up occurring earlier	Environmental change	Easier and safer access to spawning sites leading to an increase in fishing during spawning.	Deer Lake First Nation
Flooding of White Loon Lake	Hydroelectric dam constructed for Favorable Lake mining operations	Disappearance of islands in White Loon Lake, and the water quality has decreased.	North Spirit Lake First Nation
Polluted water in the vicinity of community	Sewage plant built in community	Community members no longer fish in close vicinity to the community due to sewage, requiring that people take a boat further from the community to fish.	North Spirit Lake First Nation

The previous two organizing themes under Global theme 2 have outlined how needs for fish, as well as the environment and the fish themselves have changed. Partially in response to these changes, and from the introduction of new technology, the practices surrounding fishing have also changed, which is described below.

Changing Fishing Practices

The biggest change in fishing practices identified by participants was the change from using log-constructed fish traps, to nets, and then fishing rods. Only one participant had used log-constructed fish traps in their lifetime, however other participants remembered their ancestors speaking of them, and some participants identified areas in their communities where the remains of these structures could be found. Spencer (Deer Lake First Nation) shared that when their grandpa spoke of fishing, “the majority of time he said that during the spawn they put these logs in the water where the fish would swim where it would be easier for them to catch [the fish]”. Jake (North Spirit Lake First Nation) described in more detail how these structures worked,

telling me they “would make some kind of a ramp just with logs up like that (Motions a downward angle with hands to show the downriver flow of rapids. Motions with hands horizontally to demonstrate the angle of the log-constructed ramp), and then when the fish come down the rapids they go in there. They go straight up on top there. On the ramp there's a little hole in there at the end of it. (Motions with hands vertically to indicate where the hole in the ramp would be to trap fish) Once they get in there, they can't get out they just get stuck”. While few participants recalled stories of or had experience with the log method themselves, all participants either had used and/or remembered their parents and grandparents using fishing nets to catch fish. Jake (North Spirit Lake First Nation) recalled the initial days of using fishnets: “we used to watch our grandmother make fishnets. You couldn't buy fishnets anywhere at that time, just twine to make fishnets so you had to make your own”. Many participants shared stories about setting nets to catch lots of fish. Nets became the primary form of fishing and was described by Jake (North Spirit Lake First Nation) as “the easiest way” to fish. Keegan (McDowell Lake First Nation) also explained to me that they “always used nets for commercial fishing”. Participants who commercial fished reported having up to 27 nets, all of which had to be checked daily to prevent caught fish from spoiling. For catching fish for food, participants identified that nets were gradually replaced with fishing using a rod and a reel. For participants who had relied on commercial fishing for income, rods and reels were not used until they switched to fish tourism for income.

Participants listed various reasons for the change to fishing rods, including no longer needing to rely on nets. Damian (McDowell Lake First Nation) told me that they no longer use nets because “there's a lot of fish now so you don't really need a gillnet”. The transition to fishing rods also reflects the transition of depending on fish for survival less now than in the past. Roger

(Keewaywin First Nation) reflected on this transition, stating “back then when I used to go with my dad setting up nets it was something that he needed to do to provide food for the family. So, but turning to fishing rod mainly just pleasure”. Kody (North Spirit Lake First Nation) also commented on fishing using a rod as a more enjoyable method, stating that they will use a rod just to “go out and have some fun”. Participants also expressed this change in fishing methods as different generations using different methods, with Ben (North Spirit Lake First Nation) saying “the people that would set nets there aren't around anymore. [They’re] not living on the reserve. They're getting old”, and Morgan (McDowell Lake First Nation) telling me that “most of the young people like fishing. They like casting you know using a rod. I don't think they really ever experienced putting a net out”.

While fishing using a rod and a reel has largely replaced net use, participants identified some scenarios in which a net is still used. Elliot (Deer Lake First Nation) stated that they would “only put the nets out only when we need to fish for like memorial feasts”. Spencer (Deer Lake First Nation) also described using nets to catch a large number of fish for traditional gatherings and feasts but explained that when they do that “we don't go on the main Deer Lake. We’ll go far, as far as we can to get those fish” so then that way “it's not taking away from Deer Lake”. Ben (North Spirit Lake First Nation) discussed two other scenarios they would use a net to save time: “[during] winter a gillnet is used quite often just because the length of time it takes to go out on the snow machine and drill holes and stuff for ice fishing”, and while going moose hunting on the land for days at a time so that they can spend more time hunting and less time is needed to fish for supper. Additionally, Elders that grew up fishing for and consuming species of fish that require a net to be caught do still use nets occasionally when they are craving whitefish,

for example. Isaac (McDowell Lake First Nation) explained that “last year my auntie set a net” but went on to explain that she only set a net because “she was targeting whitefish”.

Fishing methods have changed significantly over time. As described above by participants, these changes to methods reflect changing technology in fishing equipment, as well as intergenerational views of fishing. The next section, *Knowledges*, explores how these changing practices, as well as other changes in fish and fishing, have affected land-based knowledges in participants’ communities.

Knowledges

“It's important to understand how everything works in life, your surroundings, where you live, where you get your sustenance from, your sustenance for living. It's important to pass that on to your children, other children, and so they'll know what to do on their own when it's time for them to be on their own and how to do it. That's important, very important, our lives depend on it” - Colton (North Spirit Lake First Nation)

Participants expressed a responsibility to pass down knowledges about their traditional lands and land-based practices to younger generations. Spencer (Deer Lake First Nation) stated that “it was passed down to me and I've gotta pass it down too”, going on to tell me “Our purpose is to educate the next generation”. Colton (North Spirit Lake First Nation) echoed the importance of passing down knowledge, speaking of teaching their child when they were younger: “I wanted him to know everything that I know that was taught to me and it's important to pass this on to family. Not only family but friends and community members that are there. I think that's very important’. Lydia (McDowell Lake First Nation) and Spencer (Deer Lake First Nation) both explained that it is important to pass down this knowledge because its their tradition

and livelihood, with Spencer (Deer Lake First Nation) explaining they told their son they would provide them with the supplies and education to hunt and fish because “I'm going to need you guys to go out and do this for me now, hunt, fish, and just provide for the family. That's the way it always has been, our [name redacted] family. Gotta keep our traditions which is hunting and fishing”, and Lydia (McDowell Lake First Nation) stating that they want to encourage youth to continue fishing “because that's the livelihood of our family, our ancestors”. Lydia also explained that they think it's important that youth learn while Elders are still alive, “because old people aren't going to be there forever”.

Participants identified several skills and pieces of knowledge which they pass down to youth or had learned from their parents and grandparents when they were young. These included: how to fish, where to drive boats, how to filet fish, how to cook fish, how to navigate a boat in the dark, where fish are, and when to harvest fish. Keegan (McDowell Lake First Nation) identified that in addition to the land-based skills that are learned and passed down, when they were younger their parents and grandparents taught them “how to live off the land and how the land is very important to us, what the land means to us, how we benefit from the land, what the land means to us, that's something that was very special”. Keegan went on to say that these teachings made “you have a better perspective on life”.

Knowledge was identified as being passed down and learned in various ways. Participants spoke of teaching youth what their parents and grandparents had taught them in the past, with Keegan (McDowell Lake First Nation) telling me “the memories of being of growing up in McDowell Lake, those are the ones that I hold, that's my treasure, and what I learned from my parents, from my grandparents, my Elders, I try and pass that on to my children”. Elliot (Deer Lake First Nation) explained how this knowledges transfer carries on through generations:

“The kids I was teaching, now they're the ones teaching the other kids how to do that. It's a cycle”. Another method of learning participants described was hands-on learning. When asked how Spencer (Deer Lake First Nation) had learned specific fishing skills, they replied it was “just something I learned overtime”. Elliot (Deer Lake First Nation) replied to this same question saying they learned by “just going out figuring things out”. Liam (Deer Lake First Nation) phrased this self-led hands-on learning in the land in a different manner, saying “it's the land that teaches these types of things”. Participants also explained that sometimes they learned not by being taught, but through observation and stories. Liam (Deer Lake First Nation) stated that their knowledge was “kind of picked up by observing how people are doing things”, with Kody (North Spirit Lake First Nation) telling me to learn they would go out with their relatives and “just follow them around”. Spencer (Deer Lake First Nation) also described learning by listening to people with more experience: “that’s just something I learned through the fishermen's stories. It wasn't shown to me, it was just told to me”.

Participants however identified that the intergenerational cycle of knowledges transfer was severely interrupted by people’s experiences in the residential schooling system. All participants either had firsthand experiences with the residential and day schooling system, or their family members had experienced it. Damian (McDowell Lake First Nation) told me that they were “taken by the 60s scoop so I was raised here in Thunder Bay” and because of this they weren’t “really raised in the traditional ways”. When discussing learning land-based skills from family members, Thomas (Keewaywin First Nation) shared with me that they “didn't really spend time with my parents 'cause I was, because when I was 4-5 years old that's when I went back, and then I went to school, and then I went to residential school”. Ben (North Spirit Lake First Nation) discussed how the residential schooling system affected communities’ traditional

way of life stating, “it's that generation of people that are left are the ones that went to residential school and their way of life changed because they weren't able to stay in that traditional lifestyle. They were forced into that religion and lifestyle of residential schools”. Ben also stated their view that Pelican Falls, the school which they left their community to attend, “is a modern-day residential school” both “because of the history with that location” and because “you've got to leave your home and live with 15 of the other youth, and in a five-bedroom house. You leave your lifestyle for probably two thirds of the year to go there for school and you can't leave the place, you have to stay there”. Current day schooling was also commonly referred to as a reason for having to move away from home communities and land-based activities, or for taking time away from being on the land. Ben (North Spirit Lake First Nation) further explained their views of the western schooling system as “if you're in the school five to six hours a day seven hours a day that's time you’re not being on the land learning your identity and where you come from. That's the western style of knowledge not the traditional way”. When asked about teaching their kids skills around fishing, Lydia (McDowell Lake First Nation) replied that “by the time they were old enough to do those kinds of things we had moved out to Red Lake because my son [name redacted] had to go to school”. Ben (North Spirit Lake First Nation), who when younger left their community for school noted that contrasting their experience of not having many opportunities to be on the land while away at school, that: “I do know now that there's more access to hunting and fishing for the youth that are going to those schools now which is really good. I'm so jealous”.

Five participants identified traditional fishing knowledges and skills which they thought had been lost or were at risk of disappearing. Ben (North Spirit Lake First Nation) identified lost knowledge related to specific species of fish which are not fished for much anymore,

> “A lot of traditional knowledge with catching the lake trout is gone now. A lot of people don't even know how to go about going there to catch one or where to catch one” and that a “lot of people don't know how to fix northern pike anymore, that's been lost with today's youth”.

Roger (Keewaywin First Nation) told a story of how when they were younger, an Elder had asked them for a certain species of fish and returned later having smoked it to eat. Roger mentioned however that the Elder who did that “he's gone, I don’t know how he knew all that stuff”, so they can’t learn how to smoke that species of fish now. Roger also recounted stories of community members in the past returning to the community with lots of fish, “I remember seeing people coming back from the lake with their boats and they had lots of fish in their tubs. Sometimes they would have two or three full of just whitefish”, going on to say that “I wish I was out there during that time just to see where it was but at that time I didn't go” and now the knowledge of these locations is gone. Ben (North Spirit Lake First Nation) further reflected on people losing the knowledge of fishing: “It's a tradition that’s almost dying in our First Nation. A lot of people think it's just you know throw your hook in and you're gonna catch a lot of fish”. Liam (Deer Lake First Nation) stated that they believe the reason knowledge is disappearing is that “it's the modern conveniences that are outweighing you know looking for knowledge and how to fish and everything is being relied on, all that fishing equipment, and people are not learning how to look for that habitat or feeding areas of the fish”. Liam referred to “modern conveniences” a few times, usually while speaking of fish finders. Another participant however who uses a fish finder while fishing spoke of their fish finder helping them to learn more about the lakes they fished on, telling me when they started using a fish finder they “started understanding the different depths of fishing. I use the fish Finder not to find fish, just to know

what the depths are in the lake. That's what I look at, what structures there are under there" (Spencer, Deer Lake First Nation).

Although participants identified knowledge that was being lost, they also identified ways in which today's youth are still being taught traditional land-based skills about fishing. Communities have implemented a community cultural leader position which Elliot (Deer Lake First Nation) explained teaches youth "traditional activities, sometimes they'll have [fish], sometimes we take the ducks we get, we'll prepare them with the kids at the school and during the summer I go camping with them, take the school kids out usually a few days showing them basically living outdoors". Four participants discussed organised trips for youth. For example, Spencer (Deer Lake First Nation) spoke of how on these trips "the first priority would be taking a kid that hasn't gone out and done these things, who doesn't really have access. We need to reach out to these kids, take them to camp, they'd be going to camp, and we'll [say] OK what we're going to do today is you guys are going to go fishing".

As discussed above, one method participants spoke of learning and acquiring knowledge about fishing through was by going out on the land and figuring it out for themselves, learning-by-doing in other words. Without access to equipment for fishing however, this is difficult. Nine participants identified not having a boat or other fishing equipment as the main barrier to fishing. Ben (North Spirit Lake First Nation) described the effects that not having access to fishing equipment is having on people fishing: "not everybody has boats and motors anymore and people aren't going to [fish] anymore and it's starting a trend of people not going [fishing]". Spencer (Deer Lake First Nation) discussed this barrier in specific relation to youth, saying that the "barriers some of these kids have faced is that I guess their family situations where they can't

afford a boat or afford a rod. Those are the main barriers, the economics". To help youth under these circumstances overcome these barriers, Thomas (Keewaywin First Nation) told me that "we provide canoes to whoever wants to go fishing or go out just to explore the lake to fish". Elliot (Deer Lake First Nation) also explained how kids are being provided with ways to overcome these barriers telling me " I just give them what I have or sometimes [through] the choose life program there I can order supplies for them". As discussed in Global theme 1, community members with fishing equipment are often happy to take out other people who don't have gear so that they're able to fish. In addition to the cost of fishing equipment and gas being a barrier, Alex (McDowell Lake First Nation) identified that for McDowell Lake First Nation community members, the cost of flights to the community is also a barrier to fishing.

While Global themes 1 and 2 have focused on the changes and affects surrounding fish, fishing, health, and well-being from past to present, the future remains uncertain. Understanding the past is important to navigate the future, and Global theme 3 explores participants' views of this.

Global Theme 3: The Future of Fish and Fishing

"Take your kids out as you can while it's still there. Keep your waters clean. Look after one another, you know just cherish that. Cherish what you have today 'cause it could be gone tomorrow" - Kody (North Spirit Lake First Nation)

Almost all (16) participants expressed worries they had about the future of the land or fish in their communities, but many also identified hopes for future generations and ways to protect the future of fishing. These are explored in the following sections.

Worries and Hopes for the Future

Participants expressed several worries when thinking about what may happen in the future. These worries were commonly centered around proposed mining activities within traditional territories and the Severn River watershed, Lithium mining specifically. When asked about the future, Colton (North Spirit Lake First Nation) replied "I'm not too sure what the future is gonna bring, how it's going to be different. I know one thing that really, really concerns me is about that mining activity that's happening close to North Spirit Lake". Across all participating communities, participants' concerns about effects from the proposed mine were not just for their own communities, but the whole watershed:

> "Who knows what's going to happen, how it's going to affect the wildlife, the plants, and water, and the fish. You know and think about that, I think about all the other communities that are where the water flows like downriver, downstream, it goes all the way up to Hudson's Bay you know all the way up there. So, it's about three or four communities on that Severn River" (Colton, North Spirit Lake First Nation).

Participants expressed concerns with what the land would look like in the future after mining activity. Colton (North Spirit Lake First Nation) said that they "don't know what it's gonna look like after. I don't know what's gonna be left there for us". Ben (North Spirit Lake First Nation) echoed this sentiment saying, "it'll never be the same after they take what they want from it". Ben and Colton further explained their views of the mine telling me "It's a threat to myself, my identity, and to where I come from" (Ben), and "you have to destroy the land, develop it, they call they call it development right, so it's a development, a development for who? We won't benefit from it" (Colton). Allison (North Spirit Lake First Nation) spoke specifically to changes in the land proposed by mining companies, telling me "This next mine that wants to come in

they're saying that they want to build a lake". Allison disapproved of the proposed mine, stating: " I think that would just throw a lot of things off balance because when you kind of mess with nature then nature just kind of fights back stops giving". Colton (North Spirit Lake First Nation) also explained how they don't like how the proposed mine is planned, "the way they proposed to do the mining of the land there it's you know there's potential for disaster for the fish, wildlife, plants, even us, our people". As discussed earlier, the KOTC member communities of the Upper Severn River watershed are very dependent on fish and other animals and have always had to adapt to changes in animal behaviour and the environment. Colton (North Spirit Lake First Nation) however reflected on the severity of possible effects from proposed mining activity with relation to adapting to change, stating "maybe they think we'll adapt. You know maybe they think that, maybe they think that oh they've lived here all this time, they'll adapt to their surroundings anyways kind of thing. I don't think we will, not in this day".

Other than direct disruption of the land through mining itself, some participants expressed concerns about the construction of a permanent road to their communities that would be built with the proposed mine.

> "Frontier Lithium off in Pakeagama Lake they too are proposing a road to be built from I guess maybe the end of Nungesser up towards their mining site there and you know that too kind of leaves a bad taste in my mouth because what that road will bring, it will bring a lot of disturbance to the area because you know now the area is open to the world because of the road access and you know there will be people coming up there and there be a lot more activity with regards to mining. Maybe forestry will start happening all those kinds of things that happen in the world. Everybody is going to be coming like even

> with possibly tourist camps, hunting camps, and you know the outside worlds gonna come there (Colton, North Spirit Lake First Nation).

Colton told me that they think of the mining company as an "intrusion into my living space, my living quarters, and my way of life", and that if an all-seasons road is built "there has to be some mutual respect. There has to be something you know that will guarantee us no disturbance". Colton further explained their concerns with outside people coming into their community with the following analogy:

> "If I'm coming to visit you in your house and you welcome me in, I'm going to respect you and not make a mess in your house, and I'm going to look at it, and I'm going to see it, and that's all I'm going to do, and visit, and that's it, and you know pay my respects to [you], respect your area, your spot, and I'm not going to start rearranging your furniture because I don't like the way it looks or the way it's set up"**.**

Allison (North Spirit Lake First Nation) also expressed their views of a potential all season's road, telling me that at the moment their community is "kind of protected because you can only fly in or drive in during the winter but if it's all seasons then anybody can come and go and things can come in and come and go freely".

Participants compared their concerns about future land disturbances in their communities to past industrial contamination and environmental events in their and other communities. Colton (North Spirit Lake First Nation) spoke of changes in the land their dad had witnessed because of the past Favorable Lake mine:

> "White Loon according to my dad, he said it was full of islands. At one time it was full of islands, and it was I guess it was a shallow lake at one time" and "that since they built that mine towards Sandy Lake there that's not operating now, they put a couple of dams

> on that river. One in White Loon Lake there's a hydro dam they put there for powering the mine, and they flooded that lake".

Keegan (McDowell Lake First Nation) referred to how past pollution altered their community's diet:

> "There was that chemical they called PCB's which started showing up in our lakes in some of these fish, the smaller fish, and these fish-eating ducks ingested these little fish. So, the fish-eating ducks had that chemical PCB in them, so they advised us not to eat any more of those kinds of ducks that eat fish small fish. So, we don't eat those things anymore".

Other more specific worries about the future of fish for reasons beyond industry are illustrated in Table 4.

Table 4

Additional Participant Identified Worries About Fish

Worry	Illustrative Quote
Overfishing	"Just doing rough calculations of 800 guests a summer and then four fish each of walleye four fish each of northern Pike and two of trout that's 10 x 800 that's a good number of fish, and then us too like I would fish maybe I'd go three days of the week take maybe at least 5 of those days to eat, and then if there's 1200 of us maybe half would fish like me. That adds up a little bit of fish already that's what I would be concerned about" (Liam, Deer Lake First Nation)

Global Warming	“I'm concerned the heat will kill our fish through the water if the sun gets too hot, 'cause I noticed that every year it gets more hotter and hotter.” (Jamie, Keewaywin First Nation)
Invasive Species	"We've been telling them don't introduce anything that's foreign and into the lake 'cause it's going to take over or upset the lake.” (Alex, McDowell Lake First Nation)
Overpopulating	“The only thing I'm worried about is overpopulating… because [fish] die off when they are overpopulating” (Jake, North Spirit Lake First Nation)
Forest Fire Smoke	“I'm worried about the fish, contaminated fish. I don't even know what's in the air now and whatever is in the air goes in the water. I think even the forest fires are affecting the fish.” (Jake, North Spirit Lake First Nation)

Note. The worries illustrated in this table are not inclusive of worries due to industrial activity. Worries are presented in order of most commonly expressed to least commonly expressed by participants.

As identified in Global Theme 1, sixteen participants expressed worries about the future of fish in their communities. These concerns culminated in being worried for future generations. Alana (North Spirit Lake First Nation) stated “if they're successful in building that mine there I don't know if we'll have any more fish for my great grandchildren”. Morgan (McDowell Lake First Nation) shared similar worries with regards to the safety of consuming fish in the future: “My worry is with the new generation, when their time comes when they're older or when they’re adults will the fish still be good”. Isaac (McDowell Lake First Nation) expressed how these potential affects make them feel: “I would be heartbroken if my son can’t fish and eat the fish when he's a teenager”. Kody (North Spirit Lake First Nation) stated that in the future if the next generation suffered a decrease in fish “they’ll get frustrated” because it wouldn’t be “the

same as a long time ago". Reflecting on this Kody identified if the number of fish were to decrease in the future: "I know that the only people who I can blame are the mining companies".

Worries about the future are not new. Thomas (Keewaywin First Nation) shared with me conversations they'd had with their dad in the past. Thomas identified that in the past their dad had had visions of the future, which Thomas didn't believe would ever happen, but some are now reality. Thomas told me "My dad, like what he said about before is that we'll be drinking, there'll be bottles that will be sold, that's what we'll be drinking from. You can't even drink the water he said". When their dad told them what he saw would happen in the future, Thomas "laughed that time, I said that's not going to happen". Now however, water isn't drinkable in this community, and Thomas's dads' vision is reality. Jamie (Keewaywin First Nation) didn't hear of this vision but spoke of their experiences which mirror that of the vision: "before our water used to be more better, we used to drink off the water, but now it's kind of polluted. Even the springs off the land they don't even come out no more some springs. There used to be some springs that we used to get pure water". In addition to their father's vision, Thomas (Keewaywin First Nation) also shared a story of fishing with their dad. Their dad had caught a fish, but rather than keeping it, he released it and explained "we don't need it, don't kill it, just let go" (Thomas, Keewaywin First Nation). Thomas's dad told them that one day there would be nothing left to eat, and that's when they would eat that fish he'd caught. Thomas explained that's "why he put the fish back, talking, when I need you, I'm gonna need you, and if I don't need you, I'll put you back in there". Thomas said that they still think about this fish their dad released, explaining they believe there will be "a certain time when there will be no fish and he'll be the only one around".

Participants' hopes for the future were largely the opposite of their worries, focusing on hoping that future generations would still be able to fish, consume fish, and enjoy fishing within

their traditional territories and communities in the future, and that the land would remain healthy. Spencer (Deer Lake First Nation) is still young and physically well enough to fish on their own, but they're already thinking about the future, making sure their kids have the skills to be able to fish, telling me their hopes for the future are "that my kids are able to take me fishing. That's what I would like". When asked what they hope the future will look like for their son, Isaac (McDowell Lake First Nation) replied "I hope he can eat the fish" and that "there's not going to be parasites. He's not going to have to worry about eating [fish] and getting sick". Roger (Keewaywin First Nation) stated that they would like "for the next generation to be able to enjoy what I'm enjoying right now without worrying about contamination and things like that. That's my, I hope that they can enjoy what I'm enjoying right now, that's what I would like to see". Allison (North Spirit Lake First Nation) expressed similar desires telling me they "hope that a lot of people do go against the mine just to keep the land the way it is so other generations can enjoy the way they're fishing now. I guess' cause if the mine comes in, I don't think fishing will be the same".

It is evident from the quotes above that participants have several valid concerns about what may happen in the future in their communities regarding their lands, waters, wildlife, and lifestyle. While participants identified worries, they also identified ways to sustain fish and fishing in their communities.

Protecting the Future

To ensure that the future generations will still be interested in and knowledgeable about fish and fishing, participants described various community solutions. Liam (Deer Lake First Nation) explained that community leadership had started fishing derbies in their community to get people excited about fishing: "the leadership at the time they were seeing that interest

dwindling so in order to kind of bring back the interest in eating fish and learning about fish, how to make it and all that, we put up festival's". Spencer (Deer Lake First Nation) also spoke of the benefits of fishing derbies, telling me "The overall intent behind all these derbies is get the youth into fishing. Get that future generations into fishing". Liam (Deer Lake First Nation) also articulated that another benefit of these derbies is that the prizes for winning them consist of fishing equipment, so the derbies are "bringing in equipment for instance boats motors and stuff like that for the community to utilize just to make sure that they get out on the land and have the tools for it if they can't afford stuff like that". This is an important benefit, because as discussed earlier lack of equipment access was identified by participants as a main barrier to fishing.

Nine participants identified the importance of maintaining tradition surrounding fish and fishing, including continuing to catch, cook, and consume fish. Alana (North Spirit Lake First Nation) expressed that consuming fish is important to maintain tradition, and that community members eat fish at community events "to take them back to tradition they didn't want to lose, they're trying to hold on to that part of our history, of our livelihood". Providing education and fostering youths' interest in fishing is another important part of maintaining these traditions. Damian (McDowell Lake First Nation) spoke about this, telling me "The younger generations are interested in fishing. Like she said you just gotta teach them" going on to say that "it's up to [the youth] to continue that tradition" and that "if they want to eat the fish that's up to them". As discussed above, cultural coordinators in participants' communities are teaching youth traditional activities including catching and cooking fishing. Another education opportunity is the Deer Lake walleye hatchery. Liam (Deer Lake First Nation) explained that teaching people to be "aware of what a fish habitat is for instance, learning a little bit about what the fish do when they spawn" is one way of protecting the future of fish through this hatchery. Liam added to this

stating that the hatchery will help people with “learning about the habitats, learning about how fish breed, and what conditions are required, the temperature of lakes, clarity of the lakes”.

While participants identified that the Deer Lake walleye hatchery will be useful in educating community members about fish, the main goal of the hatchery is to increase the number of walleyes in Deer Lake. Participants expressed maintaining a healthy sized population of fish as being key to ensuring the future of fishing, with Colton (North Spirit Lake First Nation) saying “the hatchery right like that ensures that there's going to be a future you know for fishing and for harvesting fish and ensuring that there's a healthy [fish] population years ahead”. It is worth noting that Colton is not from Deer Lake First Nation and is happy that the future of other communities’ fishing is being protected. Spencer, a member of Deer Lake First Nation also expressed their gratitude for the hatchery: “I'm glad that's in place for the future and I'm hoping in the future I'll still have access to fish and fishing. I'm hoping that my kids are able to take me fishing, that's what I would like”.

Participants from Deer Lake First Nation also identified that in the past few years their community leadership has asked people not to fish during spawning to ensure that the fish will remain at a good number. Spencer (Deer Lake First Nation) explained that “over the last few years the community has respected the council's decision to limit the fishing during the spawning season or to close off the spawning sites” and that “if you go through those spawning sites, you're not allowed to touch the fish”. Spencer also identified that not everyone was happy about this limit on fishing, however since this decision was made, the positive effects on the fish population are already evident.

While other communities have not put in place a formal or specific limit on fishing during spawning season, Roger (Keewaywin First Nation) identified that their community has

begun to look at not fishing during spawning as a way to ensure the future of fish in their community as well, telling me “this past spring is the first time that we have actually thought about spawning in terms of not us fishing at that time”. They shared that this may become a yearly occurrence, that “that's something I did encourage that the people not to go fishing when we know when the spawning is taking place. Let them spawn first so I think we need to encourage people to think about that every year” (Roger, Keewaywin First Nation).

Communities’ solutions to protecting the future of fish and fishing are multifaceted reflecting the various challenges to fish and fishing currently. While the specific initiatives vary by community, the overall goal remains the same.

Study Strengths and Limitations

It is important to acknowledge and consider the strengths and limitations of this research and their implications for understanding and interpreting the findings. Additionally, recognizing this research’s limitations can be used to outline future areas of research, and identify potential bias’s present within the research.

A notable strength of this study includes a high level of community participation with both the KOTC and member communities. When planning this research, there was the concern that members of the KOTC member communities of the Upper Severn River watershed may not want to speak with me and share their experiences. Originally, it was planned to interview 10-12 participants, however there was a higher level of interest in participating than anticipated, and thus the data collection timeline was lengthened, and additional interviews were conducted. Community members were eager to share their knowledge and experiences. Participants identified that they enjoyed sharing stories through interviews. Participants' enjoyment of sharing

stories likely increased the detail and number of stories shared through interviews. This research also occurred at a relevant point in time, as consultation with communities by Frontier Lithium, discussions with the KOTC and the Ministry of Natural Resources and Forestry (MNRF) about land use planning, and the beginning of Deer Lake's walleye hatchery meant that the topics explored in this research were already present on participants' minds, likely contributing to their eagerness to discuss them. Stories and experiences were also collected across three generations of participants, with the oldest participant being in their late eighties and the youngest in their thirties. As this research explores changes over time, being able to analyze three generations of personal experiences added to the strength of the data. Additionally, collecting data from four different communities distributed throughout the Upper Severn River watershed provides a broad and detailed portrayal of changes in fish and fishing across the watershed. As identified in the findings, certain changes in fish and fishing were community specific, and thus would have been missed had fewer communities been involved in this research.

The main limitation to this research was the inability to access the KOTC member communities of the Upper Severn River watershed due to their remoteness. One community visit was successful, however other planned visits did not work out due to a variety of reasons. Due to this, only five participants were interviewed that live in their home communities full time, with five living in community seasonally, and eight living in outside urban areas full time. This may have impacted results, due to fewer participants having year-round and more recent experiences with fish and fishing in their home communities. Stemming from this limitation is also that no participants had direct experience working with the Deer Lake walleye hatchery. While some participants had knowledge of the hatchery, none have been directly involved with it, making more hatchery specific research a good topic for future research.

Another limitation is that only four participants were female. This means that the results of this study are largely based on the experiences of males and lacking females' experiences with fish and fishing. While there are likely gender roles surrounding fish and fishing in these participating communities, four female participants out of eighteen total participants was not enough to analyse findings for gender roles, especially with participants coming from different communities and gender roles likely differing over place and time. Due to this, there is the opportunity for future research to look at the difference in fish-people relationships between males and females to better protect everyone's relationship with fish to support health, accounting for differences in this relationship across gender.

Additionally, although the criteria for participation permitted anyone older than 16 to participate in this research, none of the participants were youth. While youth would not have had historic experience with fish and fishing, youth may have had valuable insights into their hopes and worries for the future, being the generation who will be the most affected by it.

This research was also limited to the KOTC member communities of the Upper Severn River watershed, not including First Nations communities not a part of the KOTC who utilize the study area, such as Sandy Lake First Nation and Muskrat Dam First Nation. These communities and the KOTC member communities of the Upper Severn River watershed engage in land-based activities in overlapping geographical areas, as identified in the draft of Deer Lake's land use plan (*Deer Lake First Nation Draft Community Based Land Use Plan,* 2019). Also being situated in the Upper Severn River watershed, utilizing the same lands and waters as the communities in this research, and being at risk of negative changes occurring to the lands, waters, and life in these communities due to the same development that challenges the communities in this research, the experiences of non KOTC member communities is important as well.

One limitation in this thesis research, arising from both my positionality as an outsider to participants' culture, and the time constraints of this master's program was a lack of engagement with the fish side of the fish-people relationship examined in this research. While this research was caried out using a post-humanist conceptual framework, it did so in positioning people and fish as equal entities with influence on each other through a reciprocal relationship. The experiences and views which allowed for the examination of the fish-people relationship between KOTC community members and fish within the Upper Severn River watershed was informed only by people, lacking data on the fish side of this relationship. Being an outsider to participants' culture and participants' relationships with more-than-human relations, notably fish, I would be unable to properly assess the fish-people relationship as experienced by fish, being unable to engage with fish as KOTC community members do, nor being able to hear directly from fish, as was done with KOTC community members through interviews in this research. In future research, focusing on the fish side of the fish-people relationships in the Upper Severn River watershed would be important to achieve a more comprehensive understanding of fish-people relationships in the Upper Severn River watershed, and because fish will be directly affected by ongoing environmental change and industrial activity, as well as KOTC community members changing relationship with the fish.

Finally, this research was limited in the fact that data was analysed by only one researcher. While two other interviewers were present for some of the interviews with participants, and initial themes were reviewed and developed in consultation with KOTC staff and my supervisor, data analysis, as well as choosing the questions I asked in interviews is a subjective process affected by my own positionality (Rogers, 2018). I am a settler, geographically far removed from participants' communities and traditional lands and territories.

While I have tried to identify my own biases as a settler, this cannot make up for lacking the experiences and worldviews of the participants in this research. This may have impacted the findings of this research as I collected and analysed data without being able to fully understand participants' experiences as an outsider to participants' culture.

Chapter 5: Discussion

The overall goals of this research were to situate and consider fish and fishing in relation to health and well-being in the KOTC member communities of the Upper Severn River watershed and examine how fish, fishing practices, and relationships with fish have changed and interacted with health and well-being over time through stories, experiences, and opinions collected from community members through interviews. The findings of this research illustrate the centrality of fish and fishing to the KOTC member communities of the Upper Severn River watershed, specifically highlighting the importance of understanding and conceptualizing fish from a relational and holistic perspective recognizing fish as more than a source of sustenance or resource to be monitored and regulated. Instead, fish are a foundational aspect of the health and well-being of these First Nations communities through supporting and strengthening mental health, physical health and healing; promoting relationships with family, community, the land and the more-than-human; acquiring knowledge through learning from Elders and the land first hand; time spent on the land; and identity and sense of belonging to, respect for, and responsibility to the lands, waters, and fish. While fish and fishing are integral in health and well-being, participants' interactions and experiences with fish and fishing have changed over time. Communities' needs for fish have evolved alongside changing fishing, cooking, and storage methods, and changes in fish and the environment, impacting communities' health and well-being through the pathways identified above. The findings also provide insights into how the health and well-being of participants and their communities may be impacted in the future due to continued and accelerating environmental change and increasing industrial development if fish-people-land relationships and the multi-faceted values of fish and fishing to the KOTC member

communities of the Upper Severn River watershed are not recognized, protected, and promoted going forward.

In this chapter, I will discuss the findings in relation to First Nations Peoples conceptualization of the land, environment, and animals as more-than-human relations, which merits specific consideration in mineral development planning and First Nations communities' adaptation strategies for future landscape and environmental changes. The relational significance of culturally important places and species is discussed within the context of mining impacts on First Nations communities, with a specific focus on the Frontier Lithium mine, as this potential mine emerged as a central worry of participants and the KOTC. Possible methods for adapting to further landscape and environmental changes in First Nations communities is then explored, with a focus on utilizing First Nations communities' experiences with the land, intergenerational land-based knowledges, values, land-based practices, and relationships with the land and other more-than-human relations. This chapter concludes with possible pathways forward with the aim of sustaining fish, fishing, and relationships with fish within the KOTC member communities of the Upper Severn River watershed.

The Relational Importance of the Land and Fish as More-Than-Human Relations

As identified earlier, maintaining strong reciprocal relationships more-than-human relations such as the land, plants, and animals supports First Nations Peoples health and well-being (*First Nations Perspective on Health and Wellness*, n.d.; Greenwood et al., 2018). However, western society sees land as an inanimate landscape and property to be owned and extract monetary value from, directly contradicting First Nations Peoples views of belonging to

the land (Atleo & Boron, 2022; Clark et al., 2021; Cuerrier et al., 2015; Martinez et al., 2023; Royer & Herrmann, 2013; Salmón, 2000; Shields, 2023).

Participants in this research with the KOTC member communities of the Upper Severn River watershed expressed these feelings of belonging to the land, identifying specific connections to the lakes and rivers of traditional lands in and surrounding their communities. Participants also identified that the fish within the Upper Severn River watershed do not belong to participant's or their communities, rather participants and the fish live together and share the Upper Severn River watershed. This orientation to sharing the land with fish and belonging to the land demonstrates what Salmón (2000) describes as kincentric ecology, or Martinez et al. (2023) as kincentricity. Kincentric ecology or kincentricity is the view that people, the land, animals, and plants all belong to the same family (Martinez et al., 2023; Salmón, 2000). Under the view of kincentric ecology and kincentricity, people affect, are affected by, and learn from their more-than-human relations (Martinez et al., 2023; Salmón, 2000). Recognizing kincentricity in the KOTC member communities of the Upper Severn River watershed is a necessary step in working with these communities. In recognizing kincentricity, the land, plants, and animals within the Upper Severn River watershed cannot be treated as resources or a source of sustenance but are instead understood as other community members.

Traditional land-based activities, such as harvesting, fishing, and species management facilitate, maintain, and strengthen First Nations Peoples relationships with the land and other more-than-human relations, in turn supporting and strengthening health and well-being, as identified in the findings section of this thesis: *Interactions between Fish, Fishing, Health and Well-being* (Blanchet et al., 2021; Greenwood et al., 2018; McGregor et al., 2018; Royer & Herrmann, 2013; Whitney et al., 2020). The more-than-human relations which Indigenous

communities across so-called Canada engage with differs over time and place, and specific more-than-human relations are often key parts of identity, culture, health (mental, physical, emotional, and spiritual), and well-being, termed cultural keystone species (Garibaldi & Turner, 2004). For example, the Gwich'in and Inuvialuit Peoples in the Mackenzie Delta region of the Northwest Territories have a long history of trapping muskrat, which maintains community cultural identity, land-based traditions, health, and well-being (Turner et al., 2018). In Okanagan British Columbia, Okanagan sockeye salmon are integral to the Syilx Okanagan community's relationship with the land, maintained through ceremony and respectful harvesting (Blanchet et al.,2021). For the Cree communities of Eastern James Bay, northern Quebec, community relationships with Canada geese and woodland caribou are deeply embedded in the Cree communities' ways of life, culture, providing sustenance, and strengthening relationships with traditional lands (Royer & Herrmann, 2013). For the KOTC member communities of the Upper Severn River watershed, fish are the more-than-human relation engaged with most.

In the context of the KOTC member communities of the Upper Severn River watershed, I apply the term cultural keystone species to multiple species of fish native to the Upper Severn River watershed, targeted specifically by community members over other fish species. These targeted species of fish historically or currently include pike, sucker, and walleye. While the specific targeting of and use of these various species of fish has evolved over time in the KOTC member communities of the Upper Severn River watershed, these fish are chosen over other species such as goldeneye and ling, and the process of fishing for these species has shaped community members lives, supported community members relationships with the land and more-than-human relations, and has strengthened community members cultural identity, all of which are aspects of cultural keystone species (Garibaldi & Turner). This role of fish is reflected in

interviews with participants who describe their community as a fishing community, emphasize the importance of fish and fishing to the health and well-being of their communities, and descriptions of the relationship's community members feel with fish through feelings of responsibility for caring for fish and sharing the watershed with fish.

The relationships First Nations communities have with cultural keystone species, incorporating respect for and reciprocity to keystone species, emerges from the world view of kincentricity in which these feeling of respect and reciprocity are central in viewing the land, plants, and animals as more-than-human relations (Garibaldi & Turner, 2004; Martinez et al., 2023). Therefore, concepts of cultural keystone species and kincentricity are present together within First Nations communities (Martinez et al., 2023). While the concept of cultural keystone species places a specific species as being central to a community's identity, shaping ways of life and strengthening cultural connections and relationships, these aspects of cultural keystone species do not reduce the importance of the other more-than-human relations that First Nations communities engage with and live with under kincentricity (Garibaldi & Turner, 2004; Martinez et al., 2023). While participants in this research with the KOTC member communities of the Upper Severn River watershed emphasized the importance of fish in their communities, they also spoke of overlapping engagements with other more-than-human relations, such as fishing while moose hunting, bringing unwanted fishing net bycatch to areas where birds would feed on the bycatch, and using unwanted fishing bycatch as bait for trapping. These overlapping engagements with cultural keystone species of fish and other more-than-human relations have evolved over time in the KOTC member communities of the Upper Severn River watershed. Garibaldi & Turner (2004) identify that this evolution of relationships with cultural keystone species is a common occurrence, as the relationship is affected by several factors including

environmental change, population changes, and changes in knowledge transmission (p. 4). Differences in cultural keystone species across so-called Canada and over time highlight the need for place-based work with First Nations communities, and a knowledge of historical local engagement with and value of the keystone species. The specific species and role of cultural keystone species for different First Nations communities will differ, and result in varied place and time-based methods of engagement with cultural keystone species between First Nations communities.

Findings in this research highlight that the act of fishing involves participants spending significant time on the land, learning the waters and movements of fish, which supports participants' relationship with the land. This time spent with the land and fish supports multiple aspects of health and well-being, such as mental health through the discovery of land-based knowledges and nurturing emotional health through relationships with the land and fish. This value of fish beyond sustenance, through fishing, in the KOTC member communities of the Upper Severn River watershed aligns with the research of Clarke et al. (2021), who explore the role of nonconsumptive cultural keystone species in British Columbia and Manitoba. Clark et al. (2021) explains how the Cree, Dené, Métis, and Inuit Peoples of Churchill Manitoba, and the Haíl ˜zaqv Peoples of coastal British Columbia each have long standing relationships with polar bears and grizzly bears respectfully (p. 379). These longstanding relationships are not centered around the consumption of polar and grizzly bears but are nonetheless an important aspect of identity and well-being (Clark et al., 2021). To the Haíl ˜zaqv Peoples, grizzly bears are a close relative, and the Haíl ˜zaqv Peoples and grizzly bears live together, learn from each other, and share the land and resources that the land provides (Clark et al., 2021). Recognizing the non-consumptive importance of culturally important species is especially important in the context of

research at the intersection of fish, fishing, and First Nations communities across so-called Canada which frequently focuses on fish as a source of sustenance.

Although participants in this research with the KOTC member communities of the Upper Severn River watershed identified that relationships with the lands and fish support health and well-being, through analysing data from interview transcripts I found that fish-people-land relationships were place-based and dependent on participant's traditional lands. Notably, participants expressed a lack of connection to non-traditional lands or lack of health and well-being supporting benefits of engaging in land-based activities outside of traditional lands and territories. This lack of relationship with or deriving health benefits from lands, waters, and fish away from participants home communities aligns with Greenwood's (2018) explanation that: "for many Indigenous communities the inalienable connection with and right to specific ecologies, lands, water and soil systems, and other non-human wildlife is inseparable from human health" (p. 195). While a connection to land broadly speaking is essential to First Nations Peoples health, it is beneficial to note that most of the positive impacts of fish and fishing on health and well-being, and relationality with more-than-human relations including land and fish are primarily experienced when fishing on traditional territories and homelands, which further emphasizes the importance of connection to and protection of traditional territories and homelands (Greenwood, 2018). Through analysing interview responses in this research with the KOTC member communities of the Upper Severn River watershed, it became apparent that fish and fishing generally cannot be substituted for fish and fishing within traditional territories and homelands. Many participants in this research indicated they will not fish in areas outside their home community, and participants who live out of community, in urban areas, depend on community and family members sending them fish caught on their traditional lands. This finding

demonstrates the importance of the specific lands and waters from which fish are from on participants' health and well-being.

Cuerrier et al. (2015) discusses place-based effects on well-being as experienced by KOTC community members in their research by presenting the concept of cultural keystone places (p. 427). Mirroring aspects of cultural keystone species, a cultural keystone place is a specific area with which a group of people have a longstanding close relationship with that is an important part of identity, and well-being (Cuerrier et al., 2015). Cuerrier et al. (2015) identify that the area of Moose Lake is a cultural keystone space for the Cree, Dené, and Métis Peoples of Fort McKay (p. 428). The area of Moose Lake is important for land-based activities, strengthening and maintaining cultural identity and a spiritual connection (Cuerrier et al., 2015).

Cultural keystone places for participants in this research with the KOTC member communities of the Upper Severn River watershed would include the lakes and rivers in and around participants communities as demonstrated by participants' relationships with these lakes and rivers and the fish from these waters specifically. The health of these waters and fish within participants' traditional territories is also an important aspect of participant's relationships with the waters and fish. As documented in the findings section, participants do not fish in areas where water quality and fish have been negatively affected, even when these waters and fish are in traditional territories.

Recognizing the intersecting role of cultural keystone species and cultural keystone places in the context of the KOTC member communities of the Upper Severn River watershed, and the importance of the health of these places and species, conveys the importance of protecting and the irreplaceability of community members' traditional lands, territories, and fish which live there. Reciprocal relationships with traditional lands and territories specifically

support health and well-being, while also providing an environment in which culturally important species can live and flourish, which in turn further supports the health and well-being of KOTC community members.

The reciprocal relationships the KOTC member communities of the Upper Severn River watershed have with fish, is derived from the communities' dependence on fish. To maintain the current and future generation's ability to harvest fish, KOTC member communities give back to, protect, and sustain the health of the land, waters, and fish. Harvesting fish, and sustaining the health of the land, waters, and fish over time leads to discovering land-based knowledges present in the Upper Severn River watershed and deeper relationships between the KOTC member communities and more-than-human relations. Past practices identified by participants in this research, such as live capture fishing methods, current practices of releasing larger fish which are good reproducers, and newly implemented practices such as limiting fishing during spawning and the Deer Lake walleye hatchery, are examples of reciprocal relational actions which support the KOTC member communities of the Upper Severn River watersheds' relationship with fish, and thus health and well-being.

Reciprocity to fish can support health and well-being through various aspects. For example, the Deer Lake walleye hatchery can provide community members with purpose, while protecting and providing hope for the future of fish and fishing in their community. Having purpose and hope, grounded in cultural identity and relationships support spiritual and physical health respectively (*Indigenous wellness framework reference guide*, 2020). Additionally, the direct care of fish from the point of conception likely strengthens people's relationships with fish, nurturing emotional health. Therefore, the health and well-being of the KOTC member communities of the Upper Severn River watershed is dependent not only on what the land

provides for communities, but also what the communities provide for the land, in essence, reciprocity.

The next section discusses the effects of mining specifically on First Nations communities and on First Nations Peoples relationships with more-than-human relations such as fish and the land.

Impacts of Mining on First Nations Communities

Although there are several causes of negative impacts to First Nations traditional lands and more-than-human relations which affect First Nations Peoples health and well-being, mining is the specific focus herein as it emerged as a central worry of participants in this research with the KOTC member communities of the Upper Severn River watershed and is an emerging priority for the KOTC.

While mineral development on Indigenous Peoples traditional lands arises from the economic interests of a capitalistic and settler-colonial society, the economic and capitalistic effects of industrial activity on health and well-being were not assessed in this research due to this research's focuses on the relational interactions between First Nations Peoples and the land, waters, and fish within the Upper Severn River watershed, rather than the influences of capitalism and settler-colonialism on Indigenous Peoples traditional lands through industrial development, as well as the lack of participants descriptions of the effects of economics on their relationships with the land and fish beyond the commercial fishing and fishing tourism activities identified in the finding's sections (McCormack & Gordon, 2020; Radcliffe, 2020; Shin, 2022).

While First Nations communities and watersheds within Southern Ontario have been subjected to a large amount of disruption from industrial activity and hydroelectric dam

development, the Upper Severn River watershed has been left relatively unaffected by industrial development in comparison to the south, due to its remoteness in Northern Ontario (Haxton & Cano, 2016). Thus, community members of the KOTC member communities of the Upper Severn River watershed's past experiences with mineral development are primarily with the previous Berens River Gold mine, also known as the Favorable Lake mine, which operated from 1939 to 1948, southwest of Sandy Lake (Berens River Gold Mine, n.d.). Participants in this research with the KOTC member communities of the Upper Severn River watershed identified the still present negative effects of this mine, including permanently altered water levels and water clarity.

When examining the effects of mining on First Nations communities, mining should be conceptualized as an ongoing effect of settler-colonialism, as land dispossession, and environmental injustice, in addition to the more direct land disturbances mining induces (Horowitz et al., 2018). Broadening the conceptualization of mining impacts beyond direct land disturbances more accurately represents the experiences of First Nations communities with mining (Horowitz et al., 2018).

As identified earlier, western society views land as a resource from which monetary value can be derived from, often through the extraction of natural resources (Shields, 2023). The western view of focusing on landscapes as providing resources sets peoples' relationship with the land as a consumer, contrasting First Nations Peoples views of land which are grounded in reciprocal relationships, placing people as caretakers of and cohabitants with the land (Martinez et al., 2023). Working within the western view of land, when mining companies attempt to express the benefits of mines to local First Nations communities, mining companies often focus on financial benefits (Vanthuyne & Gauthier, 2022). However, financial benefits of mines are

limited, and unevenly experienced throughout First Nations communities, and following mining operations First Nations communities are left with permanently altered environments, land use, and relationship with the land (Horowitz et al., 2018). Evidence of viewing financial benefits of mining as limited, coupled with worries of altered landscapes from mining was present in the interviews with the participants in this research with the KOTC member communities of the Upper Severn River watershed, who primarily emphasized the non financial values of the land, expressed that their communities will not benefit from the Frontier Lithium mine, and voiced several concerns with the extent the Frontier Lithium mine would alter their traditional lands.

Mining companies thus need to work to understand the value of land to First Nations communities and identify and develop ways in which mines may benefit First Nations values of and relationship with the land (Vanthuyne & Gauthier, 2022). When mining companies do not address First Nations values of and relationships with the land, and continue to work in a western worldview of resource extraction for financial gain, local First Nations communities can feel trapped and forced to enter negotiations with mining companies in order to exercise their own sovereignty, which enforces settler-colonialism processes and increases the negative effects of mining experienced by First Nations communities (Horowitz et al., 2018; Vanthuyne & Gauthier, 2022).

Martinez et al. (2023) further explains the effects of settler-colonialism, describing settler ecology (p. 203). Contrasting the relational aspects of forementioned kincentric ecology, settler ecology describes how settlers seek to dominate a natural environment, altering the landscape to suit their needs, with no respect or reciprocity for and to the land (Martinez et al., 2023). Frontier Lithium's proposed open pit lithium mine is a current example of settler ecology at the forefront of KOTC community member's worries. While participants in this study with the KOTC

member communities of the Upper Severn River watershed expressed several worries in relation to the future of fish and fishing in their communities, the most commonly reported worry was future potential mining activity. It is noteworthy that nowhere in the interviews were questions or prompts specifically related to mining, however participants almost always identified mining as a key worry when discussing fish, fishing, and future generations. While there is a considerable amount of mining claims around the KOTC member communities of the Upper Severn River watershed, the proposed Frontier Lithium mine was specifically identified by many participants (*MLAS Map Viewer*, n.d.).

Frontier Lithium is proposing the construction of an open pit lithium mine approximately 25 km northwest of North Spirit Lake First Nation, in close vicinity to Pakeagama Lake (McCracken et al., 2023). Appendix G presents Frontier Lithium's proposed mine construction timeline, and Appendix H identifies the specific location of the lithium deposits that are planned to be mined. Frontier Lithium's open pit lithium mines are expected to remain operational for 24 years such that concerns about the future impacts of the potential mining activity on fish, fishing, land, and health are particularly relevant. Horowitz et al. (2018) describes open pit mining, as planned to be implemented by Frontier Lithium, as mass destruction and a permanent alteration of land (p. 407). Mining negatively affects the landscape through physical changes, the air through dust and emissions, and the watershed through chemical and heavy metal pollution, all of which were worries brought up by participants in this research with the KOTC member communities of the Upper Severn River watershed (Horowitz et al., 2018). Mining induced negative landscape changes affect First Nations more-than-human relations in the surrounding area, altering wildlife movement and negatively influencing fish populations in affected water,

which in turn leads to negative effects on well-being for the First Nations Populations which rely on and relate to affected lands, waters, and wildlife (Horowitz et al., 2018).

Participants' experiences with land-based activities in other regions with industrial developments, past experiences with the Favorable Lake mine, as well as the experiences of other First Nations communities with Industrial activity can be drawn from to explore the potential effects of the proposed open pit Frontier Lithium mine in the Upper Severn River watershed. Construction of Frontier Lithium's open pit mine will involve activities such as drilling and blasting which will produce a large amount of noise, which has negative effects on health and well-being when present on land used by community members. Keegan (McDowell Lake First Nation) identified they don't go fishing in Red Lake because of all the noise from machinery they hear. Although Keegan spoke extensively of how fishing supports their health and well-being, machinery noise out on the land negated these benefits. Multiple participants also expressed their distrust, or negative differences in fish caught in areas where development and industrial activity occurs. The presence of mining and tailing treatment sites adjacent to community's water systems in the Upper Severn River watershed may also lead community members not to trust the fish from the waters in their traditional lands and territories, just as participants identified they do not trust the fish caught in Thunder Bay or Red Lake.

Cuerrier et al. (2015) identifies that large scale rapid landscape changes in First Nations communities, such as those which may be caused by the Frontier Lithium mine, can be detrimental to a traditional area's cultural importance (p. 433). While participants in this research with the KOTC member communities of the Upper Severn River watershed have experienced many changes in the lands, waters, fish, and other more-than-human relations of their communities, participants stated worries that adapting to changes caused by the proposed lithium

mine will not be possible. Worries about changes in the land referenced were not always changes such as pollution and contaminants, but large-scale physical changes in the landscape. While environments are in a constant state of change, Frontier Lithium's open pit lithium mine would introduce large scale changes to participants' traditional lands at an accelerated rate, potentially changing the land faster than community members could adapt to, resulting in alienation from traditional land.

Chong & Basu (2023) conducted a scoping review in which they identified the effects of contaminated industrial sites on Indigenous communities across the so-called United States and so-called Canada (p. 1). Through this scoping review Chong & Basu (2023) identified that even after land used by mining companies has been remediated, land use by local Indigenous communities is altered, leading to the Indigenous communities being alienated from their traditional lands (p. 12, 13). The experiences of First Nations communities being alienated from traditional lands even after land remediation highlights the importance of minimizing effects to the land through all stages of industrial activity, not just land remediation. Chong & Basu (2023) further identifies that alienation from traditional land alters Indigenous communities' relationship with their traditional lands and results in a loss of culture and a loss in applicability of intergenerational knowledges leading to a negative feedback loop in which Indigenous communities experience further alienation from traditional lands (p. 16).

As expressed by participants in this research with the KOTC member communities of the Upper Severn River watershed, outlined in the finding's section: *Knowledges,* as well as in Deer Lake's draft community land use plan, intergenerational land-based knowledges are integral to communities' ability to survive off the land (*Deer Lake First Nation Draft Community Based Land Use Plan*, 2019). Intergenerational land-based knowledges can be made inapplicable to the

land knowledges were learned on and about when factors such as environmental change and industrial development such as mining alter the land (Chong & Basu, 2023). Isaac (McDowell Lake First Nation) shared that in the past they knew of an area in their community where they could catch many fish, however this past year the water level in their community changed drastically, and when they returned to this area to fish, they couldn't catch anything. While this change in water level was likely the result of environmental change, industrial development such as the construction of past hydroelectric dams for the Favorable Lake mine in other KOTC member communities altered community water levels, requiring that community members change their fishing practices (Colton, North Spirit Lake First Nation). Changes in water level and fish behaviour, resulting in land-based knowledges that have been passed down over generations no longer being applicable to the very land that knowledges were learned on and about within the KOTC member communities of the Upper Severn River watershed, aligns with the experiences identified by Chong & Basu (2023) of First Nations communities being alienated from their traditional lands due to changes in the landscape (p. 12).

Going beyond alienation from land, participants in this research with the KOTC member communities of the Upper Severn River watershed reported that if the lands, waters, and fish in their communities were altered to the point where they could not fish or consume the fish, they wouldn't go out on the land anymore. Participants who live in communities seasonally stated they would likely not return to nor encourage their children to return to their home communities: "Without fishing families wouldn't go out anymore they would be indoors" (Alana, North Spirit Lake First Nation); I don't think I'd be there if I wasn't able to fish and eat the fish. What would be the point in going [to McDowell Lake]… I don't think there would be a point in going there fishing or sending any of my kids [to McDowell Lake] (Isaac, McDowell Lake First Nation).

The fact that participants would not go out on their traditional lands if the lands, waters, and fish were not healthy, demonstrates that without healthy lands and fish, there is no healthy relationship with the land and fish.

To mitigate alienating First Nations communities from their traditional lands and territories, companies such as Frontier Lithium that have vested interests in altering the landscapes used by First Nations communities should learn about local land use carried out using intergenerational knowledges, to inform decision making with the goal of specifically protecting key areas of land use. Supporting and learning about community land use planning, without imposing colonial views of land use planning structuring or regulations is one method through which this may be achieved. As identified above, the consequences for not ensuring First Nations communities continued sustainable and uninhibited land use range from forcing First Nations communities to alter land use practices, to alienating and completely displacing First Nations Peoples from their traditional lands and territories.

The rejected New Prosperity open pit copper and gold mine at Fish Lake on the traditional lands of the Tsilhqot'in Peoples in British Columbia is an example of how recognizing fish as more-than-human relations with key roles in First Nations Peoples culture, identity, and health was successfully used in opposing mining on First Nations Peoples traditional lands (Hoogeveen, 2016). In opposing the New Prosperity mine, the Tsilhqot'in Peoples expressed how fish are not merely a quantitatively measurable resource, but are a part of Tsilhqot'in Peoples families, as more-than-human relations (Hoogeveen, 2016). It was also identified that the construction of the New Prosperity mine at fish lake represented settler-colonialism in the chase for economic gain by mining companies, and that the construction of the mine would come at the cost of Tsilhqot'in Peoples future, values, and beliefs through negative

impacts to local waters and fish (Hoogeveen, 2016). The above listed points made by Tsilhqot'in Peoples and the overall community resistance to the mine resulted in the successful rejection of the New Prosperity mine twice consecutively (Hoogeveen, 2016).

Due to First Nations Peoples extensive time spent with the land, and relationships with the land and more-than-human relations, First Nations Peoples are disproportionately affected by landscape and environmental changes from mining activity (Fuentes et al., 2020). With the constant rapidly accelerating economic interest of extracting minerals and other natural resources from and surrounding First Nations Peoples traditional lands and territories, and the ongoing impacts of environmental change, mining companies need to increase meaningful engagement with First Nations communities. Meaningful engagement extends beyond providing First Nations communities with information on mineral development plans and should more importantly involve listening to communities concerns and feedback. Reframing views of land and animals from resources to place-based more-than-human relations, cultural keystone places, and cultural keystone species, becoming educated on historic and current First Nations land use and understanding First Nations concepts of health and well-being within a relational context can be beneficial in better navigating environmental impacts of industrial activity and inform decision making.

While this section focused specifically on mining, the next section; *Preparing for the Future*, will explore mining alongside environmental and other changes to First Nations Peoples traditional lands and territories and more-than-human relations, identifying ways in which further changes can be prepared for.

Preparing for the Future

Community members of the KOTC member communities of the Upper Severn River watershed's experiences with changes in lands, waters, fish and fishing, and evolving knowledges and relationships with more-than-human relations, can be drawn upon to identify the effects of and possible mitigation strategies for future changes.

In this research with the KOTC member communities of the Upper Severn River watershed participants identified worries with the proposed Frontier Lithium mine's preliminary closure plan, notably flooding the open pit mine after mining is complete (McCracken et al., 2023). Flooding the open pit mine will alter the flow and depth of existing waterways. As noted by participants, water levels have historically been affected by the Favorable Lake mining operations and are currently undergoing previously unseen levels of drastic change, which is having negative impacts on fish and fishing as identified in Table 3.

Considering past and current changes in water levels, and their effects on the land, fish, and fishing practices identified by participants, it is likely that the flooding of the open pit lithium mine after mining is complete will also induce similar negative effects. It is also important to consider the flooding of the open pit mines and the changes to the flows and quality of KOTC member communities' waters in the Upper Severn River watershed not as a singular isolated event, but rather an addition to the accumulated changes of the fish and environment of these communities, which will be discussed further later in this section.

Frontier Lithium began conducting environmental baseline testing in the study area in 2015 to establish a baseline for which land affected by mining can be returned to, as well as predict possible impacts on the environment from the mining process (McCracken et al., 2023).

KOTC community members however are hesitant to trust baseline tests being conducted and participants in this research stated they would rather conduct their own tests instead of depending on Frontier Lithium's environmental testing data (Roger, Keewaywin First Nation; Isaac, McDowell Lake First Nation). This desire of the KOTC member communities of the Upper Severn River watershed not to rely on tests conducted on their traditional lands by outside organizations is not unusual. Che & Hickey (2021) note that in location-based environmental monitoring programs, feelings of trust and credibility between organizations participating in monitoring is frequently an issue (p. 7). In light of this, KOTC member communities of the Upper Severn River watershed have started conducting their own environmental baseline tests, collecting data on water quality and documenting historic and future goals for community members relationships with the watershed, which has increased the communities' ability to engage in mineral development planning.

In addition to organizations clashes over the credibility of environmental monitoring data, there can also be issues in how collected data is utilized in informing environmental impact mitigation strategies (Cameron & Kennedy, 2023). Cameron & Kennedy (2023) reviewed the environmental assessments of every mine proposal in the previous twenty years in Nunavut (p. 1). The goal of this review was to assess how impacts on caribou, a cultural keystone animal integral to culture and food systems for Nunavummiut, were assessed within mining environmental assessments (Cameron & Kennedy, 2023). Cameron & Kennedy (2023) found that every environmental assessment noted communities' concerns for caribou, however all assessments went on to determine that the environmental impacts from mining on caribou would be insignificant due to impact mitigation strategies outlined by mining companies (p. 4). Although there was evidence that the caribou populations would be impacted, mitigation

strategies were deemed to be sufficient, without providing any evidence of their effectiveness (Cameron & Kennedy, 2023). This aligns with how Che & Hickey (2021) describe that organizations frequently interpret and mitigate environmental impacts in ways that most benefit them (p. 1). This is echoed by Cameron & Kennedy (2023) who stress that environmental impact mitigation strategies outlined by proposed development projects fail to properly minimize environmental impacts and instead focus on providing "the impression of responsible risk management and render a project palatable to the public and other participants" (p. 3). To ensure that environmental impact mitigation strategies will be effective and protect the interests of affected communities, mitigation strategies should demonstrate previous evidence of being effective and/or be approved by affected communities (Cameron & Kennedy, 2023). This is especially relevant for the KOTC member communities of the Upper Severn River watershed, as the KOTC is actively looking at ways to sustain fish-people-land relationships, presenting a good window of timing for development companies to work with the KOTC in determining effective environmental impact mitigation strategies which will ensure sustainable environments, land use, and fish-people-land relationships.

Participants in this research with the KOTC member communities of the Upper Severn River watershed also explained that the environment in their communities has been stressed by many factors over time. Thus, current environmental baseline conditions may not be reflective of a healthy environment. Additionally, other organizations, such as the MNRF have determined that the walleye population in Deer Lake is at risk and unsustainable with the current fishing level, which Deer Lake First Nation depends upon for survival. Therefore, as Frontier Lithium's environmental baseline testing began in 2015, it does not account for environmental changes which occurred prior to 2015. This lack of more historical baseline measurements, instead

relying on baseline measurements from an already stressed ecosystem, leads to what Soga & Gaston (2018) describe as shifting baseline syndrome (SBS). SBS leads those collecting tests for the establishment of current environmental baselines to believe that their measured baseline is normal, when in reality the environment is degraded when compared to the past (Soga & Gaston, 2018). Soga & Gaston (2018) identify that SBS can lead to several issues, including: "an increased tolerance for progressive environmental degradation, changes in people's expectations as to what is a desirable state of the natural environment (i.e. one that is worth protecting), and the establishment and use of inappropriate baselines for nature conservation, restoration, and management" (p. 222). Also contributing to SBS is that industrial project impact assessments often fail to address impacts as cumulative effects; environmental changes compounded over time by natural environmental change and human activities interacting with the environment (Qi Che and Hickey, 2021). SBS caused by a lack of historical baseline measurements highlights the importance of the research this thesis carried out, documenting the land-based experiences and observations of First Nations community members with the land over generations. To help mitigate SBS, First Nations communities' knowledges of traditional lands and territories, proven to be accurate historic ecological knowledge, can be used to extend historic baselines and develop more community relevant goals for which to return affected land to (Eckert, Ban, Frid, et al., 2018; Natcher, Ingram, et al., 2020).

Considering the combined effects of insufficient environmental impact assessment mitigation strategies, SBS, the lack of more historical baseline measurements in the study area, cumulative effects, and the currently stressed environment identified by the KOTC member communities of the Upper Severn River watershed, industrial and environmental mitigation strategies and land remediation plans should aim not to return the land to its current state, but

instead improve it to a state that better supports the land use, relationships, and health and well-being of local communities (Soga & Gaston, 2018, Cameron & Kennedy, 2023).

First Nations communities have continuously adapted their land-based practices to environmental change and industrial activity and maintained their relationships with the land and other more-than-human relations (Artelle et al., 2018; Cuerrier et al., 2015; Turner et al., 2013; Whitney et al., 2020). One key aspect that has made adaptations successful while maintaining relationships is values-led management; the management of the environment guided by First Nations Peoples connection to an area and relationship with the land and other more-than-human relations (Artelle et al., 2018; Cuerrier et al., 2015). Cuerrier et al. (2015) explains that sustainable environmental practices such as values-led management arise naturally in First Nations communities due to the deep place-based relationships First Nations communities have with the land (p. 429). Artelle et al. (2018) describes the retrospective aspects of values-led management, describing it as a "walk backwards into the future" (p. 8), meaning that while new western methods and technology may be used in values-led management, their use is founded in traditional values, and First Nations Peoples relationships with the land and environment.

First Nations Peoples intergenerational land-based knowledges can be used to prepare for future changes in the environment (Artelle et al., 2018). Similar to the concept of ressourcement, "a reversion to one's sources" (p. 5) outlined by Bélisle et al. (2021) discussed earlier, Abu & Reed (2018) apply the retrospective idea termed Bricolage; "turning back to an already existing set of materials and reconsidering what it contains to decide what to choose to solve the problem" (p. 439) to First Nations communities adapting to changes in their environments using historical intergenerational land-based knowledges.

The Deer Lake walleye hatchery is an example of values-led management, bricolage, and the utilization of intergenerational land-based knowledges in the context of the KOTC member communities of the Upper Severn River watershed. The Deer Lake walleye hatchery utilizes western technology to act in alliance with community values of caring for more-than-human relations, while maintaining future generation's ability to fish in their traditional lands and territories. Another example of values-led management and bricolage within the KOTC member communities of the Upper Severn River watershed is Deer Lake and Keewaywin First Nations leadership asking that community members not fish while walleye are spawning. In the past, fishing during spawning was a normal occurrence, however with increased populations of communities, and stressed fish populations, communities are seeing the need to adapt fishing practices. To make this decision to limit fishing during spawning required historical knowledge of fishing populations, and a desire to preserve fish populations for the future.

Relationships with the land and other more-than-human relations, and values such as reciprocity and respect are critical in the sustainability of the environment and land-based practices of First Nations Peoples (Artelle et al., 2018; Cuerrier et al., 2015; Eckert, Ban, Frid, et al., 2018; Eckert, Ban, Tallio, et al., 2018; Morin et al., 2021). Therefore, the place-based relationships First Nations communities have with the land and other more-than-human relations, and the values which underpin land-based practices should be recognized and understood by organizations working with or in the vicinity of First Nations communities to ensure the land is not affected in such a way that affects First Nations communities' values, relationships, and land-based practices. Additionally, drawing on historical and current land-based knowledges and experiences of First Nations community members on the land and with more-than-human relations proves to be a novel approach in adapting to changing environmental conditions and

preparing for future changes. This accentuates the importance of documenting environmental changes, land-based knowledges, relationships with the land and other more-than-human relations, and previous ways community members have adapted to changes in the environment as was done in this research with the KOTC member communities of the Upper Severn River watershed.

Possible Pathways Forward

The following possible pathways forward are derived from the experiences of the participants in this research with the KOTC member communities of the Upper Severn River watershed, and the reported experiences of other First Nations communities presented in the reviewed literature and discussion. The goal of these possible pathways forward is identifying possible ways in which fish-people-land relationships within the KOTC member communities of the Upper Severn River watershed may be sustained in ways that support health and well-being.

- The KOTC and member communities can explore additional and continue current methods of easing barriers to fishing. Commonly reported barriers across the KOTC member communities of the Upper Severn River watershed included lack of access to equipment such as fishing rods and boats, and the cost of fuel. Current solutions to these barriers vary, including community members sharing equipment amongst each other, and communities ordering equipment for youth through chose life; a program which provides First Nations communities funding to aid with youth mental health, and offering fishing equipment as prizes during community fishing derbies.
- The KOTC and member communities, with support from outside researchers as desired by communities and the KOTC could continue to research and invest in community led

environmental and species management projects such as the Deer Lake walleye hatchery, to sustain healthy fish populations and thus community members' relationships with fish and ability to fish now and into the future.

- In addition to protecting fish populations, community led initiatives such as the Deer Lake walleye hatchery can be used by KOTC member communities to teach community members about fish health and habitats, sustaining local land-based knowledges and thus fishing practices.
- KOTC member communities, supported by the KOTC and other organisations as requested can further identify community specific changes to the environment, fish, and fishing. As documented by this research, changes to the environment, fish, and fishing are not uniform across the KOTC member communities of the Upper Severn River watershed. For example, where Deer Lake First Nation was experiencing a decrease in walleye population, now being mitigated by the walleye hatchery, McDowell Lake First Nation is experiencing a much higher fish population than in the past. Strategies for sustaining fish-people-land relations should therefore be community specific, in response to each communities' unique scenarios.
- KOTC member communities with support as requested from other organisations working within an ethical space of engagement can continue community led environmental monitoring, utilizing both the western quantitative monitoring approaches focused on chemical and heavy metal pollutants in fish and the water, as well as culturally relevant and place-based monitoring of community members experiences and relationships with, and feelings towards and derived from the land and other more-than-human relations. As identified by participants in this research, community members feel a sense of belonging

to the land, share the Upper Severn River watershed with more-than-human relations such as fish, and the health of the environment is linked to the health of KOTC community members. Therefor community members leading role in environmental monitoring in the Upper Severn River watershed will ensure a more culturally significant assessment of environmental and landscape changes, as changes in the physical, spiritual, living, and nonliving environments. Conducting this environmental monitoring within an ethical space of engagement allows for the incorporation of western scientific monitoring methods, with First Nations land-based knowledges and reciprocal relationships with more-than-human relations in collaborative manners resulting in more comprehensive environmental monitoring (Ermine, 2007). This can be used by KOTC member communities for early identification of negative changes to the environment, fish and community members, resulting in earlier adoption of and more effective mitigation strategies. As strategies for protecting fish and the environment are implemented, community environmental monitoring data can be used to measure the success of implemented strategies.

- The KOTC and member communities, with support from outside researchers as desired by communities and the KOTC could continue and increase documentation of historic and current experiences on, relationships with, and observations about the land, as was done in this thesis research. This serves multiple purposes: it extends historical environmental condition baselines, allows for the more accurate assessment of current and future landscape and environmental changes as cumulative effects, can be used to develop more accurate and relevant goals for which to return affected land to in order to

avoid shifting baseline syndrome, and ensures that historic land-based knowledge is not lost and can be used by future generations.

- KOTC member communities can develop comprehensive land use plans, which can be shared with industrial companies working on or near the traditional lands of the KOTC member communities of the Upper Severn River watershed, such as Frontier Lithium, so that development companies can become aware of and educated on local land use and culture to protect culturally significant and key areas of land use to better navigate environmental impacts to these areas.

The sustainability of fish-people-land relationships within the KOTC member communities of the Upper Severn River watershed is dependent on several factors: the health and number of fish, the accessibility of fish, the health of the environment, access to fishing equipment, interest in fishing, knowledges surrounding fish and fishing, and the absence of factors which negate the positive effects of fish and fishing, such as mining equipment noise. Having the ability to fish, and care for fish through a healthy and reciprocal relationship with fish will support and enhance community members health and well-being. Within this reciprocal relationship with fish, initiatives which increase the health of fish and the land, increase the health and well-being of First Nations communities within the Upper Severn River watershed.

Chapter 6: Conclusion

Implications and Significance

As visible by the literature review on this topic, research focusing on the health intersections between fish, fishing and First Nations communities across so-called Canada is largely dominated by a focus on fish using quantitatively measurable aspects such as nutrients and pollutants. While important, this quantitative approach reduces fish to economic resources and/or sustenance and does not integrate a First Nations framework of health, failing to look at the wide-reaching influences of fish and fishing on the health and well-being of First Nations communities. Additionally, when more holistic aspects of health and well-being supported through fish, fishing practices, and fish-people-land relationships are examined, the research is often located in coastal British Columbia. Due to the importance of place-based research with First Nations communities, and the different threats to fish species in British Columbia and Ontario, findings of research from British Columbia should not be generalized to Ontario. This research with the KOTC member communities of the Upper Severn River watershed addresses this gap in the literature, working with four First Nations communities in the remote far north of Ontario, documenting participants' experiences which demonstrate how fish and fishing interacts with health and well-being. The findings of this research demonstrate that while fish and fishing support many aspects of the KOTC member communities of the Upper Severn River watershed's health and well-being, this effect on health and well-being is largely place-based, occurring specifically on participants' traditional lands. Considering the current interest from mining companies in developing open pit mining operations on these traditional lands within the Upper Severn River watershed, the irreplaceability of communities' traditional lands is critical to convey. This research with the KOTC member communities of the Upper Severn River

watershed, which collected stories from community members who live full time or part time in their communities, or full time outside of their communities demonstrates that documenting the experiences of community members living in and out of community can be a useful approach in assessing place-based interactions of land-based activities. Assessing place-based interactions of land-based activities can be achieved through comparing the reported sentiments of participating in land-based activities in both traditional lands and other areas between participants who are members of the same community but who live in these different locations.

This research also explored the effects on health and well-being of environmental and industrial change, changes in physical fish and fish behaviour, and evolving need for fish and fishing equipment. Going beyond situating fish and fishing as a supporter of health and well-being, to document how multiple aspects of fish-people-land relationships have affected health and well-being and been affected over time is significant as the environment surrounding the KOTC member communities of the Upper Severn River watershed and the communities themselves are in a constant state of change from outside influences, with changes becoming more accelerated and larger scale as time progresses. Documenting and linking changes to effects in health and well-being can be used to provide insight into how future changes may affect communities and inform future potential development and environmental protection decisions.

Further studies would benefit from hearing the perspectives and stories of youth in the KOTC member communities of the Upper Severn River watershed. While historic data was incredibly valuable in this research, the KOTC is looking forward at ways to sustain community members' relationships with fish and fishing. Following the view of seven generations, while being a good descendant to past generations is important, looking forward to future generations

and ensuring the actions of today consider future generations is also necessary (Gagnon, 2023). While this research with the KOTC member communities of the Upper Severn River watershed collected three generations of experiences, and stories of participants' ancestors who have passed, it lacks the voices of current youth and the next generations to come.

Contributions

The findings of this research will be summarized in a report for KOTC leadership, and interview transcripts are owned by and stored by the KOTC, documenting participants experiences and knowledge. In addition to the report, an infographic will be made to convey research findings to the KOTC member communities of the Upper Severn River watershed to be shared on community Facebook pages. The format of these knowledge sharing methods was decided upon in discussion with KOTC leadership to easily and accessibly present the findings of this research to the KOTC and its member communities. When conducting research with Indigenous communities, making findings available to involved communities in an accessible format rather than a copy of results in the form of academic writing is important to continue respectful community research engagement at all stages of the research project (Koster et al., 2012).

Conclusion

The goal of this research was to situate a relationship with fish as being a supporter of health and well-being while examining how fish, fishing practices, and relationships with fish have changed and interacted with health and well-being over time in the KOTC member communities of the Upper Severn River watershed. Just as Indigenous worldviews are inherently relational and deeply interconnected, the specific effects of a relationship with fish cannot be isolated from

the relationships they support with family, community, and the land, the techniques for catching, cooking, and storing fish, or the knowledges entwined in these relationships and techniques. While this research with the KOTC member communities of the Upper Severn River watershed set out to explore a relationship with fish as being a determinant of health, a relationship with fish is not in itself, a determinant of health, due to fish-people relationship's influences on and the effects on it of other determinants of health. This was evident in how participants responded to questions of the benefits of fish and fishing or the stories they chose to share. On the surface, responses at times appeared unrelated to fishing, speaking of spending time with family, sharing meals, or specific locations on the land that are important to participants. These experiences, although not always wholly about only fishing, occurred because of fishing.

Going out fishing requires that one spends time on the lands and waters around their community. Fishing requires familiarity with and knowledges of the landscape and the behaviour of fish across the seasons. Knowledges that are discovered through this time on the land, time with family and community, and learning by doing. To eat the fish, requires knowledge of the species of fish, how to find it, how to catch it, how to prepare it, and how to cook it. These practices of learning, catching, and consuming fish, are carried out with a sense of belonging to the land and a sense of responsibility for caring for the fish, and ensuring the next generations will have the same opportunity.

Fish and fishing are more valuable than the sustenance it provides. Fishing is sharing stories under the stars on the lake with family (Alana, North Spirit Lake First Nation). Fishing is a baby sleeping in a boat between that day's catch (Lydia, McDowell Lake First Nation). Fishing is the memories of growing up on the land (Keegan, McDowell Lake First Nation). Fish is a connection to home and family when far from them (Allison, North Spirit Lake First Nation).

Fishing is the last time spent on the lake with a grandparent watching them smile with every cast (Kody, North Spirit Lake First Nation). Fishing is coming together to eat and heal in times of grief (Ben, North Spirit Lake First Nation). Fish and fishing are why people return to their traditional lands (Isaac, McDowell Lake First Nation). Fishing is finding purpose on the land (Ben, North Spirit Lake First Nation). Fish and fishing are what is turned to when in pain (Thomas, Keewaywin First Nation). Fishing is Survival (Liam, Deer Lake First Nation). Fishing is an identity (Liam, Deer Lake First Nation). Fishing is part of living the good life (Allison, North Spirit Lake First Nation). Fish and fishing are everything (Allison, North Spirit Lake First Nation).

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Appendix A – Literature Search Summary

Database	**Search Details**	**Results**
Web of Science	Indigenous OR First Nation* (title) AND Fish* (topic) AND Canada (topic)	154
	After title review	84
	After abstract review	84
	Full text reviewed	45

Appendix B – Information Letter and Consent to Interview Participant

Information Letter and Consent Interview Participant

Dear Potential Participant,

We invite you to participate in a project entitled ***"Fish and fishing practices in the Upper Severn River watershed: Listening to stories and exploring changes over time"***. The overarching goal of this project is to situate the role of fish beyond food and a resource and to identify possibilities and pathways for sustaining fish/people relationships that support the health and wellbeing of Keewaytinook Okimakanak Tribal Council (KOTC) communities of the Upper Severn watershed (Deer Lake, Keewaywin, McDowell Lake, and North Spirit Lake First Nations). The project will gather stories and perspectives from community members about relationships with fish, meanings of fish, how fish and fishing practices have changed over time, personal importance of fish and fishing, and the role of fish and fishing in promoting health and wellbeing. The project is a collaboration between Lakehead University and the KOTC.

You are being invited to participate in this study because you have valuable perspectives and knowledge on fish and fishing practices in the Upper Severn watershed and visions for sustaining fish/people relationships that protect health and wellbeing.

Why is this project important?: This work will be a first step in recording the significance of fish in these communities beyond as food/a resource, which is important as the Severn River watershed is increasingly threatened by industrial activities such as mining and energy development. Additionally, with the implementation of the new Deer Lake fish hatchery, (which is taking place after the 2023 spawn), this research will help to build capacity for planning and implementing adaptation measures that protect and promote cultural values of KOTC communities.

What is involved in the study?: If you agree to voluntarily participate in this research, this will involve one interview on the topic of fish and fishing in the Upper Severn watershed. The interview will be approximately 45 – 90 minutes in length and conducted in person at a location of your choice between July and October 2023. With your permission, the interview will be audio-recorded.

Are there any risks to doing this study?: There are no foreseeable risks or harm to participating in this study. Your decision to participate or not will not affect status your community or leadership or KOTC.There are also no costs for you. Participation in this study may cause some inconvenience to you because of the use of your time. We expect that this study will take a total of 45 – 90 minutes.

Are there any benefits to doing this study?: This research will not benefit you directly although you may enjoy sharing your thoughts and stories with us. You will be thanked for your time and participation with a $250 VISA gift card. We also hope that the research will make a positive contribution to the KOTC communities of the Upper Severn watershed.

Who will know what I said or did in the study? Should you agree to participate in this study, you will be participating confidentially. We will not use your name or any potentially identifying information in any study materials or reports. You will be assigned a unique study number as a participant in this study. Only this number will be used so that your identity (i.e., your name or any other information that could identify you) will be kept confidential. When doing research with small communities, anonymity may be difficult to maintain however no one other than the project team members will know what you said during the interviews.

Data collected during this study will be kept on a password-protected computer in a locked and secure office space in Lakehead University's Department of Health Sciences. De-identified data will be stored in a secure online environment by KOTC. Data stored by lakehead will be kept for 7 years after the completion of the study at which time it will be destroyed by removing computer files from the hard drive and shredding hard copies of data. Data Stored by KOTC will not be destroyed.

Informed consent and rights: Your participation in this project is voluntary and you have the right to refuse to participate. If you decide to participate, you may still choose to withdraw for whatever reason, up until a report for KOTC and communities is submitted. There are no consequences to withdrawing. In cases of withdrawal, any data you provided will be destroyed. You may also choose not to answer specific questions or discuss certain subjects during the interview, or ask that portions of our discussion of your responses not be recorded.

How do I find out what was learned in this project?: We expect to have a project report prepared for participants and the broader community in January 2024. Copies of the report will be available (from the Community Project Lead, Dr. Dan Duckert).

Who funded the research?: This project is supported by the Canada Research Chair program.

Additional questions about the study?:

If you have questions or need more information about the study itself, please contact the Research Assistant James Beck at: jbeck@lakeheadu.ca OR Dan Duckert at danduckert@kochiefs.ca, or tel: (807) 630-9172.

THANK YOU for your participation and your time.

This study has been approved by the Lakehead University Research Ethics Board. If you have any questions related to the ethics of the research and would like to speak to someone outside of the research team please contact Sue Wright at the Research Ethics Board (email:

research@lakeheadu.ca, or tel: **807-343-828**

CONSENT

Title of the project: Fish and fishing practices in the Upper Severn River watershed: Listening to stories and exploring changes over time

Names of project team members involved:

Dr. Dan Duckert, **Community Project Lead** (Director of the Department of Research, Treaties, Lands, and resources, Keewaytinook Okimakanak Tribal Council)

Telephone: (807) 630-9172
Email: danduckert@kochiefs.ca

Dr. Lindsay Galway, **Research Lead and Advisor** (Associate Professor in the Department of Health Sciences, Lakehead University)

Telephone: *807- 766-7280*
Email: lgalway@lakeheadu.ca

James Beck, Research Assistant (Master of Health Sciences student, specialization in Indigenous and Northern Health, Lakehead University)

Telephone: 519-387-2438
Email: jbeck@lakeheadu.ca

Taking part in this study is entirely up to you. You have the right to refuse to participate. If you decide to take part, you may choose to withdraw from the study up until the report for KOTC and communities is submitted without giving a reason and without any negative consequence to you. Your oral consent indicates that you have received a copy of this consent form for your own records and that you consent to participate in this study.

- You understand the project information letter.
- You freely consent to participate.
- You are 16 years of age or older.
- You have had the opportunity to ask questions and have received satisfactory responses
- You understand that participation is voluntary and that you are free to refuse to participate or to withdraw at any time without negative consequences.
- You understand that you may choose not to answer specific questions or discuss certain subjects during the interview, or ask that portions of our discussion of your responses not be recorded.
- You understand the potential risks and/or benefits of the study.
- You understand that all potential identifying information will be kept confidential.
- You understand that information that you provide during this study may be used in a report and/or publication but you will not be identified.
- You understand that the data you provide will be securely stored at Lakehead University for a minimum of 7 years following completion of this study and de-identified data will be stored by KOTC and not destroyed.
- You can access a project report by contacting Dr. Dan Duckert.
- You agree that the interview session can be audio-recorded.

Date: _____ Name of participant (printed): _____

Date: _____ Signature of interviewer (confirming oral consent):_____

Appendix C – Interview Prompts

**These points are possible probes which may be used during the interviews. Although there are many potential prompts, not all questions will be directly asked but are there to guide conversations and see what comes up, and are listed here to illustrate possible topics which may arise.

Introductory Questions.

AIM: Start a conversation between interviewer and participant and get more comfortable talking with each other. Situate the participant in the big picture of fishing in the Upper Severn River watershed.

1. Can you please tell me about yourself?
2. Where do you live?
    a. Are you from there?
3. How long have you been fishing?
    a. Why do you fish?

A. Past.

AIM: Develop a baseline understanding of past fishing practices for which to contrast present practices to.

1. Could you please tell me about going fishing when you were younger?
    a. Could you please tell me about a story from fishing when you were younger?
    b. Do you have any fish or fishing stories that you heard from your ancestors?
2. What were fish used for?
3. What equipment did you use when fishing?
4. When you were younger, How did you handle the fish?
    a. What did you do with them right after you caught them?
    b. Where did you put them?
    c. Did you kill them right away?
    d. What did you do with the guts?
    e. Did you ever squeeze the eggs out?
    f. Did you only keep certain sizes?
    g. Where did you learn how to do that?
5. What did you do with the fish you caught?
    a. Did you keep them for yourself?
    b. Did you share them with others?
    c. Did you sell them?
6. How would you cook them?
    a. Has cooking methods changed?
    b. Have the parts of the fish people eat changed?

7. Traditionally, how did fishing support the health and well-being of your people and community?

B. Present.

AIM: Determine changes from past fishing practices, why these have occurred, and their impacts on participants

1. When you go fishing these days, do you take people out fishing with you?
2. How have fishing traditions and practices changed over time?
    a. If not, why not?
    b. have these changes impacted you beyond directly fishing?
    c. Are youth fishing?
    d. Are families fishing together?
3. Why do people still fish? Or why don't they?
4. **Do you still….**
    a. reference responses from "Past" questions
5. Are there any barriers to fishing?
6. What changes have you noticed about fish and fishing?
    a. Between when you started fishing and now
    b. Between what you heard of when Elders fished, and when you fish now
    c. In where people are fishing (use a map as a guide to draw on, home/fishing radius past and present)?
    d. In the physical fish?
    e. Fish behaviour?
    f. Fish species and populations?
    g. When was the push towards walleye?
    h. Are you using more technology now?
7. When did these changes occur?
8. What do you think of these changes?
9. Why do you think they are happening?
10. Could you please tell me a story about these changes and how they have affected you or your community?
    a. have affected your health/well-being?
    b. relationship with the land?
11. Are fish consumed during community events such as feasts
    a. How often do these occur?

C. Future:

AIM: Determine if there are specific fishing/fish related goals for the future that should be focused on

1. What concerns do you have about fish and fishing in the future and for future generations?
    a. Are you concerned with fishing traditions disappearing?
2. What do you envision for the youth and future generations in relation to fishing?
3. Do you have any concerns about fish tourism growing in the territory?
    a. If so, what are your concerns?

4. What ideas do you have about protecting fish and fishing practices in your community?
    a. Ideas for protecting fish and values
    b. Ideas for promoting fishing
5. In the future, do you think your well-being could be affected by these changes?

D. Fish hatchery specific questions:

AIM: Determine the sentiments surrounding Fish Hatcheries in the Upper Severn River watershed KO communities.

Background: Deer lake is starting a walleye fish hatchery after the 2023 spawn. Fish caught locally using a net, eggs collected and fertilized in the hatchery, and the young fish will be released locally.

1. What do you think the benefits of a fish Hatchery in your community would be?
2. How do you think a hatchery would affect you and your community?
3. Do you have any concerns about a hatchery in your community?

E. End Questions

1. Is there anything else you would like to talk about or share with me?

Appendix D: Codebook

Global Theme	Organising Theme	Basic Theme	
Interactions between Fish, Fishing, Health and Well-being	Physical and Mental Health	Physical Health	"you have to be physically active to be able to go hunting and fishing" (Colton, North Spirit Lake First Nation)
		Mental Health	"When I'm out there, it's kind of therapeutic right. When I'm feeling down, I go out with my brother because he's always asking me to go fishing, so I always go fishing with him and I just love being out on the land because it's good for your mental health" (Alana, North Spirit Lake First Nation)
	Relationships	Family Relationships	"I went out [fishing] with my niece and her family. Her husband and two kids, two boys, and we were out all day in the boat on Margot Lake just spending the whole day fishing and we got a bunch of fish and we had a fish fry, a big shore lunch and that was so nice spending time with the kids" (Alana, North Spirit Lake First Nation)
		Community Relationships	"you have a big fry, everybody makes an effort to pitch in their time like cutting fish, filleting fish and everybody gets together here, I'd say that we're a close-knit family, a family reserve" (Jamie, Keewaywin First Nation)
		Relationships with the Land	"[the land] doesn't belong to us you belong to it, you belong to the land. That's how it was taught to me. You belong to the land, take care of it and that's our lifeline" (Spencer, Deer Lake First Nation)
	Healing	Healing	"when you go fishing, you're out there and it's healing for you to go out and be on the land. You connect yourself to nature, the earth, the food" (Ben, North Spirit Lake First Nation)
		Fishing as a healthy coping mechanism	"fishing was everything for him because when he didn't have it, he fell apart. It seems that way to me anyways, it was his outlet, it helped him live the good life" (Allison, North Spirit Lake First Nation)

Global Theme	Organising Theme	Basic Theme	
Influences on and Effects of Changes Surrounding Fish and Fishing	Needs for fish evolved alongside fishing, storage, and cooking methods	Fish as Food	"that's how we survived is mostly fish" (Thomas, Keewaywin First Nation)
		Dependent on Fish	"you would use that for bait when you went trapping, but we would always use the fish that we were not going to eat" (Lydia, McDowell Lake First Nation)
		Species Specific Practices	"if you wanted to keep fish, we would go for brook trout or whitefish and we would keep them for smoking and we don't do that with northern pike or walleyes. Only whitefish and trout we would smoke, and they would keep longer" (Liam, Deer Lake First Nation)
		Evolving	"it was almost like a survival thing a long time ago right and now it's more recreational it seems to me" (Alana, North Spirit Lake First Nation)
		Storage and cooking methods	"[a] long time ago we didn't have a freezer. We just smoked everything, that's the way you can keep [fish] longer" (Jake, North Spirit Lake First Nation)
	Changes in Fish and the environment	Changes in Fish	"if you go fishing now either the third or fourth fish, walleye you'll catch it'll have warts" (Ben, North Spirit Lake First Nation)
		Environmental changes	"last year, the water was really high last year, and this year it's like three feet plus lower than it was" (Isaac, McDowell Lake First Nation)
	Changing fishing practices	Past fishing methods	"the majority of time he said that during the spawn they put these logs in the water where the fish would swim where it would be easier for them to catch [the fish]" (Spencer, Deer Lake First Nation)
		Present Fishing methods	"most of the young people like fishing. They like casting you know using a rod. I don't think they really ever experienced putting a net out" (Morgan, McDowell Lake First Nation)

	Knowledges	Land-Based Knowledges	"they would teach us how to fix the fish and how to like cut it and cook it and how to build a fire all those skills that come with it, and if it was winter we would go out on snowmobiles and we would go set a fishnet under the ice and throughout that week or however long it was. We would go check that net and show us how to do that that" (Colton, North Spirit Lake First Nation)
		Acquiring knowledge	"that's just something I learned through the fishermen's stories. It wasn't shown to me, it was just told to me" (Spencer, Deer Lake First Nation)
		Interrupted knowledge transfer	"if you're in the school five to six hours a day seven hours a day that's time you're not being on the land learning your identity and where you come from. That's the western style of knowledge not the traditional way" (Ben, North Spirit Lake First Nation)
		Rebuilding knowledge	"the first priority would be taking a kid that hasn't gone out and done these things, who doesn't really have access. We need to reach out to these kids, take them to camp, they'd be going to camp, and we'll [say] OK what we're going to do today is you guys are going to go fishing" (Spencer, Deer Lake First Nation)

Global Theme	**Organising Theme**	**Basic Theme**	
The Future of Fish and Fishing	Worries and Hopes for the Future	Worries for the future	"My worry is with the new generation, when their time comes when they're older or when they're adults will the fish still be good" (Morgan, McDowell Lake First Nation)
		Hopes for the future	"I would like to be able to for the next generation to be able to enjoy what I'm enjoying right now without worrying about contamination and things like that. That's my, I hope that they

			can enjoy what I'm enjoying right now, that's what I would like to see" (Roger, Keewaywin First Nation)
	Protecting the Future	Maintain interest and tradition	"the leadership at the time they were seeing that interest dwindling so in order to kind of bring back the interest in eating fish and learning about fish, how to make it and all that, we put up festival's" (Liam, Deer Lake First Nation)
		Solutions number of fish	"the hatchery right like that ensures that there's going to be a future you know for fishing and for harvesting fish and ensuring that there's a healthy [fish] population years ahead" (Colton, North Spirit Lake First Nation)

Research Ethics Board
t: (807) 343-8283

research@lakeheadu.ca

June 12, 2023

Principal Investigator: Dr. Lindsay Galway
Co-Investigator: Dr. Dan Duckert
Research Assistant: James Beck
Health and Behavioural Sciences\Health Sciences
Lakehead University
955 Oliver Road
Thunder Bay, ON P7B 5E1

Dear Dr. Galway, Dr. Duckert and James:

Re: Romeo File No: 1469879
Granting Agency: Galway CRC
Romeo Funding Reference #: 1468163

On behalf of the Research Ethics Board, I am pleased to grant ethical approval to your research project titled, "Fish and fishing practices in the Upper Severn River Watershed: Listening to stories and exploring changes over time".

Ethics approval is valid until June 12, 2024. Please submit a Request for Renewal to the Office of Research Services via the Romeo Research Portal by May 12, 2024 if your research involving human participants will continue for longer than one year. A Final Report must be submitted promptly upon completion of the project. Access the Romeo Research Portal by logging into myInfo at:

https://erpwp.lakeheadu.ca/

During the course of the study, any modifications to the protocol or forms must not be initiated without prior written approval from the REB. You must promptly notify the REB of any adverse events that may occur.

Best wishes for a successful research project.

Sincerely,

Dr. Claudio Pousa
Chair, Research Ethics Board
/sw

Appendix F: Oral Consent Script

Oral consent script

Introduction

- I am James Beck (tell the participant a bit about yourself if they do not know you)
- Our project called **"Fish and fishing practices in the Upper Severn River Watershed: Listening to stories and exploring changes over time"** aims to situate the role of fish beyond food and a resource, and to identify possibilities and pathways for sustaining fish/people relationships that support the health and wellbeing of KOTC communities of the Upper Severn watershed, specifically, Deer Lake, Keewaywin, McDowell Lake, and North Spirit Lake First Nations.
- The project is a collaboration between Keewaytinook Okimakanak Tribal Council (KOTC) and Lakehead University and is funded by the Canada Research Chair Program.
- This project involves interviews with community members and Elders of the Upper Severn watershed KOTC communities to hear their stories on relationships to fish and fishing practices.
- We have invited you to participate in this study because you have valuable perspectives and knowledge about fish and fishing practices in the Upper Severn watershed and visions for sustaining fish/people relationships that protect health and wellbeing.
- If you are interested in possibly participating in this project, I will tell you a bit more about it.

Project information

- If you choose to join in the research, this will involve one interview on the topic of fish and fishing in the Upper Severn watershed, with a focus on changes you have noticed on relationships with fish and fishing practices, and the impacts of these changes. The interview will be approximately 45-90 minutes in length, conducted in person, at a location of your choice. With your permission, the interview will be audio-recorded.
- If you agree to participate, we would remove your name and any other identifying information from the notes. The information we keep would not identify you in any way. We would keep our notes private, and any paperwork or files would be kept for 7 years and then destroyed. This would be confidential. We will not use your name.
- Also, you can change your mind anytime and decide not to help us and that is okay. If you change your mind then any information that you gave us will be destroyed, up until a report for KOTC and communities is submitted.
- You may choose not to answer specific questions or discuss certain subjects during the interview or ask that portions of our discussion of your responses not be recorded.
- There are no foreseeable risks or harm to participating in this study. There are also no costs for you aside from your time, about 45 - 90 minutes in total.
- Although this research will not benefit you directly, you may enjoy sharing your thoughts and stories with us. You will be thanked for your time and participation with a VISA $200 gift card ($300 if you are an Elder). We also hope that the research will make a positive

contribution to the KOTC member communities of the Upper Severn River watershed . After receiving the gift card, you will sign a form stating that you received it.
- We expect to have a project report prepared for participants and the broader community in January 2024. Copies of the report will be made available by Dan Duckert.
- Finally, it is important for us to note that there is a potential risk for contracting COVID-19 when participating in in-person research.
- Do you have any questions so far?

Seeking Consent:

The form that you have (***original REB approved information letter and consent form is provided to participant****)* includes a summary of everything I have just told you about the project as well as the telephone and email addresses for the project team members in case that you have any concerns. Please feel free to contact these people at any time.

Would you like to join the study?

Your oral consent indicates that you have received a copy of the information letter and consent form for your own records and that you consent to participate in this study. Your oral consent also indicates that you:

- understand the project information letter.
- freely consent to participate.
- are 16 years of age or older.
- have had the opportunity to ask questions and have received satisfactory responses.
- understand that participation is voluntary and that you are free to refuse to participate or to withdraw at any time without negative consequences, up until the submission of the report for KOTC and communities is submitted.
- may choose not to answer specific questions or discuss certain subjects during the interview, or ask that portions of our discussion of your responses not be recorded.
- understand the potential risks and/or benefits of the study
- understand that all potential identifying information will be kept confidential.
- understand that information that you provide during this study may be used in a report and/or publication but you will not be identified.
- understand that the data you provide will be securely stored at Lakehead University for a minimum of 7 years following completion of this study and de-identified data will be stored by KOTC and not destroyed.
- can access a project report by contacting Dr. Dan Duckert
- agree that the interview session can be audio-recorded

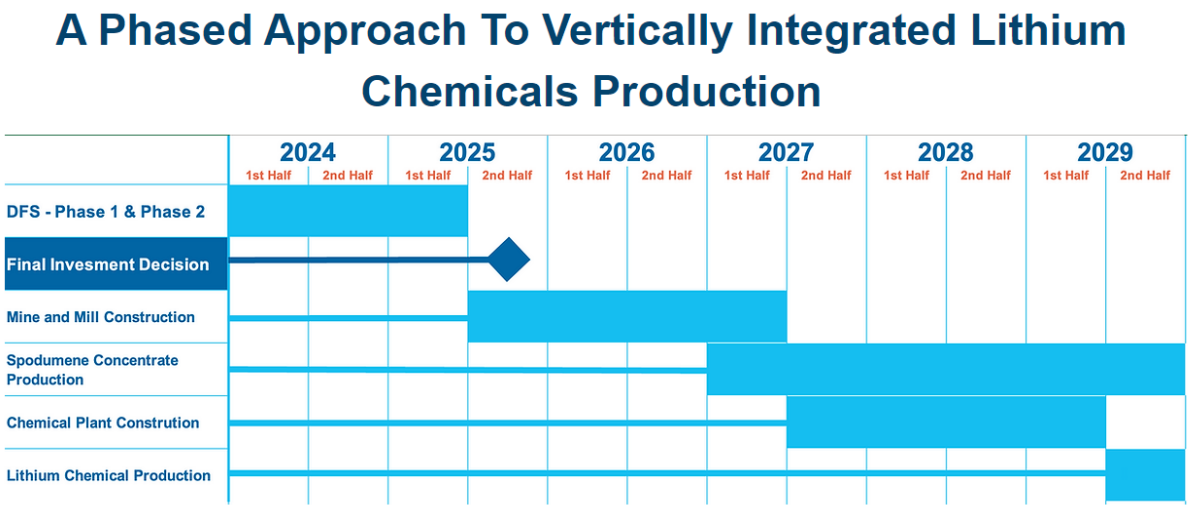
Ask for consent *a SECOND TIME while the audio-recording device is on.*

- **Would you like to join the study?**
- **Is it okay for us to record the interview using an audio-recorder? *Yes/No***

Researcher signature confirming oral consent has been obtained: _____

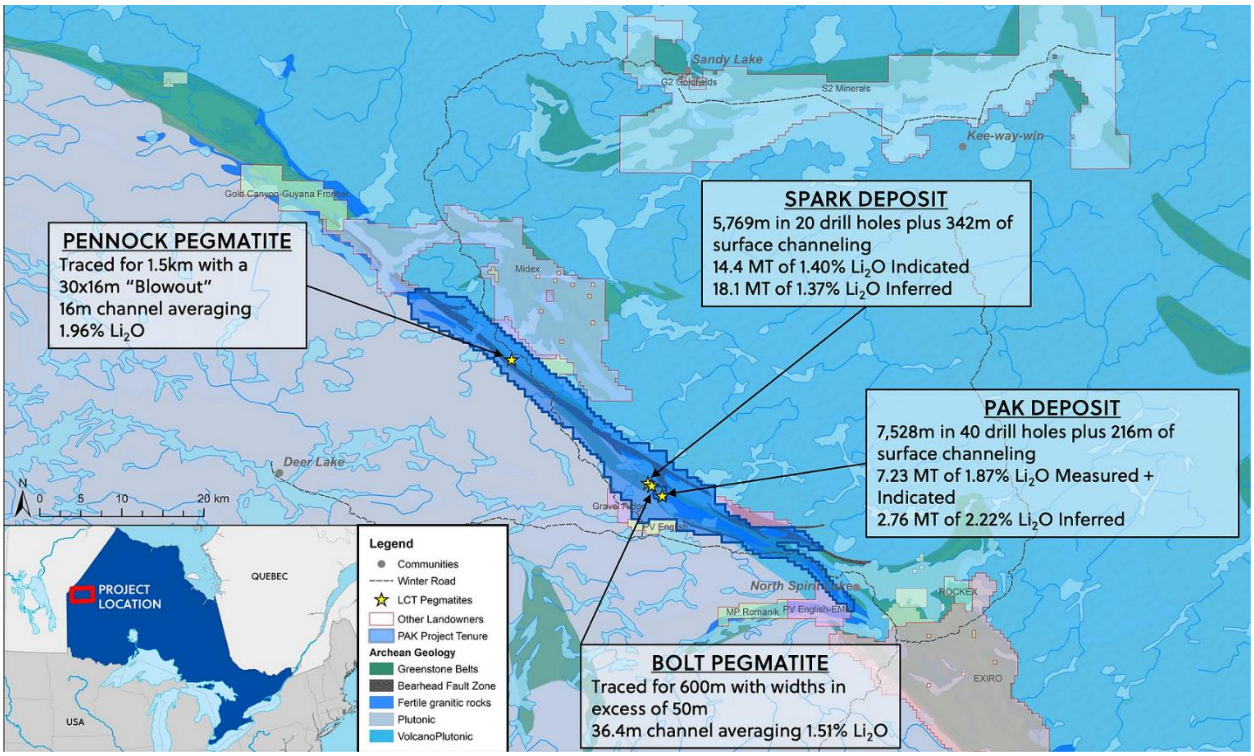
Date:_____

Appendix G: Frontier Lithium Mine Construction Schedule



Note. As the mine has a foreseen estimated life of 24 years, this plan does not include a mining schedule but is restricted to mine and infrastructure construction. From: *Frontier Lithium—Path to Production*. (n.d.). Frontier Lithium. Retrieved April 2, 2024, from https://www.frontierlithium.com/path-to-production

Appendix H: Lithium Deposit Map



Note. From: *Frontier Lithium—Resource Assets*. (n.d.). Frontier Lithium. Retrieved June 20, 2024, from https://www.frontierlithium.com/resource-assets