Nipi (Water) and its *pawistik* (falls) in Northern Manitoba:
a dive into Eurocentric policies and the effects of hydro generation on the seasonal movements of a northern Indigenous community, *Nisicawayāsihk* Cree Nation.

By

Victoria Grima
ᐱᐠᑕᐧᕒᐃᐊ ᑲᕒᐃᒪ

A thesis submitted to the Faculty of Graduate Studies of the University of Manitoba in partial fulfillment of the requirements for the degree of Master of Environment.

Department of Environment and Geography
University of Manitoba
Winnipeg, Manitoba
Canada

Abstract

Perceptions of Western society and Indigenous cultures towards the caring of *Askiy*, the Earth, contrast dramatically with one another. On one hand, Indigenous people have intertwined their coexistence with that of Nature since time immemorial, which has given rise to their cultural heritage and identity. On the other hand, western society has largely viewed the environment as a source of natural resources that are used to satisfy societal needs. This dichotomy is readily apparent when it comes to hydro power in northern Canada

This research aims to explore how Eurocentric land management policies together with the legacy brought forth by the Hydropower discourse have affected the seasonal movement of Indigenous people across Manitoba's northern landscape and their longstanding land-use and harvesting activities. This was achieved by integrating Indigenous Traditional Environmental Knowledge with Geographical Spatial Information (GIS) technologies. Participatory GIS processes based on the Map Biography Model (MBM) were shaped by the northern *nethowe-ithiniwak*, Cree speaking people of *Nisicawayāsihk* (Nelson House) Cree Nation. Maps were generated that reflect the multi-generational knowledge and lived experiences of community members, and that document hydro-related changes in space and time

The revised MBM evolved organically at its own pace, mostly reflecting the experiences of the *nethowe-ithiniwak* whom I interviewed as well as from many community-led boat, driving, and aerial trips throughout the affected landscape centering on *Nipi*, Water. These outcomes revealed how western society continues to view natural resources as objects that can be readily and sometimes drastically manipulated to fulfill its needs. Such perceptions transformed the free rumbling sound of Nipi, water, which normally constitutes the essence of northern Indigenous identity, into a static and open-water storage reservoir. These actions have resulted in a *Nisicawayāsihk* that is 23% of its pre-colonial cultural landscape.

The resulting region is not only smaller but also irrevocably damaged by hydropower infrastructure. Yet, despite the drastic changes across this landscape, the *nethowe-ithiniwak* continue to practice their traditional livelihoods and to assert their sovereignty throughout this region

Acknowledgement

I would like to acknowledge that this research was experienced, conducted, and written within the traditional cultural territory of many Indigenous people, Anishinaabag, Cree, Oji-Cree, Dakota and Dene peoples, and the homeland of the Metis Nation. I would like to recognise and convey appreciation of the shared inheritance and histories brought forth by them, as individuals, communities, and nations. Moreover, I also want to demonstrate my respect for the Elders of the past and present whose wisdom and guidance resonate across this Indigenous cultural territory.

Dedication

This thesis paper is dedicated to:

- The Indigenous people whose guidance have accompanied me throughout this journey.
  - The Northern Cree speaking people, *nethowe-ithiniwak*, whose oral inheritance, experiences and knowledge encouraged and challenged me to venture outside my comfort zone.
- *Nisicawayāsihk*, its people and ancestral cultural territory, whose patience, teachings, and responses to my queries, were the inspiration and central to the accomplishments of reflected in this work.
- The Elders of the Culture and Language Program at the *Nisichawayasi Nehetho* Culture and Education Authority in *Nisicawayāsihk,* (Nelson House), Cree Nation. Special appreciation to Elders: Leroy Francois, Harry Spence, Andrew Wood and Henry Wood, whose conversations and recollections laid the foundations of this work. A special thanks, for their generosity, their perseverance, their time devoted educating my understanding of the *Nisicawayāsihk* cultural heritage. And also, for gifting me with a translation of my given name in 'TH' dialect syllabics.
- The family members of Linklater, Neckoway and Hart. A special appreciation for their mentorship, friendship, support, teaching me words in *Nethetho* (Cree) language and most of all for welcoming me into their families.
- My academic instructors, Mrs. Michelle Mico M. Sc., Prof. Stephane McLachlan, Dr. Ramona Neckoway, and Prof. Jill Oakes, for their constant guidance and valuable advice.
- My respectful family and life-partner. They have been a persistent supply of support, encouragement, and a shoulder to cry on during moments of discouragement. You are my source of inspiration to continue grow as an individual and further challenge myself. I am truly thankful for all your sacrifices, patience of enduring my moods and for having you in my life.
- My family members, my maternal and paternal grandparents, and closest friends, Jack Lovell and Diane Camillieri who are no longer of this world, whose memories continue to accompany in life.

Glossary

Askiy – Cree word for Earth.
asiniskaw-ithiniwak – rocky cree people.
kiwitinōhk ithiniwak - northern people.
misinipiy - *Nisicawayāsihk* Cree name for the Churchill River.
nipi – Cree word for water.
nisicawayāsihk – the Cree name of the native land of *Nisicawayāsihk* (Nelson House) people.
nethowe-ithiniwak – Cree speaking people.
opawanakiyi sipiy – *Nisicawayāsihk* Cree name for the Nelson River.

The 'TH' dialect syllabics was used under the guidance of the Elders leading the Culture and Language Program for *Nisichawayasi Nehetho* Culture and Education Authority in *Nisicawayāsihk* Cree Nation, Nelson House.

Abbreviations

CCRS	Canada Centre for Remote Sensing
CER	Canada Energy Regulator
CIRNAC	Crown-Indigenous Relations and Northern Affairs Canada
CRD	Churchill River Diversion
CS	Control Structure
DOI	Department of Interior
EML	Ethnographic Mapping Lab
ESRI	Environmental Systems Research Institute
FEMP	Federal Ecological Monitoring Program
FFCA	Flin Flon Community Archives
FIDSCA	Federal Day Schools Class Action
FOCCAR	Fisheries and Oceans Canada Central and Artic Region
GoC	Government of Canada
GIS	Geographic Information Systems
GS	Generating Station
GSC	Geological Society of Canada
HBC	Hudson Bay Company
HBCA	Hudson Bay Company Archives
IAND	Indigenous and Northern Affairs Department
ICFL	Inventory of Canadian Freshwater Lakes
IHA	International Hydropower Association
IHT	Inuit Heritage Trust
IISD	International Institute for Sustainable Development
IRC	Inuvialuit Regional Corporation
LoC	Library of Congress
LWCNRSBC	Lake Winnipeg, Churchill and Nelson Rivers Study Board, Canada
MARC	Manitoba Aboriginal Rights Coalition
MC	Manitoba Conservation
MDMNR	Manitoba Department of Mines and Natural Resources
MFNERC	Manitoba First Nations Education Resource Centre Inc.
MNRA	Manitoba Natural Resources Act
NCN	Nisachawayasihk Cree Nation
MH	Manitoba Hydro
MLI	Manitoba Land Initiative
MW	Manitoba Wildlands
NACEI	North American Cooperation on Energy Information
NAOC	National Atlas of Canada
NAPL	National Air Photo Library
NCN	Nisichawayasihk Cree Nation
NEB	National Energy Board
NFA	Northern Flood Agreement
NNCEU	Nisichawayasi Nehetho Culture & Education Authority Inc.
NRC	Natural Resources Canada

NRTA	National Resources Transfer Act
NSO	National Statistics Office - Malta
NTDB	National Topographical Database
NTS	National Topographical Survey
NWCo	North West Company
RMA	Resource Management Area
RTL	Registered Trap Lines
SLCFN	Split Lake Cree First Nation
TLU	Traditional Land Use
TOM	Times Of Malta
TRCGS	The Royal Canadian Geographical Society/Canadian Geographic
WSC	Water Survey of Canada (Environment Canada)
UN	United Nations

Table of Contents

Appendices

List of Tables

List of Figures

List of Maps

List of Photos

CHAPTER 1 *kiwitinōhk ithiniwak*, northern people

Teaching Circle of Cree Elders "To pollute the water is to pollute our bodies, which will eventually put our very survival at risk.."
(LaBoucane-Benson, *et. al*, 2012, p. 7)

1.1 Ancestral Landscape:

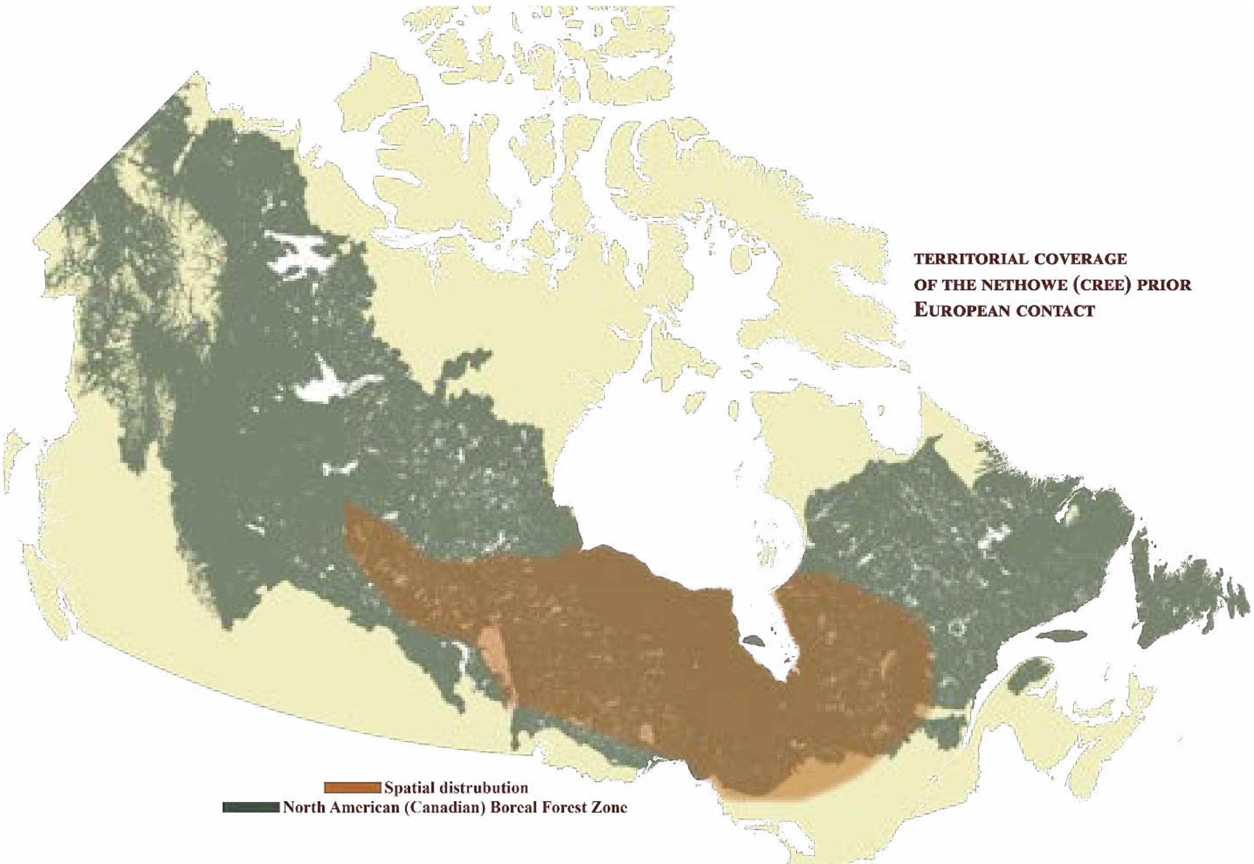
1.1.1 *Existence in the North*

Since time immemorial, the forest that embrace the central geographical topography of North America and which also extends well into its eastern region constitutes the ancestral cultural landscape[1] of the Algonquian[2] speaking people (Wright, 1971; Ray, 1974, 2016; Orecklin, 1976; Grainger, 1979; GoC, 2020). An active, dynamic, and vibrant landscape which saw its *Nethowe-Inthiniwak*, the Cree-speaking people intersperse underneath its canopy, establishing camps along shorelines in between long, narrow, and winding watercourses (Map 1). Moving across the land in groups, canoeing the intrinsic watercourses that defined their cultural landscape to reach their seasonal harvesting areas. (Linklater, 1994; Elders[3], pers. comms. 2018-19)

Where during the warm months, the groups would not limit themselves in harvesting enough food (such as, the smoking of fish) required for their winter travels, but also to the maintenance of their site and hunting gear. And, when the weather got colder, they would travel with their sled dogs to their winter hunting and trapping grounds. Then, to keep warm they would harvest the fur/skin hides of the animals hunted to be worn as garments. (Elders L. Francois and

[1] The study that documented the natural and cultural features of the Ojibwe Nation of Pikangikum, defined the term cultural landscape as *"an area over which a particular people have inscribed their culture through their intimate use and understanding of the land"* (Davidson-Hunt, *et. al*, 2010, p. 3).
[2] The spatial context of the ancestral cultural landscape of the Algonquian-speaking people used to commence from the geographical topography of the North American's east coast and extend well into the continent's interior, where its topography is defined by the mountain system of the Rocky Mountains. The Algonquian language is divided into subgroups in accordance with their inherited geographical occupancy. The Cree Nation which is characterised by five distinct dialects form part of the Algonquian language central subgroup. (Mithun, 1999; Ray, 2016)
[3] Four Elders from the group of Elders that lead the Culture and Language Program for *Nisichawayasi Nehetho* Culture and Education Authority in *Nisicawayāsihk* Cree Nation, were active contributors to this research.

A. Wood, pers. comms. Fall 2019) Thus, an ancestral cultural territory that provided its people will all the required necessities for their sustenance. While their spatial seasonal organization and use of land and water shaped their Heritage - cultural, spiritual and identity. A rich inheritance of living out on the land that gave life to the *nethowe* (Cree) cultural myths, landmarks and histories (Elders, pers. comms. 2018-19).



Map 1: The spatial context of Cree speaking people *"on the eve of European Contact"* as illustrated by Ray (2016, pp. 18-19). A territory which is characterized by an intrinsic complex of waterways that intersperse underneath the Boreal Forest canopy.

Thus, an inheritance that *"tell of a timeless presence on the land"* (Linklater, 1994, p. 34). A representational presence which through post-colonial contact endured the newly arrived Western Societal customs. Upon which the *nethowe* (Cree) not only had to reinterpret the spatial context of their ancestral cultural landscapes. But also had their timeless presence threatened by the industrial and mechanical advancements that structural engineers achieved during the twentieth century.

1.1.2 *Hydro-electrical Generation in Northern Manitoba*

These technical breakthroughs with a little bit of a helping-hand from the emergent *Global Warming* discourse, henceforth metamorphosed renewable sourced electrical energy into a necessary contemporary-living commodity. In respect of this, the generation of electricity from the hydrological force exerted by *Nipi*, Water, by the twenty-first century globally became one of the most fast growing *'renewable energy'* economy. In that, a total estimate of 4,200 terawatt hours (TWh), that is two-thirds of the consumed electrical energy worldwide for the year of 2018 was solely produced by hydropower infrastructure (IHA, 2019).

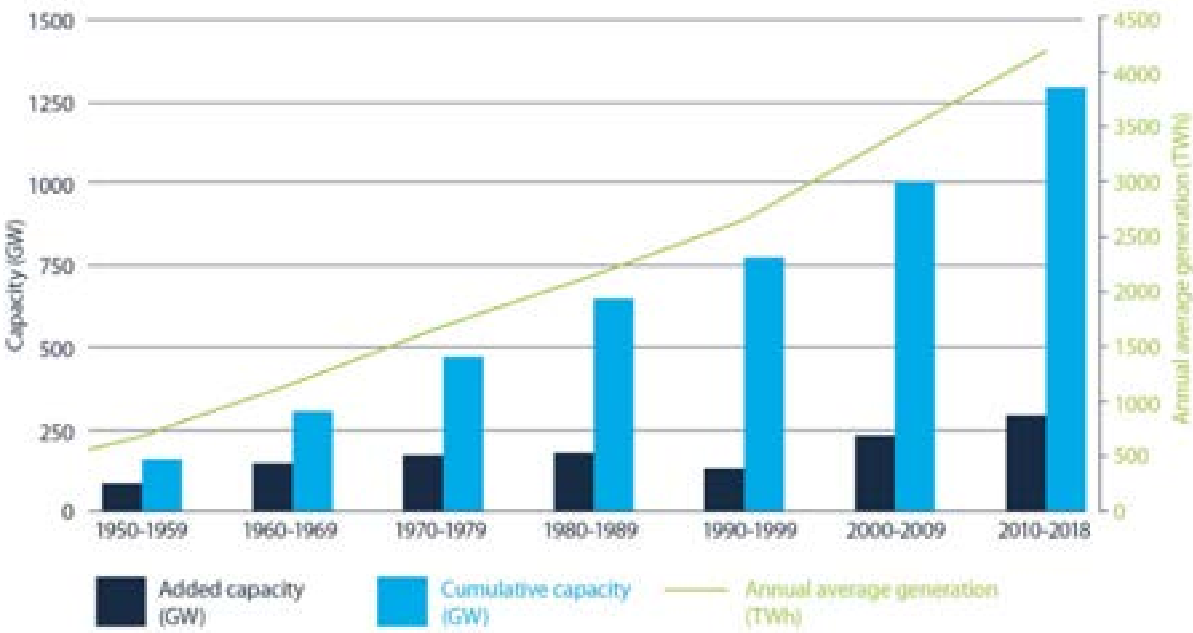
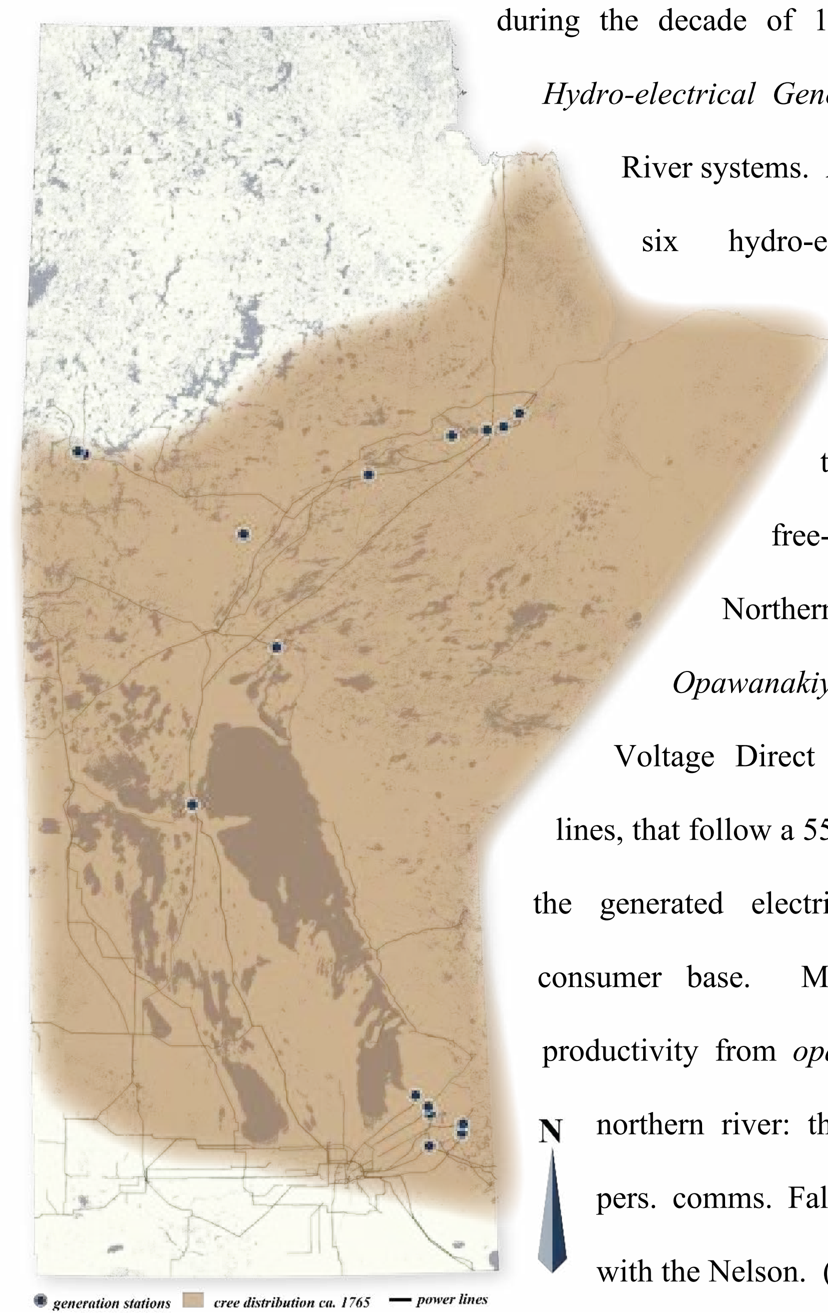


Figure 1: Hydropower growth throughout the decades, (IHA, 2019).

With respect to the Canadian prairie province of Manitoba, by mid-twentieth century, to satisfy the needs of a steadily growing southern populated suburbs and cities, six (6) hydro-electric power stations already harnessed 577 MegaWatt (MW) from the *Winnipeg River* (MH, 2015). However, notwithstanding this to further solidify the provincial economical investments (imports/exports) in energy production, its Crown Corporation, *Manitoba Hydro,* established



Map 2: Cree territory ca. 1765 in relation to the current distribution of hydropower generating stations across Manitoba. The spatial coverage of the Cree Nation was adapted from Ray, A. J. (1974), p. 22, fig. 9.

during the decade of 1960s, deployed the province's *Hydro-electrical Generation Vision* for its Northern River systems. A vision that consisted of having six hydro-electric generation stations, dominating not only the ancestral cultural territory of the *nethowe* Nation but also the free-spirited waters of the great Northern River: the Nelson, *Opawanakiyi* (NNCEU, n.d.). With High Voltage Direct Current (HVDC) transmission lines, that follow a 556-mile (895 km) route, transport the generated electricity southwards towards the consumer base. Moreover, to ensure maximum productivity from *opawanakiyi*, the flow of another northern river: the Churchill, *Misinipiy* (Elders, pers. comms. Fall 2021) was rerouted to merge with the Nelson. (MH, 2015)

Thus, maximizing the flow for the future generation of hydro-electric power. Where, the aftermath of this ambitious diversion, its built infrastructure together with the applied hydrological regimes, brought forth repercussions that after almost over half a century from their conception continue to resonate across Manitoba's Northern Indigenous ancestral cultural landscape.

1.1.3 *Eroding Identity*

Where, the aftermath of this ambitious diversion, the built infrastructure together with the applied hydrological regimes, have had repercussions that after almost over the last half a century continue to resonate across Manitoba's Northern Indigenous ancestral cultural landscape. Because the strategically placed permanent impoundments along with the re-engineered flows/routes and their unnatural flood phenomena have fragmented waterways and inundated inland and shoreline vegetation, streams, and islands. Moreover approximately 21,998 hectares (219.98 square kilometres) of hunting and trapping grounds have been further deforested to accommodate the infrastructure associated with the transmission lines[4] (MH, 2015, p. 2C-1-2C-10, 2K-1-2K-8).

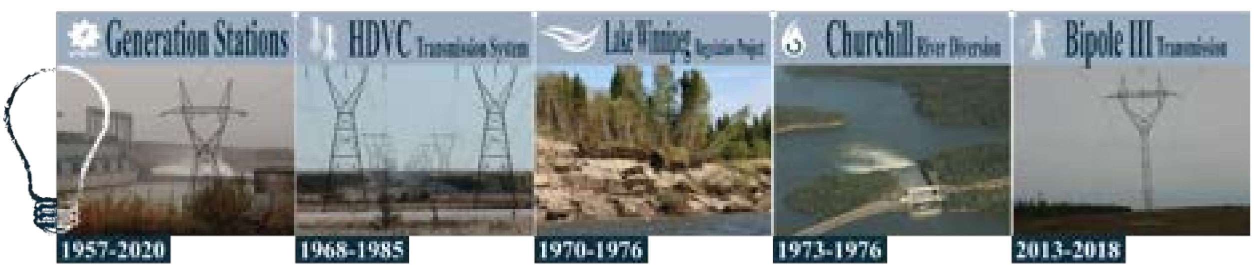


Figure 2: The phases of Manitoba's Northern Hydrro-Electrical Generation Project. Photos: a) Long Spruce GS, b) Bipole I & II, c) 2-mile channel, d) Notigi CS, and e) Bipole III. (Photo Credit: Victoria Grima, 2016-2019)

The Indigenous knowledge keepers and Elders from across this region indicate that such fragmentation of terrestrial, wetland and riparian habitats has had highly detrimental impacts to the local ecosystems. The avifauna, and fur-bearing, aquatic, and ungulates species have lost their breeding habitat and spawning areas. Thus, wildlife populations within the impacted territory vary drastically and sometimes their reproduction is inadequate to sustain viable fisheries and hunting

[4] Three high voltage direct current (HVDC) transmission lines carry the generated hydroelectricity over 1,400 km (870 mile) route southwards. Bipole I (1972), II (1978) and III. The installation of the latter was completed in 2018. (KHI, 2015; MH, 2015, 2C-1-2C-10, 2K-1-2K-8)

activities. (Informal discussions[5], Summer and Fall, 2016; Elders, pers. comms. 2018-19) While the fragmentation of water flow, slows down not only the production of micro-organisms (the nourishment of aquatic species) but also increases the production of sediments in the water (Bodaly, *et. al*, 1984; Newbury *et al*, 1984; FEMP, 1992).

Which facilitates the establishment of invasive species (R. Spence, pers. comms. 2019). Indigenous accounts also noted drastic changes to the sustenance and physiology of *Nipi*, it has become stagnant, dark, and opaque (Informal discussions, Summer and Fall, 2016 & Fall 2018-19). Conditions which not only raise questions regarding the safety of its consumption but also the navigability of the waters. And this because of the submerged debris that float silently and unnoticed. This debris led to unpredictable, dangerous, and hazardous conditions that limit accessibility to the shorelines, and thus also to the ancestral grounds, and can sometimes result in loss of property and life. (SLCFN, 1996; Neckoway, 2007; J. Osborne, per. comms. 2014; NEB, 2018; Informal discussions, Summer and Fall, 2016 & Fall, 2018-19)

However, the impacted territory is not only of ecological importance from a *nethowe* perspective but is also of great cultural significance. The landscape embraces the dispersed ancestral basecamps, ancestral burial grounds, gathering sites and historical artifacts that have been in use for millennia. These landmarks and features represent the backdrop of the *nethowe* etymology, experiences, and storytelling. Thus, the physical imprint and traces of the ancestral inheritance has also been submerged, eroded, and removed by hydro-related flooding. (Informal discussions, Summer and Fall, 2016 & Fall, 2018-19) These changes have metamorphosed the true essence of Manitoba's northern landscape together with that of its people into a shadow of their former self.

---

[5] Oral histories and narratives of people of northern Indigenous inheritance, which were shared with the researcher during intimate and personal storytelling reflections.

1.2 Locating Myself:

As a foreigner, native to the island of *Malta*, who's geographical[6] natural resources consist mainly of dramatic sea-facing steep clay cliffs that dominate its coastline. These contrast with the with agricultural fields that surround a densely populated urbanized city and with the deep blue sea of the Mediterranean. Thus, understanding the complexities of the relationship and tensions between Hydropower and the North American Indigenous Nation, represented quite a challenge. I had to invest substantial time in not only understanding the evolution of the Hydropower discourse within Manitoba but also learning about the Indigenous cultural history of the impacted territory. This understanding began to evolve organically from evening discussions, quietly listening to *histories* that resonated from and with the ancestral cultural territory of *Pimicikamak* (Cross Lake Cree Nation).

Photo 1: The northwestern coastline of Malta, (Photo Credit: Victoria Grima, 2017).

Photo 2: Erosion of shoreline along 2-Mile Channel at the northwestern shores of Lake Winnipeg in Manitoba. In the background a solitary bold eagle sits proudly on a deteriorated branch (Photo Credit: Victoria Grima, 2016).

[6] An island houses a population of 515,000 (NSO, 2020).

Photo 3: Deforestation to accommodate the installation of Bipole III and its associated infrastructure along the route towards Gillam in northern Manitoba (Photo Credit: Victoria Grima, 2016).

Where the histories emphasized that the cultural significance of *Nipi,* Water goes beyond mere recreational and aesthetical pleasantries. *Nipi*'s waterways and shorelines have transported its people to their trapping, hunting, fishing, and gathering grounds for many generations. These grounds have shaped *their* language and identity but have also taught life-long principles. However, once the conversations turn to the subject of hydropower development, the sense of loss and pain invade the tonality of all shared stories. Stories that I only began to encounter in any detail during the intensive 11-day trip, organised by *Wa Ni Ska Tan* research alliance (a collaboration between academia NGOs with hydro-impacted Indigenous communities).

During this trip, residents from each of the seven northern *nethowe-ithiniwak* nations[7] shared their accounts of the painful legacy represented by the hydro-electric generating stations that still dominate their ancestral landscape. Undeniable pain not only directed to the erosion of waterways and disappearance of habitat but also to barriers to accessing their collective ancestral heritage. These experiences further increase the disassociation of human interactions with their Water counterpart. And, for this researcher, the said trip constituted an overwhelming experience that immediately catapulted her in the unexplainable and undeniable embrace of this northern

[7] *Misipawistik* (Grand Rapids), *Kinosawi Sipi* (Norway House), *Pimicikamak* (Cross Lake), *Tastaskweyak* (Split Lake), Gillam [*Makaso Sakikan* (Fox Lake)], *O-Pipon-Na-Piwin* (South Indian Lake) and *Nisicawayāsihk* (Nelson House).

Indigenous territory. The many subsequent trips have enabled me to become fully immersed in this territory and the histories that guided and directed my research.

Through this learning, I have come to better understand the extent and depth of the social and environmental implications of hydro and thus allowed the northern *nethowe* histories to take central stage as my research has evolved and progressed.

1.3 Research's Purpose, Objectives and Significance:

1.3.1 *Purpose*

As already mentioned, the consequences of the Hydropower discourse in Northern Manitoba has not limited their extent to the peripheries of the constructed electrical generating structures. In this regard, as these consequences progress (spatially and temporally), the hydro-impacted Indigenous communities are becoming more and more disconnected with respect to their seasonal movement across their cultural landscape and waterways. The magnitude and nature of such anthropogenic disconnection on Indigenous heritage and livelihood is not yet fully understood. The overall goal of this research is thus to explore the implications of these changes on Indigenous ancestral knowledge.

In respect of this, the purpose of this research emerged not only from experiences shared by the northern *nethowe-ithiniwak* as individuals but also from the community-led boat/driving/fly-over rides, the social visits, and the quiet casual moments of reflections overlooking *Nipi*. Encounters which directed the intent not only to comprehend the importance of Nipi from an Indigenous point-of-view, but also immerse itself into the constituents that defined historical and contemporary cartography to get familiarized with the original physiologies of Manitoba's northern hydro-impacted hydrological systems. And those that surround *Nisicawayāsihk* (Nelson House) Cree Nation.

Together with the comprehension how the Eurocentric land-use planning and natural resources management policies together with the legacy of Hydropower discourse impacted upon the spatial seasonal dispersion and movement across the ancestral cultural landscape. Hence, this narrative the research portrays was shaped by the local Indigenous people themselves, through their inherited knowledge and lived experiences, as *temporal and spatial information* that contributed to the understanding of the implications of this set intent.

1.3.2 *Objectives*

Knowledge and experience are a direct representation of the timeless intimate relationship forged with land and waterways nourished by a coexistence and understanding Nature's life cycles. In view of their deep connection with the natural environment, Indigenous people are generally the first to notice and evaluate environmental change. Moreover, such coexistence has brought forth a geographical relationship within these landscape through which geo-spatial digital information technologies can be used to transpose the inherited knowledge as digital vector-based data. (McGregor, *et. al*, 2001; Laidlaw, *et. al*, 2010)

The objectives set for this spatial and temporal cartography focused project are to incorporate and consolidate Indigenous Traditional Environmental Knowledge (TEK) within Geographical Spatial Information technologies. The specific objectives of this research are to document:

a) *the progression of the historical and contemporary spatial and temporal changes* on the physiologies of the hydro-impacted river-systems: post and prior to hydro-electrical developments.

b) *the historical changes on the spatial context of an ancestral cultural landscape* as post-colonial imposed Eurocentric land-use and environmental management policies as these progressed through time.

c) *the adaptation of the spatial movement and organization of Indigenous people across a historical and contemporary cultural landscape* due to the applied land management policies and the emerging discourse of the Hydropower dominion.

d) *the local experiences of Indigenous land-water users* on how Hydropower has affected their longstanding land-use practices and harvesting activities.

1.3.3 *Significance*

This research is focused on strengthening further the United Nation's accreditation that acknowledges and confirms the Indigenous People as the legitimate experts of their respective local ancestral territory (UN, 1992).

1.4 *Nisicawayāsihk* Cree Nation, a community profile:

Understanding of how the Indigenous land-use and occupancy in Northern Manitoba has spatially and chronologically adapted to the post-contact Eurocentric land-use planning and natural resources management policies together with the impositions of the Hydropower has been facilitated through the guidance of the narratives inherited and experienced by one of Manitoba's Hydro-impacted Northern Cree Nations. The cultural territory of *Nisicawayāsihk,* colonially known as Nelson House, constitutes a topographical region that embraces the thick canopy of the North American Boreal Forest. Its territories are characterised by a diverse suite of timber which together with its undergrowth ecological habitat supports a variety of wildlife: fauna and flora.

These territories represent an interspersed complex of intrinsic hydrological networks that are the epicentre and essence of *Nisicawayāsihk* cultural, identity, histories, and environmental inheritance. During the decade of the 1970s, the existence of these rivers and that of *Nisicawayāsihk asiniskaw-ithiniwak* (rocky cree people), became threatened by engineering works that imposed on the hydraulic profile and that have since implemented operational water-level regimes. All these activities are designed to ensure that the Nelson River yields its maximum hydro-electrical energy production. Between 1973 and 1976, Manitoba's *Northern Hydro-electric*

Generation Project implemented additional excavation and impoundment that diverted the flow, approximately 80% of another nearby northern river.

This diversion saw the Churchill River's flow follow a new course that led it into the Nelson River.

Photo 4: *Nisicawayāsihk* ancestral cultural landscape, and in the foreground the Burntwood River (Photo Credit: Victoria Grima, 2018).

Photo 5: *Nisicawayāsihk* ancestral cultural landscape, overlooking the Rat River and its surrounding environs (Photo Credit: Victoria Grima, 2019).

Notwithstanding these imposed hydraulic controlled structures, *Nisicawayāsihk* has struggled in resuming its seasonal dispersal, to and from their respective ancestral basecamps. A struggle which continued to be undermined by the construction of the Wuskwatim generating station in 2006 (its construction was completed in 2012). And, the aftermath of such engineering works are great enough that the sites of ancestral, cultural and spiritual importance found themselves submerged alongside islands which have direct association with stories and myths.

1.5 Thesis Structure:

This document consists of six chapters. Chapter One introduces the rationale for investigating not only the historical context but also the consequences brought forth by the dominion of hydro-electric power within an inherited ancestral Indigenous cultural landscape. Chapter Two presents the literature reviewed on how Western-based cartography understood Indigenous orthography together with how the processes of digital cartography are adapting to incorporate Indigenous Knowledge within its mapping philosophies. Chapter Three provides an overall perception of the applied research methodologies: Indigenous and Western. Chapter Four focuses outlines the narrative regarding the environmental and cultural identity of one of Manitoba's major northern rivers and how this has been affected by hydro-electric power. Chapter Five explores how the evolution of such discourse (historic and contemporary) has affected the spatial use of one of Manitoba's hydro-impacted northern Indigenous Nations and how this has changed over time. Finally, Chapter Six explores the wider implications of these narratives.

CHAPTER 2 Literature Review

"Indigenous people and their communities have a historical relationship with their lands and area generally descendants of the original inhabitants of such lands..... They have developed over many generations a holistic traditional scientific knowledge of their lands, natural resources and environment."
(United Nations, 1992, Sect. III, Chpt. 26, para. 26.1)

2.1 Cartography, an Imperial tool for conquest of the 'Unknown Territories':

One of the elements upon which geography is dependent on, is the understanding of what constitutes the 3-dimensional spatial context of "space". However, such understanding is based upon on how both cultures and individuals perceive and conceptualise the notion of space of the territory within which they imprint their cultural believes and way-of-living. In respect of this, the visual 3-dimensional representation of such space emerged from the earliest simplistic artistic forms, yet complex, of the pictographs. Images that were drawn to record occurrences, migration and/or even the cultural hunting territory. Scenes that shaped and founded the visual graphical design proponent of *Cartography*. A visual component that catapulted it into becoming a medium that not only conveyed concepts and theories but also defined space-in-itself. (Mazur, 1983; Harley, *et. al*, 1987; Harley, 1989; Crampton, 2009a)

It is on such a premise that Brain Harley and David Wood during their research on the History of Cartography, based their definition of what constitutes a *"map"*:

> *"Maps are graphic representations that facilitate a spatial understanding of things, concepts, conditions, processes, or events in the human world."* (Harley, *et. al*, 1987, p. xvi)

This definition validated and ascertained Cartography's abilities of reconnecting and transporting its audiences to historical environments or scenes. Such temporal landscapes are etched in one's memories, but they can also be long forgotten from contemporary perspective and/or disappeared/eroded away. And, in respect of this, the contemporary audience subconsciously experiences a series of biographical and sensory emotions through each of the elements depicted on the cartographical record (Harley, 1989). As J. B. Harley explains *"we read them as transcriptions of ourselves"*. (Dodge, *et. al*, 2011, chap. 4.5)

When the audience gazes over a map, surficial stains and/or defects expose any temporal changes sustained by the cartographical material. The sense of touching the graphic medium transports the audience specifically to that era or decade when the sketch was drawn. The narrative of the landscaped sketched is foretold through a series of cartographic compositions. These include written calligraphy - names for locations, topographical features like ridges or rapids, and/or events through personal annotations. While the insignia (in the contemporary design world these are known as 'watermarks') demarked on the cartographic material, its style provides insights on the entity that commissioned it and the purpose of the narrative depicted by its content. (Harley, *et. al*, 1987; Harley, 1989; Crampton, 2009a; Dodge, *et. al*, 2011; Eades, 2015)

Hence, cartographical records are transformed from motionless sketched drawings into 3-dimensional spatial portraits of significance through the experience of such sensory emotions. When there is a level of intimacy associated with the viewed cartographic material, its acknowledged significance becomes the most insightful and predominant emotion from which all the others are perceived. Because a cartographic narrative with its intimate personal connotations constitutes a representation of the individual's ancestral inheritance, and/or contemporary cultural context. (Harley, *et. al*, 1987; Harley, 1989; Crampton, 2009a; Dodge, *et. al*, 2011; Eades, 2015) Western Colonialists (leaders/sovereigns) exploited these relationships to their fullest during their perseverance of dominance and control over vast unknown lands and territories (Harley, *et. al*, 1987; Lewis, 1998; Chapin, *et. al*, 2005; Miller, 2011; Miller, *et. al*, 2011; Lola, 2018).

Such exploitation led Cartography to becoming the major constituent in Europe's *Age of Exploration* of the North American continent (Harley, *et. al*, 1987; Crampton, 2009a; Dodge, *et.*

al, 2011; Eades, 2015). Through the ideologies of the *Doctrine of Discovery*, the European colonialist was able to ascertain its authority over the mapped content. In this regard, the origins of the *Doctrine of Discovery* were observed to be rooted in the religious wars that dominated the historic landscape of Medieval Times. In which battles were fought by the Crusaders against the Islamic Nation to regain their absolute control of the Holy Land's territory. (Harley, *et. al*, 1987; Williams, 1990; Ruggles, 1991; Pagden, 1995; Chapin, *et. al*, 2005; Miller, 2011; Miller, *et. al*, 2011; Lola, 2018).

Because the Latin Catholic Church ideology of the fifteenth century was so ardent in its believe that Christianity is 'universal', 'supreme' and 'above', all other non-Christian cultures/nations suffered (Miller, 2006; Miller, *et. al*, 2011; Miller, 2011). Hence, *"under Discovery, non-Christian peoples were not deemed to have the same rights to land, sovereignty, and self-determination as Christians"* (Miller, *et. al*, 2011, p. 826). This religious-based dichotomy played an important role in not only justifying the dispersal but also the implementation of the *Doctrine of Discovery* as a global *"international law"* (Harley, *et. al*, 1987; Williams, 1990; Pagden, 1995; Miller, 2006; Miller, *et. al*, 2011; Miller, 2011). This in turn, empowered the European Monarch Colonialist with the 'right' to explore any of the uncharted and unknown territories (Miller, 2006; Miller, *et. al*, 2011; Miller, 2011).

Moreover, it also provided the Colonialist with the right and ability to assert *"legal claims"* against any land "discovered" together with all its Natural Resources. Thus, the validation of such claims was ascertained through the establishment of occupancy (e.g. construction of strongholds) and tenure (e.g. sovereign sealed land-titles). Such an assertion drastically undermined the inherited possession rights of the Indigenous nations that inhabited the "discovered" territories since time immemorial over their respective ancestral cultural landscape.

Moreover, the Doctrine's concept of *Terra Nullius*[1], provided the necessary tools that deployed mechanisms and practices associated with these elements of possession. This ideology inevitably became strongly ingrained into the pre-established and acknowledged European practices of land-use development and management – and arguably persist today. (Williams, 1990; Pagden, 1995; Lewis, 1998; Miller, 2006; Miller, *et. al*, 2011; Miller, 2011)

The built fabric of any newly established settlements in turn asserted itself as an urban cluster with a surrounding countryside focused on animal husbandry and agricultural practices. Through commerce and trade, these urban hubs would subsequently evolve into villages, towns, and cities. Such land-use practices were not congruent with the lifestyle of the North American Indigenous Nation. This in part is because of their inherited livelihood, their movement across the land is organic in nature and mirrored Nature's seasonal patterns. Therefore, the explorers word report to their patrons that the territory (even though inhabited) discovered was not being neither used nor managed as understood by the Eurocentric land-use principles. This testament triggered the *terra nullius*, *"vacant"* land, proclamation.

This proclamation immediately asserted the notion that the discovered territory was readily available to be legally claimed and physically owned by the appropriate European Crown. (Pagden, 1995; Woodward, 2007, Vol 3, prt 1; Miller, 2006; Miller, *et. al*, 2011; Miller, 2011; Eades, 2015) Such justifications were used to secure their economical investments, gain and growth within foreign lands. To safeguard these assets, cartographical concepts and practices were adapted to reflect the requirements of their strong-minded benefactors, who funded the explorations. Such adaptations saw Cartography fail in exerting any kind of neutrality particularly when it came to the sketching of physiological characteristics of the natural environment. (Livingstone, 1993;

[1] Is a Latin terminology signifies the land is empty (Miller, 2011, p. 853).

Harris, 2002; Chapin, *et. al*, 2005; Miller, 2006; Dunn, 2007; Crampton, 2009a; Miller, *et. al*, 2011; Miller, 2011; Eades, 2015)

Such failure in turn metamorphosized cartographical principles into *"a form of power-knowledge"* (Harvey, 1989, p. 3). And from that day-forth Cartography became a language for dispossession and appropriation of lands and territories (Harley, 1989; Pagden, 1995; Lewis, 1998; Miller, 2006; Miller, *et. al*, 2011; Miller, 2011; Eades, 2015). Harris (2002) refers to this process as *"cartographic erasure"*. A process that deliberately misinterpreted the Indigenous cultural territory, not only by showing it as unpopulated, but also as empty, and unused space. This showed a complete and wilful lack of understanding of the Indigenous subsistence and their coexistence with the bio-ecological cycle. And ultimately initiated the perception that the natural resources of the claimed territory, that is, within the *'unused space',* were being wasted.

The 'mapping out' cartographical practices obliterated any reference to Indigenous identity inheritance (culture, livelihoods, and seasonal settlements) from any published European cartographic record throughout the historical period of the *Age of Exploration*. (Brealey, 1995; Sparke, 1998; Harris, 2002; Miller, 2006; Miller, *et. al*, 2011; Miller, 2011; Ryan, *et. al*, 2015; Eades, 2015; Lola, 2018) Thus, Lands and Territories were perceived as landscapes that had neither past nor history prior to their European settlement (Miller, *et. al*, 2011; Miller, 2011; McGurk, 2018). This dichotomy continued to reinforce the belief that Native Cultures were inferior to European Cultures, and indeed that First Peoples themselves were also inferior.

It also opened these landscapes for exploitation by the outsiders, notably including the over harvesting of Europe's finest beaver fur in the late sixteenth century, which brought French tradesmen over to North America (Ray, 1974, 1978, 2016; Carlos *et. al*, 1993, 2008; Harris, 2016). To not to lose out from any economic opportunities brought forth by this newly 'discovered' territory, the British landed a century later, to establish the elements of possession. This achieved through a Royal Charter[2] proclamation that not only executed *"one of the largest real estate deals in history"* (Herscovici, 2017), but also gave exclusive privileges of commerce and trade of the vast central uncharted territory of North America solely to a cousin of the British Crown and his fellow *aventuriers* (Slattery, 1979; McNeil, 1982; Carlos, *et. al*, 2008; Dolin, 2010; Harris, 2016; Herscovici, 2017).

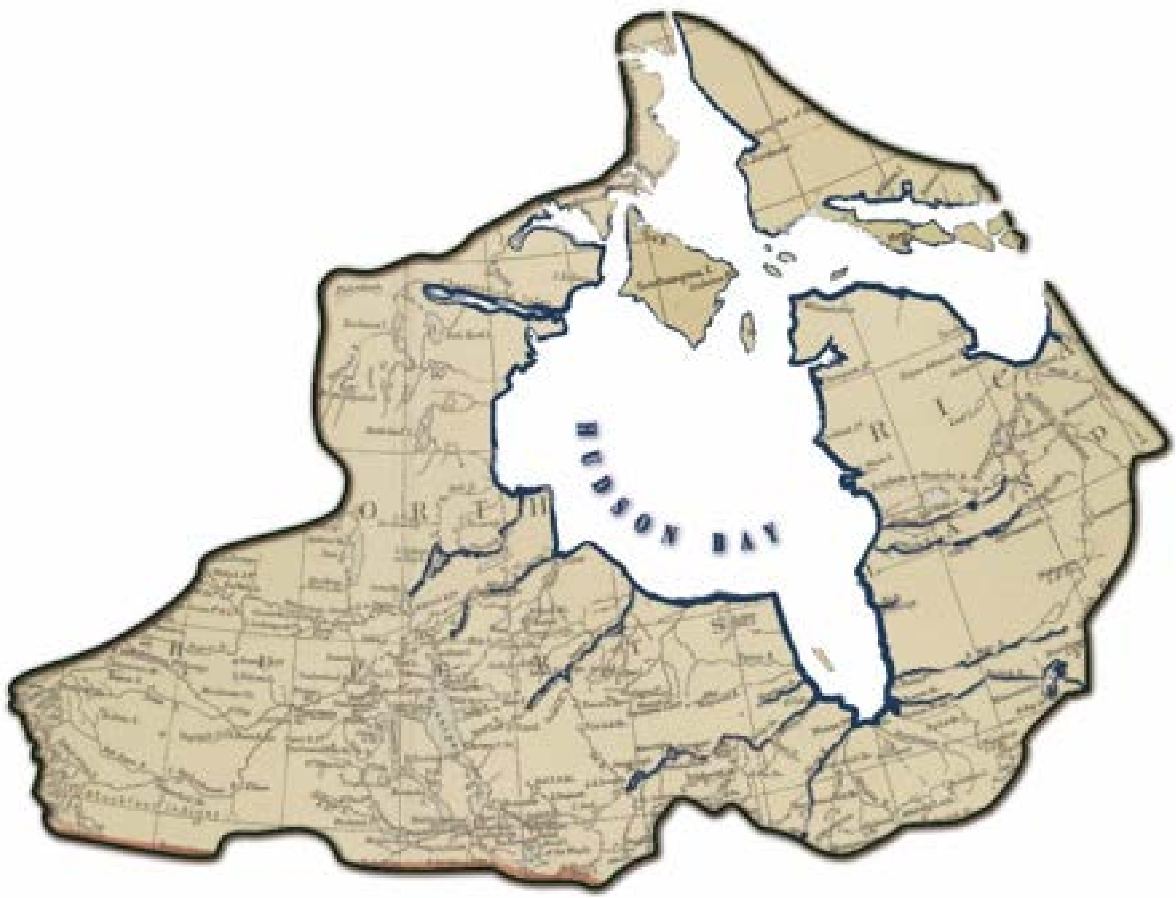


Figure 3: The geographical spatial extent of Rupert's Land, as it was interpreted by J. Arrowsmith in 1857 on his published Map of North America (Appx. A).

[2] Regarding, the 1670 Charter one can attribute it to either the ill-fated misfortunes (imprisonment) or even maybe the coincidence of being at the right moment in time (guests of the British Monarch), of two French traders/explorers – Pierre-Esprit Radisson and Médard Chouart des Groselliers. Both were able to secure the patronage of Prince Rupert of the Rhine, cousin of the British Monarch, Charles II. A monarch who enjoyed wearing fashionable item, such as, felt hats covered with beaver fur. (Ray, 1974, 1978, 1980; Carlos, *et. al*, 1993, 2008; Harris, 2016; Herscovici, 2017)

They in turn *"true and absolute Lords and Proprietors"* (Slattery, 1979, p. 379). And the territory-in-question, whose waters drained into an Atlantic Bay[3], was christened after the cousin of the British Crown, the patron of the Charter, Prince Rupert (Slattery, 1979; Carlos, *et. al*, 2008; Herscovici, 2017). Hence, by 1870 the occupancy of *Rupert's Land* encompassed a distribution of 97 fur-trading posts (Foot, *et. al*, 2019). Posts were built along the bay's coastline, within the hinterland, and along the perimeter of its intrinsic hydrological network (Appx. A: GoC, 1974). These posts, with the assistance of Indigenous hunters, trappers, and fur-traders, helped the explorers in establishing a rich cartographical history. The irony here is that this history constituted a direct portrayal and representation of the ancestral Indigenous cultural landscape. (Ray, 1974; Ruggles, 1991)

The same landscape which *terra nullius* referenced as *'wasted and unused space',* and Cartography ensured it would reveal its topographical (land features) and physiological (hydrological networks) characteristics (Ruggles, 1991). On the other hand, when it came to Indigenous ethnology, in terms of cartographical representation, it was restrictive in nature, because the publishing houses limited themselves in providing only generic information on any given subject. Thus, Indigenous ethnology was mapped in accordance with the phonetics of each respective spoken language (LoC, n.d; Ruggles, 1991). And the style of the labelling calligraphy, the character (font type and size) and structure (position and character spacing) that was applied only represented their coverage geographically.

This was a mapping concept that map designers continued to practice well into the nineteenth century (LoC, n.d; Favrholdt, 2020). Thus, it transpired that Alexander Henry (elder), may have provided the earliest cartographical record that depict geographically the diversity of the

[3] Christened after the last captain of the flyboat 'Discovery': Henry Hudson. Hudson explored this bay between 1610 and 1611 (Butts, 2009).

Indigenous language, this in 1776 (Appx. A). The territorial extent for the Indigenous Nations[4] was interpreted through the application of pastel colors, 5 in total, and which were painted directly onto the cartographic material. The peripheries of the rivers defined the coverage each respective language depicted. (Appx. A: Henry, 1776) And to give context to the sketched narrative, Henry included descriptive notes, musings that captured the conflicts of the portrayed time period and also the livelihoods of a few selected tribes[5] (Appx. A: Henry, 1776).

One of such musing describes the nomadic livelihood together with the hunting habits of the Chipewoyans Nation:

> *"The CHIPEWOYANS a most hardy nation, they bare the most intense cold, Ramble from place to place, without any fixed habitation, and are an instance of the hardships Nature can endure. They catch the Rein Deer with Snares, which they lay in the baths, thro' which these Animals usually pass. In Summer, they dry Fish and Hares, which they hide in the places thro' which they intend to pass in Winter." (Appx. A: Henry, 1776)*

Another Indigenous ethnographic map was published in the early decade of the 1830s, by the American Antiquarian Society, which used a similar cartographical technique (Favrholdt, 2020; Appx. A). The map[6] in-question in contrast to Henry's, highlighted the geographical extent of 11 Indigenous language groups. The labelling identifying the names of the diverse tribes was interspersed within and across the sketched hydrological network. Moreover, the applied tonality and color technique, although embracing Henry's techniques, further outlined a distinctive extent to the geography embraced by each depicted territory. It demonstrated each area as a polygon, each enclosed by a boundary. (Appx. A: Gallatin, 1836)

---

[4] Orabuscaw Indians, Christino Nation, Chipeways Country, Muskegos Nation and Chipewoyans Nation (Appx. A: Henry, 1776).
[5] Henry called one of the tribes under the linguistic of *Muskegoes*, Swampy Cree, that roamed the western landscape bound by the rivers of Nelson and Church, as *"Ceder Indian"*. And this because due to the cedar production of Cedar Lake and/or as it is referred by him as *"Lake Bourbon"*. (Appx. A: Henry, 1776)
[6] This map was published in 1836 and each of the geographical extent is depicted and dated in accordance with two historic temporal periods. An interpretation representative of the interest in Indigenous linguistics and ethnography shown by a contemporary politician. This politician who established New York University and was a member of the Democratic-Republican Party was Abraham de Gallatin. (Appx. A: Gallatin, 1836; Wiener, 2021)

This reflects a technique which symbolizes a Eurocentric dichotomy of how geography should and needs to be cartographically depicted, constituting mainly as a cluster of formal, structured, and organized pockets of land units. (Woodward, 2007; Miller, 2011; Malone, *et. al*, 2016) This cartographical principle continued to be perfected and evolved not only in terms of design but also the nature of the data represented. In this regard, the 1857 map published by the London-based printing house of John Arrowsmith's Company can be perceived as a good example of such an approach. Thus, Arrowsmith's color technique identified a total of 14 Indigenous territories, and the legend clarified which of these territories was nonexistent in mid-nineteenth century. (Appx. A: Great Britain, 1857b)

Arrowsmith, thus completes the narrative for the depicted landscape through the integration of quantitative data. That is, for each colored geographical unit[7], Arrowsmith provided the associated population and its numeric value. (Appx. A: Great Britain, 1857b). Hence, the ethnographical maps outlined above, do not only provide insight into how the Eurocentric colonialist understood Indigenous territory but also how the said territory evolved spatially and adapted to post-colonial influences. Such information is indeed important from a historical archiving and anthropological point-of-views. Nevertheless, such ethnographical maps continued to exert *terra nullius*: *"cartographic erasure"* and dispossession principles in their sketched content, in part because such maps failed to demonstrate and/or consider the complex social inter-relations that co-existed among nations and tribes.

Such relations were fluid, organic in nature and thus not bound by any pre-established boundaries. Hence, Indigenous co-existence was not based upon the imposed Eurocentric *"nation-*

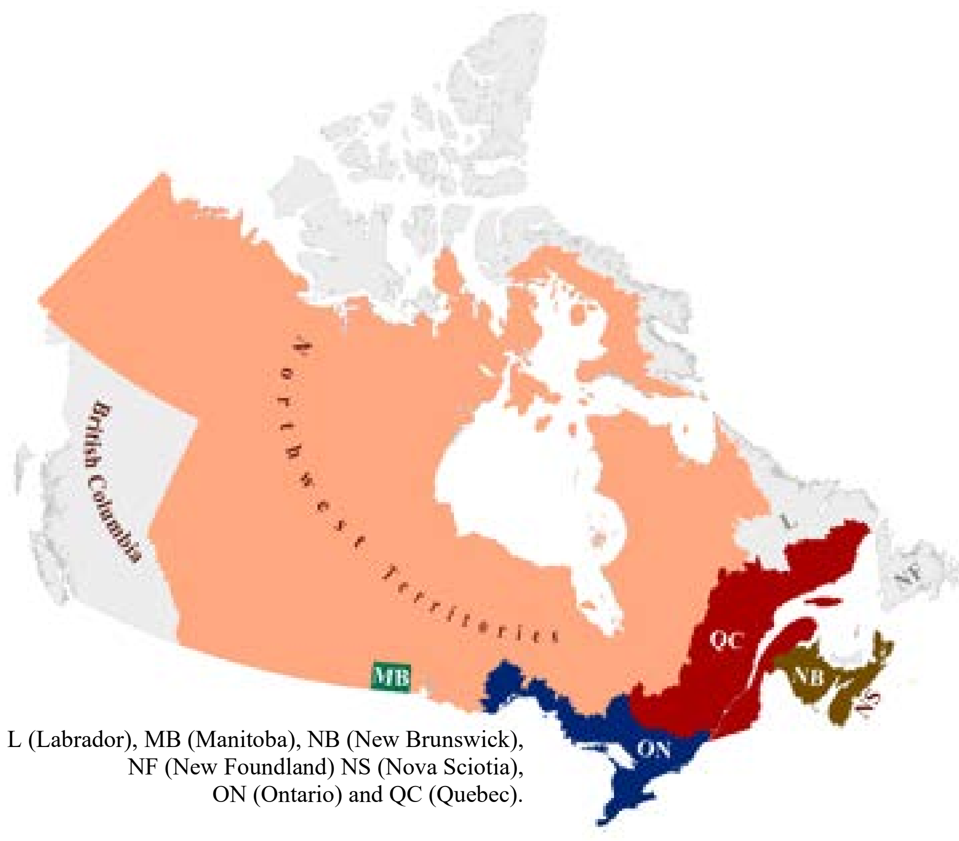
[7] During the assessment of Arrowsmith's 1857 map, it was noted that the tribes forming part of the Algonquin language, their cultural landscape embraced most of Rupert's Land territory but also extended southwards into the United States territory. That is, towards the established states of Illinois and Virginia. Arrowsmith lists a total of 12 Algonquin tribes with a combined population of 17,570. (Appx. A: Great Britain, 1857b).

state" concept. (Harris, 2002; Eades, 2015; Malone, *et. al*, 2016; Lola, 2018; TRCGS, 2018) On the other hand, during the nineteenth century, interest in resource extraction, particularly from the mining[8] industry was increasing in its pace. Therefore, to have a better understanding of these resources, the British Parliament appointed a committee to assess all the land *"under the Administration of the Hudson's Bay Company, or over which they possess a License to Trade"* (Great Britain, 1857a, p. iii). This same committee had commissioned the above Arrowsmith's 1857 Indigenous ethnographical map (Appx. A: Great Britain, 1857b).

Map 3: The Canadian territorial landscape in 1857 adapted from the Territorial Evolution Map published in 2006 by the Natural Resources Canada[9]. 1st July of 1867 marked the creation of the Dominion of Canada. A Confederation between New Brunswick, Nova Scotia, Ontario and Quebec.

[8] In 1842, the Geological Survey of Canada was founded to study and survey the country's Mineral Natural Resources (Blackadar, 1986; Vodden, *et. al,* 2017).
[9] URL https://open.canada.ca/data/en/dataset/7d6f98d4-5106-54dc-850c-d199c46960d6

Moreover, the environmental and economical evaluations[10] brought forth by such assessment played a critical role when recommending that the British Crown acquire the territory-in-question. This acquisition decision became an urgent matter once the Canadian Confederacy was established in 1867. During this year, the Alaskan territory was also purchased by the United States Government from the Russian Empire. This expansion of the Americans into the northern territory, was not positively received from a British political perspective. Hence, after the Confederacy established four (two Maritimes and two Central) Canadian Provinces, HBC relinquished its ownership rights over *Rupert's Land* to the newly established Federation, in 1870. (McNeil, 1982; Davis, 1988; Hall, *et. al*, 2017; Waite, *et. al*, 2019)



Map 4: The Canadian territorial landscape in 1870 adapted from the Territorial Evolution Maps, published in 1974[11] and 2006[12]. The newly formed Dominion acquires the territories administered by the Hudson Bay Company. Rupert's Land is amalgamated with the Northwest Territories and joins the Confederation. And, the fifth Canadian province of Manitoba is created.

[10] The appointed Commission also reviewed the assets for Vancouver Island together with the *"Indian Territory"*, west of the Rocky Mountains (Great Britain, 1857a, p. xiii).
[11] The Atlas of Canada, Ed. 4, pp. 85-86, URL https://open.canada.ca/data/en/dataset/17827eb0-5fb4-5c31-a237-b1625237a204
[12] Natural Resources Canada, URL https://open.canada.ca/data/en/dataset/7d6f98d4-5106-54dc-850c-d199c46960d6

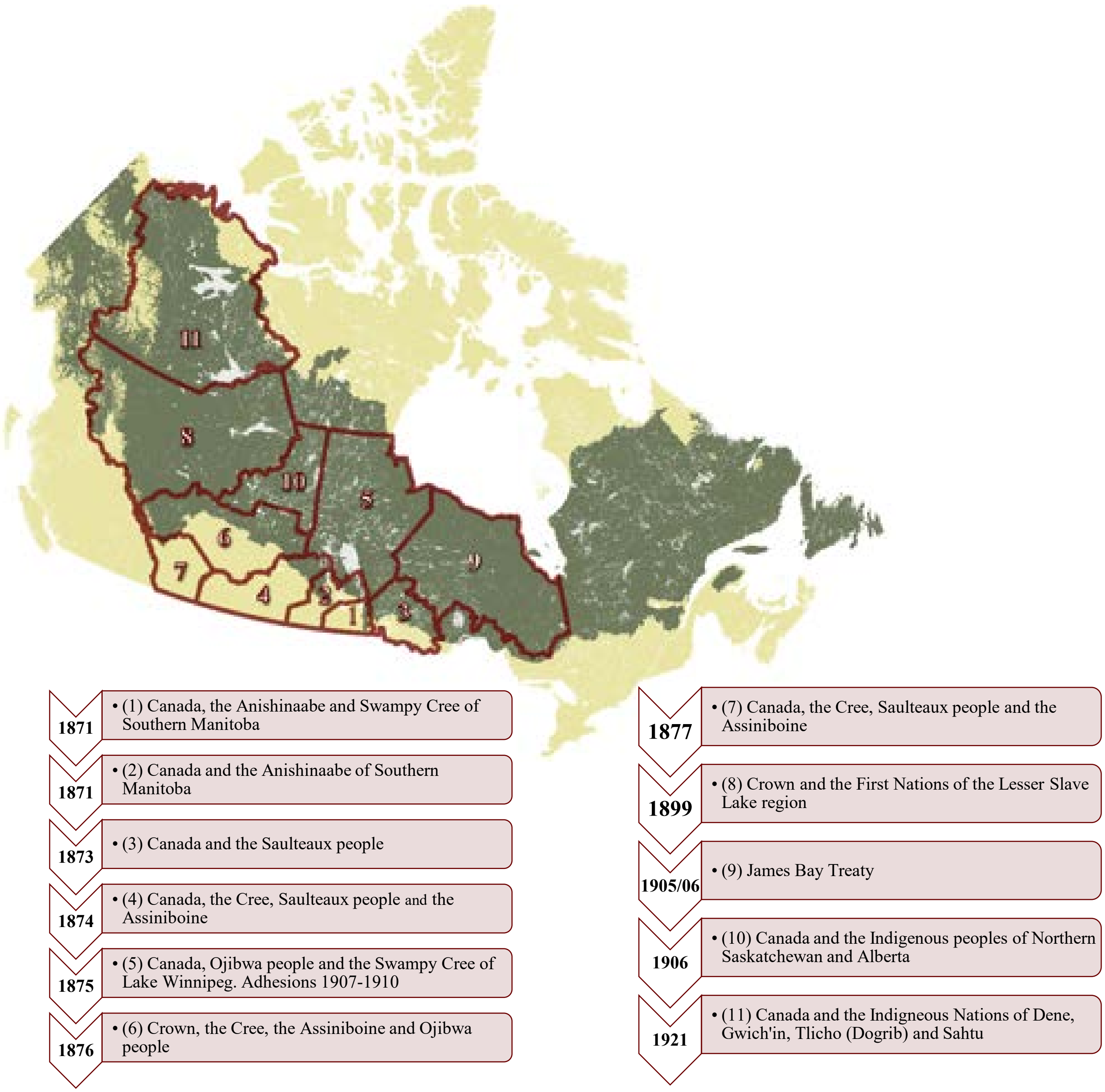
Map 5: The 1949 Canadian territorial landscape adapted from the Territorial Evolution Map published in 2006 by the Natural Resources Canada[13]. The territory of Rupert's Land was divided with six Provinces: Alberta (AB), Manitoba (MB), Northwest territories (NT), Ontario (ON), Quebec (QC) and Saskatchewan (SK).

Once the acquisition was finalized, this territory was distributed amongst the provinces of Alberta, Quebec, Ontario, Manitoba, Northwest Territories and Saskatchewan, a transitioning which led to their assertion into the Federation. (McNeil, 1982; Davis, 1988; Hall, *et. al,* 2017) This provincial jurisdiction distribution subsequently triggered the processes of Treaty-making. Post-confederation, between 1871[14] and 1921, 11 Treaties were signed between the Crown and Indigenous Nations. Such Treaties had the claimed intent of benefiting Indigenous Nations, socially and economically. However, instead with the aid of the Dominion Land Survey System,

[13] URL https://open.canada.ca/data/en/dataset/7d6f98d4-5106-54dc-850c-d199c46960d6

[14] The map published by the Dominion's Lands Department in 1878, provides the geographical context for seven (7) signatory Treaties (Appx. A).

- a system which was based upon parceling land in terms of sections and townships – the Treaties from the decade of 1870s onwards, began to designate a succession of precise, measured, and surveyed land-unit plots (Hanuta, 2008; Appx. A).

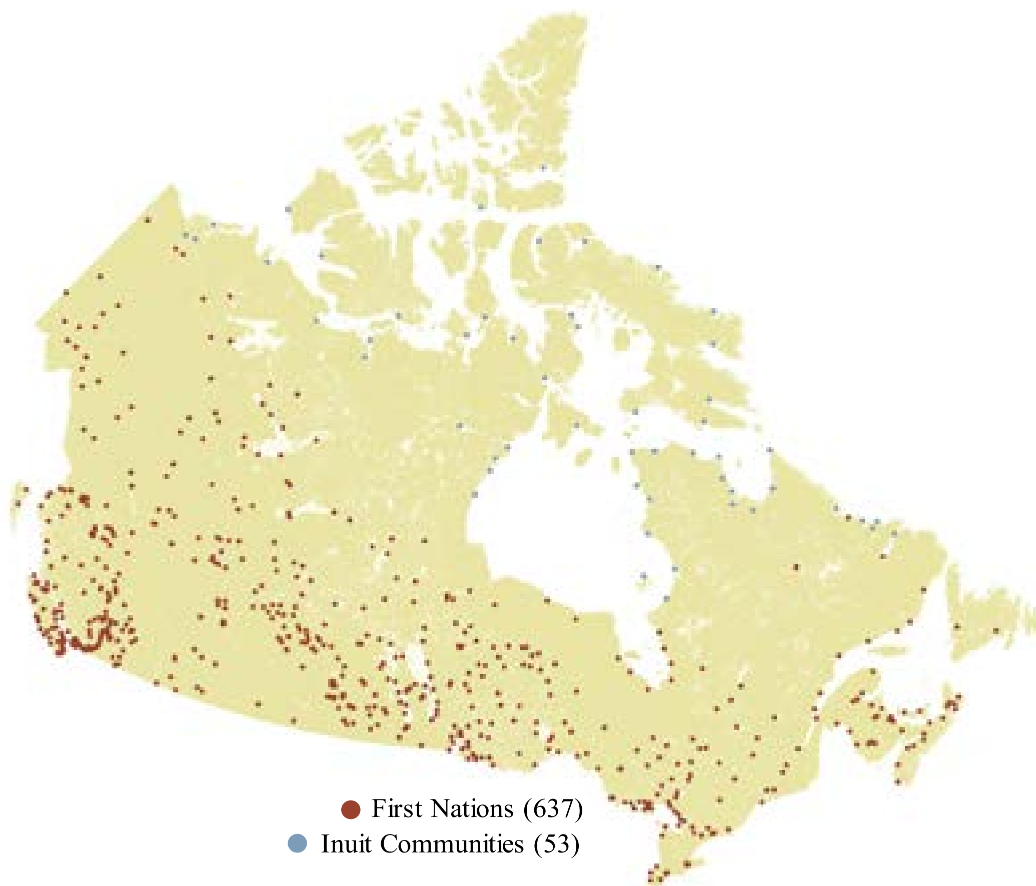


Map 6: The numbered Treaties post-Confederation, 1871-1921 (GIS Sources: MLI[15], NRC[16] and Statistics Canada[17]).

---

[15] Treaty Boundaries, URL https://mli2.gov.mb.ca/adminbnd/index.html
[16] North American Boreal Forest, URL https://www.nrcan.gc.ca/our-natural-resources/forests/sustainable-forest-management/boreal-forest/north-american-boreal-zone-map-shapefiles/14252
[17] 2016 Boundary files, URL https://www12.statcan.gc.ca/census-recensement/2011/geo/bound-limit/bound-limit-2016-eng.cfm

Indigenous Nations within the established country of Canada were expected to disregard their inherited co-existence by relocating into these formalized *'reserves'* land. And thus, to form permanent, static, urban planned settlements in each. (Kenneth *et. al*, 1986; Tough, 1996, Hall, *et. al*, 2017) This process founded over 3,000 'reserves' (NRC, 2020). Thus, Arrowsmith 1857 coloured Indigenous territory in the twentieth first century, found itself metamorphosized into the contemporary ten Canadian Provinces and three Territories.



Map 7: Indigenous Nations as distributed across Canada (GIS Sources: CIRNAC[18] and Statistics Canada[19]).

[18] Indigenous Peoples, URL https://open.canada.ca/data/en/dataset/b6567c5c-8339-4055-99fa-63f92114d9e4
[19] 2016 Boundary files, URL https://www12.statcan.gc.ca/census-recensement/2011/geo/bound-limit/bound-limit-2016-eng.cfm

2.2 *"mapping of, by, and for the people"* – Indigenous Participatory Mapping:

Bernard Nietschmann, a geographical and ecological scholar, during his work to the conserve and protect Central America Indigenous[20] cultural lands and natural resources, determined that *"more indigenous territory has been claimed by maps than by guns"* (Stone, 1998, p.54). Such claims reflect Europe's Age of Exploration, brought forth through the ideology of the Doctrine of Discovery:*terra nullius*, and a cartographical inheritance of map processes and methodologies that not only excluded Indigenous knowledge from environmental assessments but also isolated Indigenous tribes from their ancestral cultural territories (Miller, 2006; Miller, *et. al*, 2011; Miller, 2011). Notwithstanding this history, Nietschmann also emphasized that *"more indigenous territory can be reclaimed and defended by maps than by guns"* (Stone, 1998, p.54).

This empowerment is ascertained and achieved by deconstructing the colonial mapping processes. A critical analysis which does not only counter the inherited homogeneity applied through the design elements, but also, the implied notion of elimination within the spatial context of the depicted mapped content. (Huggan, 1989; Belshaw, 2005; Chapin, *et. al*, 2005; Di Gessa, 2008; Crampton, 2009a; Dodge, *et. al*, 2011; Caquard, 2013; Smith, 2013; Rose-Redwood, *et. al*, 2020) In doing so, the mapping design processes were able to acclimate by integrating within their concepts and methodologies the Indigenous bio-cultural knowledge. Thus, map making experienced a resurgence in how it perceives and represents cultural and human geographical physiologies as understood by the Indigenous people. (Huggan, 1989; Berkes, *et. al*, 1994; Chapin, *et. al*, 2005; Crampton, 2009a; Davidson-Hunt, 2010: Smith, 2013; Engel, 2015)

[20] Nietschmann through the application of GIS and SCUBA mapping technology, facilitated Indigenous-led mapping projects which helped in the conservation and protection of the Caribbean coastline (the coastal reefs and marine mammals) together with the Rain Forest (historic and contemporary use) which forms part of the Maya territories. (PEW, n.d.)

This was achieved in part by forging collaborative endeavors led by Indigenous community land and cultural insights. Such collaborations brought forth a movement of *"mapping of, by, and for the people"* constituting a 'participatory-mapping' approach. (Stone, 1998; Brodnig, *et. al*, 2000; Chapin, *et. al*, 2005; Dunn, 2007; Louis, 2007; Di Gressa, 2008; Dodge, *et. al*, 2011; Corbett, *et. al*, 2016) The methodology reflects the use of mapping tools in assisting Indigenous communities in the documenting, conserving and management of their historical and contemporary land-based knowledge inheritance. Such tools form part of the innovative twentieth century vanguard digital mapping platforms. These mapping platforms are computer-aided and based on technologies, known as Geographic Information Systems (GIS). (Stone, 1998; Chapin, *et. al*, 2005; Dunn, 2007; Crampton, 2009b; Goodchild, 2010; McCall, *et. al*, 2012; Corbett, *et. al*, 2016; Mackenzie, *et. al*, 2017)

These systems contain an array of geospatial analytical processes that allow the users to not only capture but also store and organize photographic, paper-based cartography, textual, tabulated values, etc. information as raster and/or vector-based geo-grounded digital featured layers. And such featured layers are representative of the georeferenced data captured at both micro and macro levels. This transposition can occur within a 2-D environment in relation to geographical location (longitude, latitude) or, within a 3-D modeling environment, when either the topographical elevation or depth below soil-level are required for scientific analysis. (Dunn, 2007; Cope, *et. al*, 2009; Crampton, 2009b; Mitchell, 2009; Goodchild, 2010; Clemmer, 2013)

Thus, in view of its ability to capture geographical information from a diverse suite of media at different cartographic scales and ranges, GIS[21] aided Canada in developing its first land-

[21] The concept of utilising computer-aided technology with land use mapping in Canada was initially pioneered by Dr. Roger Tomlinson. During the early 1960s, Canada needed an inventory system to oversee its land-use organization and natural resources developments. Thus, Tomlinson was employed by the Federal Government to come up with a system that facilitated the management of such assets. Hence, Tomlinson developed and created a computerized system to store, and analyze the data captured

based inventory digital mapping application, in 1960s. Since then, GIS has been applied within an array of disciplines, such as, national security, natural resource extraction, infrastructure, and health. But the analytical work carried out by these sectors is mostly driven by scientific and technical oriented data. The analytical and designs tools of GIS technological platforms thus rely heavily on the expertise of skilled academic scientific/engineering specialists. (Lillesand, *et. al*, 2007; Cope, *et. al*, 2009; Crampton, 2009b; Mitchell, 2009; Goodchild, 2010; Heywood, 2011; Clemmer, 2013)

Thus, from its conception GIS constituted a mapping program exclusively designed for and used by technically trained professionals. (Chrisman, 2006; Dunn, 2007; Crampton, 2009b; Goodchild, 2010; Ganapati, 2011; Corbett, *et. al*, 2016). However, this conception through collaborative work between cartographers and Indigenous knowledge holders, was revolutionize. By incorporating Indigenous land-based knowledge within GIS process, that is, members of the community partake in these mapping processes, as a specialized expertise in local ancestral cultural landscapes. (Brodnig, *et. al*, 2000; MrGregor, *et. al*, 2001; Chapin, *et. al*, 2005; McCall, 2012; Corbett, *et. al*, 2016; Olsen, *et. al*, 2016) Thus, enforcing and acknowledging that through the ancestral environmental inheritance, Indigenous Nations are among the first to become aware of any physiological (topographical and ecological) changes, experienced by the land and by waterways. (Brodnig, *et. al*, 2000; MrGregor, *et. al*, 2001; Palmer, 2012)

Hence, Canada began to associate a level of importance with mapped content that was produced in collaboration with Indigenous people, in the 1960s. When the established colonial legal system in relation to Aboriginal rights, began to be questioned. (Lyer, 1996; Chapin, *et. al*,

---

– a computer-aided technology which was named ‘Geographic Information System (GIS)’. (Tomlinson, 1967; ESRI, 2013; Chrisman, 2006)

2005; Louis, 2007; McCall, 2012; Corbett, *et. al*, 2016) And, this because, this decade foresaw the imposition of several mega-industrial energy infrastructures within the ancestral territories of Indigenous Nations. Developments which were and still are deficient when it came to proper engagement and consultation processes with Indigenous people. Once in operation such utilities brought forth substantial environmental damage, social-economic uncertainty, and cultural crisis. (Martin, *et. al*, 2008; NEB, 2018)

Therefore, to help *"secure tenure, manage natural resources and strengthen cultures"* (Chapin, *et. al*, 2005, p. 619), participatory GIS (PGIS) approaches became the standard methodology for validating the Indigenous rights over land and water. Thus, the 1970s PGIS became an invaluable tool for recording Indigenous land use practices and residency within the ancestral cultural landscape. A role which proved to be vital during the negotiation of Aboriginal rights and title with proponents of mega-infrastructural projects. (Lyer, 1996; Chapin, *et. al*, 2005; McIlwraith, *et. al*, 2015; Corbett, *et. al*, 2016) But, notwithstanding its support of such Aboriginal rights, PGIS also continued to some extent to exert a sense of erasure.

This in part occurred because such participatory studies focused only on cataloging Indigenous sustenance, mainly wildlife harvesting practices and sites. Thus, the collaborations focused only on interviewing local harvesters, that is, hunters, fishermen and trappers. (Chapin, *et. al*, 2005) Yet Indigenous cultural identity is not only congruent with its inherited land-use practices and activities. Such identity also reflects how the people spatially organised their territory – inter-social influences and environmental seasons. And, how land imprinted upon people through language, histories, stories, and myths. Thus, for PGIS to fully support Indigenous Nations in their reappropriation of cultural histories, language, and sovereignty over their ancestral inherited cultural territory, it had to evolve and enrich its own mapping methods. (Martin, *et. al*, 2008; McIlwraith, *et. al*, 2015; NEB, 2018; Informal discussions[22], Summer, and Fall, 2016-2021)

This growth metamorphosized into the concept of *'Map Biographies'*. These biographies go beyond the notion of just mapping the seasonal harvesting sites in accordance with their ecology. Indeed, they constitute a collection of the inherited histories that have been orally transferred for generations interspersed within the experiences related to a land-based livelihoods (Informal discussions, Summer, and Fall, 2016-2021). Such narratives emphasize the authority and legality of tenancy and use at the level of the individual, family, and community. (Freeman, 1976, 2011; Tobias, 2000; Chapin, *et. al*, 2005; McIlwraith, *et. al*, 2015) The documentation of such legacies usually occurs within semi-structured and informal settings. Where the local knowledge keepers use paper-based maps and/or clear overlays to map out their own distinctive spatial and temporal knowledge.

[22] Oral histories and narratives of people of northern Indigenous inheritance, which were shared with the researcher during intimate and personal storytelling reflections.

Through GIS, these data are geo-referenced into digital databases and repositories of cataloged earth-bound and featured classes. (Brodnig, *et. al*, 2000; Tobias, 2000, 2009; Freeman, 2011; Palmer, 2012) Such map biographies are part of the PGIS approach that was introduced in Canada, in 1973. Milton Freeman facilitated a land-use and occupancy research project on behalf of the Inuit Tapirisat of Canada and the Department of Indian and Northern Affairs (REF). The project was progressive in nature because it aimed to *"delimit the present and past use and occupation of the land and marine environment"* for the Inuit Nation (Freeman, 1976, p. 19). Geographically, it encompassed the regional extent of the Northwest Territories of Canada together with the northeast territory of Yukon.

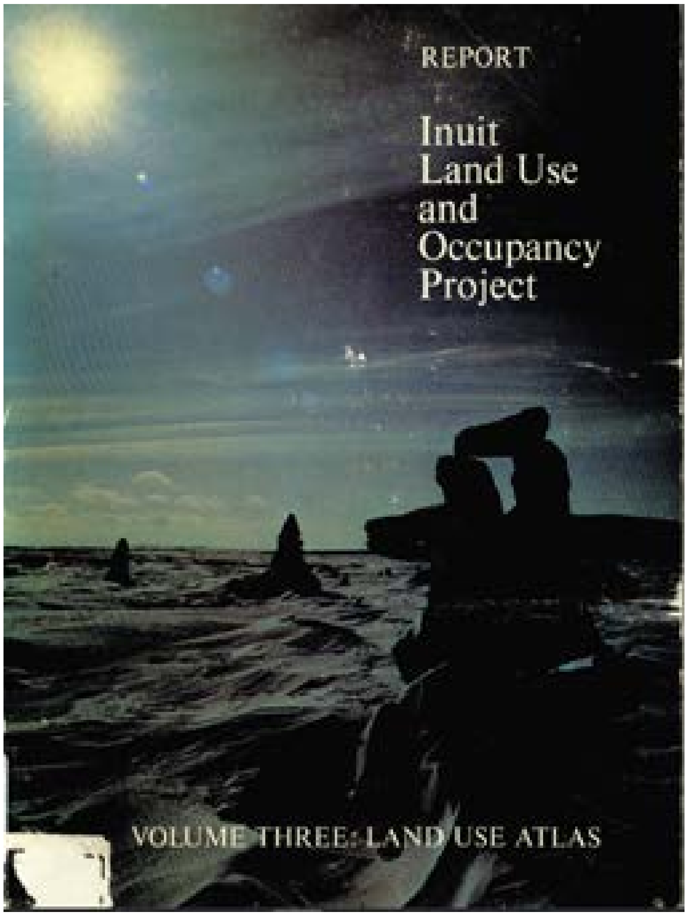
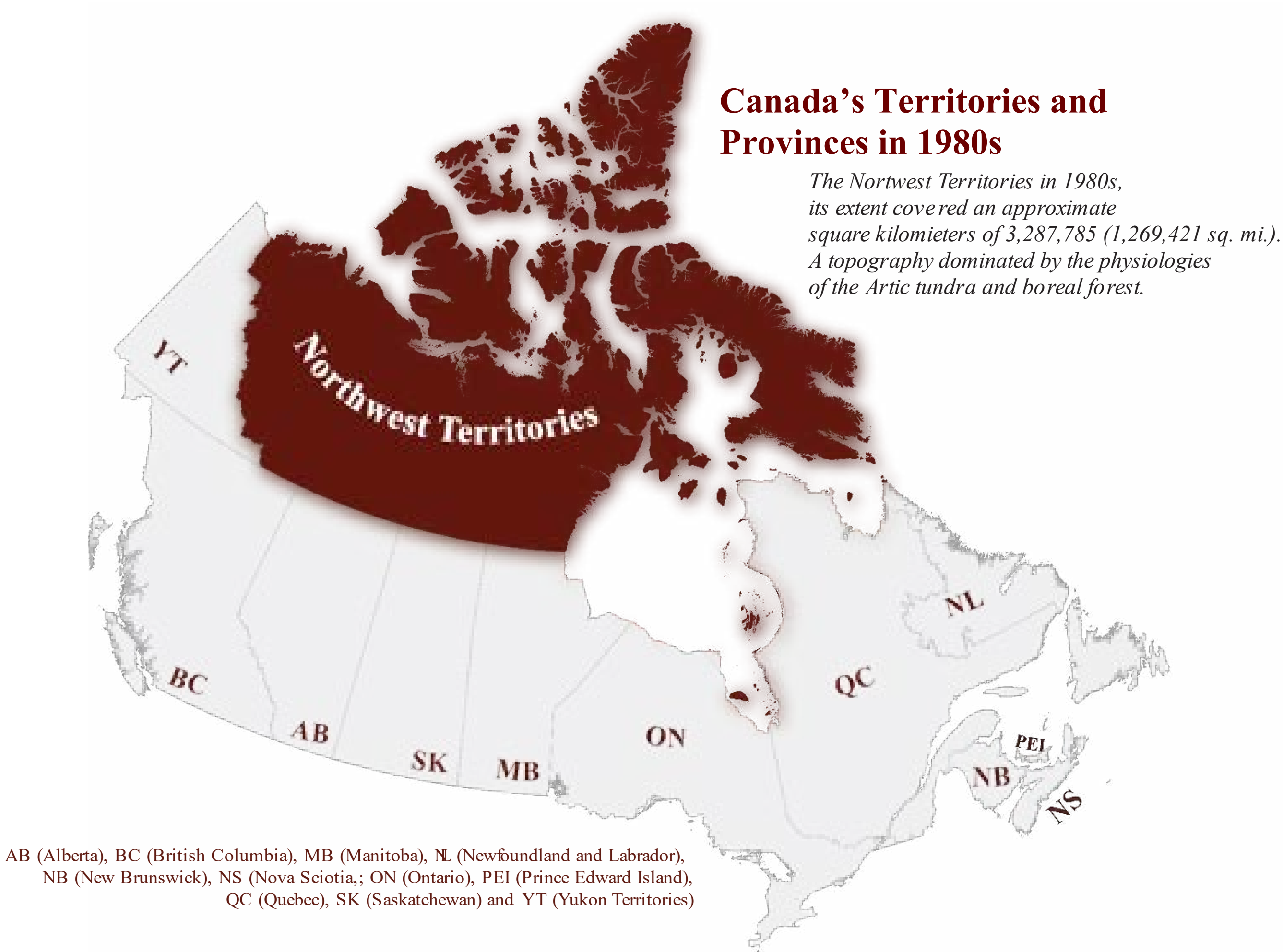


Figure 4: 1976 Milton Freeman Research Limited published report. (URL https://publications.gc.ca/site/fra/9.850125/publication.html).

Freemen, thus used the concept of map biographies to document historical and contemporary harvesting grounds together with the inherited eco-cultural heritage from the narratives of 34 Inuit communities. (Freeman, 1976, 2011) The rich heritage of the Indigenous Arctic emerged from reclaimed Inuit place names, sites of cultural importance, ecological knowledge (immigration, birth and feeding grounds), ancestral campsites, the travelled routes, and oral cultural myths. These in return revealed the full spatial context of the Inuit cultural landscape

- an occupancy covering more than 28 million square kilometers in area, and that encompassed not only land but also sea and sea-ice. (Freeman, 1976, 2011) This project clearly showcases that the ancestral Indigenous cultural landscapes do not confine themselves to a parcel of land but instead can cover a vast regional territory.

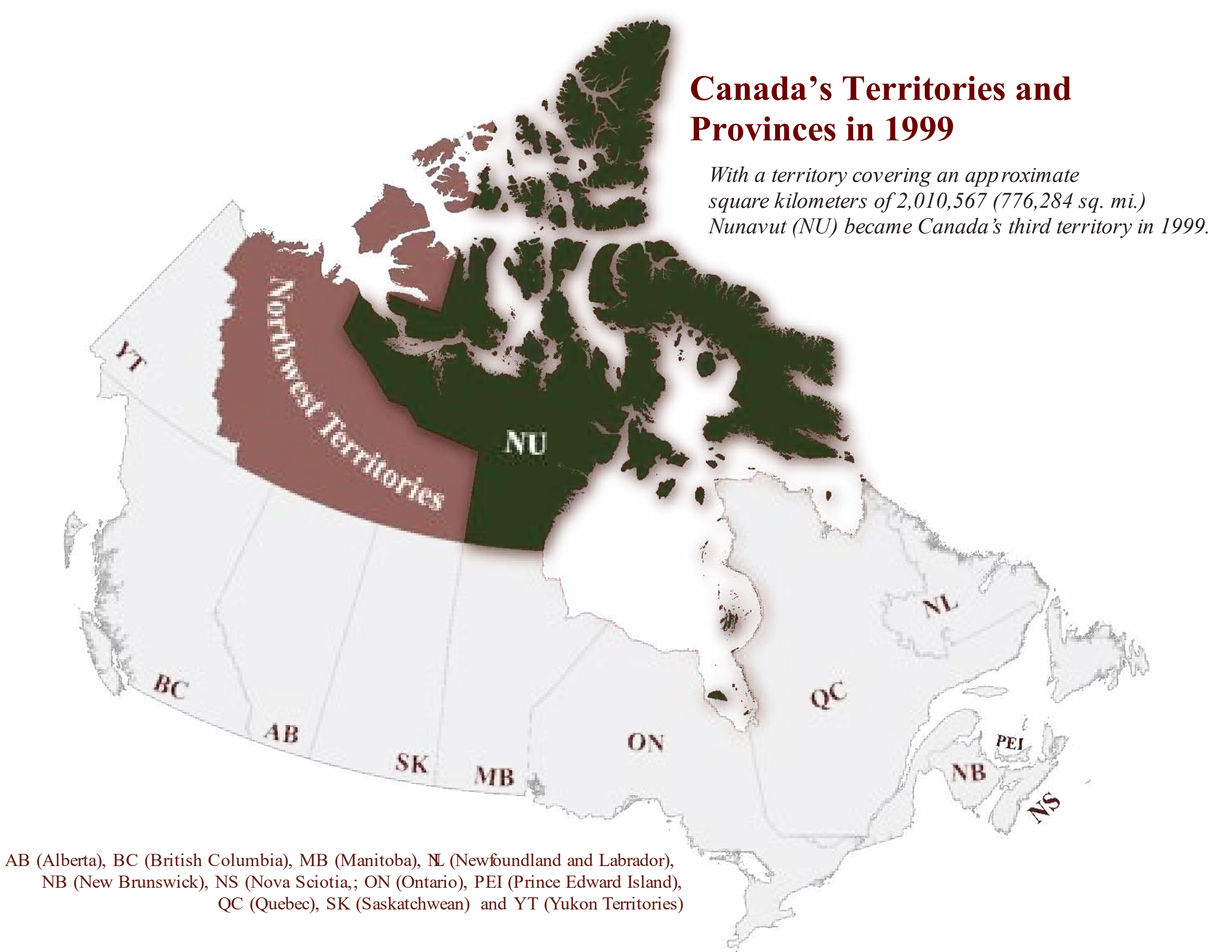


Map 8: Northwest Territories in 1980s adapted from the Territorial Evolution Map published in 2006 by the Natural Resources Canada[23].

These maps were of vital importance to Inuit communities when the legitimacy of their land claims came into question in the 1970s. Hence, in 1974 Freeman used PGIS throughout the meetings that discussed Inuit concerns regarding hydrocarbon drilling activities occurring within

[23] URL https://open.canada.ca/data/en/dataset/7d6f98d4-5106-54dc-850c-d199c46960d6

their western traditional harvesting areas. Such discussions subsequently enabled the Federal Government in 1976 to acknowledge the submitted Western Arctic land claims. Such claims in turn gave rise to the establishment of the 1984 Inuvialuit Final Agreement with a mandate of preserving Inuvialuit cultural inheritance and protect the Arctic biodiversity. Together while also enhancing the participation of Inuvialuit in the economic growth of the Canadian North. (Freeman, 2011; IRC, 2020)



Map 9: Geography of Nunavut, adapted from the Territorial Evolution Map published in 2006 by the Natural Resources Canada[24].

[24] URL https://open.canada.ca/data/en/dataset/7d6f98d4-5106-54dc-850c-d199c46960d6

This agreement settled *"the largest Aboriginal land claim in Canadian History"* (Freeman, 2011, p. 26). And in 1993 it resulted in the establishment of a new territory that encompassed the central and eastern territory of the Northwest Territories (Justice Canada, 1993; Freeman, 2011). Thus, Nunavut officially became Canada's third territory with an Inuit autonomous administration in 1999 (Justice Canada, 1993). This outcome in turn demonstrates how *Indigenous participatory mapping* can help curtail cartographic erasure. But Terry Tobias (2000, 2009) in his Guide to Land Use and Occupancy Mapping, cautions that for such geo-transformation to bear successful results, it is imperative that trust between the mapping expert and the Indigenous knowledge keepers coexist through the whole duration of the map biography process.

Thus, the adaptive mapping processes should have a good comprehension of how the nation records its oral history prior to commencing their work. (Tobias, 2000, 2009) This helps ensure that the adaptive processes capture and document the narratives of Indigenous knowledge in a manner that *"minimizes the probability that it will be dismissed or disregarded"* (Tobias, 2000, p. 20). In this regard, the voices of not only the participants but also that of the larger community should be, need to be and are required to be respected. The process should also allow them to share their awareness of their cultural territory at their own pace and in a safe space that validates the value of their knowledge, experiences, language, and ancestry. Hence, Tobias urges that communication among the researchers, consultants, participants, and the community should neither be limited to nor stop once the data associated with land-use practices and occupancy are fully documented on the paper-based maps. (Tobias, 2000, 2009)

In this regard to ensure consistency and integrity for both data and narratives, communication should be reciprocal, consistent, and continuous throughout the processes of data planning, design, collection, management, and communication. Consistency will minimise any errors arising from the geo-mapping transformation of data and transcribed narratives. This allows for a degree of flexibility so that the standardized mapping concepts can organically adapt and accommodate a diversity of Indigenous identities, concepts, and knowledge. (Tobias, 2000, 2009) In doing so, Cartography would eventually metamorphosized the ghost of Doctrine of Discovery:*terra nullius* inheritance into one that signifies the spatial context of Indigenous cultural landscapes in their entirety.

And recognizes and reinforces the existence of time immemorial Histories prior to colonial contact.

2.3 Indigenizing Eurocentric Geographic Feature Elements:

In view of the accomplishments achieved by the Inuit land claims of the 70s and 80s, Land use and Occupancy mapping coupled with PGIS has become a successful and widely applied methodology for Indigenous Nations to assert their legitimacy as related to inherited rights and the overseeing of resourced areas within their territories (Berkes, *et. al*, 1994; Chapin, *et. al*, 2005; Belshaw, 2005; Tobias, 2000, 2009; Freeman, 2011; Engel, 2015; Mackenzie, *et. al,* 2017). However, notwithstanding the ground gained in tenure and subsistence recognition through the incorporation of Indigenous land-based expertise, GIS still articulates the Indigenous landscape and knowledge based upon Eurocentric interpretations of space and place.

The symbology applied to represent land use activities are still dependent upon the rigidity of regulated and structured western land-use planning design models. (Pearce, *et. al*, 2008; Eades, 2010; Engel, 2015; Corbett, *et. al*, 2016; McIlwraith, *et. al*, 2015; McGurk, 2018; TRCGS, 2018; Rose-Redwood, 2020) Thus, the digital narrative that is portrayed, although Indigenous in content is still shaped as a representation of the dominant culture (Eades, 2010; McGurk, 2018). Therefore, from the perspective of Indigenous cultural recovery, the GIS Eurocentric design concepts still failed to provide Indigenous people with the necessary tools to preserve their respective oral inter-generational cultural narratives and identity histories. The Indigenous ancestral cultural territory, its spatial landscape does not encompass only living for sustenance. (Martin, *et. al*, 2008; Davidson-Hunt, 2010; Smith, 2013; TRCGS, 2018)

But it also constitutes an intrinsically fluid living presence of social interactions among people, tribes, and nations. Such stories are visualized through engravings or pictographs and conceptualized through a diverse suite of languages. (Mazur, 1983; Harley, *et. al*, 1987; Crampton, 2009a). Thus, to continue decolonizing the concepts of t*erra nullius*, the design cartographic format had to reimage itself by indigenizing PGIS design tools as well. Such a resurgence was facilitated by twenty-first century technological advancements in the worlds of digital programming and communication, and web applications. (Junker, *et. al,* 2008; Crampton, 2009b; Eades, 2010; Jancewicz, *et. al*, 2011; Caquard, 2013; Corbett, *et. al*, 2016; McGurk, *et. al*, 2020)

Hence, with regard to cartographic orthography, limitations in displaying language characters in accordance with the written Indigenous linguistic aesthetic were overcome when the font designers developed a standard machine-based language. This Unicode language consisted of 65,556 characters, where the non-English speakers gained access to a diverse suite of font-types capable of handling distinct typography (Wikipedia, 2021a). The *"Aboriginal (Sans) Serif Unicode"* orthography font that was developed by Chris Harvey, a Canadian linguistic scholar, represents an example of such distinctive typography. Harvey designed his Unicode font in compliance with the Unified Canadian Aboriginal Syllabics (UCAS). The syllabic symbols represented in this font style is based on James Evans linguistic work and who was a nineteenth century missionary that cataloged different Indigenous phonetic terminologies. (Harvey, 2020)

However, Harvey (2020) in collaboration with *"Native language speakers and linguists"* from a diverse suite of Indigenous Nations, continued to enlarge (augmenting additional characters) and improve the character' metrics and glyphs, accordingly. Since the Unicode system is compatible with a diverse suite of operating applications and because character limit is non-restrictive, Harvey (2020) was also able to develop individual Unicode typefaces for specific Indigenous phonetic languages. Together with the above outlined generic font type, he provides five[25] distinct native language families. The Inuit Nation embraced such ethnographic concepts to their fullest. This because through a Heritage Trust, Eurocentric place names ethnography are now instead being Indigenized in both Inuktitut Titirausiit (standardized Inuktitut) syllabics and Inuktitut phonetic language.

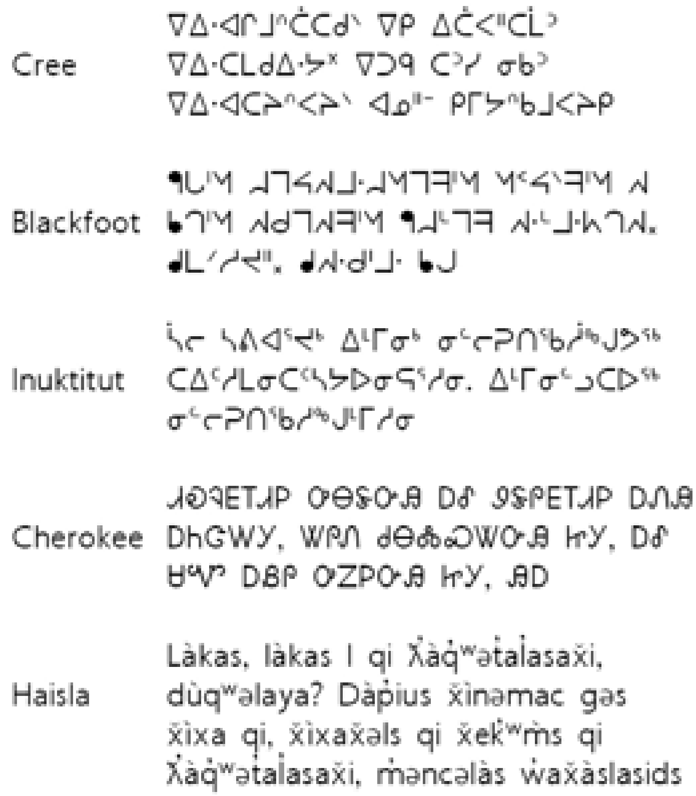


Figure 5: A snapshot of the Aboriginal Sans Unicode typeface font developed by Chris Harvey, (URL https://www.languagegeek.com/font/abfont/absans.html).

And the project has already digitally mapped the traditional Inuit territorial names for 60 regional zones on paper-based maps. This project has also an online web-format component in the form of interactive charts. Each digital point feature class provides a series of information relative to the mapped name, such as, the type of feature it represents and a description/meaning behind its Inuktitut Titirausiit syllabics. As for the web-based maps, the project so far has been

[25] Algonquian (Cree, Ojibway, Naskapi) and Inuktitut, Dakelh (Carrier Dene), Blackfoot, Dene and Cherokee linguist family fonts (Harvey, 2020).

able to geo-reference the traditional names for 19 regional zones. This endeavour was carried out in collaboration with Inuit Elders and with a vision of georeferencing the place names in Inuktitut for the whole extent of the Nunavut territory. (IHT, 2016)

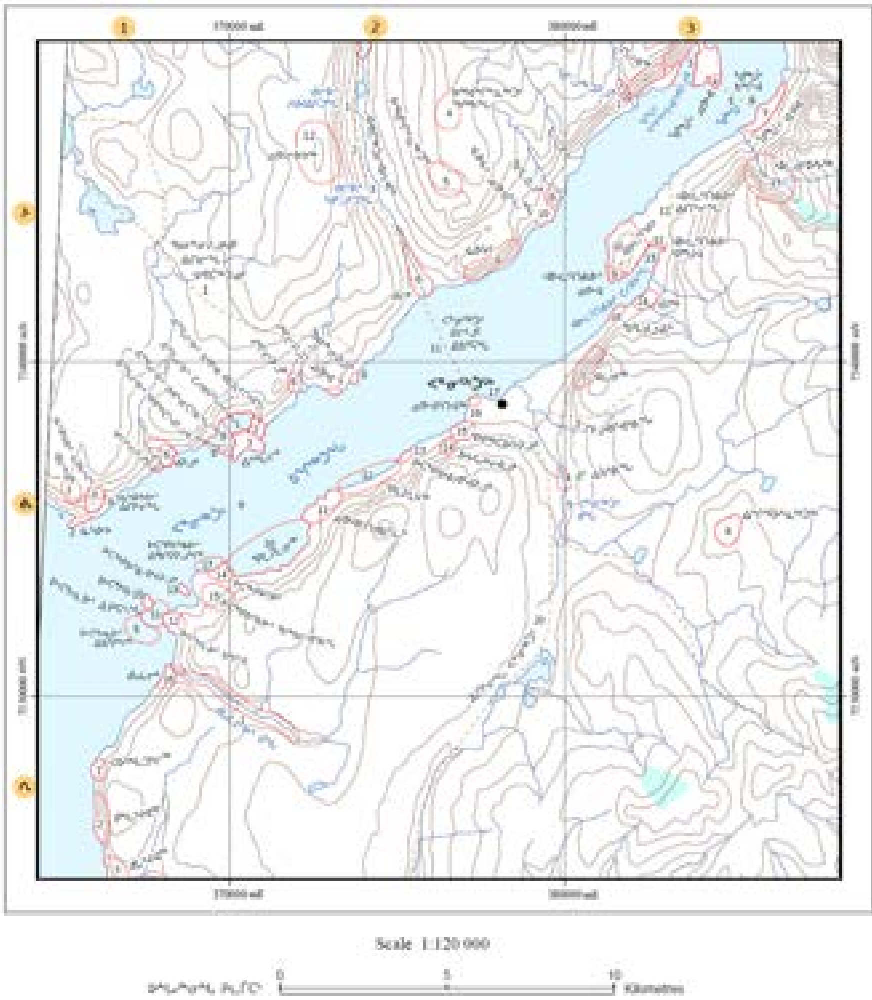


Figure 6: Snapshot of the NTS NU26I_Pangnirtung created through the Inuit Heritage Trust Place Names Program. Place names on the map are in Inuktitut Titirausiit syllabics, (URL http://ihti.ca/eng/place-names/pn-seri.html).

The Trust is also working with the relevant governing bodies so that these Inuktitut names become legalised and officially recognised by the Canadian Federal Government (IHT, 2016). With respect to cartographic symbology, GIS platforms offer its users 2-dimensional and 3-dimensional spatial environments that support an array of digital image file formats. These graphic images and their design proprietaries are either constituent to a dot matrix data structure (raster) that is based upon a rectangular grid of pixels and/or a vector-linear based graphical illustration which are shape composites. (Lillesand, *et. al*, 2007; Mitchell, 2009; Ormsby, *et. al,* 2010; Clemmer, 2013) Hence, these structural systems associate graphic images in accordance with their pixels size, shape geometry and geo-plane (latitude, longitude, altitude, direction).

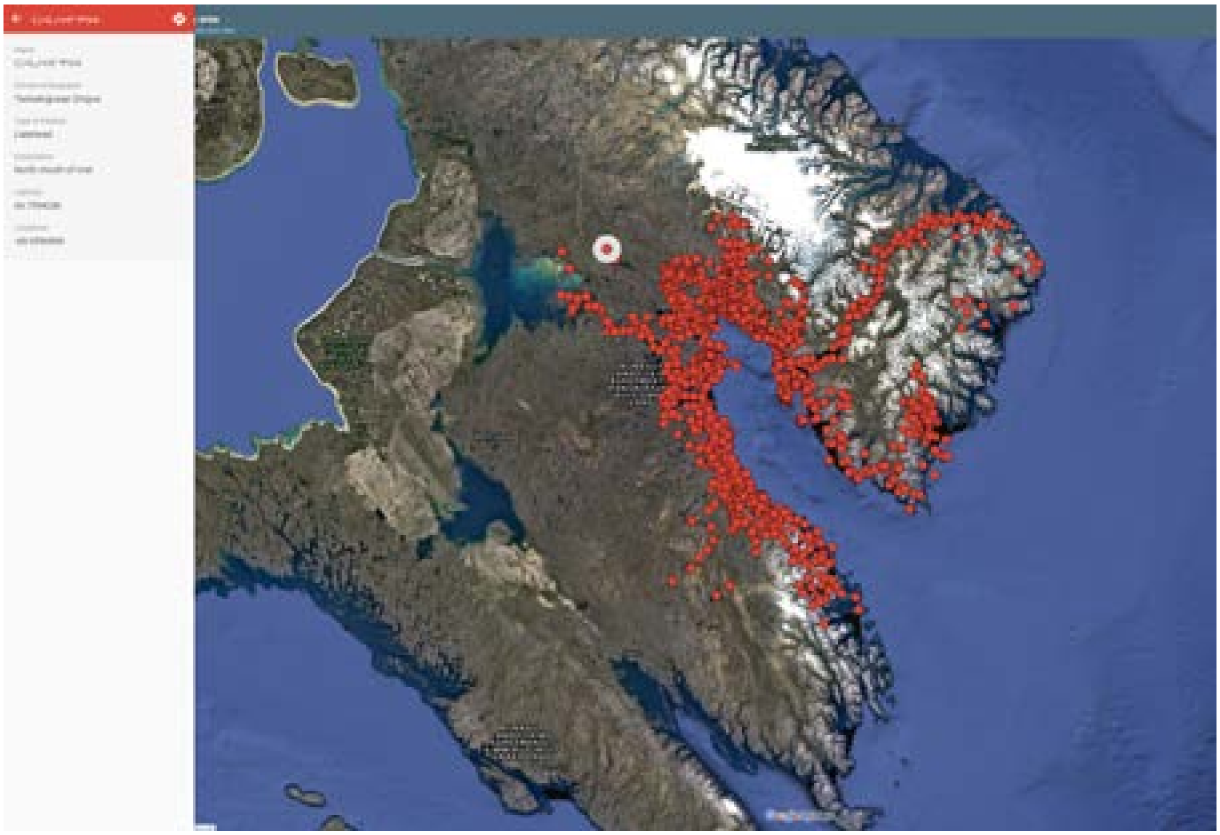


Figure 7: Screenshot of the online interactive Google MyMaps Places Names for Pangirtung. When the map marker is clicked a left-hand sidebar is activated and with supplementary info on the georeferenced place name.

Such an association enhances the process of editing the map marker symbology - color scheme, metrics (size, stroke, orientation) and positioning. Moreover, these image file formats, and their systems also incorporate decompression algorithms that accelerate their display and the uploading progression on machine-based operating systems and cyber web infrastructure. (Peterson, 2009; Wikipedia, 2021b) This ability makes them an ideal system to work with when the graphic designer creates libraries of graphic illustrations. And, GIS platforms and applications have embraced such versatility. (Lillesand, *et. al*, 2007; Mitchell, 2009; Ormsby, *et. al*, 2010; Clemmer, 2013) By pre-loading libraries of image files associated with an array of industries as part of the programming structure of the application (Mitchell, 2009; Ormsby, *et. al*, 2010; Clemmer, 2013).

However, from such libraries the constituent of cartographic erasure emerges yet again. Because these are oriented to cater the needs of Eurocentric priorities and values, such as utility companies, national security, business, transportation and so forth. (Peterson, 2009; Ormsby, *et. al*, 2010; Clemmer, 2013) Thus, the symbology has yet to fully characterize the Indigenous culture, myths, stories and land and water practices. To help address such lacuna, the University of Victoria in British Columbia, through its Ethnographic Mapping Lab, has worked with a graphic designer to create a set of Indigenous map markers.

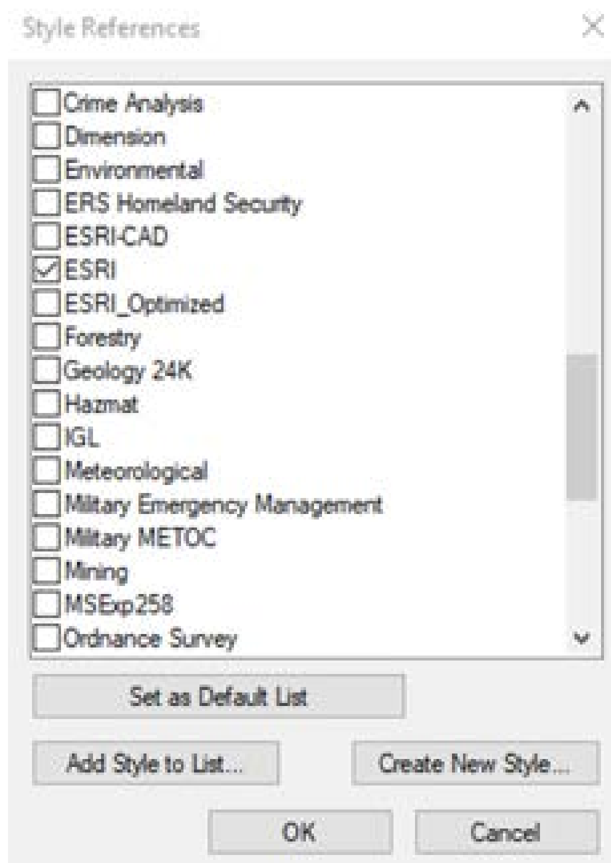


Figure 8: ESRI ArcMap Symbol Style References constitutes of pre-loaded symbol palette libraries in relation their geographical feature types. These are accessible through the Symbol Selector window which opens ups when the map marker symbol is either clicked from the Table of Contents and/or the Layer Properties dialog box.

The design protocols used to create this set are in conformity with Google's map icon design guidelines which facilitates compatibility across operating systems. And, to "*be sufficiently generic for use by a broad range of communities and cultural contexts"* (EML, 2020). Eight[26] icon packages were designed that symbolize Indigenous contemporary and historical eco-cultural knowledge and practices. But that also focus on depicting physiological features (such as

[26] Resources, Markers, Cultural/Sacred Sites, commercial/Industrial, Occupancy, Material, Activities, Geographical Features.

mountains, waterfalls) together with a diverse suite of biodiversity resources. In terms of image file format, the artists opted for the Portable Network Graphics (.png) raster-graphic system which supports full-color non-/palette-based RGB, RGBA, CMYK and grayscale images. An embedded alpha channel sets the image background as transparent. (Peterson, 2009; Ormsby, *et. al*, 2010; Clemmer, 2013; EML, 2020)

Figure 9: A map marker image icon set which was designed by a graphic artist in collaboration with the Ethnographic Mapping Lab situated at the University of Victoria in British Columbia, (URL https://www.uvic.ca/socialsciences/ethnographicmapping/resources/indigenous-mapping-icons/index.php).

Map designers can now download the created sets either in full-colour scheme and/or as five[27] distinct colour schemes. Additionally, to enhance the exchange of these sets, the icon packages have been made available to the public as open-freeware sourced material under the Creative Commons Attribution 4.0 International License. (EML, 2020) The use of these Indigenous land-water-use representative image map markers is gradually gaining momentum within the Indigenous communities. Particularly for those nations whose territories fall within the provincial boundaries of British Columbia. Thus, for example, the Ethnographic Mapping Lab

[27] Blue, Green, Purple, Red and Yellow.

applied this Indigenized symbology to restore the cultural histories of Vancouver's coastal Indigenous communities, the Salish people. (EML, 2020)

Such efforts focused on Salish oral histories that were documented and recorded by Beryl Cryer[28] in the 1930s as a series of newspaper articles/journals. The lab produced a user-friendly online interactive map using Google MyMaps interface, and the ancestral territory of the coastal Salish people as its focus. The latter focused on the southeastern land and coastline of Vancouver Island, the Gulf Islands, and the lower watershed of the Fraser River including its surrounding environs. The resulting map at once reinforces the legitimacy of occupancy through summaries that describe and narrate the time immemorial relationship between men, land, water, and their respective natural resources, but also revitalises the Hul'qumi'num language by naming sites and locations, accordingly. (EML, 2020)

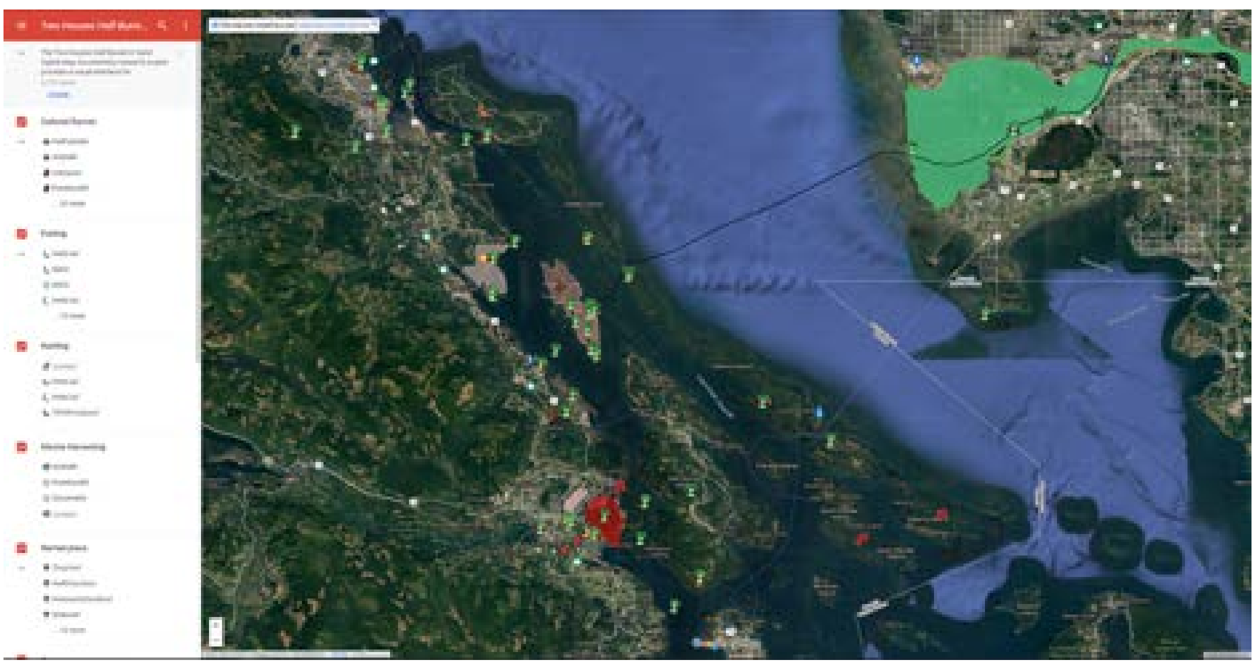


Figure 10: The Two Houses Half-Buried in Sand Digital Map depicts cultural knowledge captured by Beryl Cryer in 1930.

[28] *Two Houses Half-buried in Sand:* Oral Traditions of the Hul'q'umi'num' Coast Salish of Kuper Island and Vancouver Island.

Therefore, with the development of such computer-based orthographic typeface fonts and Indigenized image map markers, Indigenous Nations are being equipped with additional counter-mapping PGIS tools. Tools that each Indigenous community with the aid of local Elders, and land-water-knowledge keepers, can continue to ascertain their contemporary and ancestral inheritance upon the inherited cultural territory. Such activities are achieved through the process of reclamation and resurgence. Of not only the place names in accordance with the spoken Indigenous phonetical language but also each Nations spatial organisation, true depiction and interpretation of their spatial tenure. Both approaches are critical and a direct portrayal of each community's eco-cultural knowledge and history.

CHAPTER 3, *Materials and Methods*

3.1 Research Processes:

3.1.1 Indigenous-*traditional* method, *learning about the land and its people*

As outlined by the previous chapter, the environmental knowledge of Indigenous people is a direct representation of a timeless relationship which has been forged and nourished between Nature's life cycle, topographical physiologies, and humanity. A relationship which not only brought forth but also established narratives and histories that are diverse in nature. Such diversity originates from the distinct physiologies (topographical and hydrological) of the landscape which the respective ancestral cultures have embraced since time immemorial. Hence, that represent a geographical dependency through which geospatial digital information technologies have enabled inherited environmental knowledge to be transposed as geo-spatial vector-based data.

In this respect, the spatial and temporal cartographical documentation of observations associated with hydropower impacts as understood by affected northern Indigenous communities embrace the principles of Participatory GIS integrated methodology. Through overlays and/or paper maps, participatory collaboration captures any spatial changes experienced by the inherited land and water practices relative to the hydro-impacted biophysical environment. Hence, the geo-transformation of the ancestral environmental knowledge and observations at local levels embrace the processes applied by the *'Map Biography Model (MBM)'*. This model which Terry Tobias (2000, 2009) outlines has been adopted since its conception to affirm Indigenous land-use and occupancy.

3.1.1.1 *Map Biography Model (MBM)*

This research's MBM was designed in line with Tobias recommendations as depicted within his *Land Use and Occupancy Mapping Guide* (Tobias, 2000, p. 10). With respect to this,

Figure 11 outlines and organises the participatory mapping processes into four distinctive phases: phases which were revealed in an introductory meeting with the host northern Cree community – *Nisicawayāsihk,* Nelson House. The intent of this meeting was to communicate not only the objectives of my research but also within the context of the meeting to prompt the self-identification procedure. In so doing, the participating community members identified their interest in participating in the envisaged map biography collaboration. In subsequent meetings, interviews consisted of face-to-face, semi-structured and informal gatherings within which, with the aid of paper-based topographical maps and/or digital mapping platforms, each knowledge keeper would directly draw on clear overlays or delineate their respective land/water-based knowledge, narratives, and experiences.

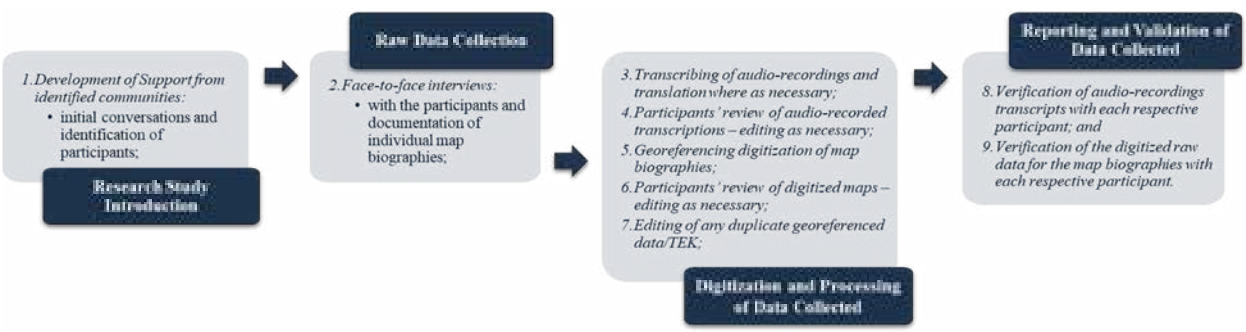


Figure 11: The research's Map Biography Model (MBM).

The gatherings-in-question were also envisaged to snowball, and thus enabled participant to identify other potential participants that might contribute to this project. Hence, the model enabled me to engage with at least ten knowledge keepers from *Nisicawayāsihk* Cree Nation. Moreover, to minimize the collection of a one-directional sample, the research with the aid of a key community liaison (Dr. Ramona Neckoway) solicitated a representative multi-directional sample from across the ancestral cultural territory of *Nisicawayāsihk*. Once the mapping interviews were completed, the MBM moved into the next processing phase, within which any collected knowledge would be converted and transposed into digital geographical vector-based features.

In order, to complement written notes taken during the gatherings, and to ensure that the shared knowledge was accurately geographically captured, the sessions were all audio-recorded and transcribed in their entirety. However, if any of the engaged knowledge keepers were uneasy about the recording equipment, written notes were taken as reflected in the Informed Consent forms. Furthermore, with regards to the validation processes, the MBM also reflected the importance of additional follow-up meetings within which the collected knowledge was reviewed by the collaborators to mitigate against any inaccuracies. This procedure also allowed for any additional editing and corrections of the visualized mapped data and to address any concerns.

As an acknowledgement of their shared expertise, each participating knowledge keeper was provided with a final personalised copy of a map that reflected their respective shared knowledge, experiences, and observations.

3.1.1.2 *The people and territory of Nisicawayāsihk*

My comprehension of Hydropower and its implications for Manitoba's northern Indigenous Nations, began during evenings spent quietly listening to the life-time experiences of Jackson Osborne on the ancestral cultural territory of *Pimicikamak* (Cross Lake Cree Nation). His profound narrative recalled childhood memories of boating towards his family's campsite with his father, who during such travels taught him how to comprehend the various characteristics of *Nipi* and to identify important shoreline features. However, when the impacts of hydro development took hold of the conservations, the nature of his narratives shared became engulfed with a sense of concern and distress. Mr. Osborne explained that the erosion of shorelines and the flooded waterways of his ancestral cultural landscape are wearing away the Indigenous cultural identity of his community.

Because water has become unsafe to boat or even to swim in because of hydro-related flooding, sites of cultural importance were submerged and accessibility to campsites by water is becoming increasingly difficult. This situation is not only disconnecting the knowledge keepers from their cultural landscape, but also limiting the transmission of oral histories to younger generations. The tonality of this narrative embraces and resonates across Manitoba's northern Indigenous cultural landscape. A tonality of pain and sense of loss which during my first intensive 11-day trip across this region, left me overwhelmed. Those highly emotionally charged moments taught me as an attentive listener and that, from an Indigenous perspective, waterways together with their surrounding landscapes, are not mere objects.

The simple act of boating to and from the respective ancestral gathering grounds used to create such an intimate bond between *Nipi* and its people. Thus, the interspersed complex of intrinsic hydrological network is the epicentre and essence of the northern *nethowe-ithiniwak* (cree-speaking) nations' cultural and spiritual identity, histories, and environmental inheritance. I now have a better understanding of the importance of Nipi as a cultural epicentre. This, in part, reflects the 4 years, I spent visiting the impacted physiologies (land and waterways) of the *Nisicawayāsihk* cultural landscape. These visits did not limit themselves to dissecting the former and contemporary history of hydro-electrical development across Manitoba's North. But they also constituted a full cultural immersion that was guided and orchestrated by the inherited narratives of the *Nisicawayāsihk*.

This full cultural immersion completely deconstructed the space enclosed by walls, floor, ceiling, and door, within which Map Biographies (MB) are required to be collected. The participants (the interviewed community's knowledge-keepers and Elders), and also the community (the people) and *Nisicawayāsihk* as a whole entity, became my educators and the classrooms. Thus, through the unique storytelling abilities of the *asiniskaw-ithiniwak*[1], all the following became the backdrop for my learning:

- *many informal gatherings:* around campfires, hiking across historical homesteads, visiting site of cultural importance and the simple act of just sitting looking over *Nipi*. Where I introduced myself as an individual to this cultural ancestry but also listened attentively to the people reminiscing about childhood anecdotes and the stories heard during their childhood out on the land. Listening quietly to the recollections of prominent landscape features - land and water - which gave birth to myths, histories, and names. And, to the experiences regrading how hydro development transformed either these into a shadow of their former selves or were eradicated completely.
- *many informal discussions on heritage:* A group of Elders generously invested time in sharing histories about *Nisicawayāsihk* and drawing from their own personal histories, orally transmitted by their family, provided their interpretation and understanding of the spatial extent of *Nisicawayāsihk* ancestral cultural landscape prior colonial contact. They explained how the ancestral ground not only provided the necessary sustenance but were also the epicenter for instilled life-long lessons. All the constituents (ecosystems, plants, and wildlife) of a *Nisicawayāsihk* spatial context were defined by the spiritual essence, existence, and identity of the Rocky Cree people, *asiniskaw-ithiniwak.* We had

[1] Rocky Cree people.

discussions surrounding the importance of the *Nethetho*, Cree, language, which provided guidance on the meaning and written aspect of words in the 'TH' phonetics and syllabics dialect. Sessions within which Elder A. Wood gifted me with a representation of my name in 'TH' syllabics. Together we viewed the historical photos depicting *Nisicawayāsihk* which not only facilitated the geomapping process but also enriched conversations about such histories.

- *boating activities within flooded lakes and watercourse:* During such travels, companions recalled how *Nipi,* water, through its watercourses transported the clusters of families to and from their ancestral trapping, hunting, harvesting, and fishing grounds. We talked about the importance of shorelines that forged an intricate deep emotional and spiritual bond between humans and nature. And which spoke volumes during those silent moments of recollections. I experienced firsthand not only the high-water level conditions but also being surrounded by floating debris which most of the time was invisible to the naked eye.
- *long drives within the impacted landscape:* The essence of the land took precedence during these drives. Being silent, observing the physiologies of the land and listening to what its constituents' parts shared with me, such experiences also helped me deconstruct how the hydro infrastructure imposes and dominates this landscape.
- *Aerial flyovers along the impacted hydrology:* During such experiences the essence and living entity of *Nipi* was free to express itself. Which touched me on a deep emotional level that I never imagined would even be possible. The visual extent of the flooding is overwhelming to the point that it silenced my conversation with the pilot. I experienced a sense of loss, emptiness and hurt. The landscape bleeds, - both forest and water are continuously flooded.

This, the outlined diverse and distinct backdrops contextualize the oral' histories, experiences, and observations that were shared with me and within which each distinctive voice emerged. The spatial narrative depicted within this document evolved and emerged organically, collectively, at its own space. It was shaped by *Nisicawayāsihk* and its people, through their inherited knowledge and lived experiences. Within these contextual backdrops a diverse suite of visual media (paper-based maps, digital online aerial imagery systems and historical aerial photographs) was applied to capture land/water-based knowledge, ancestral histories, experiences, and spatial adaptation. In between visits, I continued to invest extensive time in archival cartographical research to comprehend the geography in-question.

Such geographical knowledge aided and facilitated the drawing/mapping process with the participants. I validated the mapped content as outlined in the previous section during a series of informal follow-up meetings. And once all the designed maps were edited in accordance with the feedback I received, the thesis structure together with its outcomes and results was presented to the Elders of *Nisicawayāsihk*. This group of Elders with whom I closely collaborated on this research was a constant source of inspiration. Inspiration projecting their wisdom which many a times helped me in moments of uncertainties and when I lacked cartographical inspiration. This group of collaborators, and their cultural landscapes were an integral part of the design process that gave rise to the maps contained in this thesis.

In this process I also included Indigenous icons and labelled maps with the 'TH' Cree dialect (language and syllabics). But such an intent was also reflected within the text of this document. When drawing from this Indigenous knowledge, the references of names particularly those related to water features were also indicated by their respective Cree word and syllabics. This journey not only enriched my full immersion experience together with the personal relationships I established within *Nisicawayāsihk,* but also added a new whole dynamic to better understand the Indigenous cultural identity.

3.1.2 Western-*scientific* method, *from oral-text-photographic knowledge to geographical map-elements*

Computer-aided technologies, *Geographic Information Systems (GIS),* offer their users an array of tools that allow for the capture and documentation of Traditional Environmental Knowledge (TEK), as audio, text and photographic medium. This information was not only stored and organised into a digital archive but was also analysed as a diverse suite of spatial and temporal vector-based geo-grounded digital features. Thus, this project's western-*scientific* methodology grounded itself in the principles and process of *GIS analysis*. Processes, that allow any georeferenced feature classes to be broken down into elements at micro-level, where one can investigate, examine, and identify any *geographical patterns* and *relationships* exhibited between different classes of geo-features.

3.1.2.1 *Organization of collected material and data*

A *file-system* structured workspace environment was designed to facilitate both the organisational and the geo-processing processes of the acquired material (that is, vector-textural-photographic), where the administration of the designed system occurred within a principal upper-level project folder housing an archived catalogue of literature (such as, textual, photographic visuals, historical cartographical maps, etc.) and as geo-spatially derived digital data. To aid in their organisation, each was cataloged into a data library workbook in accordance to their source, data-type and data-of-download. Additionally, to facilitate the visualisation of the photographic material, during follow-up collaborative sessions, these were subsequently cataloged into a presentational slide-interface platform.

On the other hand, a *GIS Geodatabase* environment helped store and organise the spatial vector/raster-based datasets into theme-based containers. Geodatabase systems provide a controlled environment for geo-spatial tools that are used to execute the geo-processing analysis processes. Its structure also facilitates user-end accessibility and sharing abilities with any third parties beyond the main user handling the data. (Ormsby *et. al*, 2010) A *'Metadata'* catalogue recorded their source, date depictions any descriptions, and geographical projections of the geo-spatial features (vector & raster). Such functionality was enabled using applied geospatial platforms, specifically ESRI ArcGIS ArcCatalog[2] application. In line with the requirements of the Natural Resources of Canada (2018), this *'Metadata'* information conforms to the North American Profile (NAP) ISO 19115.

The established *coordinate system* that was used here was the Northern American Datum (NAD) 1983, Projection Zones 14N and 15N, respectively.

3.1.2.2 *Geotagging photographic media*

Photography constitutes a graphic medium that, aids its audience to rekindle and reconnect visually with their respective ancestral heritage and with personal landscape backdrops. These represent backdrops, which might still exist, but which might also have been changed or even destroyed by industry. With respect to this, photographic imagery constitutes a reflection and a representation of *'snapshots'* of moments as perceived by the viewer at that specific time and space. With the aid of GIS, along with associated times (date/month/year) and geographical locations (place/country), these permit their viewer to illustrate their then/current narratives in the

[2] To view the properties of the any vector/raster features under the Catalog tree, select a listed feature and displayed on the right viewing panel. This panel will provide three options, and one of these is the Description tab. From it the Metadata of the selected feature is accessed and edited.

present day. That is, the representation of spatial and temporal change. (Mitchell, 2009; Clemmer, 2013).

A *'Geotagging'* technique was conducted whereby the digital association of the geographical locations and positions to the historic photographed landscapes, respectively. To locate historical photographs depicting the landscape in-question the following online photographic digital archives, not limited to were reviewed:

→ Photographic Archival Database, University of Manitoba, Libraries Online Digital Collection;

→ Archives of Manitoba, Hudson Bay Company Archives;

→ National Air Photo Library (NAPL), Natural Resources Canada Archives, Ottawa;

→ Western Canada Pictorial Index (WCPI), University of Winnipeg[3];

→ The Roman Catholic Archiepiscopal Society of Keewatin, the Pas Collection, the Centre du Patrimoine Saint-Boniface Society[4], Winnipeg, Manitoba; and

→ The United Church of Canada Digital Collections Archives[5].

Such technique stores the locational and temporal information in a metadata catalogue known as *Exchangeable image file format (Exif)*[6]. This type of file system is accessible from any type of digital photographic geospatial application through the embedded cross-platform plugin tool, *ExifTool*. However, for the photographs that are captured with a digital device (DSLr camera and mobile phones), this geotagging process is performed automatically. This is because the operative system of all digital devices supports and contains an *Exif firmware.* (Luo *et. al*, 2010; LoG, 2017)

[3] This contains numerous catalogues that contain the reproductions (slides and contact sheets) of more than 70,000 photographs, which highlight historical reflections of Western Canada.
[4] Retrieved from Société Historique de Saint-Boniface online photographic digital archive, URL https://shsb.mb.ca/?lang=en
[5] Retrieved from URL http://www.uccdigitalcollections.ca/search?query=Nelson+House
[6] It is a standard format system specifying the captured format-type for photograph (such as, PNG, JPEG, TIFF, CR2) and defines the associative metadata tags (such as, date, time, aperture settings, GPS coordinates, datum, etc.). (LoG, 2017; Wikipedia, 2020)

Therefore, the in-built and/or stand-alone Global Positioning System (GPS) receiver communicates directly with such firmware, and the temporal and locational data immediate to the capturing of the image are recorded (Luo *et. al*, 2010). However, this was not applicable to the acquired historical photographs. Despite being received digitally from the archives; their original counterparts were captured by film-based devices. Such devices did not support this GPS technology. In this regard, the geotagging process for these photos was carried out manually and within the geospatial environment of an *open-source freeware software, GeoSetter.* Its interface entailed an image-browser panel on the left-hand-side opposite to Google Maps satellite imagery (Figure 12).

The activation of the *ExifTool* within this software occurs once a desired photo that needs to be geotagged is selected from the browser panel. This tool opens a form containing six categories of metadata, and the latitude and longitude coordinates for the selected photo are, then entered manually under the *Location* tab category. Through this tab, the user has the ability also to enter the time and year when the selected photo was originally captured. However, notwithstanding these objectives, the software provides additional tools for the user to map interactively onto the embedded satellite imagery interface. This in turn is carried out through the insertion of a *'geo-marker'* that represents the location of the viewing point of the photo directly onto the imagery.

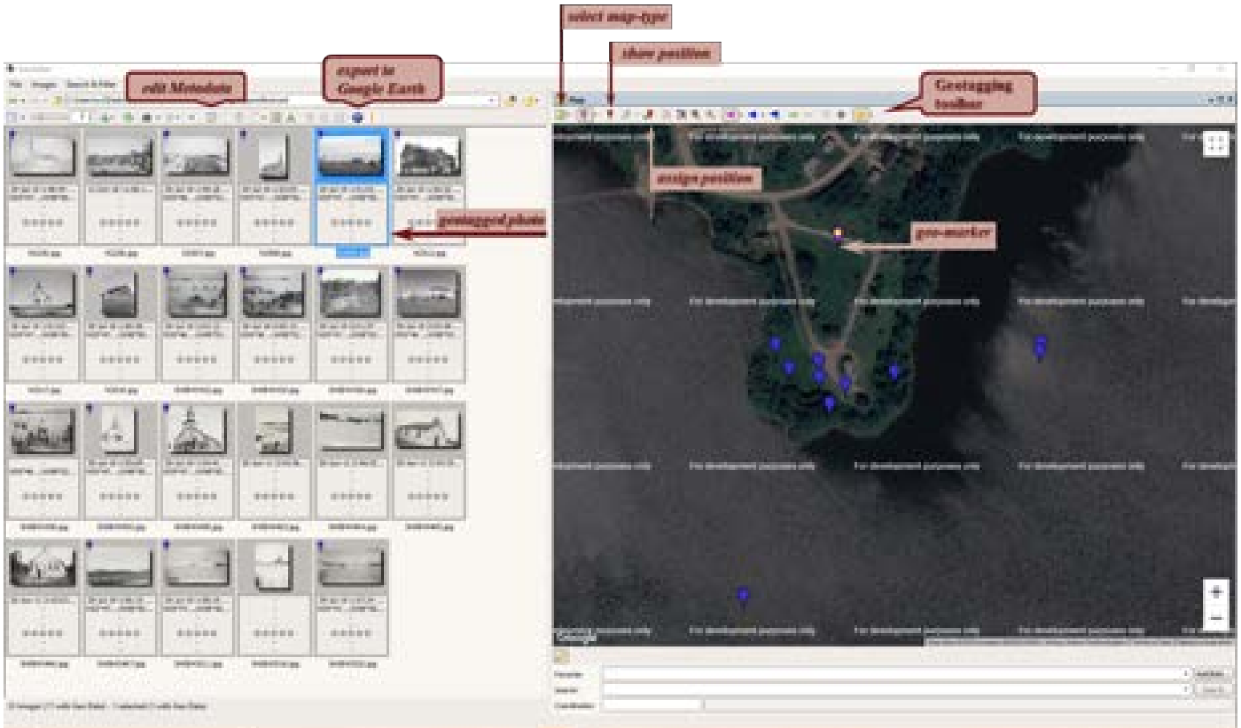


Figure 12: The interface of the GeoSetter software.

Thus, the *Show position marker* part of the *Geotagging toolbar* above the imagery interface activates the geo-marker and once positioned the *Assign position marker to selected images* button assigns it to the selected photo. The locational and temporal information becomes permanent in the *Exif* standard systems once the geotagging session is saved. Furthermore, to facilitate the share ability and the visualization of the geo-located photos digitally with the participants, these were subsequently exported from the *GeoSetter* interface as *Google Earth language product* (.kmz) for further analysis.

3.1.2.3 *Geospatial mapping representation of the TEK and historical topographical features*

Aerial imagery visualisation geographical software can explore the diverse physiognomies of Earth's landscapes (urban and rural) from different viewing points. This interaction occurs within a three-dimensional (3D) environment where the imagery captured by satellite technology is draped upon a spherical representation of the Earth's mass. This adds a degree of flexibility and versatility not only to the mapping and data validation processes but also to the editing sessions. They can thus be carried out interactively in an accessible form in the presence of audiences/participants. With respect to such capabilities, the mapping tools catered by Google's aerial imagery-based application, *Google Earth Pro*[7], utilised for the geo-mapping spatial representation of the paper-mapped Indigenous knowledge and for the historic[8] topographical features used in this project.

Earth's users are presented a two-panelled window interface, where the vector or raster-based data is visualised on a 3D spherical globe of satellite driven Earth's imagery. These are listed and contained under the virtual memory of the *Places* tab, as part of the left-hand side *Sidebar*. It functions similar to a *Windows-based operated system File Explorer*. The TEK gathered from each participant and historic characteristics were then organised into a file-system folder structure. A unique code[9] was associated with the mapped TEK, while the historic content was structured in relation to its narrator and publishing year. In turn, a summary for each map biography and/or descriptions of the historic landscape were added as part of the file-folder system through its *Properties*.

The management of their content was contained in the folders' sub-structure through their representation as geographical map features/elements.

---

[7] Google Earth *Pro* desktop version, in 2015 became an open-source freeware stand-alone desktop software (Rose, 2015), where the public together with the commercial businesses could now upload, access and interact with a diverse suite of data formats. The program supports a diverse suite of digital data formats, such as, photographs (TIFF, JPEG, GIF), rasters (VRT, MAP), vector-based data (SHP, KMZ), gps tracks (GPX, GBD, LOG), etc. (Google Earth Engine, 2020)

[8] Archival research was carried out to locate the original physiological characteristics of the affected hydrological network. Which constituted in the investment of an extensive of research time at the Archives of Manitoba, Hudson Bay Company Archives and online researching through historical archival databases (such as, archive.org, Hudson Bay Company Archives and Peel's Prairie Provinces, University of Alberta Libraries). And this to locate landscape in-question within manuscripts (journals, voyages, cartographical material) published during the exploration era (18^{th} and 19^{th} centuries) and scientific environmental assessments written in the 20^{th} century.

[9] This to safeguard any anonymity/confidentiality requests expressed from the participants.

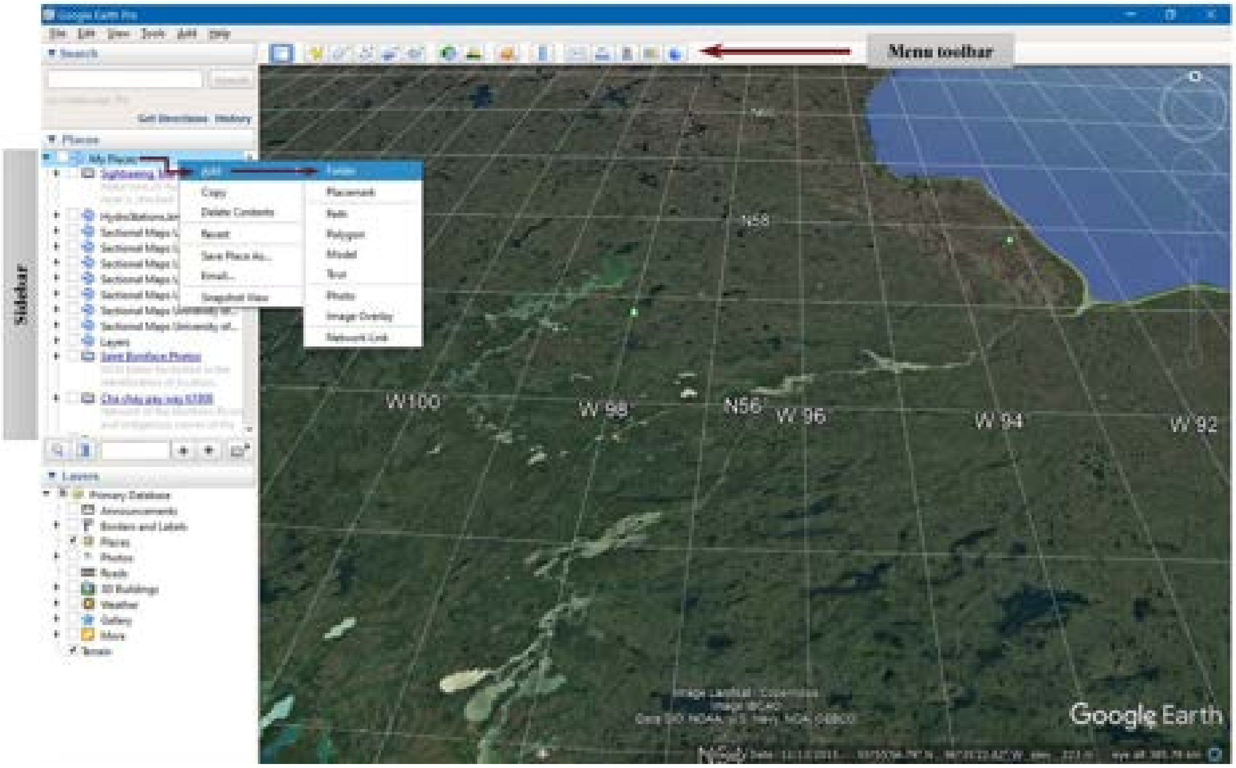


Figure 13: The interface of Google Earth Pro.

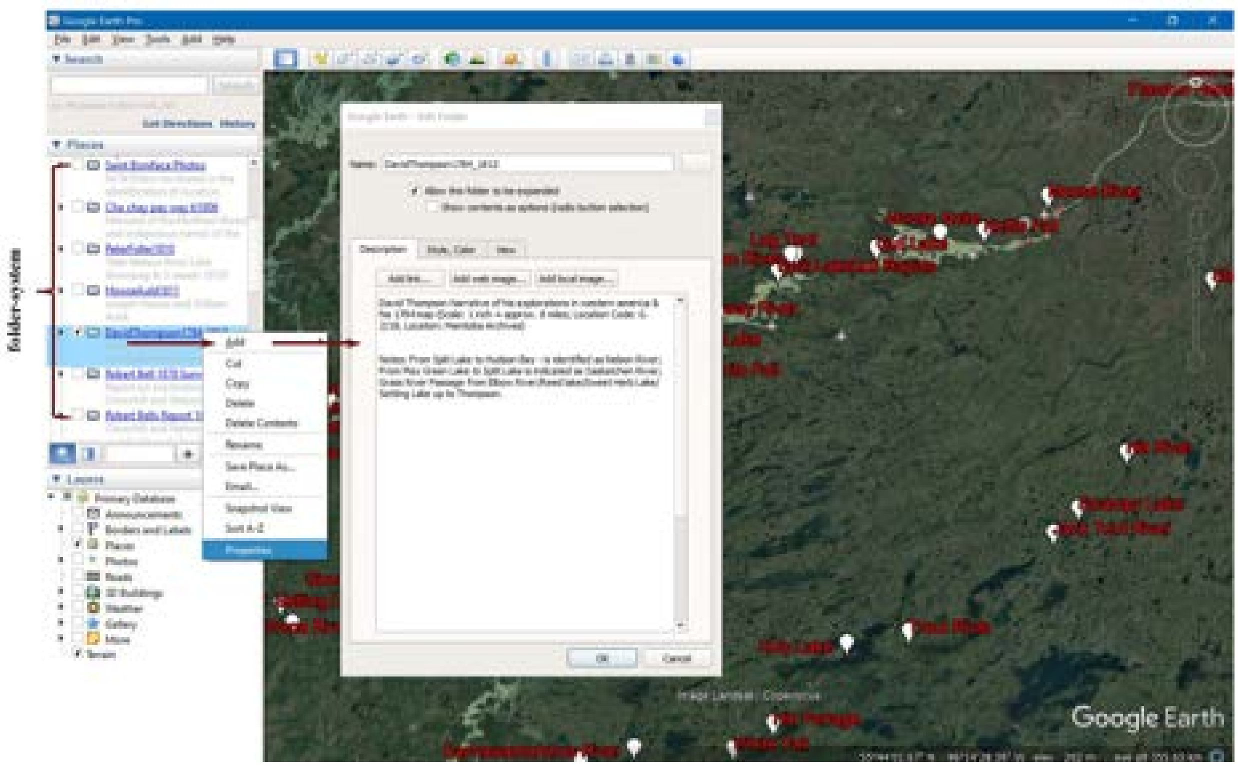


Figure 14: Description interface of Google Earth Pro.

The historic text and TEK were broken down into cartographical map elements. That is, point geo-features represented places and geographical feature names; line geo-features outlined routes/hydrological features and polygon geo-features earmarked areas of interest, activities, hydrological features etc. The *Menu toolbar* of the panel containing the 3D geospatial environment allowed for the insertions of placemarks [ ], paths [ ] and polygons [ ] onto the imagery. The *Properties* dialog window for each geo-feature allowed for the designation of labels, and the user to insert narratives as summaries together with temporal stamps. This dialog window also activated the edit processes, that is, a *yellow flashing boxes* which allowed for freedom of movement to placemarks, and the *vertices (nodes)* permitted changes onto the geometry of paths and polygons.

Any editing becomes permanent once accepted [*Ok* button] by the user. Additionally, to further accredit the Indigenous knowledge, the names of landscapes with the guidance of the Elders of the host community, were respectively represented in *Western Cree Syllabics*[10] and as *Nisicawayāsihk* spoken Cree dialect. Moreover, the Indigenous mapping icons developed by the *University of Victoria's Ethnographic Mapping Lab*[11] in British Columbia, was used to cartographically represent the shared TEK. To finalise the map layouts, all mapped geo-features were exported as an Earth's *Keyhole Markup Language*[12] (KML) file (Google Developer, 2018, 2020). Here KML is a type of file-format that uses the markup language, *Extensible Markup Language* (XML), to express and visualise Google Earth *Pro* mapped geo-features within the geographical environment of GIS platforms (Google Developer, 2018, 2020).

[10] The Aboriginal Unicode Font package containing the Syllabics characters (Regular, Italic, Bold and Bold Italic) was downloaded through the Algonquian Dictionaries Online Project, URL https://resources.atlas-ling.ca/fonts/?lang=en

[11] The graphic artist James Gray designed this cartographical map icon package under a Creative Commons Attribution International License.

[12] The environment of Google Earth Pro's *Places* tab, part of its *Sidebar interface,* constitutes a virtual environment. Thus, with respect to the folders and layers created under this tab, they are hosted semi-permanently on the RAM of the operative machine. Therefore, Earth's markup language (XML) permanently saves the folders and layers as sharable KML files.

This type of file-format facilitates the conversion of the KML files to shapefiles using the open-sourced freeware *Quantum GIS* (QGIS) application. This process allows for the inheritance of any associated attributes (descriptions, notes, etc.) when the .kml file-extension is changed to .shp. Additionally, the exported KML files inherit Google's Geographical Coordinate System, the Western Geographic System (WGS) 1984. Thus, the *Projection and Transformation tool* part of the *Data Management* Toolbox package of ESRI ArcMap GIS application transformed this system into the NAD 1983 14N (ESRI, 2016a).

3.1.2.4 *Mapping spatial and temporal changes for the impacted hydrology*

To establish and identify the original profile of the impact hydrological network, extensive archival research was carried out to locate the first editions of the National *Topographical Survey (NTS) Sheets,* (at a scale of 1:50,000, 1:250,000). These topographical maps were published between 1950s and 1970s. In this regard, the Map & Data libraries of various Canadian Universities were respectively contacted. And, the necessary sheets were acquired as digital files (.jpeg/.pdf) from the respective Map departments of the University of Toronto and the University of Winnipeg. These first trigonometric sheets calculated the geographical locations in accordance with Clarke's Ellipsoid of 1866. This ellipsoid based its North American coordinates calculations on a centre that was situated in Kansas (Meade's Ranch), USA (GIS Geography, 2020).

Such calculations were projected upon the North American Datum system of 1927 (NAD27). Alas although the projection system of NAD83 constitutes the same as that of its predecessor NAD27, its geodetic datum differs considerably from that of its predecessor. (ESRI, 2016c; GIS Geography, 2020; USGS, n.d.) Thus, the NAD83's geodetic datum reflects a Reference System (1980) which acquires and calculates its coordinates from remote sensing data (terrestrial + orbital). Since the nature of these calculation reference Earth's mass centre, CRS80 ellipsoid is physically bigger than Clarke's 1866 ellipsoid. And, this leads to a datum shift between these two projection systems. (ESRI, 2016c; GIS Geography, 2020; USGS, n.d.)

Therefore, a *datum transformation,* from NAD27 to NAD83, was performed on the control points, during which the *Georeferencing* process of the acquired sheets ground of known coordinates:

→ *NTS first editions, scale 1:50,000*:
The geographic coordinates indicated at the four corners - upper left, upper right, lower right, lower left - of the map sheets were transposed as Standard UTM coordinates[13]. After conversion a distance of 226m was added to the *Northing* control points and a distance of 37m was subtracted from the *Easting* control points.

Conversion of Geographical Units

Latitude Degrees	Longitude Degrees	Standard UTM Easting	Standard UTM Northing
56°00' (N/+)	99°30' (W/-)	468815	6205978

Coordinate Conversion NAD 27 to NAD 83

$$Easting: 468815 - 37 = 468778$$

$$Northing: 6205978 + 226 = 6206204$$

Table 1: Datum transformation for the upper left corner coordinate of NTS 63O14, Ed. 1, Scale 1:50,000.

→ *NTS first editions, scale 1:250,000*:
The Online Unit Converter Form developed by the Natural Resource Canada[14], NTv2 [NAD27 to NAD83(Original)] was used to convert the geographic coordinates indicated at the four corners - upper left, upper right, lower right, lower left - of the map sheets into NAD83 UTM Zones 14N and 15N Northing (metres) Easting (metres) coordinates. The form calculates the geodetic shift automatically.

[13] An open-sources Geographic Unit Converter developed by Montana State University was applied to transpose the Degree coordinates into Standard UTM coordinates. This online converter allows the user to select the original Map Datum of the inputted coordinated, which was set to North American 1927. All transposed coordinates were tabulated in a table format. URL: http://www.rcn.montana.edu/Resources/Converter.aspx
[14] URL https://webapp.geod.nrcan.gc.ca/geod/tools-outils/ntv2.php?locale=en#DESTZONE

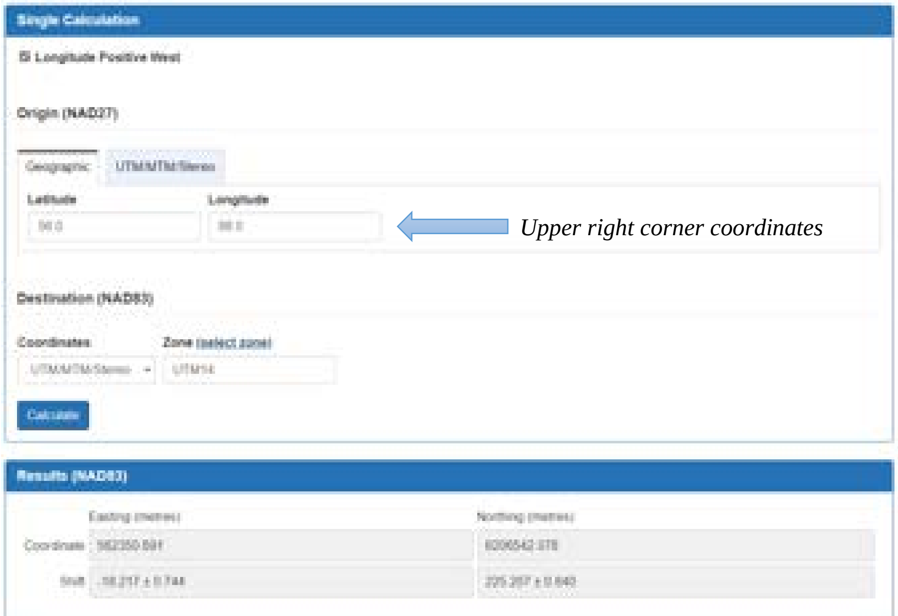


Figure 15: The online Unit Converter Form for NTS Sht 63O, Ed. 2, Scale 1:250,000.

In this regard, the georeferencing process, that is, the association of the NAD83 coordinate system within the image files of the sheets occurred within the 3D space of ESRI ArcMap application. Prior to the adding the image sheets within ESRI ArcMap application, the Coordinate System NAD 1983 14N and 15N, in accordance to the sheet being georeferenced was assigned to the ArcMap's Data Frame. The image sheets inherit internally this system once all the control points are assigned to their associated locations on the image sheets. Image sheets for georeferencing were then added to the *Table of Contents* and from the Customize tab (Toolbars→Georeferencing), the *Georeferencing toolbar* became active:

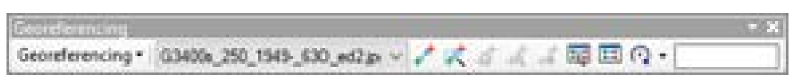
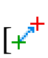


Figure 16: Georeferencing toolbar.

The *Control Points* [] were inserted at the four corners - upper left, upper right, lower right, lower left - of the map sheet (figure 16). And, the calculated UTM Northings and Eastings coordinates were then recorded by the toolbar *Input X and Y option*:

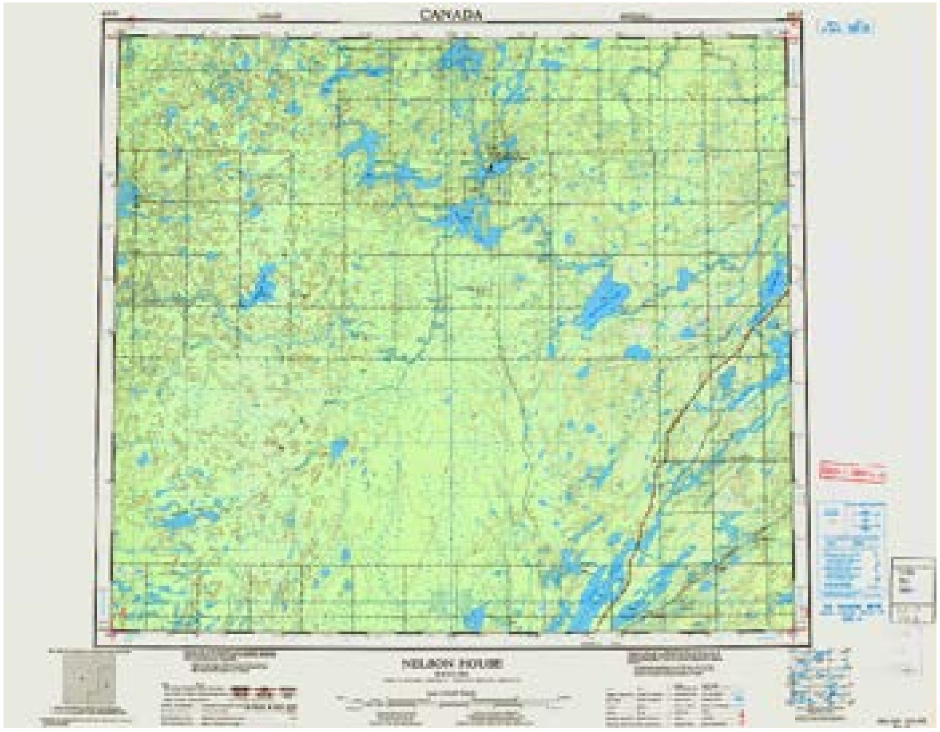


Figure 17: Control Points at each corner of the topographical sheet.

Once all the necessary control points were added, (refer to figure 17) the toolbar *Rectify*[15] command was used assigns and associates the applied coordinate system within a copy of the scanned image sheets as raster geospatial dataset (GeoTIFF).

Subsequent to the georeferencing process, the *original profile* of the impacted hydrology prior to the introduction of Hydroelectric infrastructure, was hand-drawn manually using the now georeferenced NTS images as a guide. Thus, for each sheet, a vector-based polygon feature class was created and stored in a geodatabase. Using the *Editor* toolbar, their geometry was sketched to reflect the profile outlined on the hand-drawn sheets. The mapping and quantification of the temporal changes across a sixty-year span followed this process. Table 2 outlines the various geospatial data packages that were used to quantify any temporal changes, particularly focusing

[15] The *Georeferencing* toolbar has the capabilities to store the referenced geospatial information directly within the original image file. And, by selecting the *Update Georeferencing* command. However, if errors occur during the whole process, when the said command is selected these cannot be rectified. On the other hand, the *Rectify* command saves the applied coordinate system by creating a new geo-raster dataset of the image file while preserving the original digital scanned file. (Esri, 2016b)

on seven of the impacted northern fresh waterbodies [i.e. four along the CRD route and three within the extremities of the Nelson River].

Time Period	Geospatial Data Package
1950s-1960s	*First Editions NTS*
1970s – 1980s	*CanMatrix Digital Topographic Raster Maps*[16]
1995	*National Topographic Data Base (NTDB)*[17], *MLI topographical mapping*[18]
1999 - 2000	*Canadian Land Cover, Circa 2000 (vector data acquired from raster thematic data) - GeoBase Series*[19]
2002 - 2007	*Topographic Data of Canada - CanVec Series* (Scales: 1:250, 000; 1:50,00)[20]
2015	*Land Cover 30m, 2015 (Landsat and RapidEye)*[21]

Note: The NTDB, VMap1, LCC, and CanVec series together with the Land Cover 30m constitute open-source directories accessible online from the Government of Canada's Open Data portal.

Table 2: Geospatial databases used for the temporal component of this study.

Therefore, from the above outlined vector-based geospatial data packages, the polygon feature class representing the selected waterbodies, were individually exported in accordance with their respective temporal date. Concerning the raster data package, the 2015 Land Cover, this Landsat dataset was clipped[22] reflecting the coverage of the NTS maps and converted[23] into a polygon vector-based feature layer. The 'water' land cover-type was then extracted (*Selection* tool→*Select by Attributes* tool→18). Once all the temporal data was organised, a workflow was designed within ESRI ArcMap ModelBuilder to quantify any temporal change (Area in acres). The designed workflow contains two geo-processing tools that are linked and feed data into each other sequentially.

---

[16] Raster Scanned maps at scales 1:250,000 and 1:50,000. URL https://open.canada.ca/data/en/dataset/d248b5be-5887-4cfb-942f-d425d82e6ea9

[17] Retrieved from Open Government of Canada Data. URL https://open.canada.ca/data/en/dataset/1f5c05ff-311f-4271-8d21-4c96c725c2af

[18] Digital Topographical Mapping. URL https://mli2.gov.mb.ca/topo_mapping/index.html

[19] The land-use cover type classification was processed from Landsat 5 and Landsat 7 ortho-images. URL https://open.canada.ca/data/en/dataset/97126362-5a85-4fe0-9dc2-915464cfdbb7

[20] This prepackaged directory contains sixty (60) topographical features grouped into eight (8) thematic themes, such as hydrology. URL https://open.canada.ca/data/en/dataset/8ba2aa2a-7bb9-4448-b4d7-f164409fe056

[21] Developed by the Canada Centre for Remote Sensing (CCRS). URL https://open.canada.ca/data/en/dataset/4e615eae-b90c-420b-adee-2ca35896caf6

[22] Data Management Toolbox → Raster → Raster Processing → Clip.

[23] Conversion Toolbox → From Raster → Raster to Polygon.

Hence, to store the features' geometric areas, the model provided for the inclusion of a new field that through the *Add Field*[24] tool (Name: Area_acres[25], Field Type: Double) that adds this to the GIS featured classes' attribute tables. The calculation of the said area occurred automatically within the linked *Calculate Field*[26] tool's *Expression Field* by a Python expression (!shape.area@acres!).

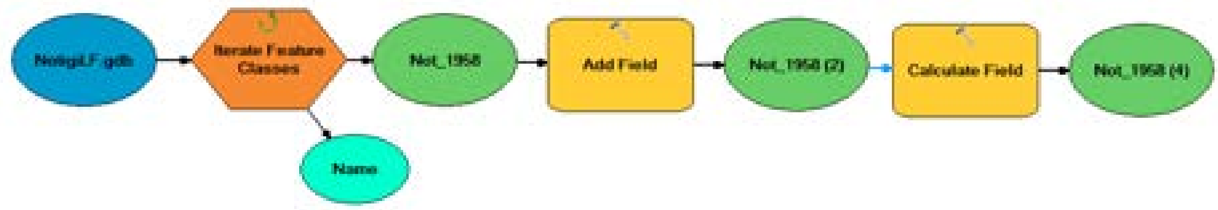


Figure 18: The workflow applied to calculate the geometric areas.

This workflow was reiterated across the Datasets containing the various spatial and temporal vector-based layers developed for the hydrology impacted by the Churchill River Diversion project. Moreover, to ensure that the data contained within the respective datasets was valid and the parameters were correctly set, the model was manually validated prior it being run. Once the model was activated, the sought-after calculations were automatically generated and tabulated, accordingly.

Additionally, the Resource Management Area[27] (RMA) established for *Nisicawayāsihk* contains the regional extent of 49 traplines[28] and these in the vector-based layer are represented as polygons. Thus, to identify the total area impacted of the RMA (upstream and downstream), the

---

[24] Data Management toolbox→Field toolset.

[25]The geometric area was also respective calculated in square kilometers and square miles. With a Python expression of !shape.area@squarekilometers! inputted for the former, while for the latter the inputted expression was !shape.area@squaremiles!.

[26] Data Management toolbox→Field toolset.

[27] The GIS layer containing the extent of the RMA was acquired from the Land Management Office *Nisicawayāsihk* Cree Nation.

[28] The GIS layer containing the 49 polygon traplines for *Nisicawayāsihk* Cree Nation was acquired from the Provincial Agriculture and Resource Development Office. This Office informed that this digital layer was mapped between the 1940s and 1960s from the 1:1,000,000 or 1:500,000 scaled topographical paper maps. It was noted that there are some discrepancies in the boundaries.

relevant polygons were identified by the *Select Feature* tool and exported accordingly. The exported file was then dissolved by running the *Dissolve Geoprocessing Tool* and the above outlined area expression was applied. The said expression was subsequently applied to calculate also the total area for the RMA boundary. For the percentages calculated the following formulae was applied:

$$= \left(\frac{Total\ Area\ of\ impacted\ Traplines}{Total\ Area\ of\ the\ RMA}\right) * 100$$

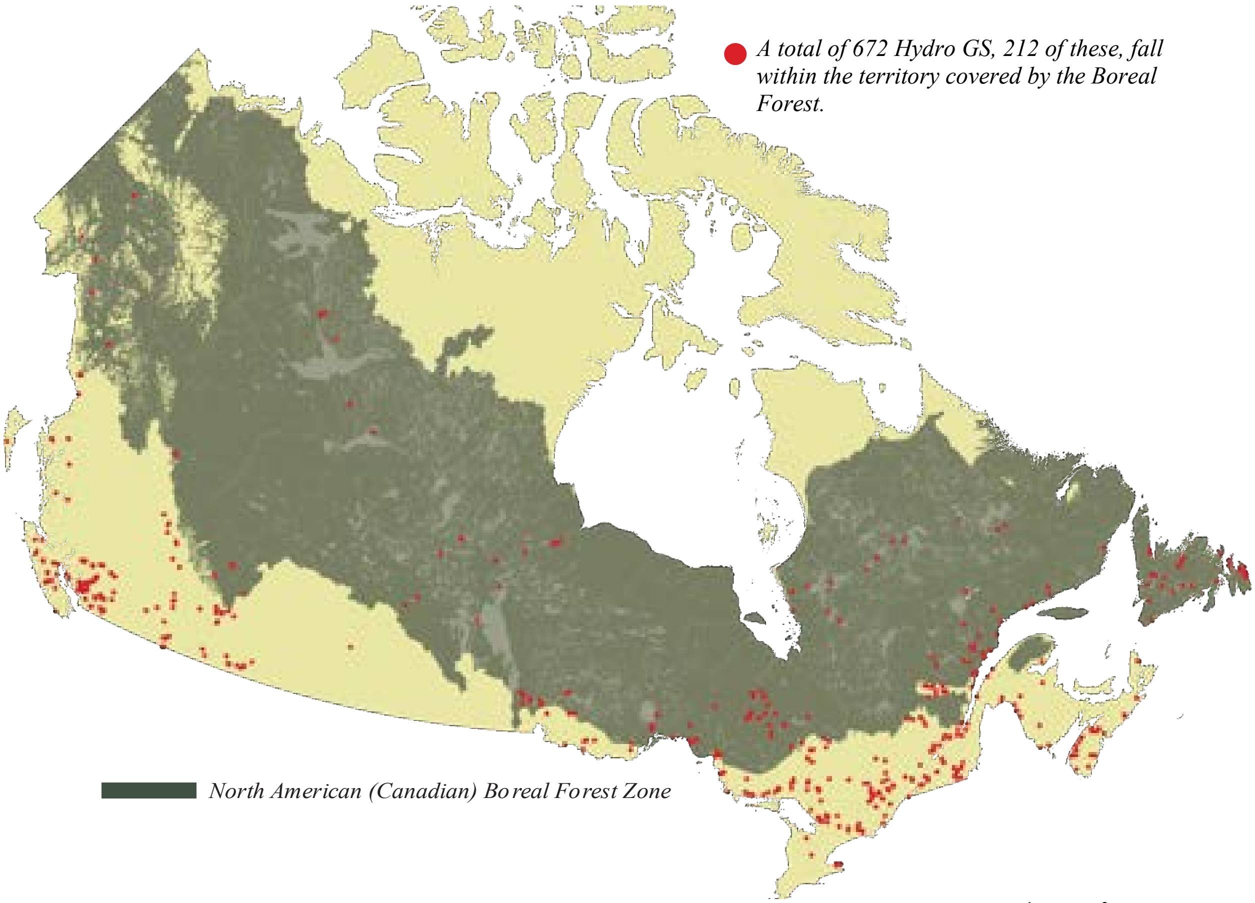
CHAPTER 4: Hydropower Dominion over Manitoba's Northern Indigenous Ancestral Cultural Landscape -
the discourse that controls and silence the rumbling flow of Nipi

"The fall of 710 feet from Lake Winnipeg to the sea level in Hudson Bay, combined with the immense flows from the tributary watersheds indicates the enormous potential water powers on the Nelson River…"
(Challies, 1916, p. 191)

4.1 A broken identity waiting to be rediscovered:

From an environmental sustainability perspective, *Hydropower* constitutes one of the cleanest sources for the production and generation of *Renewable Energy* (Zarfl, *et. al*, 2014). This is in view of its low emissions of greenhouse gases into the atmosphere. A quality, which has aided *Hydro energy* in becoming, one of the most invested global renewable energy sources in the 20th century. (Zarfl, *et. al*, 2014; IHA, 2019) However, notwithstanding these benefits, the associated engineering contributions (past and contemporary), across the Northern territory of the Canadian prairie province of Manitoba, which focus their efforts on harnessing *Nipi*'s power capabilities, have been and are still shrouded in controversies. Although this province commenced its *Hydro Electrical Generating Project* more than half a century ago, its repercussions still resonate across this landscape today.

This project's six hydro-electric generating stations together with their associated control structures were built with the intent to regulate the power production capabilities of the Great Northern River, the Nelson (MH, 2015; Appx. I; Map 11). Moreover, to distribute electricity southwards, corridors within the Boreal Forest were deforested to accommodate the necessary converting stations and the high-voltage transmission towers (MH, 2015; Appx. I; Map 11). Thus, the long-term implications and consequences of these activities area not limited to just the immediate structural footprint of the built buildings and reservoirs.



Map 10: Distribution of Hydro-Electric generating stations across Canada (GIS Sources: Open GoC[1], NRC[2] and Statistics Canada[3]).

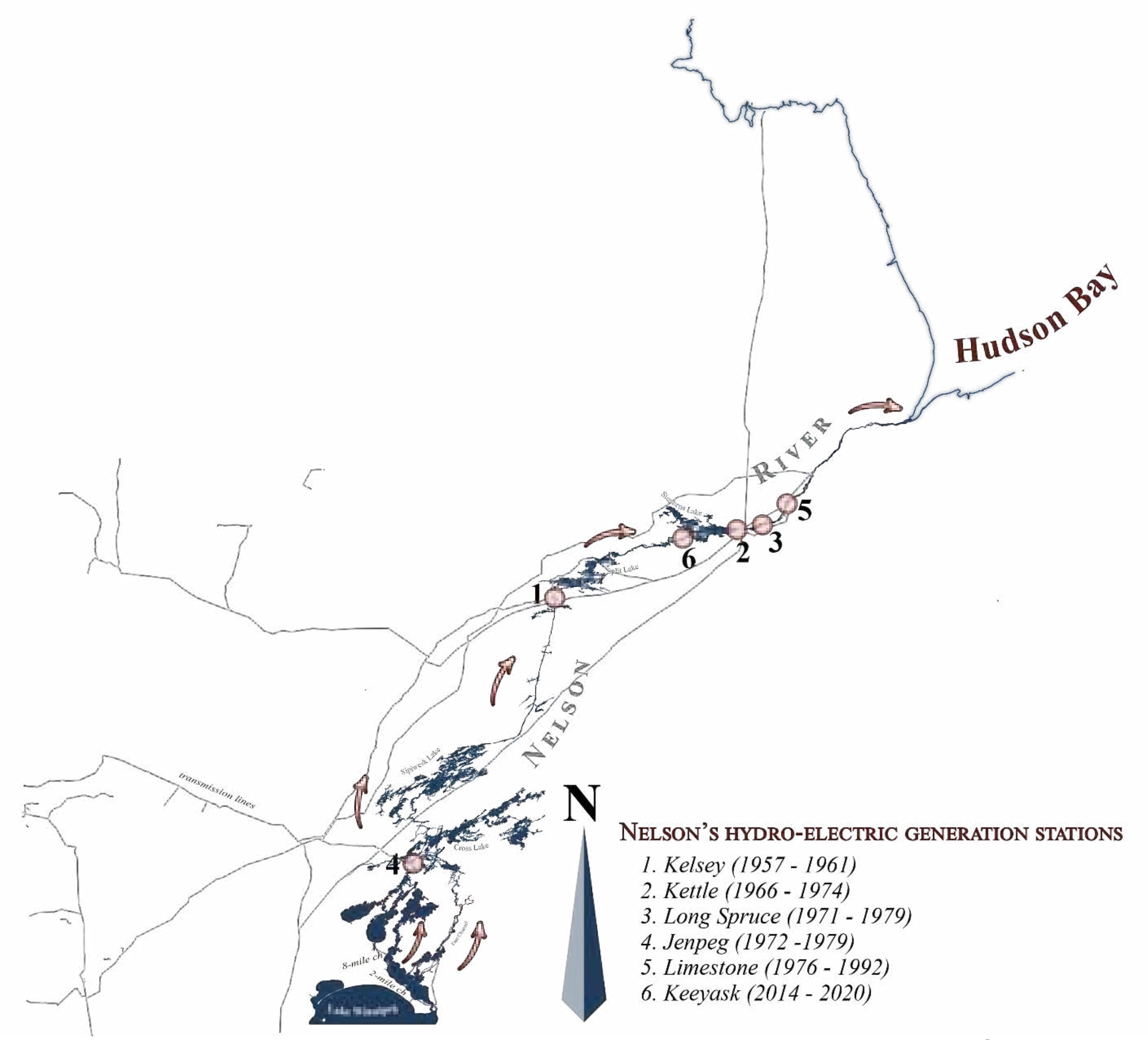
These efforts magnitude reengineered the physiological features of associated rivers and reconfigured natural flows. But they also engulfed a broad extent of the shoreline ecological habitat, while spreading across the inland forested topography, flooding creeks/streams, and the undergrowth and habitat that normally sustains healthy population of wildlife. Prime riparian habitat was eroded and submerged. However, these efforts also systematically and permanently placed a blanket over the free rumbling sound, persona, of *Nipi*. This by impounding drainage outlets and transforming prominent hydrological sites (rapids/falls) into stations that now generate

[1] Renewable Energy Power Plants, 1 MW or more - North American Cooperation on Energy Information, URL https://open.canada.ca/data/en/dataset/490db619-ab58-4a2a-a245-2376ce1840de

[2] North American Boreal Forest, URL https://www.nrcan.gc.ca/our-natural-resources/forests/sustainable-forest-management/boreal-forest/north-american-boreal-zone-map-shapefiles/14252

[3] 2016 Boundary files, URL https://www12.statcan.gc.ca/census-recensement/2011/geo/bound-limit/bound-limit-2016-eng.cfm

the required electrical energy. (Kulchyski, *et. al*, 2006; MH, 2015; Informal discussions, Summer and Fall, 2016-2021[4])



Map 11: Distribution of Hydro-Electric generating stations along the Nelson River (GIS Sources: Open GoC[5]).

The aftermath of these efforts not only undermined the northern Indigenous identity but also disconnected the people from their ancestral knowledge and heritage. This because these consequences have occurred within the ancestral Indigenous cultural landscape. People still

[4] Oral histories and narratives of people of Indigenous inheritance, which were shared with the researcher during intimate and personal storytelling reflections.

[5] Topographic Data of Canada - CanVec Series, URL https://open.canada.ca/data/en/dataset/8ba2aa2a-7bb9-4448-b4d7-f164409fe056

associate this landscape with clean, clear, safe to drink and navigable *Nipi*, where its physiologies and personalities were well understood. Such physiologies have since time immemorial have been the highways that seasonally transported its people to and from their ancestral campgrounds. This physiology sustained a wandering livelihood that across multiple generations defined cultural identity and ensured the transmission of an inheritance rich in environmental knowledge. A knowledge which engaged all the human sensory perceptions. (Informal discussions, Summer and Fall, 2016-2021)

Photo 6: A 1921 view of the Grand Rapids[6] at the mouth of the Saskatchewan River which drained its flow directly into Lake Winnipeg. The early 20th century scientific studies observed its eighty (80) foot head generated a minimum theoretical waterpower of 41,000 h.p. (Denis, *et. al*, 1916, p. 18), thus, *"affording an exceptionally good power site"* (Denis, *et. al*, 1916, p. 277). (Photo Credit: Centre du patrimoine, La Société historique de Saint-Boniface Online Digital Photo Collection. Fund No: 0001, Ref. no: SHSB 1220. URL https://archivesshsb.mb.ca/fr/permalink/archives143911).

Such perceptions were able to detect *Nipi*'s moods through sounds that were emitted when flowing through the geological formations. Such comprehension not only safeguarded the water users during the seasonal travels across *Nipi* and while passing through any encountered rapids/falls. But also aided the detection of when the seasons began to change. As such, when

[6] This rapid used to form in proximity of the northwestern shores of Lake Winnipeg. In contemporary setting, one would have seen it from the bridge of Provincial Highway 6 which runs through the community of *Misipawistik* (Grand Rapids) Cree Nation.

both *Nipi*'s flow and tonality decreased, this meant the approaching of winter, *Pipon*, season. Hence, the resultant deafening silence[7] associated with the hydro-related engineering meant that such inheritance could neither be practiced, nor taught to new generations of Indigenous youths. This silence progressively diminishes the Indigenous personal and spiritual connection with *Nipi*. And is an impact that was aggravated by the challenges imposed by the floating debris together with the unnatural fluctuation of water levels. (Informal discussions at *Misipawistik* (Grand Rapids) Cree Nation, Fall, 2016)

Photo 7: A 2016 aerial view of the generation station that replaced the Grand Rapids shown by Photo 6. This GS built between 1960 and 1968 paved the way to the systematic silencing of the distinctive rumbling sound of *Nipi*. And is located west of Provincial Highway 6 which runs through the community of *Misipawistik* (Grand Rapids) Cree Nation. (Photo Credit: Wa Ni Ska Tan)

During those quiet evenings spent fully immersed listening to the sense of nostalgia and painful experiences/legacies, where emotions ran high for both myself and participants, it was also clear to me that an incredible resilience has also kept alive the inherited ancestral connections with *Nipi*.

[7] A practice that is still being implemented to this day. Current mega hydro electrical developments under construction include for Site-C, a 1,100 MegaWatt energy-generating dam in British Columbia and Muskrat Falls, an 824 MegaWatt project in Labrador. While, for the Canadian interior, Keeyask Project (this will replace a number of rapids within Gull Lake) will produce an additional 695 MegaWatt for Manitoba, and the La Romaine units will generate 640 MegaWatt in Quebec. (CER, 2019)

"the eyes are the mirror of the soul and reflect everything that seems to be hidden"
Paulo Coelho (2013)

In this regard, to disperse the notion that when the accustomed norm is no longer the norm, the northern Indigenous narratives encouraged to familiarize with and experience the original physiologies and personality of *Nipi*. However, how can something non-physical which has been impacted and mostly long forgotten by contemporary society, resurface? And to this, Julie Cruikshank, through her work *"Lives Lived like a Story"* (1990) emphasises that solutions for the problems faced, are often found within the narratives of the Elders. Thus, the context of the northern Indigenous narratives subconsciously directed me and other listeners towards a rediscovery which required the peeling off, layer by layer, of all the imposed infrastructure associated with hydro-electrical development.

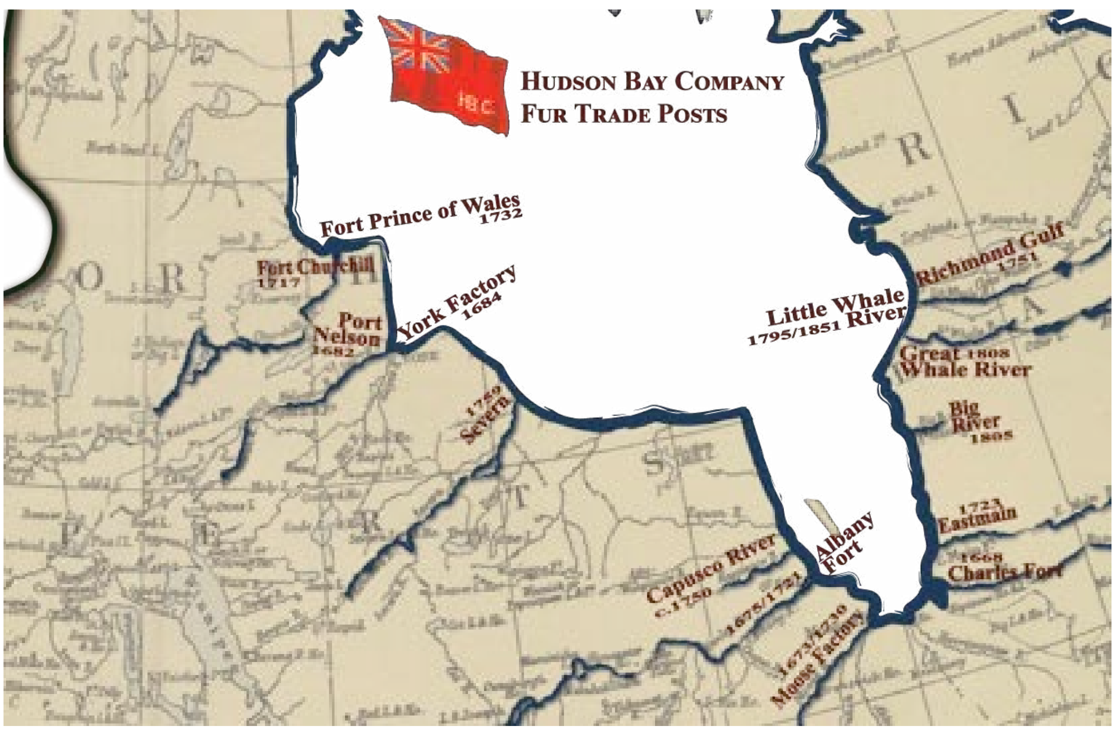
And this is revealed by diving into the historical cartographical context which not only shaped the explorations within and across the North American territory but also provided an insight on the Natural Resources that shaped the topography of such territory.

4.2 Rediscovering the original topographical physiologies of the Nelson's rumbling flow:

4.2.1 *The Hudson Bay Company Cartographers*

To ensure success in supplying the European market with superior pelts from North America, in 1670 the newly appointed Hudson Bay Company (HBC) invested in developing a system of trading posts along the whole peripheral extent of North America *Hudson Bay's* coastline. These posts were strategically constructed at the mouths of the key hydraulic system which drained into the *Bay*. (GoC, 1974; Ruggles, 1984, 1991; Appx. A) However, the success of such a construction venture depended on having knowledge of the topographical features and physiologies of the *Bay's* surrounding environs. These, at the time, were still unknown to the HBC. Therefore, to access the much sought-after fur, the Company had to rely upon the inherited land-based knowledge of Indigenous people. (Ray, 1974; Ruggles 1984, 1991; Davis, 1988 chap. 1)

The HBC, thus immediately established and defined roles of *omaciw*[8]-hunters, *owanihkiw*[9]-trappers, for Indigenous traders within its fur-trading North American empire. Moreover, when the harvesting grounds contiguous to the established coastal fur-trading posts began to be depleted, this network played an important role in the Company's being able to access other more distant fur resource areas. (Ray, 1974, 1978) In order to ensure and secure its business transactions over this territory, the Company began requesting and encouraging its explorers (cartographers) to travel and collaborate closely with Indigenous traders. And to transpose the inherited Indigenous ancestral land-based knowledge into cartographical information. (Ruggles, 1984, 1991)



Map 12: A sample of Hudson Bay Company's Fur Trade Posts built along Hudson Bay's shoreline superimposed on J. Arrowsmith 1857's *Map of North America*. The 4th Edition (1974) of the Atlas of Canada provides a full geographical depiction of these posts. (Appx. A).

[8] NNCEU, n.d.
[9] NNCEU, n.d.

This interaction took place over the two-hundred-year dominion over *Rupert's Land* and produced approximately 800 cartographic archival records (Ruggles, 1984, 1991). And, the *'wasted and unused space'* identified by the Doctrine of Discovery:*terra nullius* for its 'justified' colonial conquests began to take shape through the sketches that depicted complex profiles of vast hydrological landscape together with descriptions of water flow (strongest points and features: rapids/falls), geographical terrain and timber canopy (Ruggles, 1984, 1991; Davis, 1988 chap. 1). Such cartographic topographical physiologies reflected the Indigenous ancestral cultural landscape but also tremendous economic promise for the Company.

4.2.1.1 *The Nelson as Coureurs de Bois*

The major waterways nurturing the biodiversity within *Rupert's Land* metamorphosized into exclusive, *'highways'* for the transportation of high-quality fur by the *coureurs de bois* to nearby trading posts (Morse, 1971; Ray, 1974). The flow that fed the profile of the Nelson River, *Kache Sipi* (MC, 2000, p. 189)*, Opawanakiyi Sipiy,* (NNCEU, n.d.), travelled within a territory that sustained the ideal fur-bearing species: in particular, the much sought-after beaver. Thus, when a fur-trading post named *York Factory*[10] was constructed at the mouth of this river in 1684, its perimeter ran within the hinterland landscape that immediately was made available for use by the *coureurs de bois*. When the Company continued to establish fur-trading posts inland[11], the post of York Factory became one of the most effective and profitable trading hubs for the fur-trading markets of the time. (Ray, 1974; Ruggles, 1994, 1991; Davis, 1988 Chap. 1; Dolin, 2010)

This success reinforced the Nelson role as transportation corridor for trade into the early years of the nineteenth century. (Ray, 1974; Ruggles, 1994, 1991; Map 13; Appx. A)

[10] When York Factory was under the control of the French, from 1694 until 1714, it was called Fort Bourbon (Ruggles, 1994, 1991).

[11] On the river system of the Saskatchewan River (north-west of Manitoba's boarder), Samuel Hearne built in 1774 Cumberland House. Lower Hudson House (1779) and Chesterfield House (1880) were respectively built within the northern and southern branches of the Saskatchewan River. (Ruggles, 1994, 1991)

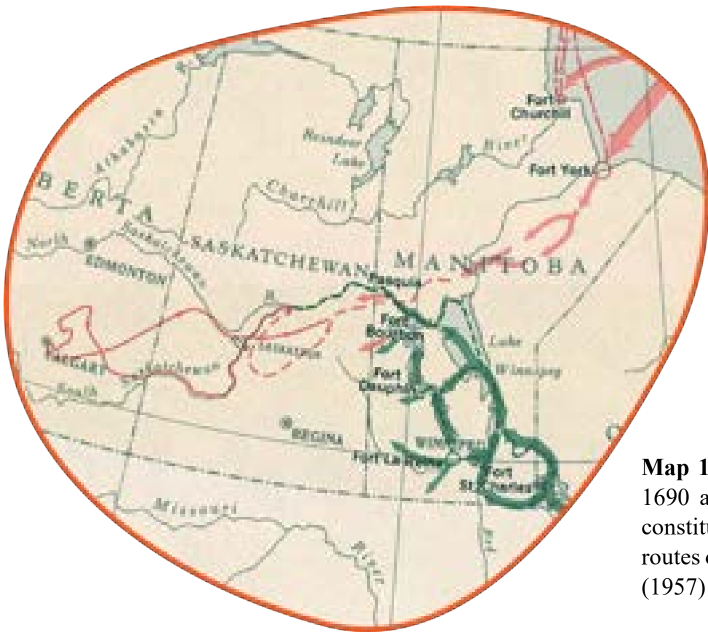
Map 13: The dominant routes within Rupert's Land superimposed on J. Arrowsmith 1857's *Map of North America* (Appx. A). The information pertaining the canoe routes has been adapted from Ray, A. J. 1974 publication p. 15, fig. 6.

4.2.1.2 *The earliest known physiologies of the Nelson*

To ensure that such success was sustained, the canoes deployed by York Factory not only transported merchandise and provisions from an inland fur-trading posts towards its coastal hub but also carried the earliest explorers/cartographers employed by the HBC (Ray, 1974, 1978). Therefore, with the aid of the *nethowe-ithìniwak,* the young Henry Kelsey became the first explorer to venture into inner[12] woodlands of *Rupert's Land,* this between 1690-1692 (Appx. A: GoC, 1957; NAOC, 1991). Ruggles (1991) observed that Kelsey failed to catalog any cartographical material or descriptions (topographical and hydrological) for the territory explored in his journals. Notwithstanding these shortcomings, the earliest descriptions of the Nelson's topographical

[12] Young Kelsey journeyed as far as where the North Saskatchewan River confluence with the branch of the South Saskatchewan River occurs. Both rivers drain into the Saskatchewan River system. The area in question now falls within the boundaries established for the Prairie Province of Saskatchewan. (Appx. A: GoC, 1957)

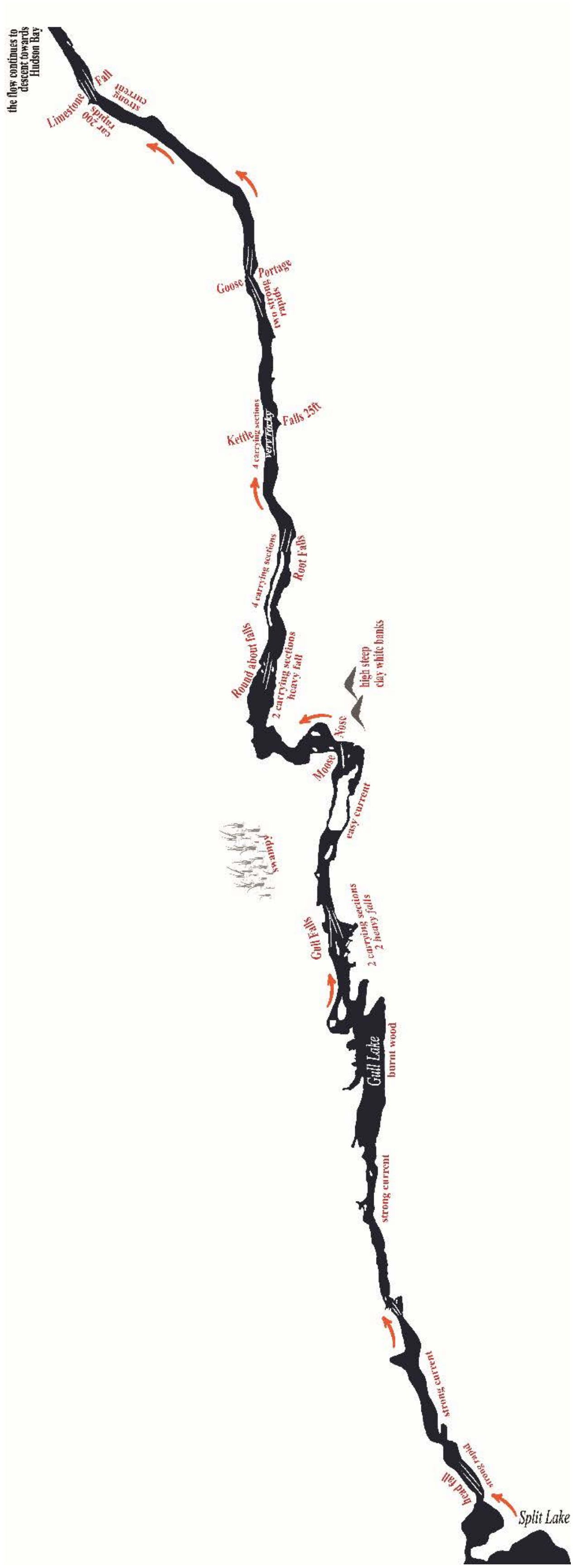
physiologies emerge from Peter Fidler, a postmaster and surveyor for the HBC (Ruggles, 1984, 1991).



Map 14: The extent of Henry Kelsey explorations between 1690 and 1691 (path earmarked in red dashed line). This constitutes a snapshot of one of the plates that highlight the routes of explorers that was published as part of the 3rd Edition (1957) of the Atlas of Canada (Appx. A).

Peter Fidler, was one of the few early surveyors who with the aid of his Indigenous wife (of Cree ancestry), not only spoke the Algonquian language but whose cartographic work embraced to the fullest its Indigenous TEK inheritance (Beattie, 1985/86; Ruggles, 1984, 1991). In this regard, to improve his knowledge, geographically and cartographically, Fidler[13] often sought to acquire sketches of the terrain as perceived by its Indigenous inhabitants. In fact, in view of such practice Beattie (1985-86) accredits Fidler two-thirds of the so-called 'Indian' sketched maps collection. One of these sketches, embedded in one of his personal journals, depicts a series of interlocking freshwater lakes of the hinterland (HBC E.3/4 fo. 13d; Appx. B), where the Indigenous knowledge keeper in 1806 represented the inter-connectivity of these lakes (28 in total) as a circular pattern (HBC E.3/4 fo. 13d; Appx. B).

[13] Fidler was known to thoroughly record the spatial components of the surrounding landscape, in terms of scale, distance and orientation (compass readings). (Ruggles, 1984, 1991)



Map 15: Mapped notes taken along the Nelson River during Peter Filder's 1809 expedition (HBC H1-30-3, E.3/4). (Profile of this branch was graphically designed from the Sectional Map, Sht. 524 of 1915, Ed. 1).

The flow coming from the Saskatchewan River, fed into each of the sketched lakes, and further converged and drained into an expansion which divides the Nelson into two sections (HBC E.3/4 fo. 13d; Appx. B). This expansion is Split Lake[14]. Thus, this sketch symbolizes not only the complete dependency on these cartographers on Indigenous experience and expertise but also constitutes one of the earliest illustrations showcasing segments of the Nelson River's hydrological context. Additionally, the knowledge reflected in this map, was attributed to an Indigenous individual, identified as *Cha chay pay way ti*, and also provides a glimpse into the Algonquian language as understood by Fidler. The Cree names that he associated with this landscape, still phonetically resonate throughout northern Manitoba:

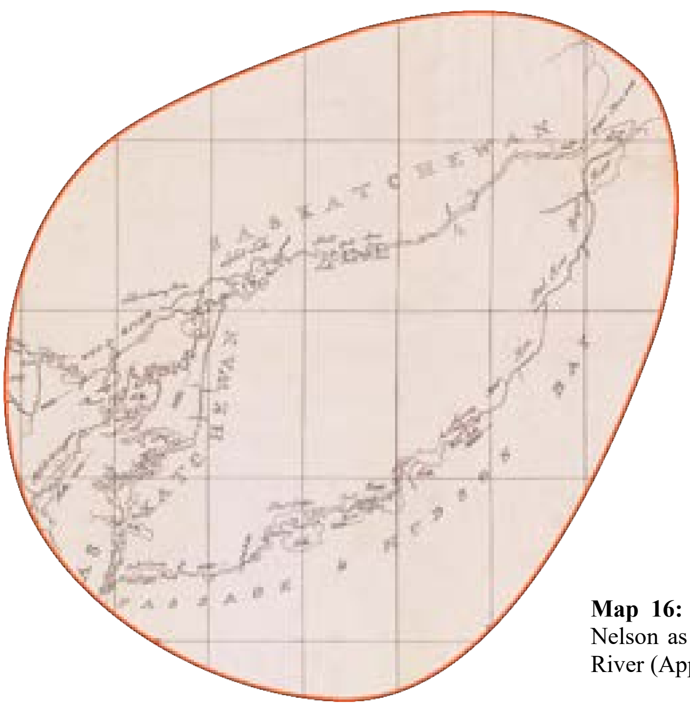
Cha chay pay way ti (1806)	***MFNERC (2009)***
"Pim mit chik oo mow" - Cross Lake	*Pimicikamak* – Cross Lake
"Na ha tha win nit tat too" - Seepawisk	*Tastaskweyak* – Split Lake
"Ta tas que" - Split Lake	

Table 3: Temporal Evolution of Indigenous locational names

With respect to the depiction of detailed topographical hydraulic features of the Nelson River, Fidler began his cartographic work around 1808 and finished it in 1809 (Ruggles, 1991, p. 65, p. 193-236; Appx. B). His maps annotate very strong and dangerous currents for the flow that characterised the narrow channel between the outlet of Split Lake and Nelson's drainage exit onto Hudson Bay. Fidler within this section identifies at least six falls and describes them as being "*heavy in their descent*". (HBC E.3/4, pp. 7-10) Moreover, he writes that the name given to a fall, whose 25-foot drop occurred within this section of the channel, originated from the process of *"excavating in the rocks"* ((HBC E.3/4, p. 9). The fall in-question was Kettle, which would eventually be replaced by a hydro-electric generation station 200 years later.

[14] This lake divides the lower (the stretch from Split Lake to the Bay) reaches of the Nelson from its upper section (the stretch from Lake Winnipeg to Split Lake).

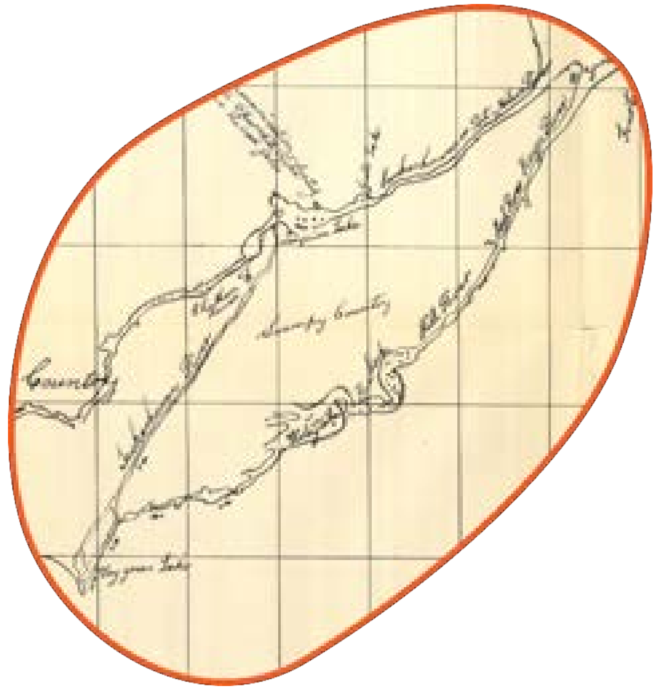
On the other hand, Fidler observed that the shoreline that used to dominate this section of the Nelson**,** formed high and steep clay/rock banks characterized by intermediate swampy areas (HBC E.3/4, pp. 7-10). The overall personality of the Nelson was described by another explorer of the era, David Thompson, during explorations carried out between 1784 and 1812. He observed it as a *"bold, wide rapid River"* (Tyrrell, 1916a, p. 435-436). Thompson continues describing that *"the natural route to the inland country would by the great River"*. That is, the Nelson River. But, also recognized that *"its immense volume of water, heavy falls and waves make it dangerous for small canoes"* (Glover, 1962, p. 38). With respect to the strength of its water flow, Thompson validates Fidler's initial observations.



Map 16: A portion of Thompson's 1814 Map, indicating the Nelson as part of the hydrological network of the Saskatchewan River (Appx. B).

This validation is strengthened further when Thompson states that at least *"twenty-eight Falls"* were encountered within the whole extent covered by the Nelson (Tyrrell, 1916a, p. 435-436). Additionally, Thompson's outcomes were evaluated, and an interesting cartographic annotation was observed. The hydrological network representing the physiologies of Nelson, Hayes, and Saskatchewan, drawn in 1794, annotates the branch connecting Lake Winnipeg and

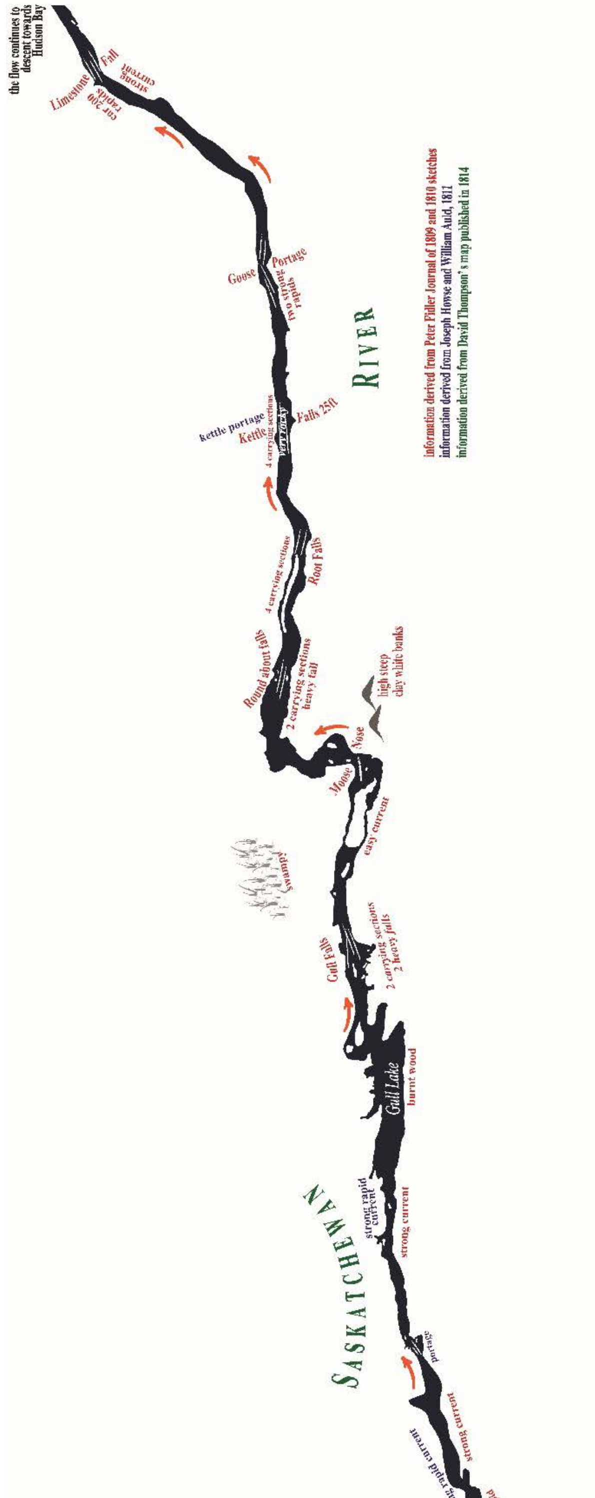
Split Lake as being part of the Saskatchewan River (H.B.C. G. 2/18). But, in his subsequent 1814 *Map of the North-West Territory of the Province of Canada*, Thompson identifies the whole extent of the Nelson River as part of the hydrological network of the '*Saskatchewan River'* (Appx, B).



Map 17: A snapshot of Turnor's 1779 Chart depicting the Nelson as part of the hydrological network of the Saskatchewan River (Appx. B).

The geologist Joseph Burr Tyrrell (1916a, p. xvi) assessed Thompson's work, and argued that Thompson was simply conforming to *"the usage of the natives and employees of the Hudson's Bay Company of that time"*. Moreover, from the study of cartographical material published during the same explorative time period, it was observed that 35 years prior to Thompson's map, HBC inland surveyor, Philip Turnor[15] used the same analogy for the naming of the highlighted section (Map 17; Appx. A). The state-of-condition of Nelson's *Nipi* also emerges from an 1819 bulletin describing the ventures of the British Royal Navy Officer, Sir John Franklin *"to the shores of the Polar Sea"*. Franklin wrote about dangerous sailing upon entering the Nelson's eastern channel from the direction of the outlet of Lake Winnipeg and as going through Playgreen Lake. As such, the water of this channel was *"muddy white"*, *"equally opaque"*, and thus rendered *"the sunken rocks, so frequent"* (Franklin, 1824, pp. 65-66).

[15] Turnor trained both Fidler and Thompson in enhancing their surveying techniques (Mitchell, 2017). Also Refer to Appx. B - Philip Turnor. (1779): *Chart of Lakes and Rivers in North America*.



Map 18: Additional hydrological characteristics from the explorers[16].

[16] Fidler, 1809 (HBC H1-30-3, E.3/4) and 1810 (HBC G.1/28a-c, 3 shts.); Howse and Auld, 1811 (HBC G.1/31a-f, 6 shts.)

Franklin continued, reinforcing in his notes that the Nelson was *"very dangerous to boats in a fresh breeze"* (Franklin, 1824, pp. 65-66). Hence, therefore canoeing within the Nelson River was not for the fainthearted.

4.2.2 *The first scientific environmental assessments on the Nelson*

The conclusion of the nineteenth century brought forth a radical change in the study of environmental and geological assessments. The technological advancements marked by the outcomes of the Industrial Revolution had improved both accuracy and design of the surveying equipment used during the explorations and expeditions. Thus, equipped with 'modern' surveying gear and ease of accessibility to the written explorative notes/observations, the newly established Geological Survey of Canada (GSC) began to publish regional scientific and technical environmental assessments, to mainly cater to the growing interest in mining (Blackadar, 1986).

4.2.2.1 *The physiologies*

One of the GSC Directors, Dr. Robert Bell, published one of the earliest scaled (8 miles to 1 inch) technical drawing[17] which covers the perimeter that defined the Nelson's original extremities. This extended from the drainage point of Lake Winnipeg till the river's drainage outlet into the Bay. (McInnes, 1913, p. 3; Denis, *et. al*, 1916, p. 102)

Bell's 1877(78) technical study shows that the original point-of-entry for the flow occurred at an opening located along the north-eastern region of Lake Winnipeg, at the end of the shores that defined the peninsula, *Mossy Point*. Once the flow reached the expansion of *Playgreen Lake* it dispersed within an intrinsic network of narrow channels that headed the flow towards the waterbody of *Cross Lake*. Here, the flow ran into another complex of narrow channels which transported it towards the expansion of, *Sipiwesk Lake*, where it took a north-eastern direction to

[17] Titled: *Map of Nelson River and the boat-route between Lake Winnipeg and Hudson's Bay*: *from track-surveys*. The draftsman was George Andrews. (Appx. B: Bell, 1878)

continuously flow within a long narrow channel (the neck of the river) to reach *Split Lake*. This lake then led the flow into another long channel, of similar characteristics to its predecessor, to merge and drain into Hudson Bay. (Appx. B: Bell, 1878)

With respect *to Nipi*'s rumbling characteristics, Bell's studies noted that it was defined by at least 25 sites that used to accommodate the geological formation of rapids and falls (Appx. B: Bell, 1878). Bell[18] wrote that the strength of the flow tested the water users' navigational skills, but it also had the ability to move a substantial quantity of water (GSC, 1879; 1880). Hence, he identifies a 15-foot rapid, that used to be located four miles above the entrance of Split Lake, known as *Grand Rapid*, as *"the only formidable obstruction to the navigation of the Nelson River"* (GSC 1880, C, IV, p. 12; Appx. C). In terms of waterpower, the 20-foot descent of *Whitemud* falls, situated on the western side of Cross Lake, had the most powerful discharge capabilities.

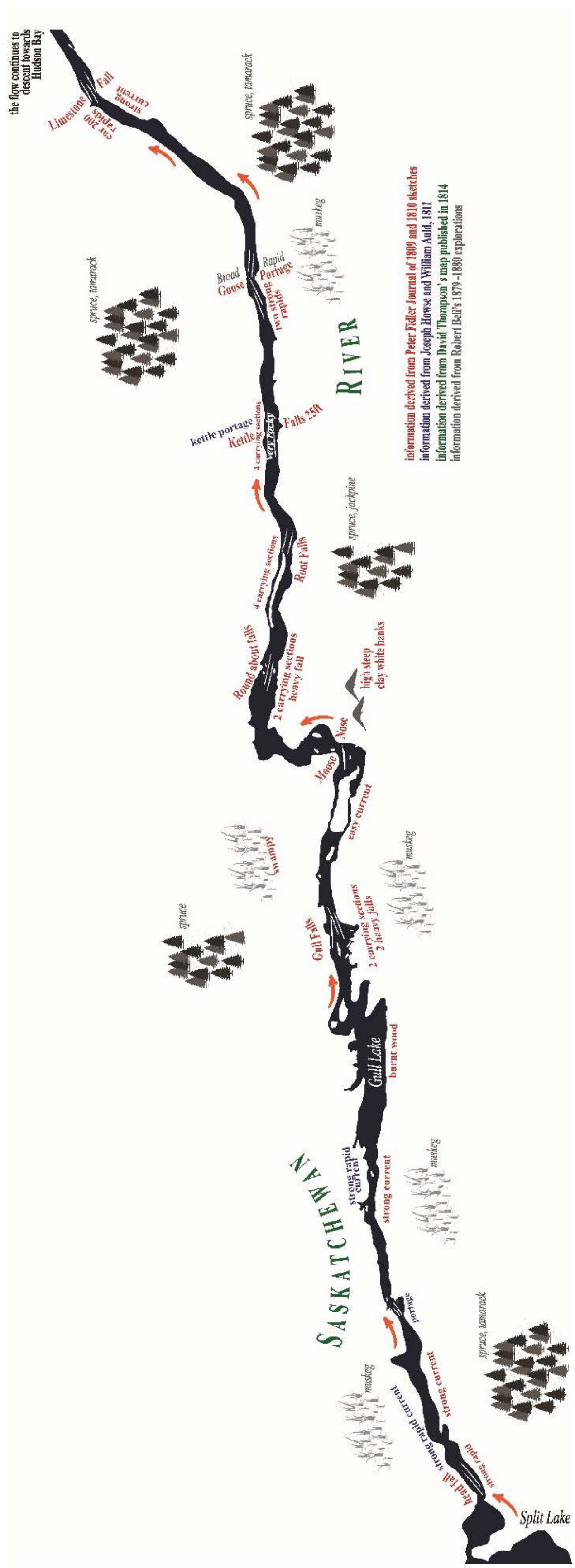
Map 19: Grand Rapids hydrology (1946-1947), (graphically designed from NTS Sht. 64A, Ed. 1 (preliminary), acquired from University of Toronto, Map & Data Library).

[18] Bell specified that *"herring white-fish"* was particularly abandoned at the mouth of the Nelson (GSC, 1879, 1880).

Bell's study further stated that the drainage of this fall *"represent about half the volume of the Nelson River"*, a volume which emerged from three distinctive descents with intermediate islands (GSC 1879, CC, VI, p. 14; Appx. C). Such conclusions provided the necessary sparks to ignite the discourse on the waterpower production regarding Manitoba's northern rivers. With respect to timber, Bell observed a mixture of large-size boreal coniferous and deciduous trees[19] dominating environs contiguous to the shores of escarpments of steep clay ridges (GSC 1879; 1880).

Map 20: Whitemud Falls hydrology (1930), (graphically designed from NTS Sht. 63I, Ed. 1 (provisional), acquired from University of Winnipeg, Map Library).

[19] Bell identified Spruce, Poplar, Tamarack, Aspen, Balsam fir, 'Banksian pirn', and balm of Gilead as the predominant tree species, for this region (GSC 1879; 1880).



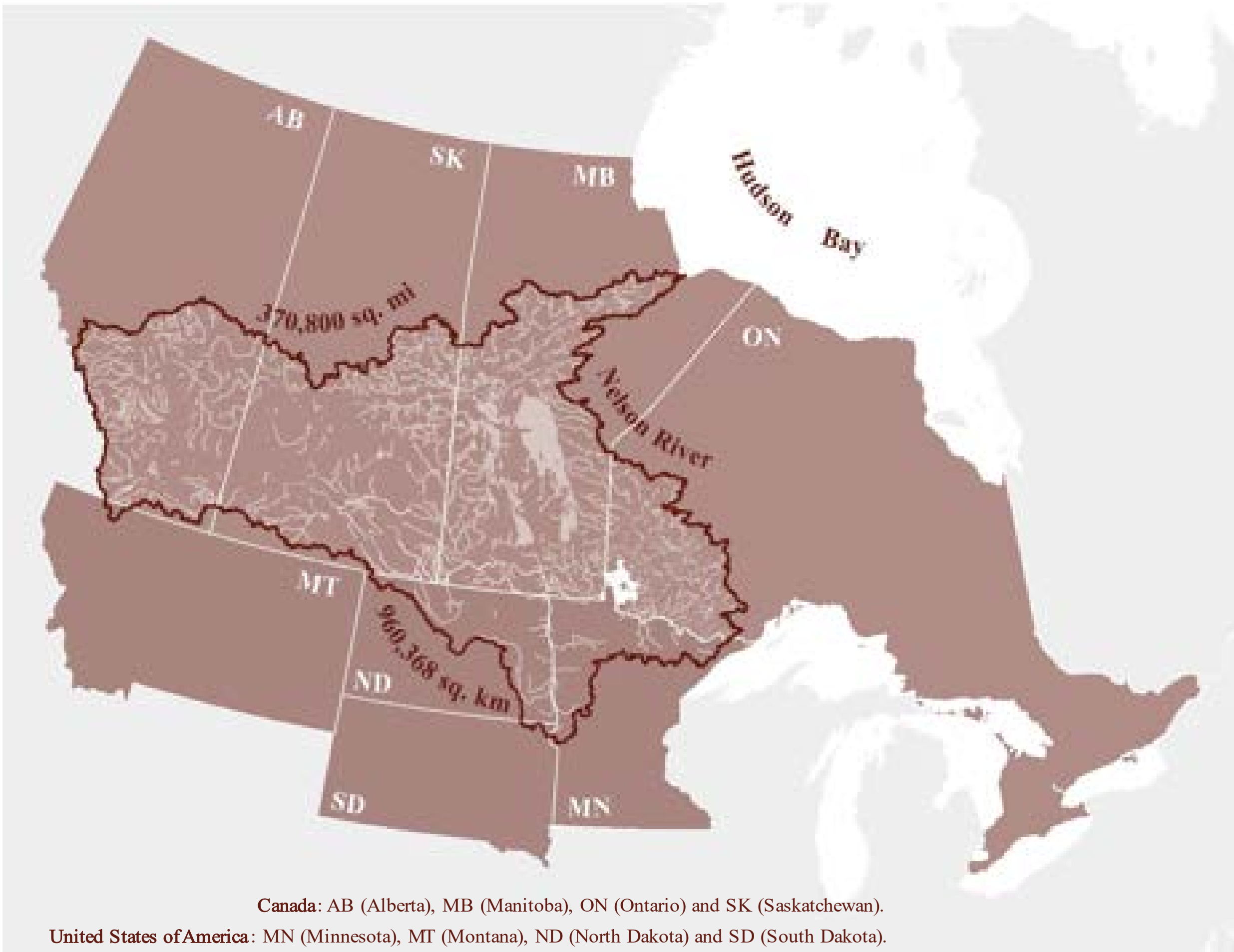
Map 21: Topographical physiologies noted from the Geological Society of Canada, Bell's studies also included with the explorers' observations.

4.2.2.2 *The drainage basin*

The practice of minerals[20] extraction gained much a momentum during the first years of the twentieth century. The Dominion of Canada gained additional environmental knowledge and explored the potential of these resources by continuing its campaign of publishing in-depth scientific environmental assessments. These assessments began to ascertain and reinforce the hydrological capabilities of the Nelson River hydrologic by calculating not only the geographical extent of its Drain Basin but also its waterpower capabilities. Its drainage basin with was estimated an approximate coverage of 370,800 square miles (approx. 960,368 square kilometers) (McInnes, 1913).

This basin was noted to incorporate *"all the country, westward to the mountains, lying between the watersheds of Churchill and Athabaska rivers to the north and the Missouri to the south, and eastward to the head-waters of Albany river and to within 50 miles of the head of Lake Superior"* (McInnes, 1913, p. 5). The hydrology of the three primary rivers supplied, maintained and fed the Basin's hydraulic flow capabilities. The incoming source from the west originates from the hydraulic network defining the *North* and *South Saskatchewan Rivers* systems. These systems run this flow eastwards to converge and merge into the *Saskatchewan River,* which drains into Lake Winnipeg in Manitoba, (Map 23).

[20] J. B. Tyrrell, for 11 years (1888-1899) travelled and studied the valley system of the Nelson River (McInnes, 1913; Denis, *et. al*, 1916). The northern Algonquian languages as understood by Tyrrell re-emerges again from his journals and this list represents the Indigenous names associated with the rivers and lakes that form part of the territories of Manitoba and Ontario. Three of the Nelson's expansions were identified: "*Nōtawēwinan Saka'higan"*, Great Playgreen Lake; *"Pimichicomow Saka'higan",* Cross Lake and *"Tatas'kwĕo Saka'higan",* Split Lake. The Nelson River was identified as *Pow'inigow Sipi*. (Tyrrell, 1915).



Map 22: Geographical extent of Nelson River Drainage Basin (GIS Sources: Open GoC[21], Statistics Canada[22], USCB[23] and WSC[24]).

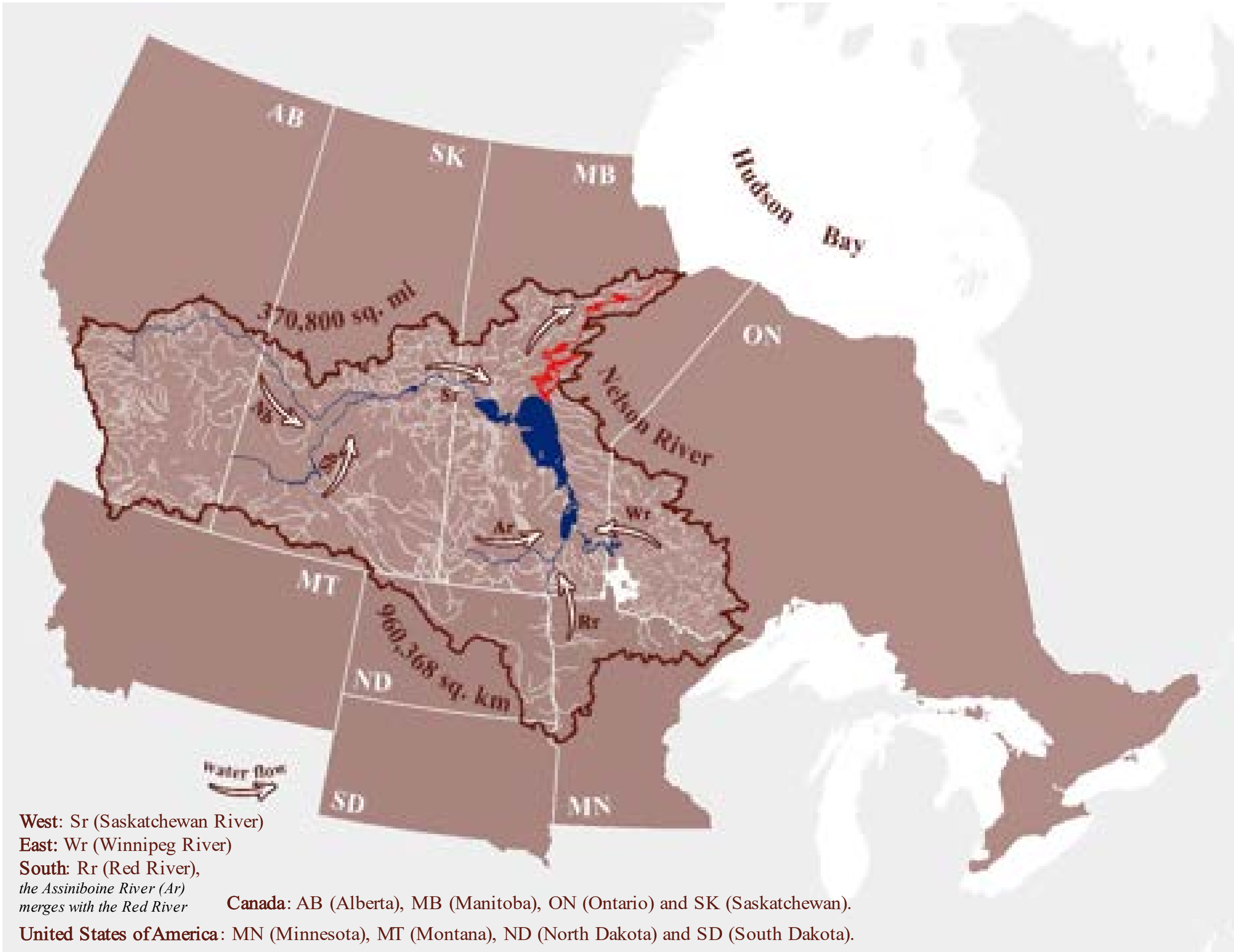
Opposite to this source, is the hydrology of the *Winnipeg River*, which from the east crosses the Ontario border into Manitoba to also drain into the expansion of Lake Winnipeg. From the south the hydrology of the *Red River*, crosses the US-Canada border and directs the flow into Manitoba to be drained into Lake Winnipeg. This Lake then takes this collective drainage into the Nelson River's profile. (McInnes, 1913; Denis, *et. al*, 1916; Map 13)

[21] Lakes, Rivers and Glaciers in Canada - CanVec Series - Hydrographic Features, URL https://open.canada.ca/data/en/dataset/9d96e8c9-22fe-4ad2-b5e8-94a6991b744b

[22] 2016 Boundary files, URL https://www12.statcan.gc.ca/census-recensement/2011/geo/bound-limit/bound-limit-2016-eng.cfm

[23] Cartographic Boundary Files, URL https://www.census.gov/geographies/mapping-files/time-series/geo/cartographic-boundary.2019.html

[24] Major Drainage Areas dataset, National Atlas Major River Basin. URL www.geogratis.cgdi.gc.ca (accessed in 2016).



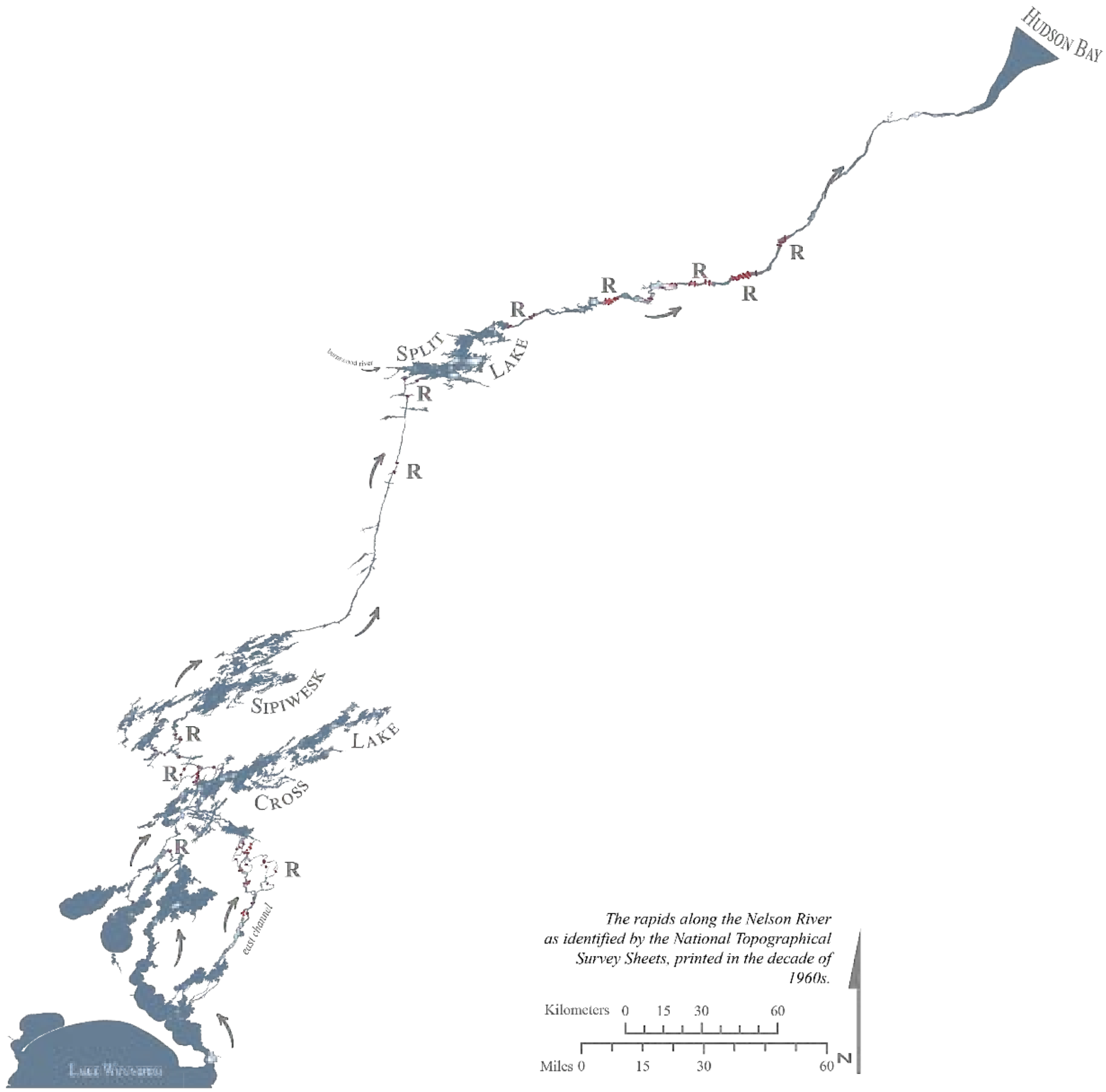
Map 23: The water flow (delineated in blue) within Nelson River (delineated in red) Drainage Basin (GIS Sources: Open GoC, Statistics Canada and WSC).

The studies observed that the Nelson 430[25] mile river *rumbling personality* had the capability to provide 11 to 25 potential power development sites (McInnes, 1913; Denis, *et. al*, 1916; Appx. F). The possible power sites were described to be characteristically strong, swift and *"rough"*, thus, requiring *"many portages"* for the water users to cross them. (McInnes, 1913, p. 42) The state-of-condition of the Nelson's *Nipi*[26] was described as being *"murky from suspended sediment"* and that it *"clears as it passes through the numerous lake expansions along its course"*

[25] In the early years of the 20th century, the narrow channel connecting Split Lake with the Hudson Bay was 200 mile in length and descended 470 feet into the Bay (McInnes, 1913; Denis, *et. al*, 1916)
[26] The Nelson was abundant in sturgeon, lake trout, dore, whitefish and pike. The boreal forest supported the woodland caribou, moose, and many fur-bearing species, and avifauna (geese, ducks, etc.). (McInnes, 1913; Denis, *et. al*, 1916)

(McInnes, 1913, p. 5). Such observations have been affirmed by the contemporary northern Indigenous narratives:

> *"The elders,……they were born here, they know their land, the condition of the land, the shoreline, the ice, the water. We used to have natural flow water"* [where] *"the water was clear and blue."* (J. Osborne, pers. comms. Fall, 2014)



Map 24: The Nelson's rumbling persona, its rapids and falls.

By, the mid-twentieth century, the Hydropower discourse had transformed such strong "personality" into a mere shell of its former self: not only by limiting and completely suffocating its character but by also controlling its natural characteristics.

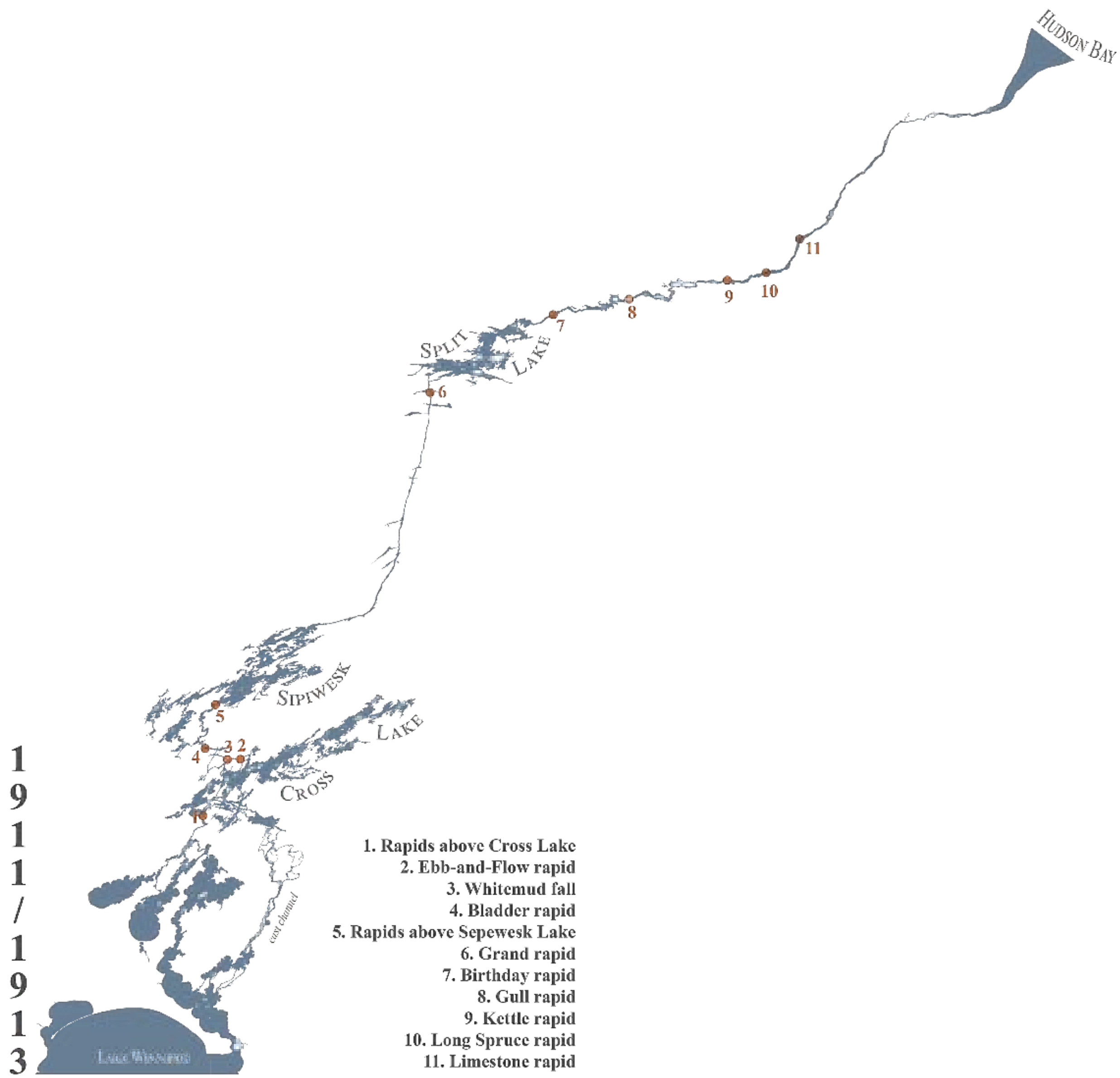
4.2.2.3 *The waterpower capabilities*

Such a transformation was attained through engineering which metamorphosized electricity from a scientific concept into a commodity for contemporary living. The studies that followed, focused their efforts into identifying and assessing the *Waterpower possibilities* for specific river networks. Since Manitoba's southern urban centers were growing exponentially during this time, by 1911, the Commission of Conservation of Canada moved forward on its intent to harness the hydraulic system of Winnipeg River to produce electrical energy (Denis, *et. al*, 1911 pp. 283-289) But, the Commission still kept a watchful eye over Manitoba's northern rivers. In doing so, it initiated a reconnaissance assessment of the discharge capabilities for the upper region of the Nelson River, that is, from Playgreen Lake to Sipiwesk Lake, by 1910. (Denis, *et. al*, 1911, 1916; McInnes, 1913; Appx. F).

The 1909 assessment carried out by Dufresne noted the discharge capabilities exerted during the dry season by the outlet of *Sipiwesk Lake* were at *"118,000 cubic feet of water per second"*. The same assessment indicated that the site had the potential to double this discharge when the level of the water was high. (Tyrrell, 1916b, section IV, p. 1). William Ogilvie[27] carried out another assessment in the summer season of the following year (1910). His calculations recorded a *"109,364 second-feet"* discharge for Whitemud Fall (Denis, *et. al*, 1916, p. 103). This

[27] William Ogilvie, was a Land Surveyor for the Dominion of Canada and was appointed by the Canada Dominion Water Power Branch, to carry out a preliminary examination of the upper section of the Nelson River (Denis, *et. al*, 1911).

aided him in estimating the horsepower value for eleven (11) possible sites[28] (Denis, *et. al*, 1911, p. 289).



Map 25: Possible water-power sites identified by the studies carried out by Ogilvie in 1910 and McInnes in 1911.

Such calculations assisted William McInnes in 1913, to validate Ogilvie's horsepower estimates for the 11 potential sites that ranged between 605,000 h.p and 1,290,00 h.p. (Denis, *et. al*, 1911, p. 289; McInnes, 1913, p. 13). Collectively, a total power for the Nelson River was

[28] Note that these sites were mostly the same areas that the previous geological surveyors noted as having the highest discharge characteristics. Thus, the new school of engineers as their predecessors continued to build upon previous recorded data.

calculated at 6,859,000 horsepower (approximately 5,114.752 megawatt) (McInnes, 1913, p. 13; Appx. F). Ultimately it was claimed that the Nelson River, *"by reason of its great volume and numerous falls, is the most important from the point of view of power development"*. (McInnes 1913, p. 11). Such observations encouraged further in-depth waterpower calculations[29], to incorporate other possible sites within the extremities of the Nelson. Indeed, the additional calculations that emerged in 1916 identified 25[30] possible sites for hydropower development. (Denis, *et. al*, 1916, p. 283; Appx. F).

Such sites represent the geological formation of 15 major rapids/falls (Map 26) and, their theoretical[31] horsepower was calculated to have ranged between 25,500 h.p and 301,000 h.p. (Denis, *et. al*, 1916, p. 283). And these scientific studies (Denis, *et. al*, 1916, p. 283) acknowledged and attributed the highest theoretical horsepower generating capacity to the rapids of Long Spruce which formed within the last segment of the river. Its theoretical hydraulic power, in 1916, was estimated at 532,500 h.p. Hence, the overall theoretical horsepower for Nelson was calculated at 2,904,300 horsepower (approximately 2,165.74 MW). (Denis, *et. al*, 1916, p. 283; Appxs. C & F) Such calculations[32] were ground-breaking in nature since the Hydroelectric Generation Industry was still in its infancy.

Indeed, the Superintendent, of the Canada Dominion Water Power Branch, responded that *"some day"* within the whole hydraulic system of the Nelson River there shall *"be located immense power developments"* (Challies, 1916, p. 227). That, the Hydropower across Manitoba's

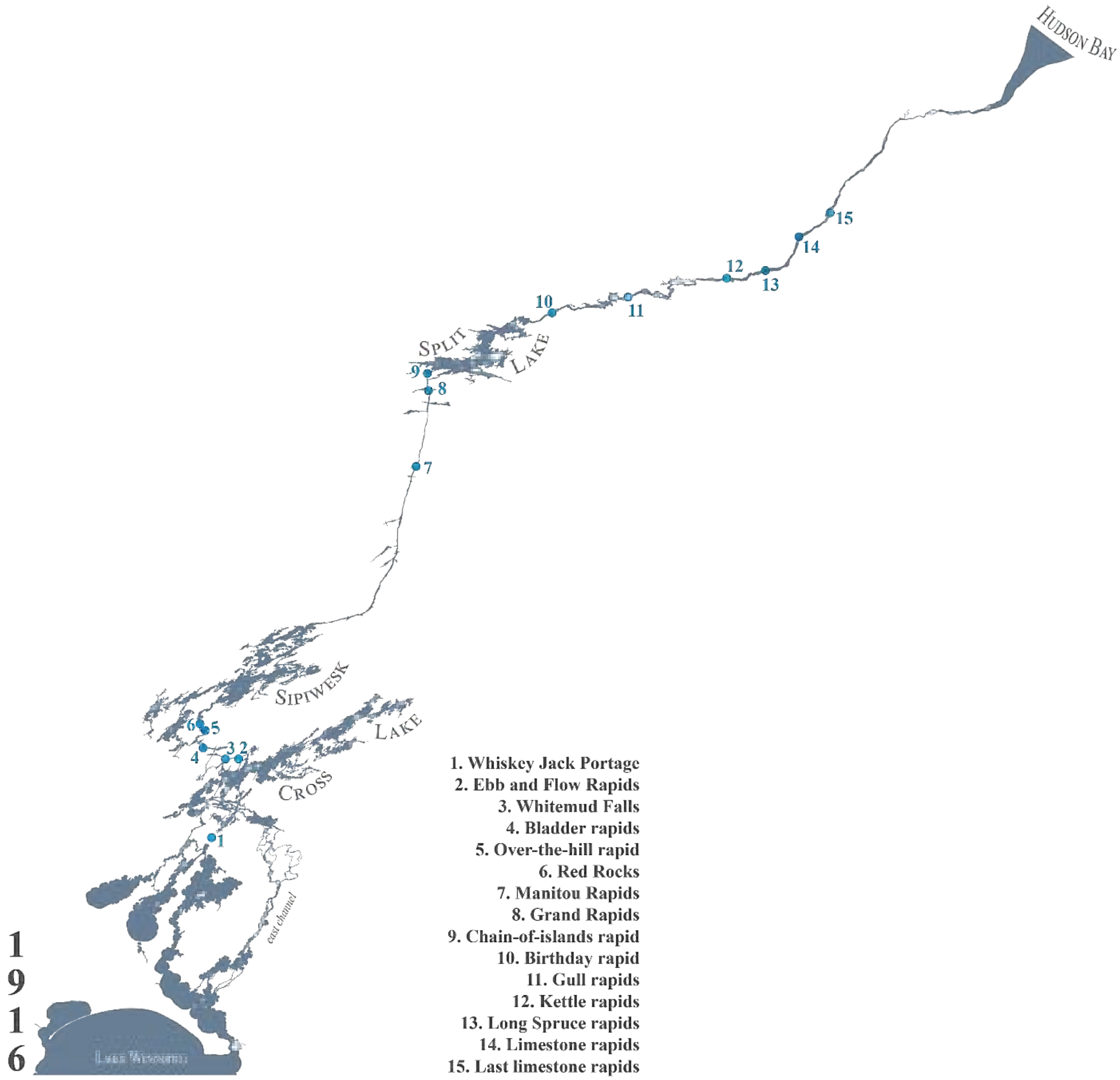
[29] To obtain frequent readings on discharge, in 1914, the Hydrometric Survey of Manitoba installed a metering station within the neck of the Nelson, that is, in the proximity of *Manitou Rapids* (Denis, *et. al*, 1916, p. 103).

[30] Distinctive characteristics were noted at the rapids above Cross Lake (in the proximity of Whiskey Jake portage), the ones above Sipiwesk Lake (Red Rock and Manitou Rapids) together with the one at entrance of Split Lake (Chain-of-islands chute). This assessment was also able to identify additional cascades for the rapids at Gull, Kettle, Long spruce, and Limestone. (Denis, *et. al*, 1916)

[31] This was calculated between the months of May and November (Denis, *et. al*, 1916, p. 283).

[32] The province Crown Co-operation, Manitoba Hydro, attributes its intension of harnessing the waterpower produced by the Nelson House to the work of William McInnes carried out in 1913 (MH, 2014, p. 2-1).

ancestral Indigenous cultural landscape only began to take shape about 40 years later, is a true testament to this statement.



Map 26: Possible water-power sites.

4.3 The Nelson River's strong rumbling personality, *'the sound of rapids'*, silenced:

4.3.1 *Manitoba's hydro-electric dominion over Nipi – its rapids and falls*

4.3.1.1 *The Grand Rapid*

The dominion of Hydropower over the strong rumbling personality of the Nelson commenced in 1957 with the construction of a generation station at its neck. The structure that replaced the Grand Rapid[33] was built at the *"sharp bend"* at the end of the narrow channel that connects Sipiwesk Lake with Split Lake (Bell, 1878; Tyrrell, 1916; MH, 2015; Appx. C). The water at this point was deep and carried across strong currents. The early nineteenth century studies had noted that canoeists had to portage nine times to cross its whole extent (McInnes, 1913; Denis, *et. al*, 1916). With respect to power generation capabilities, its 20-foot fall produced a waterpower of 270,000 h.p. (201.34 MW), in 1913 (McInnes, 1913, p. 13), with a theoretical waterpower that reached a value of 113,500 h.p. (84.64 MW), in 1916 (Denis, *et. al*, 1916, p. 283; Appx. F).

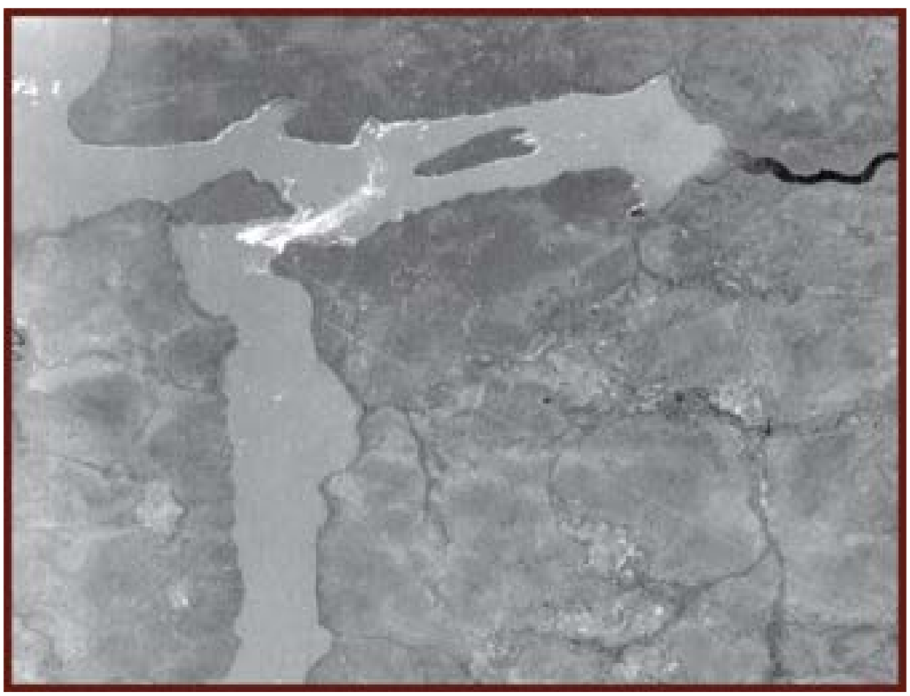


Photo 8: A 1955 aerial view of Grand Rapids on the Nelson River (Photo Credit: NAPL, Roll No. A14984, Photo No. 0076).

[33] During the review of the cartographical material published during the exploration era of North America, it was observed that the terminology 'Grand Rapids' was commonly used by the explorers to describe the grandeur tenure of rapids through which a great volume of water ran through.

The Grand Rapid was about 400 feet wide and characterised by granite banks that were 20-foot high (Denis, *et. al*, 1916, p. 109). This rapid was replaced by a seven-unit powerhouse (which could be converted into ten units) with the capability of generating 292 MW in electrical energy (MH, 2015, app. 2A). This station was named after the young eighteenth century fur-trader and explorer, Henry Kelsey (Ruggles, 1991). Additionally, Manitoba Hydro's regional hydropower infrastructure assessments highlighted that this station's spillway could discharge a volume of water up to 322,458 ft^3 /s (9,131 m^3 /s), which in turn resulted in flooding that covered an area of 16,580 hectares (165.8 km^2). This was done to accommodate the elevation[34] of the reservoir or forebay needed for the operations of this generating station. (MH, 2015, app. 2A)

The consequence of such engineering feats not only led to the loss of the rapid in-question, but also, they influenced the upstream and downstream hydraulic and terrain physiologies. The operational regimes of Kelsey GS did not drastically the water levels and flows of the downstream affect section. However, an immediate difference in the state-of-condition of *Nipi* within the Nelson was observed by the *nethowe-ithìniwak* whose ancestral cultural landscape incorporate Split Lake and its environs. Thus, the water was seen as less clear, while the occurrence of algae and the quantity of floating debris increased. (Informal discussions[35], Fall, 2016 & Fall 2018) Moreover, in the upstream section, the resultant flooding effected 14,250 acres of boreal forest. (SLCFN, 1996).

Such flooding submerged a substantial area of the inherited Indigenous cultural landscape. Thus, the resulting erosion of soil and floating debris increased the *"sediment load"* within the channel that connects Sipiwesk Lake to Split Lake. (SLCFN, 1996, Vol. 1, p. 52) This in turn

---

[34] Thirty feet, particularly for the area where the rapid used to form (SLCFN, Vol. 1, p. 52).
[35] Oral histories and narratives of people of northern Indigenous inheritance, which were shared with the researcher during intimate and personal storytelling reflections.

severely limited accessibility to the ancestral campsites, and the hunting, trapping, and harvesting territory that embraced the upper Nelson River (SLCFN, 1996, Vol. 1).

Photo 9: A 1976 aerial view of Kelsey GS (Photo Credit: NAPL, Roll No. A24542, Photo No. 0175).

However, it must also be pointed out that the 1916 waterpower studies on the neck of the Nelson had also identified another possible site for future hydropower development. This was the rapid called the *Devil Rapid*[36] and which occurred within a ravine approximately in the middle of the narrow channel that connected Sipiwesk Lake to Split Lake. (Denis, *et. al*, 1916, p. 109; Appx. C).

Nonetheless, since the Hudson Bay Railway also required a viable transportation route to access communities in the North, at that time, Devil Rapid was selected to be re-engineered to be a railway crossing (Armstrong, 1909; Malaher, 1984; Photo 10). But what is interesting is that the engineers of the time realized that if *"a dam were constructed just above Grand rapids to maintain a rise of about 25 feet Devils rapids would be drowned"* (Dufresne, 1909, p. 22). Therefore, the

[36] Photographs of this rapid taken during the early years of the 19th century, name it as Manitou Rapid.

impoundments at Kelsey GS, which raised the water levels of the dam's forebay up to thirty feet in height also suppressed the rumbling personality of this rapid (SLCFN, 1996 Vol. 1, p. 52).

Photo 10: Nelson River Manitou Bridge c1929 (Photo Credit: FFCA[37], Photo No. 1028720).

Entering 1960s, the dominion of the Hydropower discourse in the North had begun to embrace the narrow channel that used to connect the waterbody of Split Lake with the shores of Hudson Bay (MH, 2015; Appxs. C, G, I).

4.3.1.2 *Kettle Rapid*

Over a span of 60 years Manitoba Hydro constructed four hydroelectric generating powered stations in this region. The associated engineering continued to reconfigure not only the Nelson's spatial context but also its natural "rumbling personality". Thus, the three cascades[38] that gave character to Kettle Rapid**,** used to occur 23 miles downstream from the foot of Gull Rapid. This represented a decent of 78 ½ feet and was flanked by a mixture of clay and granite

[37] URL http://flinflonheritageproject.com/transportation-rail/wppaspec/oc1/lnen/cv0/pg1/ab461
[38] The channel was at its narrowest where Kettle's second pitch used to form, which was approx. 600 feet in width. Thus, to reach the northern settlement of Churchill, the Hudson Bay Railway built a second rail line that crosses the Nelson at this point. (Armstrong, 1909; Denis, *et. al*, 1916; Malaher, 1984; Appx. C).

banks[39]. (Denis, *et. al*, 1916, pp. 106-107; Appx. C) With respect to its power capabilities, in 1913 Kettle's 96-foot fall produced a waterpower of 1,290,000 h.p. (962 MW) (McInnes, 1913, p. 13; Appx. F). While, in 1916 when the waterpower calculations took into consideration this rapid head (78 ½ feet) and its estimated low water flow (153,000 second per feet), its theoretical waterpower was calculated at 454,500 (339 MW) (Denis, *et. al*, 1916, p. 283; Appx. F).

The construction of a generation station within the extent of Kettle's first pitch commenced in 1966. Its 1,200 feet (365.75m) long powerhouse contained 12 propeller turbines, which could produce 1,220 MW in electrical energy and, its spillway has the potential to discharge a volume of 360,210 ft^3/s (10,200 m^3/s). (MH, 2015, app. 2B; Appxs. C & G) The engineering activities carried out within this section of the channel not only reconfigured its spatial environment but also resulted in flooding. Thus, the branch[40] (approx. 22.4 miles /36 km in length) that used to connect the base of Gull Rapid with the head of Kettle Rapid[41] was submerged (Appx. G). This branch has been characterised by swift and rough flow that passed through a series of small rapids[42] and in between several islands. (Denis, *et. al*, 1916, pp. 106-107)

The topography surrounding Kettle was characterized by spruce and jack pine trees interspersed with swamp and muskeg. This flooding did not limit itself to the confines defined by the banks of this branch but extended to the northwest to reach the waterbody of Moose Lake[43]

[39] The banks had an overall height that ranged between 15 feet and 50 feet (Denis, *et. al*, 1916, pp. 106-107).
[40] Approx area: 47.3 sq. km/18.2 sq. mi/1,1694.6 acreas (Appx. G).
[41] Where the railway bridge crossed over the Nelson River.
[42] The first editions of the Sessional Maps dated 1915 (Sheet No. 524) identified three rapids in the area-in-question. In contrast, the first editions of the 1963 NTS identified five rapids for the area-of-interest which were characterized by a series of sequential pitches (Sheet No. 54D).
[43] For the *nethowe-ithìniwak* of Split Lake, this lake is known as Moose Nose Lake (SLCFN, Vol. 1, p. 59). Additionally, it must be point out that in 1909 the engineers noted that the management of a dam in the proximity of Kettle's first pitch would *"drown out all rapids as far as back as Moose Nose Point"* (Dufresne, 1909, p. 22).

(Appx. G). Thus, 54,000 acres of the Northern Indigenous ancestral cultural landscape was submerged[44] (SLCFN, 1996, Vol. 1, p. 58).

Photo 11: Kettle Rapids in 1930 (Photo Credit: University of Manitoba Libaries digital collection, Andrew Taylor Fonds).

Moreover, to commemorate Manitoba Hydro's managerial and colonial legacy, this human-made waterbody was named after one of its past Chairmen, *Stephens Lake* (MH, 2015; Appx. G). Inevitably, these structural engineering works continued to disassociate the Northern *nethowe-ithìniwak* from their land-use inheritance and to enforce their control over the free rumbling personality of the Nelson River.

4.3.1.3 *Long Spruce Rapid*

Such perseverance continued further downstream from Kettle Rapids, this time at Long Spruce Rapid. This rapid was situated 50 miles (80 km) downstream and where the channel width measured approximately 2,800 feet (853 m) (Denis, *et. al,* 1916, pp. 106, 283; Appx. C). Its personality constituted of two distinctive rapids[45]: an upper, 40 ft fall and a lower, 52 ft fall, with

[44] According to NTS Sheet 54D, second edition and publish in 1977, the new human-made lake covered an approximate area (from the GS till the original lower reaches of Gull Rapids) of 292 sq. km/113 sq. mi/72,040 acres (Appx. G).
[45] Length of two (2) miles for the former and four (4) miles for the later (Denis, *et. al*, 1916, p. 106).

passing swift currents and a rocky/granite shoreline (Dufresne, 1909, p. 22; Denis, *et. al*, 1916, p. 106; Appx. C). In 1913 its power capabilities were calculated at 1,140,000 h.p. (850 MW) (McInnes, 1913, p. 13), while its theoretical power in 1916 reached a total of 532,500 h.p. (397 MW) (Denis, *et. al*, 1916, p. 283). The lowest rapid contributed a theoretical power of 301,000 h.p. (224.46 MW) (Denis, *et. al*, 1916, p. 283). (Appx. F)

Therefore, the permanent replacement of Long Spruce Rapid arrived in 1971 with a ten-unit powerhouse[46] spanning 0.9 mile (1.4 km) in width and having a production of 980 MW (MH, 2015, app. 2G; Appx. C). This structure silenced not only the upper reaches of this rapid but also the remaining remnants of Kettle Rapid (Appxs. C & G). This because Long Spruce GS created an enclosed open reservoir between it and its predecessor. During the 1970s, the reservoir covered an area of 11.2 sq. mi (28.9 sq.km/7,138.2 acres) (Appx. G). A surface area which 30 years later increased by an additional square mile – 12 sq. mi/30.7 sq. km/7,590.3 acres (Appx. G).

4.3.1.4 *Limestone Rapid*

Once the generating stations at Kettle and Long Spruce became operative, the third phase of the Hydropower discourse in the already impacted Northern Indigenous cultural landscape was introduced in the 1980s. A site 17 miles (27.4 km) downstream from Long Spruce GS was selected to host the next hydro-electric generating station. At this site, the Limestone Rapid saw rough waters passing through its two distinctive rapids that used to be delineated by clay banks. Its upper rapid used to form four cascades. The first had a descent of 6 ft, the second 15 ft, and the third and fourth, each had descents of 10 ft (Tyrrell, 1915; Denis, *et. al*, 1916, pp. 105-106; Appx. C). The geological formation of this rapid was similar to Long Spruce Rapid.

[46] Its six-gated spillway discharges a volume of 342,552 ft^3/s (9,700 m^3/s) (MH, 2015, app. 2G).

Thus, in terms of power capabilities it yielded the same as Long Spruce, that is, 1,140,000 h.p. (850 MW) (McInnes, 1913, p. 13; Appx. F). However, with regard to theoretical[47] power, its total value was lower than Long Spruce since it was calculated at 428,500 h.p, (319.53 MW) (Denis, *et. al*, 1916, p. 283; Appx. F). Thus, this new generating station also impounded Limestone Rapid, and was constructed with the similar structural specifications to Long Spruce GS (MH, 2015, app, 2H). However, according to Manitoba Hydro's 2015 assessment, the area that was flooded to accommodate this station amounted to 0.8 sq. mi (2.1 sq. km) (MH, 2015, app, 2H). Moreover, the installed infrastructure had the ability to produce 1,350 MW in electrical energy (MH, 2015, app, 2H).

Hence, this generating station permanently silenced the complex of Limestone Rapids but also the remnants of Long Spruce Rapid (Appxs. C & G). The latter because of the reservoir that was created between the two and which by the 1990s covered an area of 10.4 sq. mi (27 sq.km/6,675 acres) (Appx. G). Notwithstanding the damage indicated above, these generating stations were built to generate a considerable amount of energy, a combined of 2,960 MW (Appx. I). The discourse of Hydropower dominion over *Nipi* across Manitoba's North did not there, however and continued well into the twenty-first century.

4.3.1.5 *Gull Rapids*

The 2000s saw the construction of yet another generating station within the lower reaches of the Nelson River. The site selected was located 37 miles (60 km) downstream from Split Lake, and contiguous to the new entry point of the man-made waterbody of Stephens Lake (MH, 2015, app, 2L; Appxs. C & G). The selected site yet again hosted a complex of rapids, which are named Gull Rapids. These rapids run in between islands, and the current running through was strong,

[47] Limestone Rapid theoretical horsepower ranged between 34,700 (25.88 MW) and 144,700 (107.90 MW) (Denis, *et. al,* 1916, p. 283).

rough, and swift. The banks delineating and defined the whole extent of their 78-foot descent were a mixture of rock and clay with granite, and the width of the selected channel varied between 1,000 ft (304.8 m) and 2,000 ft (609.6 m). With respect to their power generating capabilities, the study carried out in 1916 calculated their theoretical power at 451,600 h.p. (336.76 MW). (Denis, *et. al*, 1916, pp. 108, 283; Appxs. C & F)

However, since the elevation of the banks was low, the 1916 study did not recommend this site as having potential for hydropower development (Denis, *et. al*, 1916, pp. 108, 283). But twenty-first century technology proved otherwise since these rapids were impounded by a seven-unit 694.7 ft (211.74 m) powerhouse of the Keeyask Generating Station (Appx. C & G)**.** This station is estimated to generate energy of at least 695 MW. Its associated structural components cover a 1.7-mile (2.7 km) extent across the Nelson. Its spillway was designed to accommodate seven bays with an anticipated volumetric flow of 399,585 ft^3/s (11,315 m^3/s). It is the largest hydraulic discharge within the lower section of the Nelson River (MH, 2015, app, 2L), and as a result the segment between Kelsey GS through Split Lake up to Gull Lake was transformed into another reservoir.

Therefore, the metamorphosis of the Great River, *Kache Sipi* (MC, 2000, p. 189), *Opawanakiyi Sipiy*, (NNCEU, n.d.), from a free, untamed, strong rumbling persona to a controlled, manipulated, stagnant persona is now complete, and the river finally silenced.

4.4 Conclusion: from a River to a Dissected Reservoir:

When the European Colonialist shifted its fur-market investments to North America, this continent's Rivers became vital in the transportation of the much sought-after pelts. The European explorers' cartographical endeavours focused on sketching the complex hydraulic network that dominated the forested landscape of the 'newly claimed' territory. As described in this chapter, such sketches provide a glimpse into the earliest known characteristics of the Great River of the 'Canadian' North, the Nelson River, *Kache Sipi* (MC, 2000, p. 189)*, Opawanakiyi Sipiy,* (NNCEU, n.d.). Whose *Nipi* has become and is still at the epic-center of the narrative imposed by Hydropower on Manitoba's northern Indigenous ancestral cultural landscape. A landscape where its waters were described as bold, strong, rough, and swift.

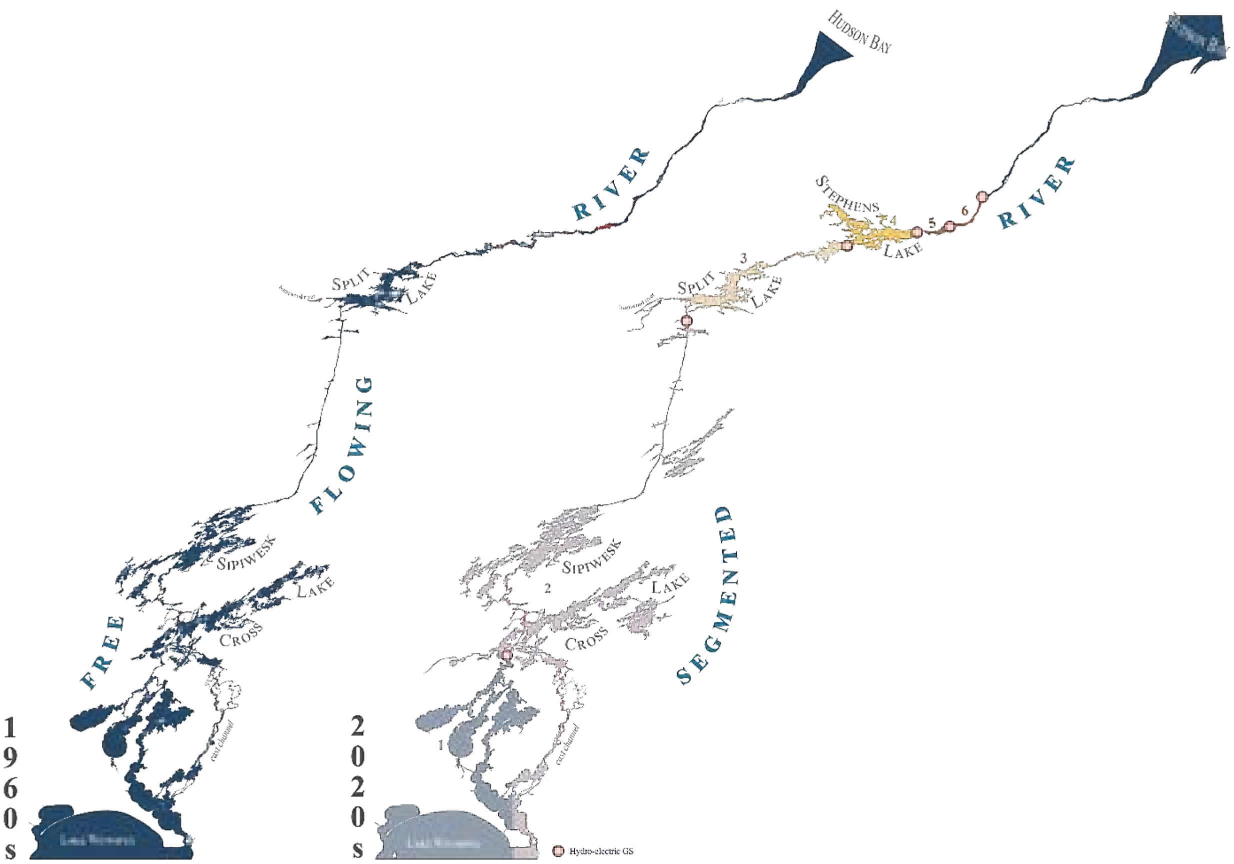
From the explorations of the inner regions of the 'Canadian' North by David Thompson (1784-1812), the rumbling persona of the Nelson's *Nipi*, was attributed to its *"twenty-eight Falls"* (Tyrrell, 1916, p. 435-436). However, by the end of the nineteenth[48] century, the scientifically minded geologists as driven by this Country's emerging interest in mineral extraction, began to publish their detailed environmental and geological assessments that built upon the accounts of their predecessors. Such assessments[49] highlighted and produced detailed surveying material that depicted the topography of the Nelson as constituting a complex of intertwined narrow channels dominated by numerous rapids and falls that lead *Nipi* towards the Hudson Bay. They in turn further extenuated the Nelson's rumbling behavior through their discharge capabilities calculations.

This was achieved by stating that Whitemud Falls on its upper regions, as the waters that pass through its 20-foot drop *"represent about half the volume of the Nelson River"* (GSC 1879, CC, VI, p. 14). Thus, the strength of Nelson's rumbling persona did not only project itself from the two-dimensional surveys but also from the observations of the scientists who subsequently visited this region. Such potential immediately caught the attention of the Dominion, who by the

---

[48] The HBC sold Rupert's Land to the newly appointed Government of Canada, three years after the 1867 Confederation was signed.
[49] Dr. Robert Bell's studies on the Nelson River and its surrounding environs commenced right after the 1875 Treaty 5 was signed between the Dominion of Canada on behalf of Her Majesty and the Saulteaux and Swampy Cree Nations. Adhesions to this Treaty were respectively signed between 1907 and 1910. Geographically this Treaty encompasses all the northern landscape and central areas of Manitoba together with smaller section of the adjoining provinces (Saskatchewan to the West and Ontario to the East). (Friesen, 1987, Tough, 1988; 1996)

early years of the twentieth century began examining and measuring the country's waters hydraulic power and potential to produce hydro-electric energy. On this matter, the Nelson as the studies of this decade have since verified, in providing at least 25 possible sites for the harvesting of hydro-electric energy (Denis, *et. al*, 1916, p. 283).

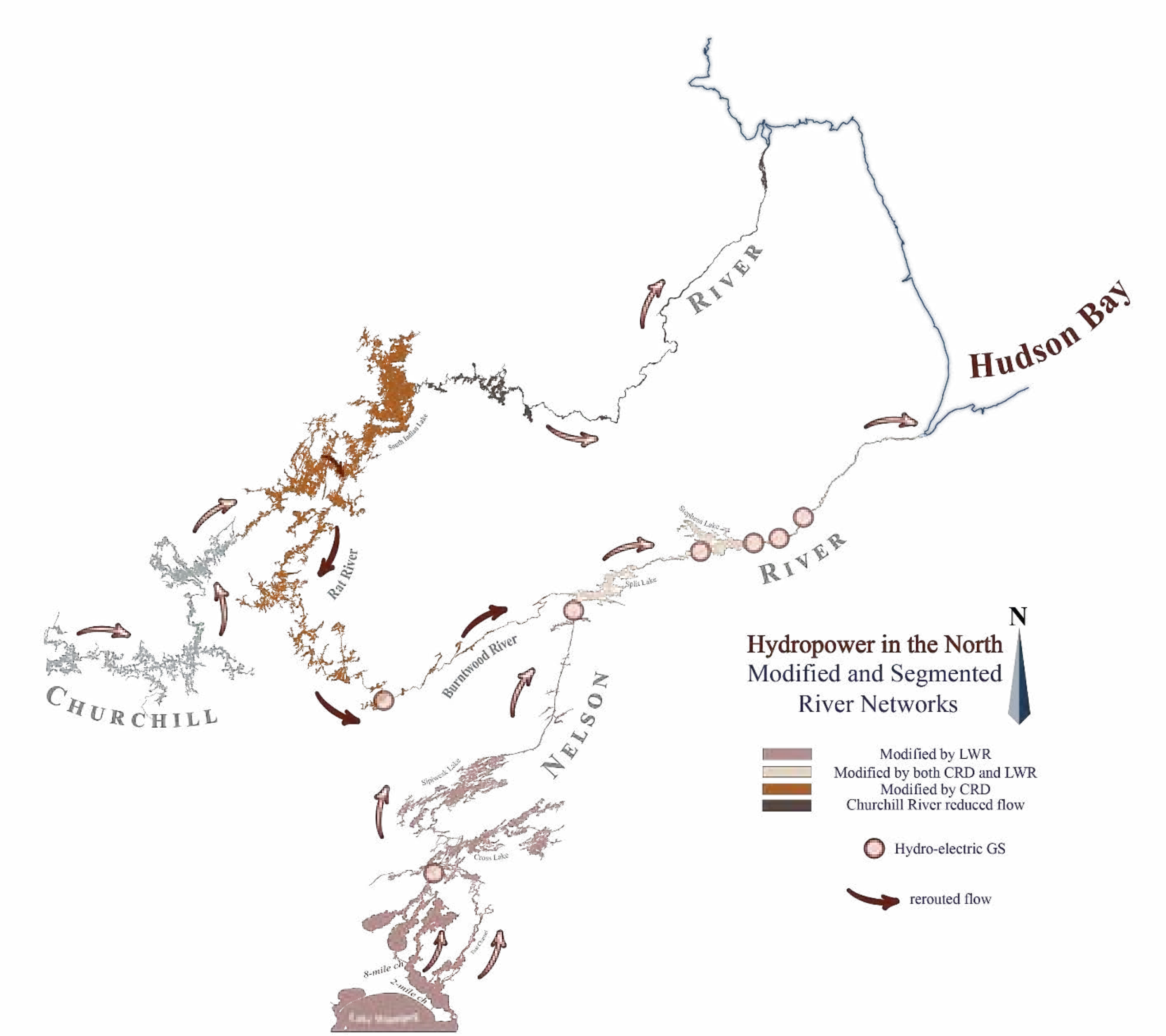


Map 27: From a free-flowing river into 6 segmented portions.

These sites have for more than a century seen their rumbling temperament systematically silenced. The structural engineered works facilitated the spread of the dominion of Hydropower across Manitoba's northern Indigenous ancestral cultural landscape, and not only submerged (associative cascades and numerous contiguous smaller falls) ecological habitat but also replaced and impounded five of the Nelson's dominant rapids. Sites where five hydro-electric generating stations currently sit proudly along the newly established lower spatial context for the Nelson. The repercussions of such silencing continued to unfold now that the re-engineered hydraulic coverage has transformed the once powerful rumbling persona of the Nelson, *Nipi*, into a shell of its former self.

The Nelson has been transformed from a free, swift, strong flowing *Nipi* to a state-of-condition that is representative of a submissive open-water storage reservoir. Such acts showcase Society that continues to perceive *Askiy*, Earth's natural resources as an object that can be easily manipulated to fulfill every one of its needs. Where, *Nipi* still finds itself forfeit in its servitude. The question remains, however, has Hydropower's dominion over the rumbling persona of the Nelson River come full circle? From a societal perspective, time will only tell. This because the journey I have undertaken under the guidance of the Northern *nethowe* narratives observed that notwithstanding Hydropower's persistence in controlling *Nipi*'s nature, its rumbling persona has already survived more than three hundred years of colonial impositions.

Since time immemorial, this distinctive and dominant attribute has played a vital role and connection the Indigenous Nation. Not only to disperse across and within their respective ancestral cultural landscape, but also in forging the Indigenous Identity in close relationship with *Askiy*, Earth's natural resources. Thus, to be forever etched deeply and to live within the Northern *nethowe* histories and narratives.



Map 28: Hydropower in the North.

CHAPTER 5: THE TERRITORY OF *NISICAWAYĀSIHK AND ITS ASINISKAW-ITHINIWAK*

"..the land was beautiful and the lakes were pristine. Lots of game, ducks, lots of animals, all over. Plenty of fish, all over. Our land was abundant with natural wild game. As soon as Hydro raised the water and built the dam, that was it. Everything just changed."
(Elder Leroy Francois, 2019)

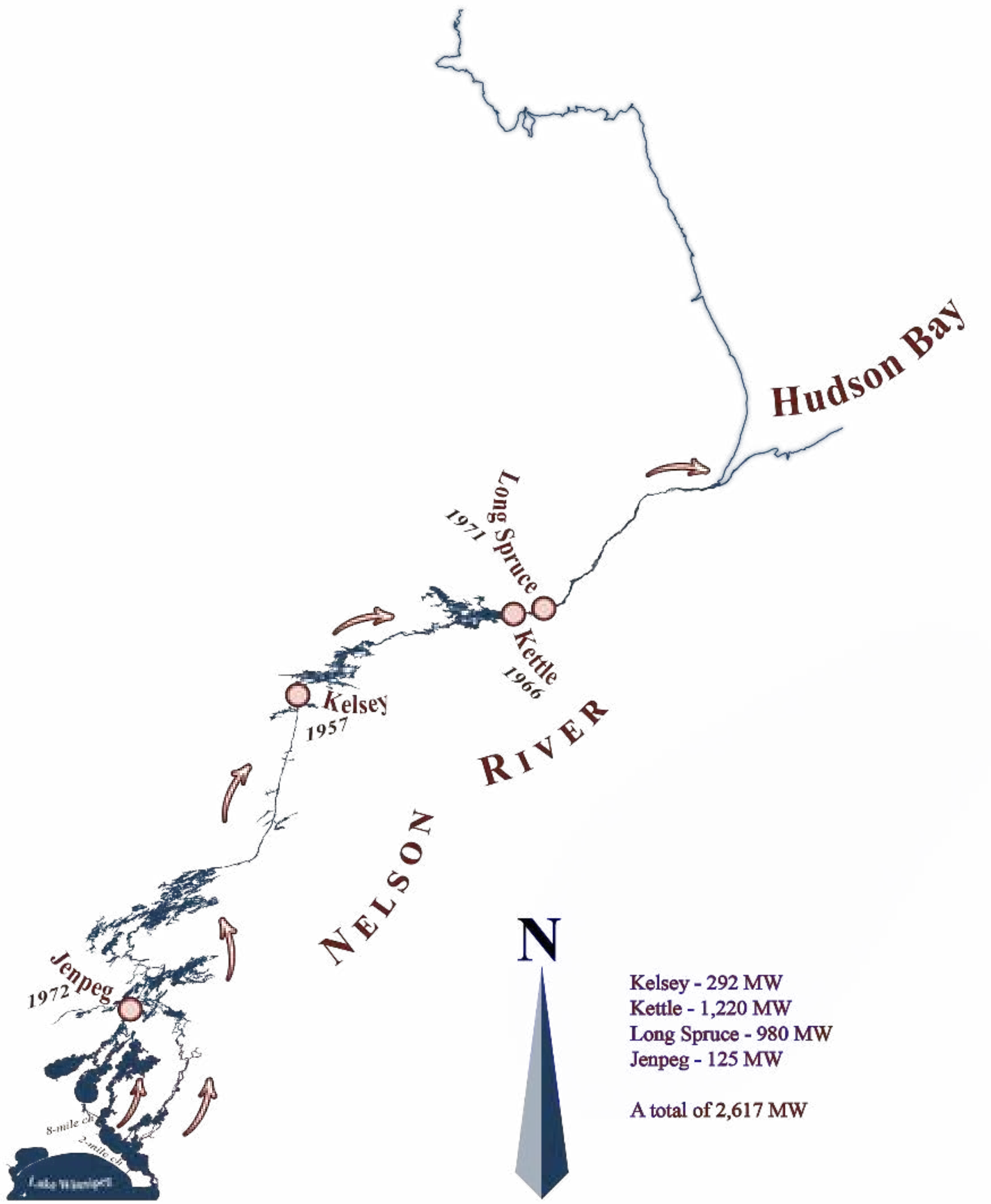
5.1 The Hydropower discourse in the territory *Nisicawayāsihk*:

As, highlighted in the previous chapter, the discourse surrounding Society's quest to generate Electrical Energy, played a critically important strategic role in the conceptualization of Manitoba's Northern Hydropower Generation. By 1970s, a *'small'* fleet of hydro powered generating stations[1] had already begun their dominion over the strong rumbling personality of the Nelson River (Map 29). These produced a combined electrical energy of 2,617 MW. Yet the province's electric power and natural gas crown corporation utility Manitoba Hydro, as established in 1961, was also still required to ensure, satisfy, and safeguard the future demands of the province's growing urban centers and its anticipated cross-boundary energy exportations. (MH, 2015)

Hence, this utility corporation had to guarantee that the Nelson River performed not only predictably but also at its highest capabilities. This need subsequently triggered the execution of the *fourth stage*[2] in Manitoba's Northern Hydro-electric Generation project (Appx. I). Over a three-year period (1973-1976), another northern river, the *Churchill River*, was re-engineered to have 80% of its flow redirected into the nearby Nelson River. (LWCNRSBC, 1975; FEMP, 1992; MW, 2005). This *Churchill River Diversion* impounded the natural drainage outlet of one of the

[1] Construction at Limestone were halted in 1976, due to limited demand, however they resumed in the following decade and Jenpeg was also constructed, as a structure that controls the outflows of Lake Winnipeg (MH, 2015).
[2] First stage: construction of hydro-electric generating stations; Second stage: construction of a HVDC system; and Third stage: the implementation of Lake Winnipeg Regulation (Appx. I).

Churchill's main waterbodies (South Indian Lake) and flow was diverted through an excavated channel along the southern section of the impounded lake (South Bay) (FEMP, 1992; MH, 2015).



Map 29: 1970s Hydro GSs dominion and hydro-electric production along the Nelson River (GIS Sources: Open GoC[3]).

[3] Topographic Data of Canada - CanVec Series, URL https://open.canada.ca/data/en/dataset/8ba2aa2a-7bb9-4448-b4d7-f164409fe056

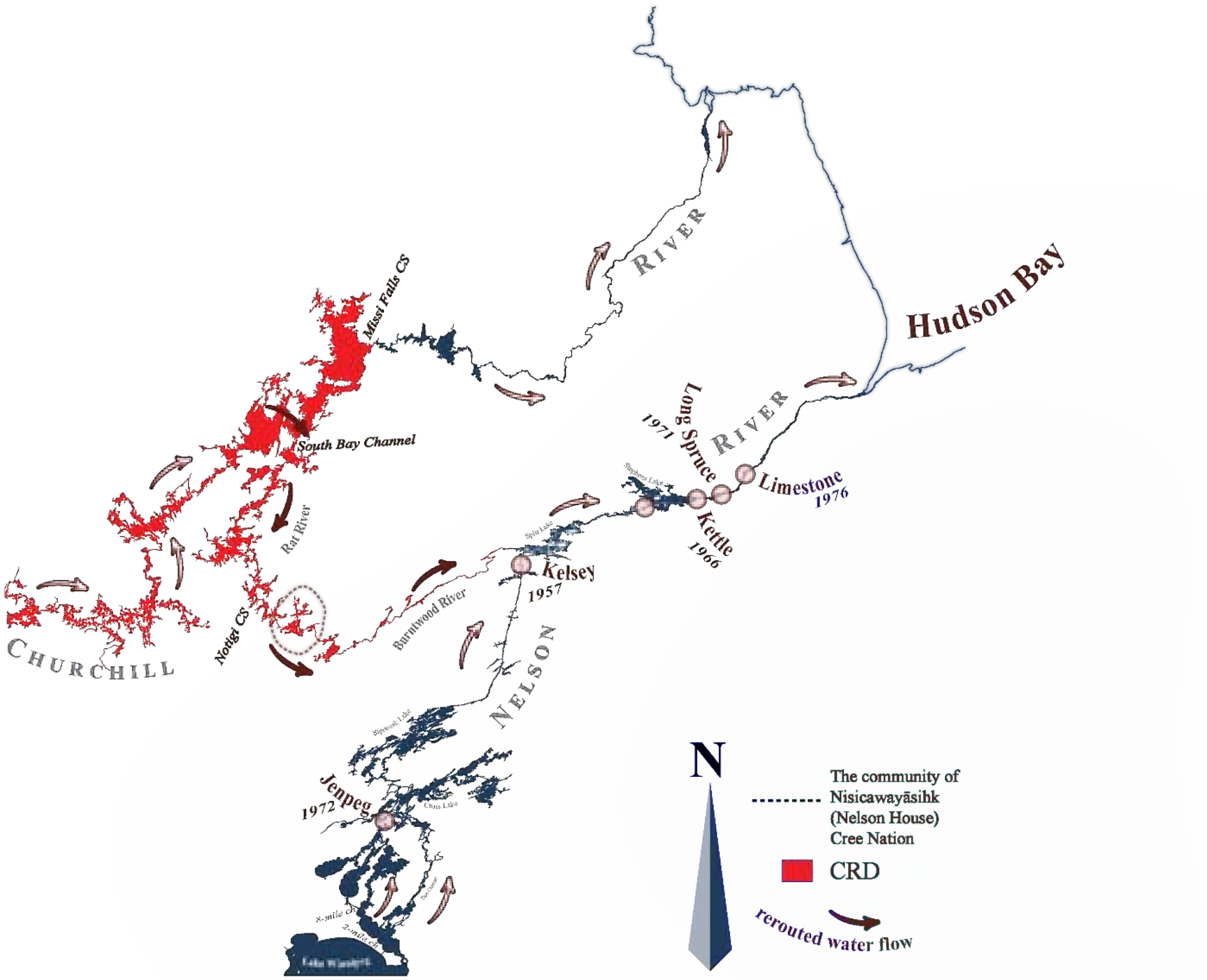
This channel not only had the intent to redirect but also to connect the flow to the *Rat River* which constitutes a tributary of the *Burntwood River* system. A system that in turn drains into the Nelson at Split Lake. The diverted flow was regulated by three-gated control structure that impounded the Rat River hydraulic network system, the Notigi CS. (LWCNRSBC, 1975; FEMP, 1992; MH, 2015; Map 30) The topography upon which this structural engineering exerts their dominion constitute the ancestral cultural territory of the *Asiniskaw-Ithiniwak*[4] *of Nisicawayāsihk*[5]. The landscape of this vast territory embraces a complex of hydrological networks, that sustain a diverse suite of ecological habitats interspersed under the foliage of the Canadian boreal forests. (Elders[6], pers. comms. 2018-19; Appx. D)

The narratives of *Nisicawayāsihk* recall and describe this spatial environment as one being dynamic, vibrant, clean, and organic in nature. Characteristics that directly reflects its people's inherited movement and organisation across the imprinted landscape. The *asiniskaw-ithiniwak* of *Nisicawayāsihk* were thus dispersed in clusters and organised along its intrinsic complex of watercourses. Clusters of families dispersed seasonally in groups to and from the ancestral basecamps. These camps were built along the peripheries of lakes that not only sustained harvesting of wild fruits, and medicinal plants, but also trapping, fishing, and hunting practices. (Elders, pers. comms. 2018-19)

The extremities that defined the waterbody of *Wapānakāhk Sakahekan*, ᐊᐧᐹᓇᑳᕽ ᓴᑲᐦᐁᑲᐣ, or Threepoint Lake, constituted the epicenter for *Nisicawayāsihk* larger social gatherings. (Linklater, 1994; Neckoway, 2007; Elders, pers. comms. 2018-19)

---

[4] Meaning: rocky Cree people (Elders, pers. comms. Fall, 2018-19).
[5] Colonially known as Nelson House Cree Nation.
[6] Four Elders from the group of Elders that lead the Culture and Language Program for *Nisichawayasi Nehetho* Culture and Education Authority in *Nisicawayāsihk* Cree Nation, Nelson House.



Map 30: Northern Manitoba's Hydropower dominion as evidenced by the end of the 1970s (GIS Sources: Open GoC[7]).

[7] Topographic Data of Canada - CanVec Series, URL https://open.canada.ca/data/en/dataset/8ba2aa2a-7bb9-4448-b4d7-f164409fe056

Photo 12: Footprint Lake: one of the remaining islands passing, eroding away (Photo Credit: Victoria Grima, 2016).

The inheritance of this spatial movement/distribution across the cultural landscape represents an intimate understanding of the bond that developed between *Nipi* and its human counterparts. Through time and space, such experiences not only shaped *Nisicawayāsihk* environmental knowledge but also its cultural identity existence. This leading to a coherent coexistence and reciprocating relationship between human and environment. This intimate relationship was shaken to its core once the diversion became operative in 1977 at which time the physiologies of this territory and the social cultural livelihoods dependent upon it found themselves in constant survival mode. These engineering acts dewatered and flooded the ancestral cultural topographical landscape together with its constituent water. (Linklater, 1994; Neckoway, 2007; L. Dysart, pers comms. 2015, 2019; NEB, 2018; Elders, pers. comms. 2018-19)

The extreme fluctuation of water levels destabilised shorelines, increased soil erosion and floating debris, and replaced naturally formed sandy beaches with silts and clays. Prime flora and fauna along with their habitat were inundated, and navigation became dangerous due to the submerged floating debris. The latter in turn limited accessibility to the remaining ancestral basecamps. (Linklater, 1994; Neckoway, 2007; L. Dysart, pers. comms. 2015, 2019; NEB, 2018; Elders, pers. comms. 2018-19; Informal discussions[8], Fall, 2016 & 2018-2019) Notwithstanding such dramatic consequences, *Nisicawayāsihk* managed to retain and continued to exert much of its inherited wandering roaming life activities. Yet, the spatial context for such activities was reshaped in its entirety due to the second phase of this diversion project.

This in turn reflected the establishment of the next hydro-electric generation station, constructed contiguous to the natural outlet of Wuskwatim Lake. This lake forms part of the Burntwood River system. (MH, 2015) This latest impoundment not only silenced the voices of two major rapids, Wuskwatim falls and Taskinigup Falls, along the Burntwood River, but yet again flooded additional *Nisicawayāsihk* ancestral cultural territory. This situation in turn led to further unfortunate circumstances since *Nipi* began to respond unpredictably. (Linklater, 1994; Neckoway, 2007; Elders, pers. comms. 2018-19) Hence, the movement across the inherited territory and navigation within the ancestral watercourses also became uncertain as people adapted to these changes and as the knowledge keepers/custodians of *Nisicawayāsihk* found themselves reinterpreting this uncertainty to safeguard their heritage and identity (Elders, pers. comms. 2018-19).

[8] Personal conservations held with the community members of *Nisicawayāsihk* who further enriched my understanding of the impacts experienced.

Photo 13: Shore banks erosion along Threepoint Lake (Photo Credit: Victoria Grima, 2018).

During my time interacting with and immersed within *Nisicawayāsihk* ancestral cultural landscape and listening to the stories that were shared with me by the participating Elders and community members, the history which defined the current contemporary spatial distribution went beyond the impositions brought forth upon by the Hydropower discourse became clearer. Such experiences reflected the *Explorative Era*, during which Eurocentric metropolitan land-use together with the exploitation of resources were introduced which restricted the spatial distribution of *Nisicawayāsihk* to which they needed to adapt in the subsequent decades (Elders, pers. comms. 2018-19).

5.2 *Nisicawayāsihk* and its ancestral spatial context post-colonial contact:

5.2.1 Nisicawayāsihk inherited ancestral spatial distribution

Pre-colonial, the *Algonquian Nation* moved across and within the central-to-eastern zones of a forested[9] territory, which covered at least 270 million hectares of the Canadian geographical

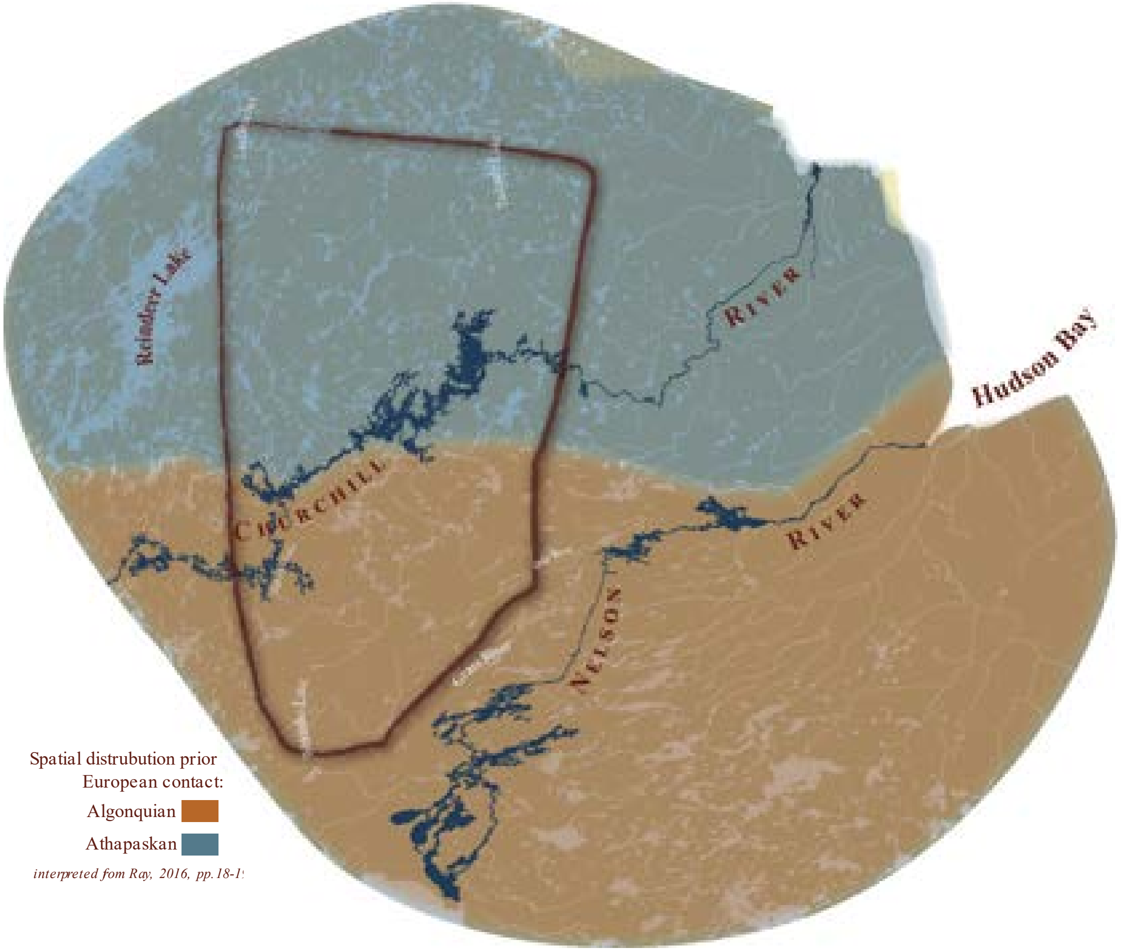
[9] From the Yukon, it crosses into the Northwest Territories and parts of Nunavut, and covers: the northern landscape of British Columbia, Alberta, and Saskatchewan; most of Manitoba, Ontario, and Quebec; and ends at Newfoundland and Labrador (NRC, 2020).

physiology (Wright, 1971; Ray, 1974, 2016; Orecklin, 1976; Grainger, 1979; NRC, 2020; Map 1). The oral histories of the *asiniskaw-ithiniwak* of *Nisicawayāsihk* shared by the group of Elders who guided my cultural immersion explained that the spatial context of their cultural landscape formed part of this larger region (Elders H. Spence & H. Wood, pers. comms. Fall 2018). This topography embraces the landscape that exist between the hydrological physiologies of *Misinipiy*, the Churchill and *Opawanakiyi*, the Nelson. The Elders continued to explain that the dispersion of the people across this landscape was facilitated by canoeing the river systems of *Wasasko*, ᐊᓴᐢᑯ, Rat and *Wiposkawi*, ᐃᐳᐢᑲᐃ, Burntwood (Elders, pers. comms. 2018-19; Map 31).

> *"along the route* [referring to the Rat River] *towards South Indian Lake and* [the route going] *to Thompson, that was part of our traditional territory."*
> (Elder A. Wood, pers. comms. Summer, 2019)

As described by the Elders, this hydraulic complex allowed *Nisicawayāsihk* to imprint upon and occupy a territory that extended southwards, along the peripheries of *Paskoskakanis Sipiy*, ᐸᐢᑯᐢᑲᑲᓂᐢ ᓯᐱᐩ, Grass River[10]. Reflecting a long standing and respectful cross-cultural relationship, this territory extended well into the northern territory of the Athapaskan Nation (Map 31). On the other hand, to the East, this territory continued along the Odei River until it joined with *Wiposkawi Sipiy*, ᐃᐳᐢᑲᐃᐧ ᓯᐱᐩ, Burntwood River. In turn, *Nisicawayāsihk* dispersed westward into the southern region of the Churchill River. (Elders, pers. comms. 2018-19; Map 31)

[10] This constitutes one of the Nelson River's tributaries which drains within that section that accommodates the infrastructure of downstream of Kelsey GS.



Map 31: The spatial context of *Nisicawayāsihk* ancestral cultural landscape as described and understood from the inherited narratives by participating Elders. This was superimposed on the spatial distribution that Ray interpreted in his 2016 publication (pp. 18-19) for the Algonquian and Athapaskan nations prior European contact. (GIS Sources: NRC and Statistics Canada)

Such spatial context has a topography that is characterised by rocky/clayey ridges, low-laying muskeg, and a network of interlocking small to very large waterbodies (Denis *et. al*, 1916; LWCNRSBC, 1975; Newbury *et al*, 1984; Smith *et al*. 1998). The landscape represents a diversified habitat in which black spruce, white spruce, jack pine, and poplar and trembling aspen dominate the flora (Tyrrell, 1896; Denis *et. al*, 1916; LWCNRSBC, 1975; Newbury, *et al*, 1984; Smith, *et al,* 1998). Such habitat sustains a diversity of other flora (undergrowth including berries and herbs) and fauna (waterfowl such as: geese, whitefish; furbearers including muskrat and ungulates such as: moose) (Elder L. Francois, pers. comms. Fall, 2019). Moreover, *Nisicawayāsihk* stories explained that the consumption and availability of such traditional foods depended on their natural life cycle (e.g. berries ripening in fall and geese arriving in spring/summer) (Elders, pers. comms. 2018-19).

The spatial movement of the *asiniskaw-thiniwak* of *Nisicawayāsihk,* across their ancestral cultural landscape was and still constitutes a direct reflection of living in harmony and in conjunction with the different phases of the weather. Through the acquired environmental knowledge, the Elders described that the context of such movement was based upon *nikotwaswow kakwiskipathikwaw,* ᓂᑯᑕᐧᓱᐧᐤ ᑲᑭᐧᐢᑭᐸᖨᑲᐧᐤ, six seasons. In *sikwan*, ᓯᑲᐧᐣ, spring the ice begins to thaw, thus initiating break-up and after two phases of the moon, *Nipi* is free flowing (*mithoskāmin,* ᒥᖪᐢᑳᒥᐣ) and navigable. This flow is nourished through *nīpin*, ᓃᐱᐣ, summer and *takwākin*, ᑕᑳᐧᑭᐣ, fall in preparation of the freeze-up (*mikiskaw,* ᒥᑭᐢᑲᐤ) cycle which introduces the cold attributes of *pipon*, ᐱᐳᐣ, winter. (Elders[11], pers. comms. Fall 2021; Figure 19)

[11] Six Elders from the group of Elders that lead the Culture and Language Program for *Nisichawayasi Nehetho* Culture and Education Authority in *Nisicawayāsihk* Cree Nation, provide additional teachings about the six-season cycle during a gathering where I presented the thesis's outcomes. Four of these six Elders present, were actively involved during the mapping aspect of this study.

Figure 19: Seasonal Round interpreted from narratives shared the participating Elders from *Nisicawayāsihk.* The color scheme of this design reflects those that were used on a poster shared by the Elders, that shows the sequence of *nikotwaswow kakwiskipathikwaw* going into each other. A color scheme which is also part of the Pīsim Finds Her Miskanaw Teacher's Guide published by the Six Seasons of the *Asiniskaw Īthiniwak* project.

During these six seasons, the Elders continued explaining that *Nisicawayāsihk,* travelled in clusters to and from their respective ancestral basecamps. The composition and size of the clusters depended on the inter-relational dynamics among the relatives. As such a cluster may have incorporated either the members of one family group and/or that of two or three families. The campsites were interspersed within, across and along the topographical physiologies that surrounded and were immediate adjacent to the river systems of *Wacasko*, ᐊᒫᐢᑯ, Rat and

Wiposkawi, ᐃᐳᐢᑲᐏ, Burntwood. These camps occurred along the shores of distinctive waterbodies, such as those of *Wacasko*, ᐘᒐᐢᑯ, Rat; *Oswapisin,* ᐅᐢᐘᐱᓯᐣ, Wapisu, *Wapānakāhk*, ᐘᐹᓇᑳᕽ, Threepoint and *Oskotimi*, ᐅᐢᑯᑎᒥ, Wuskwatim. (Elders, pers. comms. 2018-21)

> *"We used these camps for thousands of years. They are the same camps we used for thousands of years".*
>
> (Elder L. Francois, pers. comms. Spring, 2019)

The Elders shared that each basecamp[12] acted as a hub, from which the male members of the group dispersed into the nearby resourced tracts of land and women stayed back to smoke the harvested meat and take care of the children. Thus, sustaining *Nisicawayāsihk* livelihoods all-year round. (Elders, pers. comms. 2018-19) Fishing (such as whitefish in the fall/pickerel in the spring and winter) mostly happened all year round. However, *sikwan*, ᓯᑿᐣ, spring and *takwākin*, ᑕᒁᑭᐣ, fall hunting and trapping activities focused on small-to-medium-sized animals, such as geese, marten, muskrat, and hares. While dog teams during *pipon*, ᐱᐳᐣ, winter season facilitated the hunt of large-sized game, like caribou and moose. Although moose hunting also occurring during fall season. (Elders, L. Francois and A. Wood, pers. comms. 2018-19)

The inheritance of such rotational seasonal movement from one ancestral basecamp to another strengthened *Nisicawayāsihk* intimate connection with *Nipi* and its topographical physiologies for many generations (Elders, pers. comms. 2018-19). Such connections transformed the inherited ancestral cultural landscape into a dynamic, vibrant, and organic spatial fabric context that gave *"context and substance"* (Linklater, 1994, p. 33) to *Nisicawayāsihk* identity and cultural heritage. The shared knowledge continued by highlighting that *Nethetho* (Cree) language imprinted names onto the inherited landscape as landmarks, and features, via

[12] These constituted of a cluster of log cabins where the group lived together as a small community (Elders, pers. comms. 2018-19).

achimowenu,[13]storytelling and *achuthokewenu*[14], cultural myths (Elders, pers. comms. 2018-21; Informal discussions, Fall, 2016 & 2018-2019). These communicated the value of mutual respect towards all living things by preserving and taking care of the occupied land-space and not taking more than it is necessary (Elder A. Wood, pers. comms. Summer, 2019)

> *"I was taught the most important thing to respect the land, that was the number one, to respect, not only the land but also the animals that were caught, everything had a purpose."*
>
> (Elder A. Wood, pers. comms Summer, 2019)

5.2.2 The ancestral cultural landscape of Nisicawayāsihk during the fur trade era

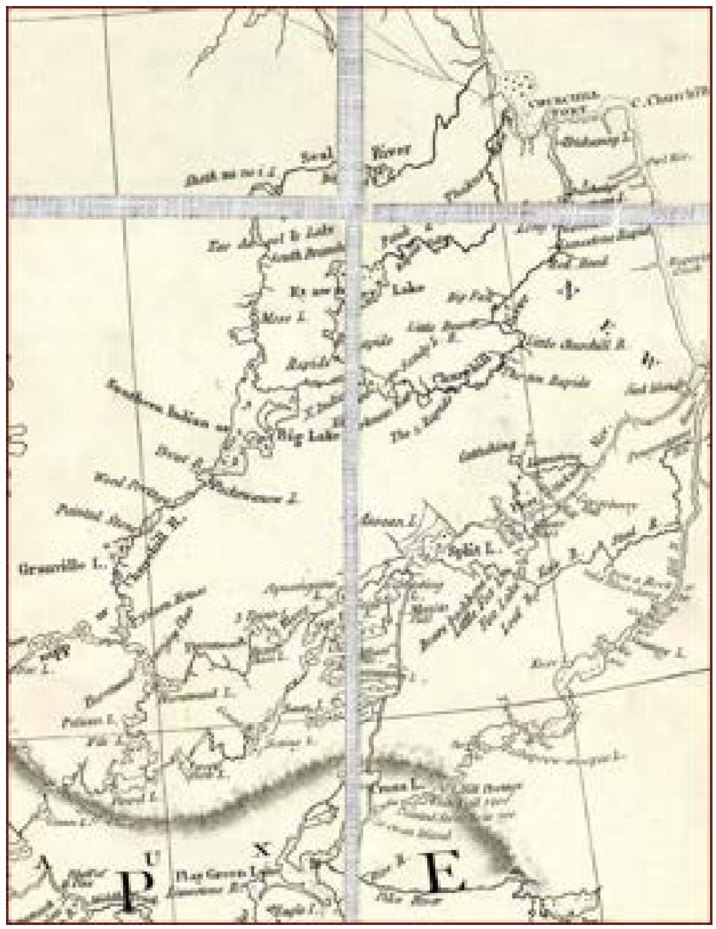
Post-colonial contact with the fur trade in Northern America occurred through the establishment of coastal and inland posts which reshaped the spatial context of this geographical and topographical landscape (Appx. A). The territories under the control of the British Crown together with the topography under the dominion of the Hudson Bay Company (HBC), were subdivided into fur-trading resource regions (Appx. A: Arrowsmith, 1832). Their geographic outreach and the number of trading posts constructed within each region varied in accordance with the supply of the harvested fur by the Indigenous traders and hunters, and the demands by the European market for high quality pelt. (Ray, 1974; Orecklin, 1976; Grainger, 1979).

Hence, within the territory referred to by Thompson as *"Muskrat Country"* (Tyrrell, 1916, p. xxxiii), the earliest evidence of an established fur-trading post in the proximity of the hydrological network of the Rat and Burntwood Rivers emerge from 1740 to 1760 according to dated documentation (Voorhis, 1930, p. 124). Due to the continued trading feuds between the British and the French, the location of this post shifted repeatedly and thus, its geographical origins are unknown (Ray, 1974, 1978; Orecklin, 1976; Grainger, 1979). Notwithstanding this

[13] NCN, 2016, p. 2
[14] NCN, 2016, p. 2

uncertainty, Voorhis (1930, p. 124) accredits *'Nelson House'*[15] and/or *'Nelson River House'* as its given name. A name that Fidler sketched and documented in his hydraulic surveys within his 1798/1807 exploration notes (Appx. B: HBCA-E3-3-056; HBCA-E3-3-095)

These notes highlight the location of Nelson House post as being part of the eastern shoreline of an unnamed[16] waterbody which constituted an expansion within the hydraulic system of *Misinipiy Sipiy*, the Churchill River (Appx. B: HBCA-E3-3-056; HBCA-E3-3-095). This lake in accordance with Arrowsmith's 1814 map was located approximately 60 miles (96 km) northwest of *Wapānakāhk Sakahēkan*, ᐋᐸᓈᑳᕽ ᓴᑲᐦᐁᑳᐣ, Threepoint Lake. This fur-trading post was located on this lake in the closing years of the eighteenth century, where it was built by the French traders in 1789/1790 and then built again by British traders in 1793/1794 (Grainger, 1979, p. 36).



Map 32: A snapshot of the Arrowsmith 1814 Map. Besides the location of Nelson House fort, this also earmarked the prominent rapids/falls along the Churchill's hydrology (Appx. A).

[15] This colonial name will *Nisicawayāsihk* ultimately inherit more than a century later through an adhesion made to Treaty No. 5 (1875-1876) signed on July 30th of 1908 (IAND, 1969).
[16] Late 19th century cartography named this lake as Nelson Lake (Appx. A: Bartholomew, 1880). On the other hand, contemporary cartography names it as Highrock Lake (NTS Sht. 63N, Ed. 2).

Map 33: Approximate location (orange arrow) of Nelson Lake fort/trading post as depicted on J. Arrowsmith 1857's *Map of North America* (Appx. A).

What is interesting about the relocation of this fort, is that the year it was under the control of the British traders, Thompson was canoeing with his companions through the countryside in-question. In June of 1793, Thompson left Seepayisk House, which was located within the extent of Sipiwesk Lake, on the Nelson River, to explore the topographical physiologies of the northwest countryside (Tyrrell, 1888; Tyrell, 1916b). In his letter to the HBC, Thompson writes that on the sixth day of June of the same year he encountered the ancestors of the present-day *Nisicawayāsihk* Cree Nation. Thompson explains that he met with the *"Northern Indians"* when he arrived at the *"Neestowyans or the three tracks"*. That is, where the *"Musk rat river"* (the Rat River) and *"another of no note disembogue into Weepooscow*[17] *river"* (the Burntwood River) (HBC Arch B 239/b/58 p. 17; Appx. B). Thus, Threepoint[18] Lake.

As participating Elders explained, *"Neestoyasee"* signified a spatial context where the three rivers of Footprint, Rat[19] and Burntwood joined together. This space was known, understood by the water users, and seen as occurring when canoes entered and headed north in Threepoint Lake. (Elders, H. Wood, pers. comms. Summer 2019) A space which configuration was completely altered and obliterated through the operations of the Diversion project (Appx. H). Going back to Thompson's narrative, he informed the HBC that upon his arrival, he was welcomed by "*about 20 Canoes of Northern Indians"* (HBC Arch B 239/b/58 p. 17). Such an observation clearly affirms that *Wapānakāhk Sakahēkan*, ᐋᐧᐸᓈᑳᕽ ᓴᑲᐦᐁᑳᐣ, Threepoint Lake and its environs were a central component of the cultural inheritance of *Nisicawayāsihk*.

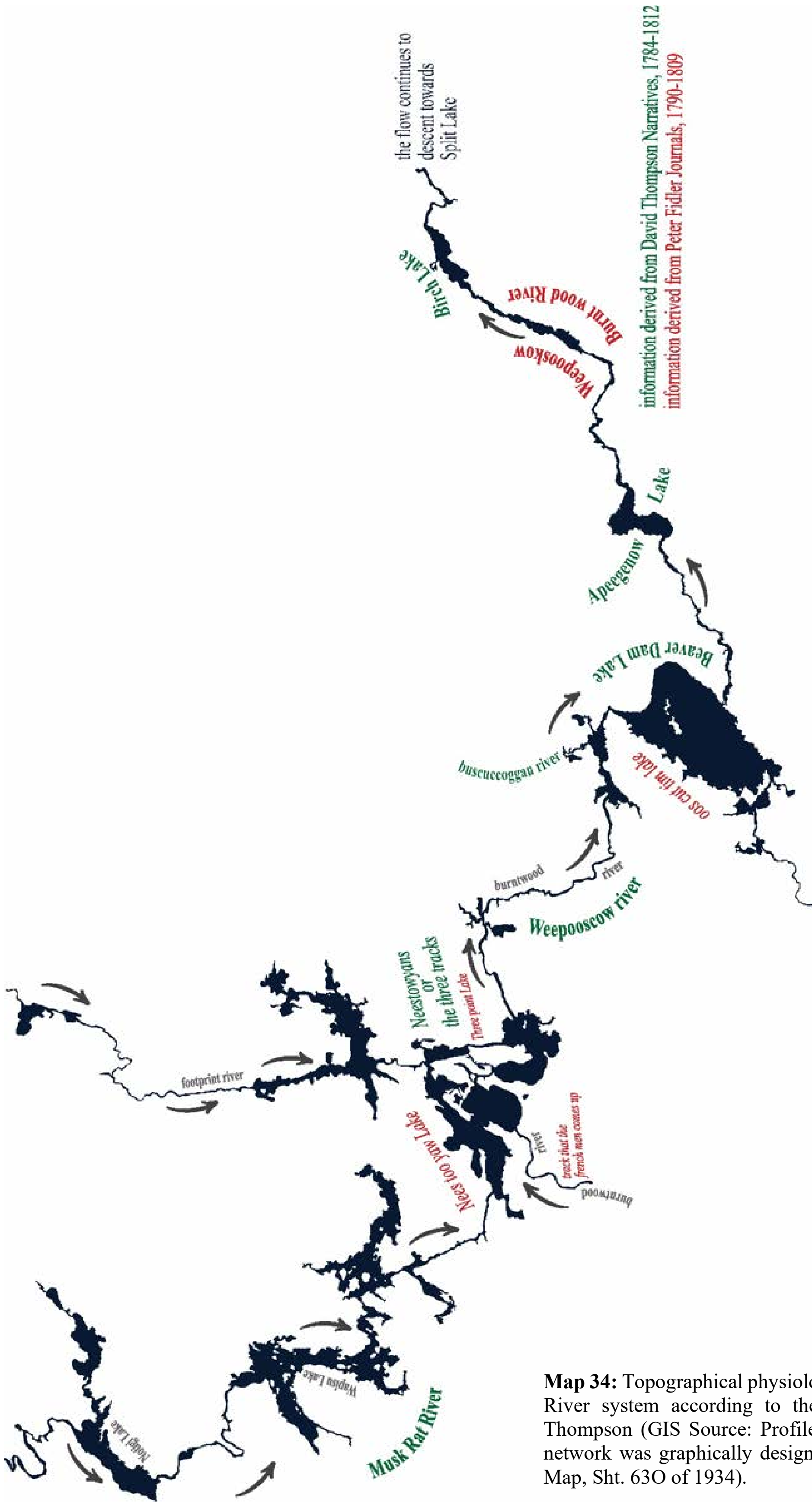
Once Thompson met with these *"Northern Indians",* he was presented to the Chief. In the presence of the Chief, Thompson offered *"brandy, tobacco and ammunition"*, together with a request that two *"Northern Indians"* guide him *"up the Deers river to the athapuscow Lake"* (HBC Arch B 239/b/58 p. 17). The latter lake forms part of the Grass River, a hydrology which constitutes one of the tributaries that feeds into the Nelson River. Thus, the lake is located within southwest topography to Threepoint Lake and at Manitoba's western border (Map 34). With respect to *"Deers River",* Thompson is referring to the Reindeer River, which feeds into the Churchill River and the territory west of Threepoint Lake (Map 34).

---

[17] In the 20th century according to Tyrell's 1915 (p. 227) research, the Algonquian name associated with the Burntwood River was *Wipiskow' Sipi*.

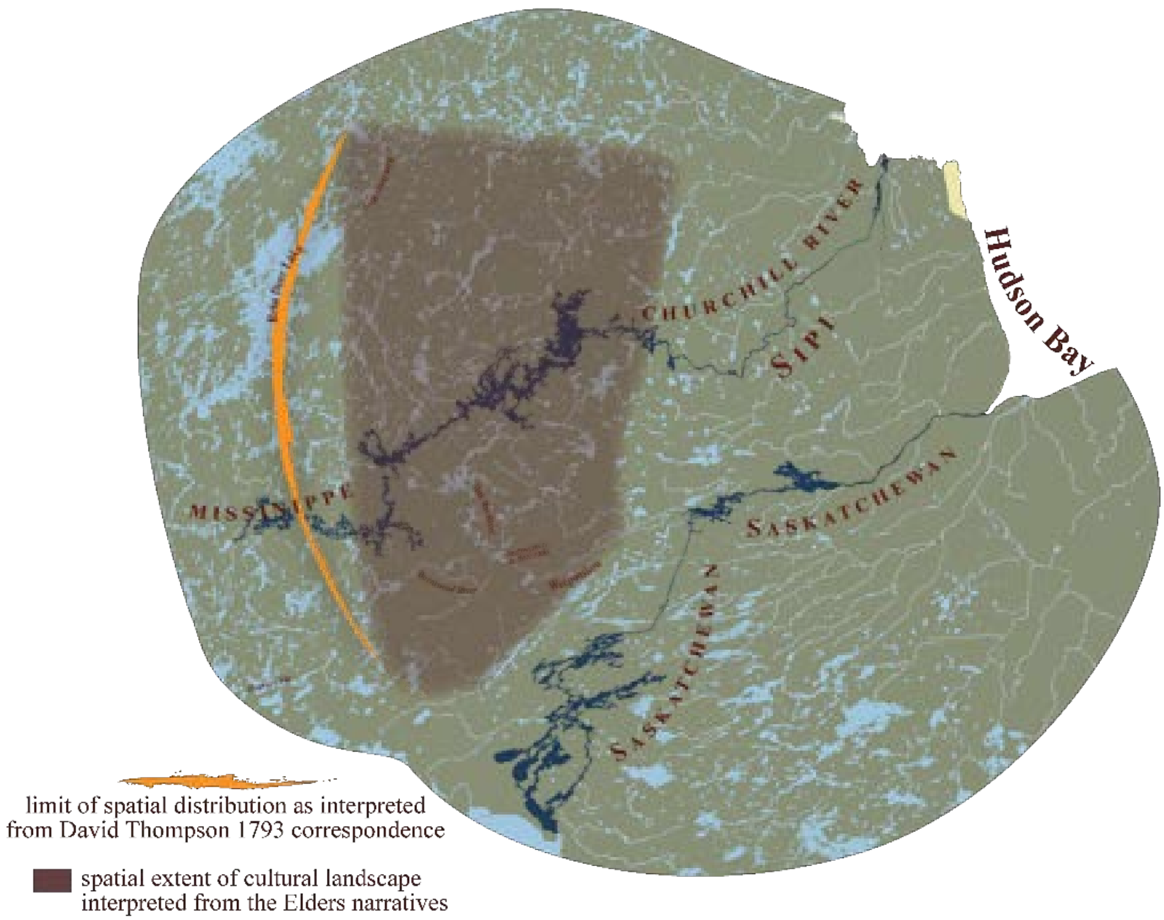
[18] Early 19th century cartography annotated this lake as *'3 Points Lake'* (Map 32; Appx. A). On the other hand, Tyrell's 1915 (p. 221) research indicates *Nistowean' Saka'higan* as the Algonquian name for Three Point Lake. However, the map published by Commission of Conservation for the assessment carried out on the country's waterpower capabilities during the early years of the 20th century, identified Threepoint Lake as "*Nistowasis*" (Appx. F)

[19]. The late 19th century maps prepared for the Canadian Pacific Railway identified this river as Squirrel River (Appx. A: Bartholomew, 1880).



Map 34: Topographical physiologies along the Rat-Burntwood River system according to the observations of Fidler and Thompson (GIS Source: Profile of the Rat-Burntwood River network was graphically designed from the NTS Preliminary Map, Sht. 63O of 1934).

So that spring, Thompson was trying to reach Cumberland House through a northwest route rather than the better-known route through the Saskatchewan River (Tyrrell, 1916a, pp. xvi-xviii). The ancestral Chief of *Nisicawayāsihk* replied by accepting the offered 'gifts' and providing the requested guides. However, he informed Thompson that his guides could only assist him in reaching the expansions that formed part of the hydraulics of *"Deers river",* this because *"beyond those places" "their own knowledge ends"* (HBC Arch B 239/b/58 p. 17). Thus, the ancestral spatial coverage of *Nisicawayāsihk* during the closing years of the eighteenth century extended well into the topographical physiologies of the northwestern territory.



Map 35: The western spatial extent interpreted from *Nisicawayāsihk* ancestral chief in accordance with David Thompson's 1793 correspondence to HBC. The Indigenous names for the rivers of Churchill and Nelson are as understood by Thompson.

Therefore, this documented testimony ascertains that although the fur-trade market was ardent in imposing pre-defined geographical trading districts (Appx. A: Arrowsmith, 1832), *Nisicawayāsihk* spatial movement and context inheritance still prevailed over any such impositions. Notwithstanding this, such restrictions, the new strategies implemented by the HBC to ensure consolidation of its fur-trade market (i.e the 1821 merger of the NWCo) in the turn of the century (19th) began to gradually undermine this spatial heritage.

5.2.3 Missionaries in Nisicawayāsihk

To improve the generation of profitable economic trade benefits, the HBC required that its posts[20] attain and assume much more permanent positions within their fur resource regions (Grainger 1979). To achieve this objective, the northern territory, in particular, had to embrace to the fullest the structured livelihoods of the introduced European society. This structure ardently sought to transform Indigenous heritage, livelihood, and its seasonal organic nomadic movement into a permanent *"small self-sufficient agricultural community"* (Orecklin, 1976, p. 43). The territory in-question together with its Indigenous Nations was required to acknowledge the so-called superiority of *"civilized society"* by embracing Britain's *"evangelical theology"* (Orecklin, 1976, p. 43).

Thus, the reconstructed trading post at *Otītiskiwin Sakahekan*, ᐅᑌᑎᐢᑭᐃᐧᐣ ᓴᑲᐦᐁᑲᐣ, Footprint Lake (Elders, per. Comms. Summer, 2019, Map 37), which was named Nelson House, in July of 1891, was provided a Methodist missionary (Gaudin, 1942, p. 23). Reverend S. D. Gaudin, thus began his travels towards the Nelson House post later that year, with two Indigenous

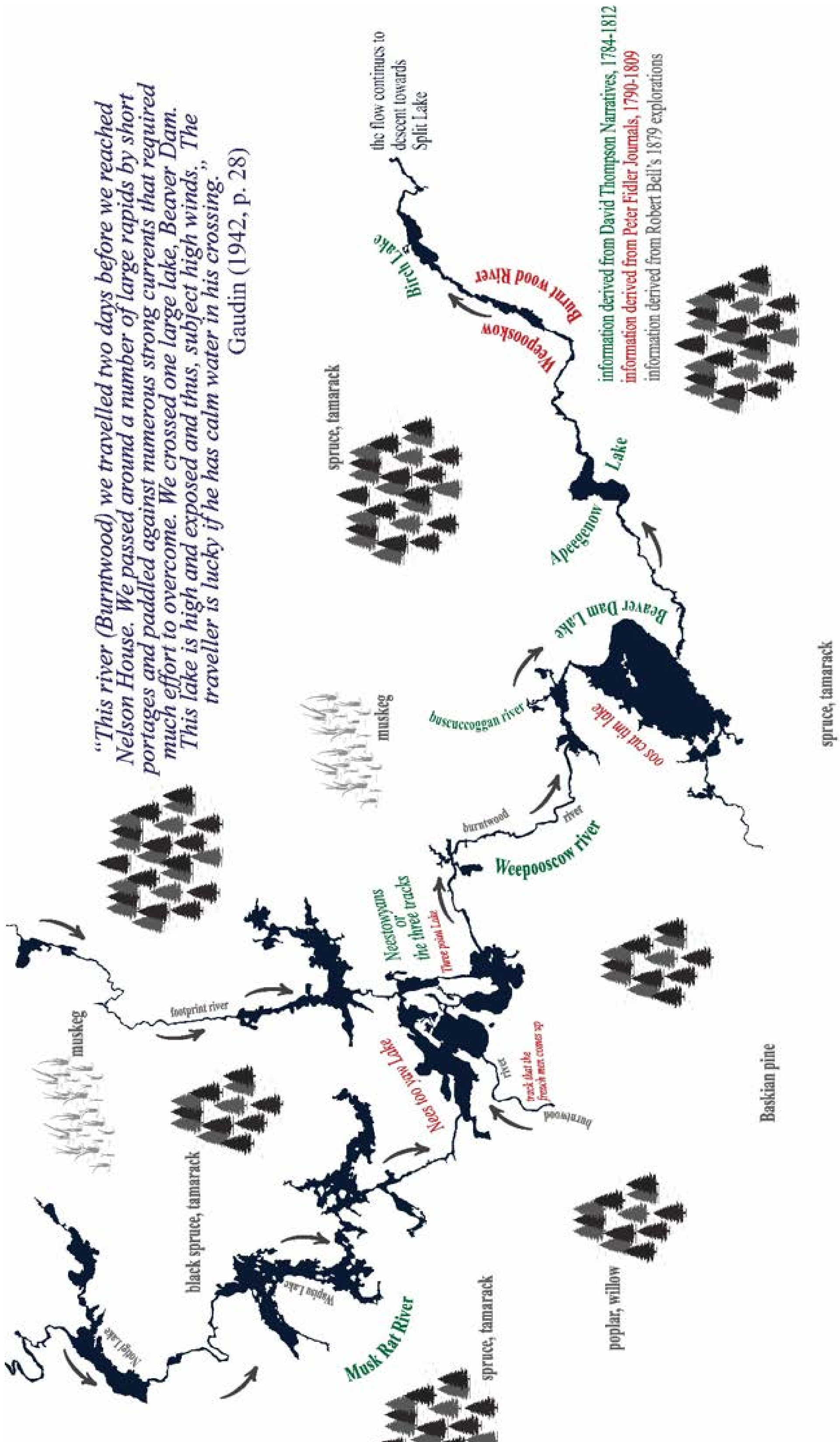
[20] The trading post at the "three track" and/or Threepoint Lake was reconstructed in 1822 and again in 1833 (Ray, 1974; Orecklin, 1976; Grainger, 1979). This post was known as Fort Seaborn and built in an area known as *othowinihk*, ᐅᑐᐦᐅᐃᐧᕽ (Elders, pers. comms. Summer, 2019; Map 37). However, in 1878 this post was relocated further inland, was reconstructed on the northeastern shoreline of *Otītiskiwin Sakahekan*, ᐅᑌᑎᐢᑭᐃᐧᐣ ᓴᑲᐦᐁᑲᐣ, Footprint Lake (Grainger, 1979; Linklater, 1994; Elders, pers. comms. Summer, 2019, Map 37). There, it inherits the name of *Nelson House* (Voorhis, 1930, p. 124).

companions, one of whom was from *Nisicawayāsihk* (Gaudin, 1942, pp. 23-30). Their journey commenced from the Methodist Rossville[21] missionary which had been established within the eastern channel of the Nelson. They canoed through the maze of narrow channels that characterised this section of the river, that led them into the lake of *"Pim-che gu-mak",* Cross Lake. From this lake, they continued to portage through several rapids/falls which steered them into the lake of *"See-pee-wask"*. (Gaudin, 1942, pp. 23-30)

From *"See-pee-wask"*, they turned and travelled within the northwestern landscape whose topography was dominated by muskeg vegetation. This route ultimately led them into the Burntwood River, where they had to canoe against *"numerous strong currents"* to reach the *"Beaver Dam".* (Gaudin, 1942, pp. 23-30) Gaudin, is referring to *Oskotimi Sakahekan,* ᐅᐢᑯᑎᒥ ᓴᑲᐦᐁᑲᐣ, Wuskwatim Lake (Elders, pers. comms. Summer, 2019). Gaudin further writes that the shoreline of this lake is *"high and exposed"*, thus gave rise to *"high winds"* when they crossed its open waters. Thus, Gaudin and his companions experienced rough waters while paddling into the channel that guided them into Threepoint Lake. (Gaudin, 1942, pp. 23-30)

Upon their arrival at Threepoint Lake, they met with a group of people, that Gaudin refers to in Cree as understood by him, as *"oo twa hoo win"* (Gaudin, 1942, pp. 28, 41; Map 37), in an area (*othowinihk,* ᐅᑐᐦᐅᐃᐧᕽ) that hosted one of the oldest basecamps for *Nisicawayāsihk* (Elders, pers. comms. Summer, 2019). This area defined the outlet channel that connects this lake with Footprint Lake (Map 37). Gaudin continued to explain that their arrival was welcomed by a *nethowe* woman, who informed them that most of the members forming part of this cluster were currently out for fall fishing (Gaudin, 1942, p. 28).

[21] This missionary was reached by canoeing from Warren Landing, the outlet of Lake Winnipeg, down through Playgreen Lake that led into the eastern branch of the Nelson River.

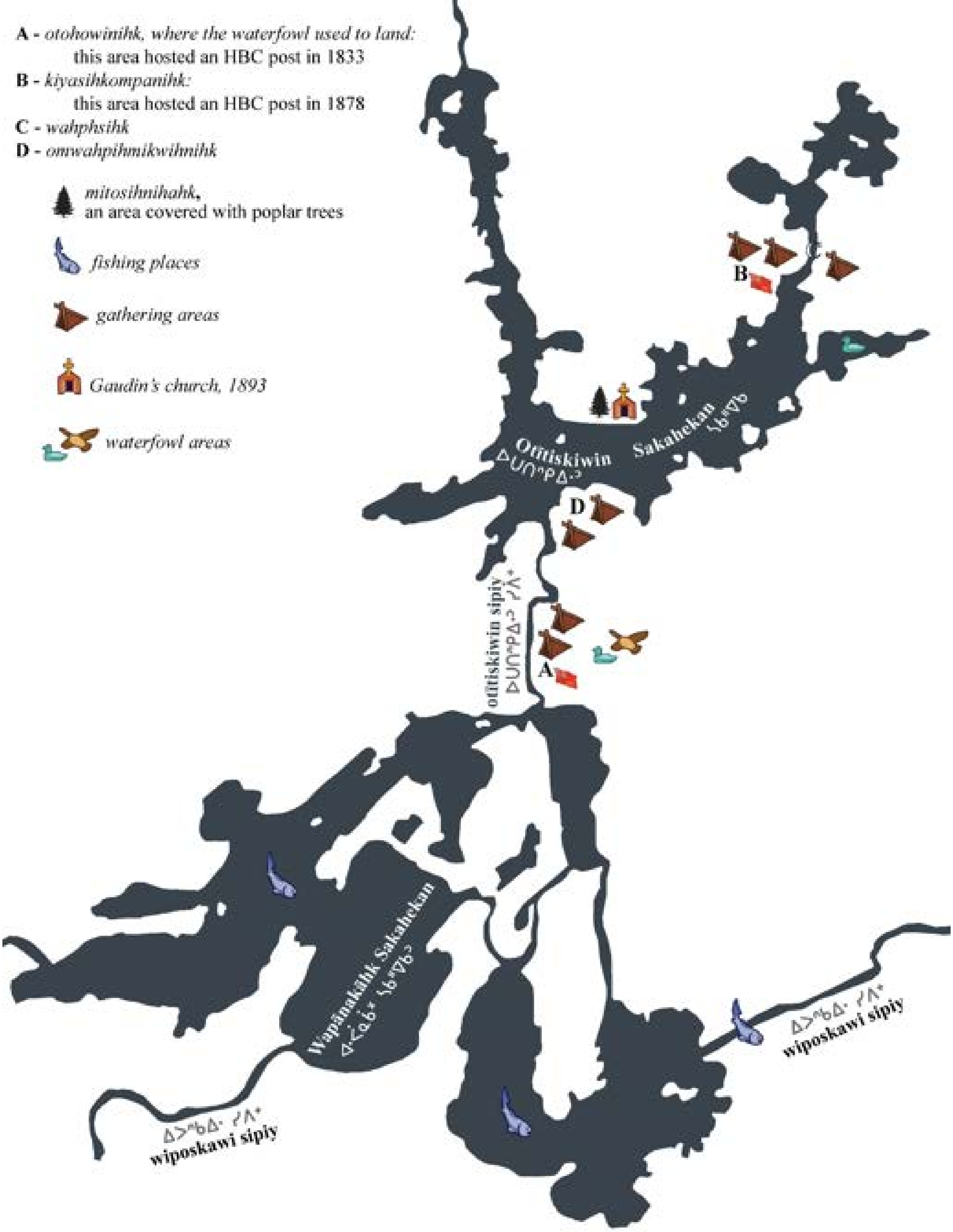


Map 36: Additional topographical physiologies from geologists and missionaries.

Upon hearing this, Gaudin and his companions continued to canoe towards Footprint Lake, where they met the postmaster of the HBC trading post (Gaudin, 1942, pp. 23-30). Right after making his presence known to the HBC post, Gaudin immediately started his missionary work. After two years, he had established a church (in 1893) on the western shores of Footprint Lake, within an area which was dominated by poplar trees (Gaudin, 1942). An area which *Nisicawayāsihk* refers as *"mitosihnihahk*[22]*"* (Linklater, 1994 p. 82; Map 37). Notwithstanding having established this place of worship, after 15 years of missionary work within the ancestral cultural landscape of *Nisicawayāsihk,* Gaudin failed in establishing a permanent settlement. This failure in part, as reflected in the memoirs of Gaudin and of his wife, are due to *Nisicawayāsihk* seasonal nomadic movement that occurred through their stay.

Thus, Gaudin writes that each year, during summer[23] season, the ancestors of *Nisicawayāsihk* would gather along the shores that defined the lakes of Footprint and Threepoint. There, he would observe the women preserving meat for pemmican and tanning the skins of the animal harvested during seasons of winter and spring (Gaudin, 1942). Skins were used to make moccasins and gloves (Elders, 2019), and the families would congregate in large numbers within four specific areas. Gaudin continued to explain that for the summer of 1895, the people formed four clusters, these near the HBC post (*kiyasihkompanihk*[24]), across the narrows (*wahpahsihk*[25]), across Poplar Point (*omwahpihmihwihnihk*[26]) and at "*oo twa hoo win*[27]" (Gaudin, 1942, p.64; Map 37).

[22] It is from this area, that the present-day 'urban' fabric of *Nisichawayasihk* community evolved.
[23] The Elders of *Nisichawayasihk* informed that the months which comprised the summer season were the busiest. And this was not only because of the intensive fishing activities that occurred but also because it was the ideal time to carry out any repairs to hunting and fishing gear and stock up on supplies. (Personal dialogues)
[24] Linklater, 1994, pp. 80-95.
[25] Linklater, 1994, pp. 80-95.
[26] Linklater, 1994, pp. 80-95.
[27] *Otohowinihk* (Elders, pers. comms. 2019).



accordance with the shared narratives of the Elders of *Nisicawayāsihk.* The Elders also provided guidance on the appropriate Cree names and syllabics symbols for the locations mapped. The Cree names for locations B to D and poplar point were respectively adapted from Linklater 1994 thesis. (GIS Source: Profile of the lakes as per NTS Sht. 63O, Ed. 2).

On the other hand, in her memoirs, Gaudin's wife, Anna, recalls that during winter her husband had to travel into the wilderness to reach the winter campsites, in order to do his missionary work. These camps were interspersed underneath the forest's canopy and located far apart at great distances. Moreover, they were not stationery since the hunting groups followed the game being hunted. Thus, Anna further indicated that her husband during his winter travels often required the aid of a local member of *Nisicawayāsihk*. This to help him understand the directions that the hunters used to leave on the bark of the trees to indicate their locations. (Shipley, 1955)

Photo 14: "*Nelson House on Three Point Lake*" c.1889-1890. In the background one can see the trading post surrounded by gardens. (Photo Credit: Archives of Manitoba, James McDougall album 1, 1889-1890, Item Description: 1987/13/1-113).

5.3 *Nisicawayāsihk* context during the early stages of the 1900s:

5.3.1 *Canadian Numbered Treaties: Treaty No. 5 (1875-1876), its adhesion (1907-1910)*

The 1867 *Canadian Confederation* (Map 3), set the stage for the newly formed government as it began implementing its campaign of 'acquiring land'. Hence, in 1870, the HBC relinquished its rights over the North American landscape - Rupert's Land (Map 4), in large part because for the newly formed *Federation* be a success, the unorganised territory needed to be under Federal jurisdiction. (Kenneth, *et. al*, 1986; Martin, 1995; Tough, 1996; Hall, *et. al*, 2017) This brought forth the issue of Indigenous land entitlement, since the purchased territory constituted the ancestral cultural inheritance of a diverse group of Indigenous Nations (Elder, D. Scott, per. comms. Fall, 2019). Thus, a systematic negotiation process of Treaty[28] negotiations began to transfer Indigenous jurisdiction over to the Crown across much of Canada (Kenneth, *et. al*, 1986; Tough, 1996).

Through this treaty process the signatory Indigenous Nations were expected to relocate onto *'reserves'* (Kenneth, *et. al*, 1986; Tough, 1996). This in part because these agreements were *"based more on economic practicality"* rather than *"on any conception of Indigenous rights"* (Hall, *et. al*, 2017). Hence, five years after the consolidated sale of *Rupert's Land*, Treaty Number 5[29] was signed in 1875. The geographical extent of this treaty included the eastern and western physiological topography that surrounded the shores of Lake Winnipeg. While it extended northwards to include the mid-portion of the Nelson River at Split Lake. (Appx. A: DOI, 1878) This Treaty was signed by the Crown, Her Majesty the Queen, with the Ojibwa and Swampy Cree Nations that resided along the shores of Lake Winnipeg (IAND, 1969; Kenneth *et. al*, 1986; Tough, 1996; Hall *et. al*, 2017)

[28] Between 1871 and 1921, 11 numbered Treaties were negotiated and signed between the Government and the Indigenous Nations (Kenneth, *et. al*, 1986; Tough, 1996; Hall, 2011; Map 6).

[29] The negotiations were carried out with each Indigenous Nation, individually, rather than treating the interested landscape as one wholistic region. The latter constituted the standard practice applied by the Commissioners who dealt with the making of the Treaty. (Ray, *et. al*, 2000, pp. 121-129)

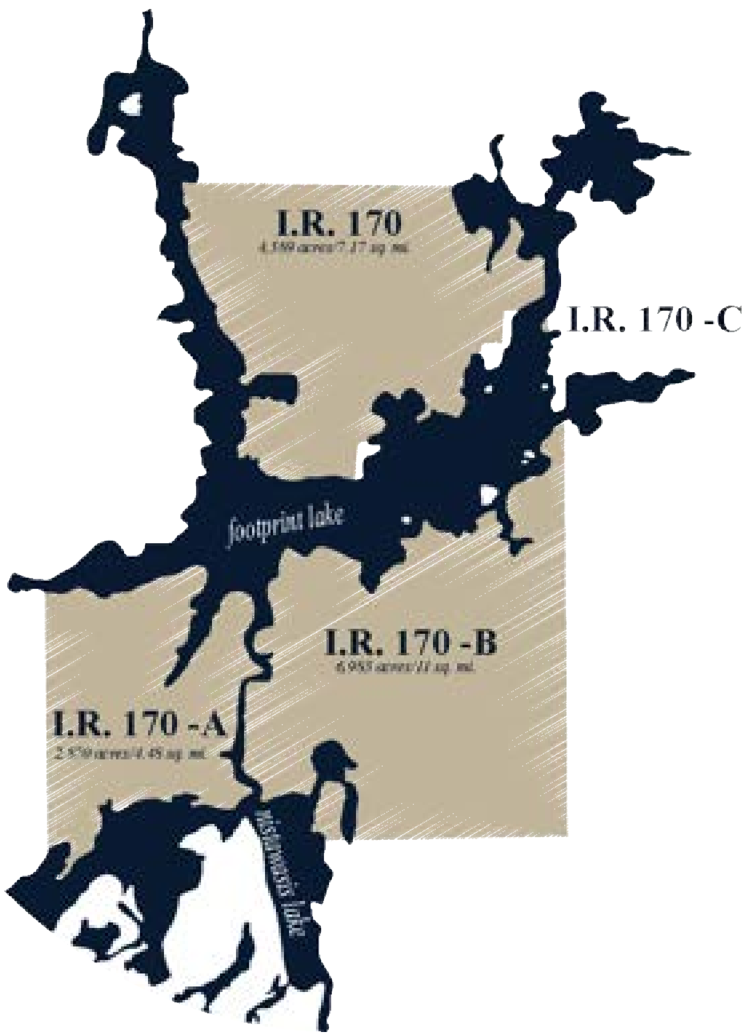
Map 38: Treaty 5 Extent (GIS Sources: Statistics Canada and Open Data Government).

Thus, the Indigenous Nations, north of this mentioned territory were excluded from this signed Treaty. This was an absence which the outcomes and observations outlined by the early 20th century waterpower studies helped to rectify. As narrated in the previous chapter, these studies identified the immense hydraulic capabilities of the Nelson River. And Water constituted an important factor in the institution of Treaty 5 of 1875, this because Lieutenant Governor Alexander Morris recognised the economical advantages of the untouched resources of Lake Winnipeg and its surrounding natural environment - its fertile soil nourishing a rich source of timber and land for agricultural purposes, and its rivers and lakes plentiful in fish - sustaining the northern territory. (Tough, 1996; Ray, *et. al*, 2000; Hall, *et. al*, 2017)

In respect of this, it was essential for the Crown to continue safeguarding the navigational rights rooted in the original writing script of Treaty 5 (Tough, 1996; Ray, *et. al*, 2000):

> *"…to Her Majesty, Her successors, and Her subjects the free navigation of all lakes and rivers and free access to the shores…"* (IAND, 1969)

Therefore, in 1876 another round of negotiations was carried out with the northern Cree, Oji-Cree and Dene communities, establishing a series of adhesions to Treaty 5 (IAND, 1969; Tough, 1996; Ray, *et. al*, 2000; Hall, *et. al*, 2017). One of its constituents was *Nisicawayāsihk*, who signed its associative adhesion on the thirtieth day of the month of July in 1908 (IAND, 1969). This adhesion metamorphized *Nisicawayāsihk* seasonal movement and livelihood into an 'Indian Reserve' within which it had to permanently reside. This reserve was subsequently numbered as I. R. 170, and associated with the colonial name of *'Nelson House'* and with an allocated land area of 14,452 acres (58.5 square kilometers) at Footprint Lake (Map 39). This allocated area was transposed into four land parcels[30] in 1913, two each on opposite sides of Footprint Lake's shoreline (Appx. B: Roberston 1913).



Map 39: The identified parcel for the Indian Reserve of Nelson House as per Treaty No. 5 adhesion (Appx. B).

[30] Roberson 1913 survey indicate the existence of five buildings along the northern shoreline of Footprint Lake. That in nature they constituted of two churches (a Roman Catholic & a Methodist), a school, and two stores (a HBC & a Hyer) (Appx. B).

5.3.2 *Canadian Pacific Railway, (1908-1929)*

During the Treaty period, the province of Manitoba experienced a surge in its agricultural growth together with an increased interest from its established urban centers in the South towards reactional activities, such as, fishing and the hunting of wild game (Mochoruk, 2012; Weir, *et. al*, 2020). This economical growth and recreational interest aided the Dominion's Department of Interior (Supt. Railway Land) in its intent to construct a railway system within the untouched northern territory, which at that time was known as the District of Keewatin (Johnson, 1883; Deville, *et. al*, 1891, Appx. A). Thus, the Department's Railway Branch undertook a feasibility and environmental assessment study along the envisaged railway route, from 1907-1908 (Appx. B: White, 1908).

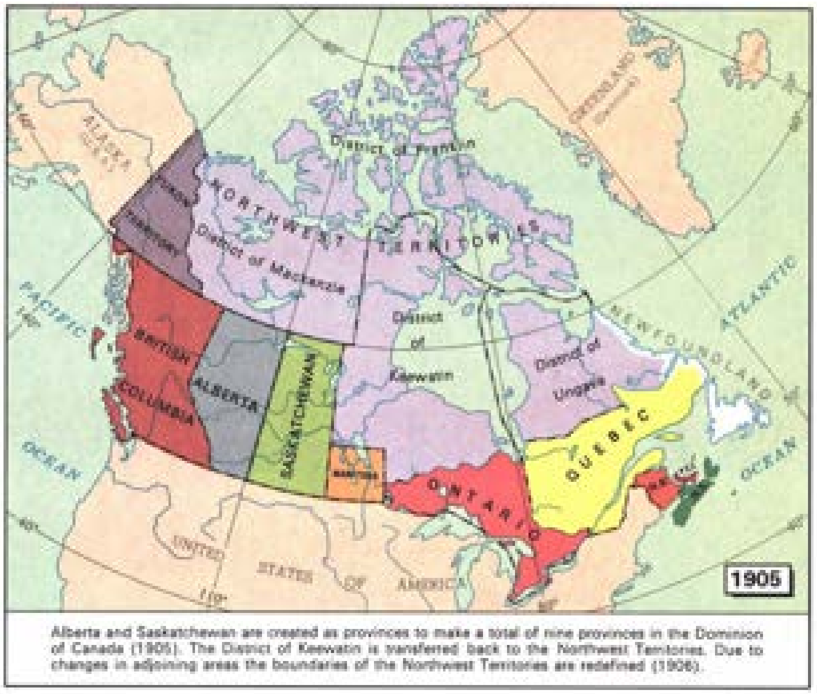


Figure 20: The Canadian Territory in 1905 as shown within Edition 4 of The Atlas of Canada (pp. 85-86).

This feasibility study provides contextual information on *Nisicawayāsihk*, Nelson House 'reserve' for that timeframe. Indeed, F. G. Durnford, a member of the Department of the Interior, in his testimony dated February 12 of 1907 stated that in 'Nelson House', agricultural activities included wheat and cereals production were observed (Young, 1907, pp. 30-35; Appx. E). Similarly, geologists - William McInnes and J. B. Tyrrell – observed that the Indigenous people of 'Nelson House' had well established gardens. And, on this subject Tyrrell's testimony further clarified that during his travels within the landscape of 'Nelson House', he witnessed patches of potatoes garden hidden and interspersed among the forest's undergrowth. (Young, 1907, pp. 65-71, 88-94; Appx. E)

> *"On July 11, when the witness* [McInnes] *arrived at Nelson House, the Indian potatoes had vines about eleven inches high, and were almost ready to flower."* (Young, 1907, p. 67)

> *"He* [Tyrrell] *saw excellent potatoes in the district around Nelson House."* (Young, 1907, p. 89)

Tyrrell testimony indicated that the Indigenous people would cultivate such vegetables during spring season so that they would be ready to harvest in fall. Such practices helped to ensure food security to the *asiniskaw-ithiniwak* of *Nisicawayāsihk* during their seasonal movement, particularly when they travelled toward the winter campsites. (Young, 1907, pp. 88-94) These statements, were later affirmed by Roberston in 1913, in his field notes associated with the surveying work that he carried out in line with the Treaty 5 adhesion requirements. Roberston observed that the livelihoods of the Indigenous groups living along the waterbodies of Footprint and *"Nistawasis"* (Threepoint), depended on hunting and fishing. He also, he continued to write that the soil conditions were favourably for agricultural purposes as reflected in the *"fine gardens*" growing contiguous to and along the shores. (Roberston, 1913; Photo 14; Appx. E)

Map 40: White's 1908 map highlights the resources for the landscape which the Railway Lands Branch studied during their route analysis (Appx. B).

The conversations held with the Elders during gatherings held reviewing historical photography of *Nisicawayāsihk*, not only verified the outlined observations but also identified the geography of the gardens, which was along the shoreline of *Otītiskiwin Sakahekan*[31], ᐅᑌᑎᐢᑭᐃᐧᐣ ᓴᑲᐦᐁᑲᐣ, Footprint Lake. Thus, they informed that there were well-established gardens in areas known as *pāhkwasihk*, ᐹᐦᑳᐧᓯᕽ, Roman Catholic point and *mitosihnihahk*, Poplar Point, in close proximity to the mission church (Elders, pers. comms. Summer, 2019; Appx. E; Map 43).

5.4 *Nisicawayāsihk* ancestral spatial context post Treaty:

5.4.1 *The 1920s, 1930s and 1940s*

After negotiating with the Dominion, in 1881, Manitoba was able to expand the spatial extent of its post-confederation *"postage stamp"* shaped provincial boundaries. These extended eastwards to join with the western border of Ontario and northwards to latitude 44° N, which is the grid line that runs across Lake Winnipeg. (Mochoruk, 2012; Appx. A: Bartholomew, 1880; Deville, *et. al*, 1891). However, it was the above mentioned 1907/08 environmental study carried out for Canadian Pacific Railway, which ultimately established, Manitoba's contemporary provincial geographical boundaries in 1912 (Berezanski, 2004; Mochoruk, 2012; Appx. A: Chaulifour, 1915). Thus, encouraged by the observed natural resource abundance (fertile soil, forestry, biodiversity, and plentiful watercourses) of its newly acquired territory, Manitoba joined the tourism campaign initiated in 1920s by the Dominion (Young, 1907; Ruggles, *et. al*, 1970, p. 510).

Through his 1929 cartographical publication, the artist A. E. Elias used artistic impressions to attract and increase outside interest to Manitoba's northern territory. This propaganda was used

[31] The Cree name was provided by *Nisicawayāsihk* Elders.

to showcase this territory as an ideal recreational landscape for hunting, fishing, and camping activities. (Ruggles, *et. al*, 1970, p. 510, Map 270; Appx. A) Notwithstanding the fact that the depicted mapped information was inaccurate, the map-in-question served its purpose, as a result by 1930s, the Northern landscape was not only popular with vacationers as a recreational destination, but such activities also created employment opportunities in the region. Moreover, the increases influx of visitors (for recreational and/or commercial purposes) gave rise to the overharvesting of wild game. (Grainger, 1979; Tough, 2004; Calliou, 2007)

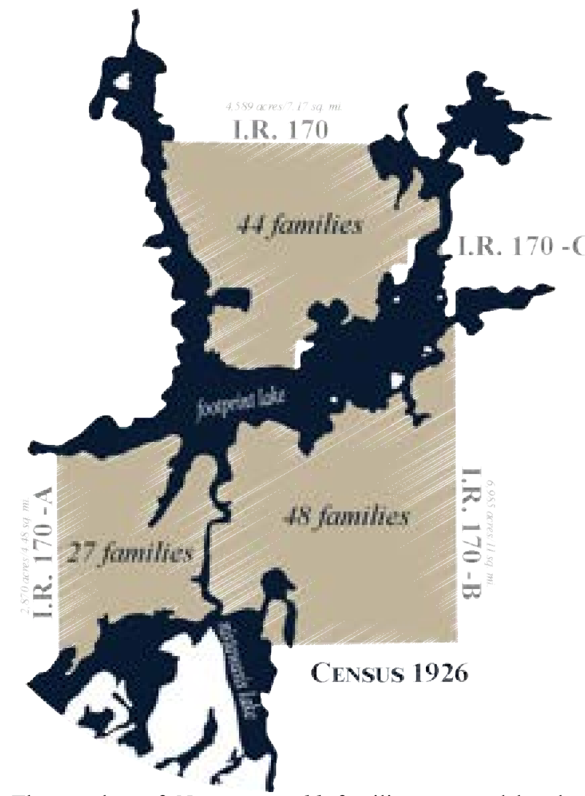
Hence, fur-bearing populations, once again found themselves under threat. A threat which undermined the livelihoods (commercial income) and sustenance (traditional diet) of the northern Indigenous Nations (Elders, pers. comms. Summer, 2019). Thus, to try and address this overharvesting and the subsequent management of these resources, the Federal Government instituted a new legal framework, known as the *Natural Resources Transfer Acts* (NRTA) of 1930 (Berezanski, 2004; Tough, 2004; Calliou, 2007). Such acts were mandated by the transferring of the management of Crown Lands[32] including their natural resources (such as water, minerals, fisheries, etc.) from Federal authority to the respective provincial jurisdictions (MNRA S.C. 1930, c. 29; Tough, 2004; Calliou, 2007; Elder, D. Scott, pers. comms. Fall, 2019). This administrative and organisational transferal occurred through the signing of *Memorandums of Agreement* between the Dominion and the respective provincial governments.

The prairie province of Manitoba, signed its respective agreement in 1929, an agreement which became a constitutionally binding document through the passing of the *Constitution Act of 1930*, 20 & 21 George V, c. 26 (U.K.). (MNRA S.C. 1930, c. 29; Tough, 2004; Calliou, 2007). Although through this agreement the fur market recovered to some extent in the 1930s, its

[32] The assertion into Confederation limited provincial jurisdiction over their respective unorganised territories (Berezanski, 2004; Mochoruk, 2012; Weir, *et. al*, 2020).

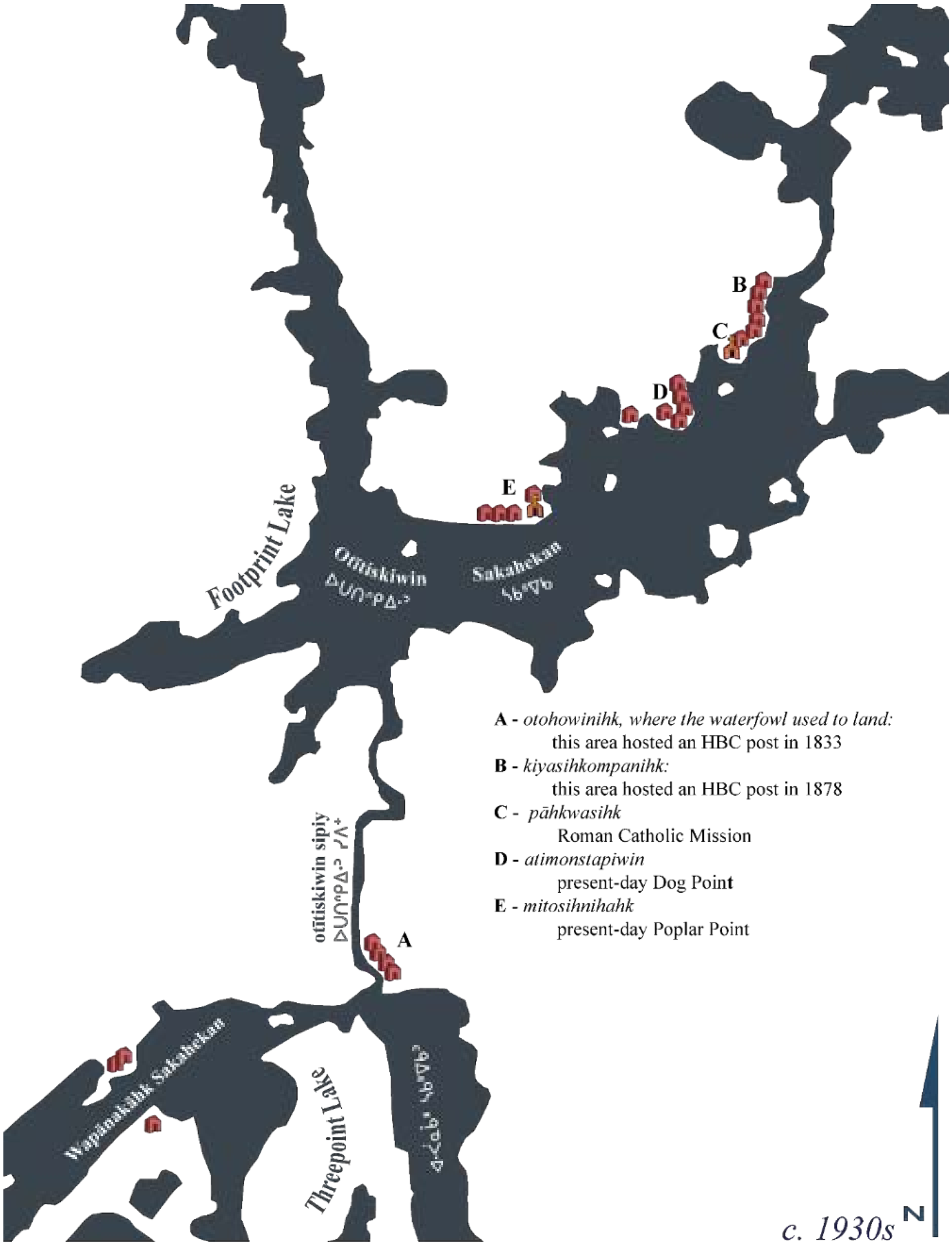
proceedings were not proactive enough. This deficiency was the engagement framework adopted throughout the NRTA decision-making and planning processes. In that, the transferable territory not only constituted the inherited ancestral Indigenous cultural landscape but also a *Treaty territory*. Thus, the Crown was required to consult with the First Nations of those territories but failed to do so. (D. Scott, pers. comms. 2019)

This failure, together with the erroneous text of the agreement, in particular the phrase *"unoccupied Crown Lands"* and the misplaced intent of the NRTA[33], thus gave rise to a complete misinterpretation. This in part reflected the inherited legacy of the Doctrine of Discovery:*terra nullius* which even after five centuries, still deemed the Indigenous cultural landscape to be uninhabited and vacant as land. Thus, with respect to such misconceptions, the authorities through the NRTA called upon the confinement of the Indigenous Nation within the remits of the treaty-established boundaries of each *'Indian Reserves'*. Therefore, beginning impeding upon the inherited seasonal land use of the Indigenous people within their ancestral territory. Which in turn facilitated and enabled the



Map 41: The number of *Nisicawayāsihk* families captured by the 1926 Census Officer. (Source: Library and Archives of Canada, URL https://www.bac-lac.gc.ca/eng/census/1926/Pages/default.aspx)

[33] MNRA S.C. 1930 c. 29, paras. 11-13.



Map 42: The context of *Nisicawayāsihk* c.1930s captured from the National Topographic Series Sheet 63O, 1934. Elders provided guidance on the appropriate Cree names and syllabics dialect for the locations mapped. The Cree names for locations B and E were adopted from Linklater 1994 thesis. (GIS Source: Profile of the lakes as per NTS Sht. 63O, Ed. 2).

extraction and exploitation of resources outside the ‘reserves’. (Elder, D. Scott, pers. comms. Summer, 2019)

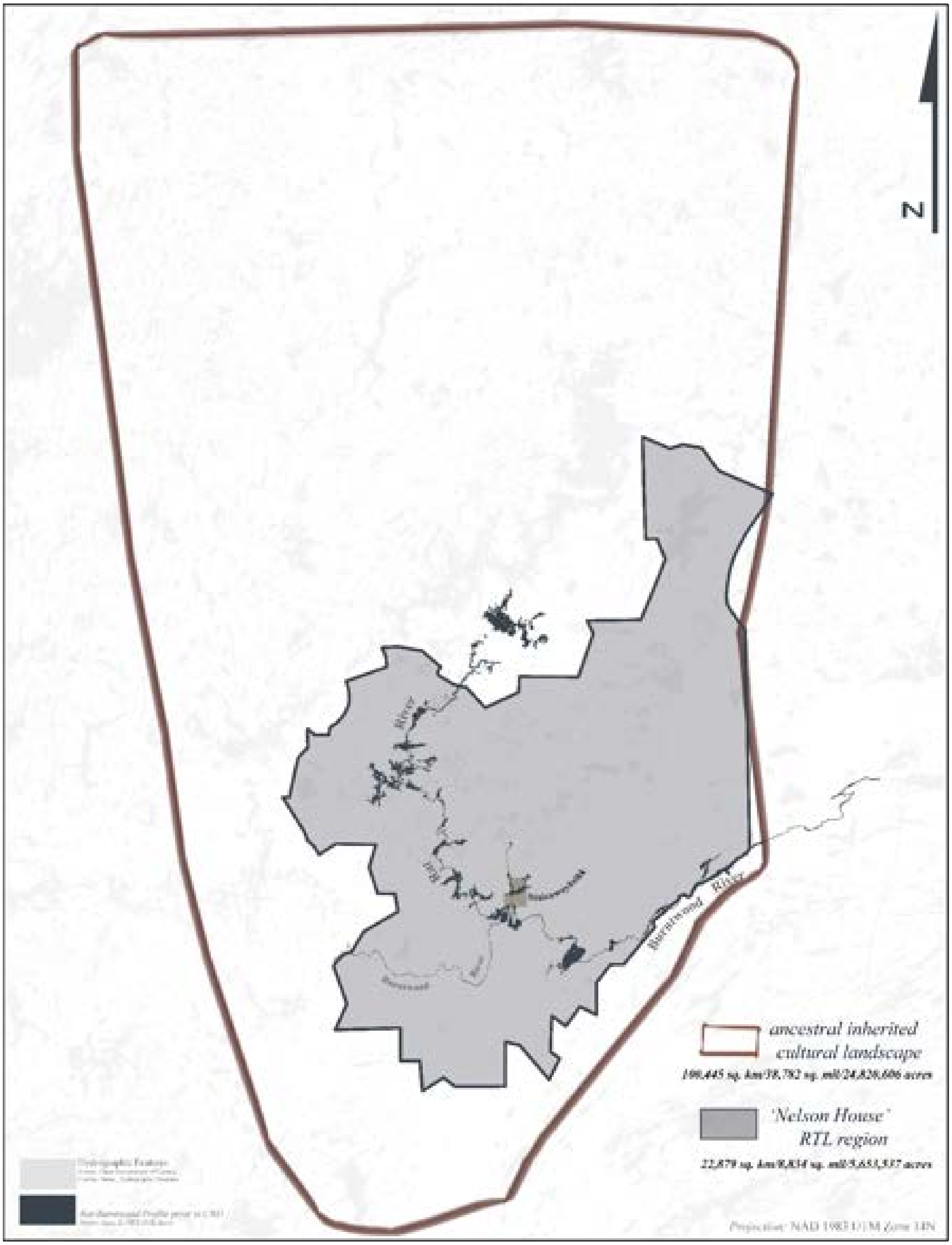
This gradual relocation which was not only captured in photographs of *Nisicawayāsihk* during Treaty Days or pastoral visits (Appx. E) but also, by the first provisional editions of sheets that depicted the topographical physiologies of the Canadian territory (Map 42). Such mediums revealed three distinctive regions along Footprint Lake which constituted the origins of the current fabric of *Nisicawayāsihk* Cree Nation (Map 43: location C, D & E). Although land use has been shaped by the NRTA, the conversations with the Elders indicated that families still retained the spatial use and movement of their dispersed campsites. They recalled with clarity the presence and viability of basecamps along the northern shores of Threepoint Lake (Map 42: location A and contiguous environs). (Elders, pers. comms. 2019-21)

Notwithstanding such resiliency to the NRTA-related regulations over nature resources, through the proceedings of the NRTA, Manitoba established its Game and Fisheries Branch with the authority to safeguard and preserve wildlife while ensuring population growth for recreational and commercial use. Thus, policies were introduced that specifically targeted and was expected to recover the full economic value of the fur-market. Hence, as recommended by Cooney - the Supervisor of Titles – this branch developed and implemented a system of *registered trap lines* (RTL) system in 1940. (Smith, 1976; Malaher, 1988; Berezanski, 2004). Although, this new system in part was designed to protect the rights of the Indigenous *owanihkiw*[34], ᐅᐊᐧᓂᐦᑭᐤ, trapper; *opakitawaw*[35], ᐅᐸᑭᑕᐊᐧᐤ, fisherman and *omaciw*[36], ᐅᒪᒋᐤ, hunter, its primary purpose was to

[34] NNCEU, n.d.
[35] NNCEU, n.d.
[36] NNCEU, n.d.

ensure that economic benefits brought forth by outsider investments in recreational activities and employment prospects were guaranteed.

Figure 21: The Registered Traplines regions showcased during the Conference on Conservation Offices of 1951 (MDMNR, 1951).



Map 43: *Nisicawayāsihk* RTL spatial context in relation to the spatial context of the ancestral inherited cultural landscape.

Thus, in order to establish the spatial context of each trap line district, the provincial's Game and Fisheries Branch carried out negotiations with both interested parties, that is, the Indigenous land-water users and the outsider trappers. (Smith, 1976; Malaher, 1988; Berezanski, 2004) By the 1950s, this process had dissected Manitoba's northern landscape into 18 RTL resource districts (Berezanski, 2004, p. 96, fig. 2; Figure 21). Subsequent wildlife resource management policies would play out within these districts[37] (Malaher, 1988; Berezanski, 2004). This process metamorphosed the *Nisicawayāsihk* ancestral cultural landscape into a defined spatial context that was 5,653,537 acres/8,834 sq.mi/22,879 sq. km in size (Map 43).

5.4.2 *The 1960s*

This newly imposed regional extent forced *Nisicawayāsihk* to rethink its seasonal spatial movement inheritance and its livelihoods (Elders, per. comms. Summer, 2019). By the 1960s *Nisicawayāsihk* was a still remote and fly-in community. But the community's urban fabric was evolving and achieving a permanent status. Thus, the *asiniskaw-ithiniwak* of *Nisicawayāsihk* continued to settle not only within the hamlets along the northern shores of Footprint Lake, which had begun to take shape in the 1930s, but they also established households on most of all the islands contained within that waterbody, along the channel connecting it with Threepoint Lake and along the northern shores of Threepoint Lake. (C. Kobliski, pers. comms. Fall, 2018; Elders, pers. comms. Summer, 2019; Photo 15)

[37] After the first pilot zone for the Cree communities of Thicket Portage and Pikwitonei was successful, the remaining boundaries of the RTL's structural spatial distribution was designed by H. E. Wells (Smith, 1976; Berezanski, 2004)

Photo 15: A 1950 aerial view of the lakes of Footprint and Threepoint (Photo Credit: NAPL, Photo no. A12941_360)

While having families that still had maintained and lived in their cabins out on the land. Particularly, along the shores of the lakes of *Oswapisin* - Wapisu, *Wacasko* - Rat and *Oskotimi* – Wuskwatim (C. Kobliski, pers. comms. Fall, 2018; Elders, pers. comms. 2018-19). The permanent nature of the community at Footprint Lake continued to be reaffirmed by the establishment of a nursing station and the construction of two day-schools[38] by their respective missionaries (FIDSCA, n.d, p. 20; Linklater, 1994; Elders, pers. comms. 2018-19). Regarding income, a makeshift airfield[39] was situated further east to the Roman Catholic Church, where it helped to support *Nisicawayāsihk* commercial and domestic fisheries interests (C. Kobliski, pers. comms. Fall, 2018; Elders, pers. comms. 2018-19). By 1968, 'Nelson Cree Nation' had 1,393 registered members and 502 still lived off the land mostly across the topography dominated by South Indian Lake[40] (Grainger 1979, pp. 15-21).

[38] The Methodist United Church established its school in 1901 (operations ended in 1981) and the school was located next to the church at the contemporary location known as Poplar Point (*mitosihnihahk*). The Roman Catholic Church established St. Patrick school in 1925 and remained opened till March of 1970. This school was also constructed in the proximity to the church. (FIDSCA, n.d. p. 20; Appx. E)

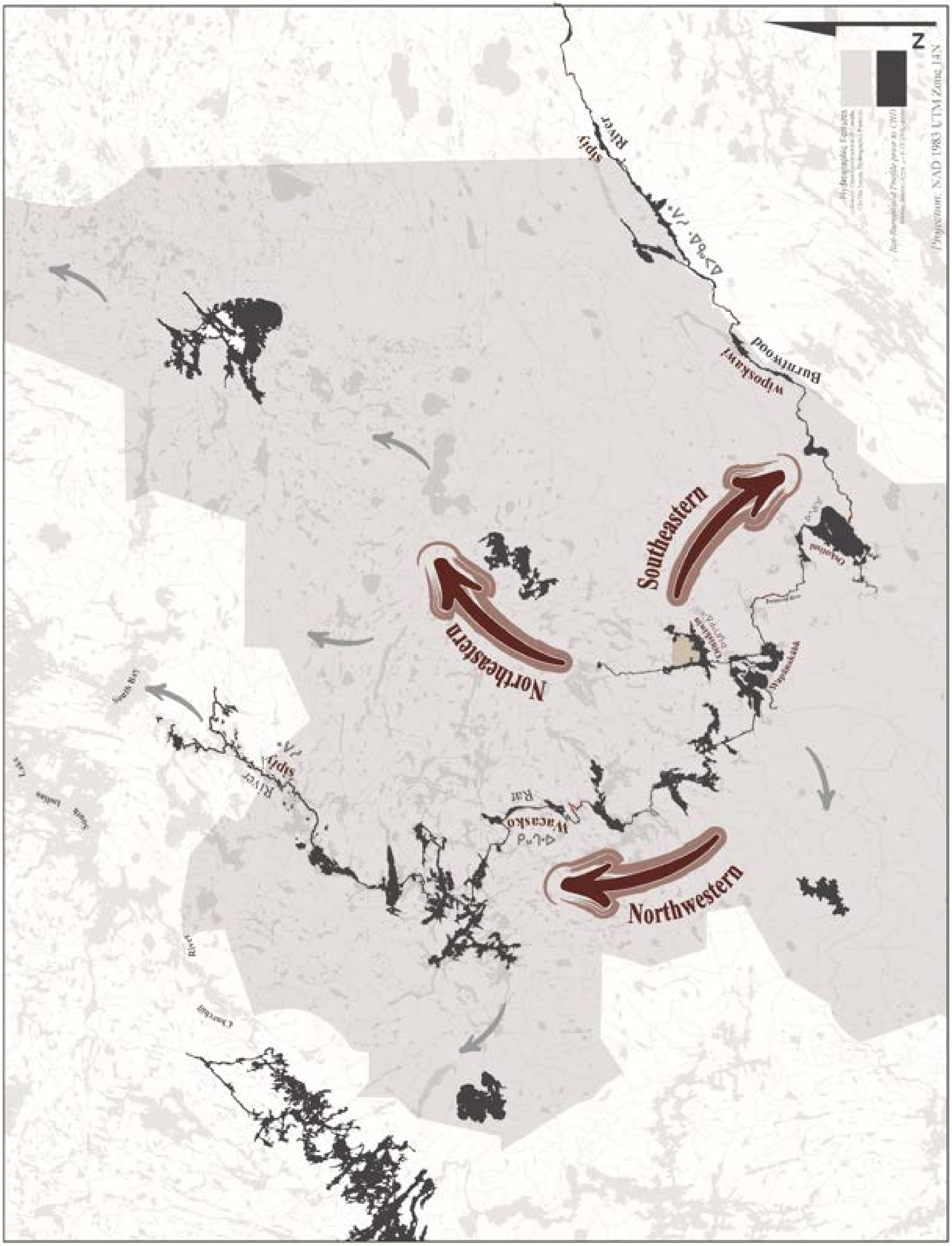
[39] Vehicle access to the community was established during the late 1960s, when the northern mining facilities, from Thompson to Lynn Lake became connected through the construction of a provincial highway. A decade later, the community was connected to the rest of the fast-growing northern road network, and this through the construction of an access road directly to its centre. (Linklater, 1994; Elders, pers. comms. 2018-19)

[40] The clusters situated to South Indian Lake separated officially from Nelson House Cree Nation in 2005 and their community became a recognized First Nation, O-Pipon-Na-Piwi Cree Nation (OPCN) (NCN, 2016).

Notwithstanding these changes, *Nisicawayāsihk* still preserved its seasonal movement across its land and waterways. Such land use was based upon a restructured and reconfigured nomadic cluster which consisting solely of men (adolescents and adults). The Elders not only took seasonal leadership of the group but also provided the necessary guidance during the hunting, trapping, and fishing activities through the oral transmission of inherited ancestral knowledge. Women and children would subsequently join during the seasons of *nīpin*, ᓂᐱᐣ, summer and *sikwan*, ᓯᑲᐧᐣ, spring and/or when there was a religious holiday. There, they would enjoy berry picking, teach open-fire cooking and the occasional first fishing cast. (Elders, pers. comms. 2018-19)

Thus, land use changed from the dispersed ancestral seasonal basecamps into interim campsites. My interviews with the Elders from *Nisicawayāsihk* indicated the importance of *three navigational routes* that were used to access the interim campsites seasonally across the territory:

1. ***Northwest navigational route:*** from *Wapānakāhk Sakahekan,* ᐊᐧᐹᓇᑳᕽ ᓴᑲᐦᐁᑲᐣ, *Threepoint Lake canoeing towards into the Rat River system via its interspersed lakes till one reached the lake of Karsakuwigamak which through a network of streams would drain into Issett Lake:*
   - → Once, clusters of families would reach the head of the Rat River, at Issett Lake, they used to partage to reach the southern shores of South Bay which forms part of South Indian Lake's waterbody extent. From Rat Lake, which is located almost mid-point on this route, through one of its smaller tributaries (Suwannee River), another cluster continued to canoe to reach the lakes of Suwaneee and Granville. The latter forms part of the hydraulic network of the Churchill River. (Elders, pers. comms. Summer, 2019; Map 44)



Map 44: *Nisicawayāsihk* main navigational routes prior CRD in accordance with the narratives shared.

2. ***Northeast navigational route:*** *from Wapānakāhk Sakahekan,* ᐊᐧᐹᓈᑳᕽ ᓴᑲᐦᐁᑲᐣ, *Threepoint Lake canoeing into Otītiskiwin Sakahekan,* ᐅᑎᑎᐢᑭᐃᐧᐣ ᓴᑲᐦᐁᑲᐣ, *Footprint Lake to continue canoeing within a complex of an interconnecting tributary river network (and then portaging when necessary) and through its small-to-medium sized waterbodies until encountering the expansion of Waskwayi Sakahekan,* ᐊᐧᐢᑲᐧᔨ ᓴᑲᐦᐁᑲᐣ, Gauer Lake:

    → Through this route, a few family clusters from the lake of *Wapasihk*, ᐊᐧᐸᓯᕽ, Leftrook were able to reach South Bay by continuing into a northwestern direction. Although there were others from Gauer Lake who would portage to reach Northern Indian Lake on the Churchill River to canoe towards their basecamps at Missi Falls. (C. Kobliski, pers. comms. Fall, 2018; Elders, pers. comms. 2018-19; Map 44)

3. ***Southeast navigational route:*** *from Wapānakāhk Sakahekan,* ᐊᐧᐹᓈᑳᕽ ᓴᑲᐦᐁᑲᐣ, *Threepoint Lake canoeing east within the narrow channel that connects it with the lake of Oskotimi,* ᐅᐢᑯᑎᒥ, *Wuskwatim:*

    → Through this route, the groups had to portage the geological formation of three rapids to reach their campsites located along the eastern shores of Wuskwatim Lake. (Elders, pers. comms. 2018-19; Map 44)

"We could go hunting anywhere, down south, towards Wuswatim."
(Elder L. Francois, pers. comms. Spring, 2019)

With respect to the land use practices, fishing activities for domestic consumption occurred on all the waterbodies defining the above outlined main navigational routes. *Nisicawayāsihk*

Elders recalled with fondness the practice of smoking the fish during the summer camps that used to form along the shoreline of the lakes of Otītiskiwin, ᐅᑌᑎᐢᑭᐃᐧᐣ, Footprint and *Wapānakāhk,* ᐊᐧᐹᓈᑳᕽ, Threepoint. On the other hand, most of the community's main commercial fishing for outside consumption, occurred within the waterbodies of *Wacasko*, ᐊᐧᒐᐢᑯ, Rat; *Notokīwesiw*, ᓄᑐᑫᐧᓯᐤ, Notigi; *Oswapisin,* ᐅᐢᐊᐧᐱᓯᐣ, Wapisu, Mynarski (west - *wakaskwasihk*; east - *wapiwaskwiskahk*) and *Oskotimi*, ᐅᐢᑯᑎᒥ, Wuskwatim. (Elders, pers. comms. 2018-19; Map 45)

Within this community, at least 10 to 15 fishermen remained fishing commercially during the winter season commercial (Elder L. Francois, pers. comms. Fall, 2019). The terrestrial ecosystems sustained healthy population of waterfowl species (ducks, geese, swans, mallards), fur-bearing animals (beaver, mink, fox, lynx) and large ungulates (moose, caribou). Hence, *Nisicawayāsihk* hunted moose mainly along the entire western extent of the Rat-Burntwood River system and caribou hunting took place within its southern region. Waterfowl and fur-bearing species were trapped along the extremities of the above navigational routes and their associated tributaries. The former was concentrated along the northeastern-southeastern route, and the latter along the northwestern-southeastern route. (Elders, pers. comms. Fall, 2019; Map 45)

The Elders in *Nisicawayāsihk* further indicated that the picking of wild fruit (such as berries) and the harvesting of medicinal plants, constituted an activity that each family practiced in their own personal region. Regarding basecamps, these were established and spatially organised along the shorelines of the navigational routes, with a few others that were interspersed along the tributaries. (Elders, pers. comms. Fall, 2019; Map 45)

Map 45: *Nisicawayāsihk* land-use practices prior the diversion project.

These interviews revealed 10 key basecamps regions: 4 northwesterly, 3 north-easterly, 1 southeastern. 1 northern and one that was centrally located (Map 45). The sense of community living and the use of the *Nehetho* language were both strong and flourished accordingly (Elders, pers. comms. 2018-19). Moreover, everyone helped take care of the most vulnerable within the community (C. Kobliski, pers. comms. Fall, 2018).

The territorial physiologies, land and water, were:

"pristine, good hunting grounds" and *"we could see the tracks on the shoreline." "It was easy to find tracks on the shoreline"*

(Elder L. Francois, pers. comms. Fall, 2019)

Moreover, the lakes were *"plentiful for wild game, ducks, geese and fish" and "we used the resources of our land"*

(Elders L. Francois and A. Wood, pers. comms. Fall, 2019)

"The knowledge of our landscape…medicine…trap…the taste of wild meat…was instilled" since childhood (Elder A. Wood, pers. comms. Summer, 2019).

Food was readily accessible. Being out on the land *"you never run short of wild food"* or *"get lost"* (Elder L. Francois, pers. comms. Fall, 2019).

By being out on the land, they developed close relationships with their environments:

"we had that connection with the land, when are out there, you look at the landscape…listen to the wind…the birds…that connection" with the territory *"was so strong"*

(Elder A. Wood, pers. comms. Summer, 2019).

These relationships gave rise to rich insights into how to make use of animals and medicines:

> *"It was easy for us to travel, because the people knew how to travel and along the river routes, there was everything, plants, medicines, waterfowl, fish species…"*
>
> (Elder A. Wood, pers. comms. Summer, 2019).

However, the cultural inheritance, experiences, identity and what was known as the norm, were shaken to their core by the introduction of the Hydropower discourse in this region by the first phase the Churchill River Diversion (CRD) Project in 1970s.

5.5 *Nisicawayāsihk* ancestral spatial context vs the Churchill River Diversion:

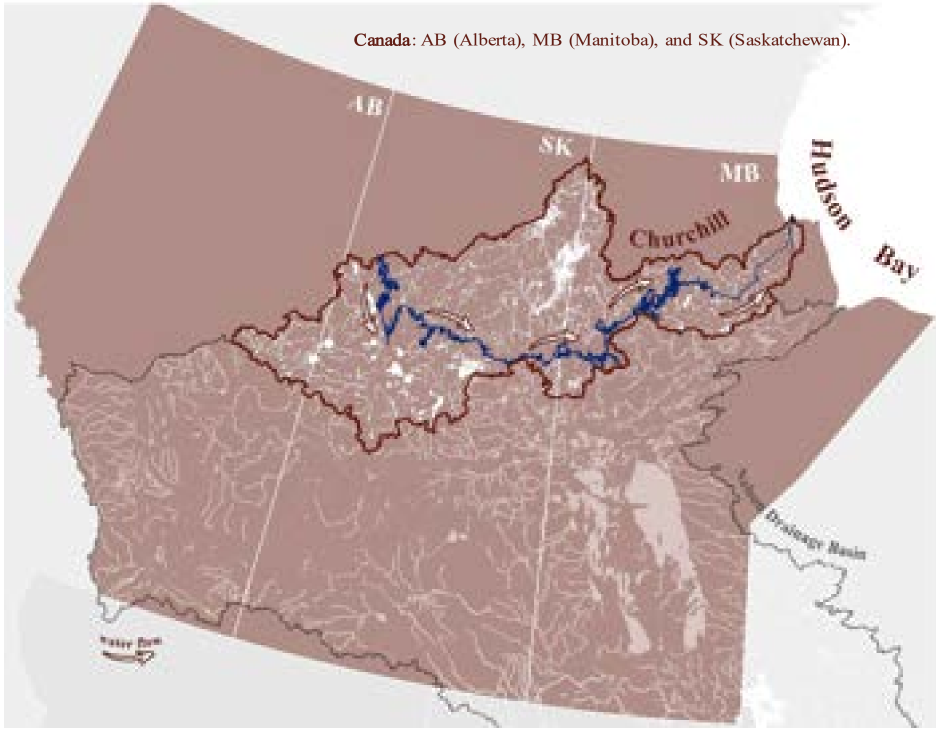
5.5.1 The 1970s: first phase of the *Churchill River Diversion, 1970-1976*

To satisfy Manitoba's overall Northern Hydropower vision, the electrical energy production capabilities by the Nelson River's generation stations had to be consolidated. This was in part achieved by tapping into the resource capabilities of another northern hydrological system, that of the *Churchill River*. The Churchill is 1,000[41]-mile (1,609 km) river whose perimeter runs across the Canadian Shield and whose name is derived from a Governor of the HBC, Lord John Churchill (McInnes, 1913; McCullough, 1981; MC, 2000). Its perimeter was described as encompassing *"long series of very irregular lakes, connected by short and usually rapid reaches"* (Denis, *et. al*, 1916, p. 249). These early waterpower assessments described 115,500 square mile (29,9143.6 square kilometer) drainage basin and 38 [42] sites possible for hydropower development that had the capability of producing a theoretical hydraulic power of 472,700 h.p, (McInnes, 1913, p. 5; Appx. F).

Ten of the identified sites fell within the northern Manitoba, and these geological formations of falls and rapids had the capability to yield a total theoretical power of 185,900 h.p. (Table 4; Appx. F). However, this hydraulic section contains two of the Churchill's largest expansions which are Granville Lake and South Indian Lake. The waterpower calculations carried out in 1916 revealed that within Northern Manitoba, such power peaked at the falls that formed part of both lakes (Table 4). Where the falls contributed a theoretical power of 38,000 h.p. and 31,000 h.p. respectively (Table 4).

[41] The assessments carried out in 1916 by the Federal Commission of Conservation on Water-powers attributed a length of 1,200 mile (1,931 km), measured from the Beaver River which was identified as Churchill's longest tributary till its drainage point on the shoreline of the Hudson Bay (Denis, *et. al*, 1916, p. 249).

[42] The identified sites were distributed from its last major drainage outlet, at Missi Falls, till the waterbody Shagwenaw Lake, located in the northwestern territory of the prairie province of Saskatchewan (Appx. F: CoC, 1915).



Map 46: The extent of the Churchill River Drainage Basin. Its hydrological flow originates from within the northwestern landscape of the prairie province of Saskatchewan. From there it flows through an intrinsic complex of channels and waterbodies to drain into the Hudson Bay (GIS Sources: Open GoC[43], Statistics Canada[44], and WSC[45]).

Names Identified from NTS (1:250,000)	**1916 (Denis, *et. al*, p. 285)**		
	Rapids/Falls	**Approximate Head in feet**	**Available Theoretical h.p.**
Missi Falls	Below South Indian Lake	18	31,000
	Above South Indian Lake	2	3,200
	Leaf Rapids	8	13,000
	Above Leaf Rapids	2	3,200
Granville Falls	Granville Fall	25	38,000
Devils Falls	Above Granville Fall	5	7,600
Twin Falls	Rapid	19	29,000
	Rapid	15	23,000
Pukatawagan Falls	Below Pukkatawagan Lake	4	5,600
unnamed	Rapid	2	2,800
Bloodstone Falls	Redstone Rapid	15	21,000
Sisipuk Lake	Below Loon River	6	8,500

Table 4: Possible sites for hydropower development along the perimeter of the Churchill River that falls within the boundaries of Manitoba.

43 Lakes, Rivers and Glaciers in Canada - CanVec Series - Hydrographic Features, URL https://open.canada.ca/data/en/dataset/9d96e8c9-22fe-4ad2-b5e8-94a6991b744b (accessed in 2018)
44 2016 Boundary files, URL https://www12.statcan.gc.ca/census-recensement/2011/geo/bound-limit/bound-limit-2016-eng.cfm
45 Major Drainage Areas dataset, National Atlas Major River Basin. URL www.geogratis.cgdi.gc.ca (accessed in 2016).

Additionally, the scientific studies conducted in the 1970s indicated that the falls of Missi, the original outfall for South Indian Lake produced the highest hydraulic discharge of 35,700 cfs (LWCNR, 1975, p. 23; Appx. D). This was because it dumped the water accumulated from its western territory together with the water coming from the watershed contiguous to South Indian Lake (Map 46). This, notwithstanding the fact that the Churchill's water capabilities were the furthest away from populated area (FEMP, 1992; MH, 2015). Henceforth the *fourth stage* of Manitoba's Northern hydro-electric generation project was first conceived in the early years of 1970s. The main intent of this stage was to divert 80% of the Churchill's flow into the Nelson[46] River. (McCullough, 1981; FEMP, 1992, Vol. 1, pp. 2-4-2-5)

The diversion of the said flow entailed the construction of two control structures together with the excavation of a channel that would connect South Indian Lake with the hydraulic system of the Rat River (LWCNR, 1975; FEMP, 1992; MW, 2005; MH, 2015). The engineering works associated with the changes, constituted of the following:

→ In 1973, engineering works commenced on the location which was to accommodate the Control Station (CS) that would regulate the flow drained into the last section of the Churchill River, which runs into the Hudson Bay. For the next three years, South Indian Lake's natural outlet was impounded, and a secondary dam was constructed to the south. This second impoundment accommodated a six-bay gated CS, which had the capability of discharging 113,000 ft^3/s (3,200 m^3/s) into the Churchill's lower reaches. (LWCNR, 1975; FEMP, 1992; MH,2015; Appx. D) To accommodate the operations of this CS, South Indian's mean elevation was raised by an additional 10 ft (3 m) - 255m MSL to 258m MSL. This rise

[46] When the engineering works related to the diversion project commenced, the province was simultaneously constructing additional two hydro-electrical generating stations on the Nelson River (Appx. I). That is, on the lower reaches, Long Spruce GS (1971-1977) and as part of the Lake Winnipeg Regulation regime, Jenpeg GS (1972-1979) (MH, 2015; Appx. I).

increased the overall surface area of the lake by an additional 160 sq. mi. (414 sq. km.) (McCullough, 1981; Bodaly, *et. al*, 1984a). Flooding *"the backshore zone"* (Newbury, *et al*, 1984), most of which was *"classified as productive forest land"* (LWCNR, 1975, p. 45).

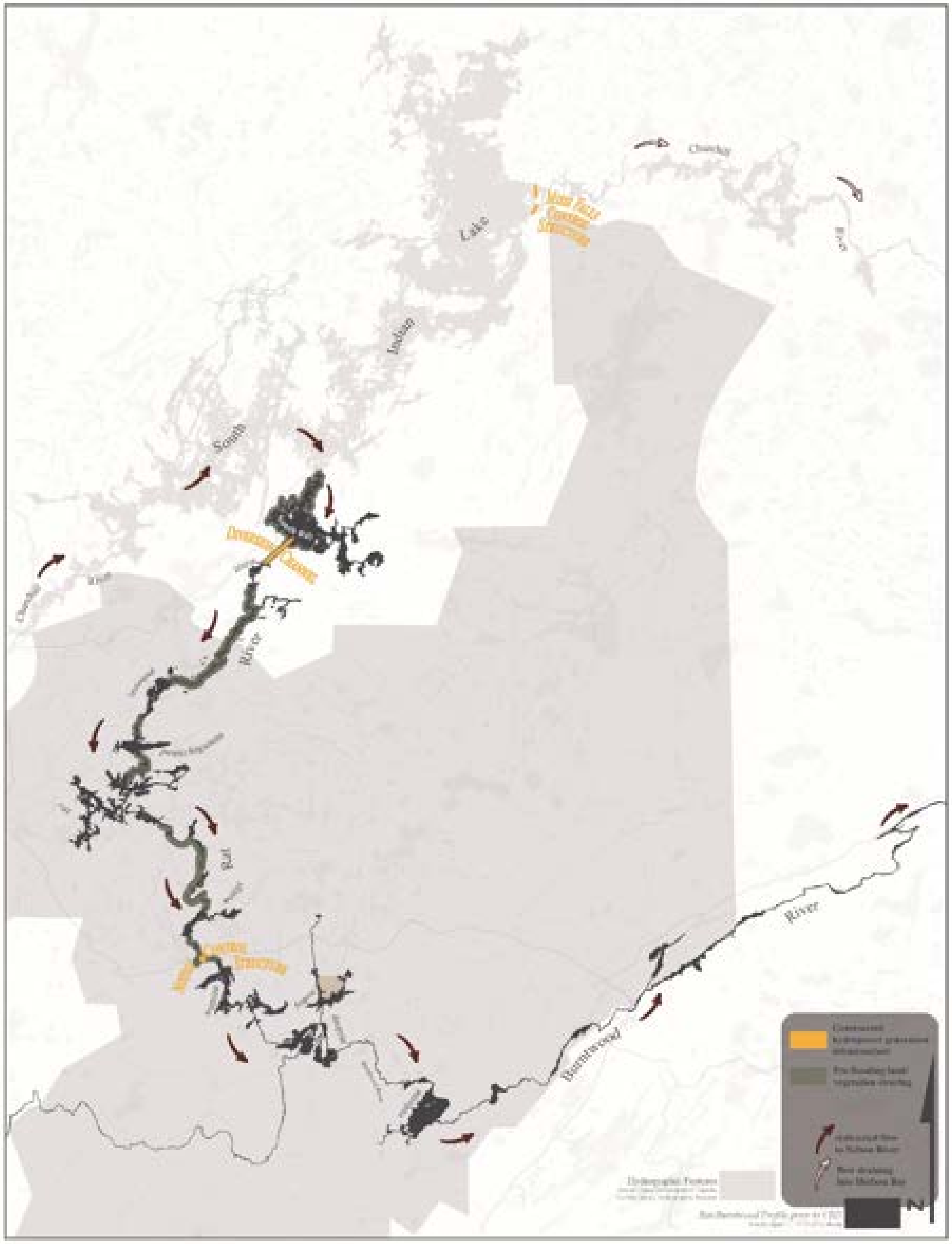
→ The excavation[47] works on the diversion channel were carried out simultaneously with the impoundment works that were being carried on the northeastern section of South Indian Lake. The 9.3-kilometre-long human-made channel connected the southern shores of South Indian Lake through one of its bays (South Bay) with the headwaters (Issett Lake) of the Rat River. This rerouted the flow into the Rat's hydraulics (Map 47: a network of narrow channel interconnected by five expansions) to merge with the flow carried by the Burntwood River at Threepoint Lake (Map 47). And the rerouting of the flow was facilitated by the raise of the mean elevation achieved at South Indian Lake. Additionally, to regulate the re-directed flow, within the Rat River system, another CS was constructed. (LWCNR, 1975; Newbury *et al*, 1984; FEMP, 1992; MH, 2015; Appxs, D & H)

→ The second CS was constructed between 1974 and 1975 and was located within the branch of the river that connected the lakes of Wapisu and Notigi. Thus, the engineering works associated with the said structure, resulted in the impoundment of the natural route of the river and a channel was excavated into the contiguous landscape that accommodated a 3-bay spillway. (MH, 2015, Appx. 2F; Appxs. D & H) These engineering works raised the overall mean elevation of the lake of Notigi and that of its contiguous environs from 794 ft (242 m) to 843 ft (257m) (Appx. H). Thus, the upstream section of the Rat River, from the CS till the site of the diversion channel, become an open storage reservoir that helped support the

[47] MH's documentation of the project fails to indicate its year of commencement (MH, 2015).

operations of CS (Bodaly, *et. al*, 1984a; Newbury *et al*, 1984; FEMP, 1992; Appx. H). The CS, itself, had the capabilities of discharging 66,000 ft^3/s (1,869 m^3/s into downstream section of the diversion route (MH, 2015, p. 2F-6; Appx. D).

Hence, the above structural engineered components were completed in October of 1975 and the diverted flow began traveling along its new 186.6 mile (300 km) path through the Rat River then merging with that of the Burntwood to be ultimately drained in the Nelson River at Split Lake (LWCNR, 1975; MH, 2015). By June 1976, this diversion was operated at *"about one-third of [the] licensed capacity"* and its optimum operational discharge was reached in 1977. (FEMP, 1992, Vol. 1, p. 2-4)



Map 47: 1970s, the first phase of the diversion project.

5.5.2 *CRD, during and post-diversion development*

The above first phase of the diversion project, was conceptualised with a specific intent in mind: not only securing but also enhancing *"opportunity and prosperity to society at large"* (MARC, 2001, p. 4). However, the repercussions brought forth during both of its construction and operational phases, continue to overshadow this envisaged positive outcome to this day. This in part was because the established reservoir did not limit itself in reconfiguring the upstream section of the Rat River. Where, the five[48] distinctive lakes that characterise this section become united under one topographical elevation (Bodaly, *et. al*, 1984a; Newbury *et al*, 1984; Appx. H). Moreover, a constant elevation throughout also connected the five lakes with other small-to-medium sized expansions[49] that form part of its tributary system. (LWCNR, 1975; Bodaly, *et. al*, 1984a; Newbury, *et al*, 1984; FEMP, 1992; Appx. H)

Moreover, the projects also imposed and forced flooding to create the required spatial context of the achieved reservoir, which had an immediate impact on *Nisicawayāsihk:*

→ *Upstream accessibility:*

The closure of the channel between the lakes of Notigi and Wapisu, cut off direct accessibility for *Nisicawayāsihk* to its ancestral northern-northwestern resource regions. Thus, for the upstream users to access their basecamps within this region, they had to buy a vehicle, load all the necessary material (supplies, provisions) and equipment (hunting gear, boats) from the community and then drive all the way to the impounded area[50] (approx. 40 minutes away), where they had to unload everything again to placed them into the unloaded boats (Informal discussions, 2018-19) This process was not only labor-intensive and

---

[48] Issett, Karsakuwigamak, Permichigamau, Rat and Notigi (Map 48).
[49] The lakes of Mynarski (Map 49).
[50] This was subsequently transformed into a motorway cross over for the provincial highway PR 391.

expensive since extra labor was needed to help out with the loading and unloading, but also very time-consuming.

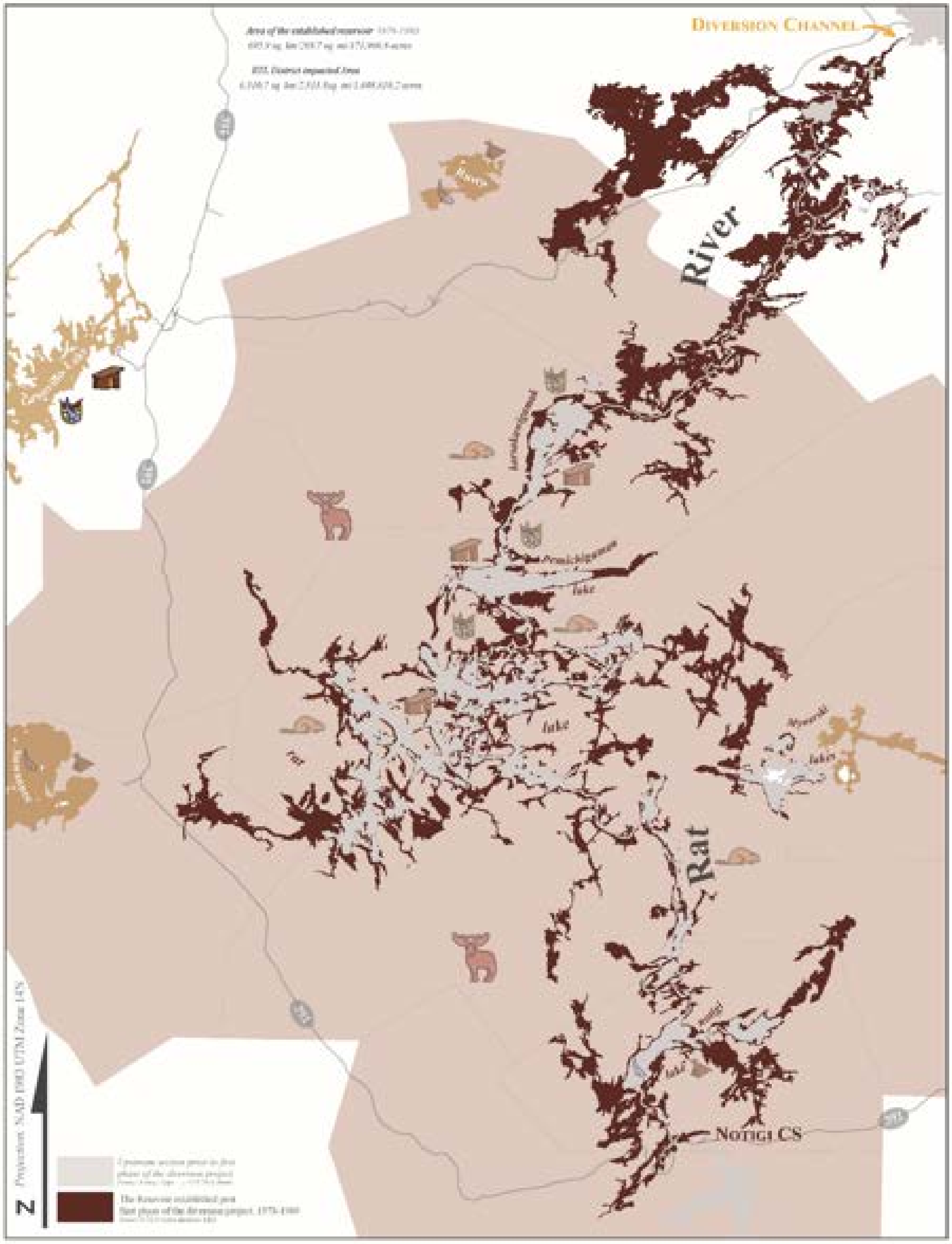
This situation was aggravated by the operations of the project as it progressed, and the upstream users began to question not only its practicality but also the energy spent in these activities (Elders, pers. comms. 2018-19; Informal discussions, 2018-19). Additionally, the frequent users of this section began to observe an augmentation in the natural generation and deposition of the organic residue along the northwestern navigational route (Elders, pers. comms. 2018-19; Informal discussions, 2018-19). These deposits were brought about by three factors brought forth by the diversion project. That is;

- the sedimentation passing through the human-made diversion channel that was generated within the South Indian Lake (impoundments + erosion);
- the clearance of shoreline vegetation that was carried out prior the operations of the diversion; and
- the imposed and forced flooding within the diversion system, which engulfed the terrestrial terrain not only on route but also went well into the tributaries. (LWCNR, 1975; Bodaly, *et. al*, 1984a, 1984b; Newbury, *et al*, 1984; FEMP, 1992; Appx. H)

This situation intensified substantially the state-of-condition of turbidity in the water, to the extent that *"you can't see what there is below"* the surface (Informal discussions, 2018-19; Elders, pers. comms. 2019; Appx. D). The visibility of the floating-submerged debris (large stumps and trunks or "deadheads") thus, became extremely limited, to the extent, that the upstream users began to incur frequent and substantial damages to their boats and motors. Moreover, the accumulation of floating-submerged debris along the newly created shoreline began to limit accessibility to the campsites, some of which were submerged by the flooding. Thus, navigation within the upstream system became dangerous for upstream users. This danger resulted in several accidents with tragic consequences, and thus adding a level of concern and worry within *Nisicawayāsihk.* (Informal discussions, 2018-19).

With respect to winter season, the additional influx of flow within the Rat-Burntwood system hindered spatial movement by snowmobiles, this because the people noticed that the undercurrents increased the accumulation of ice-slush over the frozen surface of the water. Thus, ice breakages and soft spots areas developed unpredictably, resulting in situation where the user of the northwestern navigational route became hesitant in to travel across the frozen surface. Due to such threat, seasonal movement across and within the northwestern navigational route started to decline. (Informal discussions, 2018-19; Elders, pers. comms. 2018-19) Thus, due to these factors *Nisicawayāsihk* experienced its first physical disconnection from its inherited cultural landscape.

> *"People used to come back with lots of staff, like meat, geese, moose"* but *"on the other side there is nothing"…"to hunt"* and the *"fish are dying". "No means of living". (The voices of the Elders during the Task Force Inquiry of 1975)*



Map 48: Post-diversion impacts on upstream *Nisicawayāsihk* land-use activities – impacted ecosystems are depicted as faded-out icons.

→ *Upstream ecological resources:*

With regard to upstream biodiversity, by the end of the 1970s when the diversion was fully operational, the surface area of the reservoir already covered 695.9 sq.km (268.7 sq. mi.) (Map 48; Appx. H). *Nisicawayāsihk* experienced and observed this substantial increase in coverage at first-hand not only its disruptions upon the ecology of the region but also the distress that was brought forth upon the wildlife habitat (Informal discussions, 2018-19; Elders, pers. comms. 2018-19). The flooding interspersed into and within the terrestrial landscape of the Rat's main tributaries (Reading and Suwannae Rivers) and the contiguous creeks together with the numerous small water pools scattered underneath the vegetation (Appx. D; Map 48).

Not only was the prime ecological habitat of marshlands and mud banks that sustained the fur-bearing animals' food sources, and the waterfowl and fur-bearing species reproductive territory submerged. But also, vegetation along the shorelines upon which ungulates (moose, caribou etc.) thrived upon. Thus, upstream users noticed drastic changes in wildlife – decreases in population, changes in migration and a strange taste of wildmeat. With regards to aquatic species, reproduction also declined due the increase in the organic material as deposited on lakes beds. (Informal discussions, 2018-19; Elders, pers. comms. 2018-19; Appx. D; Map 48)

This increased flooding not only covered spawning areas but also the food sources that sustained aquatic bottom feeder's species. The increase in turbidity of water also limited the vision of aquatic species that depend on sight to find food. Indeed, the productivity of the impacted lakes started to decline, which had adverse effects on both the fisheries and location consumption of traditional foods. (Informal discussions, 2018-19; Elders, pers. comms. 2018-19; Map 48)

Notwithstanding these dire conditions, *Nisicawayāsihk* did its best to adapt to these topographical and ecological changes, in part by relocating any flooded basecamps and establishing new resource harvest areas at higher grounds. (Informal discussions, 2018-19; Elders, pers. comms. 2018-19) However, as the spatial and temporal operational regime progressed, this interference became move severe. By 2000s, the extent of the upstream reservoir covered an approximate area of 711.3[51] sq. km. (274.6 sq. mi.) (Appx. D). Thus, the harvesting of wild meat (game and fish) and furbearers became domestically and commercially non-viable and economically redundant (Informal discussions, 2018-19; Elders, pers. comms. 2018-19)

Subsequent to the operation of the diversion project, *Nisicawayāsihk* found itself with approximately 6,510.7 sq, km. (2,513.8 sq. mi.) of in adequate land within the allocated northwestern resource territory, within which the spatial movement of its peoples was drastically limited (Map 48)

→ *Downstream accessibility:*

In preparation to the operation of the diversion, once the structural engineering work relative to the impoundments between the lakes of the Notigi and Wapisu was completed, water was withheld and stored upstream (Bodaly, *et. al*, 1984a; Newbury, *et. al*, 1984; FEMP, 1992). Thus, the lower branch of the Rat-Burtnwood system, from Wapisu till Wuskwatim experienced temporal declines in water levels that were severe particularly within the extremities of the route from Wapisu -Threepoint – Footprint – Osik.

[51] Area calculated from the CanVec Series, Hydrographic Feature 2002-2007.

Low water levels exposed extensive strands of mud along the shoreline that defined the outlined lakes. These mud strands limited direct accessibility to nearby campsites. (Informal discussions, 2018-19)

Users of this section shared that most of the time they had to leave the boats a long distance from the original shoreline and walk through the mud to reach the shore. This task was cumbersome and often dangerous when one had to haul equipment and provisions. With respect to the central section of this route, although it was somewhat still navigable, it also represented its own difficulties. This zone did not have enough water depth to accommodate the motors of the boats. Hence, propellers were either damaged by the bedrock and/or stuck in the bed's organic matter and on many occasions the users had to paddle. (Informal discussions, 2018-19; Elders, pers. comms. 2018-19)

Henceforth, *Nisicawayāsihk* yet again experienced a disconnect with its resource region[52]. and a decline in its spatial movement along with any associated recreational, domestic, commercial activities.

→ *Downstream post-operative diversion:*

Once, the diversion was operative in 1976-77 and the Notigi CS initiated the release of the stored water, the downstream branch experienced very similar disruptions to the ones described for the upstream reservoir.

> *"After the flood, it was very hard to go out into the land, because of the fluctuation of water levels, goes up and down, it was very dangerous, you needed to know what you were doing, very cautious…"*
>
> (Elder, A. Wood, pers. comms. Summer, 2019)

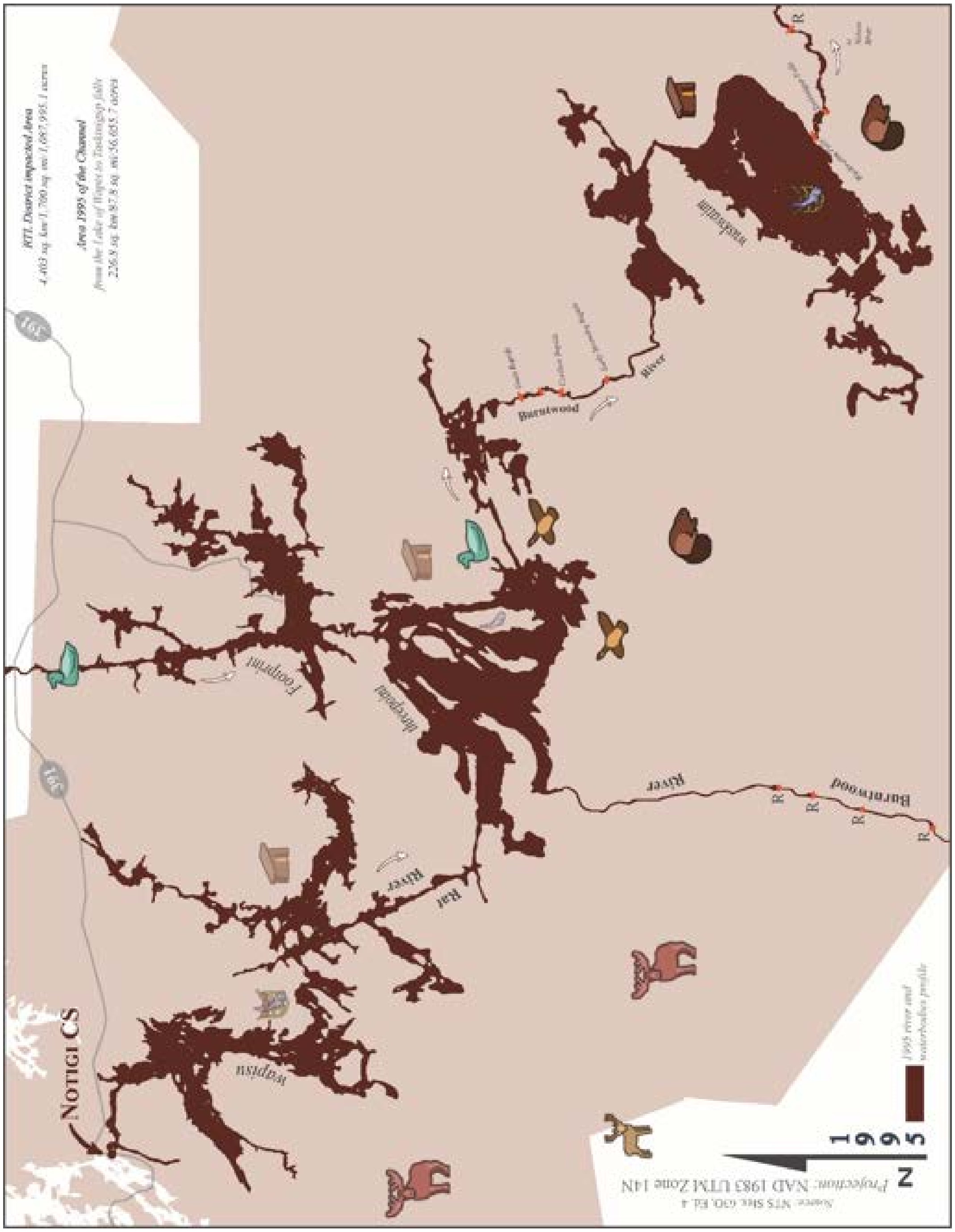
[52] The spatial context of the RTL.

Therefore:

- The hydraulic elevation that extended from the lake of Wapisu to the waterbody of Wuskwatim was increased by an additional 13 ft (4 m) (Bodaly, *et. al*, 2007). Thus, the flooding interspersed into the contiguous tributaries and creeks, completely engulfed all the natural beaches in its route. Such changes submerged and eroded additional stretches of shoreline vegetation, and terrestrial ecological habitat. (C. Kobliski, pers. comms. Fall, 2018; Elders, pers. comms. 2018-19; Informal discussions, 2018-19) This also saw the creation of new waterbodies and bays: within Threepoint Lake, Honeymoon Lake southeast of Footprint Lake and Kinosaskaw Lake within the channel that connects Threepoint with Wuskwatim. Such changes reconfigured the spatial context of the downstream branch. (Map 49, Appxs. D & H);
- Due to such changes, camps along the northern shores of Threepoint Lake, the shores of the channel, the southeastern shores of Footprint together with those located on the islands of Footprint, had to be immediately evacuate. Many of these displaced families relocated to the urban sprawl of the community, along the northern shores of Footprint Lake. (C. Kobliski, pers. comms. Fall, 2018)

> *"There were some beaches, right here, there and there* [referring to the northern shores of Footprint Lake]. *They all were flooded out. Now we have a man-made beach."*
>
> (C. Kobliski, pers. comms. Fall, 2018)

- Although high-water conditions at times facilitated accessibility of shoreline during warmer seasons, the navigational conditions within this section were again quite similar to those experienced in the reservoir region. Turbidity and the quantity of submerged debris[53] increased considerably and, damages and dangers associated with floating debris also increased. (Informal discussions, 2018-19; Appx. D)



Map 49: Post-diversion impacts on downstream *Nisicawayāsihk* land-use activities – impacted ecosystems are depicted as faded-out icons.

[53] I experienced this situation on numerous occasions during the boating activities within Threepoint Lake. In one occasion when with community members, we were trying to reach the southern section of the lake, travelling with limited speed, and out of nowhere the boat was surrounded by debris. We had to stay at a standstill to wait for the debris to disperse before continuing to travel cautiously.

- On the other hand, as winter approached, *Nisicawayāsihk* began to observe that the surrounding waterbodies, particularly Threepoint Lake, and their process of total freeze-up was lengthier than what occurred prior to the diversion. Thus, associated winter travels toward the campsites also took place later than usual. Indeed, in many cases winter travels did not occur at all in view of the unstable conditions of the surface ice. (Informal discussions, 2018-19; Elders, pers. Comms. 2018-19)
- Additionally, users of this section noticed an increase in the strength of the undercurrents[54], particularly within the section from Threepoint Lake to Wapisu Lake, and the branch that connects Threepoint with Wuskwatim. Regarding the former, *Nisicawayāsihk* was required to use large motorboats that could withstand such strength which are expensive to purchase, operate and maintain. Smaller motorboats were confined to an area close-by the community. The geological formation of the falls - *manito*, ᒪᓂᑐ; *atihko*, ᐊᑎᐦᑯ; *wapanska*, ᐋᐸᐣᐢᑲ[55], in turn became dangerous. Thus, users either risked navigating the falls, portaged or tried to find alternative routes to reach the basecamps of Wuskwatim. (Elders, pers. Comms. 2018-19)

"the rapids are deadly, all rapids are deadly, they are powerful."
(Elder. L. Francois, pers. comms. Spring, 2019)

With regards to biodiversity, the resource area contiguous to the lake of Wapisu was instantly affected due to its proximity to the CS. Both domestic and commercial fisheries within this waterbody collapsed and were unable to recuperate. Fishing for domestic purposes within

[54] I experienced this situation with community members when boating towards the channel from Threepoint Lake that leads into Wapisu Lake. The size of our boat was small and thus, the push of the undercurrents could be felt resisting the motor from moving us forward.
[55] Gods, Caribou, Early Morning (DMATS, 1965, Sht. 63O, Ed. 2).

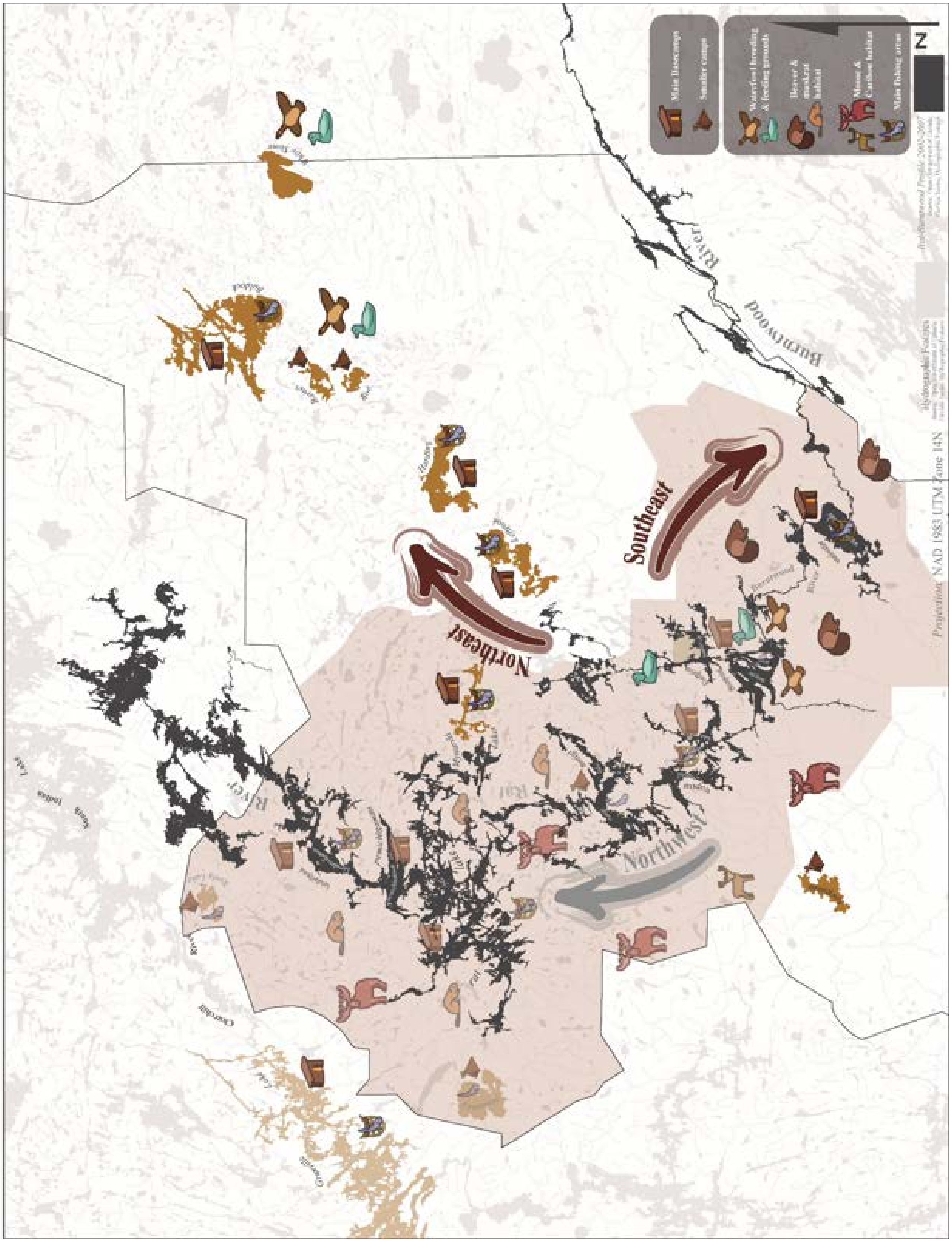
the lakes of Threepoint and Footprint declined as the operations of the diversion progressed, until this activity also gradually disappeared altogether. Additionally, the operations of the diversion, engulfed the many natural sandy beaches and the wooded[56] areas that defined the bays and the perimeter of the waterbody for Wuskwatim. Despite these impacts, interviews indicated that these waterbodies were still able to produce a sufficient fish quota. Therefore, for those who had camps along these shorelines, commercial fishing continued to some extent.

Thus, as outlined above, the implementation and operations of the first phase of the diversion project, undermined the local land-use practices and livelihoods of trapping, hunting, and fishing within 42% and/or 9,558 sq.km/3,690.2 sq. mi. of its allocated resource district[57] (Map 50). Moreover, due to the dangerous water conditions created by the project, which continued to occur along its operations, the spatial movement within the southeastern navigational route greatly restricted. Thus, seasonal use declined in frequency. (Elders, pers. comms. 2018-19; Informal discussions, 2018-19) By the 2000s, spatial movement was limited to just two of the main navigational routes (Map 50). Both circumstances disconnected and further distanced *Nisicawayāsihk* from its cultural landscape, a disconnect only aggravated further by the second phase of the diversion project.

> *"Prior to the flood, what we ate, the fruit, animals, was healthy food….After the flood, we noticed when the water started going up, we noticed that most of our medicine along the shorelines were not good as they were before…The wildlife, the fish was not good…"*
>
> (Elder A. Wood, pers. comms. Summer, 2019),

[56] The upland regions were covered by a mixture of aspen and poplar trees. While the islands within the lake and its low regions were characterized by white spruce and poplar specimens. On the other hand, the geological composite of its shoreline provided ideal soil conditions for the growth of vegetables. (McInnes, 1913, p. 25) Observations which are still clearly recalled by the soul of those families whose ancestral basecamps were established along the shores of Wuskwatim (Informal discussions, 2018-19).

[57] The 1977 Northern Flood Agreement formalized and transposed the 1940s RTL district designated for *Nisicawayāsihk* into a legally binding region. And, this by having it designated as a Resource Management Area (RMA), containing 49 registered trap lines. (NFA, 1977, Schedule B) The history that established the RMA is contentious and complex in nature which goes beyond the scope of this research.



Map 50: *Nisicawayāsihk* impacted land-use activities and navigational routes at the verge of the construction of Wuskwatim GS, c.2002-2007 - impacted ecosystems and routes are depicted as faded-out icons.

5.5.3 The second phase of the CRD, *2006-2012*

During the early twentieth century, Manitoba's energy utility provider (Manitoba Hydro) continued in its efforts to secure further investments in electrical-energy exports and to accommodate in-house demands. This would be achieved by harnessing the hydraulic power of the diverted flow through the development of a hydro-electric generation station within the system of the Burntwood River. (LWCNR, 1975; FOCCAR, 2005; MH, 2015) The Burntwood river was described as being a deep and steep river with narrow interconnecting channels that were characterised by numerous sequential falls and rapids. Its channels were defined by rocky gorges and clay banks, and with headwaters that originated from a waterbody bearing its name. This lake formed part of the topographical physiologies west of Threepoint Lake. (McInnes, 1913; Denis, *et. al*, 1916; Appx. F).

Early assessments in waterpower capabilities, described the Burntwood River as *"a stream of large volume"* (1913, p. 39). Notwithstanding the absence of any flow data, the studies still identified six possible waterpower sites[58], and three of which were located within the context of its eastern branch. (Denis, *et. al*, 1916, p. 291; Map 51; Table 5) The hydrology of this branch was interspersed underneath a diverse suite of wooded canopies (such as, poplar, white spruce, birch) and with rough, rocky/clay-covered banks and plateaus that define its shores (McInnes, 1913; Denis, *et. al*, 1916). This is the same branch through which the diverted, flow coming from the Rat River, led into Nelson River at Split Lake (Appx. D & F; Maps 51 & 52).

[58] These sites that accommodated the geological formation of six distinctive falls (Table 5).

Possible waterpower sites	Names Identified from NTS (1:250,000)	1916 (Denis, *et. al*, p. 291)	
		Rapids/Falls	Head in feet
6	Manasan Fall	Manasan fall	20
5	Kepuche Falls	Wapishtigau fall	15
	Upper Kepuche Rapids	Kepuche rapid	3
	Jackpine Falls	Waskatigau rapid	30
4	Taskinigup Falls	Taskinigup rapid	50
	Wuskwatim Falls	Waskwatin fall	20
3	Gate Falls	Gate rapid	17
	Kettle Rapids	Leaf rapid	8
	Leaf Rapids	One mile above Leaf rapid	8
	unnamed	Two miles above Leaf rapid	7
2	Grindstone Rapids	2nd Driftwood rapid	5
	Driftwood Rapids	1st Driftwood Rapid	4
1	Clay Rapids	Clay rapid	25
	Moose Rapids	Flathill rapid	10
	Eagle Rapids	Eagle rapid	8
	Carrot Rapids	Carrot rapid	8

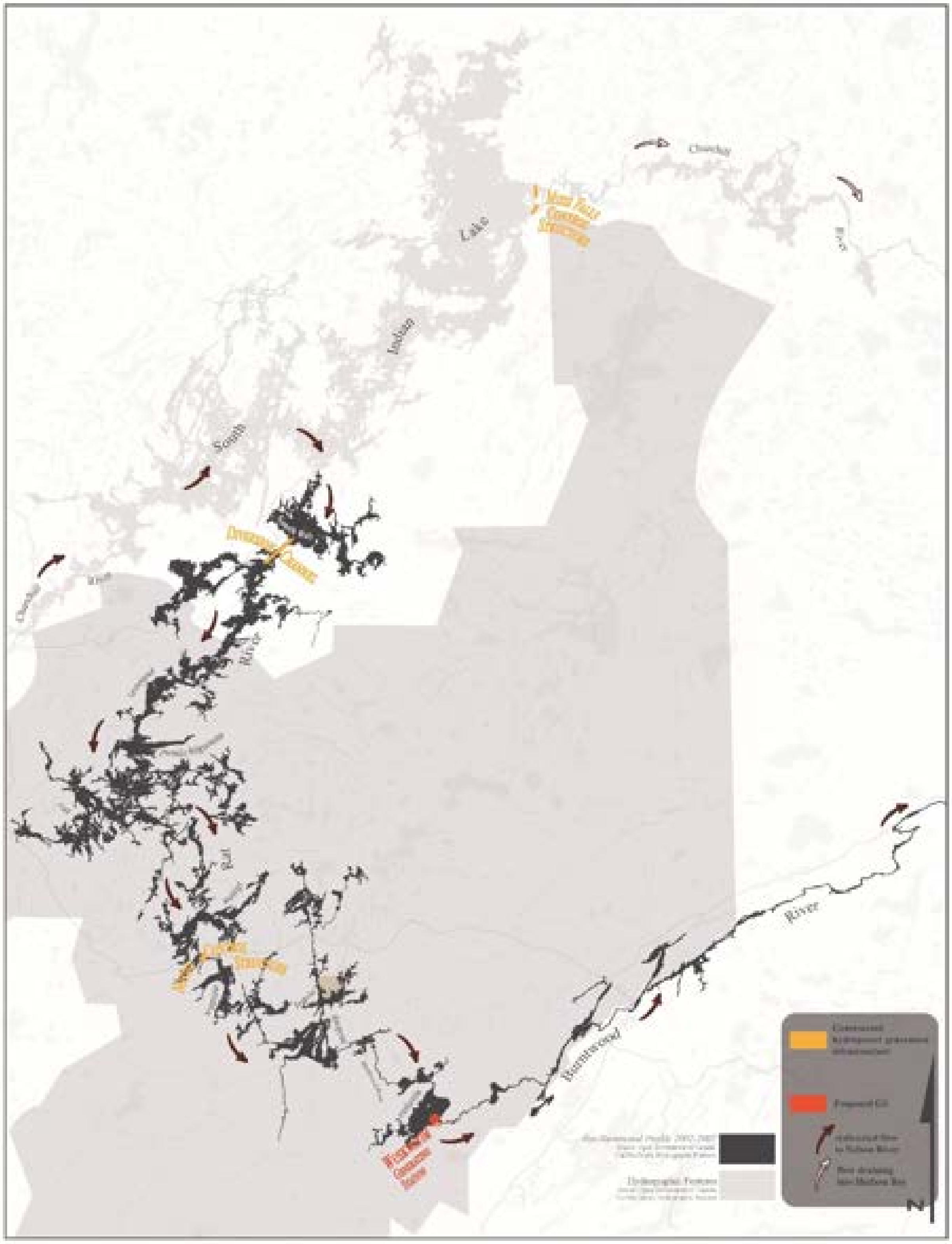
Table 5: Possible sites for hydropower development along the perimeter of the Burntwood River.

This branch became the ideal candidate to house the envisaged new hydroelectrical generating station in the twenty-first century. Thus, the site selected by the modern-day structural engineers was the spatial context which contained the rumbling persona of two distinctive falls, these running a collective distance of 0.31 miles (500m) (Denis, *et. al,* 1916, p. 291; MH, 2002; Appx. D). In accordance with the *Nisicawayāsihk*, *Nethewo* language these were known as the falls of *Oskotimi*, ᐅᐢᑯᑎᒥ, Wuskwatim and *Taskinikaph*, ᑕᐢᑭᓂᑲᐦᑊ, Taskinigup (Elders, pers. comms. Summer, 2019). The geological physiologies of these falls formed at and in the proximity to the natural outlet of *Oskotimi Sakahekan*, ᐅᐢᑯᑎᒥ, ᓴᑲᐦᐁᑲᐣ, Wuskatim Lake (Appx. D). The falls of *Taskinikaph* used to occur about *"three-quarters of a mile below"* the falls of *Oskotimi* (Denis, *et. al*, 1916, p. 113; Appx. D).

Map 51: The rapids downstream section on the Burntwood River, that were identified for possible hydropower development.

In 1997, Manitoba Hydro embarked on a four (4) year negotiation[59] with *Nisicawayāsihk*. Negotiations which focused on discussing the project's prospects and feasibility (FOCCAR, 2005; MH, 2002, 2015). These interested parties eventually signed *"an agreement-in-principle"* in 2001 which both signatories had to manage, maintain, and operate the newly constructed structure. But this agreement also permitted *Nisicawayāsih*k to legally *"obtain an equity position by investing"* in the operations of the envisaged hydro-electric generating structure. Thus, the agreement provided *Nisicawayāsihk* with an *"ownership interest"* of thirty-three percent – in large part by borrowing funds from the Crown corporation. (MH, 2002, 2020; C. Kobliski, pers. comms. Fall, 2018) Once this agreement was formalised, the associated hydropower structural engineering works commenced five years later in 2006. (MH, 2015; Map 52)

[59] The complexities of the processes adopted by these negotiations go beyond the scope of this research.



Map 52: The second phase of the diversion project – the construction of Wuskwatim Generating Station.

The engineering works focused on impounding and completely replacing the 50-foot (15.2 m) rapids of Taskinigup with a 200 MW powerhouse and a three-bay spillway with discharge capacity of 38,846 ft^3/s (1,100 m^3/s). (Denis, *et. al*, 1916, p. 113, MH, 2012, 2015, p. 2J-1-2J-11; Appxs D & H). To further increase the outflow capacity of the lake, excavation works were also carried out on the geological formation of the falls of Wuskwatim. These were used to create the forebay of the GS and thus accommodate the required 22m water drop for the powerhouse. The water level behind the dam together with that of the lake had to be increased to a hydraulic elevation of 234m above sea level, which according to Manitoba Hydro's 2015 regional assessment, flooded an area of 0.1 square miles (0.4 square kilometers). (MH, 2012, 2015, p. 2J-1-2J-11; Appxs. D & H).

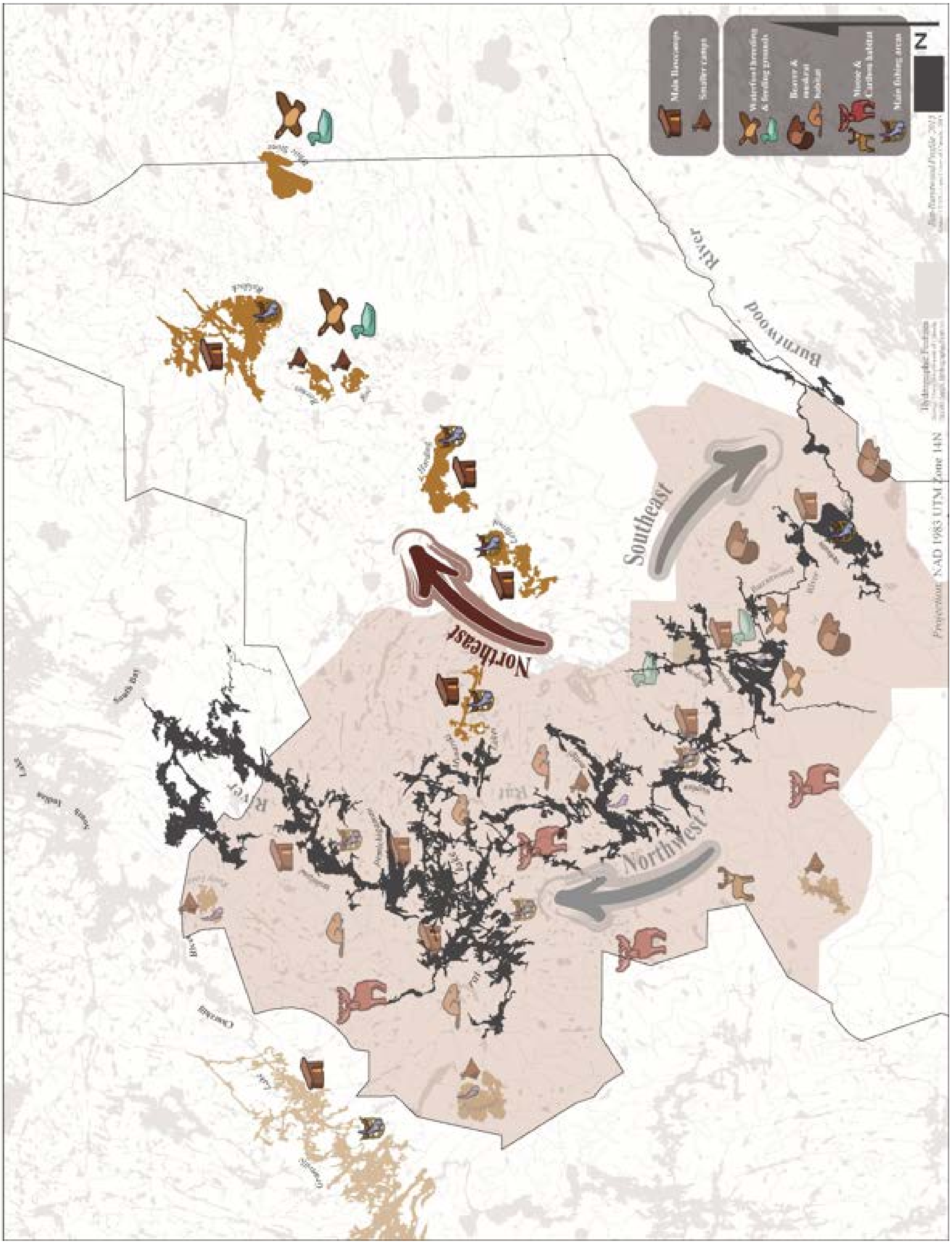
MH Annual Report (Edition)	**Year-end** (March 31)	**Percentage of Electrical Energy –** contributed into the interconnected Hydro-electric system	**The Generated Net Capacity (MW)**
62nd, p. 101	2013	2.74%	200
63rd, p. 109	2014	4.03%	214
64th, p. 93	2015	3.79%	211
65th, p. 115	2016	4.10%	211
66th, p. 103	2017	3.82%	213
67th, p. 108	2018	4.06%	212
68th, p. 115	2019	4.93%	208
69th, p. 115	2020	4.65%	208
70th, p. 115	2021	4.21%	210

Table 6: Temporal hydroelectric generation contributions by Wuskwatim GS.

The flooding immediately engulfed and silenced the fall at the lake's outlet and continued to redefine the spatial context of the lake. In so doing, the flooding eroded the shoreline vegetation and the nearby islands. Thus, floating debris was produced and floating 'islands' were created – the latter referring to material that detached from the shoreline due to flooding (Appxs. D & H). Once the second phase of the diversion project was fully operational, its consequences were not immune from history. Prime ecological habitat along the impacted system was yet again degraded and flooded. Thus, ecological disruption that distressed the wildlife food source and reproductive habitat. Therefore, downstream users noticed and experienced the same changes that the upstream users observed during the first phase of the diversion project, on the wildlife population. (Elders, pers. comms. 2018-19; Informal discussions, 2018-19; Map 53)

Due to the increase in turbidity, and deposition of organic material and the flooding that increased the lake's hydraulic elevation, Wuskwatim Lake was another waterbody that suffered in producing sufficient fish quota, for local and commercial consumption. Thus, the commercial fisheries practices within this lake collapsed. The remaining nearby basecamps, particular the one established along the shores of Wuskawtim lake were either flooded out or dismantled to make way for the new infrastructure. Therefore, a number of families again were displaced from their ancestral basecamps and were forced to relocate within the community. (Elders, pers. comms. 2018-19; Informal discussions, 2018-19; Appxs. D & H)

Thus, approximately 3,468.1 sq. km (1,339 sq. mi.) of the downstream resource area became inaccessible and unfeasible when it came to practicing inherited ancestral livelihoods practices (Map 54). This condition became dire when *Nisicawayāsihk* had to make a drastic decision to completely halt any navigation towards Wuskwatim because of the inherent dangers associated with this transportation. Indeed, the undercurrents produced by the flooded rapids on route to Wuskwatim became so extreme, particularly while crossing the rapid known as *manito*, ᒪᓂᑐ, Gods Rapid, to the point that users lost their lives. (Elders, pers. comms. 2018-19; Informal discussions, 2018-19; Appx. D). In doing so, the ancestral livelihood practices continued their metamorphosis until the spatial movement along the southeastern navigational was eliminated completely (Map 53).



Map 53: Post-Wuskwatim GS construction, impacts on *Nisicawayāsihk* land-use activities and navigational routes – impacted ecosystems and routes are depicted as faded-out icons.

> *"The waterways were beautiful, and people loved living along the waterways. Now its dangerous. Nobody wants to cross, all these traplines* [referring to the one impacted inaccessible] *are just sitting"*
>
> (Elder L. Francois, pers. comms. Fall, 2019)

5.6 Conclusion: contemporary spatial configuration

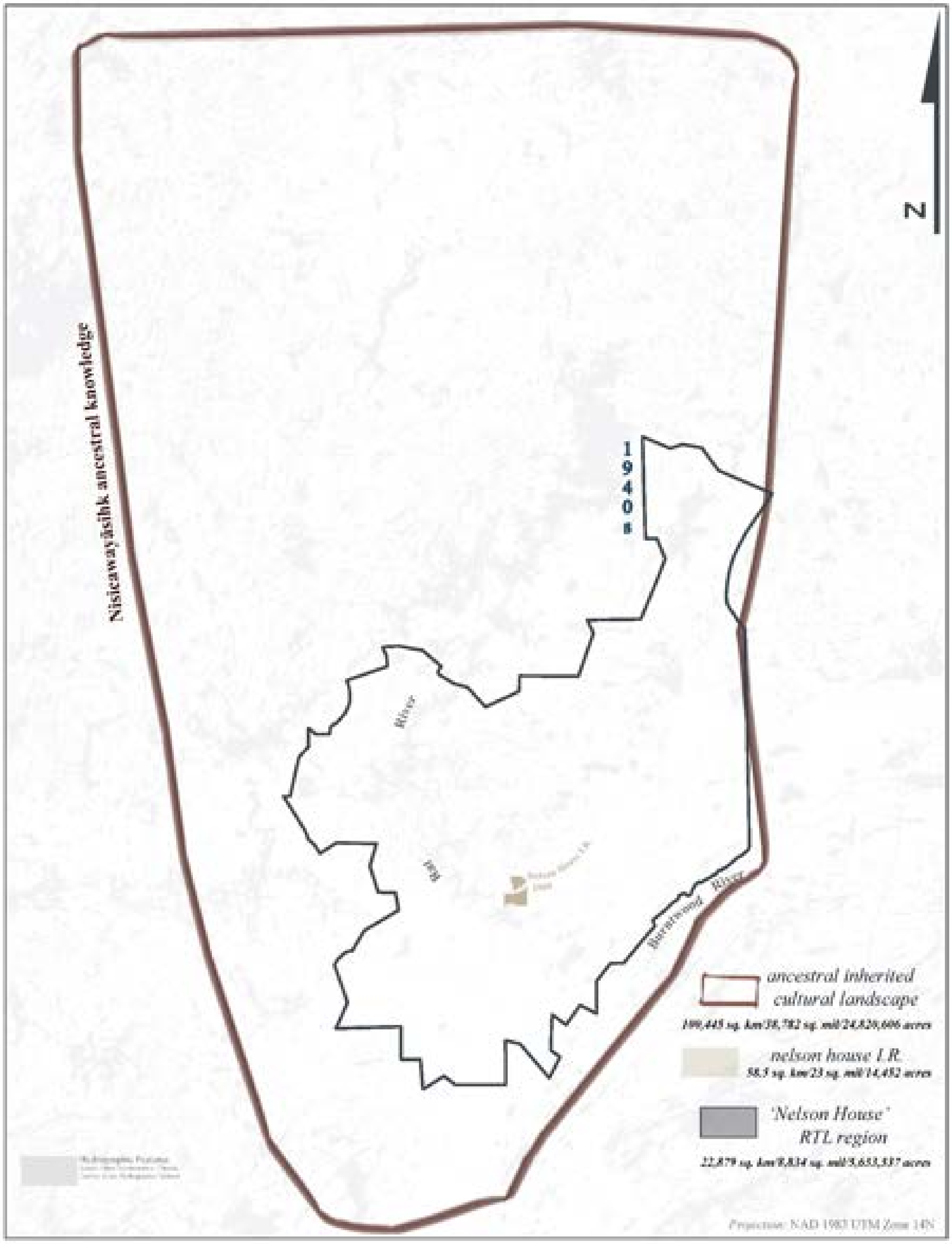
Nisicawayāsihk oral histories narrate and interpreted an inheritance of an ancestral cultural landscape with a regional context of 100,445 sq.km (24,820,606 acres) (Elders, pers. comms. 2018-19). This spatial territory has topographical physiologies that are characterised by a maze of hydraulic ridges and freshwater expansions that intersperse underneath a diverse suite of wooded canopies. Within one of its hydrological networks (Rat-Burtwood) *Nisicawayāsihk* cultural identity emerged and established itself. *Nisicawayāsihk* seasonal socio-cultural livelihoods, have been contextualized by and taken place on the waterbodies of the lakes of *Wapānakāhk*, ᐊᐧᐹᓇᑳᕽ, Threepoint and *Otītiskiwin*, ᐅᑌᑎᐢᑭᐏᐣ, Footprint, since time immemorial. However, since post-European contact, such vast ancestral spatial occupancy had had to continuously adjust to satisfy the needs of the dominant society.

Indigenous Nations communities have long been affected by colonialism. Initially this revolved around the economical expectations surrounding the fur-trade and extended to the unification of a Canadian Federation, which in part was consolidated to manage and control its Natural Resources. This dominance was achieved through the Treaty-making processes in 1908, allocated 58.5 sq. km (14,452 acres) in 'reserve' land to the *asiniskaw-ithiniwak* of *Nisicawayāsihk.* Such acts restricted the spatial movement of its members across and within their ancestral cultural territory. Notwithstanding this first essence of centralized community planning within the untamed Northern Territory, *Nisicawayāsihk* restructured its spatial organisation by establishing semi-permanent clusters at its epicentre while also maintaining its inherited spatial movement.

However, once transportation arrived within the Northern Territory, *Nisicawayāsihk* found itself again reinterpreting its spatial norms. This time to accommodate and satisfy the recreational (hunting/fishing) activities of the southerners. To ensure adequate resources for newcomers and the Indigenous Nation, while also protecting wildlife population according to scientific worldviews, regional trapline districts were established in the 1940s. *Nisicawayāsihk* was provided with a wildlife resource district that amounted to 22,879 sq. km (8,843 sq. mi.). This terrestrial and ecological territory constituted 23% of *Nisicawayāsihk* pre-colonial inherited ancestral cultural (Map 54). A district which was undermined by the introduction of the Hydropower discourse in northern Manitoba.

Thus, a series of hydro-electric generating stations were constructed across northern Manitoba during the 1950s and in the 1970s, the first phase of the CRD began affecting *Nisicawayāsihk* livelihoods. A landscape that was flooded, and damaged environmentally by the impositions of the Hydropower discourse. Thus, compromising the habitat required for healthy wildlife population. The associative hydro-structural components redirected 80% of the hydraulic capacity of the Churchill River into a system (Rat-Burntwood) that in turn fed the hydraulic flow of the Nelson River, reconfigured the existing physiologies of *Nisichawayasihk* and that of their allocated resource territory.

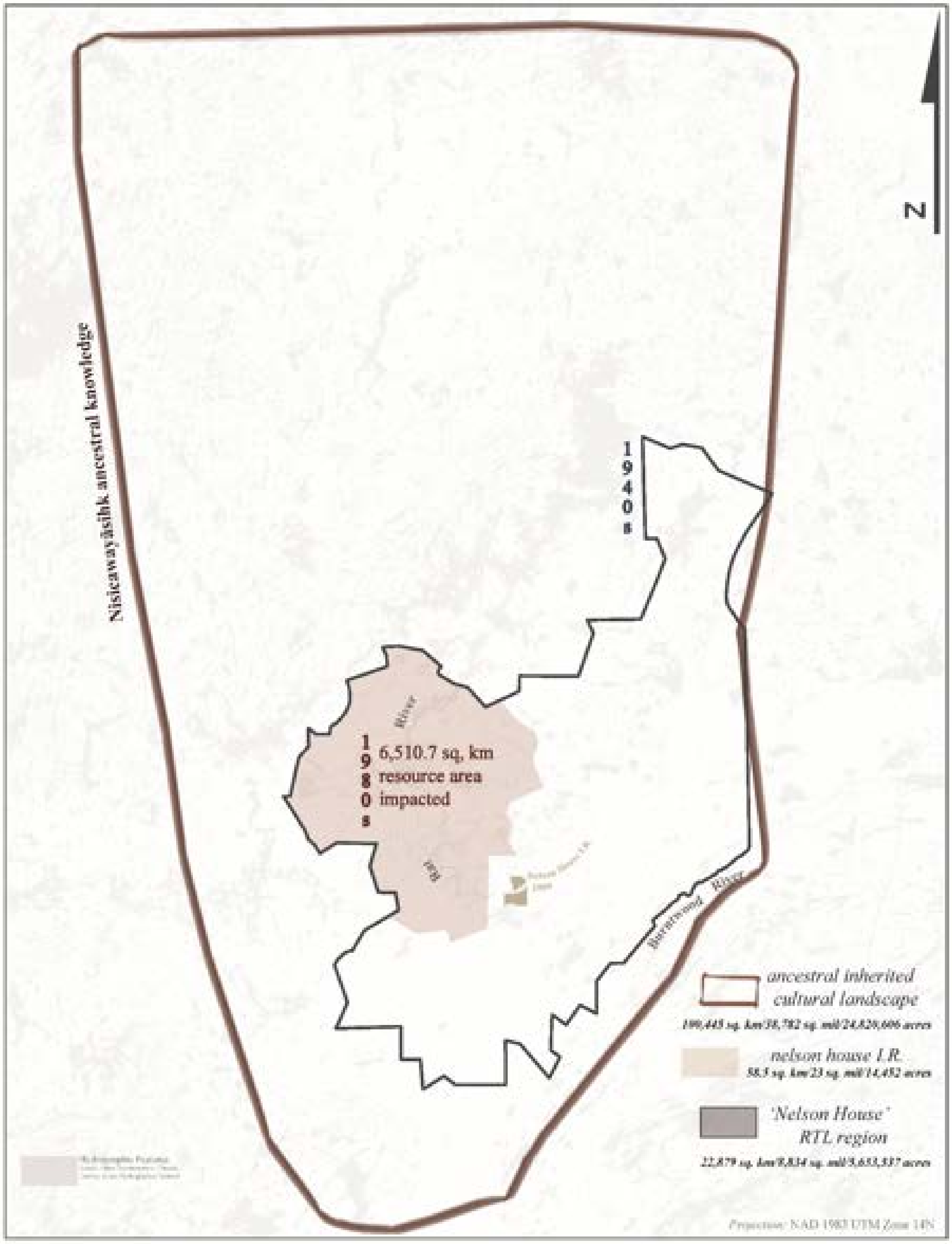
The hydrology of the Rat and Burntwood system was segmented into three distinctive branches with two reservoirs that permitted the generation of hydroelectricity. The first phase of the structurally engineered excavation and impoundment works immediately established a 695.9 sq.km (268.7 sq. mi.) reservoir, which extended from the southern shores of South Indian Lake (South Bay) into the Rat River till the reengineered lake of Notigi, increasing the hydraulic elevation for each of its waterbodies.



Map 54: *Nisicawayāsihk* inherited ancestral spatial in relation to its RTL district.

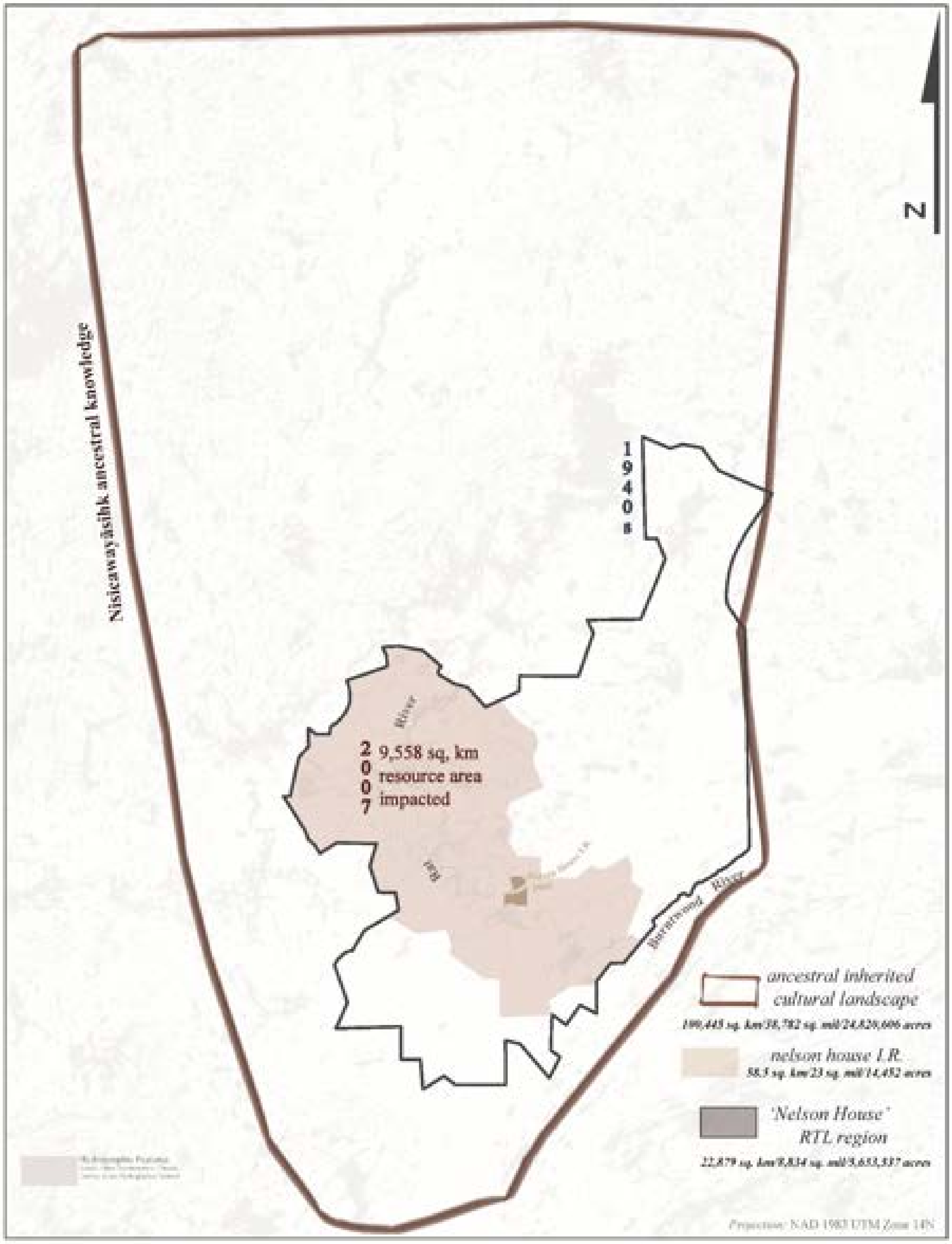
The subsequential flooding not only engulfed shorelines but also seeped into the contiguous streams, creeks, and tributaries. Such changes damaged, submerged, eroded, and suffocated prime ecological habitat upon which a wide diversity of wildlife (aquatic, avifauna, furbearers, and ungulates species) depended.

Such imposed stressor brought forth a substantial decline in wildlife population across the territory. Which also adversely affected *Nisicawayāsihk* land-use activities. Moreover, since time immemorial, this intrinsic hydrological network had characterised *Nisicawayāsihk* inherited ancestral cultural landscape, constituted a direct representation of its people's ancestral identity and environmental knowledge inheritance. Therefore, the disturbances imposed on the ecological habitat also metamorphosized the physiologies of the water in this region, to the point where these became largely unknown to upstream users. This was due not only due to the drastic changes that the landscape of the shoreline experienced, in that the landmarks which earmarked the navigational route towards the basecamps, were submerged.



Map 55: *Nisicawayāsihk* inherited ancestral spatial context consumed by the CRD project.

But also, due to decline in the condition of the water, which due to the increases in sedimentation and turbidity hindered visibility of the submerged debris. The changes in water levels and the inability to see floating debris led to unfortunate circumstances and thus, as sense of worry and concern settled among the upstream users. This worry coupled with the unprecedented changes in water that continued to worsen as the operations of the project progressed, completely halted navigation and use of the upstream section. Thus, by the 1980s, *Nisicawayāsihk* had become completely cut off from at least 11 resource areas that covered 6,510.7 sq, km. (2,513.8 sq. mi.) (Map 55). With respect to the downstream section, although it suffered similar environmental consequences to the downstream section, *Nisicawayāsihk*, by drawing from its ancestral environmental knowledge adapted to any resulting changes occurring in this watercourse.

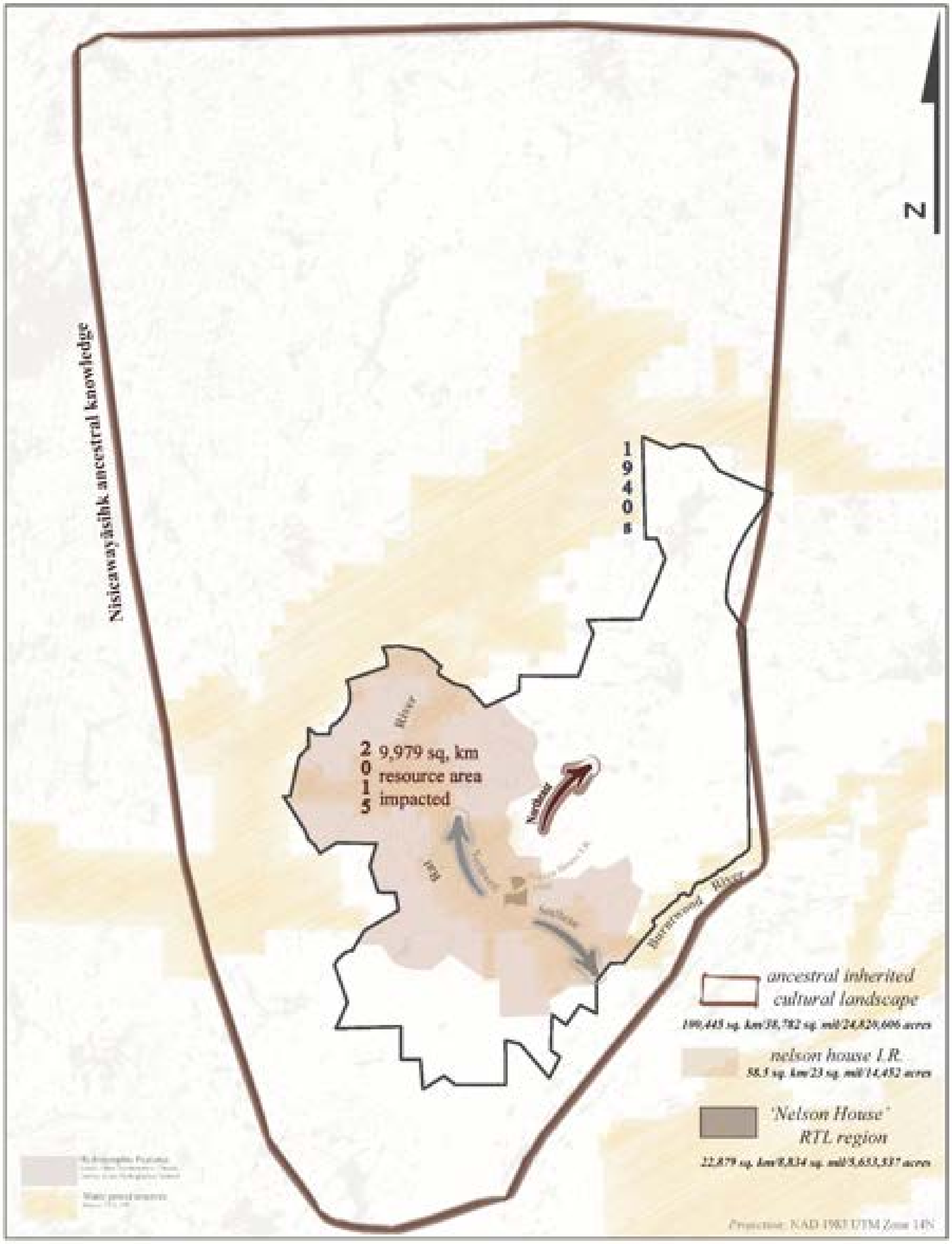


Map 56: *Nisicawayāsihk* inherited ancestral spatial context being eaten up by the CRD project, prior Wuskwatim GS.

Thus, managed to largely maintain an extent of its seasonal spatial movement along this route. Yet this movement was ultimately threatened by the implementation of the second phase of the diversion project, 30 years later. Its proponents established another reservoir (extending from the lake of Wapisu to the lake of Wuskwatim) designed to sustain the operations of the newly constructed hydroelectric generating station. These operations did not limit themselves to suffocate the rumbling persona of two more falls/rapids, but also, continued to undermine the associated watercourses and associated ecological habitat. *Nisicawayāsihk* yet again found itself cut off from its downstream cultural landscape and allocated resources, covering an area of 3,468.1 sq. km (1,339 sq. mi.)

As a result, the ancestral inherited navigational routes that arose from multi-directional seasonal spatial movement were reconfigured into a contemporary one-directional movement. This reconfiguration disconnected *Nisicawayāsihk* from 9,979 sq.km (3,853 sq. mi.) of its allocated regional resource territory, which separated its *asiniskaw-ithiniwak* from their lineage (homesteads), parentage (basecamps), and histories (gravesites, cultural pictographs, and artifacts iconography). These changes instilled within the soul of the people a deep sense of loss, a weight that still to this day resonates across *Nisicawayāsihk* narratives and experiences. (Map 57)

> *"Everything changed, the people, their livelihoods. It was traumatic. The people were traumatized by the flood. They didn't feel like going out. They were so traumatized, sad".*
>
> (Elder L. Francois, pers. comms. Spring, 2019)



Map 57: *Nisicawayāsihk* spatial movement today in 2019.

CHAPTER 6

Perceptions of Indigenous cultures and Western societies as they relate towards the caring of *Askiy*, the Earth, are in contrast with each other. Since time immemorial Indigenous livelihoods and coexistence depended on and intertwined with Nature's environmental seasonal changes. Such seasonal associations reflect their spatial movement distribution within and along the physiologies of their environments, defining the geography of their respective ancestral cultural territory. This spatial context forges a timeless and intimate relationship between Nature and its human counterpart, and the constituents (biodiversity) of the former have helped shape the culture, spiritual essence, and identity of Indigenous Heritage. *Nipi* (Water) as it flows through its watercourses, has guided, and connected nomadic clusters of these peoples as they move among their respective ancestral grounds.

On the other hand, Western societies due their need to satisfy societal commodity demands and need to safeguard economic growth, reflect a dichotomy that perceives Natural Resources as exploits. This dichotomy of objects and its dismissal to any adverse consequences have been embraced by Manitoba's Northern Hydro-electrical Generation proponents to the fullest during its 20th century resurgence. Such acts have systematically placed a permanent blanket of silence over the free rumbling personality of *Nipi* . Structurally engineered impoundments not only physically imposed themselves upon the physiologies of waterways, but also intensify the natural cycle of environmental erosion.

Such acts result in the gradual disappearance of a landscape (topographical and hydrological features) that at once gave rise to and ground Indigenous cultural richness. The region that is affected by the imposed Hydropower discourse must readapt and reorganise its spatial relationship, which has shrouded the historical (past and contemporary) legacy of a hydro-electrical infrastructure development in Northern Manitoba with controversies and mistrust. To better understand and communicate such complexities and impositions, I spent a substantial amount of time not only dissecting the former and contemporary history of hydro-electrical development across Manitoba's North. But also, immersing myself, fully, in the cultural ancestral northern Indigenous landscape which was accompanied and guided by its inherited *nethowe-ithiniwak* narratives.

The stories and experiences that were shared with me, their sense of nostalgia, pain and loss guided me and my insights of how as a society, we are inclined to take the simplest forms of existence for granted, such as sound. Such realizations gave rise to my quest as I began to unearth the original physiologies of *Nipi* and familiarize myself with her true free-spirted voice, which was systematically undermined by the Hydropower discourse, yet still lives deeply within the memories of the Cree speaking people.

> *"Water is very essential, without water there would be no life. You lose your way."*
> (Elder A. Wood, pers. comms. Summer, 2019)

This historical cartographical investigation has led me through the passage of time, as I hunted for the true essence of what has been lost to modernist ideas and expectations. In so doing, I was introduced to one of Manitoba's greatest watercourses, the Nelson River and his 28 falls that were first mapped by the outsiders during the fur trade era and from which his rumbling person gathered its strength and voice.

Outsiders who lived and witnessed *"its immense volume of water, heavy falls and waves"* (Glover, 1962, p. 38). Thus, the rumbling personality of one of his falls was described by the late nineteenth century geological surveyors to *"represent about half the volume of the Nelson River"* (GSC 1879, CC, VI, p. 14). A strength that was transposed into a measurement of power by scientific environmental assessments carried out during the early years of the twentieth century.

The total waterpower was calculated to 2,706,300 horsepower[1] in 1916, to which the Superintendent of the Canada Dominion Water Power Branch, responded with a declaration that *"some day"* [there shall] *"be located immense power developments"* within the reach of the Nelson River (Challies, 1916, p. 227). The rest as they say is history. Five (5) hydro-electric generating stations and another one that regulates the incoming flow from Lake Winnipeg, currently sit proudly, dominating the hydrological landscape of the Nelson River.

This dominance transformed the free, swift, strong flowing characteristics of *Nipi* into a state-of-condition that is representative of submissive persona and open water storage reservoirs. Notwithstanding such dominance, the Hydropower discourse continues to forfeit servitude from *Nipi,* in part, because the strength of another great northern river was also sacrificed to ensure and satisfy the province's demands. Thus, over a three-year span during the decade of 1970s, the Hydropower discourse implemented a project with the clear intent of diverting a substantial flow from the Churchill River. This diversion directed and ran the altered flow into an intrinsic chain of tributaries, to ultimately drain it into and join the Nelson River.

This diversion project together with the subsequent construction of another hydroelectric generating station, within the perimeter of a tributary, ensured that the Nelson performed not only at constant pace but also at its highest capabilities. However, history manages to repeat itself. The imposed structural impoundments not only silenced yet again the rumbling sound and personality of *Nipi* but reengineered the topographical physiologies together with the associated hydraulic network of a territory which gave birth to the cultural identity of the *Asiniskaw-Ithiniwak* (Rocky Cree) of *Nisicawayāsihk*. This reengineering brought forth substantial environment havoc, through habitat fragmentation, destabilization of shoreline vegetation, and erosion of flooded

[1] Approximately 2,018.088 MW (Denis, *et. al*, 1916, p. 283; Appx. F).

habitat. An environmental disturbance that has instilled a sense of cultural disconnection within *Nisicawayāsihk.*

> *"There is not many that still go out."*
> (Elder L. Francois, pers. comms. Spring 2019)

This disconnect has restricted spatial accessibility to wild meat, berries, medicinal plants but also to the ancestral territory itself. This spatial accessibility *Nisicawayāsihk* recalls and describes it as being exiting, dynamic, vibrant, clean, and organic in nature. Characteristics which are the essence of *Nisicawayāsihk* cultural and identity inheritance. During those quite moments of recollection and reflection by both participants in this research (knowledge-keepers and Elders) but also by *Nisicawayāsihk* in its entirety (community and territory), I began to understand that what Society foresees or perceives as the norm is not necessarily correct. These voices and backdrops have guided my full immersion experience as I unearthed the background history which shaped *Nisicawayāsihk* inherited ancestral spatial context as well as the evolution to its contemporary extent.

This journey through time and space, has revealed how the Eurocentric urban sprawl and their environmental management policies, has eaten away at the ancestral regional context of *Nisicawayāsihk* cultural landscape. It began as a vast territory which prior to colonial contact, in accordance with the inherited oral narratives of *Nisicawayāsihk* Elders, had a regional context that covered at least 100,445 square kilometers in land area. This territory stretched North towards the lakes of Lac Brochet and Tadoule, and well into the Athapaskan Nation ancestral landscape. While its southern delineation was defined by the peripheries of *Paskoskakanis Sipiy*, ᐸᐢᑯᐢᑲᑲᓂᐢ ᓯᐱᕀ, Grass River. Central to this regional context the intrinsic hydraulic complex of the rivers of *Wasasko*, ᐘᓴᐢᑯ, Rat and *Wiposkawi*, ᐃᐳᐢᑲᐃᐧ, Burntwood.

Nisicawayāsihk interspersed within and moved across this ancestral territory whose ecological habitat sustained a great diversity of wildlife and embraced a complex of clean running watercourses. However, in 1940s this territory was reduced to the confines of a resource trapping district which covered a 22,879 square kilometer in area, which came to represent 23% of *Nisicawayāsihk* pre-colonial spatial territorial inheritance. This reconfigured landscape was then subject to the introduction of the Hydropower infrastructure. An imposition that flooded watercourses, lakes and creeks, environmentally damaged prime wildlife habitat and forced the unnatural erosion of shoreline and vegetation.

> "*Along the shoreline, all the water keeps coming up. The animals suffer because the fluctuation of water damage the habitat upon which the furbearing animals depend.*"
>
> (Elder A. Wood, pers. comms. Summer, 2019)

Not only did the fauna and flora found itself in decline but accessibility to and within the inherited navigational routes also decreased substantially. Such routes saw themselves as being metamorphosized from a multi-directional seasonal spatial reach to a contemporary one-directional spatial movement. And the ancestral territory continues to be eaten away by the operations of the Hydropower discourse and, thus continues to be disconnected from its people. A painful legacy that resonated loudly during my informal gatherings around campfires or hiking through the remnants of cultural sites, boating and fly-overs experiences. A legacy that signifies an ongoing disappearance of cultural, lineage, parentage, and heritage.

> *"It's so sad to see our land so destroyed and also all the floating debris, so dangerous."*
>
> (Elder A. Wood, pers. comms. Summer, 2019)

The weight of this loss invades the tonality of the voices of *Nisicawayāsihk.* Although living with and through this deep sense of loss, my immersion into such overwhelming narratives taught me that *Nisicawayāsihk* is resilient and fully committed to keeping its ancestral cultural and identity inheritance alive as it continues to withstand the passage of time. This perseverance resonated with intensity throughout my numerous reflective moments as I listened attentively to the teaching of such histories and experiences, shared through the unique *achimowenu*, storytelling abilities of the *asiniskaw-ithiniwak* of *Nisicawayāsihk.*

Such insights and abilities remain strong within the voices of the Elders, who generously and tirelessly invested time in me, while sharing their inherited knowledge and guidance as they work to reconnect current and future generations with their oral and territorial inheritance. This is achieved not only by revitalizing *Nisicawayāsihk Nethetho* (Cree) language and *achuthokewenu*, cultural myths. But also, by establishing feasible and manageable land-based activities along the unimpacted navigational route. These activities have the intent of reconnecting *Nisicawayāsihk* with its seasonal basecamps and outdoors subsistence. Such activities ultimately challenge the imposed disconnection and gap that co-exist between *Nisicawayāsihk* and its ancestral cultural landscape.

The Elders of *Nisicawayāsihk* are confronting such challenge because the hydro-related erosion of their cultural identity is simply unacceptable.

> *"We had names for all our lakes in Cree, everything had a Cree name, even the rapids and the animals."*
>
> (Elder A. Wood, pers. comms. Summer, 2019)

At the same time, there is much local interest in cultural resurgence and in revitalizing this knowledge.

> *"We're starting here, our revitalization of language,…We got lots of spots that we are going to name, ….people will start to know their own language, our own language… we can utilize the lakes along the northern area of our territory, like Baldock Lake, to get the people out on the land, we get to that, lot's of work."*
>
> (Elder. L. Francois, pers. comms. 2019)

Such strength and resilience fully characterize *Nisicawayāsihk.*

References

Articles, Books and Journals

1) Armstrong, J. (1909). *Report of the Hudson's Bay Railway Surveys. Department of Railways and Canals*. Sessional Paper No. 20d.
2) Arrowsmith, A. & Puke, J. (1814) *A map exhibiting all the new discoveries in the interior parts of North America*. London: A. Arrowsmith. [Map] Retrieved from the Library of Congress Online Digital Collection, URL https://www.loc.gov/item/2004629031/.
3) Bell, R. (1878). Map of Nelson River and the boat-route between Lake Winnipeg and Hudson's Bay. [Montreal]: Geological Survey of Canada, 1878. URL https://nla.gov.au/nla.obj-231618468/view
4) Bell, R. (1880). *Report on explorations of the Churchill and Nelson rivers and around God's and Island Lakes, 1879*. Montreal: Dawson Brothers
5) Belshaw, K. J. (2005). Decolonising the land – naming and reclaiminFg places. The *Quality Planning Resource*, Planning Quarterly, 7–9. URL https://www.qualityplanning.org.nz/sites/default/files/Decolonising%20the%20Land.pdf
6) Berezanski, D. (2004). *Trapping Comes of Age: The Registered Trapline System of Manitoba.* In Malaher, D. (compiler). Selected Papers of the 11th Biennial Rupert's Land Colloquium, Kenora, May 2004. Centre for Rupert's Land Studies, University of Winnipeg, Winnipeg, pp.85-97.
7) Berkes, F., Hughes, A., George, P. J., Preston, R. J., Cummins, B. D., & Turner, J. (1995). The Persistence of Aboriginal Land Use: Fish and Wildlife Harvest Areas in the Hudson and James Bay Lowland, Ontario. *Arctic*, *48*(1), 81–93. https://doi.org/10.14430/arctic1227
8) Blackadar, R. G. (ca. 1986). *The Geological Survey of Canada: Past and Present*. [Ottawa]: Geological Survey of Canada. URL https://publications.gc.ca/site/eng/9.813870/publication.html?wbdisable=true
9) Bodaly, R., Hecky, R., & Fudge, R. (1984a). Increases in Fish Mercury Levels in Lakes Flooded by the Churchill River Diversion, Northern Manitoba. *Canadian Journal of Fisheries and Aquatic Sciences, 41*(4), 682–691. https://doi.org/10.1139/f84-079
10) Bodaly, R. A., Rosenberg, D. M., Gaboury, M. N., Hecky, R. E., Newbury, R. W., & Patalas, K. (1984b). Ecological Effects of Hydroelectric Development in Northern Manitoba Canada. *Canada Department Fisheries and Oceans Freshwater Institute*. John Wiley & Sons Ltd, pp. 273-309
11) Bodaly, R. A. D., Jansen, W. A., Majewski, A. R., Fudge, R. J. P., Strange, N. E., Derksen, A. J., & Green, D. J. (2007). *Postimpoundment Time Course of Increased Mercury Concentrations in Fish in Hydroelectric Reservoirs of Northern Manitoba, Canada*. Archives of Environmental Contamination and Toxicology, 53(3), 379–389. https://doi.org/10.1007/s00244-006-0113-4
12) Brealey, K. G. (1995). Mapping Them "Out": Euro-Canadian Cartography and the Appropriation of the Nuxalk and TS'ILHQOT'IN First Nations' Territories, 1793-1916. *The Canadian Geographer*, *39*(2), 140–156. https://doi.org/10.1111/j.1541-0064.1995.tb00409.x

13) Brodnig, G., & Mayer-Schönberger, V. (2000). Bridging the Gap: The Role of Spatial Information Technologies in the Integration of Traditional Environmental Knowledge and Western Science. *The Electronic Journal of Information Systems in Developing Countries, 1(*1), 1–15. https://doi.org/10.1002/j.1681-4835.2000.tb00001.x
14) Bryan, J. (Joseph H.), & Wood, D. (2015). *Weaponizing maps: indigenous peoples and counterinsurgency in the Americas*. The Guilford Press.
15) Butts, E. (2009). *Henry Hudson: New World Voyager.* Dundurn Press.
16) Calliou, B. (2007). *Natural resources transfer agreements, the transfer of authority, and the promise to protect the first nations' right to a traditional livelihood: a critical legal history*. Review of Constitutional Studies, 12(2), 173–.
17) Canada Energy Regulator. (2019). *Canada's Energy Future 2019: Energy Supply and Demand Projections to 2040*. https://doi.org/10.35002/3hze-jk50
18) Caquard, S. (2013). Cartography I: Mapping narrative cartography. *Progress in Human Geography*, *37*(1), 135–144. https://doi.org/10.1177/0309132511423796
19) Carlos, A. M., & Lewis, F. D. (1993). Indians, the Beaver, and the Bay: The Economics of Depletion in the Lands of the Hudson's Bay Company, 1700–1763. *The Journal of Economic History*, *53*(3), 465–494. https://doi.org/10.1017/S0022050700013450
20) Carlos, Ann & Frank Lewis. (2008) Fur Trade (1670-1870). EH.Net Encyclopedia, edited by Robert Whaples. URL https://eh.net/encyclopedia/the-economic-history-of-the-fur-trade-1670-to-1870/
21) Challies, J. B. (1916). *Water Powers of Canada*. Department of Interior, Dominion Water Power Branch Canada. Water Resources Paper No. 16
22) Chapin, M., Lamb, Z. and Threlkeld, B. (2005). *'Mapping Indigenous lands'*, Annual Review of Anthropology, 34, pp. 619–638
23) Chrisman, N. (2006). *Charting the Unknown: How Computer Mapping at Harvard Became GIS (Paperback) - Common* (1st Edition). Esri Press.
24) Clemmer, G. (2013). *The GIS 20: Essential Skills [With DVD] (Paperback)--by Gina Clemmer [2013 Edition]*. Gina Clemmer
25) Coelho, P., & Costa, M. J. (2013). *Manuscript Found in Accra* (Reprint ed.). Vintage.
26) Cope, M., & Elwood, S. (2009). *Qualitative GIS: A Mixed Methods Approach* (1st ed.). SAGE Publications Ltd.
27) Corbett, J., Cochrane, L., & Gill, M. (2016). Powering Up: Revisiting Participatory GIS and Empowerment. *Cartographic Journal*, *53*(4), 335–340. https://doi.org/10.1080/00087041.2016.1209624
28) Crampton, J. W., & Crampton, J. W. (2009a). *Mapping: a critical introduction to cartography and GIS.* WILEY.
29) Crampton, J. W. (2009b). Cartography: maps 2.0. *Progress in Human Geography*, *33*(1), 91–100. https://doi.org/10.1177/0309132508094074
30) Crown-Indigenous Relations And Northern Affairs Canada. (2020). *Treaties and agreements*. Government of Canada. URL https://www.rcaanc-cirnac.gc.ca/eng/1100100028574/1529354437231#chp3
31) Cruikshank, J. (1992). *Life Lived Like a Story: Life Stories of Three Yukon Native Elders (American Indian Lives)* (New edition). BISON BOOKS.
32) David K Laidlaw, & Monique Passelac-Ross. (2010). Water Rights and Water Stewardship: What About Aboriginal Peoples? *Law Now, 35(1), 1–.*

33) Davidson-Hunt, I. J, O'Flaherty, R. M., & Shearer, J. M. (2010). *Pikangikum cultural landscape: documentation guide*. Aboriginal Issues Press.
34) Davis, R. C. (1988). *Rupert's Land: A Cultural Tapestry (Calgary Institute for the Humanities Series)*. Wilfrid Laurier University Press.
35) Denis, L. G., & White, A. V. (1911). *Water-powers of Canada*. Ottawa: Commission of Conservation.
36) Denis, L. G., & Challies, J. B. (1916). *Water-powers of Manitoba, Saskatchewan and Alberta*. Toronto: Commission of Conservation
37) Derksen AJ et. al. (1987) *Total mercury concentrations in large fishes from lakes on the Churchill River diversion and Nelson River. Canada–Manitoba Agreement on the Study and Monitoring Mercury in the Churchill River Diversion*. Tech. App. Vol. 4, Rep. 17
38) Di Gessa, S. (2008). *Participatory mapping as a tool for empowerment*. International Land Coalition.
39) Dodge, M., Kitchin, Rob, & Perkins, C. R. (2011). *The map reader: Theories of mapping practice and cartographic representation* / edited by Martin Dodge, Rob Kitchin, Chris Perkins. Chichester, West Sussex [England]; Hoboken, NJ: Wiley-Blackwell
40) Dolin, E. J. (2010). *Fur, Fortune, and Empire: The Epic History of the Fur Trade in America* [FUR FORTUNE & EMPIRE]. W. W. Norton & Company+.
41) Dufresne A. R. (1909). *Nelson River. Report upon Reconnaissance Survey September-October 1909*. Department of Public Works Canada. Sessional Paper No. 19b.
42) Dunn, C. E. (2007). 'Participatory GIS – A people's GIS?' *Progress in Human Geography*, 31(5), pp. 616–637
43) Dysart, L. (2015). *Wa Ni Ska Tan Hydro Alliance Tour* [Presentation]. South Indian Lake, Manitoba.
44) Dysart, L. (2019, November). *Film Session: An Analysis of Hydro Development in South Indian Lake: Oral History, Licensing, and Aboriginal Rights* [Film Session]. Ki Ta Ski Naw Our Land, Winnipeg, Manitoba.
45) Eades, G. (2010) *Geoweb: Indigenous Mapping of Intergenerational Knowledge.* Doctor of Phylosophy thesis, McGill University.
46) Eades, G. (2015). Maps and Memes. *Redrawing Culture, Place, and Identity in Indigenous Communities. McGill-Queen's University Press, Montreal*.
47) Engel, J. (2015). Decolonial Mapping: Reclaiming Inidgenous Places and Knowledge. *Landscape Magazine*, *4*(2). URL https://medium.com/langscape-magazine/decolonial-mapmaking-reclaiming-indigenous-places-and-knowledge-4779b7f8b81c
48) E.M.L. (2020). *Projects - University of Victoria*. University of Victoria, Anthropology. URL https://www.uvic.ca/socialsciences/ethnographicmapping/projects/index.php
49) ESRI. (2013). *The 50th Anniversary of GIS | ArcNews*. ArcNews. URL https://www.esri.com/news/arcnews/fall12articles/the-fiftieth-anniversary-of-gis.html
50) ESRI. (2016a). *What are map projections?* URL https://desktop.arcgis.com/en/arcmap/10.3/guide-books/map-projections/what-are-map-projections.htm

51) ESRI. (2016b). *Georeferencing toolbar tools*. URL https://desktop.arcgis.com/en/arcmap/10.3/manage-data/raster-and-images/georeferencing-toolbar-tools.htm
52) ESRI. (2016c). *North American datums.* URL https://desktop.arcgis.com/en/arcmap/10.3/guide-books/map-projections/north-american-datums.htm
53) Farrugia, C. (2018). *First inhabitants arrived 700 years earlier than thought*. Times of Malta.
54) Favrholdt, K. (2020). "Looking at Indigenous Territories on Historical Maps." *Cartuche*, *Canadian Cartographic Association*, vol. 97, pp. 15–19, URL https://cca-acc.org/wp2020/wp-content/uploads/Cartouche_097_Dec2020.pdf
55) Federal Ecological Monitoring Program. *Final report.* (1992). Environment Canada, Western and Northern Region, Department of Fisheries and Oceans, Central and Arctic Region.
56) Federal Indian Day Schools Class Action. (n.d.). Schedule K-List of Federal Indian Day Schools. URL https://indiandayschools.com/en/faq/
57) Fisheries and Oceans Canada and Arctic Region. (2005). *Wuskwatim Generation Project: Canadian Environmental Assessment Act, Comprehensive Study Report*. Fisheries and Oceans Canada.
58) Foot, R., McIntosh, A. & Smith, S. A. (2019) Rupert's Land. *The Canadian Encyclopedia*. URL https://thecanadianencyclopedia.ca/en/article/ruperts-land
59) Franklin, J. (1824). *Narrative of a journey to the shores of the Polar Sea, in the years 1819-20-21-22* (Vol. 1, 2nd ed.). London: J. Murray.
60) Freemen, M. (1976). *Inuit land use and occupancy project: a report*. Milton Freeman Research Limited under contract with the Dept. of Indian and Northern Affairs. Minister of Supply and Services Canada.
61) Freeman, M. M. R. (2011). Looking back-and looking ahead-35 years after the Inuit land use and occupancy project. *The Canadian Geographer*, *55*(1), 20–31. https://doi.org/10.1111/j.1541-0064.2010.00341.x
62) Gallatin, A. & American Antiquarian Society. (1836) *Map of the Indian tribes of North America, about A.D. along the Atlantic, & about 1800 A.D. westwardly.* [Washington, D.C.: The Society] [Map] Retrieved from the Library of Congress, URL https://www.loc.gov/item/2002622260/
63) Ganapati, S. (2011). *'Uses of public participation geographic information systems applications in E-Government', Public Administration Review, 71(3), pp. 425–434*
64) Gaudin, S. D. (1942). *Forty-four years with the northern Crees*. Toronto: Published for the Author by Mundy-Goodfellow Printing Co.
65) GIS Geography. (2020). Geodetic Datums: NAD 27, NAD 83 and WGS84. URL https://gisgeography.com/geodetic-datums-nad27-nad83-wgs84/
66) Glover, R. (Ed.). (1962). *David Thompson's narrative 1784–1812*. Toronto: The Champlain Society.
67) Goodchild, M. F. (2010). Twenty years of progress: GIScience in 2010. *Journal of Spatial Information Science*, *1*, 3–20. https://doi.org/10.5311/JOSIS.2010.1.2
68) Google Developer. (2018). *KML Documentation Introduction*. URL https://developers.google.com/kml/documentation
69) Google Developer. (2020). *KML Reference*. URL https://developers.google.com/kml/documentation/kmlreference

70) Google Earth Engine. (2020), *Meet Earth Engine.* URL https://earthengine.google.com/
71) Government of Canada. (1867). *THE CONSTITUTION ACTS, 1867 to 1982*. Justice Laws Website. URL https://laws-lois.justice.gc.ca/eng/Const/page-1.html#h-3
72) Government of Canada. (1957). Routes of Explorers. *The Atlas of Canada*, 3rd Ed. Natural Resources Canada.
73) Government of Canada. (1974). Posts of the Canadian Fur Trade, 1600-1870. *The Atlas of Canada*, 4th Ed, p.79-80. Natural Resources Canada.
74) Grainger, D. (1979). *Nelson House, Manitoba an ethnodemographic history.* Thesis (M.A.), University of Manitoba, 1979.
75) Great Britain. Parliament. House of Commons Select Committee on the Hudson's Bay Company (1857a). *Report from the Select Committee on the Hudson's Bay Company: together with the proceedings of the committee, minutes of evidence, appendix and index*. The House of Commons. URL https://archive.org/details/cu31924032193975/page/n567/mode/2up
76) Great Britain. Parliament. House of Commons Select Committee on the Hudson's Bay Company. (1857b) *Aboriginal Map of North America denoting the Boundaries and the Locations of various Indian Tribes.* [Map] Retrieved from Washington State University Digital Collections, URL https://content.libraries.wsu.edu/digital/collection/maps/id/705/
77) Hall, A. J., & Albers, G. (2017). *Treaties with Indigenous Peoples in Canada*. The Canadian Encyclopedia. URL https://www.thecanadianencyclopedia.ca/en/article/aboriginal-treaties
78) Hanuta, I. (2008). *Manitoba History: A Dominion Land Survey Map of the Red River Valley*. Manitoba Historical Society. No. 58, pp. 23-25 URL http://www.mhs.mb.ca/docs/mb_history/58/landsurveymap.shtml
79) Harley, J. B., & Woodward, D. (1987). *The History of cartography*. University of Chicago Press.
80) Harley, J. B. (1989). *Deconstructing the Map. Cartographica: The International Journal for Geographic Information and Geovisualization, 26(2), Summer, 1-20*
81) Harris, C. (2002). *Making native space: colonialism, resistance, and reserves in British Columbia*. UBC Press.
82) Harris, C. (2016). *Rupert's Land: The dashing prince who did much to shape the direction of Canada was not your run-of-the-mill royal.* Canada History. URL https://www.canadashistory.ca/explore/exploration/rupert-s-land
83) Harvey, C. (2020). *Languagegeek Font Download*. Languagegeek. URL https://www.languagegeek.com/font/fontdownload.html#Full_Unicode
84) HBC. York Factory, Correspondence Book. (1793-1797). *B.239 | HBCA Post Records By Number | Section B | HBCA Microfilm Catalogue | Hudson's Bay Company Archives | Archives of Manitoba*. Archives of Manitoba. Location: B.239/b/58, Microfilm Reel No. 1M256.
85) HBCA. *Peter Fidler journals of exploration and survey, 1790-1809*. (E.3/3). Archives Manitoba.
86) HBC. *Peter Fidler, Journal of exploration and survey, 1809*. (E.3/4). Archives Manitoba
87) Henry, A. (1776) *A map of the north west parts of America, with the utmost respect, inscrib'd to His Excellency, Sir Guy Carleton, Knight of the Bath: Captain General and Governor of the province of Quebec: General and Commander in Chief of His Majesty's forces in the said province, and frontiers thereof. &c. &c. &c. [?]* [Map] Retrieved from the Library of Congress, URL https://www.loc.gov/item/74694753/

88) Herscovici, A. (2017). The Country that Fur Built: Canada's Fur Trade History. *Truth About Fur, The Blog All Facts No Fiction.* URL https://blog.truthaboutfur.com/canada-fur-trade-history/
89) Heywood, I. (2011). *By Dr Ian Heywood - An Introduction to Geographical Information Systems (4th Edition)* (4th Edition). Prentice Hall.
90) Huggan, G. (1989). Decolonizing the Map: Post-Colonialism, Post-Structuralism and the Cartographic Connection. *Ariel*, *20*(4), 115–.
91) IAND. (1969). *Treaty 5 Between Her Majesty The Queen and The Saulteaux and Swampy Cree Tribes of Indians at Beren's River and Norway with Adhesions.* Ottawa. Cat. No.: R33-0557, IAND Publication No. QS-0573-000-EE-A-1
92) ICFL, Environment Canada. (1973) Inventory of Canadian Freshwater Lakes.
93) International Hydropower Association. (2019). *2019 hydropower status report*. URL https://www.hydropower.org/statusreport
94) International Institute for Sustainable Development. (2003). *A Teacher's Guide for the Video Sila Alangotok— Inuit Observations on Climate Change: a resource for Senior 2 Science.* Manitoba Education and Youth Cataloguing in Publication Data. ISBN 0-7711-237-6
95) Inuit Heritage Trust. (2016). *Inuit Heritage Trust: Place Names Program*. Inuit Heritage Trust. URL http://ihti.ca/eng/place-names/pn-index.html
96) Inuvialuit Regional Corporation. (2020). *Inuvialuit Final Agreement*. URL https://irc.inuvialuit.com/about-irc/inuvialuit-final-agreement
97) Jancewicz, Bill, & Junker, Marie-Odile. (2011) *Cree syllabic fonts: development, compatibility, and usage in the digital world*. In Valentine, Randolph (ed.) Papers of the 40th Algonquian Conference. URL https://www.eastcree.org/pdf/CreeFonts-Jancewicz-Junker-2011.pdf
98) Junker, M., & Stewart, T. (2008). *Building Search Engines for Algonquian Languages*. In Karl S. Hele and Regna Darnell (eds). Papers of the 39th Algonquian Conference. London: University of Western Ontario Press: 378-411.
99) Justice Canada. (1993). *Nunavut Act*. Justice Laws Website. https://laws-lois.justice.gc.ca/eng/acts/N-28.6/index.html
100) Kenneth, S. C., & Morrison, W. R. (1986). *Treaty Research Report Treaty Five (1875)*. Treaties and Historical Research Centre Indian and Northern Affairs Canada.
101) Know History Inc. (2015). *The Nelson River Hydroeletric Project – A History of Lake Winnipeg Regulation*. Report submitted to Manitoba Clean Environment Commission.
102) Kulchyski, P. & Canadian Centre for Policy Alternatives. (2006). *The Town that Lost Its Name*. Canadian Centre for Policy Alternatives.
103) LaBoucane-Benson, P., Gibson, G., Benson, A., & Miller, G. (2012). Are We Seeking Pimatisiwin or Creating Pomewin? Implications for Water Policy. *International Indigenous Policy Journal, 3*(3), 10–. https://doi.org/10.18584/iipj.2012.3.3.10
104) Lake Winnipeg, C. and N. R. S. B. (1975). *Summary Report - Lake Winnipeg, Churchill and Nelson Rivers Study Board*. Government of Manitoba, Government of Canada.
105) Lewis, M. G., & Lewis, G. M. (1998). *Maps, Mapmaking, and Map Use by Native North Americans*. In D. Woodward (Ed.), Cartography in the Traditional African, American, Arctic, Australian, and Pacific Societies, vol. 2, bk. 3, of The History of Cartography,

G.M.artography in the Traditional African, American, Arctic, Australian, and Pacific Societies, vol. 2, bk. 3, of T (pp. 51–182). Chicago: University of Chicago.

106) Library of Congress. (n.d.). *Research Guides: Native American Spaces: Cartographic Resources at the Library of Congress: Ethnography, Linguistics, Distribution, and Archeology*. URL https://guides.loc.gov/native-american-spaces/cartographic-resources/ethnography

107) Library of Congress. (2017). *Exif Exchangeable Image File Format, Version 2.2*. Sustainability of Digital Formats: Planning for Library of Congress Collections. URL https://www.loc.gov/preservation/digital/formats/fdd/fdd000146.shtml

108) Lillesand, T., Kiefer, R. W., & Chipman, J. (2007). *Remote Sensing and Image Interpretation* (6th ed.). Wiley.

109) Linklater, M. M. E. (1994). *The Footprints of Wasahkacahk: The Churchill River Diversion Project and Destruction of the Nelson House Cree Historical Landscape.* Thesis (M.A.), Simon Fraser University, 1994.

110) Livingstone, D. (1993). *The Geographical Tradition: Episodes in the History of a Contested Enterprise,* Wiley-Blackwell, Malden, *Isis*, *84*(4), 778–779. https://doi.org/10.1086/356656

111) Louis, R. P. (2007). Can You Hear us Now? Voices from the Margin: Using Indigenous Methodologies in Geographic Research. *Geographical Research*, *45*(2), 130–139. https://doi.org/10.1111/j.1745-5871.2007.00443.x

112) Luo, Joshi, D., Yu, J., & Gallagher, A. (2010). Geotagging in multimedia and computer vision—a survey. *Multimedia Tools and Applications*, *51*(1), 187–211. https://doi.org/10.1007/s11042-010-0623-y

113) Lyer, M. (1996). *Outlining their rights: Cartography provides the indigenous peoples of the world another way of asserting their rights*. Down To Earth. URL https://www.downtoearth.org.in/coverage/outlining-their-rights-25144.

114) Mackenzie, K., Siabato, W., Reitsma, F., & Claramunt, C. (2017). Spatio-temporal Visualisation and Data Exploration of Traditional Ecological Knowledge/Indigenous Knowledge. *Conservation and Society*, *15*(1), 41–58. https://doi.org/10.4103/0972-4923.201391

115) Malaher, D. (1984). *Manitoba History: Port Nelson and the Hudson Bay Railway*. Manitoba Historical Society. Number 8. URL http://www.mhs.mb.ca/docs/mb_history/08/hudsonbayrailway.shtml

116) Malaher, R. (1988). Historical Tour – The Pas, Manitoba. Manitoba History, No. 15. URL http://www.mhs.mb.ca/docs/mb_history/15/thepas.shtml

117) Malone, M., & Chrisholm, L. (2016). *Indigenous Territory*. The Canadian Encyclopedia. URL https://www.thecanadianencyclopedia.ca/en/article/indigenous-territory

118) Manitoba Aboriginal Rights Coalition. (2001). *Let the justice flow: Report of the Interchurch Inquiry into Northern Hydro Development*.

119) Manitoba Conservation. (2000). *Geographical Names of Manitoba. Manitoba Conservation.*

120) Manitoba Hydro. (n.d.). *Generating Stations.* URL https://www.hydro.mb.ca/corporate/facilities/generating_stations/

121) Manitoba Hydro. (2002). *The Manitoba Hydro Electric Board 51st Annual Report.*

122) Manitoba Hydro. (2014). *Regional cumulative effects assessment for hydroelectric developments on the Churchill, Burntwood and Nelson River systems: Phase I Report.* URL https://www.hydro.mb.ca/-regulatory_affairs/rcea/
123) Manitoba Hydro. (2015). *Regional cumulative effects assessment for hydroelectric developments on the Churchill, Burntwood and Nelson River systems: Phase II hydroelectric development project description in the region of interest.* URL https://www.hydro.mb.ca/-regulatory_affairs/rcea/
124) Manitoba Hydro. (2020). *Navigating change and challenges with action.* Manitoba Hydro-Electric Board 69th Annual Report.
125) Manitoba Widlands. (2005). *The Hydro Project: Manitoba's Hydroelectric Complex*. URL http://manitobawildlands.org/develop_maps.htm
126) Martin, G. (1995). *Britain and the origins of Canadian confederation, 1837-67*. UBC Press.
127) Martin, T., & Hoffman, S. M. (2008). *Power Struggles: Hydro Development and First Nations in Manitoba and Quebec* (Illustrated ed.). University of Manitoba Press.
128) Mazur, E., & Urb nek, J. (1983). Space in Geography. *GeoJournal*, *7*(2), 139–143. https://doi.org/10.1007/BF00185159
129) McCall, M. K., & Dunn, C. E. (2012). Geo-information tools for participatory spatial planning: Fulfilling the criteria for "good" governance? *Geoforum*, *43*(1), 81–94. https://doi.org/10.1016/j.geoforum.2011.07.007
130) McCullough, G. K. (1981). Water Budgets for Southern Indian Lake, Manitoba, Before and After Impoundment and Churchill River Diversion. *Canadian Journal of Fisheries and Aquatic Sciences*, *1620:iv,* pp. 22, ISSN 0706-6473
131) McGregor, D. (2012). Traditional Knowledge: Considerations for Protecting Water in Ontario. *International Indigenous Policy Journal*, *3*(3). https://doi.org/10.18584/iipj.2012.3.3.11
132) McGregor, D., & Whitaker, S. (2001). *Water quality in the province of Ontario: An aboriginal knowledge perspective.* Toronto: Chiefs of Ontario.
133) McGurk, Thomas (2018) *Indigenous Online Mapping in Canada - Decolonizing or Recolonizing Forms of Spatial Expressions?* Masters thesis, Concordia University.
134) McGurk, T. J., & Caquard, S. (2020). To what extent can online mapping be decolonial? A journey throughout Indigenous cartography in Canada. *The Canadian Geographer*, *64*(1), 49–64. https://doi.org/10.1111/cag.12602
135) McIlwraith, T., & Cormier, R. (2015). Making place for space: land use and occupancy studies, counter-mapping, and the supreme court of Canada's Tsilhqot'in decision. *BC Studies*, *188*, 35–.
136) McInnes, W. (1913). *The basins of Nelson and Churchill Rivers (Memoir No. 30).* Ottawa: Government Printing Bureau.
137) McNeil, K. (1982). *Native rights and the boundaries of Rupert's Land and the North-Western Territory*. University of Saskatchewan Native Law Centre.
138) Miller, R. J. (2006). *Native America, discovered and conquered: Thomas Jefferson, Lewis & Clark, and Manifest Destiny*. Praeger Publishers.
139) Miller, R. J., LeSage, L., & Escarcena, S. L. (2011). The international law of discovery, indigenous peoples, and Chile. *Nebraska Law Review*, *89*(4), 819–.
140) Miller, R. J. (2011). The international law of colonialism: a comparative analysis. *Lewis & Clark Law Review*, *15*(4), 847–.

141) Mitchell, A. (2009). *ESRI Guide to GIS Analysis Vol 2* (1st ed.). ESRI Press.
142) Mitchell. (2017). *Mapmaker: Philip Turnor in Rupert's Land in the Age of Enlightenment*. University of Regina.
143) Mithun, Marianne. *The Languages of Native North America.* Cambridge University Press, 1999.
144) Mochoruk, J. (2012). Manitoba Expands Northward: A Special Edition of Manitoba History. *The Journal of the Manitoba Historical Society*, *68*, 2–5. ISSN 0226-5036
145) Morse, E. W. (1971). *Fur trade canoe routes of Canada/Then and now.* National and Historic Parks Branch.
146) M.F.N.E.R.C. (2009). *First Nations' Traditional Names Community Map (MFNERC)*. Treaty Relations Commission of Manitoba. URL http://www.trcm.ca/treaties/first-nations-traditional-names-community-map-mfnerc/
147) National Energy Board. (2018). *Manitoba Manitoba-Minnesota Transmission Project (MMTP).* Hearing Order EH-001-2017, Volume 5, 968-1364.
148) National Statistics Office – Malta. (2020). *News Release.* Issue 114/2020.
149) Natural Resources Canada. (2018). *Digital Geospatial Metadata*. URL https://www.nrcan.gc.ca/earth-sciences/geomatics/canadas-spatial-data-infrastructure/standards-policies/8912
150) Natural Resources Canada. (2019). *Aboriginal Lands of Canada Legislative Boundaries - Open Government Portal* [Dataset]. Open Government Licence - Canada. URL https://open.canada.ca/data/en/dataset/522b07b9-78e2-4819-b736-ad9208eb1067
151) Natural Resources Canada (2020). *8 facts about Canada's boreal forest*. Government of Canada. URL https://www.nrcan.gc.ca/our-natural-resources/forests-forestry/sustainable-forest-management/boreal-forest/8-facts-about-canadas-boreal-forest/17394
152) Neckoway, R. (2007). *Only beavers should build dams*. Thesis (M.A.), University of Manitoba, 2007.
153) Neckoway, R. (2018). *"Where the Otters Play," "Horseshoe Bay," "Footprint" and Beyond: Spatial and Temporal Considerations of Hydroelectric Energy Production in Northern Manitoba*. Thesis (Ph. D), University of Manitoba, 2018.
154) Newbury, R., McCullough, G., & Hecky, R. (1984). The Southern Indian Lake Impoundment and Churchill River Diversion. *Canadian Journal of Fisheries and Aquatic Sciences, 41*(4), 548–557. https://doi.org/10.1139/f84-068
155) Nisichawayasi Nehetho Culture & Education Authority Inc. (n.d.) *Nisichawayasi Mini Cree Dictionary 'TH' Dialect*.
156) Nisachawayasihk Cree Nation. (2016). *History, Respecting Our Past..Creating a Bright Future*. URL https://ncncree.com
157) Northern Flood Agreement. (1977).
158) Olson, R., Hackett, J., & DeRoy, S. (2016). Mapping the Digital Terrain: Towards Indigenous Geographic Information and Spatial Data Quality Indicators for Indigenous Knowledge and Traditional Land-Use Data Collection. *Cartographic Journal*, *53*(4), 348–355. https://doi.org/10.1080/00087041.2016.1190146
159) Orecklin, M. (1976). *Design implications of site selection and resource utilization of Lake Wapisu by the Cree of Nelson House Manitoba and a useable shoreline classification system for the Boreal Forest*. Thesis (M.Sc.), University of Manitoba, 1976.

160) Ormsby, T., Napoleon, E., Burke, R., Groessl, C., & Feaster, L. (2010). *Getting to Know ArcGIS Desktop*. Amsterdam University Press.
161) Pagden, A. (1995). *Lords of all the world: ideologies of empire in Spain, Britain and France c. 1500-c. 1800*. Yale University Press.
162) Palmer, M. (2012). Theorizing Indigital Geographic Information Networks. *Cartographica: The International Journal for Geographic Information and Geovisualization*, *47*(2), 80–91. https://doi.org/10.3138/carto.47.2.80
163) Pearce, M., & Louis, R. (2008). Mapping Indigenous Depth of Place. *American Indian Culture and Research Journal*, *32*(3), 107–126. https://doi.org/10.17953/aicr.32.3.n7g22w816486567j
164) Peterson, G. N. (2009). *GIS Cartography: A Guide to Effective Map Design* (1st ed.). CRC Press.
165) PEW. (n.d.). *Bernard O. Nietschmann, Ph.D.* URL URL https://www.pewtrusts.org/en/projects/marine-fellows/fellows-directory/1993/bernard-nietschmann
166) Ray, A. J. (1974). *Indians in the fur trade: their role as trappers, hunters, and middlemen in the lands southwest of Hudson Bay, 1660-1870*. University of Toronto Press.
167) Ray, A. J. (1978). History and Archaeology of the Northern Fur Trade. *American Antiquity*, *43*(1), 26–34. https://doi.org/10.2307/279628
168) Ray, A. J., Tough, F., & Miller, J. R. (2000). *Bounty and benevolence: a history of Saskatchewan treaties*. McGill-Queen's University Press.
169) Ray, A. J. (2016). *An Illustrated History of Canada's Native People: I Have Lived Here Since the World Began, Fourth Edition* (4th ed.). McGill-Queen's University Press.
170) Remy, Lola. (2018). Making the map speak: Indigenous animated cartographies as contrapuntal spatial representations. In: *NECSUS. European Journal of Media Studies*, Jg. 7, Nr. 2, S. 183–203. DOI: https://doi.org/10.25969/mediarep/3446.
171) Robertson, D. J. (1913). *Field Notes Nelson House on Footprint and Nistowasis Lakes Manitoba Treaty 5*. URL https://clss.nrcan-rncan.gc.ca/clss/plan/detail/id/FB638+CLSR+MB
172) Rose, R. (2015). *"Good News Everyone! Google Earth Pro Now Free!". Mapshole.* Archived from the original on July 26, 2019. URL https://web.archive.org/web/20190726175647/http://mapshole.com/2015/02/11/google-earth-pro-now-free/
173) Rose-Redwood, R., Barnd, N. B., Lucchesi, A. H., Dias, S., & Patrick, W. (2020). Decolonizing the Map: Recentering Indigenous Mappings. *Cartographica*, *55*(3), 151–162. https://doi.org/10.3138/cart.53.3.intro
174) Ruggles, R. I., & Warkentin, J. (1970). *Manitoba Historical atlas: a selection of facsimile maps, plans, and sketches from 1612 to 1969*. Published: Winnipeg, Historical and Scientific Society of Manitoba
175) Ruggles, R. I. (1984). Mapping the interior plains of Rupert's Land by The Hudson's Bay company to 1870. *Great Plains Quarterly, 4*(3), 152–164. Retrieved from http://digitalcommons.unl.edu/-greatplainsquarterly/1806
176) Ruggles, R. I. (1991). *A Country So Interesting: The Hudson's Bay Company and Two Centuries of Mapping, 1670-1870*. McGill-Queen's University Press.
177) Shipley, N. (1955). *Anna and the Indians.* Ryerson Press.

178) Six Seasons Partnership Project. (n..d). Pīsim Finds Her Miskanaw Teacher's Guide. Book One by William Dumas. Illustrated by Leonard Paul. URL https://sixseasonsproject.ca/outputs/outputs
179) Slattery, B. (1979). *The land rights of indigenous Canadian peoples, as affected by the Crown's acquisition of their territories*. University of Saskatchewan, Native Law Centre.
180) Smith, H. (1976). *The Solomon of the Traplines*. Manitoba Pageant, 21(2). URL http://www.mhs.mb.ca/docs/pageant/21/solomontraplines.shtml
181) Smith, R. E., Veldhuis, H., Mills, G.F., Ellers, R. E., Fraser, W. R., & Lelyk, G. W. (1998). *Terrestrial Ecozones, Ecoregions, and Ecodistricts of Manitoba, An Ecological Stratification of Manitoba's Natural Landscapes.* Technical Bulletin 1998-9E. Land Resource Unit, Brandon Research Centre, Research Branch, Agriculture and Agri-Food Canada, Winnipeg, Manitoba. Report and map at 1:1,500,000 scale.
182) Smith, L. T. (2013). *Decolonizing methodologies: Research and indigenous peoples*. Zed Books Ltd.
183) Sparke, M. (1998). A Map that Roared and an Original Atlas: Canada, Cartography, and the Narration of Nation. *Annals of the Association of American Geographers*, *88*(3), 463–495. https://doi.org/10.1111/0004-5608.00109
184) Split Lake Cree Nation. (1996). *Analysis of Change.* Split Lake Cree Post Project Environmental Review, Vol. 1
185) Stone, M. (1998). "Map or Be Mapped", *Whole Earth* (Fall 1998):54.
186) Strong, P. T. (2005). Recent Ethnographic Research on North American Indigenous Peoples. *Annual Review of Anthropology*, *34*(1), 253–268. https://doi.org/10.1146/annurev.anthro.34.081804.120446
187) The Manitoba Natural Resources Act, S.C. 1930, c.29. Minister of Justice. URL http://laws-lois.justice.ca
188) The National Atlas of Canada. (1991). *Canada Exploration 1651-1760*. 5th Edition. Energy, Mines and Resources Canada
189) The Royal Canadian Geographical Society/Canadian Geographic. (2018). *Indigenous Peoples Atlas of Canada*. Canadian Geographic.
190) Tobias, T. N. (2000). *Chief Kerry's moose a guidebook to land use and occupancy mapping, research design and data collection.* Union of British Columbia Indian Chiefs.
191) Tobias, T. N. (2009) *Living Proof: the Essential Data-Collection Guide for Indigenous Use -and-Occupancy Map Surveys*. Ecotrust Canada.
192) Tomlinson, R. F. (1967). *An Introduction to the Geo-information System of the Canada* Land Inventory. (Department) of Forestry and Rural Development. Development, C. D. O. F. A. R., & Canada Land Inventory.
193) Tough, F. (1996). *"As their natural resources fail': native peoples and the economic history of Northern Manitoba, 1870-1930*. UBC Press.
194) Tough, F. J. (2004). *The Forgotten Constitution: The Natural Resources Transfer Agreements and Indian Livelihood Rights, Ca. 1925-1933*. Alberta Law Review, 41(4), 999–. https://doi.org/10.29173/alr1316
195) Tyrrell, J. B. (1888). A brief narrative of the journeys of David Thompson in north-western America. Toronto: Copp, Clark. URL https://archive.org/details/briefnarrativeof00tyrr/page/24/mode/2up

196) Tyrrell, J. B. (1896). *Diary*. Special Collections, Thomas Fisher Rare Book Library, University of Toronto. MsColl26, box 50, f. 40; MsColl26, Vol. 48, Book III.
197) Tyrrell, J. B. (1915). *Algonquin Indian Names of Places in Northern Canada*. From the Transactions of the Royal Canadian Institute, Toronto. University of Toronto Press. Retrieved from The Barren Lands Online Digital Collection, URL https://barrenlands.library.utoronto.ca/islandora/object/barrenlands%3AT10034
198) Tyrrell, J. B. (Ed.). (1916a). *David Thompson's narrative of his explorations in Western America, 1784–1812*. Toronto: The Champlain Society.
199) Tyrrell, J. B. (Ed.). (1916b). *Presidential address: notes on the geology of Nelson and Hayes Rivers*. Printed for the Royal Society of Canada. Section IV, Series III, Vol. X, pp. 27. Retrieved from The Barren Lands Online Digital Collection, URL https://barrenlands.library.utoronto.ca/islandora/object/barrenlands%3AT10033
200) United Nations. (1992). *Earth Summit Agenda 21*. URL https://sustainabledevelopment.un.org/content/documents/Agenda21.pdf
201) USGS. (n.d.) Why are the NAD 83 position values so far from the NAD 27 values? Were the old coordinates wrong? URL https://www.usgs.gov/faqs/why-are-nad-83-position-values-so-far-nad-27-values-were-old-coordinates-wrong?qt-news_science_products=0#qt-news_science_products
202) Usher, P. J., Tough, F. J., & Galois, R. M. (1992). Reclaiming the land: aboriginal title, treaty rights and land claims in Canada. *Applied Geography (Sevenoaks)*, *12*(2), 109–132. https://doi.org/10.1016/0143-6228(92)90002-5
203) Vodden, C., Frieday, L., & Block, N. (2017). *Geological Survey of Canada*. The Canadian Encyclopedia. URL https://www.thecanadianencyclopedia.ca/en/article/geological-survey-of-canada
204) Voorhis, E. (1930). *Historic forts and trading posts of the French regime and of the English fur trading companies.* Canada. National Development Bureau. Ottawa: Department of the Interior, National Development Bureau, pp. 188. Accessed from Peel's Prairie Provinces University of Alberta Online Digital Collection, URL http://peel.library.ualberta.ca/bibliography/5519.html
205) Waite, P. B., Foot, R., Filice, M., & McIntosh, A. (2019). *Confederation*. The Canadian Encyclopedia. https://www.thecanadianencyclopedia.ca/en/article/confederation
206) Wikipedia contributors. (2020). *Exif*. Wikipedia. URL https://en.wikipedia.org/wiki/Exif
207) Wikipedia contributors. (2021a). *Unicode font*. Wikipedia. URL https://en.wikipedia.org/wiki/Unicode_font
208) Wikipedia contributors. (2021b). *Image file formats*. Wikipedia. URL https://en.wikipedia.org/wiki/Image_file_formats
209) Wiener, J. B. (2021). *Albert Gallatin: A Swiss Founding Father*. Swiss National Museum - Swiss History Blog. URL https://blog.nationalmuseum.ch/en/2021/01/albert-gallatin-a-swiss-founding-father/
210) Williams, Robert A. (1990) *The American Indian in Western Legal Thought: the Discourses of Conquest*. New York: Oxford University Press.
211) Woodward, D. (2007). *The History of Cartography.* Volume 3. University of Chicago Press.
212) Wright, W. R. (1971). Cree Culture History in the Southern Indian Lake Region. *Contributions to Anthropology*, *Archaeology Paper No. 1*, National Museums of Canada, Bulletin 232, 1–27.

213) Young, R. E. (1907). *Canada's fertile northland: A glimpse of the enormous resources of part of the unexplored regions of the Dominion: Evidence heard before a select committee of the Senate of Canada during the Parliamentary session of 1906-7, and the report based thereon*. Canada. Parliament. Senate. Select Committee on Resources of Territory between Labrador and the Rocky Mountains. Ottawa: Government Printing Bureau. URL https://archive.org/details/canadasfertileno01cham/mode/2up
214) Zarfl, C., Lumsdon, A. E., Berlekamp, J., Tydecks, L., & Tockner, K. (2014). *A global boom in hydropower dam construction*. Aquatic Sciences, 77(1), 161–170. https://doi.org/10.1007/s00027-014-0377-0

GIS Data

a) Crown-Indigenous Relations and Northern Affairs Canada. (n.d.). *First Nations Location.* Government of Canada (Open Government). URL https://open.canada.ca/data/en/dataset/b6567c5c-8339-4055-99fa-63f92114d9e4
b) Manitoba Hydro. (2015). *Regional cumulative effects assessment for hydroelectric developments on the Churchill, Burntwood and Nelson River systems: Phase II hydroelectric development project description in the region of interest.* URL https://www.hydro.mb.ca/-regulatory_affairs/rcea/
c) Manitoba Land Initiative. (n.d.). Administrative Boundaries -Treaty Boundaries. Conservation and Water Stewardship. URL https://mli2.gov.mb.ca/adminbnd/index.html
d) N.A.C.E.I. (2017). *North American Cooperation on Energy Information, Mapping Data* - Open Government Portal. Government of Canada. URL https://open.canada.ca/data/en/dataset/aae6619f-f9f3-435d-bc32-42decd58b674
e) Natural Resources Canada. (n.d.) *Major Drainage Areas – National Atlas Major River Basins*. Water Survey of Canada (Environment Canada), Geogratis, geospatial data. URL www.geogratis.cgdi.gc.ca
f) Natural Resources Canada. (n.d.) *Renewable energy Power Plants, 1MW or more – North American Cooperation on Energy Information*. Government of Canada (Open Government). URL https://open.canada.ca/data/en/dataset/490db619-ab58-4a2a-a245-2376ce1840de
g) Natural Resources Canada. (n.d.) *Territorial Evolution of Canada, 1876 to 1949.* The Atlas of Canada, Ed. 4. Government of Canada (Open Government). URL https://open.canada.ca/data/en/dataset/17827eb0-5fb4-5c31-a237-b1625237a204
h) Natural Resources Canada. (n.d.) *Territorial Evolution - Open Government Portal.* Government of Canada (Open Government). URL https://open.canada.ca/data/en/dataset/7d6f98d4-5106-54dc-850c-d199c46960d6
i) Natural Resources Canada. (n.d.) *Topographic Data of Canada - CanVec Series - Open Government Portal*. Government of Canada (Open Government). URL https://open.canada.ca/data/en/dataset/8ba2aa2a-7bb9-4448-b4d7-f164409fe056
j) Natural Resources Canada. (2009). *North American boreal zone map shapefiles*. Government of Canada. URL https://www.nrcan.gc.ca/our-natural-resources/forests/sustainable-forest-management/boreal-forest/north-american-boreal-zone-map-shapefiles/14252

k) Statistics Canada (2019). *2016 Census Boundary files*. Statistics Canada. URL https://www12.statcan.gc.ca/census-recensement/2011/geo/bound-limit/bound-limit-2016-eng.cfm
l) US Census Bureau. (2019). *Cartographic Boundary File Description.* The United States Census Bureau. URL https://www.census.gov/programs-surveys/geography/technical-documentation/naming-convention/cartographic-boundary-file.html

Historical and contemporary cartographic records

i) Arrowsmith, A. (1814) *Facsimile: New Discoveries in the Interior Parts of North America. To the Honorable Governor And Company Of Adventurers Of England Trading Into Hudson Bay In testimony of their liberal Communications.* [Map] Retrieved from David Rumsey Map Digital Collections, Cartography Association, URL https://www.davidrumsey.com/luna/servlet/detail/RUMSEY~8~1~910~50002:New-Discoveries-in-the-Interior-Par?sort=Pub_List_No_InitialSort%2CPub_Date%2CPub_List_No%2CSeries_No#
ii) Arrowsmith, J. (1832) *Facsimile: British North America, by permission dedicated to the Honourable Hudsons Bay Company, containing the latest information which their documents furnish.* [Map] Retrieved from David Rumsey Map Digital Collections, Cartography Association, URL https://www.davidrumsey.com/luna/servlet/detail/RUMSEY~8~1~304081~90074714:British-North-America-?sort=Pub_List_No_InitialSort%2CPub_Date%2CPub_List_No%2CSeries_No#
iii) Arrowsmith, J. (1857) Facsimile: *Map of North America.* Hudson's Bay Company (Arrowsmith) ordered by House of Commons. [Map] Retrieved from David Rumsey Map Digital Collections, Cartography Association, URL https://www.davidrumsey.com/luna/servlet/detail/RUMSEY~8~1~204798~3002158:Facsimile--Map-of-North-America--Hu?sort=Pub_List_No_InitialSort%2CPub_Date%2CPub_List_No%2CSeries_No&qvq=w4s:/when%2F1857;q:Map%20of%20North%20America;sort:Pub_List_No_InitialSort%2CPub_Date%2CPub_List_No%2CSeries_No;lc:RUMSEY~8~1&mi=2&trs=114
iv) Bartholomew, J. (1880) *British Columbia and North West Territory shewing the country to be traversed by the Canadian Pacific Railway.* [East sheet]. [Montreal: Dawson BrothersIEdinburgh] [Map] Unique identifier: CU14089237, Call Number: Call Number: G3531 .P3 3,000 1880 EAST. Retrieved from Map Digital Collection University of Calgary, URL https://digitalcollections.ucalgary.ca/asset-management/2R3BF1F3BHHKK?FR_=1&W=1920&H=969
v) Bell, R. (1878) *Map of Nelson River and the boat-route between Lake Winnipeg and Hudson's Bay: from track-surveys*. Draftsman: George Andrews. [Montreal] Geological Survey of Canada [Map] Call Number: MAP RM 1893/2. Retrieved from Trove Map Digital Collection, Australia, URL https://nla.gov.au/nla.obj-231618468/view
vi) Canada Dominion Lands Branch. (1878) *Map of part of the North West Territory including the Province of Manitoba. Exhibiting the several Tracts of Country ceded by the Indian Treats, 1, 2, 3, 4, 5, 6 and 7.* [Ottawa: Dominion Lands Office, Dept. of the Interior] [Map] Unique identifier: CU294170, Call Number: G3536 .E1 3,500 1878.

Retrieved from Map Digital Collection University of Calgary, URL https://digitalcollections.ucalgary.ca/asset-management/2R3BF1F3BHTP2

vii) Chalifour, J. E. (1915). *Ontario Manitoba Boundaries* [Map]. 1:6,336,000. In: Dept. of the Interior. Atlas of Canada Revised and Enlarged Edition. [Ottawa]: Dept. of the Interior, p.62. Retrieved from Map Digital Collection University of Manitoba, Manitoba Historical Maps, National Atlas of Canada, Album. URL https://www.flickr.com/photos/manitobamaps/2104873457/in/album-72157603436085578/

viii) Deville, E., & Johnston, J. (1891) *Map of the province of Manitoba and part of the Northwest Territories of the Dominion of Canada: shewing Dominion land surveys to 30th June 1891 [NE & SE sheets].* [Montreal: Sabiston Lith. and Pub. Co.] [Map] Call Number: G3536 .B5 800 1891 NE, G3536 .B5 800 1891 SE. Retrieved from Map Digital Collection University of Calgary, URL https://digitalcollections.ucalgary.ca/asset-management/2R3BF1F3BH9EI

ix) Elias, A. E. (1926) *Animated Map of Manitoba.* [Ottawa: Canada Department of the Interior, Natural Resources Intelligence Services] [Map] Oliver Master. Dominion of Canada Animated Atlas.. Retrieved from Map Digital Collection University of Manitoba, Manitoba Historical Maps, Resource Appraisal and Development Album, URL https://www.flickr.com/photos/manitobamaps/albums/72157603425833787/with/2092084520/

x) Energy Mines and Resources Canada. (1957). *One of the four maps depicting the routes of the main individuals that explored Canada between 1670 and 1763.* The National Atlas of Canada, (ed. 3), URL https://open.canada.ca/data/en/dataset/274dc154-4a5d-5257-a47a-81a49c58133b

xi) Energy Mines and Resources Canada. (1974a). *Posts of the Canadian Fur Trade*. Canada Surveys and Mapping Branch, (ed. 4), 1973 p. 79-80, 1 sheet, The National Atlas of Canada, URL https://doi.org/10.4095/294447

xii) Energy Mines and Resources Canada. (1974b). *Exploration of Hudson Bay and the Western Interior 1610 to 1904*. The National Atlas of Canada, (ed. 4), p. 74, URL https://open.canada.ca/data/en/dataset/eaf5753f-7ca1-5c6e-a4a6-ab5c5dacd1fc

xiii) Energy Mines and Resources Canada. (1974v). *Exploration Route Surveys, 1758 to 1905.* The National Atlas of Canada, (ed. 4), p. 78, URL https://open.canada.ca/data/en/dataset/607320a2-9075-55d9-b64f-7d36cdfc29c7

xiv) Energy Mines and Resources Canada. (1991). Canada Exploration 1651 - 1760. The National Atlas of Canada, (ed. 5), Geographical Services Division, URL https://open.canada.ca/data/en/dataset/00ea8f26-0e33-582d-8408-4e061331b85a

xv) Gallatin, A. & American Antiquarian Society. (1836) *Map of the Indian tribes of North America, about A.D. along the Atlantic, & about 1800 A.D. westwardly*. [Washington, D.C.: The Society] [Map] Retrieved from the Library of Congress, URL https://www.loc.gov/item/2002622260/

xvi) Great Britain. Parliament. House of Commons Select Committee on the Hudson's Bay Company. (1857b) *Aboriginal Map of North America denoting the Boundaries and the Locations of various Indian Tribes*. [Map] Retrieved from Washington State University Digital Collections, URL https://content.libraries.wsu.edu/digital/collection/maps/id/705/

xvii) Henry, A. (1776) *A map of the north west parts of America, with the utmost respect, inscrib'd to His Excellency, Sir Guy Carleton, Knight of the Bath: Captain General and Governor of the province of Quebec: General and Commander in Chief of His Majesty's forces in the said province, and frontiers thereof. &c. &c. &c.* [?] [Map] Retrieved from the Library of Congress, URL https://www.loc.gov/item/74694753/

xviii) Johnston, J. (1883) *General map of part of the North-West Territories including the province of Manitoba shewing Dominion land surveys to 31st December, 1882*. [Ottawa: Canada. Dominion Lands Branch [Map] Call Number: G3536_2500_1883b, Unique Identifier: CU14089250. Retrieved from Map Digital Collection University of Calgary, URL https://digitalcollections.ucalgary.ca/asset-management/2R3BF1F3BHSQP?FR_=1&W=1920&H=969

xix) Roberston, D. F. (1913) *Ext. Boundaries of Reserves at Nelson House on Footprint Lake, Treaty 5*. Government of Canada, Canada Land Surveys. URL https://clss.nrcan-rncan.gc.ca/clss/plan/detail?id=37040+CLSR+MB

xx) Thompson, D. (1814) *Map of the North-West Territory of the Province of Canada*. [Part 2] [Map]. Retrieved from the Historical Atlas of Canada Online Project Digital Map Collection, URL http://www.historicalatlas.ca/website/hacolp/national_perspectives/exploration/UNIT_08/U08_staticmap_Thompson_1814.htm#

xxi) Turnor. P. (1779) *Facsimile: Chart of Lakes and Rivers in North America*. [Toronto] [Map] Publications of the Champlain Society, No. 21. Journals of Samuel Hearne and Philip Turnor. Toronto: The Map Specialty Co., 1934. Retrieved from Manitoba Historical Maps Digital Collection, , URL https://www.flickr.com/photos/manitobamaps/3817359811/in/album-72157603397271363/

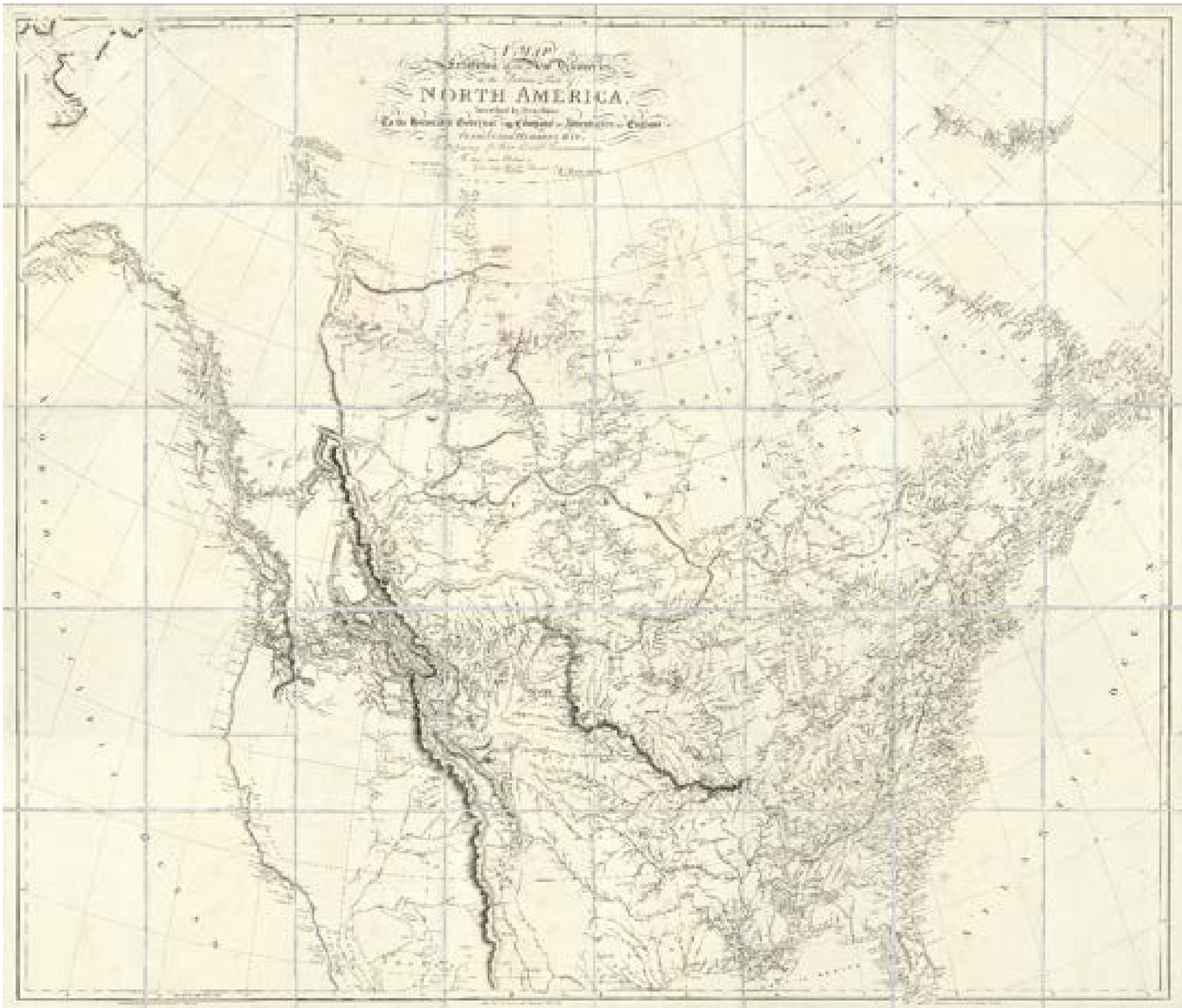
xxii) Speed. J. (1626) *Facsimile; America by Speed.* [Washington, D.C] [Map] Retrieved from David Rumsey Map Digital Collection, Cartography Associates, URL https://www.davidrumsey.com/luna/servlet/detail/RUMSEY~8~1~203956~3001741:Facsimile--America-by-Speed-?sort=Pub_List_No_InitialSort%2CPub_Date%2CPub_List_No%2CSeries_No&qvq=q:John%20Speed;sort:Pub_List_No_InitialSort%2CPub_Date%2CPub_List_No%2CSeries_No;lc:RUMSEY~8~1&mi=5&trs=284

xxiii) White, J. & Canada Railway Lands Branch. (1908). *Northern Canada* [Map]. In: Railway Lands Branch, Department of the Interior. [Ottawa]: Accompanying the Report of the Senate Committee appointed to inquire into the Resources of Northern Canada. Retrieved from Peel's Prairie Provinces Online Digital Map Collection. URL https://archive.org/details/WCW_M000417

Appendix A: *Historical and Contemporary Cartographic Records*

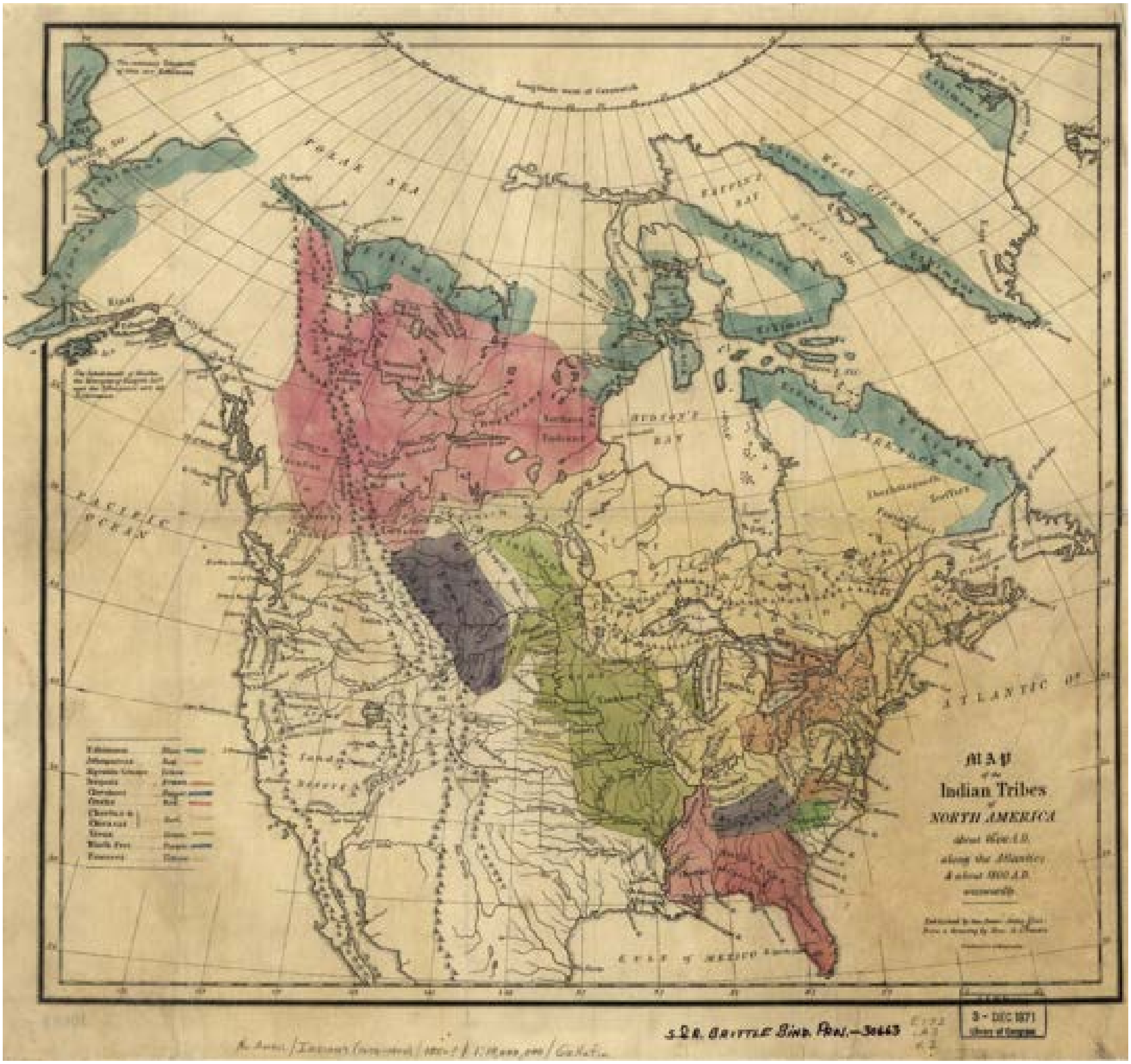
Speed. J. (1626) *Facsimile; America by Speed.* [Washington, D.C] [Map] Retrieved from David Rumsey Map Digital Collection, Cartography Associates, URL https://www.davidrumsey.com/luna/servlet/detail/RUMSEY~8~1~203956~3001741:Facsimile--America-by-Speed-?sort=Pub_List_No_InitialSort%2CPub_Date%2CPub_List_No%2CSeries_No&qvq=q:John%20Speed;sort:Pub_List_No_InitialSort%2CPub_Date%2CPub_List_No%2CSeries_No;lc:RUMSEY~8~1&mi=5&trs=284

Henry, A. (1776) *A map of the north west parts of America, with the utmost respect, inscrib'd to His Excellency, Sir Guy Carleton, Knight of the Bath: Captain General and Governor of the province of Quebec: General and Commander in Chief of His Majesty's forces in the said province, and frontiers thereof. &c. &c. &c.* [?] [Map] Retrieved from the Library of Congress, URL https://www.loc.gov/item/74694753/

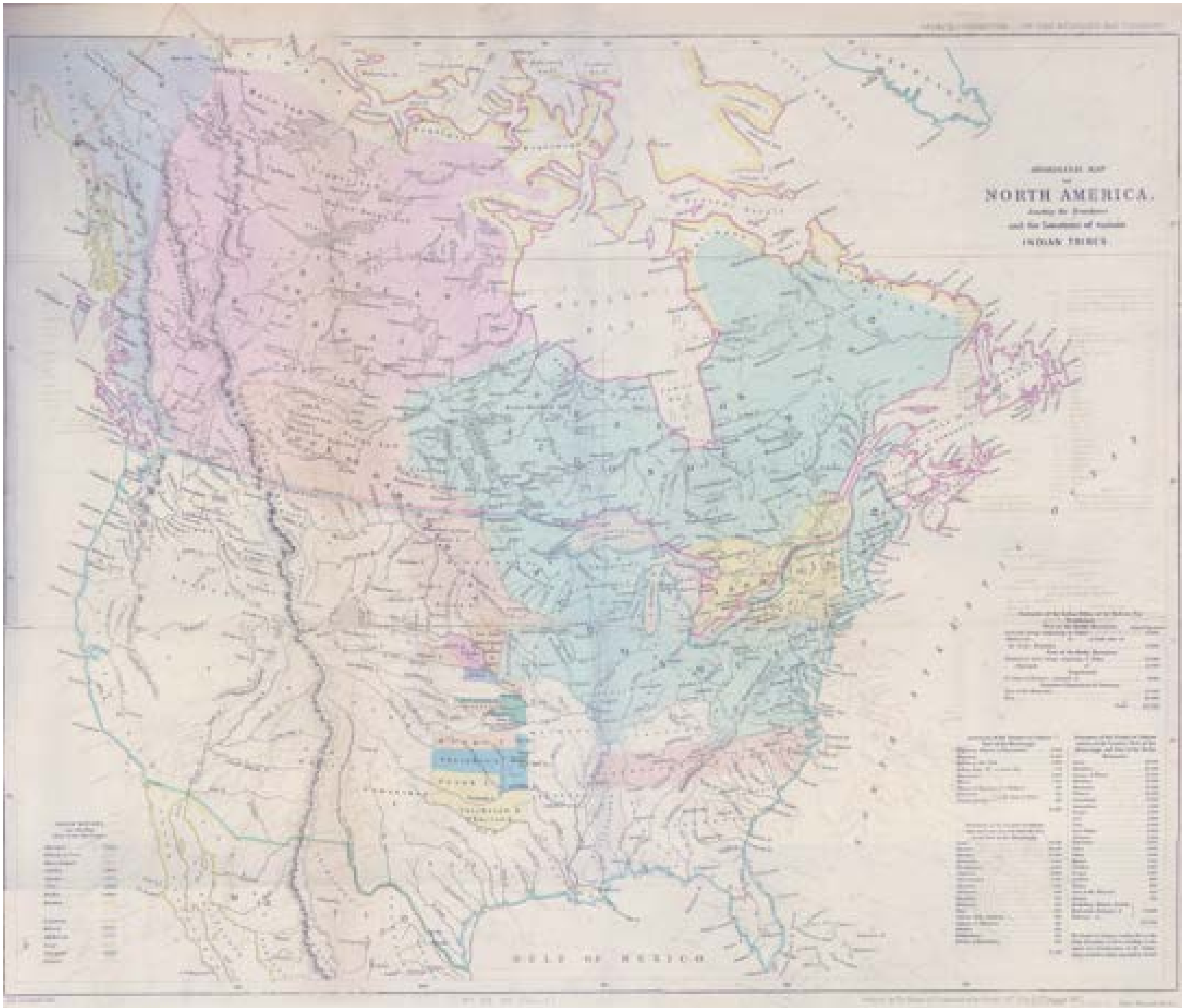


Arrowsmith, A. (1814) Facsimile: *New Discoveries in the Interior Parts of North America. To the Honorable Governor And Company Of Adventurers Of England Trading Into Hudson Bay In testimony of their liberal Communications.* [Map] Retrieved from David Rumsey Map Digital Collections, Cartography Association, URL https://www.davidrumsey.com/luna/servlet/detail/RUMSEY~8~1~910~50002:New-Discoveries-in-the-Interior-Par?sort=Pub_List_No_InitialSort%2CPub_Date%2CPub_List_No%2CSeries_No#

Arrowsmith, J. (1832) Facsimile: *British North America, by permission dedicated to the Honourable Hudsons Bay Company, containing the latest information which their documents furnish.* [Map] Retrieved from David Rumsey Map Digital Collections, Cartography Association, URL https://www.davidrumsey.com/luna/servlet/detail/RUMSEY~8~1~304081~90074714:British-North-America-?sort=Pub_List_No_InitialSort%2CPub_Date%2CPub_List_No%2CSeries_No#



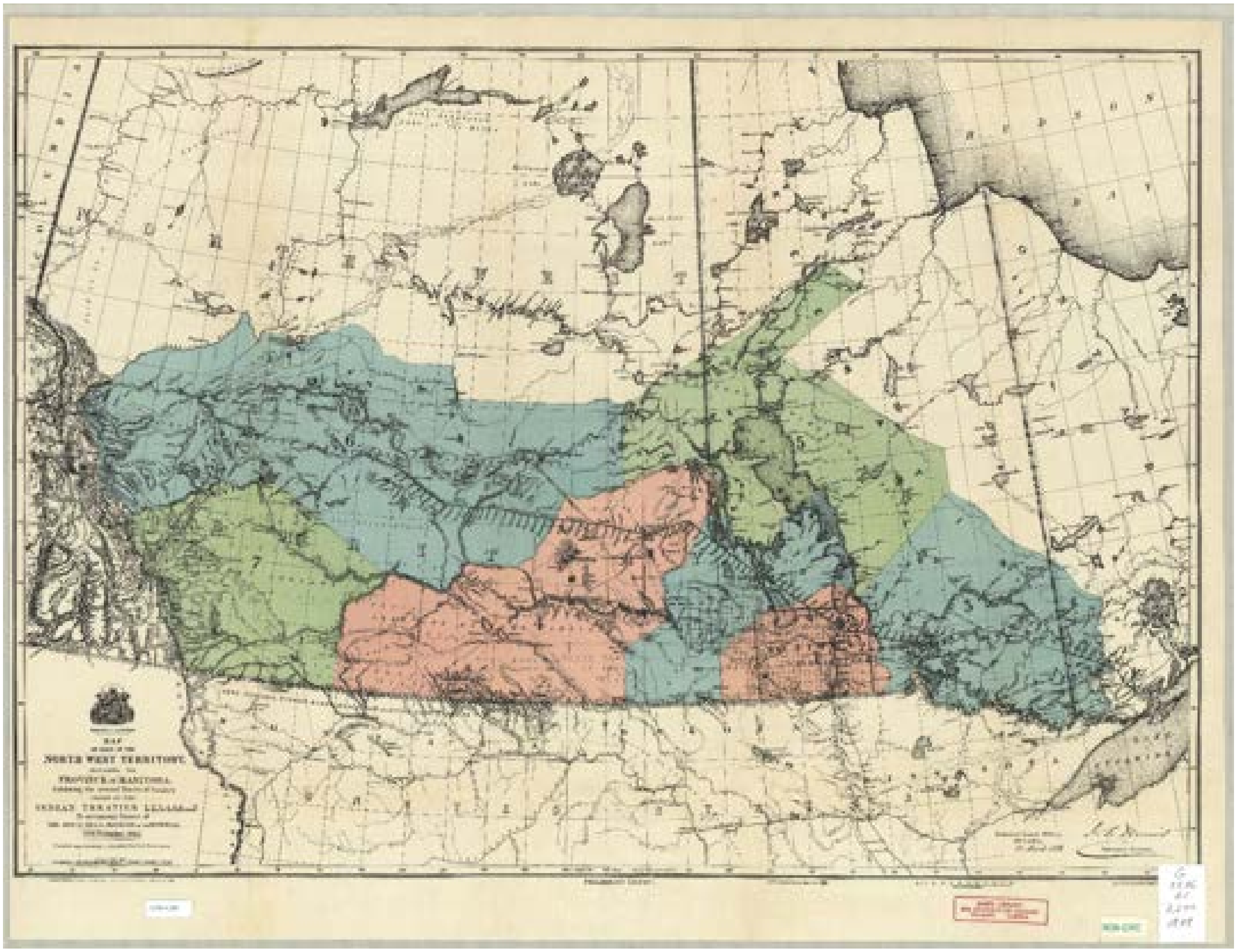
Gallatin, A. & American Antiquarian Society. (1836) *Map of the Indian tribes of North America, about A.D. along the Atlantic, & about 1800 A.D. westwardly.* [Washington, D.C.: The Society] [Map] Retrieved from the Library of Congress, URL https://www.loc.gov/item/2002622260/



Great Britain. Parliament. House of Commons Select Committee on the Hudson's Bay Company. (1857b) *Aboriginal Map of North America denoting the Boundaries and the Locations of various Indian Tribes.* [Map] Retrieved from Washington State University Digital Collections, URL https://content.libraries.wsu.edu/digital/collection/maps/id/705/

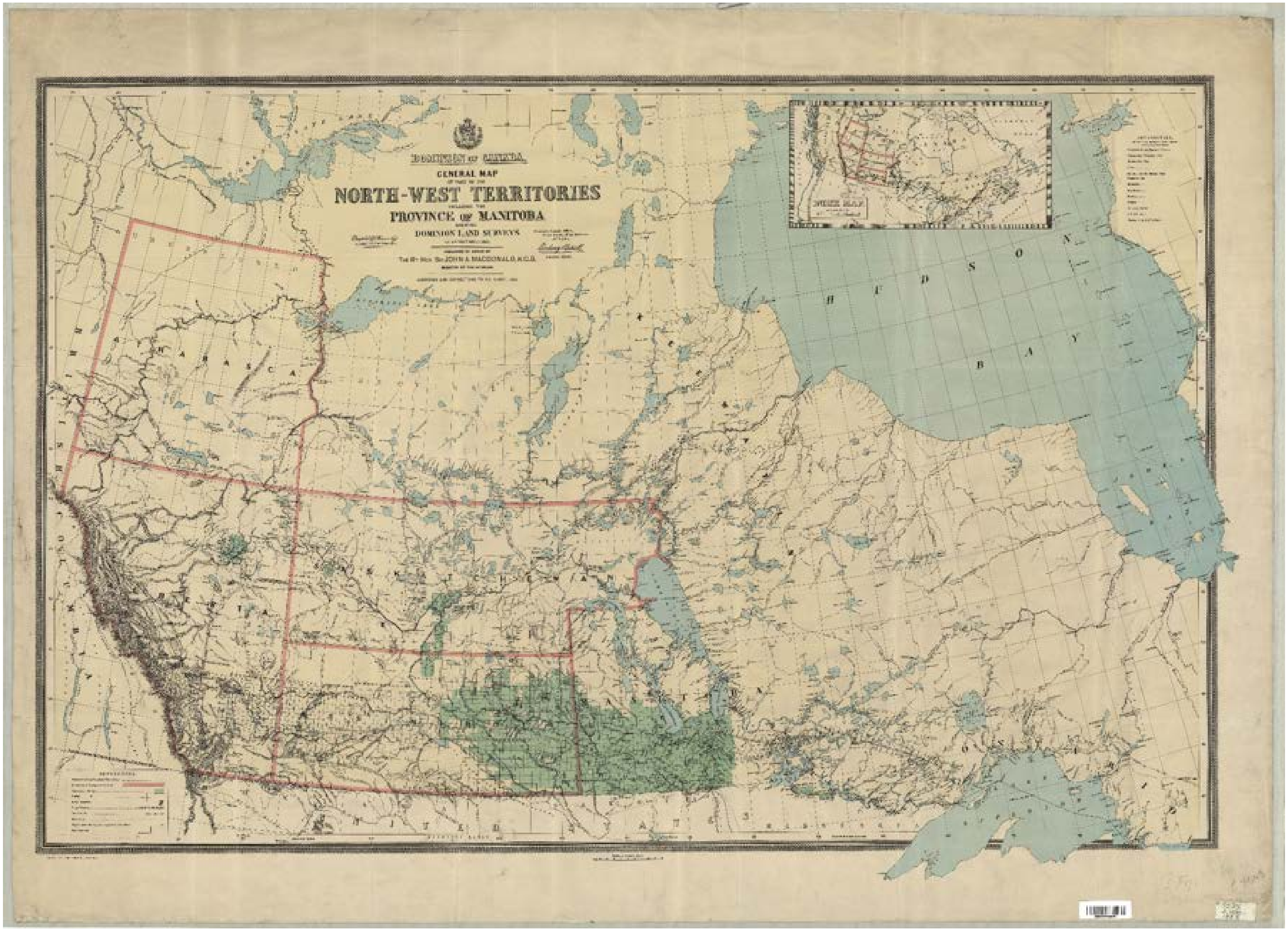
The dark green boundary is delineating the extent of Rupert's Land as understood in the 19th Century.

Arrowsmith, J. (1857) Facsimile: *Map of North America*. Hudson's Bay Company (Arrowsmith) ordered by House of Commons. [Map] Retrieved from David Rumsey Map Digital Collections, Cartography Association, URL https://www.davidrumsey.com/luna/servlet/detail/RUMSEY~8~1~204798~3002158:Facsimile--Map-of-North-America--Hu?sort=Pub_List_No_InitialSort%2CPub_Date%2CPub_List_No%2CSeries_No&qvq=w4s:/when%2F1857;q:Map%20of%20North%20America;sort:Pub_List_No_InitialSort%2CPub_Date%2CPub_List_No%2CSeries_No;lc:RUMSEY~8~1&mi=2&trs=114

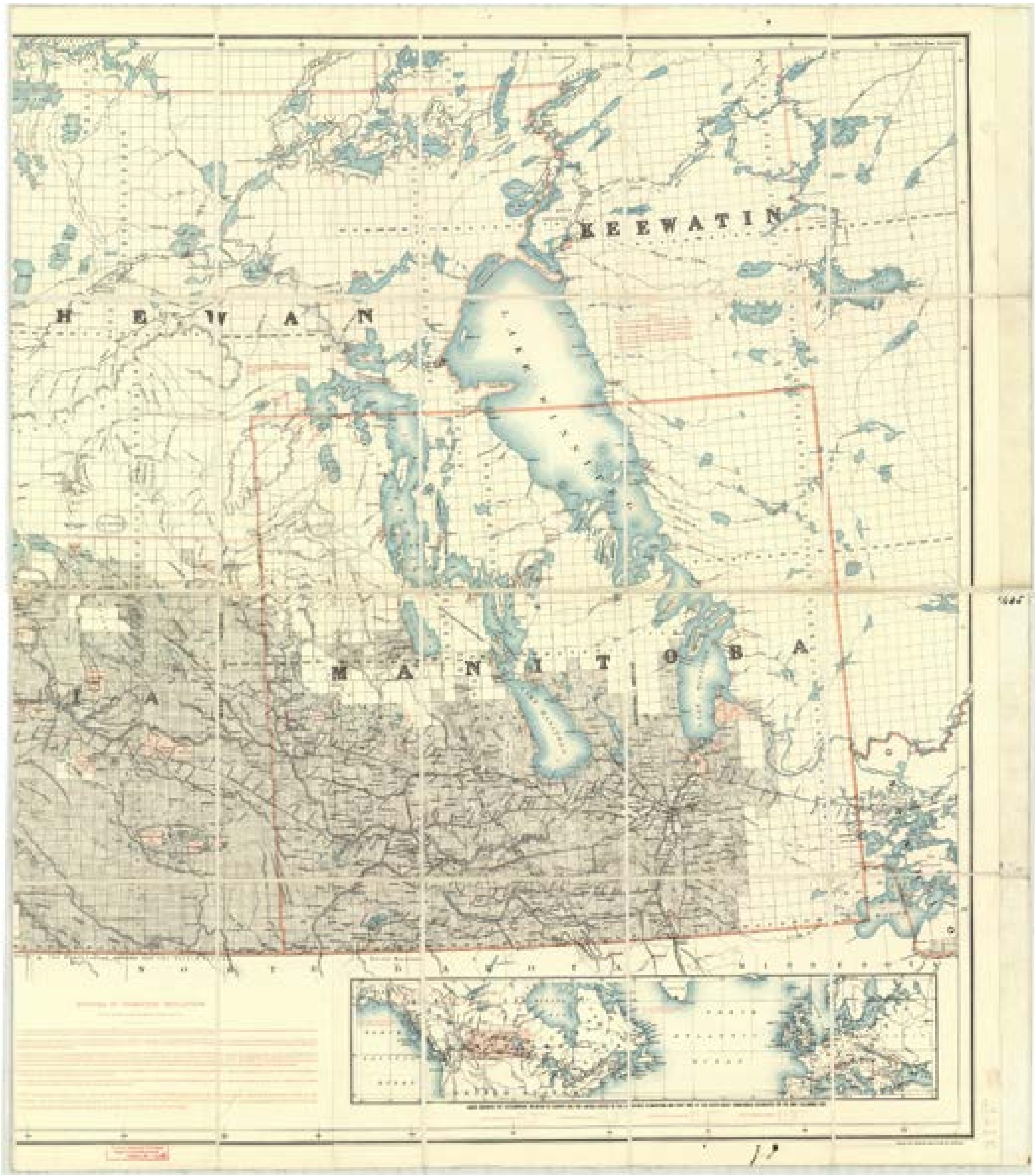


Canada Dominion Lands Branch. (1878) *Map of part of the North West Territory including the Province of Manitoba. Exhibiting the several Tracts of Ctounry ceded by the Indian Treats, 1, 2, 3, 4, 5, 6 and 7.* [Ottawa: Dominion Lands Office, Dept. of the Interior] [Map] Unique identifier: CU294170, Call Number: G3536 .E1 3,500 1878. Retrieved from Map Digital Collection University of Calgary, URL https://digitalcollections.ucalgary.ca/asset-management/2R3BF1F3BHTP2

Bartholomew, J. (1880) *British Columbia and North West Territory shewing the country to be traversed by the Canadian Pacific Railway. [East sheet].* [Montreal: Dawson BrothersIEdinburgh] [Map] Unique identifier: CU14089237, Call Number: Call Number: G3531 .P3 3,000 1880 EAST. Retrieved from Map Digital Collection University of Calgary, URL https://digitalcollections.ucalgary.ca/asset-management/2R3BF1F3BHHKK?FR_=1&W=1920&H=969

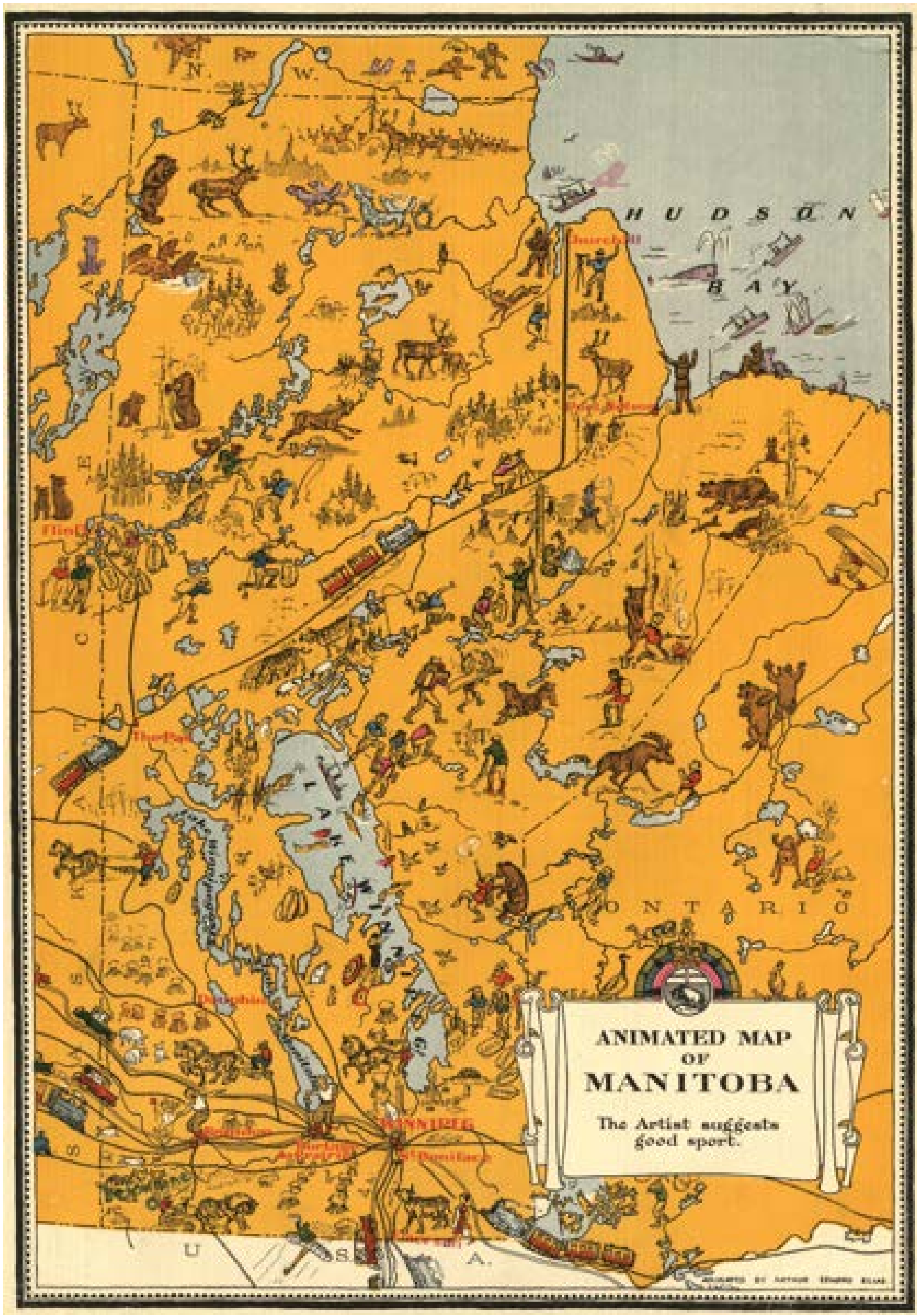


Johnston, J. (1883) *General map of part of the North-West Territories including the province of Manitoba shewing Dominion land surveys to 31st December, 1882.* [Ottawa: Canada. Dominion Lands Branch [Map] Call Number: G3536_2500_1883b, Unique Identifier: CU14089250. Retrieved from Map Digital Collection University of Calgary, URL https://digitalcollections.ucalgary.ca/asset-management/2R3BF1F3BHSQP?FR_=1&W=1920&H=969

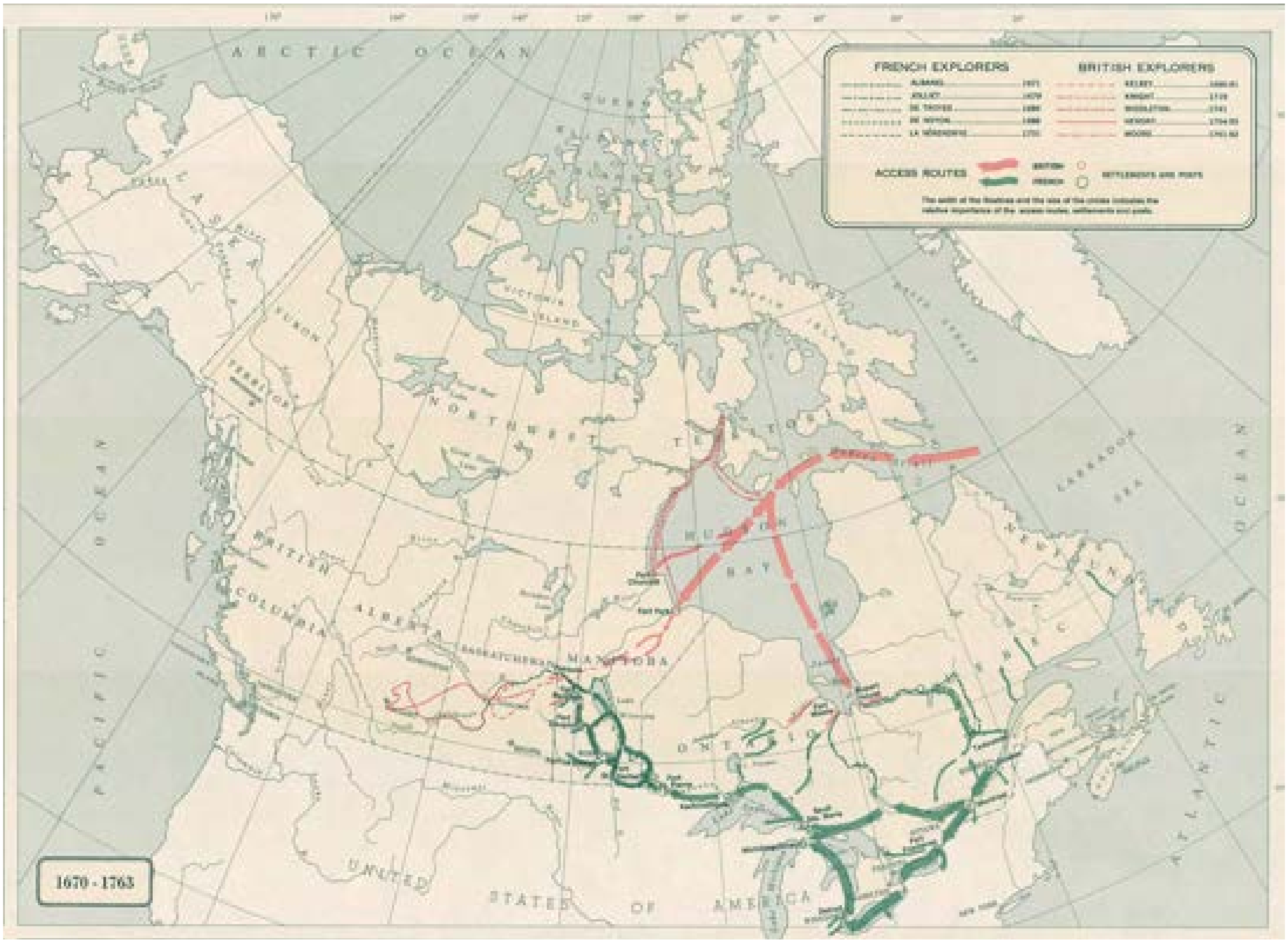


Deville, E., & Johnston, J. (1891) *Map of the province of Manitoba and part of the Northwest Territories of the Dominion of Canada: shewing Dominion land surveys to 30th June 1891 [NE & SE sheets]*. [Montreal: Sabiston Lith. and Pub. Co.] [Map] Call Number: G3536 .B5 800 1891 NE, G3536 .B5 800 1891 SE. Retrieved from Map Digital Collection University of Calgary, URL https://digitalcollections.ucalgary.ca/asset-management/2R3BF1F3BH9EI

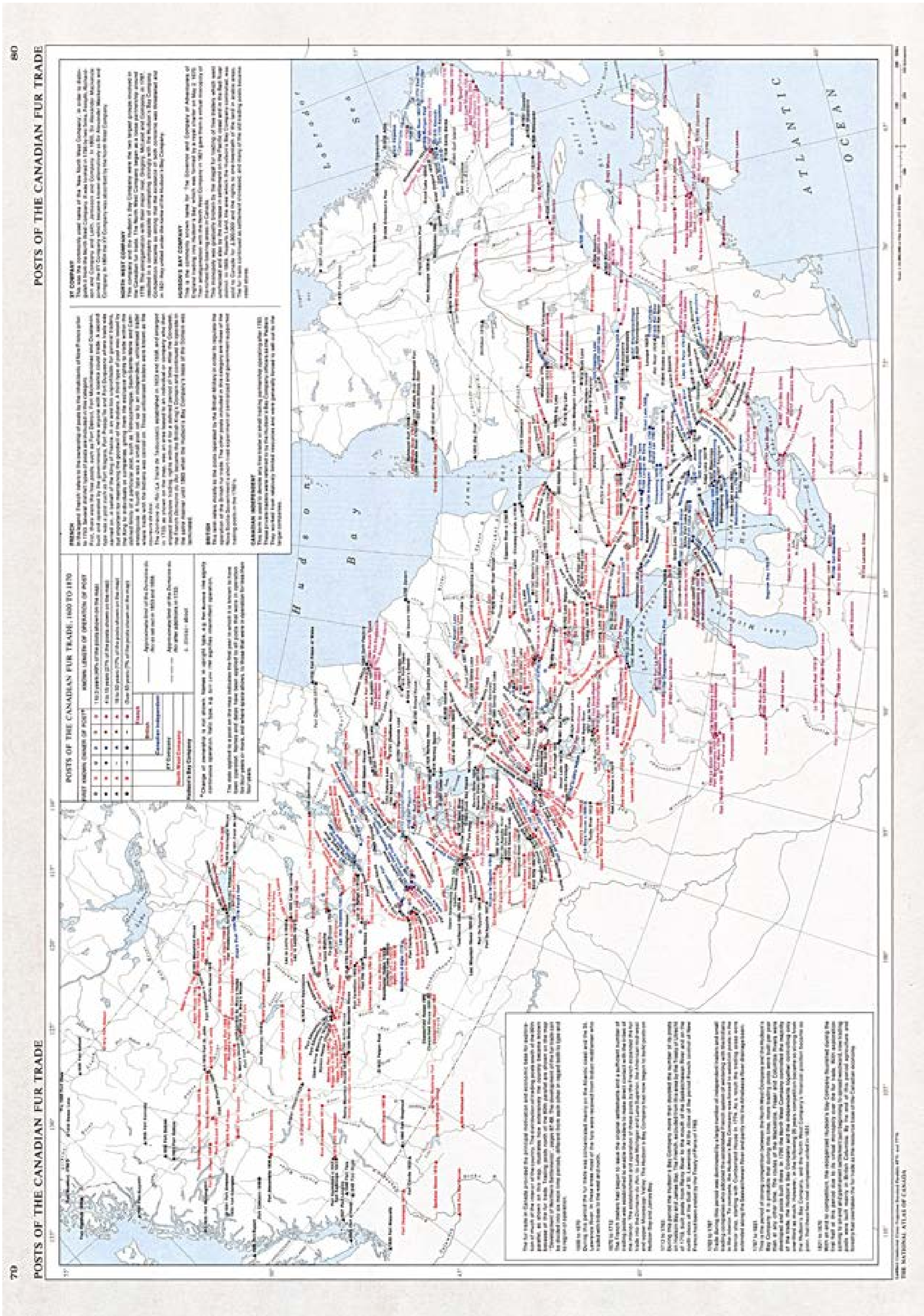
Chalifour, J. E. (1915). *Ontario Manitoba Boundaries* [Map]. 1:6,336,000. In: Dept. of the Interior. Atlas of Canada Revised and Enlarged Edition. [Ottawa]: Dept. of the Interior, p.62. Retrieved from Map Digital Collection University of Manitoba, Manitoba Historical Maps, National Atlas of Canada, Album. URL https://www.flickr.com/photos/manitobamaps/2104873457/in/album-72157603436085578/



Elias, A. E. (1926) *Animated Map of Manitoba.* [Ottawa: Canada Department of the Interior, Natural Resources Intelligence Services] [Map] Oliver Master. Dominion of Canada Animated Atlas.. Retrieved from Map Digital Collection University of Manitoba, Manitoba Historical Maps, Resource Appraisal and Development Album, URL https://www.flickr.com/photos/manitobamaps/albums/72157603425833787/with/2092084520/

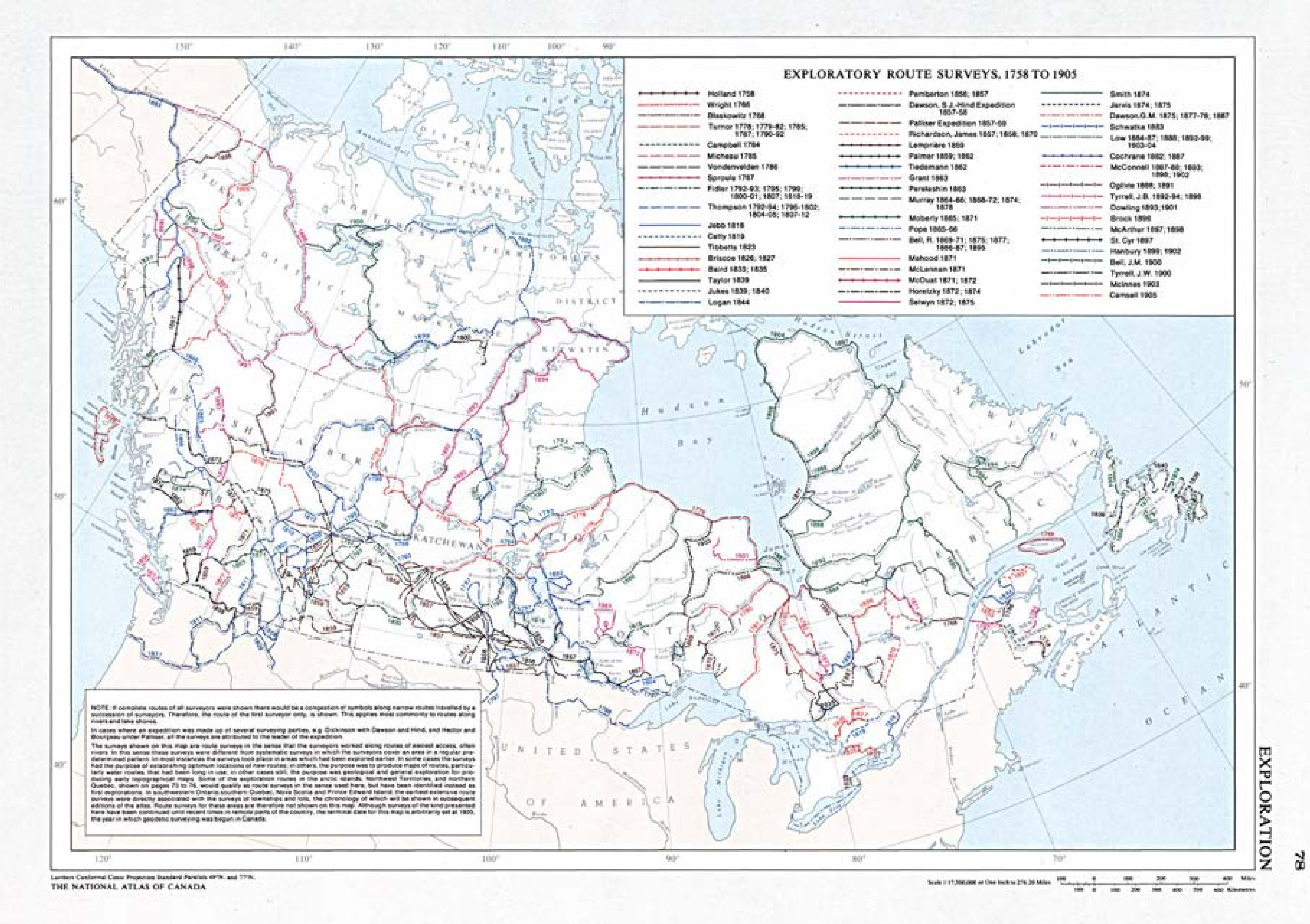


Energy Mines and Resources Canada. (1957). *One of the four maps depicting the routes of the main individuals that explored Canada between 1670 and 1763*. The National Atlas of Canada, (ed. 3), URL https://open.canada.ca/data/en/dataset/274dc154-4a5d-5257-a47a-81a49c58133b

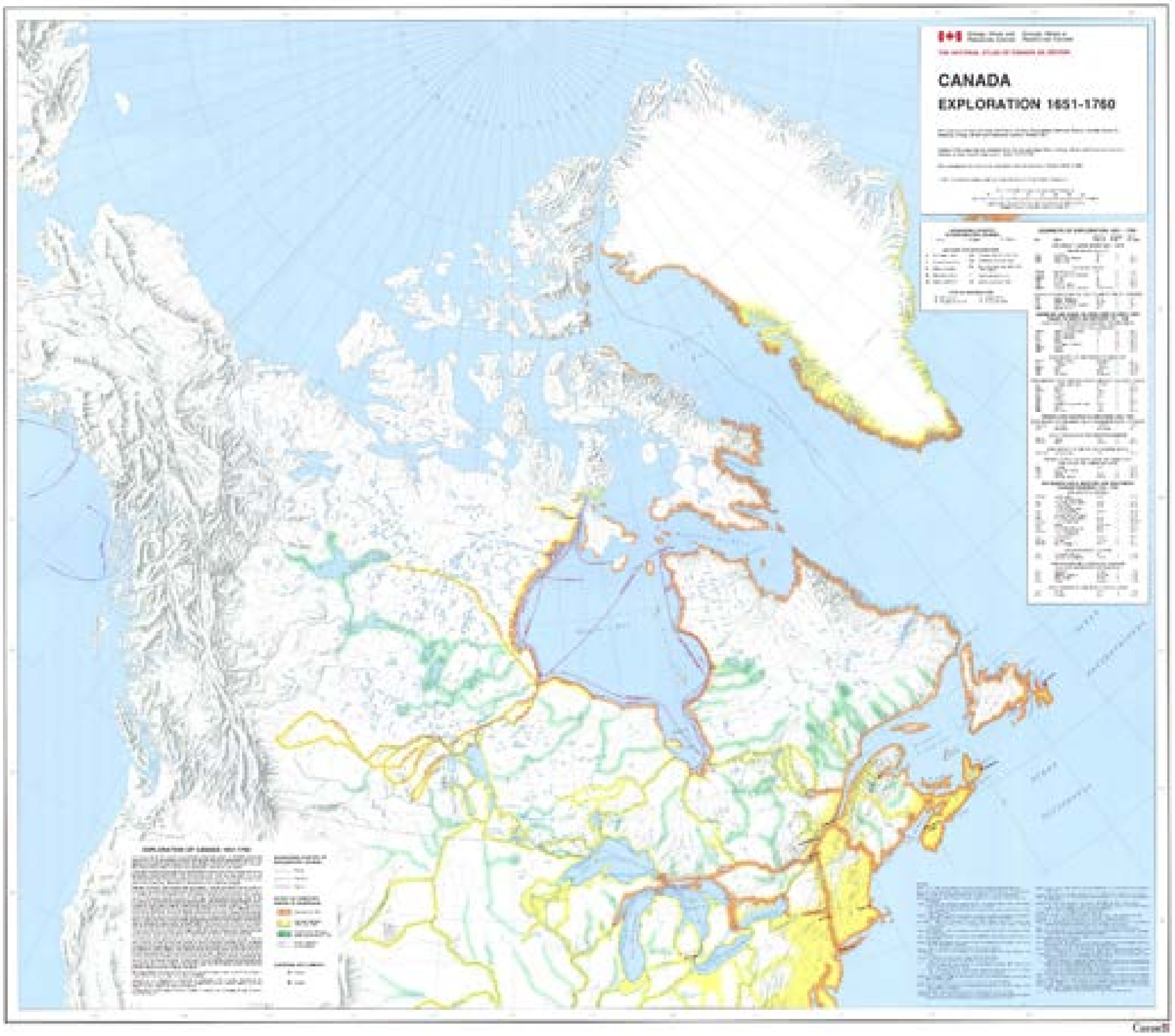


Energy Mines and Resources Canada. (1974a). *Posts of the Canadian Fur Trade*. Canada Surveys and Mapping Branch, (ed. 4), 1973 p. 79-80, 1 sheet, The National Atlas of Canada, URL https://doi.org/10.4095/294447

Energy Mines and Resources Canada. (1974b). *Exploration of Hudson Bay and the Western Interior 1610 to 1904*. The National Atlas of Canada, (ed. 4), p. 74, URL https://open.canada.ca/data/en/dataset/eaf5753f-7ca1-5c6e-a4a6-ab5c5dacd1fc



Energy Mines and Resources Canada. (1974c). *Exploration Route Surveys, 1758 to 1905*. The National Atlas of Canada, (ed. 4), p. 78, URL https://open.canada.ca/data/en/dataset/607320a2-9075-55d9-b64f-7d36cdfc29c7

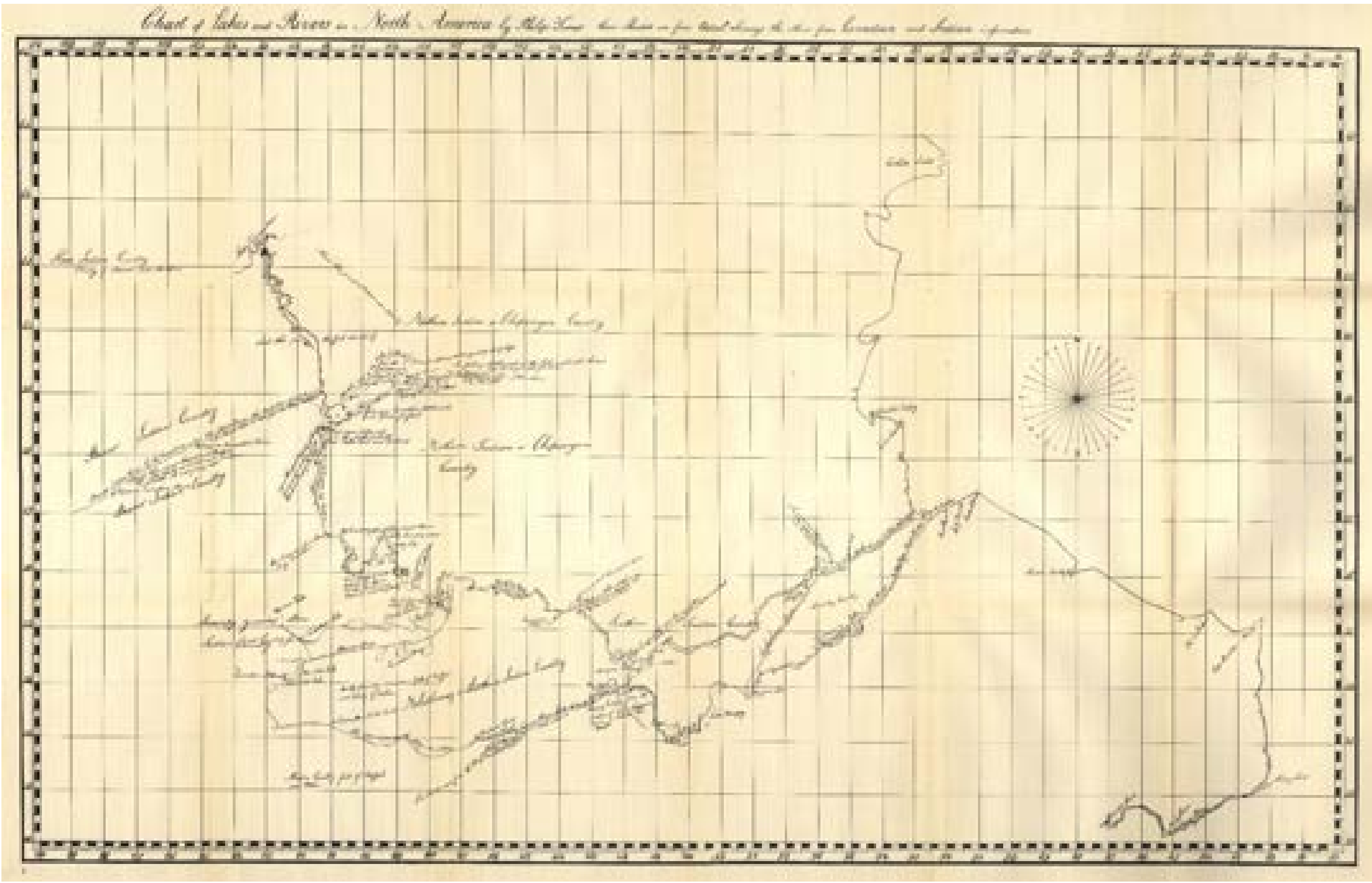


Energy Mines and Resources Canada. (1991). *Canada Exploration 1651 - 1760*. The National Atlas of Canada, (ed. 5), Geographical Services Division, URL https://open.canada.ca/data/en/dataset/00ea8f26-0e33-582d-8408-4e061331b85a

Appendix B: *The explorers, the scientific geological scholars, and institutions*

Philip Turner

→ *The rivers and lakes of North America, 1779*

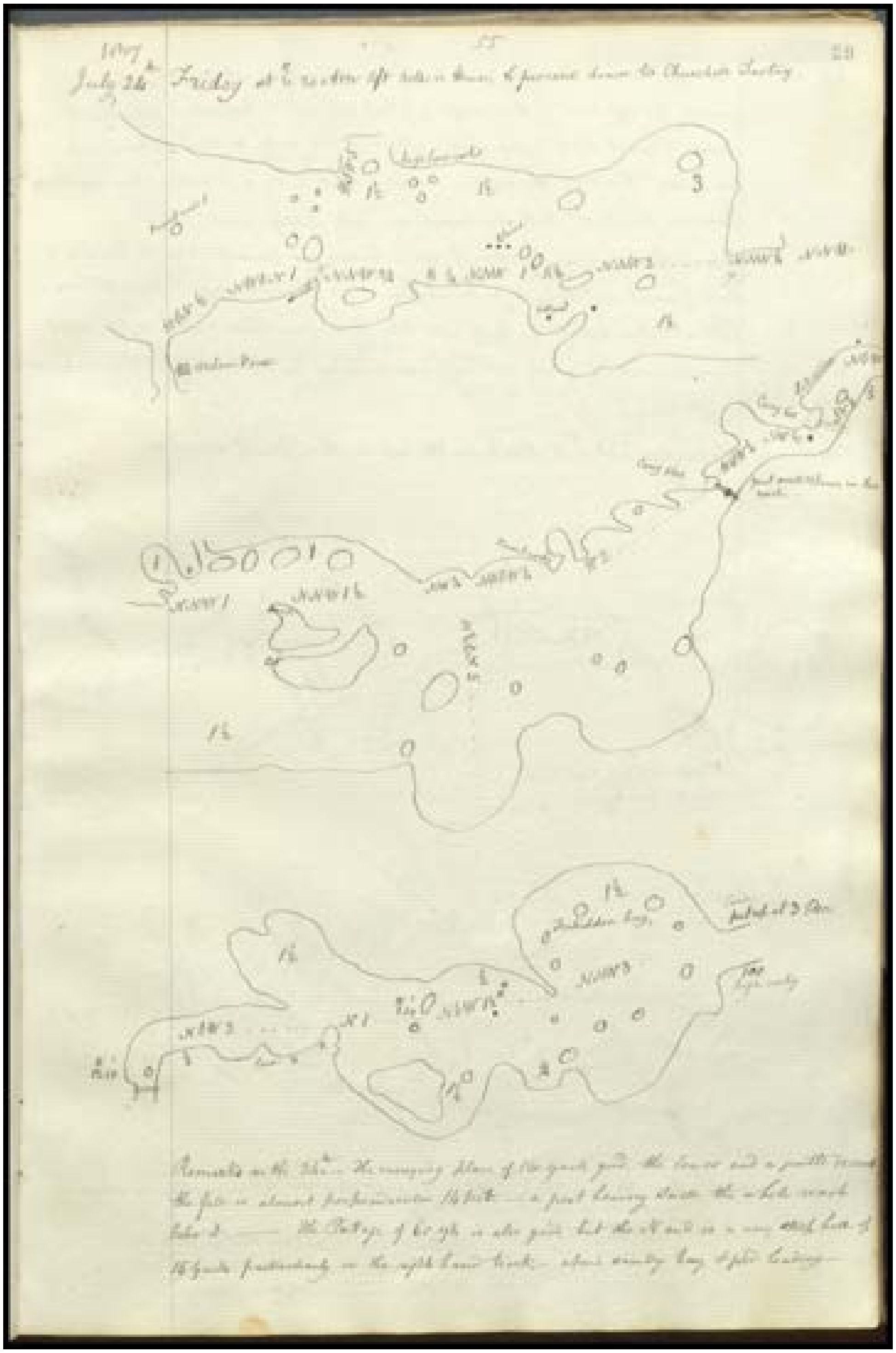


Turnor. P. (1779) *Facsimile: Chart of Lakes and Rivers in North America.* [Toronto] [Map] Publications of the Champlain Society, No. 21. *Journals of Samuel Hearne and Philip Turno*r. Toronto: The Map Specialty Co., 1934. Retrieved from Manitoba Historical Maps Digital Collection, , URL https://www.flickr.com/photos/manitobamaps/3817359811/in/album-72157603397271363/

Peter Fidler

→ *Abstracts from the Journals of Exploration and Survey, 1790-1809*

- Journal *'Down Churchill River [sic] to Churchill Factory from mouth of Deers River'* (pp. 41-79)

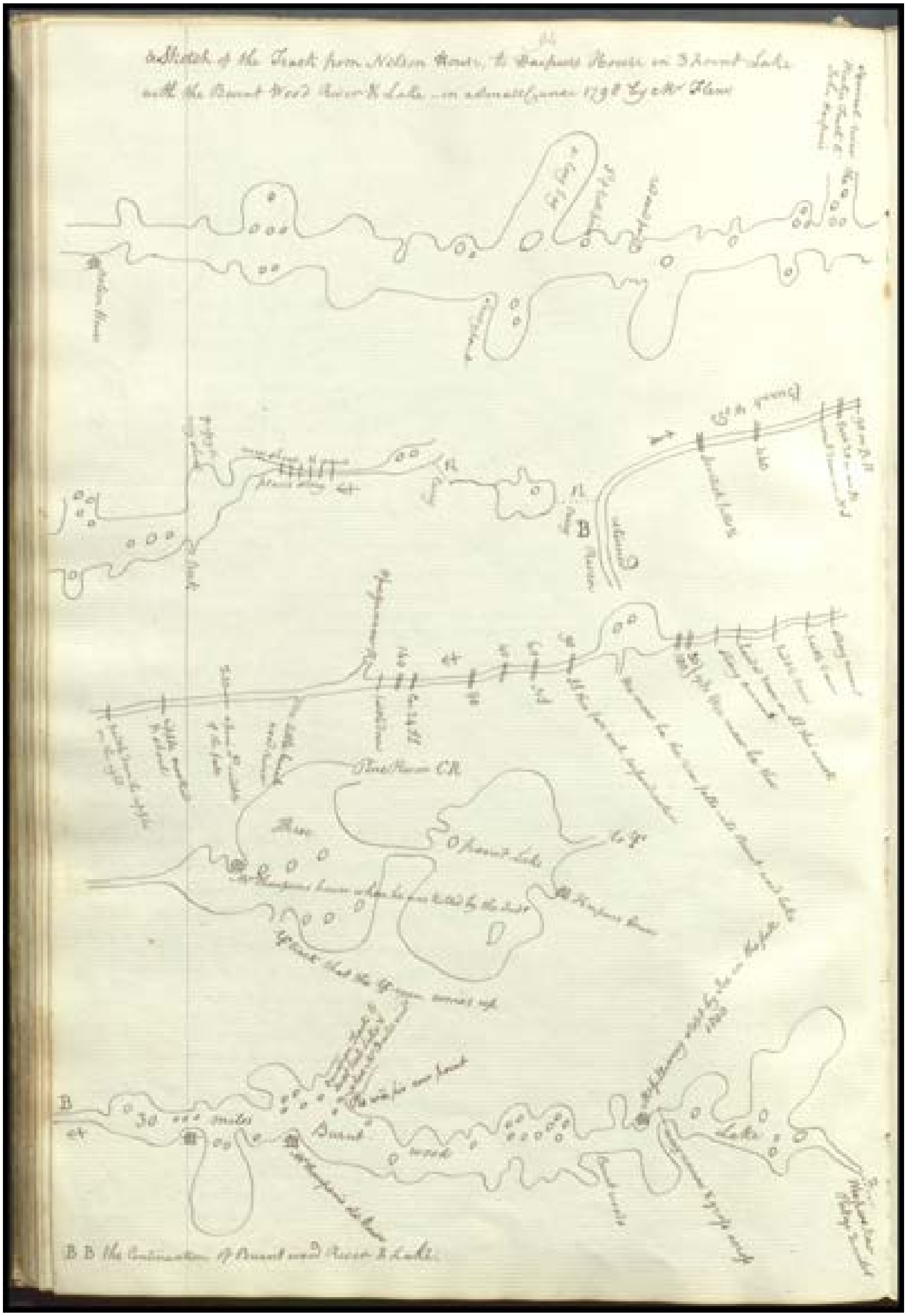


Entry in page 55 contains three sketches associative to the lake, named as Highrock Lake. This lake forms part of the Churchill River network and it drains into a narrow channel which enters Granville Lake at is southern shores.

The upper sketch provides a snapshot of the northern shores of the lake which at one point accommodated 'Nelson House' trading post.

Source: Archives of Manitoba; **Location:** HBC E 3/4**; Image code:** HBCA- E3-056

- *A Sketch of the Track from Nelson House to Harper's House in 3 point Lake with the Burnt Wood River & Lake in a small canoe 1798 by Mr Flew, p. 94:*



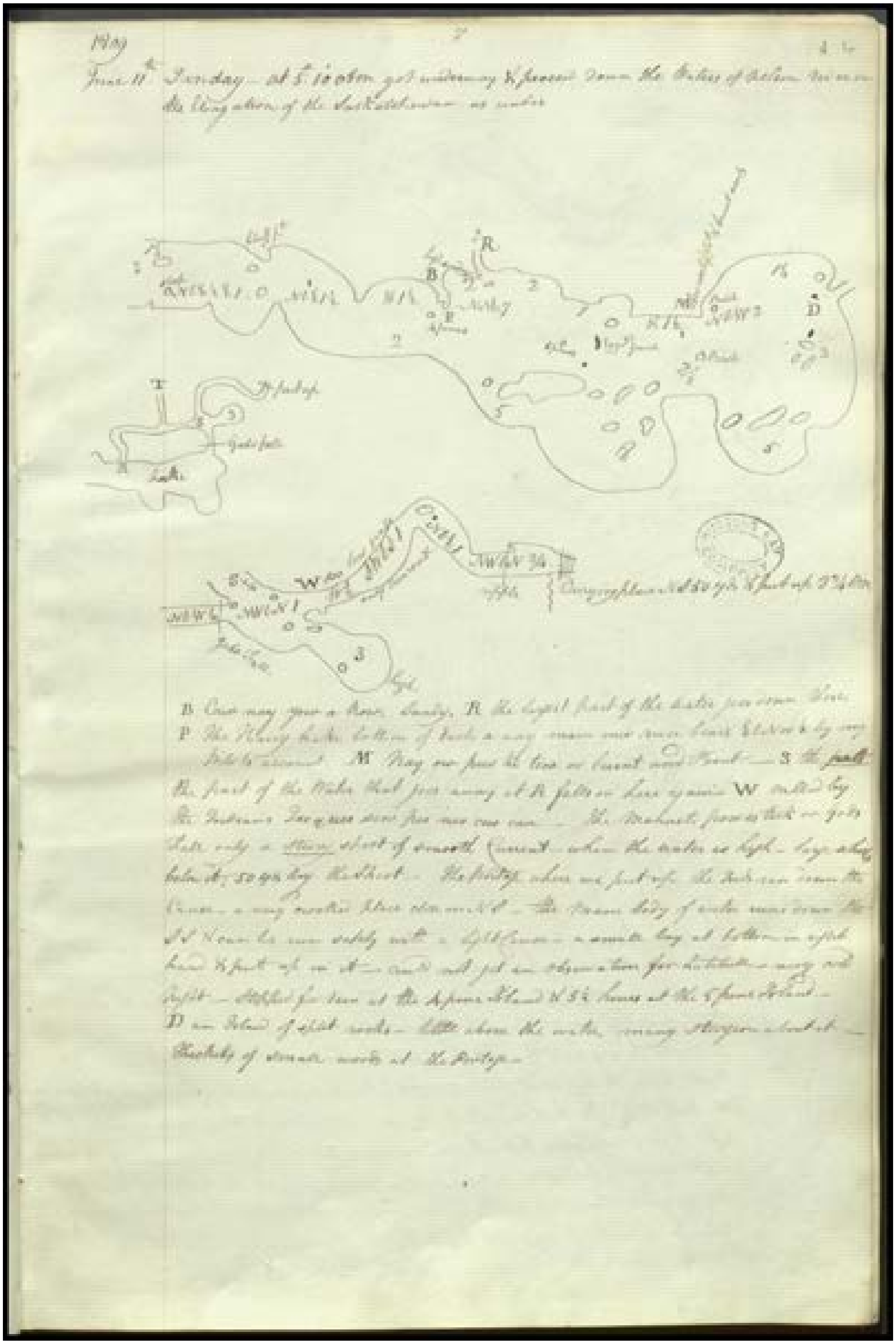
Mr. Flew reference to ‘Nelson House’ is to the trading post which was established within the previously mentioned Highrock Lake.

However, note an early rough sketch of *‘Three point Lake’*.

Source: Archives of Manitoba; **Location:** HBC E 3/3 fo. 48d**;** **Image code:** HBCA-E3-095

→ *Abstracts from the Journal of Exploration and Survey, 1809*

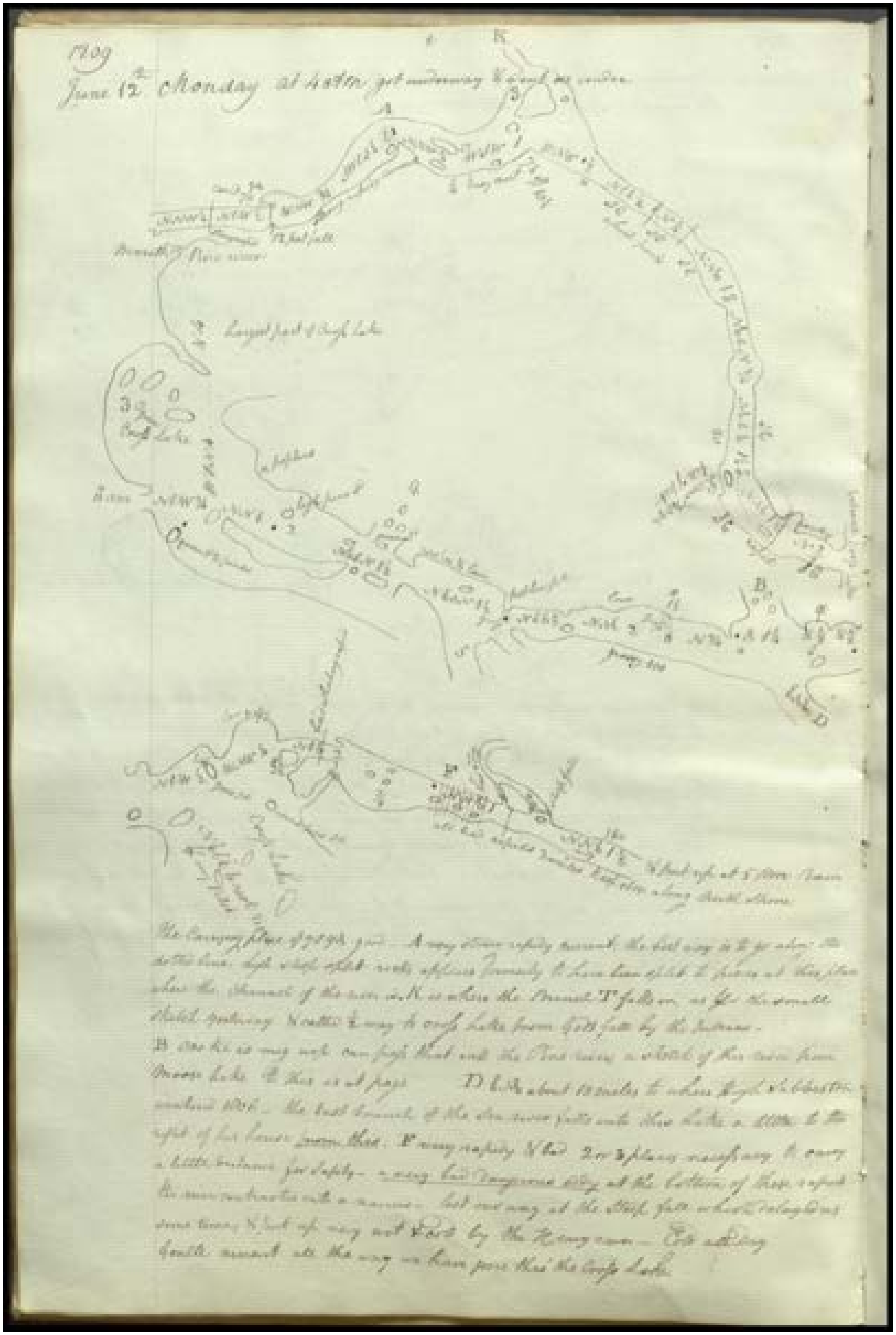
- Early insights the original profile and characteristics of the Nelson River



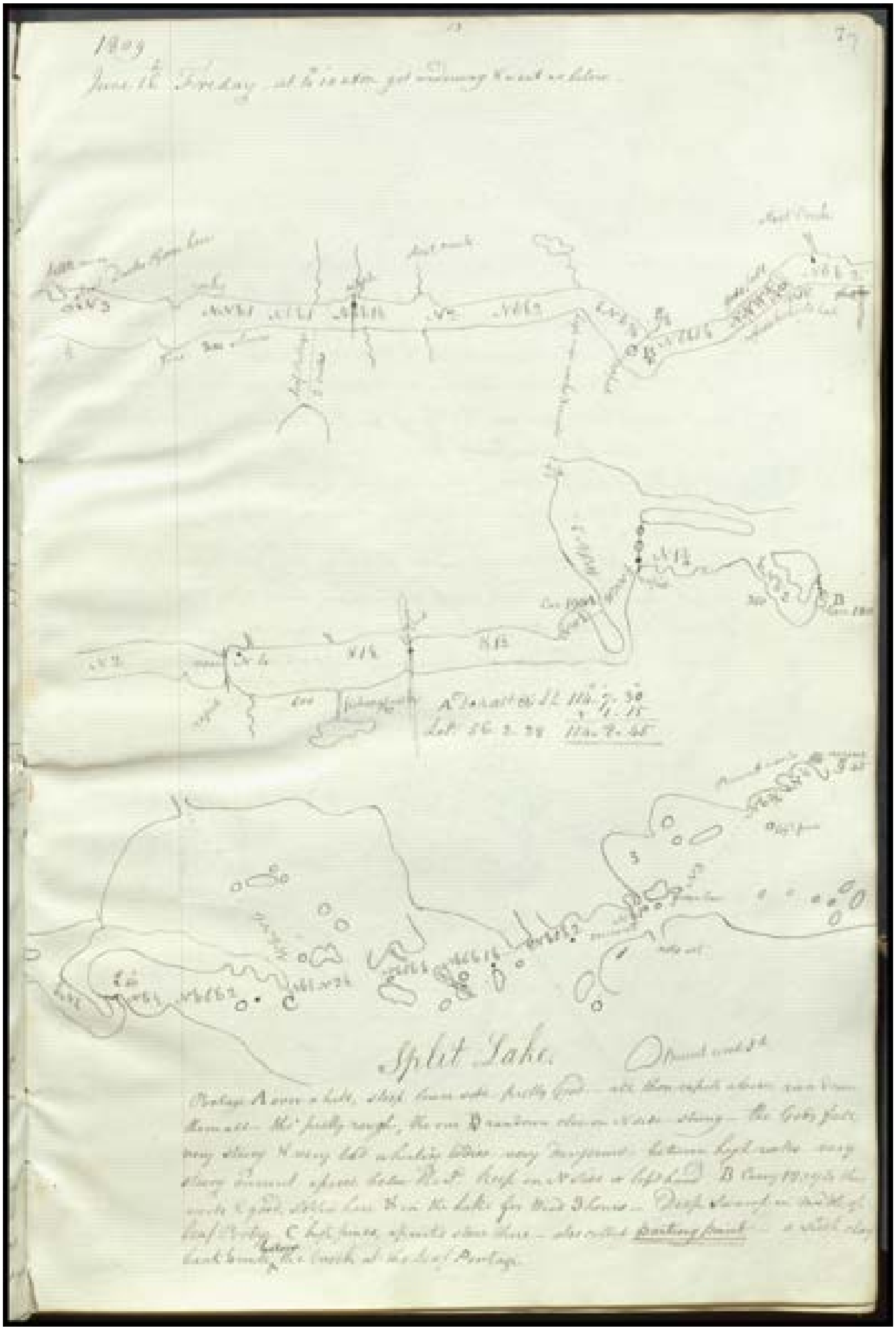
p. 7 - June 11th, Fidler indicated that they were proceeding into the Nelson via the *'the elongation of the Saskatchewan*'.

He is referring to the branch between Playgreen Lake and Split Lake. Hence these sketches are showing the landscape for the outlet of Kiskittogisu Lake.

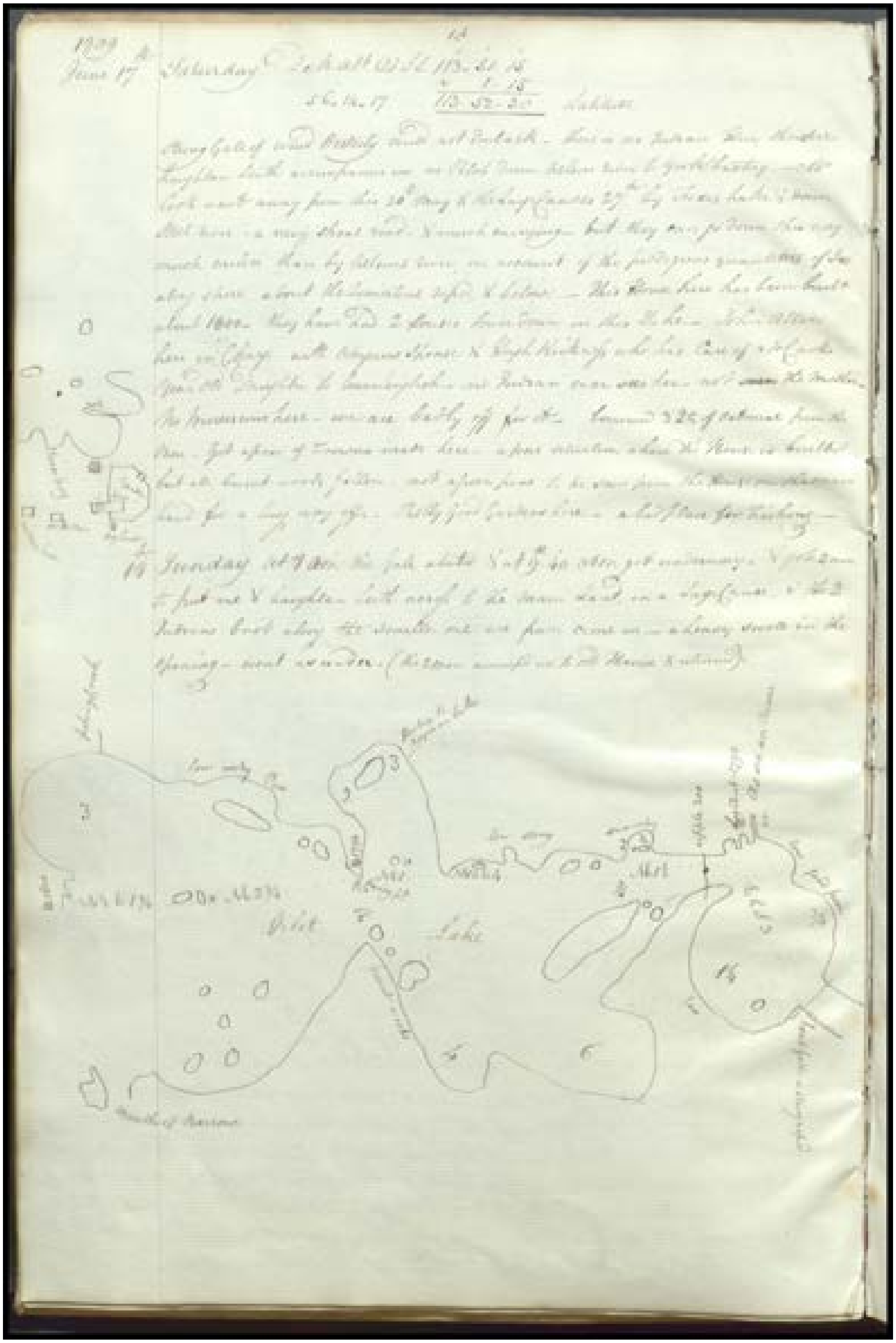
Source: Archives of Manitoba; **Location: Location:** H1-30-3 (E.3/4)**; Image code:** HBCA- E3-4-007



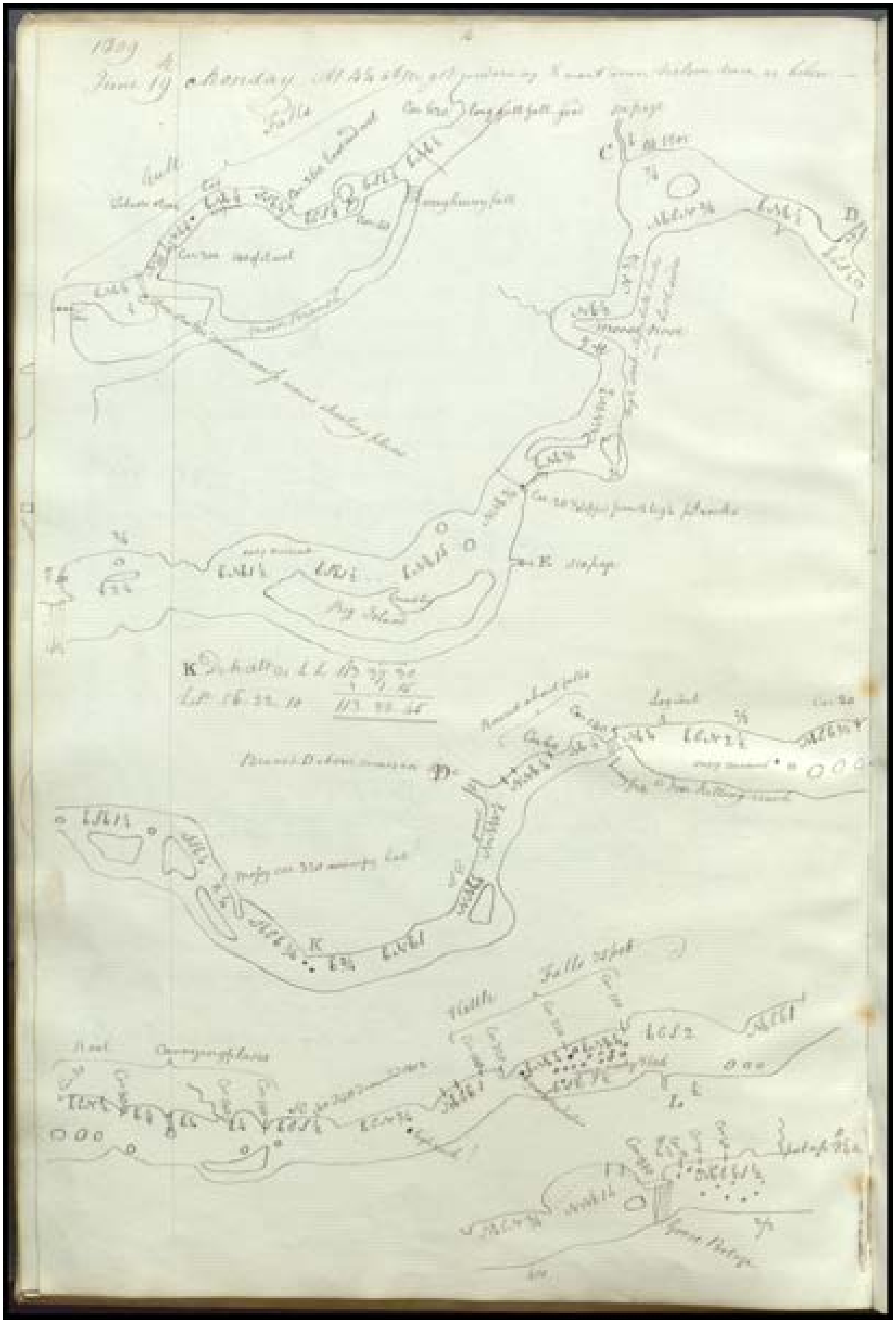
p. 8 - June 12th, the hydrology that dominates the landscape within which Cross Lake drains into. The sketched channel on the upper section of the page, constitutes the area that houses Whitemud Falls and Ebb and Flow Rapids. [**Source:** Archives of Manitoba; **Location: Location:** H1-30-3 (E.3/4)**; Image code:** HBCA- E3-4-008]



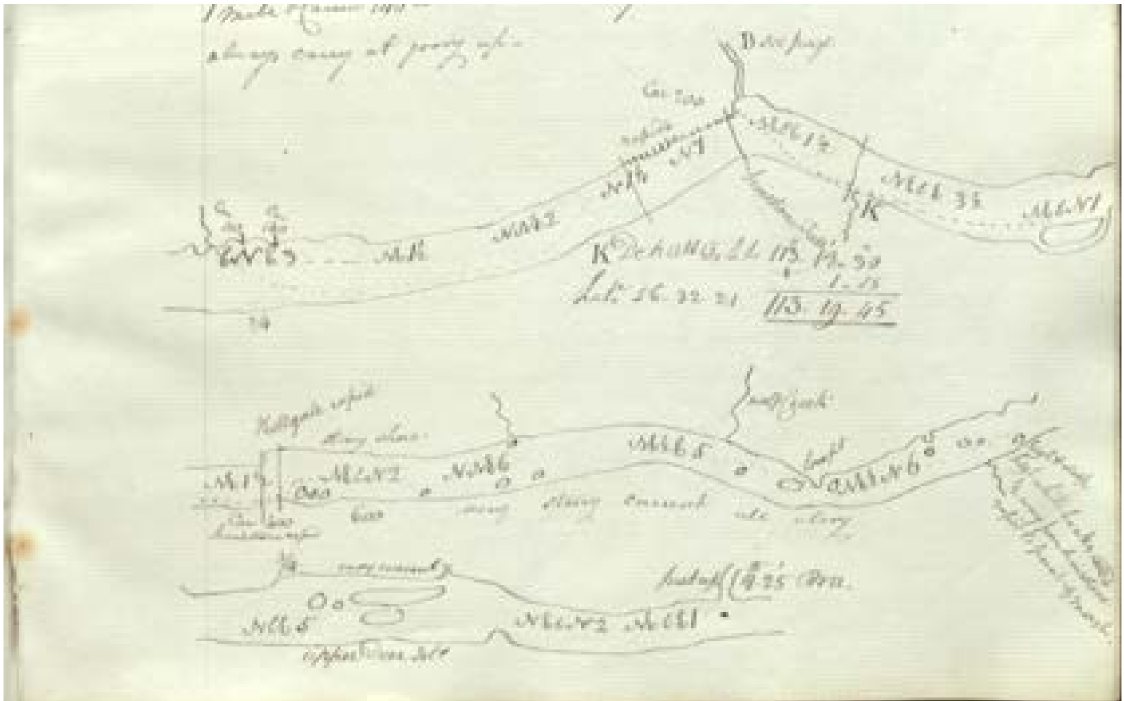
p. 13 - June 16th, Gods Fall (contemporary cartography as Manitou Rapid), the rapid below Split Lake (which was eventually replaced by Kelsey GS) and a section of Split Lake. [**Source:** Archives of Manitoba; **Location: Location:** H1-30-3 (E.3/4)**; Image code:** HBCA- E3-4-013]



p. 14 - June 17th, Split Lake. [**Source:** Archives of Manitoba; **Location: Location:** H1-30-3 (E.3/4)**; Image code:** HBCA- E3-4-014]

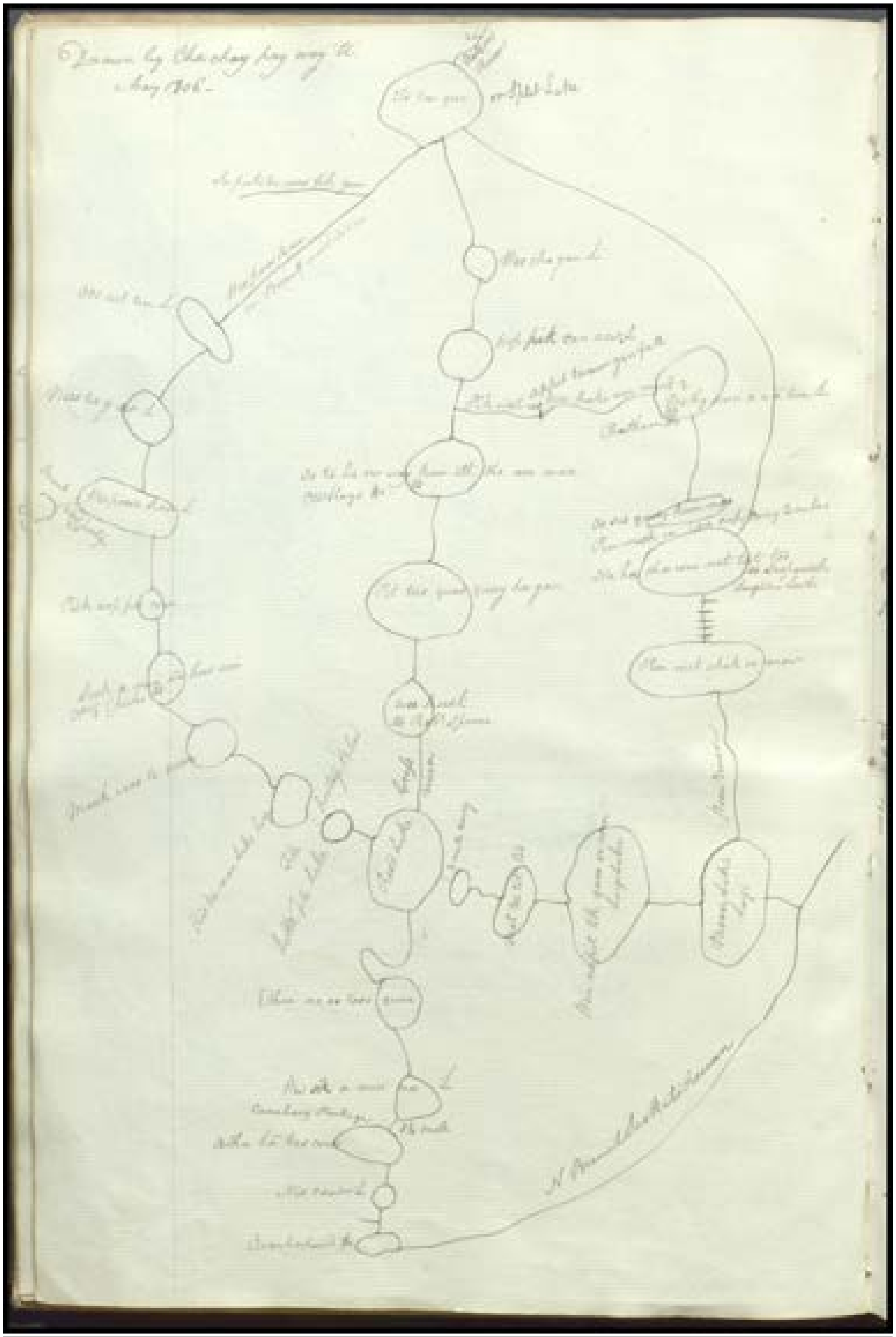


p. 16 - June 19th, the physiologies of Gull Lake and Kettle falls. [**Source:** Archives of Manitoba; **Location: Location:** H1-30-3 (E.3/4)**; Image code:** HBCA- E3-4-016]



p. 17 - June 20th, Lower Limestone rapid (Fidler also notes in very close proximity Hellgate rapid) and Limestone falls (replaced by the GS) [**Source:** Archives of Manitoba; **Location:** H1-30-3 (E.3/4)**; Image code:** CA-E3-4-017]

- The routes and lakes between Cumberland House and Split Lake which was sketched by *"Cha chay pay way ti May 1806"* (p. 26)

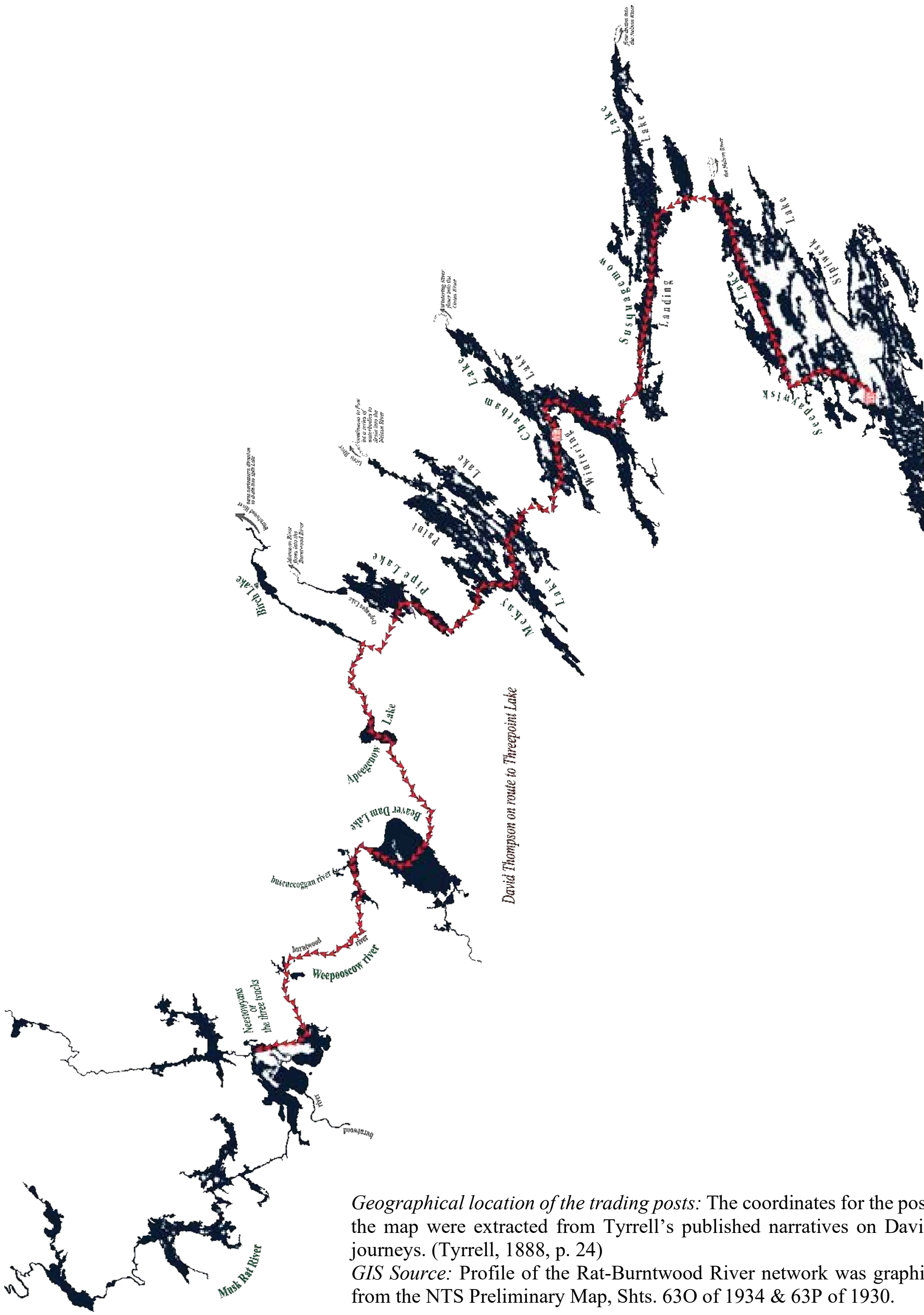


Indigenous names of waterbodies that form part of the hydrology that connects Cumberland House (in the province of Saskatchewan) with Split Lake (in the province of Manitoba).

Source: Archives of Manitoba; **Location:** HBC E 3/4 fo. 13d; **Image code:** HBCA-E4-025

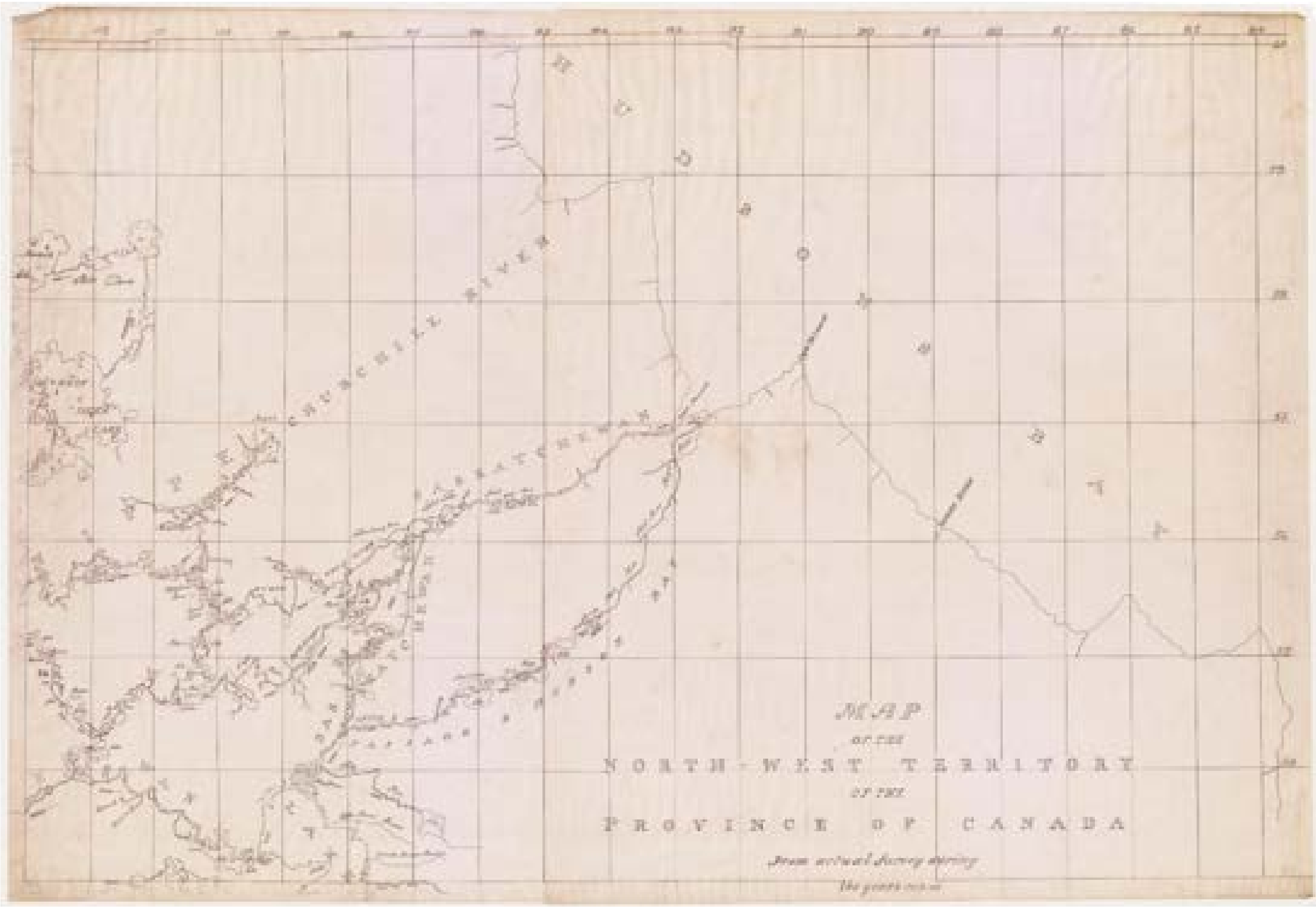
David Thompson

- *The route taken when the left "Seepaywisk House" in 1793 that led him to meet with the asiniskaw-ithiniwak of Nisicawayāsihk (Tyrrell, 1888, p. 24; Tyrrell, 1916b, pp. xvi-xvii)*



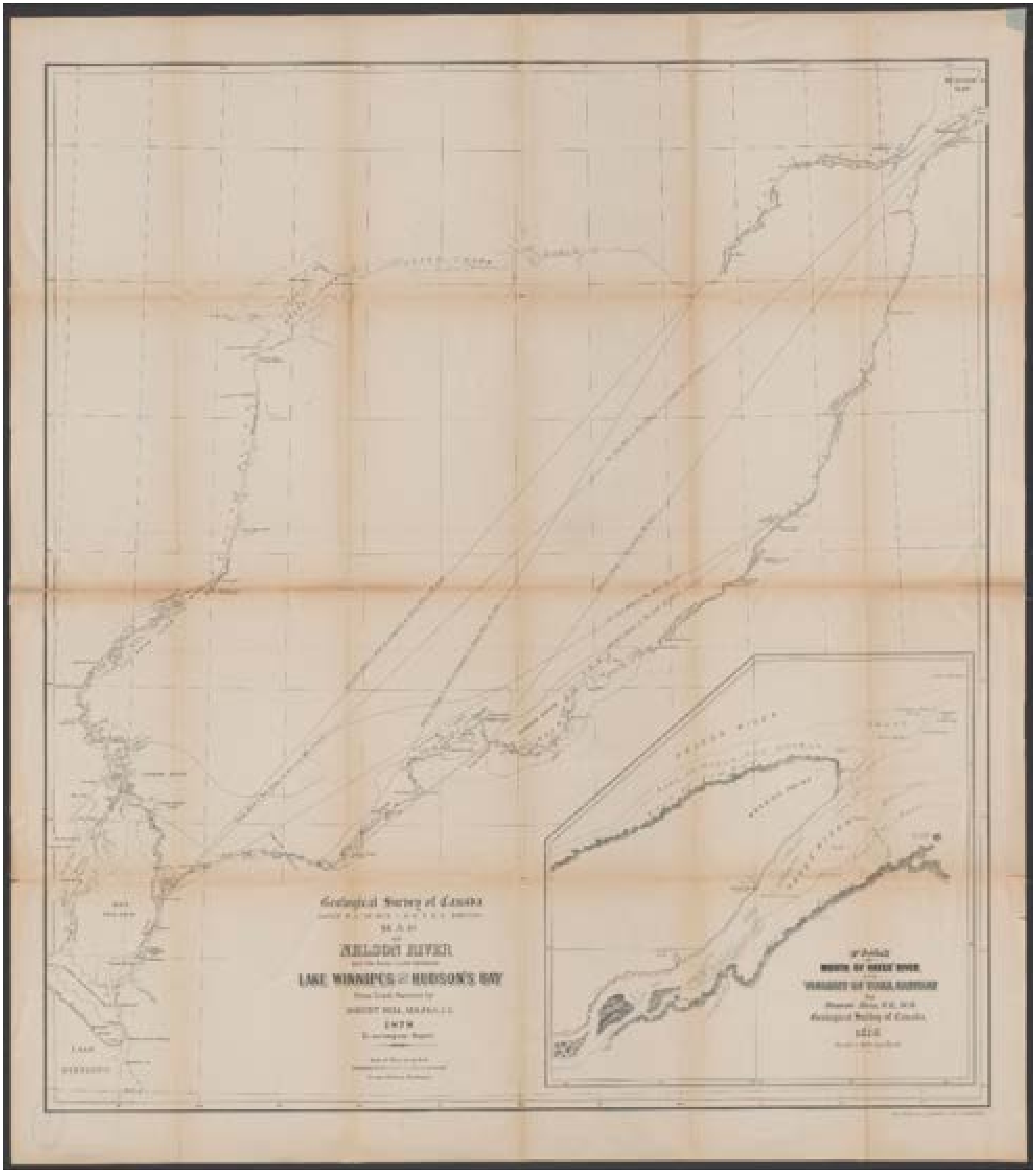
Geographical location of the trading posts: The coordinates for the posts indicated on the map were extracted from Tyrrell's published narratives on David Thompson's journeys. (Tyrrell, 1888, p. 24)
GIS Source: Profile of the Rat-Burntwood River network was graphically designed from the NTS Preliminary Map, Shts. 63O of 1934 & 63P of 1930.

- *1814 cartography*



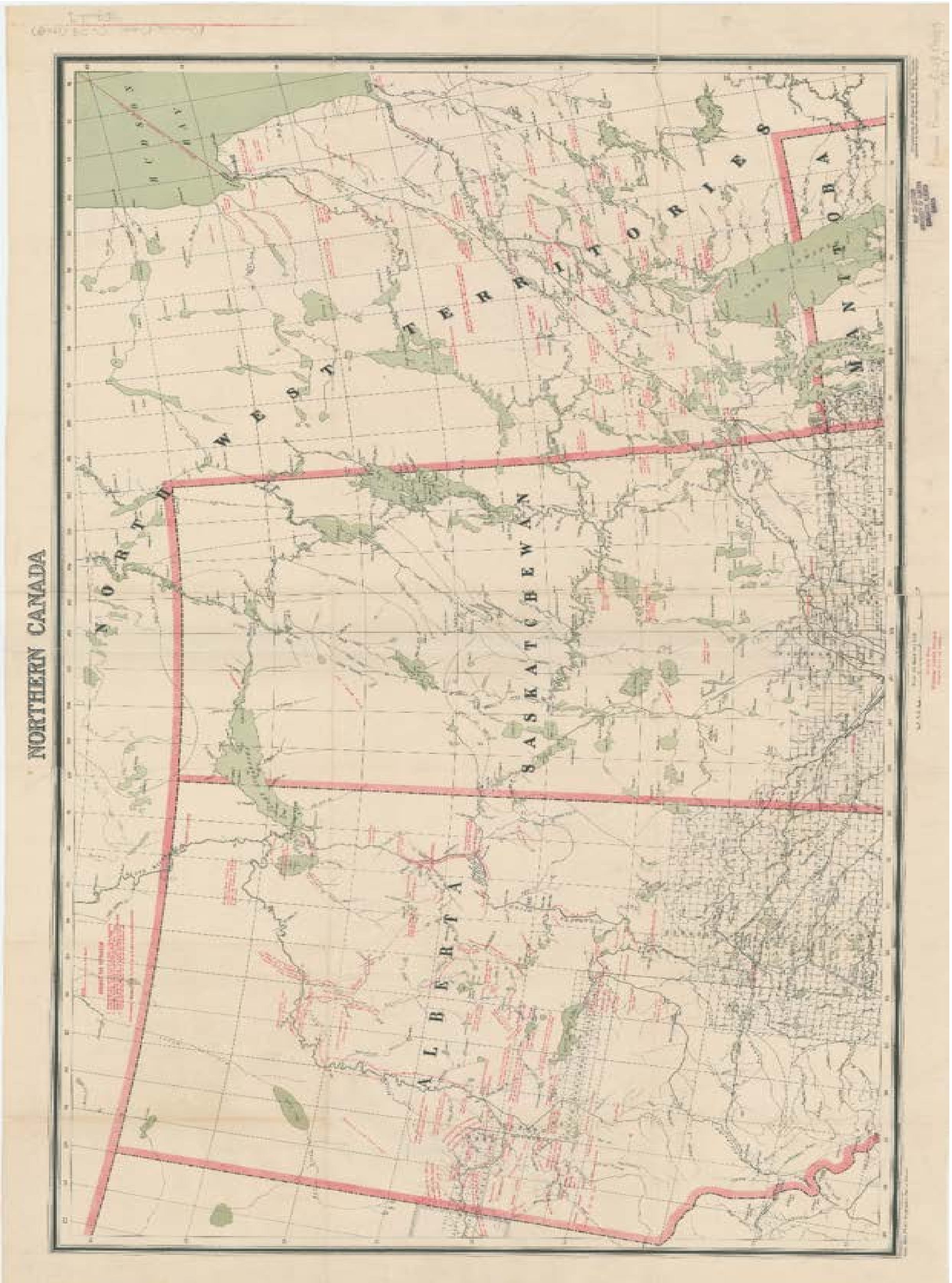
Thompson, D. (1814) *Map of the North-West Territory of the Province of Canada.* [Part 2] [Map]. Retrieved from the Historical Atlas of Canada Online Project Digital Map Collection,
URL http://www.historicalatlas.ca/website/hacolp/national_perspectives/exploration/UNIT_08/U08_staticmap_Thompson_1814.htm#

Robert Bell, 1878



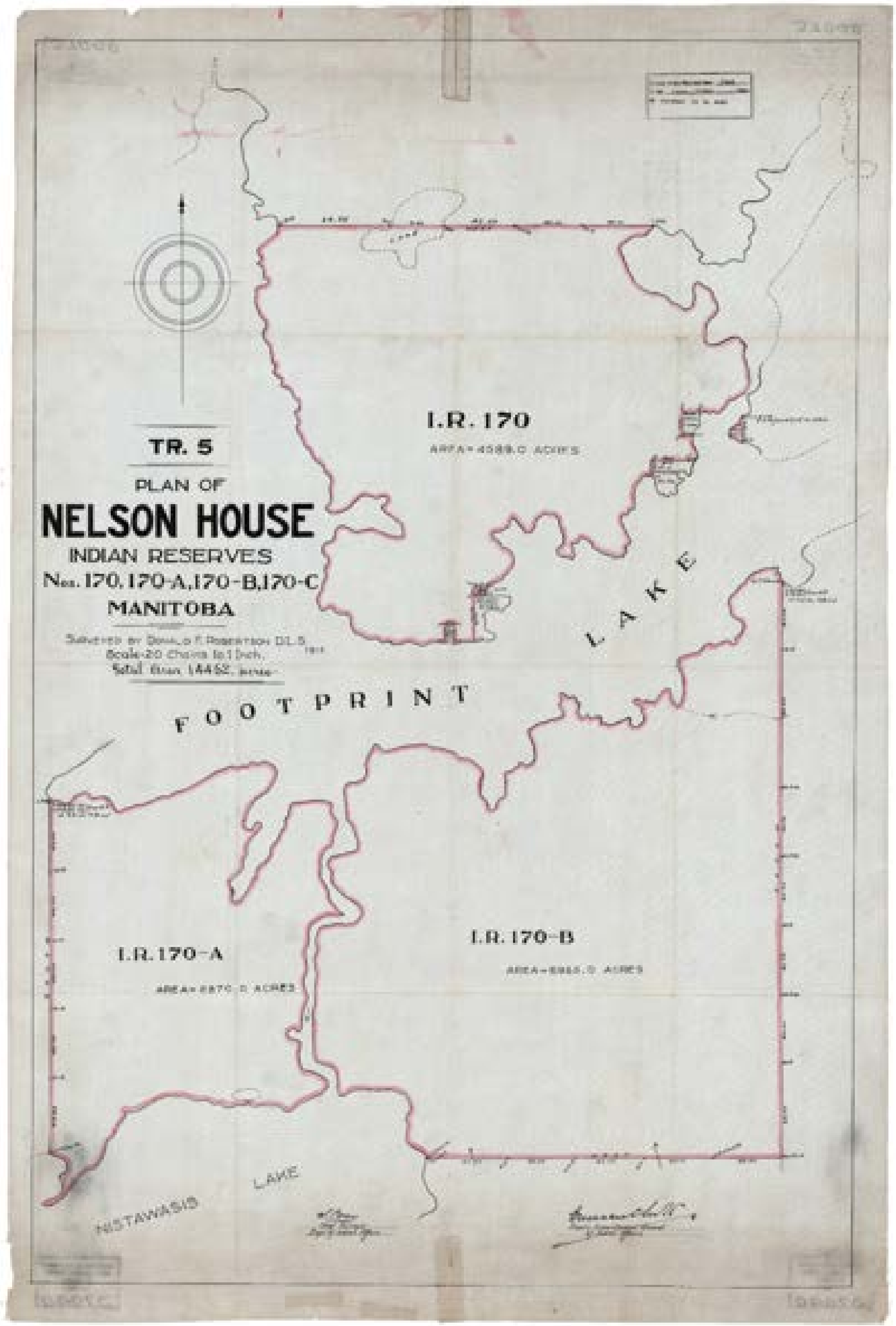
Bell, R. (1878) *Map of Nelson River and the boat-route between Lake Winnipeg and Hudson's Bay: from track-surveys. Draftsman: George Andrews.* [Montreal] Geological Survey of Canada [Map] Call Number: MAP RM 1893/2. Retrieved from Trove Map Digital Collection, Australia, URL https://nla.gov.au/nla.obj-231618468/view

Railway Land Branch, 1908



White, J. & Canada Railway Lands Branch. (1908). *Northern Canada* [Map]. In: Railway Lands Branch, Department of the Interior. [Ottawa]: Accompanying the Report of the Senate Committee appointed to inquire into the Resources of Northern Canada. Retrieved from Peel's Prairie Provinces Online Digital Map Collection. URL https://archive.org/details/WCW_M000417

Treaty 5, 'Indian Reserves' Surveys, 1913

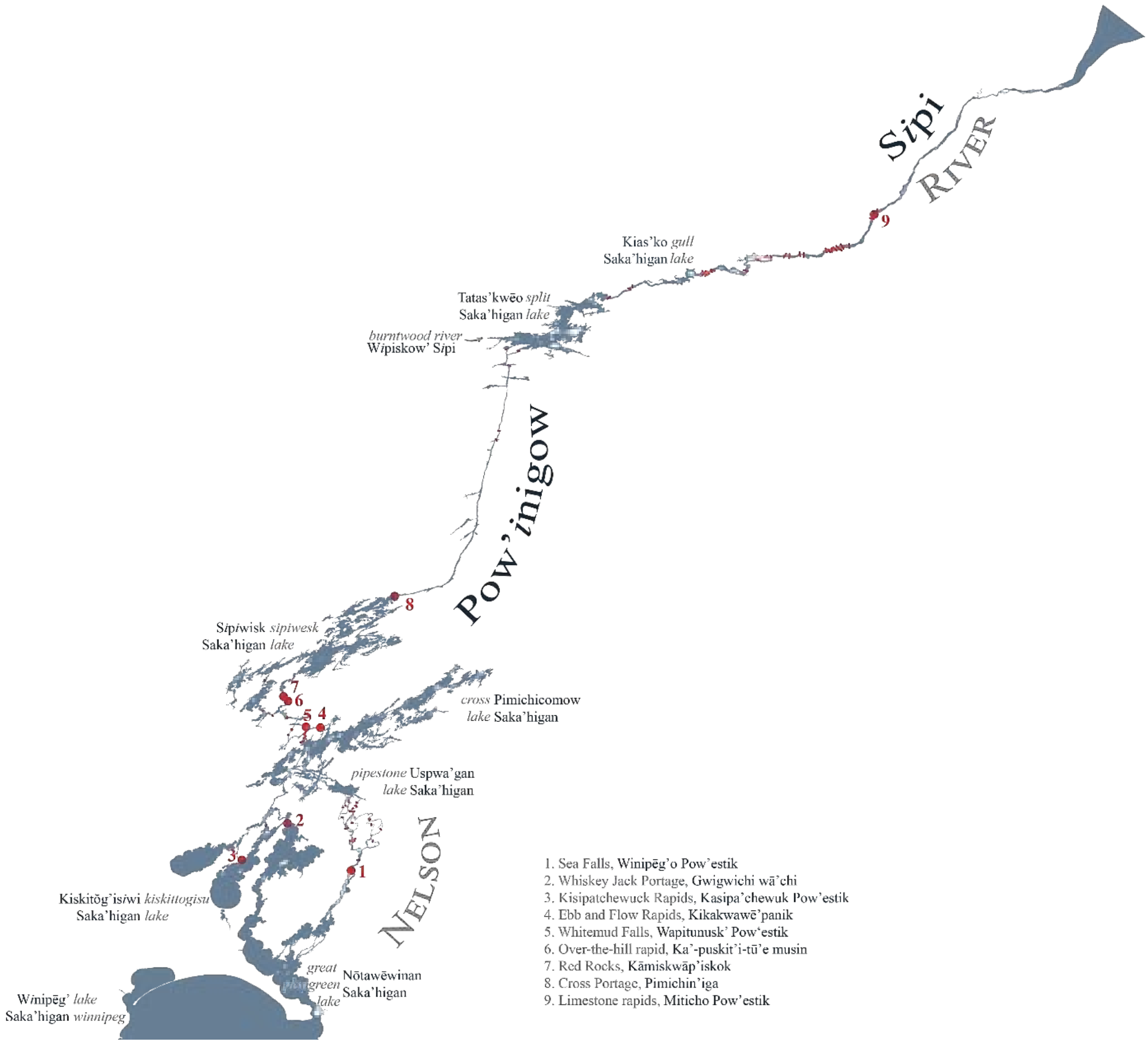


Roberston, D. F. (1913) Ext. Boundaries of Reserves at Nelson House on Footprint Lake, Treaty 5. Government of Canada, Canada Land Surveys. URL https://clss.nrcan-rncan.gc.ca/clss/plan/detail?id=37040+CLSR+MB

J. B. Tyrrell, 1915

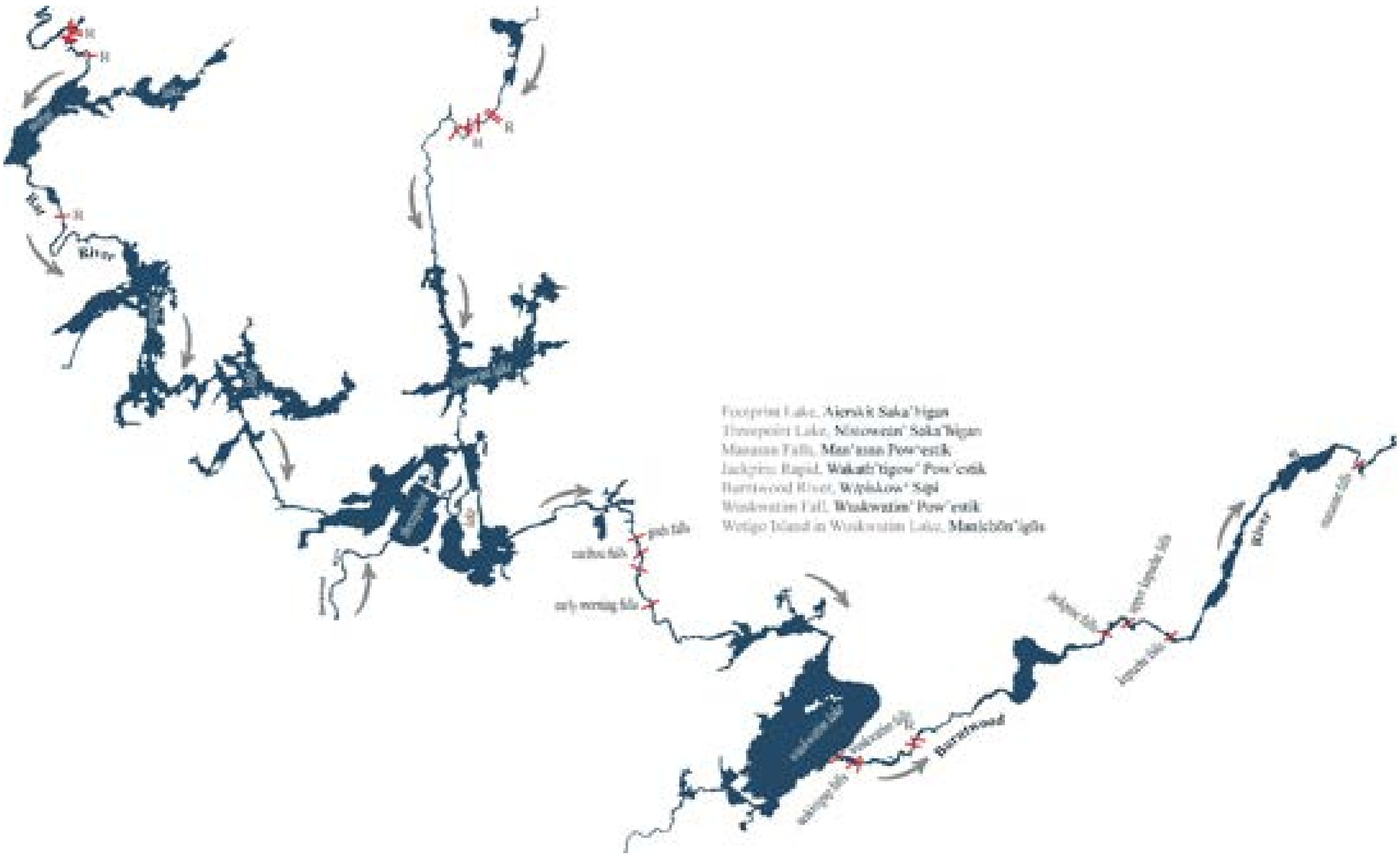
→ *Algonquian Indian Names of Places in Northern Canada*

- Nelson River



A sample of the Algonquian Names along the Nelson River as interpreted by the geologists Tyrrell

- Rat-Burntwood river network



A sample of the Algonquian Names along the rat-burntwood river network as interpreted by the geologists Tyrrell

Appendix C: *The Nelson River, pre and post Hydro-electrical generation stations*

Photo 16: Jenpeg Generating Station overlooking the upstream section of the Nelson River, June 2016 – water flow is coming from the western channel.
(Photo Credit: Victoria Grima)

Photo 17: A 1930 view of White Mud falls.
(Retrieved from University of Manitoba Libraries Digital Collection, Andrew Taylor Fonds.
https://digitalcollections.lib.umanitoba.ca/islandora/object/uofm%3A2462554)

Photo 18: View of White Mud Falls, rapids 15 miles from Cross Lake.
(Retrieved from Societe Historique de Saint Boniface Digital Online Collection, Roman Catholic Archiepiscopal Society of Keetwatin, Ref. No. N4907, Fonds No. 0484)

Photo 19: A 1928 view of Manitou (also known as Devils) Rapids near the Railway line crossing the Nelson River. (Provided by FFCA, Photo No. 1008614, URL http://flinflonheritageproject.com/transportation-rail/wppaspec/oc1/lnen/cv0/pg4/ab461)

Photo 20: The Grand Rapid on the neck of the Nelson River in May of 1950. This rapid was subsequently replaced by Kelsey GS
(Acquired from NAPL, Roll No: A12567, Photos Nos: 0016, 0017, 0018)

Photo 21: Kettle Rapids.
(Retrieved from Archives Manitoba, James McDougall Fonds Album 1, 1889-1890, Digital Image Number: HB17-000137.jpg)

Photo 22: undated view of Kettle Rapids.
(Retrieved from University of Manitoba, Libraries Online Digital Collection, Nan Shipley Fonds, URL https://digitalcollections.lib.umanitoba.ca/islandora/object/uofm%3A11059)

Photo 23: undated view of Railway Bridge over Kettle Rapids.
(Retrieved from University of Manitoba, Libraries Online Digital Collection, Nan Shipley Fonds, Northern Manitoba Album 1, URL https://digitalcollections.lib.umanitoba.ca/islandora/object/uofm%3A11493/manitoba_metadata)

Photo 24: An aerial view of the complex of Kettle Rapids in June of 1954.
(Acquired from NAPL, Roll No: A14188, Photos Nos: 0045, 0046)

Photo 25: An aerial view of the complex of Root Falls in relation to Kettle Rapids in June of 1954. Falls which were subsequently flooded to accommodate the operations of Kettle GS. (Acquired from NAPL, Roll No: A14127, Photos No: 0108)

Photo 26: Overlooking the man-made lake, Stephens Lake, June 2016 – floating islands near its flooded shoreline. (Photo Credit: Victoria Grima)

Photo 27: Overlooking the man-made lake, Stephens Lake, June 2016 – floating islands near its flooded shoreline (Photo Credit: Victoria Grima)

Photo 28: Deforestation to accommodate Bipole III high-voltage towers, June 2016 – on the way to Kettle GS camp. (Photo Credit: Victoria Grima)

Photo 29: Deforestation to accommodate Bipole III high-voltage towers, June 2016 – on the way to Kettle GS camp.
(Photo Credit: Victoria Grima)

Photo 30: Kettle Hydro-electric Generating Station, June 2016.
(Photo Credit: Victoria Grima)

Photo 31: Clay banks dominate the shoreline just downstream to Kettle GS, June 2016.
(Photo Credit: Victoria Grima)

Photo 32: An aerial view of Long Spruce Rapids in June of 1954.
(Acquired from NAPL, Roll No: A14188, Photo No: 0038)

Photo 33: The high-voltage towers carrying the generated hydroelectricity by Long Spruce GS, September 2016.
(Photo Credit: Victoria Grima)

Photo 34: Long Spruce Hydro-electric Generating Station, September 2016.
(Photo Credit: Victoria Grima)

Photo 35: Downstream section from Long Spruce Hydro-electric Generating Station, September 2016.
(Photo Credit: Victoria Grima)

Photo 36: undated view of the junction where the Limestone River) merge with the Nelson River.
(Retrieved from University of Manitoba, Libraries Online Digital Collection, Nan Shipley Fonds, Northern Manitoba Album 1, URL https://digitalcollections.lib.umanitoba.ca/islandora/object/uofm%3A11492)

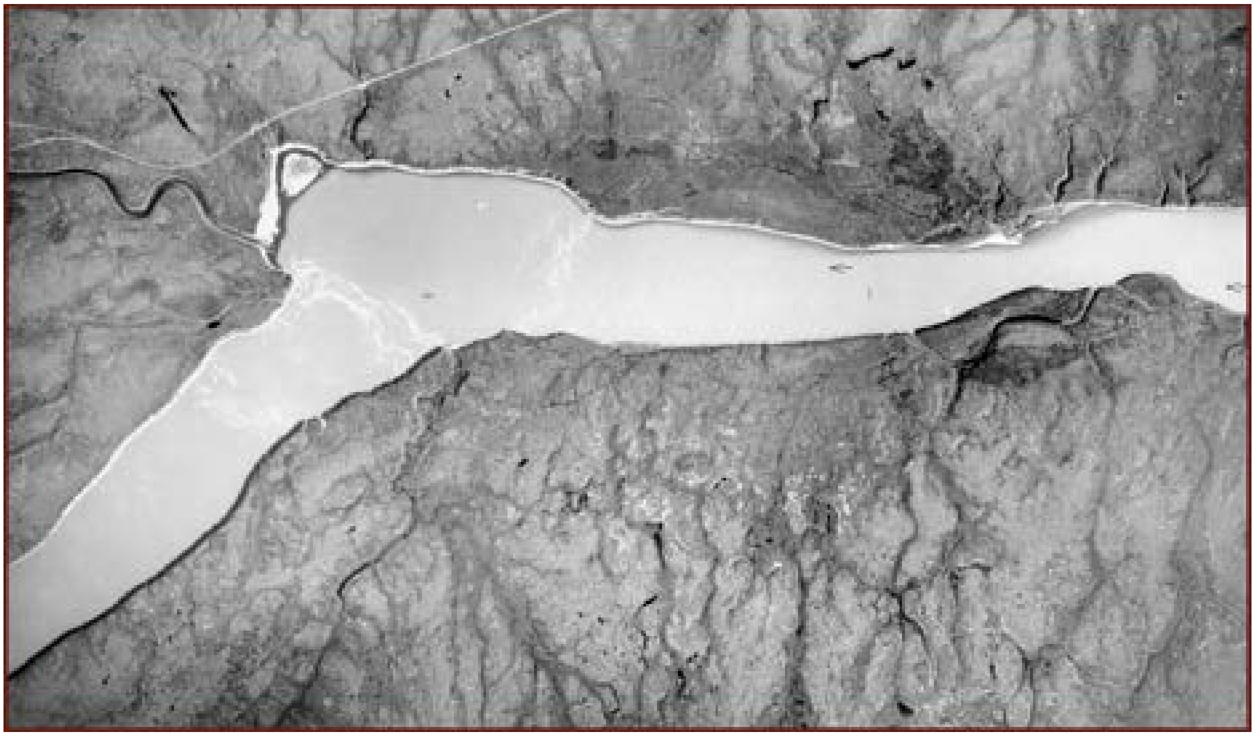


Photo 37: Aerial view of Limestone Rapids in June of 1954.
(Acquired from NAPL, Roll No: A14188, Photo Nos: 0035-0036)

Photo 38: Henday CS surrounded by the high-voltage towers, September 2016.
(Photo Credit: Victoria Grima)

Photo 39: Henday CS, September 2016.
(Photo Credit: Victoria Grima)

Photo 40: Limestone Hydro-electric Generating Station Cofferdam, September 2016.
(Photo Credit: Victoria Grima)

Photo 41: Limestone Hydro-electric Generating Station and its cofferdam, September 2016.
(Photo Credit: Victoria Grima)

Photo 42: Limestone Hydro-electric Generating Station, September 2016.
(Photo Credit: Victoria Grima)

Photo 43: The shores just behind (upstream) Limestone GS, September 2016.
(Photo Credit: Victoria Grima)

Photo 44: The shores just behind (upstream) Limestone GS, September 2016.
(Photo Credit: Victoria Grima)

Appendix D: *Rat-Burntwood River Network, state-of-condition pre and post the Churchill River Diversion Developments*

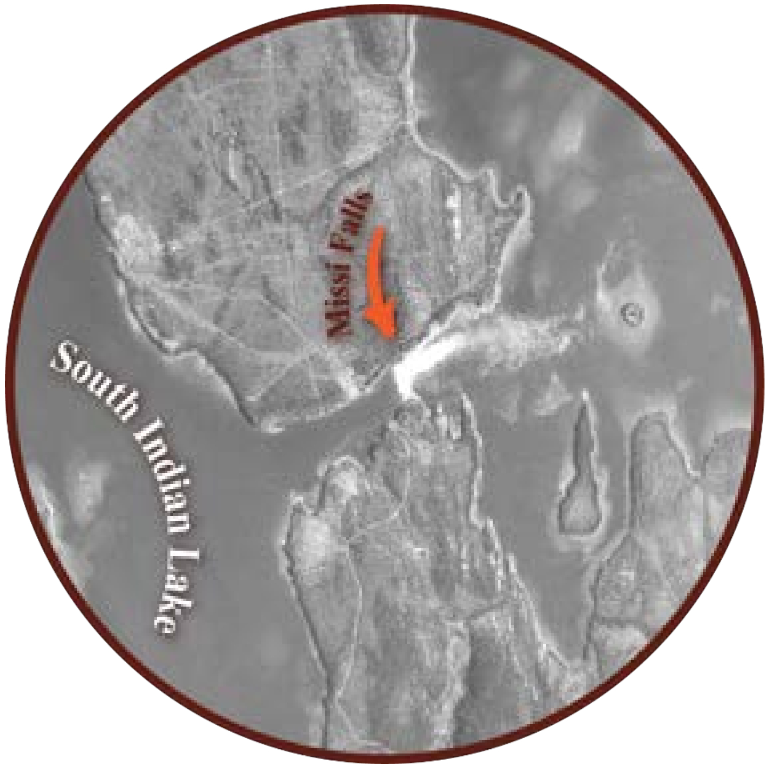


Photo 45: An aerial view of Missi Falls in 1971.
(Acquired from NAPL, Roll No: A22580, Photo No: 0018)

Image No. 12450)

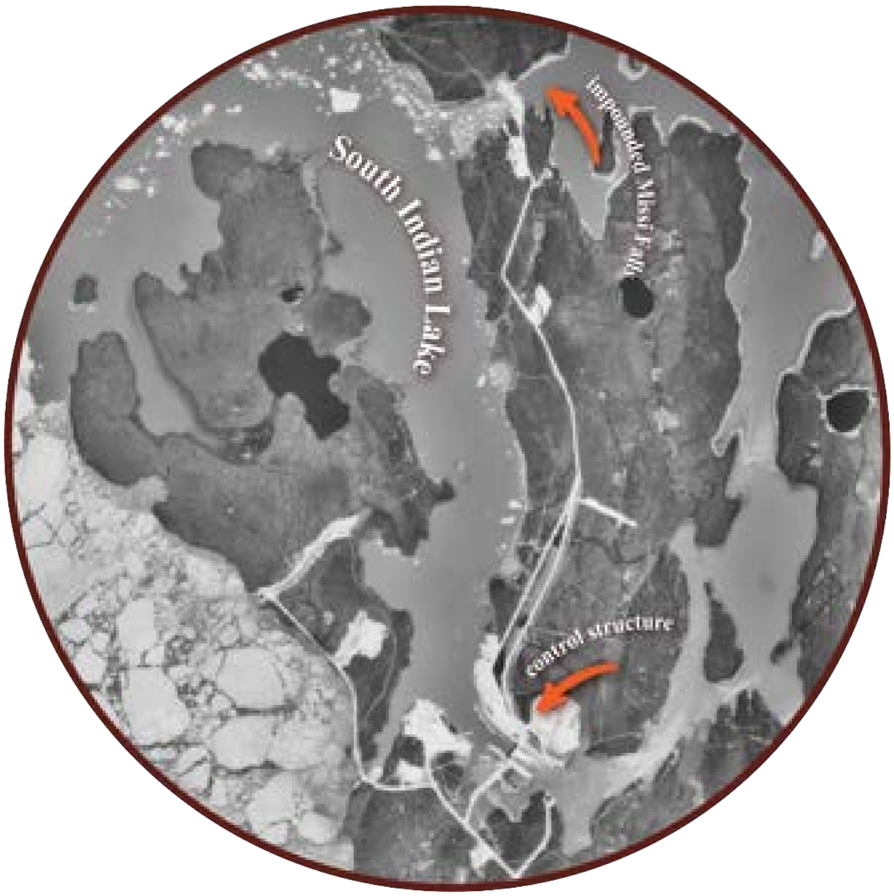


Photo 46: Aerial view of Missi Falls in 1978.
(Acquired from NAPL, Roll No: A24920, Photo No: 0101)

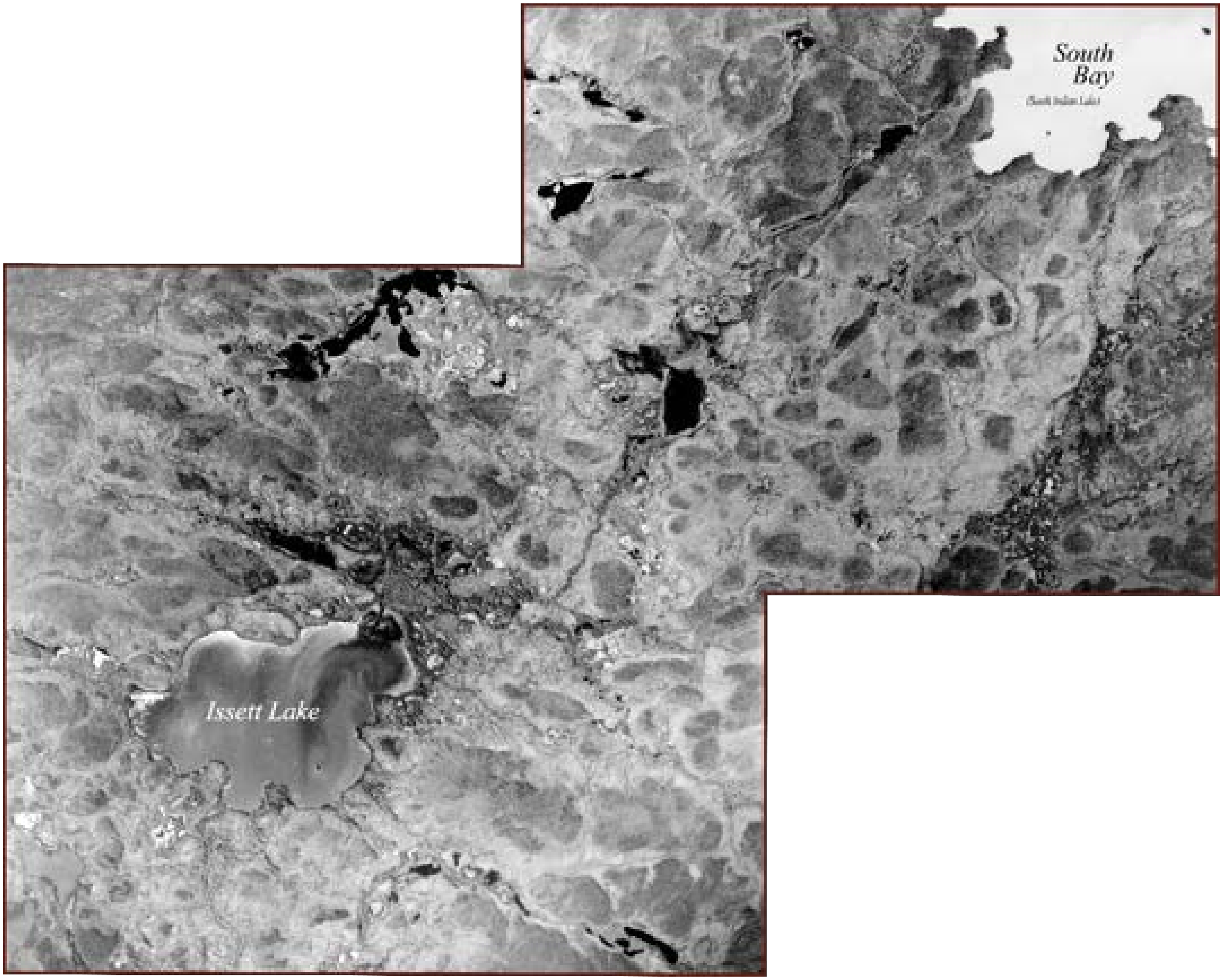


Photo 47: A 1951 aerial view of the landscape between South Bay and Issett Lake.
(Acquired from NAPL, Roll Nos: A13242, A13243; Photo Nos: 0042, 0108)

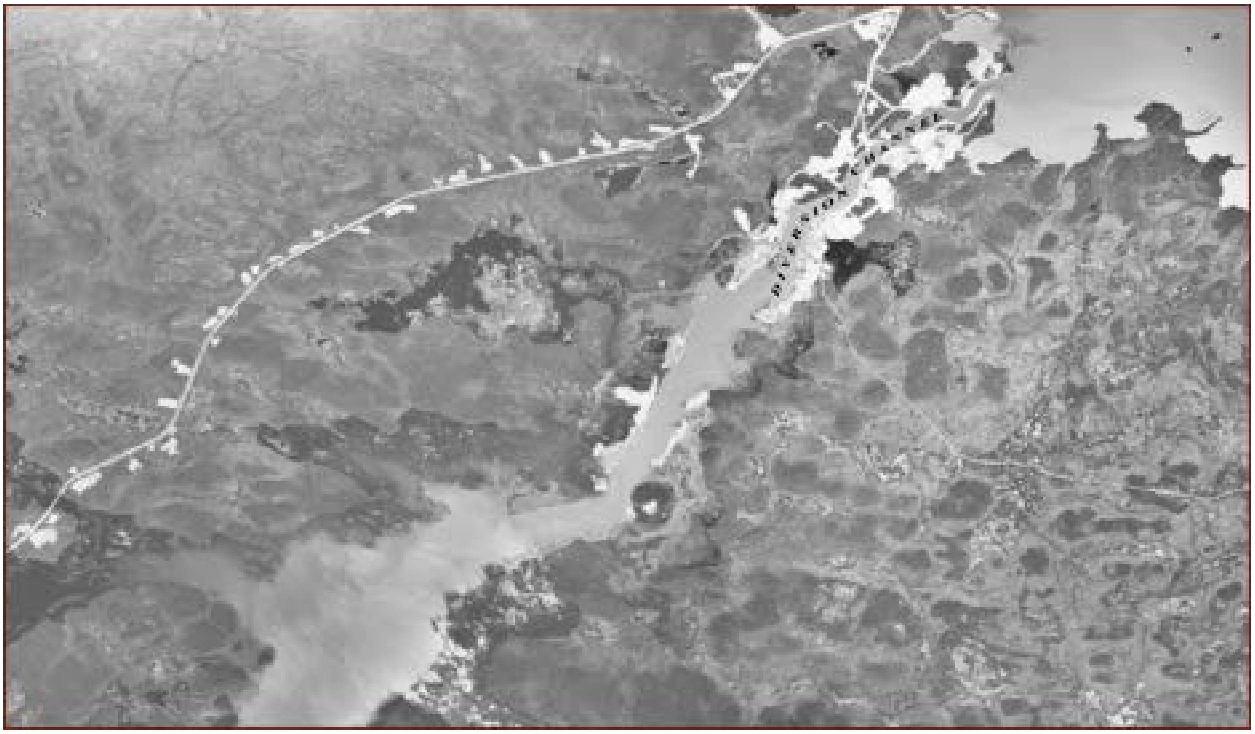


Photo 48: Diversion Channel connect South Bay with the Rat River in 1978.
(Acquired from NAPL, Roll Nos: A24935, A24936, Photo Nos: 0211, 0163)

Photo 49: Panoramic view of the Diversion Channel (southern viewpoint) –
Issett lake and Rat River in the background, August 2019. (Photo Credit: Victoria Grima)

Photo 50: Aerial view of the Diversion Channel (southern viewpoint) – Issett lake left hand side of the photo, while the flooding to the west is in the background, flooded shoreline and landscape, and floating islands. August 2019. (Photo Credit: Victoria Grima)

Photo 51: Aerial view of the flooding west to the Diversion Channel (southern viewpoint) – flooding shoreline and landscape and floating islands, August 2019. (Photo Credit: Victoria Grima)

Photo 52: Aerial view of the Diversion Channel, August 2019. (Photo Credit: Victoria Grima)

Photo 53: Aerial view of the Diversion Channel in relation to South Bay, August 2019. (Photo Credit: Victoria Grima)

Photo 54: A 1951 aerial view of the channel that hosted the rapids that lead the flow into the Lake of Notigi.
(Acquired from NAPL, Roll No: A13242, Photo No: 0042)

Photo 55: A 1950 aerial view of the channel that used to connect the Lake of Notigi with the Lake of Wapisu. (Acquired from NAPL, Roll No: A12942, Photo No: 0054)

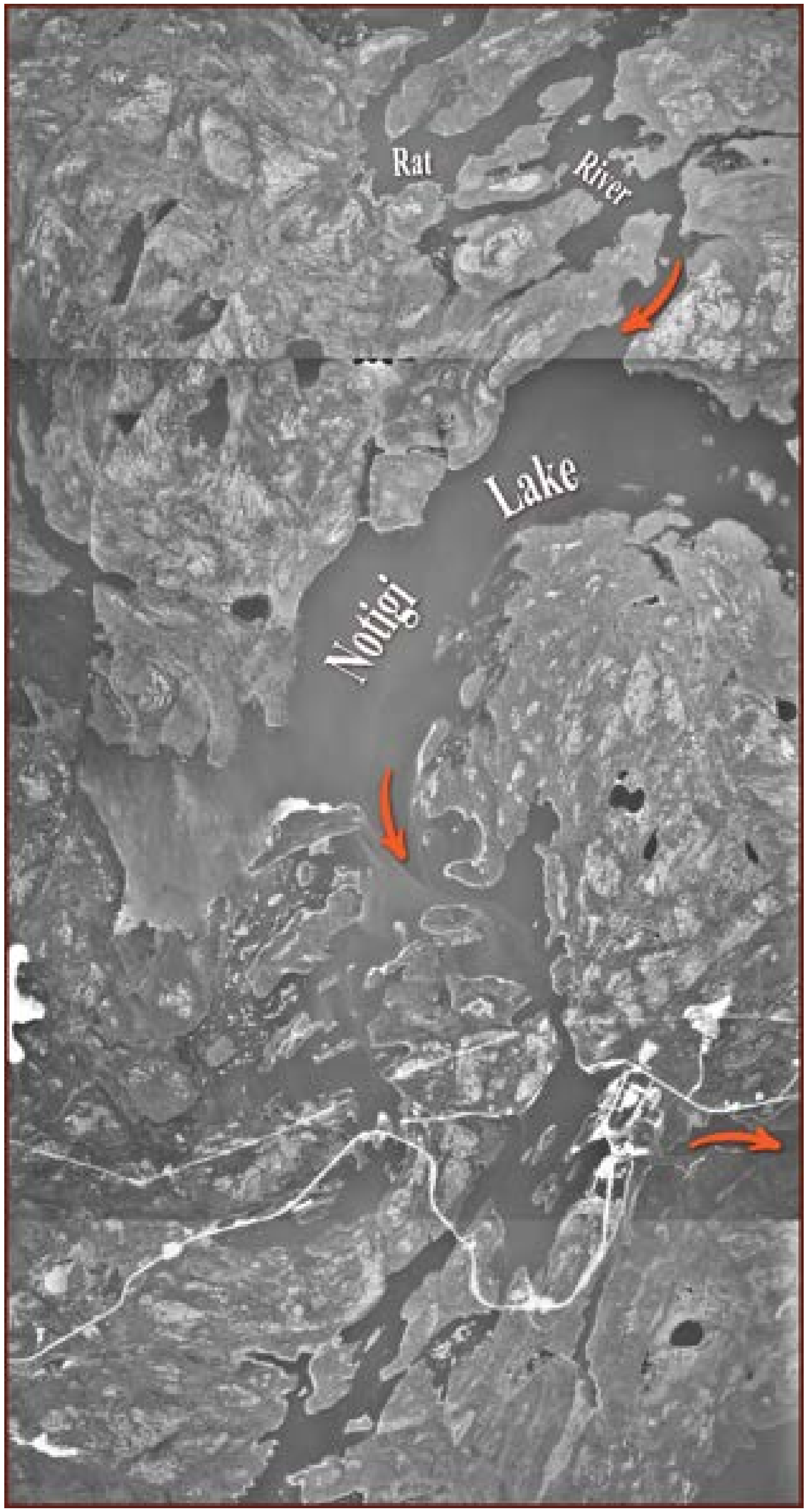


Photo 56: The Lake of Notigi and the Control Structure in 1978.
(Acquired from NAPL, Roll No: A24995, Photo Nos: 0062, 0063, 0064)

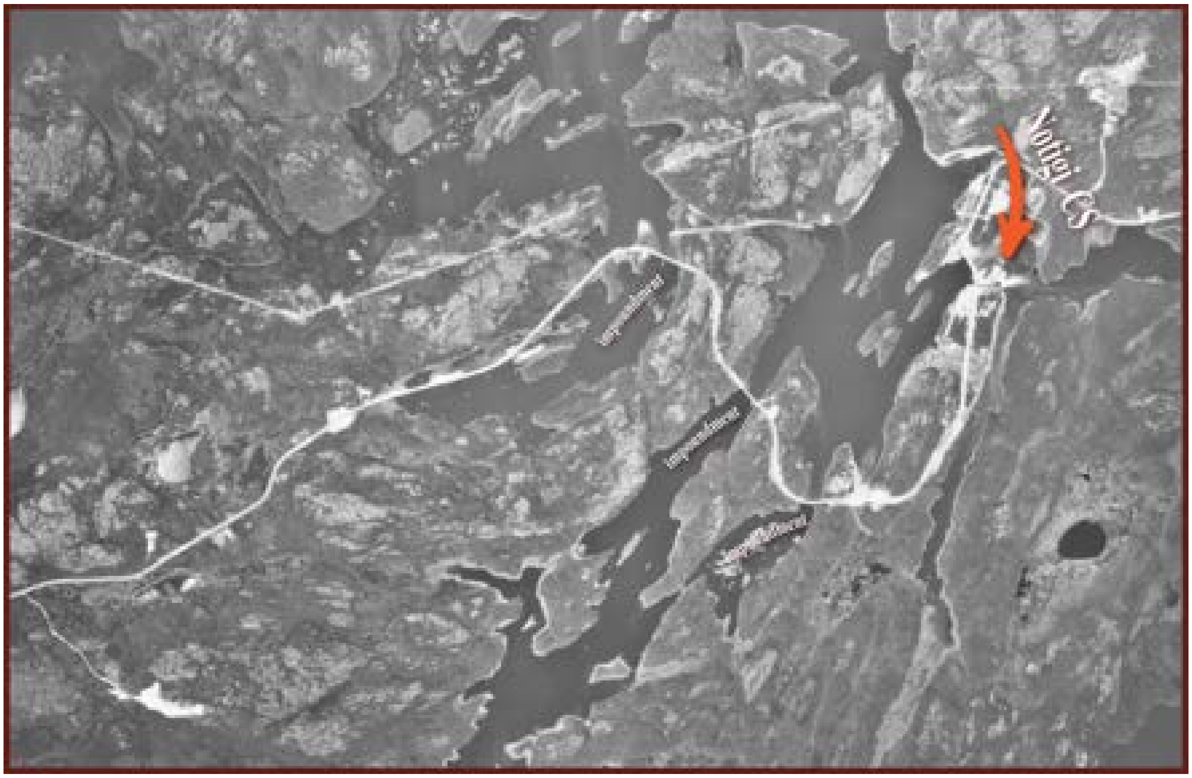


Photo 57: Notigi CS in 1978.
(Acquired from NAPL, Roll No: A24995, Photo No: 0064)

Photo 58: Notigi Lake – flooded shorelines and floating islands, in the background the Rat River coming out from Rat Lake, August 2019. (Photo Credit: Victoria Grima)

Photo 59: Notigi Lake – flooded shorelines and floating islands, August 2019. (Photo Credit: Victoria Grima)

Photo 60: Just upstream of Notigi CS – flooded shorelines and floating islands, August 2019. (Photo Credit: Victoria Grima)

Photo 61: Notigi CS and the impounded original outlet, August 2019. (Photo Credit: Victoria Grima)

Photo 62: Notigi CS, August 2019. (Photo Credit: Victoria Grima)

Photo 63: Notigi CS in relation to its surroundings landscape –
in the background Notigi Lake, August 2019. (Photo Credit: Victoria Grima)

Photo 64: Panoramic view of the Rat River, downstream Notigi CS – high water level and flooded shoreline, August 2019.
(Photo Credit: Victoria Grima)

Photo 65: Aerial view of Wapisu Lake – high water level,
flooded shoreline and floating islands, August 2019. (Photo Credit: Victoria Grima)

Photo 66: Aerial view of Wapisu Lake – high water level,
flooded shoreline and floating islands, August 2019. (Photo Credit: Victoria Grima)

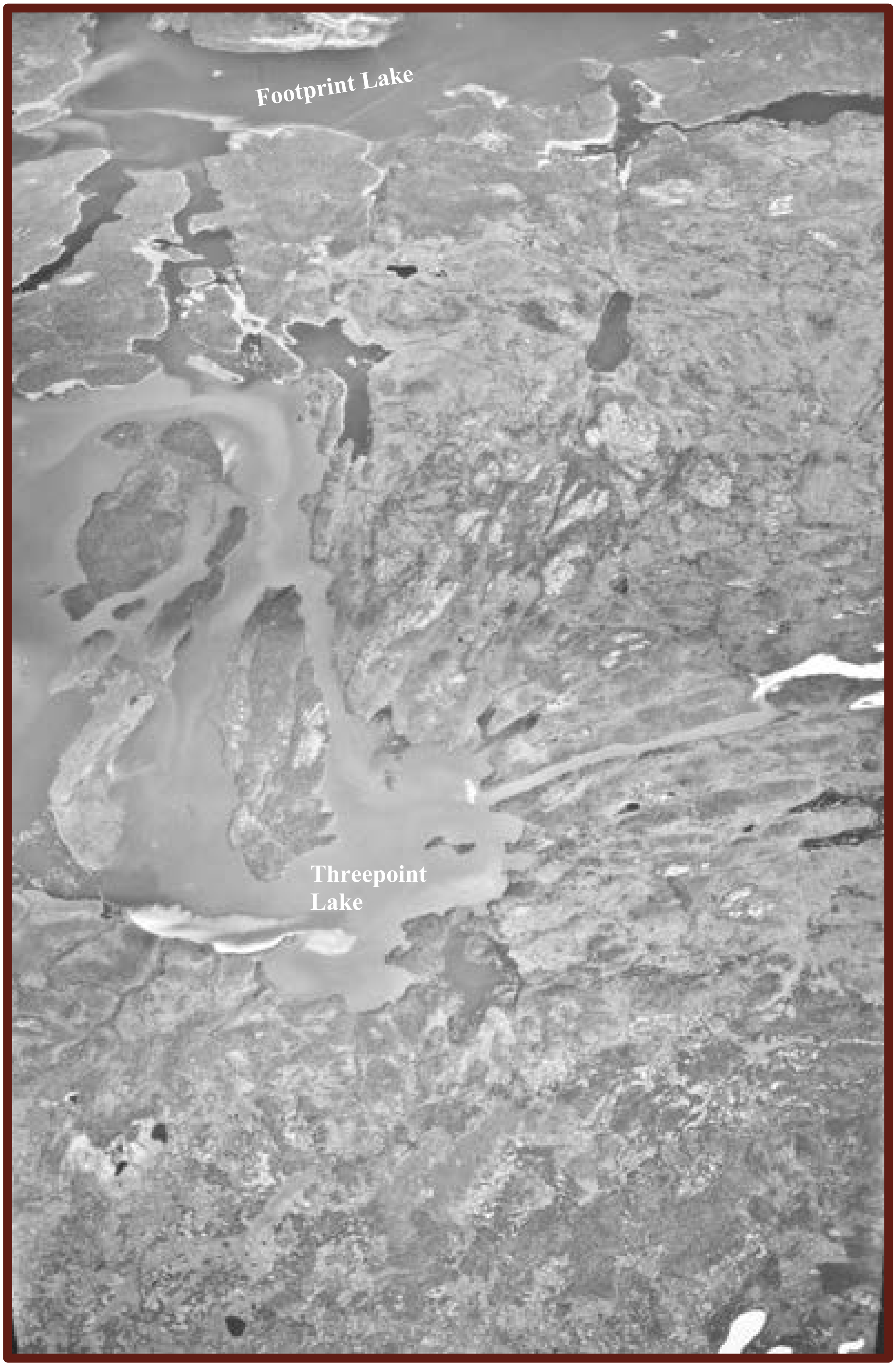


Photo 67: State-of-condition of Footprint and Threepoint Lake in 1978.
(Acquired from NAPL, Roll No: A24996, Photo Nos: 0162, 0164)

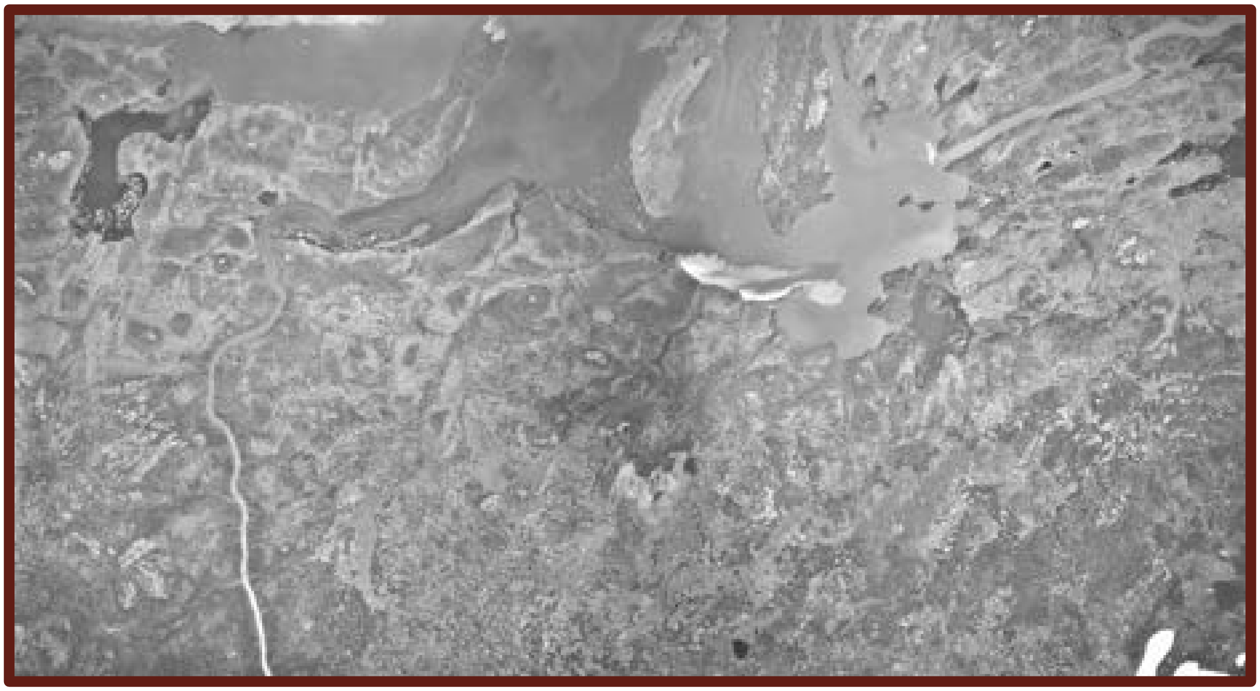


Photo 68: Southern region of Threepoint Lake in 1978: flooded shorelines and contiguous wetlands.
(Acquired from NAPL, Roll No: A24996, Photo Nos: 0162, 0164)

Photo 69: Aerial view of Threepoint Lake (southern viewpoint), August 2019. (Photo Credit: Victoria Grima)

Photo 70: Aerial view of a section of the channel which connects the lakes of Threepoint and Footprint – flooded shoreline, August 2019. (Photo Credit: Victoria Grima)

Photo 71: Aerial view of the area that once hosted the topography of *otohowihnihk* – which accommodated one of the oldest basecamps, August 2019. (Photo Credit: Victoria Grima)

Photo 72: Aerial view of Threepoint Lake and the channel which connects it with Footprint Lake, August 2019. (Photo Credit: Victoria Grima)

Photo 73: Aerial view of Threepoint Lake, August 2019. (Photo Credit: Victoria Grima)

Photo 74: Aerial view of the channel which leads the flow towards
the submerged God Rapids, August 2019 (Photo Credit: Victoria Grima)

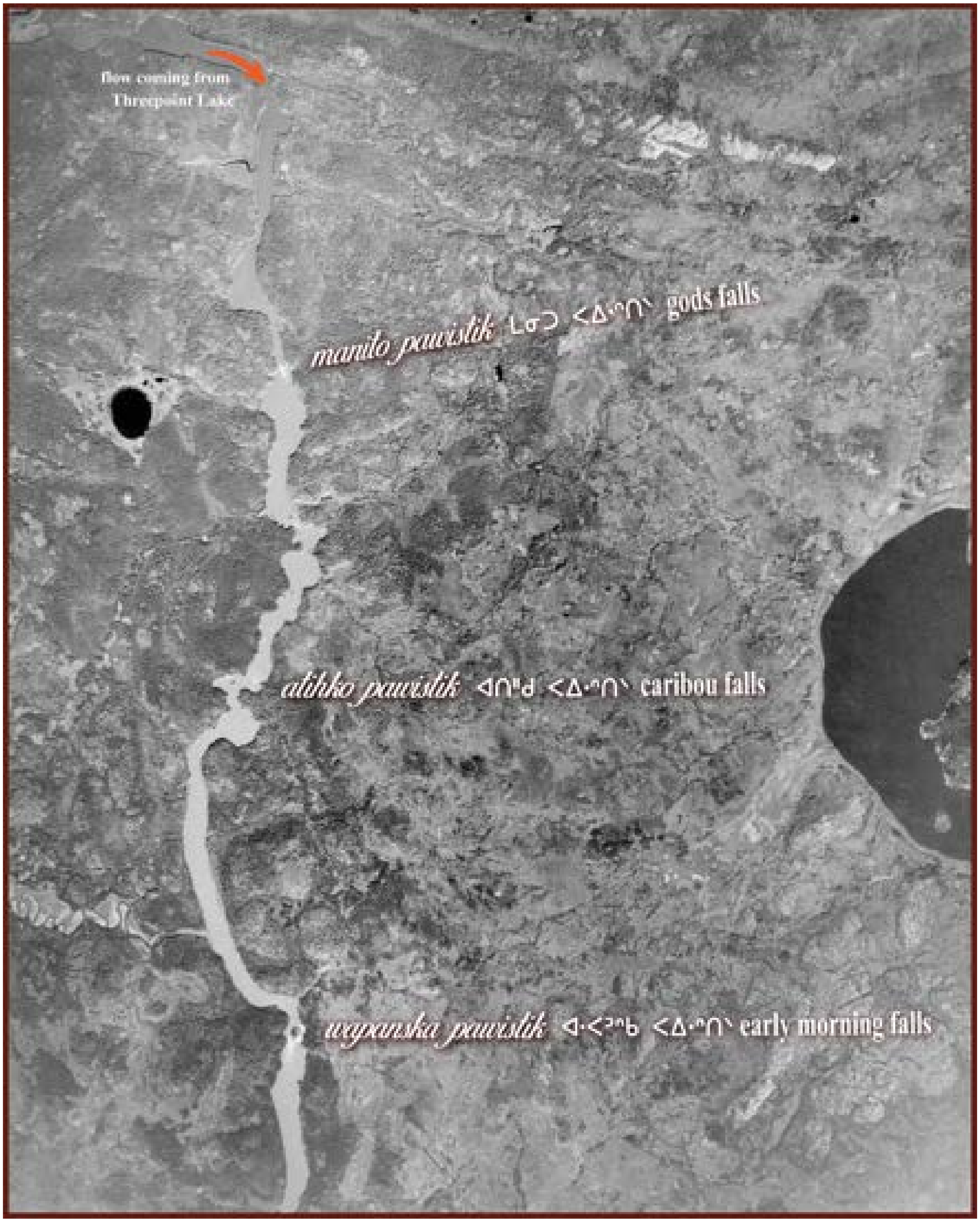


Photo 75: The branch that connects Threepoint Lake with Wuskwatim Lake in 1950.
(Acquired from NAPL, Roll No: A12942, Photo Nos: 0054)

Photo 76: The branch that connects Threepoint Lake with Wuskwatim Lake in 1978. It was observed that the islands which once characterised the falls of caribou and early morning were completely submerged due to the operations of Notigi CS. (Acquired from NAPL, Roll No: A24936, Photo Nos: 0165)

Photo 77: Aerial view of the currents occurring at the submerged Gods Rapids, August 2019. (Photo Credit: Victoria Grima)

Photo 78: Aerial view of the remnants of Caribou Rapids, August 2019. (Photo Credit: Victoria Grima)

Photo 79: Aerial view of that section of the channel which once accommodated Caribou Rapids, August 2019.
(Photo Credit: Victoria Grima)

Photo 80: Aerial view of the currents occurring at the submerged Early Morning Rapids, August 2019.
(Photo Credit: Victoria Grima)

Photo 81: Aerial view of the shorelines of the channel south of the submerged Early Morning Rapids, August 2019.
(Photo Credit: Victoria Grima)

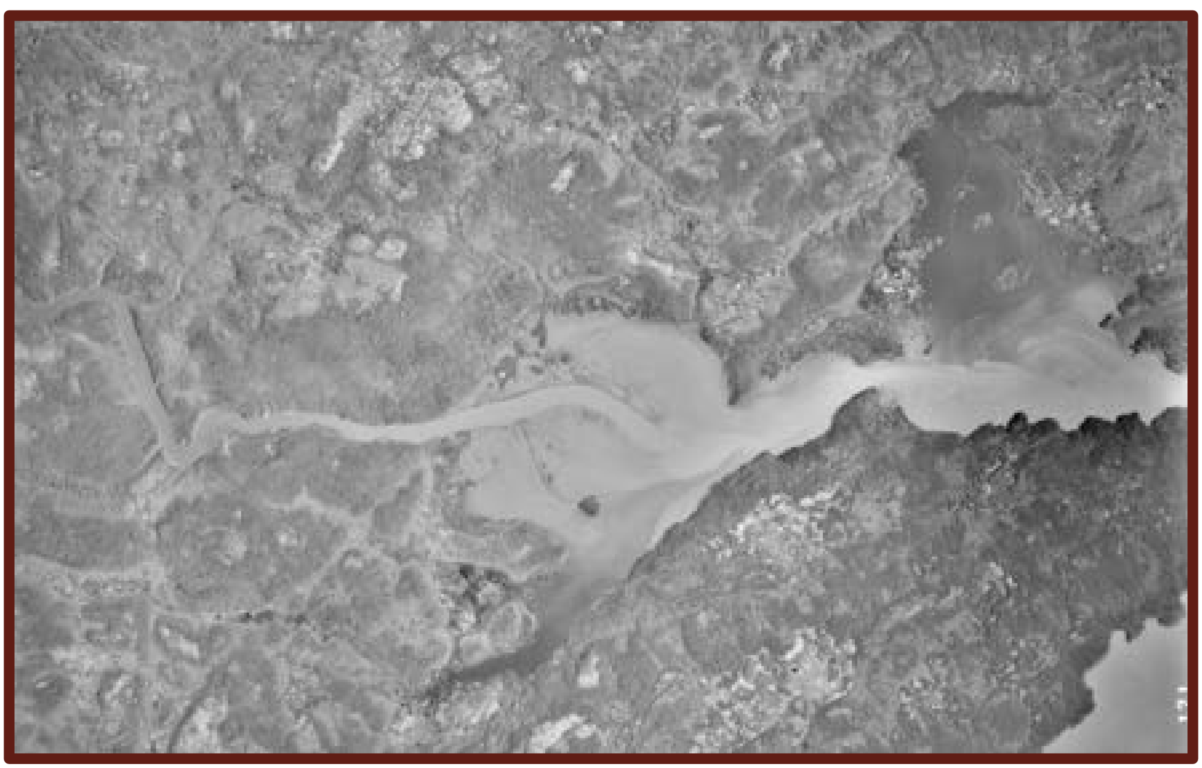


Photo 82: 1978 aerial view of the flooded channel and its surrounding wetlands, north to the entrance into Wuskwatim Lake.
(Acquired from NAPL, Roll No: A24936, Photo Nos: 0171)

Photo 83: Aerial view of the flooded channel and its surrounding wetlands, August 2019 – in the background floating debris and islands (Photo Credit: Victoria Grima)

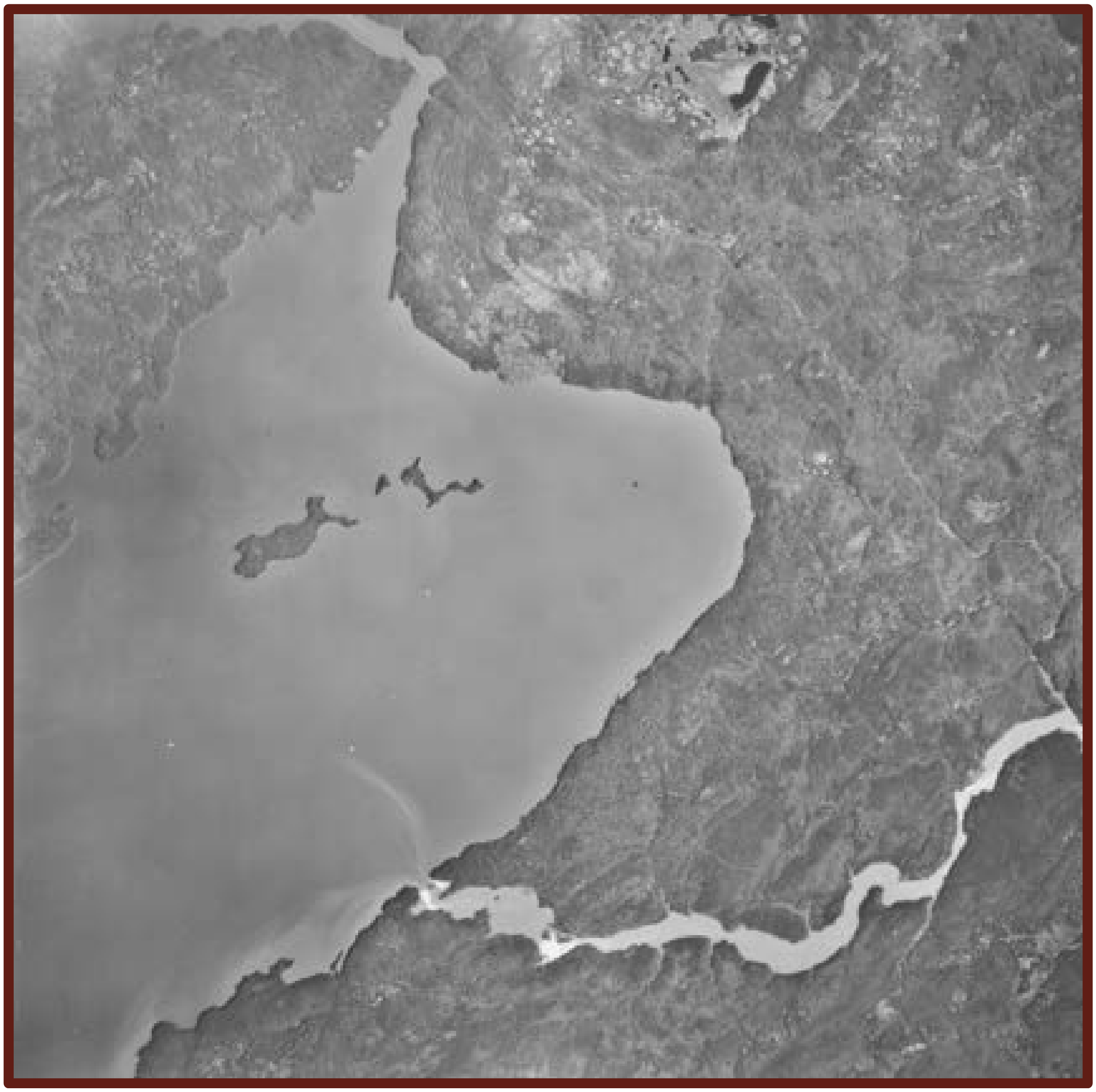


Photo 84: 1978 aerial view of Wuskwatim Lake.
(Acquired from NAPL, Roll No: A24936, Photo Nos: 0214)

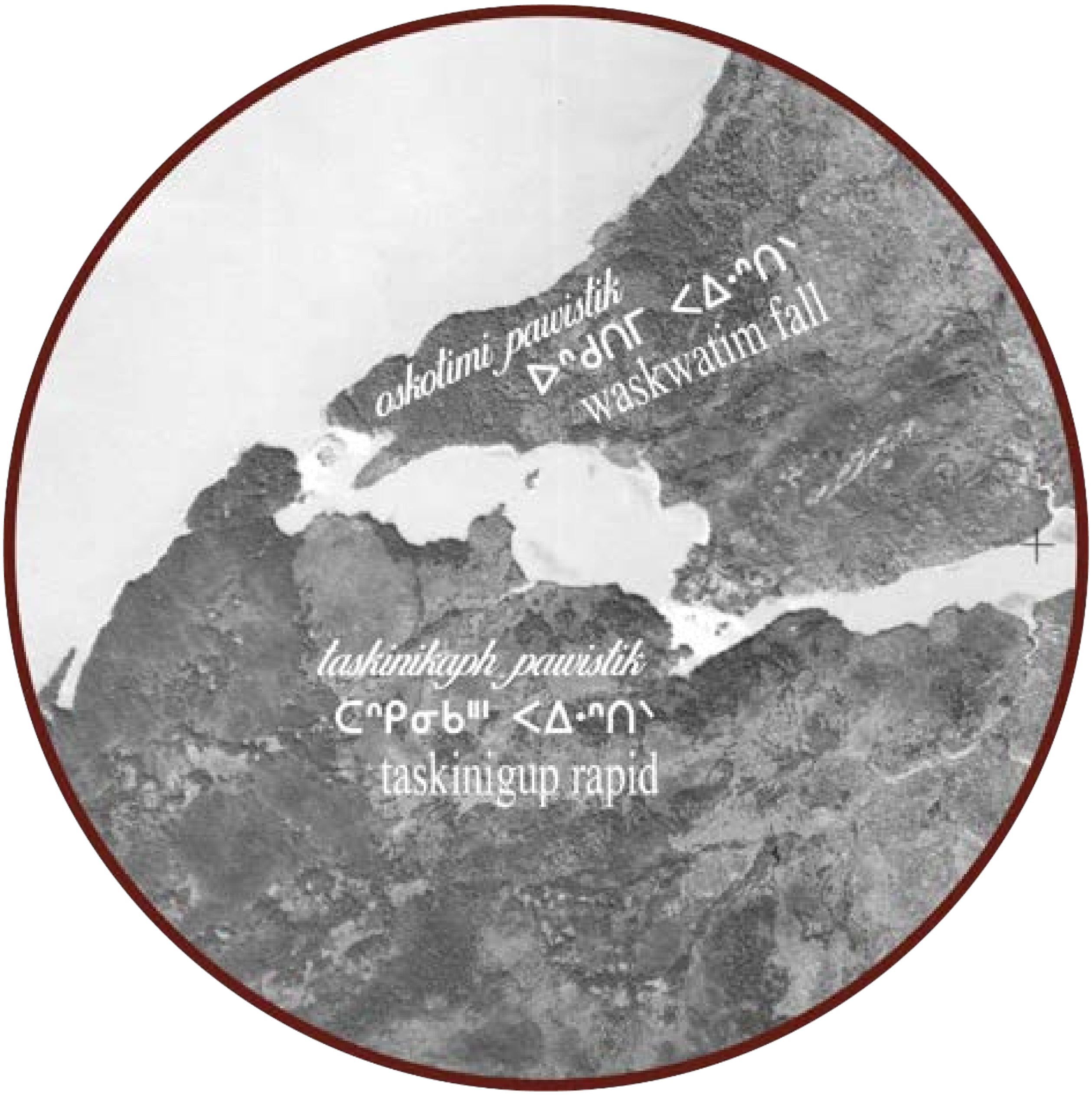


Photo 85: The outlet of Wuskwatim Lake in 1950.
(Acquired from NAPL, Roll No: A12946, Photo Nos: 0062)

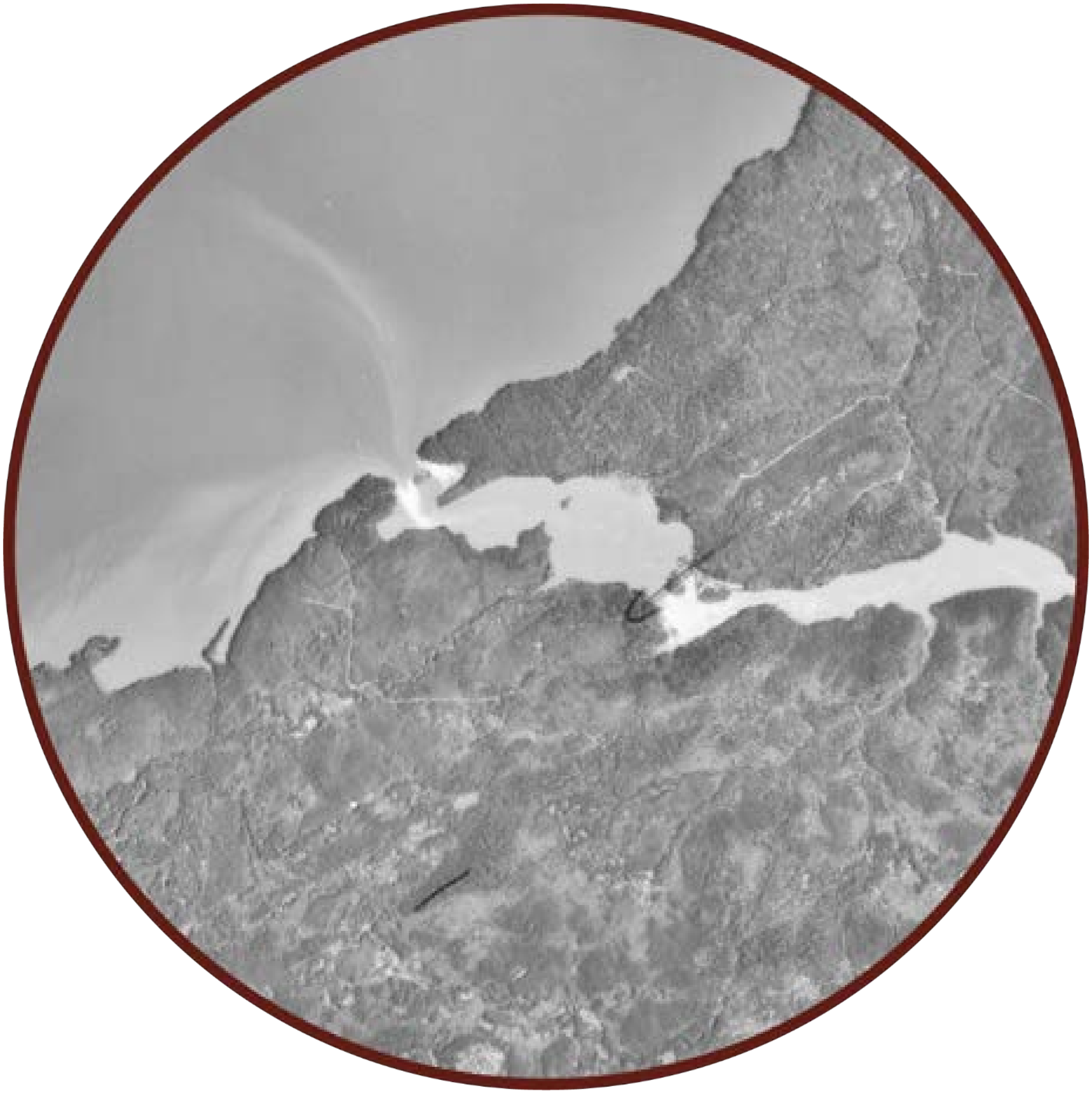


Photo 86: The outlet of Wuskwatim Lake in 1978. Observed high water level conditions since both falls and shorelines are inundated. Notwithstanding this, the undercurrents of the falls still dominate the flow.
(Acquired from NAPL, Roll No: A24936, Photo Nos: 0215)

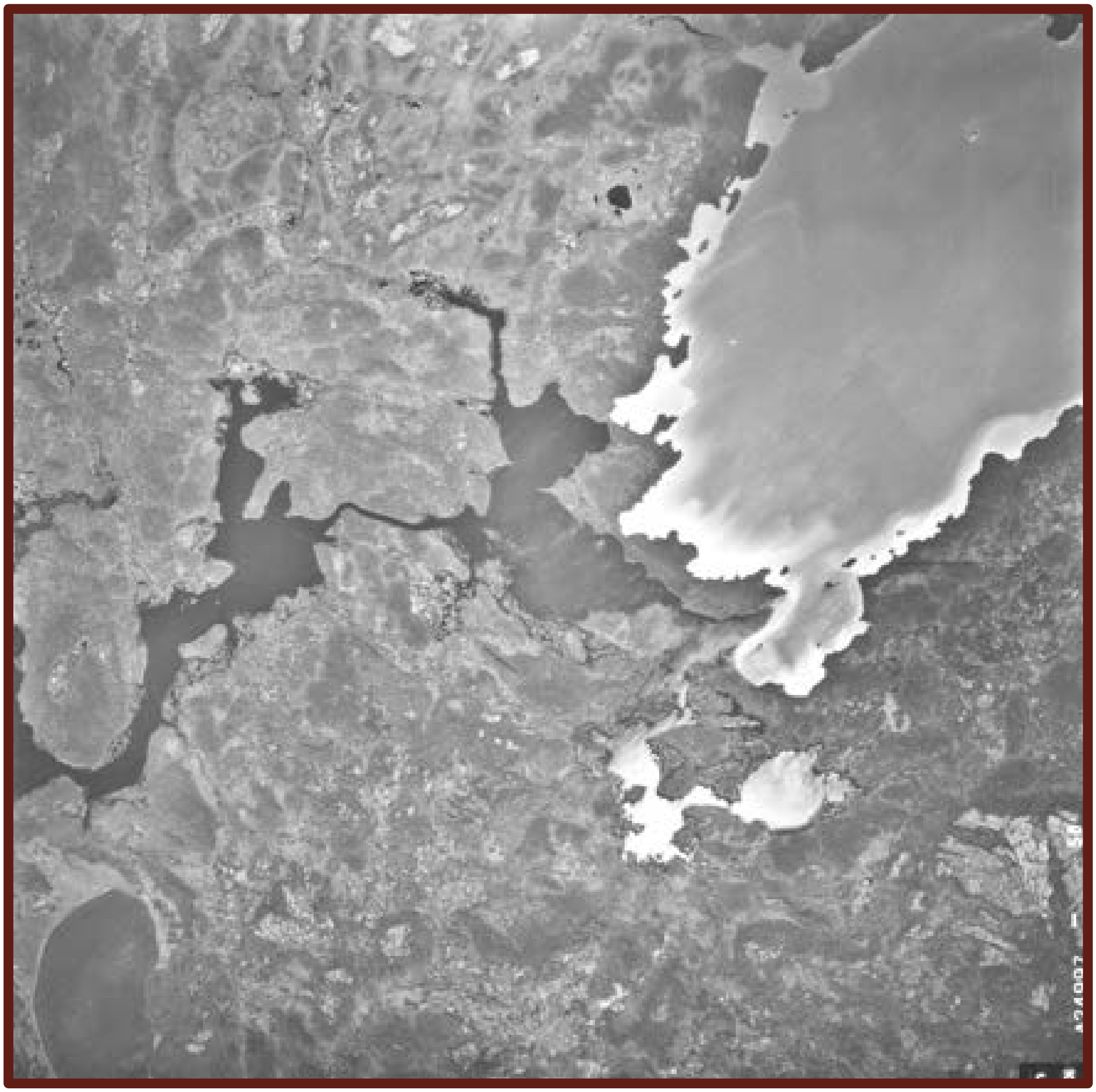


Photo 87: 1978 aerial view of Wuskwatim Lake: flooded shoreline vegetation and flood dispersed into the contiguous creeks. (Acquired from NAPL, Roll No: A24997, Photo Nos: 0058)

Photo 88: Aerial view of Wuskwatim Lake, September 2018 – in the background one of the larger islands separated into smaller distinct islands. (Photo Credit: Victoria Grima)

Photo 89: Aerial view of Wuskwatim Lake, September 2018 – floating islands within its western region. (Photo Credit: Victoria Grima)

Photo 90: Aerial view of Wuskwatim Lake, September 2018 – flooded and eroding shorelines. (Photo Credit: Victoria Grima)

Photo 91: Aerial view of Wuskwatim Lake, September 2018 –
eroding shorelines and accumulation of debris.
(Photo Credit: Victoria Grima)

Photo 92: Aerial view of Wuskwatim Lake, September 2018 – flooded and eroding shorelines. (Photo Credit: Victoria Grima)

Photo 93: Aerial view of Wuskwatim Lake, September 2018 –
flooded and eroding shorelines and accumulation of debris.
(Photo Credit: Victoria Grima)

Photo 94: Aerial view of Wuskwatim Lake, September 2018 – the passing of an island within the lake, tips of the submerged trees still visible. (Photo Credit: Victoria Grima)

Photo 95: Aerial view of Wuskwatim Lake, August 2019 – eroding and flooded islands. (Photo Credit: Victoria Grima)

Photo 96: Aerial view of Wuskwatim Hydro-electric Generating Station, September 2018. (Photo Credit: Victoria Grima)

Photo 97: Aerial view of the submerged Wuskwatim fall at the outlet of the lake, August 2019. (Photo Credit: Victoria Grima)

Photo 98: Aerial view of Wuskwatim Lake in relation to the hydro-electric generating station, September 2018. (Photo Credit: Victoria Grima)

Photo 99 An aerial view of Opegano Lake, September 2018. (Photo Credit: Victoria Grima)

Photo 100: An aerial view of Jackpine Falls, located within the lower branch of the Burntwood River and south of Opegano Lake, September 2018. (Photo Credit: Victoria Grima)

Photo 101: An aerial view of the flooded Upper Kepuche Rapids, located within the lower branch of the Burntwood River and south of Opegano Lake, September 2018. (Photo Credit: Victoria Grima)

Photo 102: An aerial view of currents generated by the flooded Kepuche Falls, located within the lower branch of the Burntwood River and south of Opegano Lake, September 2018. (Photo Credit: Victoria Grima)

Photo 103 An aerial view of currents generated by the flooded Kepuche Falls, August 2019. (Photo Credit: Victoria Grima)

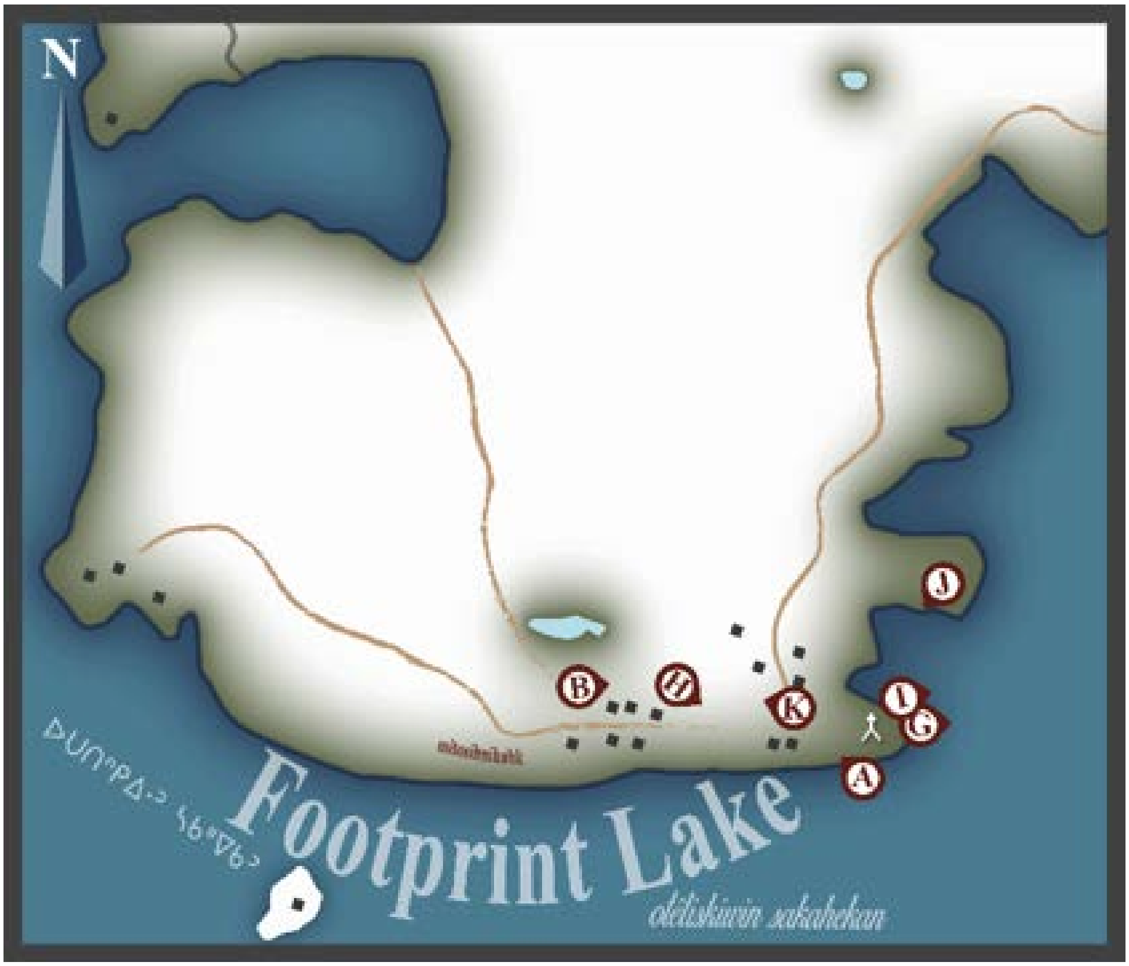
Photo 104: A 1950 aerial view of the landscape that surrounded Manasan Falls. (Acquired from NAPL, Roll No: A12942, Photo Nos: 0198)

Photo 105: An aerial view of the reengineered Manasan Falls, location on the lower branch of the Burntwood River, August 2019. (Photo Credit: Victoria Grima)

Appendix E: *Collection of Historical Photos of Nisicawayāsihk, Nelson House Cree Nation*

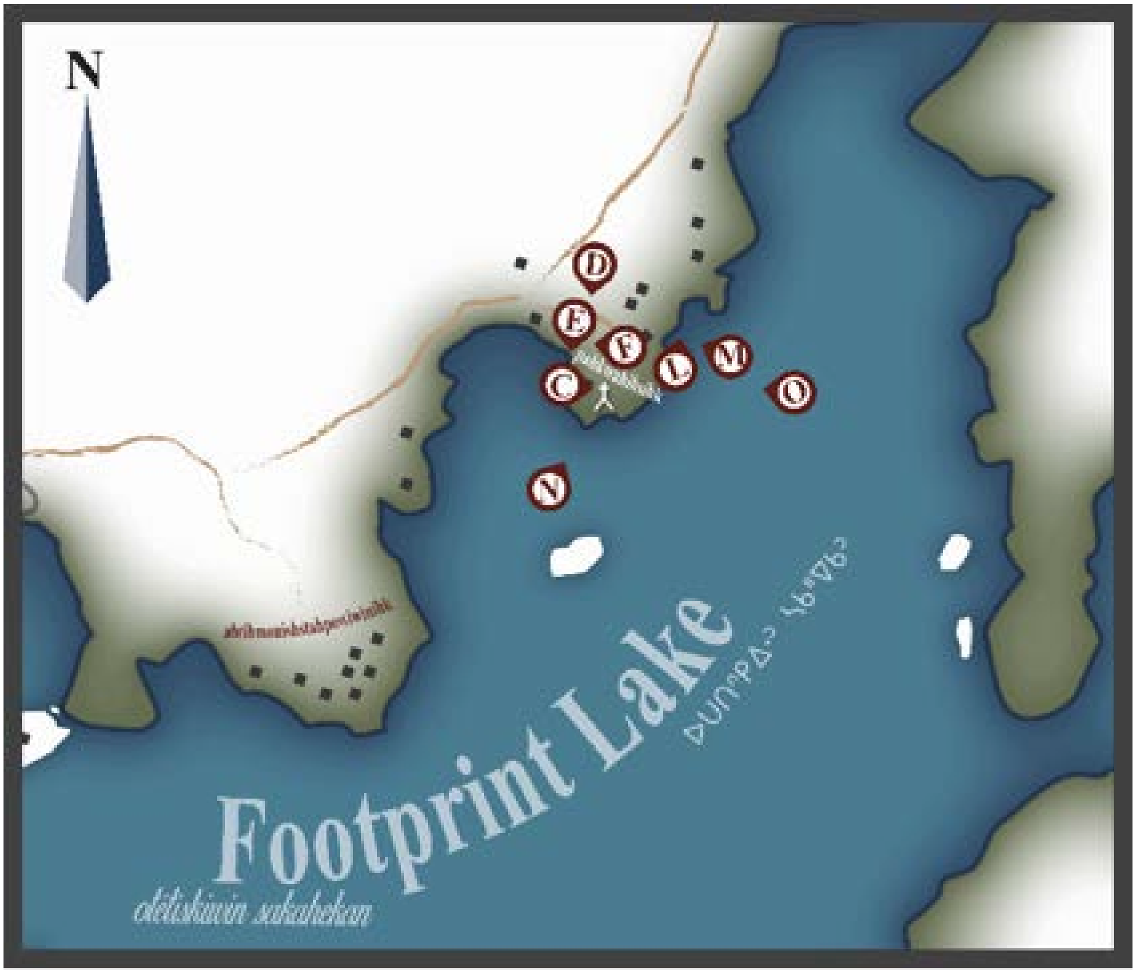
→ *From the Roman Catholic Archiepiscopal Society of Keewatin, the Pas Collection, at the Centre du Patrimoine Saint-Boniface Society*[1]*, Winnipeg, Manitoba:*

- The approximate geolocation of the photos was facilitated by the Elders of *Nisicawayāsihk*.



Viewing point of the photos along the shores of Footprint Lake – the present location of the established community.
(Source: The shorelines of Footprint Lake were graphically designed from NTS Sheet No: 63-O/15, Ed. 1, 1972)

[1] Retrieved from Société Historique de Saint-Boniface online photographic digital archive, URL: https://shsb.mb.ca/?lang=en



Viewing point of the photos of the eastern shoreline of Footprint Lake.
(Source: The shorelines of Footprint Lake were graphically designed from NTS Sheet No: 63-O/15, Ed. 1, 1972)

Viewing point, A: During a pastoral visit, people gathering at the shoreline watching the arrival of the waterplane, 1937.
(Ref. No.: N2236, Fund No.: 0484)

Viewing point, B: *"Pointe des Protestants"* – a view of 'Poplar Point' on Treaty days, July 18-19, 1943.
(Ref. No.: N2507, Fund No.: 0484)

Viewing point, C: Nelson House Roman Catholic Church, September, 1949. (Ref. No.: N2508, Fund No.: 0484)

Viewing point, D: The Roman Catholic Church and the built school, August 1949. (Ref. No.: N2509, Fund No.: 0484)

Viewing point, E: The catholic school, September 1949.
(Ref. No.: N2512, Fund No.: 0484)

Viewing point, F: *"Nelson House Catholic School, May 1954."* (Ref. No.: N2518, Fund No.: 0484)

Viewing point, G: Sports day of 1949? canoe race. (Ref. No.: SHSB 43432, Fund No.: 0484)

Viewing point, H: Sports day of 1949? Men's pack race. (Ref. No.: SHSB 43434, Fund No.: 0484)

Viewing point, I: Sports day of 1949, women's canoe race –
the island in the background has passed away due to the CRD project (dog point). (Ref. No.: SHSB 43435, Fund No.: 0484)

Viewing point, J: Nelson House in summer, 1949? (Ref. No.: SHSB 43436, Fund No.: 0484)

Viewing point, K: *"Camps during Treaty Day, 1949?"* (Ref. No.: SHSB 43437, Fund No.: 0484)

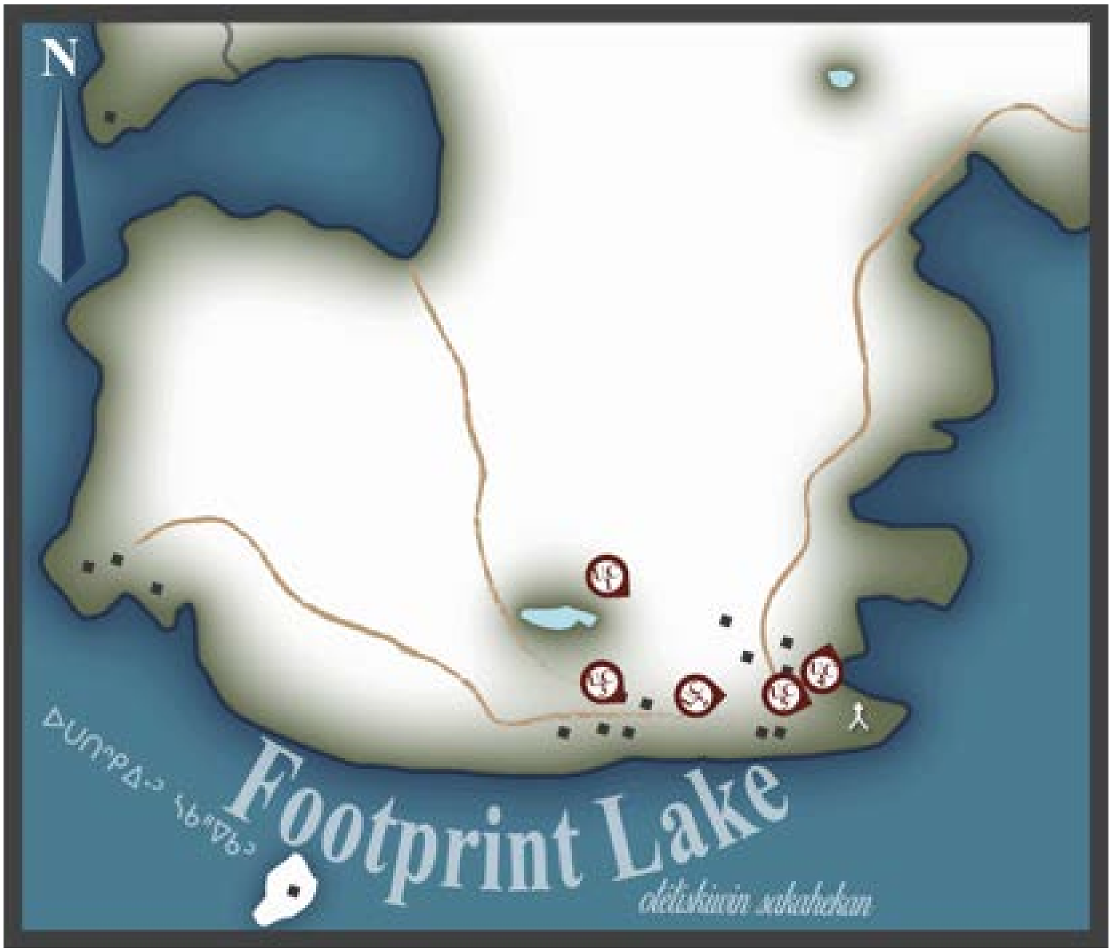
Viewing point, L: Winter 1930, a view of the church built by Bishop Charlebois. (Ref. No.: SHSB 43463, Fund No.: 0484)

Viewing point, M: *"The Church, the rectory, and the school of the Mission Saint-Patrice, between 1928-1929."* (Ref. No.: SHSB 43467, Fund No.: 0484)

Viewing point, N: An undated winter photo of the Roman Catholic Church. (Ref. No.: SHSB 43511, Fund No.: 0484) This church was established in 1930.

Viewing point, O: An undated photo of the Roman Catholic Church. The photo was taken from the lake.
(Ref. No.: SHSB 43520, Fund No.: 0484)

→ *From the United Church of Canada Digital Collections Archives[2]:*



Viewing point of the photos along the shores of Footprint Lake – the present location of the established community.
(Source: The shorelines of Footprint Lake were graphically designed from NTS Sheet No: 63-O/15, Ed. 1, 1972)

[2] Retrieved from URL: http://www.uccdigitalcollections.ca/search?query=Nelson+House

Viewing point, UC1: *"Mission church and manse, 1900?"*
(Col.: Missions to Partnership Photograph Collection, Identifier: 93.049P1660)

Viewing point, UC2: *"Indian tents, 1910?"* (Col.: Missions to Partnership Photograph Collection, Identifier: 93.049P1662)

Viewing point, UC3: ***"****The mission school, 1933."*
(Col.: Missions to Partnership Photograph Collection, Identifier: 93.049P1634)

Viewing point, UC4: *"Looking west from the mission house, 1933."*
(Col.: Missions to Partnership Photograph Collection, Identifier: 93.049P1628)

Viewing point, UC5: "*Close view of church and house, between 1934-1938."*
(Col.: Missions to Partnership Photograph Collection, Identifier: 93.049P1640N)

Appendix F: *20th Century Manitoba's Northern Waterpower capabilities and projects*

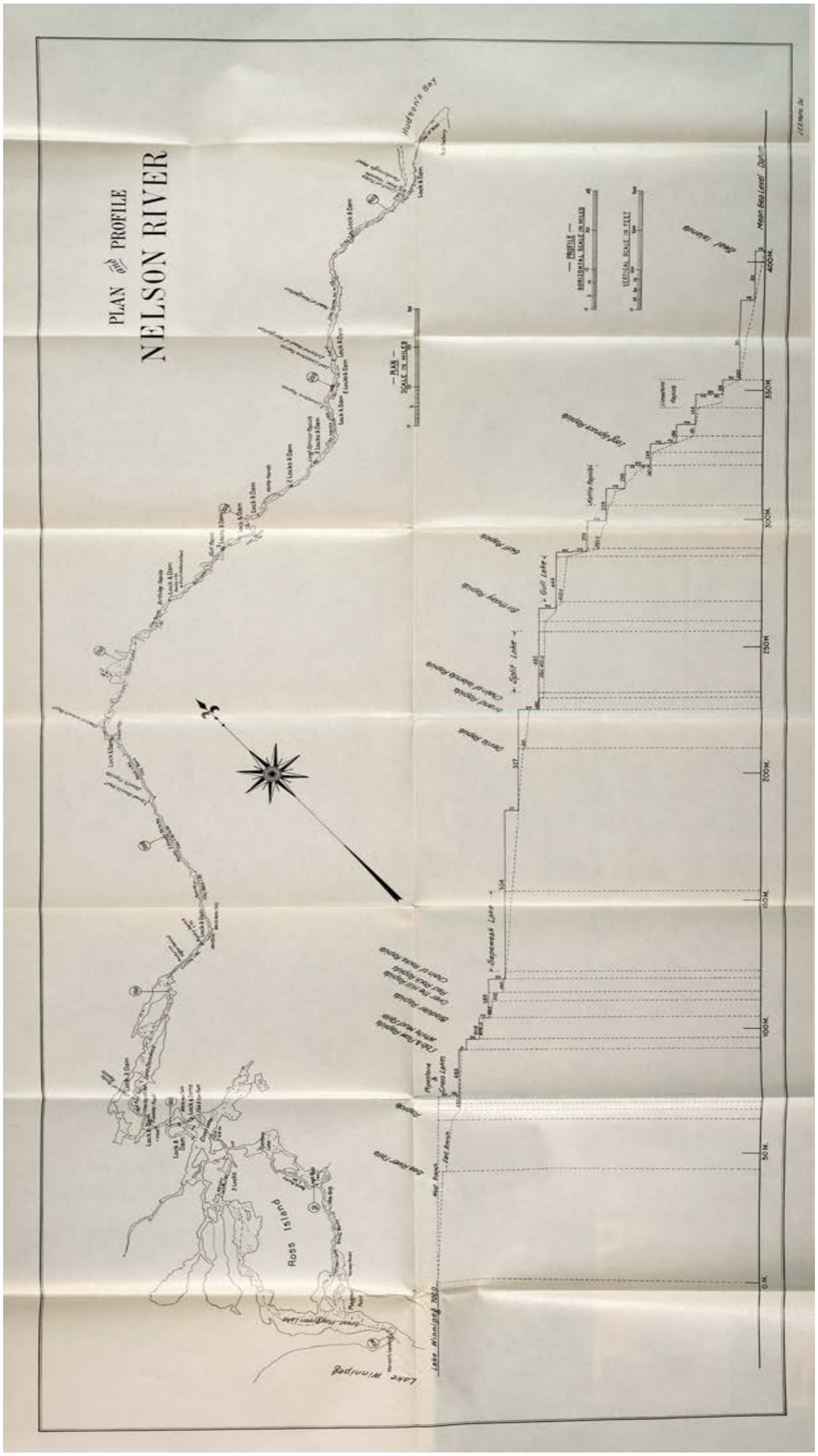
Nelson River		1913 (McInnes, p. 13)		1916 (Challies, p. 227)		1916 (Denis, *et. al*, p. 283)	
Rapids/Falls		Approximate Head in feet	Estimated h.p.	Approximate Head in feet	Estimated h.p.	Approximate Head in feet	Available Theoretical h.p.
Rapids above Cross Lake		45	605,000				
	Whiskey Jack Portage			40	181,150	35	200,000
	Ebb and Flow Rapids	11	148,000	17	77,150	9 1/2	54,000
	Whitemud Falls	30	403,000	30	135,860	30	170,000
	Bladder Rapids	10.6	147,000	20	90,575	11 1/2	65,500
Rapids above Sepewesk Lake	Over-the-hill Rapid	31	416,000			9 1/2	54,000
	Red Rocks					12	68,000
	Chain of Rocks Rapids			35	158,510		
	Devil's Rapids or Manitou Rapids			25	113,220	25	142,000
	Grand Rapids	20	270,000	27	122,530	20	113,500
	Chain-of-Islands Rapid					4 1/2	25,500
	Birthday Rapids or Overfall Rapid	24	320,000	36	163,375	25	144,700
Gull	Fourth Rapids	67	900,000	30	135,860	17	98,500
	Third Rapids			20	90,575	21	121,500
	Second Rapids			21	95,105	20	115,800
	First Rapids			17	77,150	20	115,800
Kettle	Third Rapids	96	1,290,000	40	181,150	17	98,500
	Second Rapids			21.5	97,370	21 1/2	124,500
	First Rapids			17	77,150	40	231,500
Long Spruce	Upper	85	1,140,000	40	181,150	40	231,500
	Lower			52	335,495	52	301,000
Limestone	Upper	85	1,140,000	33	149,450	25	144,700
	Lower			41	185,680	8	46,300
Last Limestone	Fourth Rapids					10	57,900
	Third Rapids					10	57,900
	Second Rapids					15	87,000
	First Rapids					6	34,700

Table 7: Possible sites identified for hydropower development along the perimeter of the Nelson River.

Churchill River	1916 (Denis, *et. al*, p. 287-289)		
	Rapids/Falls	**Approximate Head in feet**	**Available Theoretical h.p.**
Possible Hydropower sites identified within Manitoba	Below South Indian Lake	18	31,000
	Above South Indian Lake	2	3,200
	Leaf Rapids	8	13,000
	Above Leaf Rapids	2	3,200
	Granville Fall	25	38,000
	Above Granville Fall	5	7,600
	Rapid	19	29,000
	Rapid	15	23,000
	Below Pukkatawagan Lake	4	5,600
	Rapid	2	2,800
	Redstone Rapid	15	21,000
	Below Loon River	6	8,500
Possible Hydropower sites identified within Saskatchewan	Two Rapids	7	10,000
	1st rapid above Nemei River	14	19,700
	2nd rapid above Nemei River	11	15,500
	3rd rapid above Nemei River	8	11,200
	4th rapid above Nemei River	11	15,500
	Knife Rapid	11	15,500
	Rapid	8	11,200
	Above Knife Rapid	5	7,000
	Wintego	9	12,700
	1st rapid above Wintego	3	4,200
	2nd rapid above Wintego	25	35,000
	3rd rapid above Wintego	9	12,700
	4th rapid above Wintego	4	5,600
	Atik Rapid	15	21,000
	Kettle Fall	17	14,000
	Grand Rapid	16	13,000
	Keg Rapid	7	5,700
	Island Rapid	9	7,300
	Pine Rapid	7	5,700
	Grave Rapid	4	4,600
	Otter Fall	20	14,500
	Birch Fall	8	5,500
	Above Black Bear Island Lake	6	4,100
	Lower Needle fall	4	2,500
	Pelican rapid	8	4,300
	Rapids above Mujatik River	19	8,800

Table 8: Possible sites identified for hydropower development along the perimeter of the Churchill River.

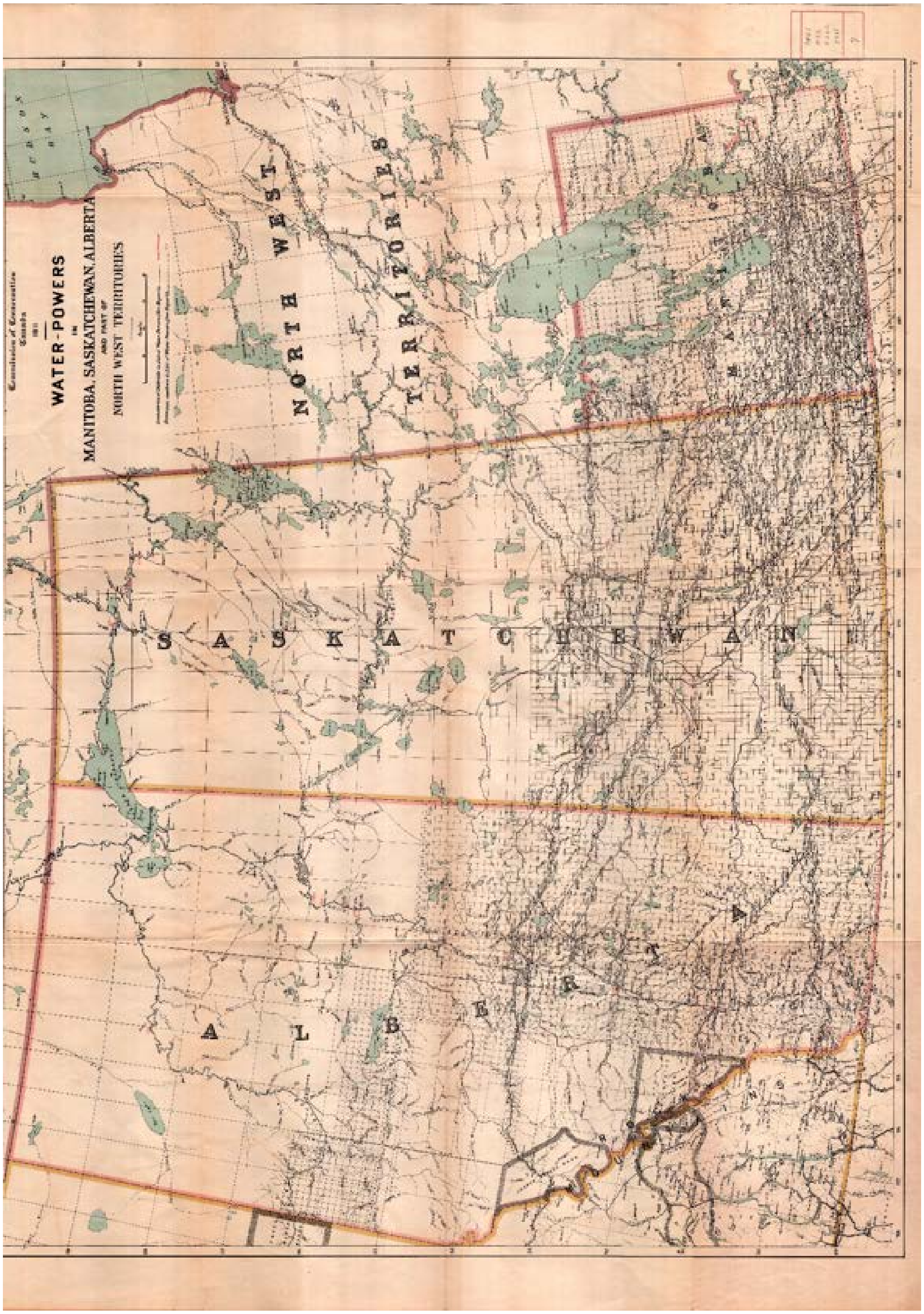
Department of Public Works, 1909



Canada Dept. of Public Works. (1909) *Plan and Profile of Nelson River.* [Ottawa] [Map] Sessional Paper #35a, Vol. 44, Issue 05. Related with the Report Upon Reconnaissance Survey September-October. Retrieved from University of Toronto Map Digital Collection, URL https://maps.library.utoronto.ca/datapub/digital/sess_papers/

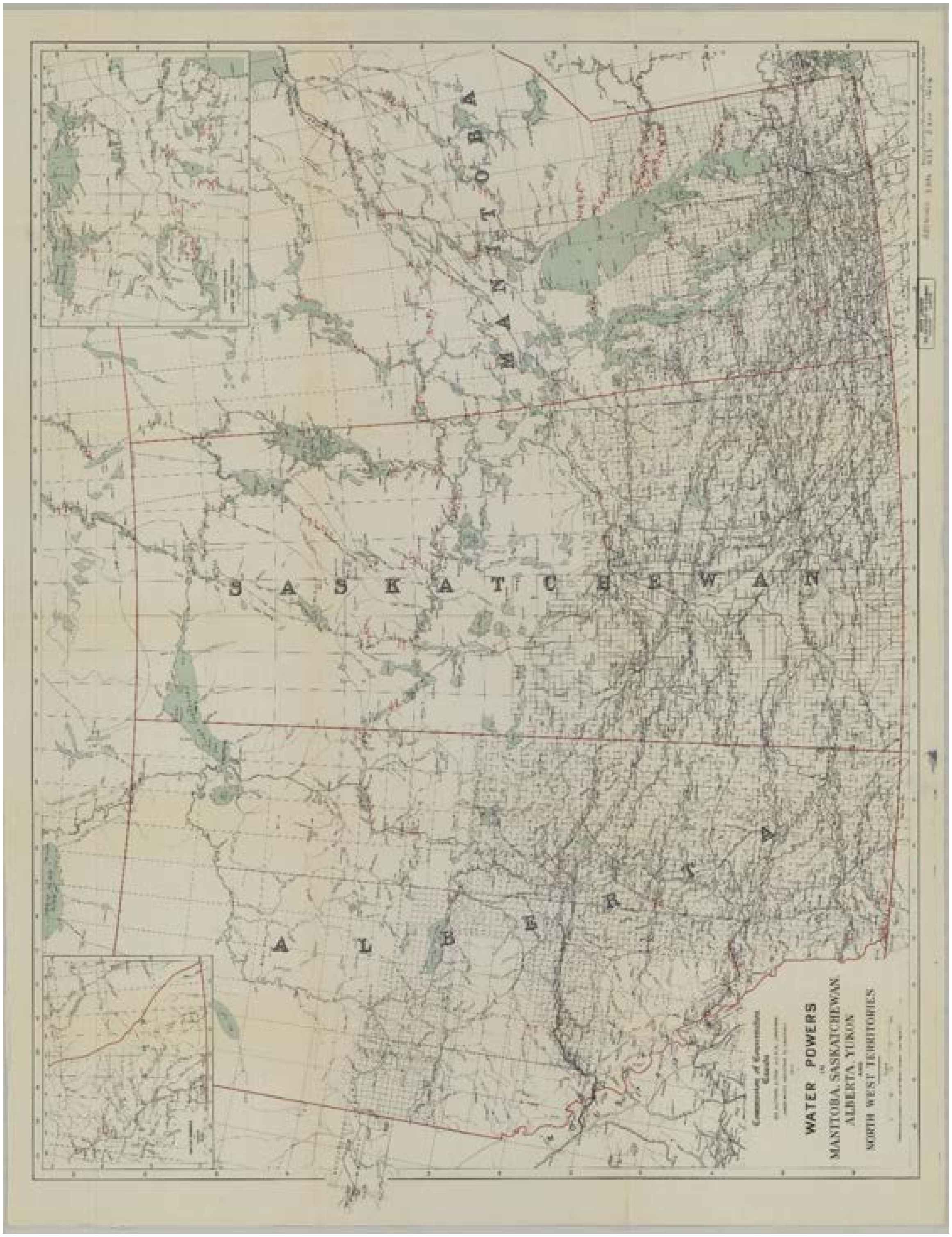
Water Powers

- ***1911***



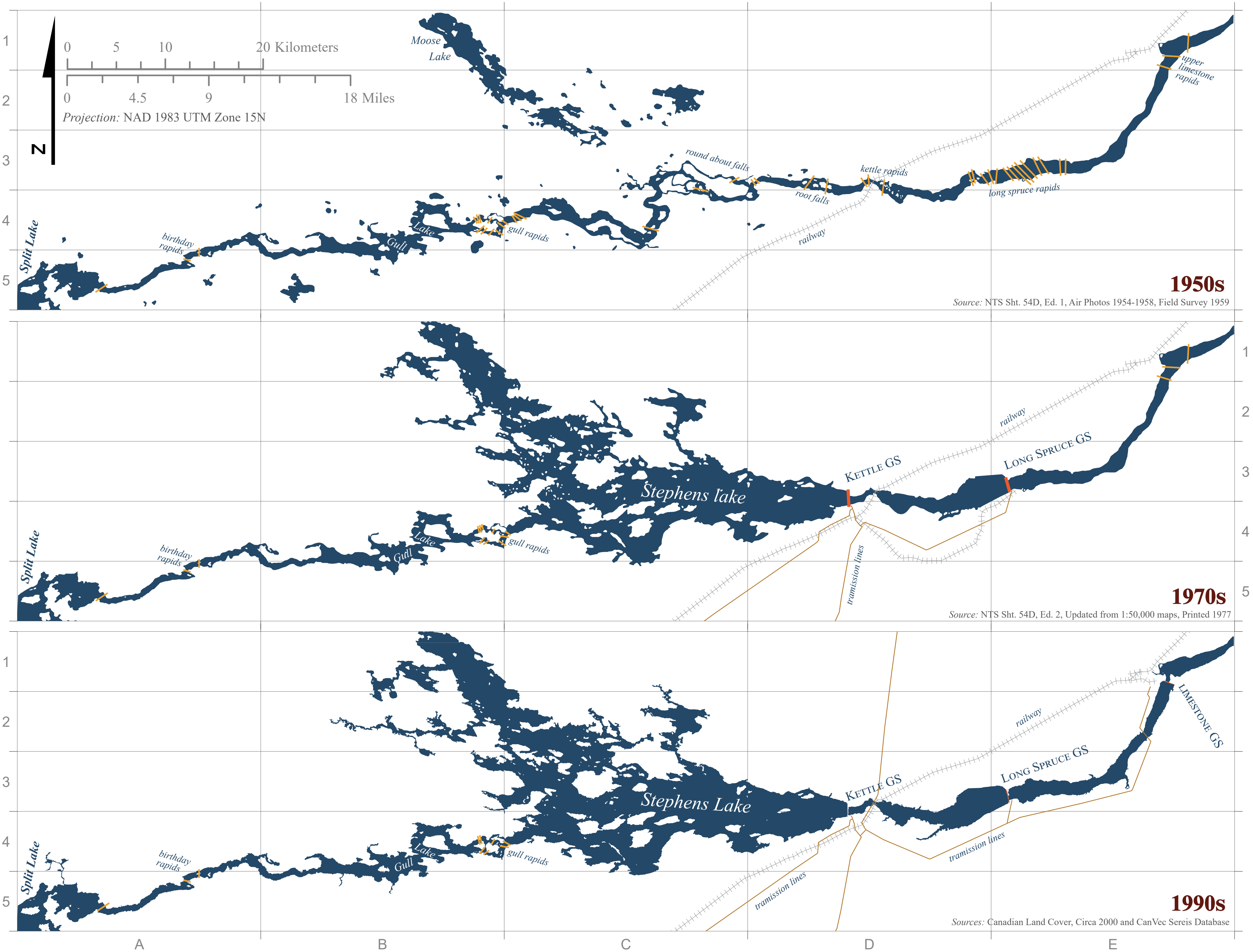
Commission of Conservation Canada. (1911) *Water Powers in Manitoba, Saskatchewan, Alberta, and Part of North West Territories.* [Ottawa: Ottawa Commission of Conservation] [Map] Call Number: G3401 .N33 1100- 2250 1911. Retrieved from Map Digital Collection University of Toronto, URL https://collections.library.utoronto.ca/view/mdl:G3401_N33_1100-2250_1911

- ***1915***

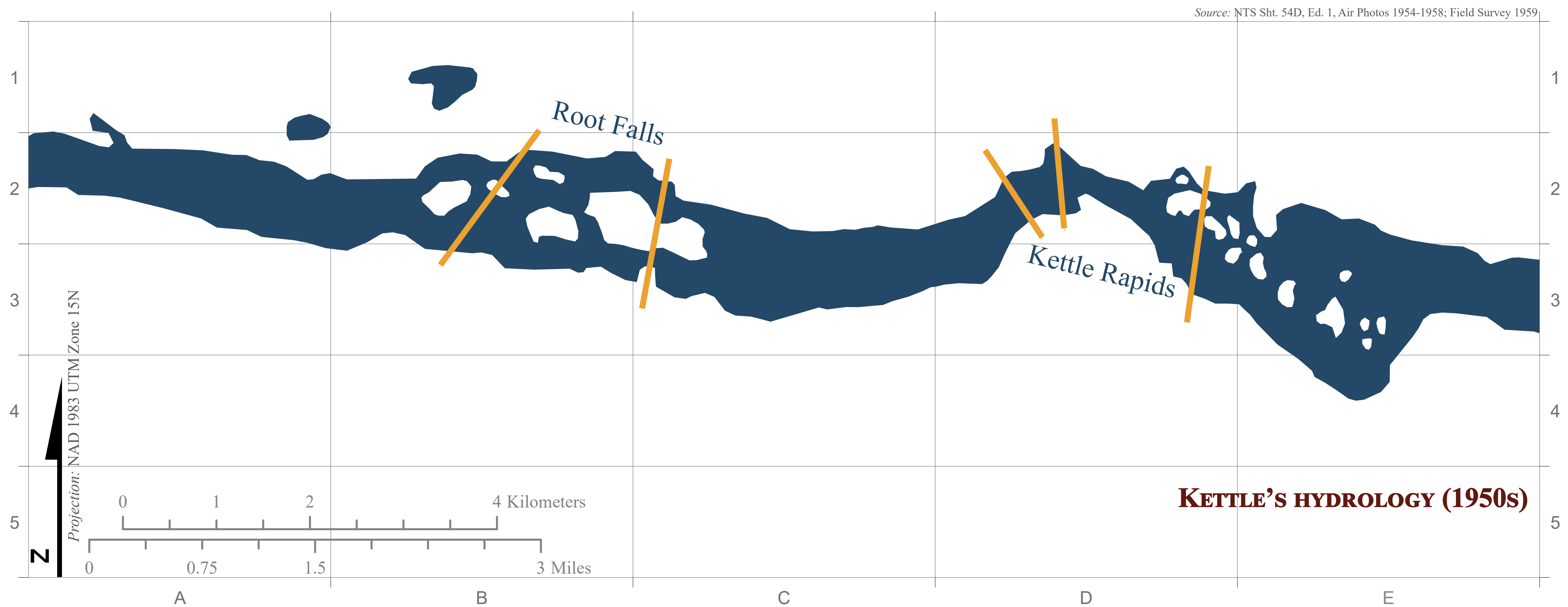


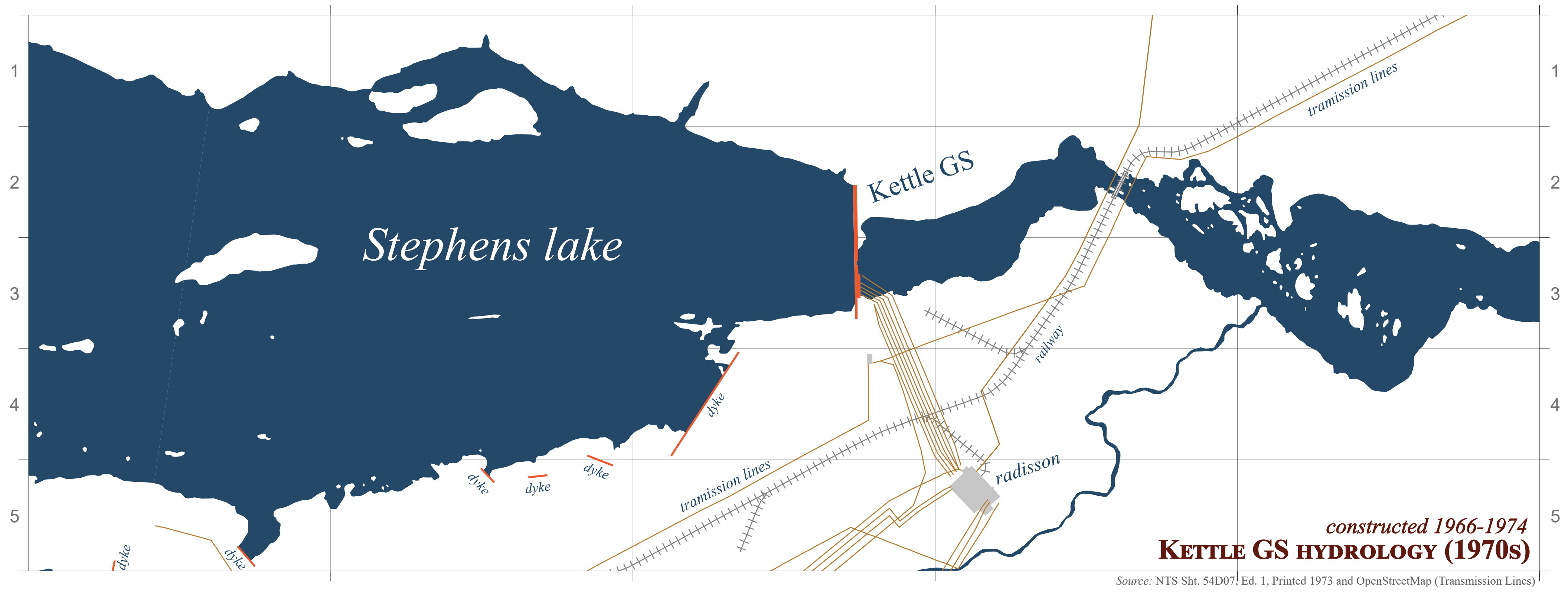
Commission of Conservation Canada. (1915) *Water Powers in Manitoba, Saskatchewan, Alberta, Yukon and North West Territories.* [Ottawa: Ottawa Commission of Conservation] [Map] Unique identifier: CU14089543, Call Number: G3536.N33 2,200 1915. Retrieved from Map Digital Collection University of Calgary,
URL https://digitalcollections.ucalgary.ca/CS.aspx?VP3=DamView&DocRID=2R3BF1F3B5WO7&RW=1920&RH=969

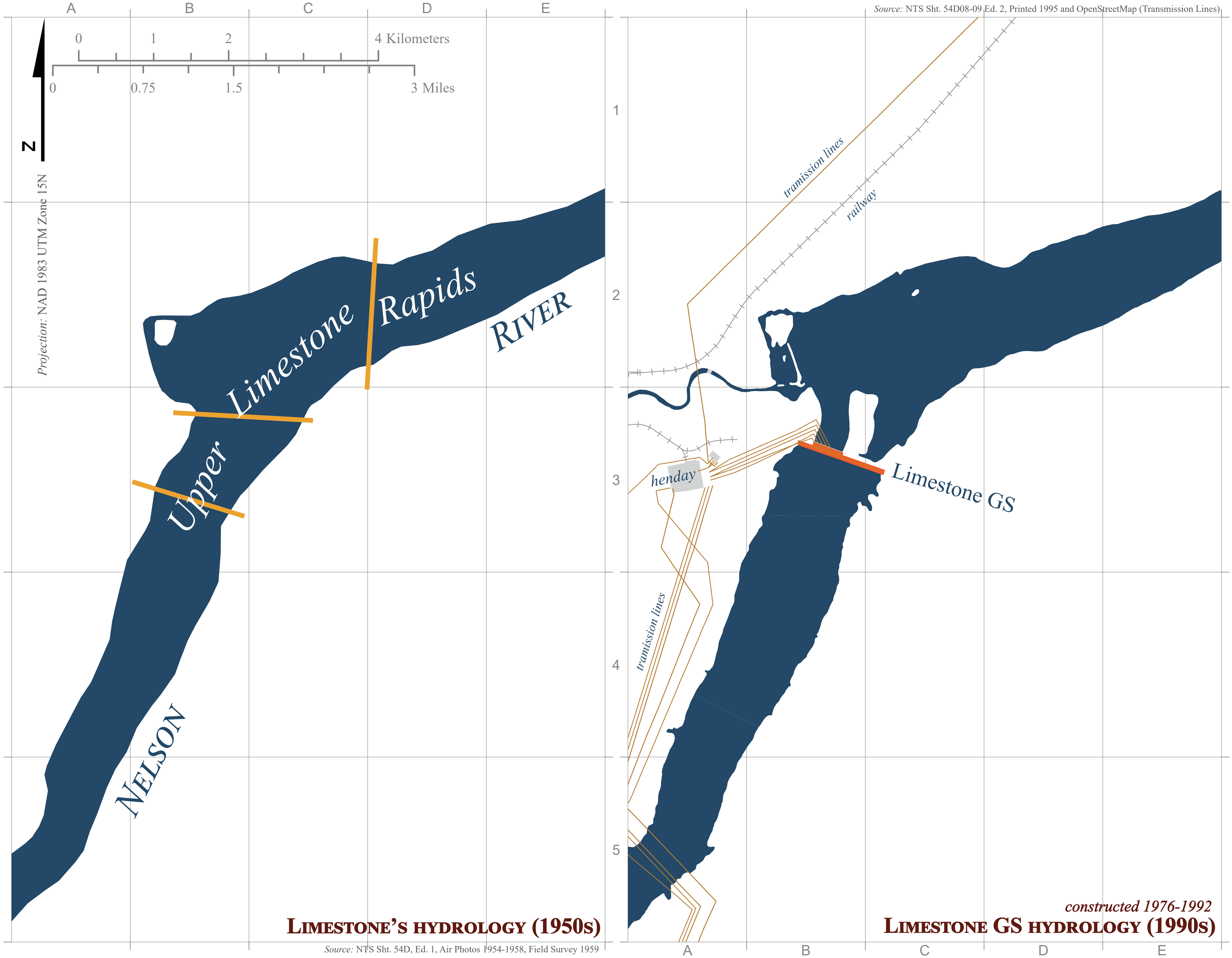
Appendix G: *Nelson River Changes*

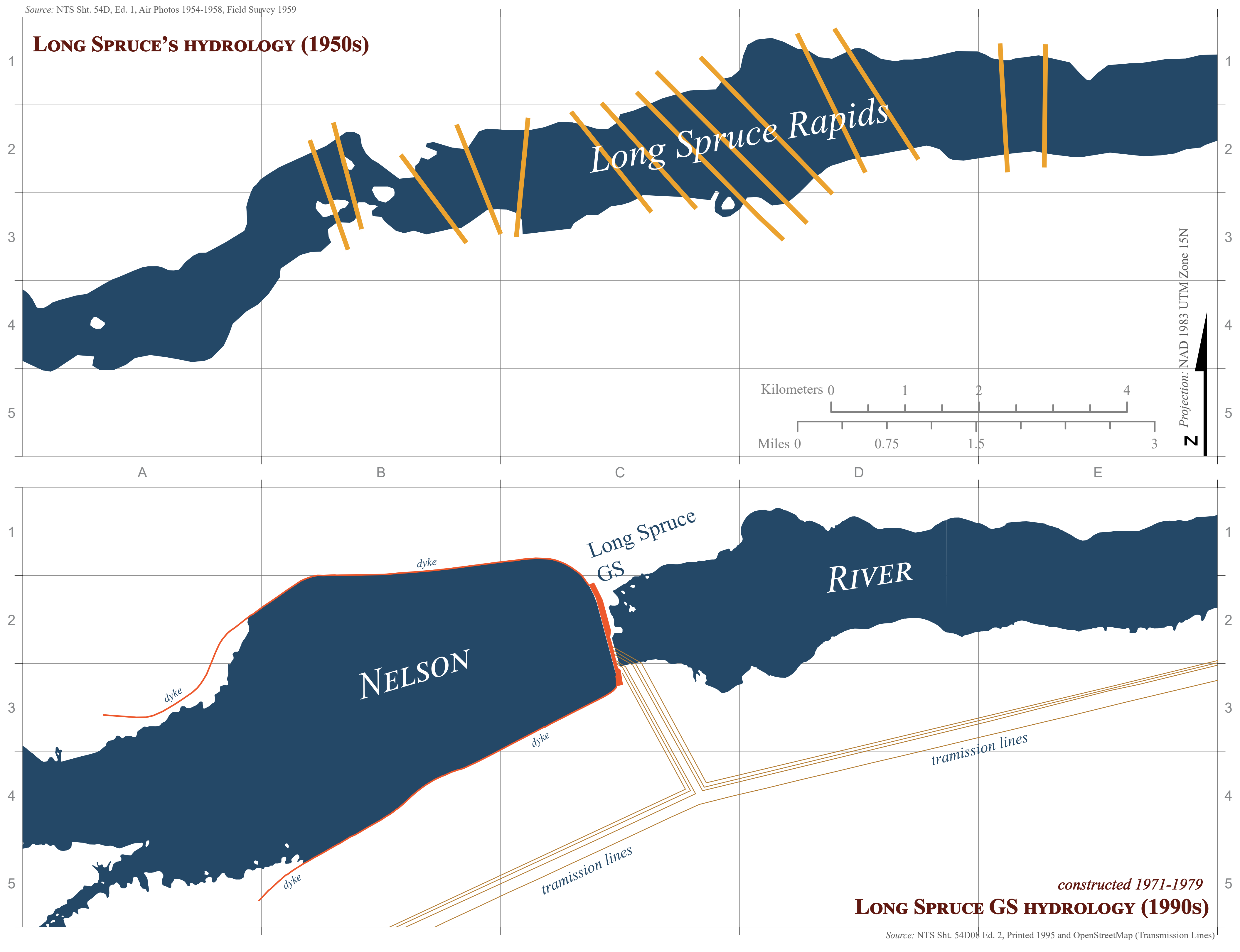


0 5 10 20 Kilometers
0 4.5 9 18 Miles
Projection: NAD 1983 UTM Zone 15N
N
Moose Lake
Split Lake
birthday rapids
Gull Lake
gull rapids
round about falls
root falls
kettle rapids
long spruce rapids
upper limestone rapids
railway
1950s
Source: NTS Sht. 54D, Ed. 1, Air Photos 1954-1958, Field Survey 1959
Stephens lake
Kettle GS
Long Spruce GS
tramission lines
1970s
Source: NTS Sht. 54D, Ed. 2, Updated from 1:50,000 maps, Printed 1977
Stephens Lake
Limestone GS
1990s
Sources: Canadian Land Cover, Circa 2000 and CanVec Sereis Database
A B C D E
1 2 3 4 5


Source: NTS Sht. 54D, Ed. 1, Air Photos 1954-1958; Field Survey 1959
Root Falls
Kettle Rapids
Projection: NAD 1983 UTM Zone 15N
N
0 1 2 4 Kilometers
0 0.75 1.5 3 Miles
KETTLE'S HYDROLOGY (1950s)
A
B
C
D
E
1
2
3
4
5

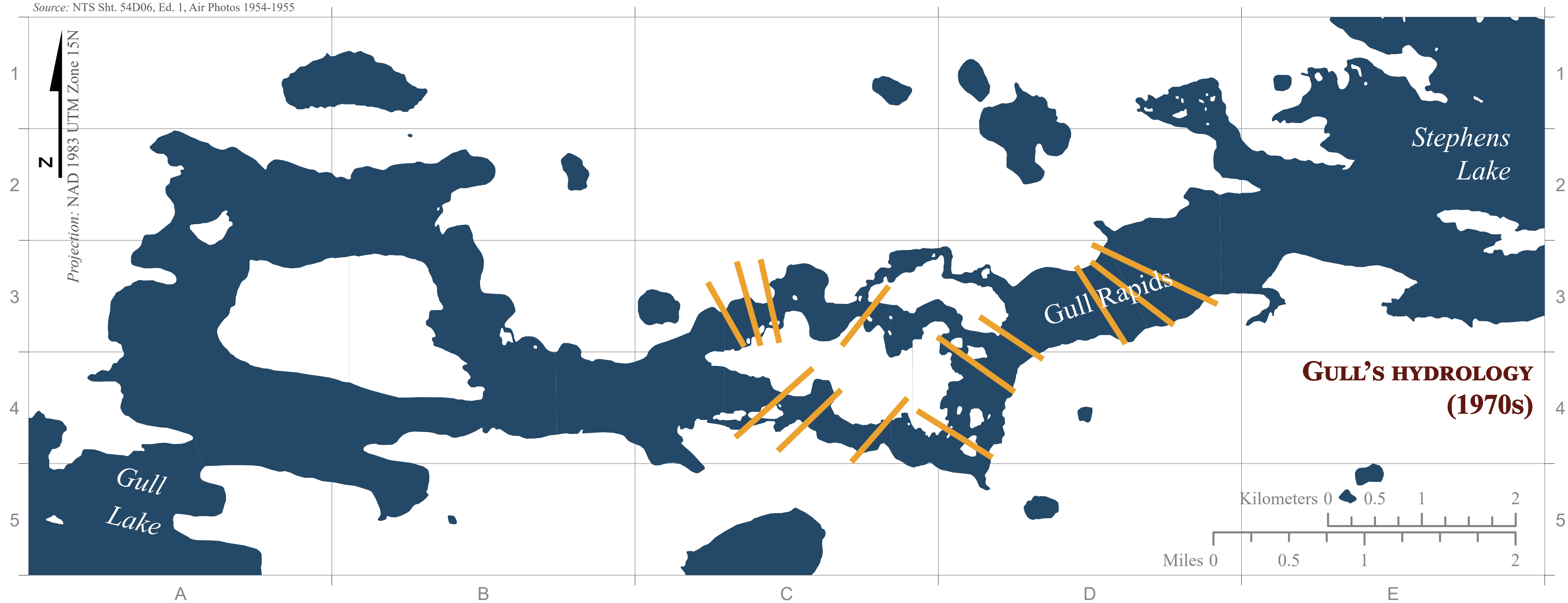

Kettle GS
Stephens lake
tramission lines
railway
dyke
radisson
constructed 1966-1974
KETTLE GS HYDROLOGY (1970s)
Source: NTS Sht. 54D07, Ed. 1, Printed 1973 and OpenStreetMap (Transmission Lines)

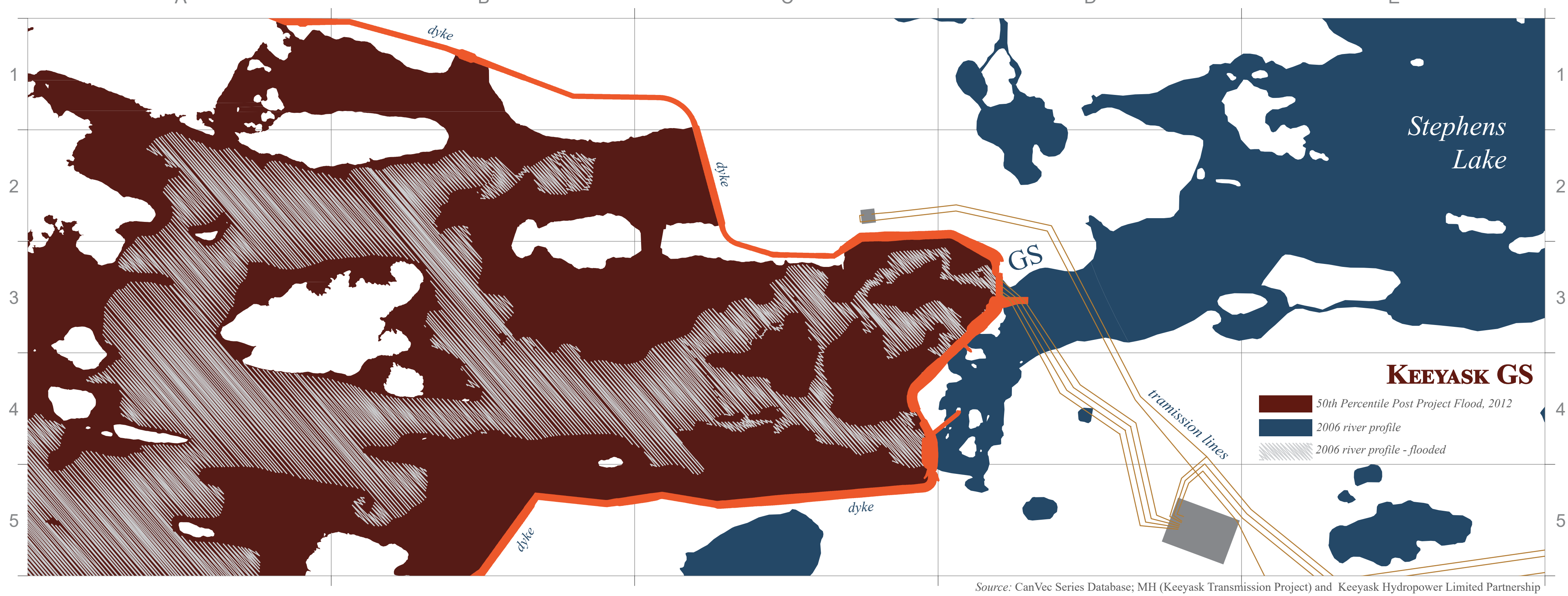

A
B
C
D
E
0
1
2
4 Kilometers
0
0.75
1.5
3 Miles
N
Projection: NAD 1983 UTM Zone 15N
Upper
Limestone
Rapids
RIVER
NELSON
LIMESTONE'S HYDROLOGY (1950s)
Source: NTS Sht. 54D, Ed. 1, Air Photos 1954-1958, Field Survey 1959
Source: NTS Sht. 54D08-09 Ed. 2, Printed 1995 and OpenStreetMap (Transmission Lines)
1
2
3
4
5
tramission lines
railway
henday
Limestone GS
tramission lines
constructed 1976-1992
LIMESTONE GS HYDROLOGY (1990s)



Source: NTS Sht. 54D, Ed. 1, Air Photos 1954-1958, Field Survey 1959
Long Spruce's hydrology (1950s)
Long Spruce Rapids
Kilometers 0 1 2 4
Miles 0 0.75 1.5 3
Projection: NAD 1983 UTM Zone 15N
N
A B C D E
1 2 3 4 5
Long Spruce GS
dyke
NELSON
RIVER
tramission lines
constructed 1971-1979
Long Spruce GS hydrology (1990s)
Source: NTS Sht. 54D08 Ed. 2, Printed 1995 and OpenStreetMap (Transmission Lines)

Source: NTS Sht. 54D06, Ed. 1, Air Photos 1954-1955



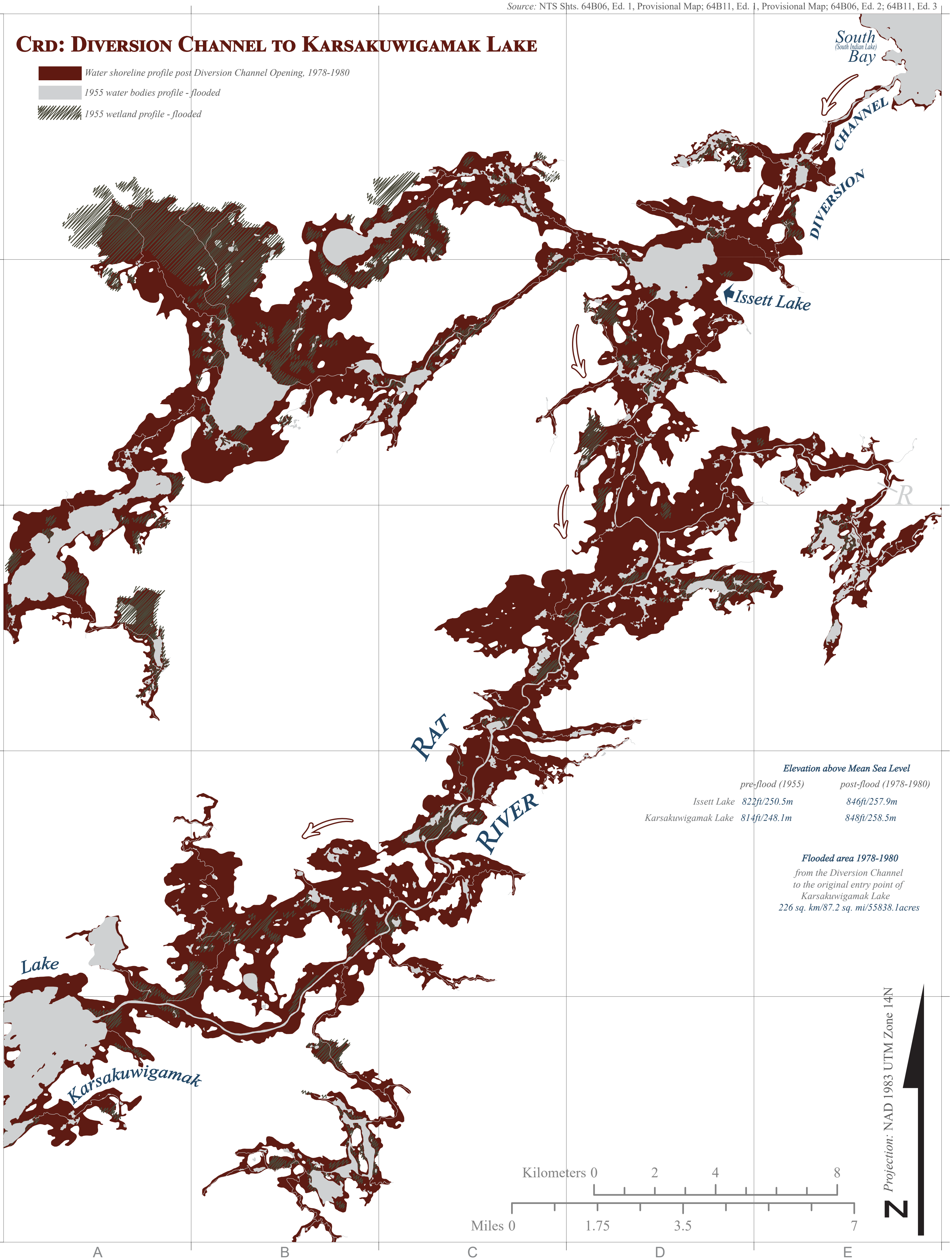


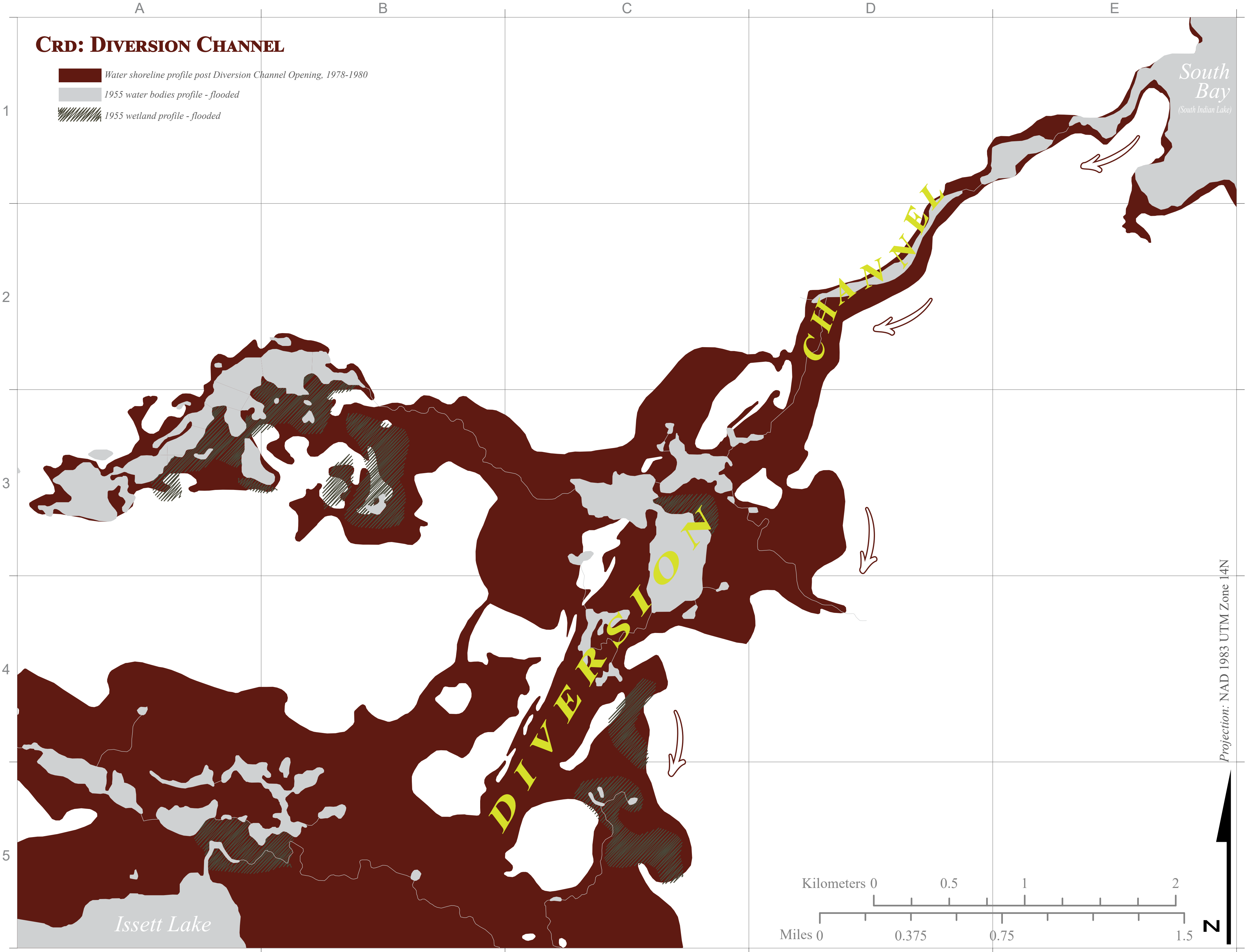
Source: CanVec Series Database; MH (Keeyask Transmission Project) and Keeyask Hydropower Limited Partnership

Appendix H: *Rat-Burntwood Changes*

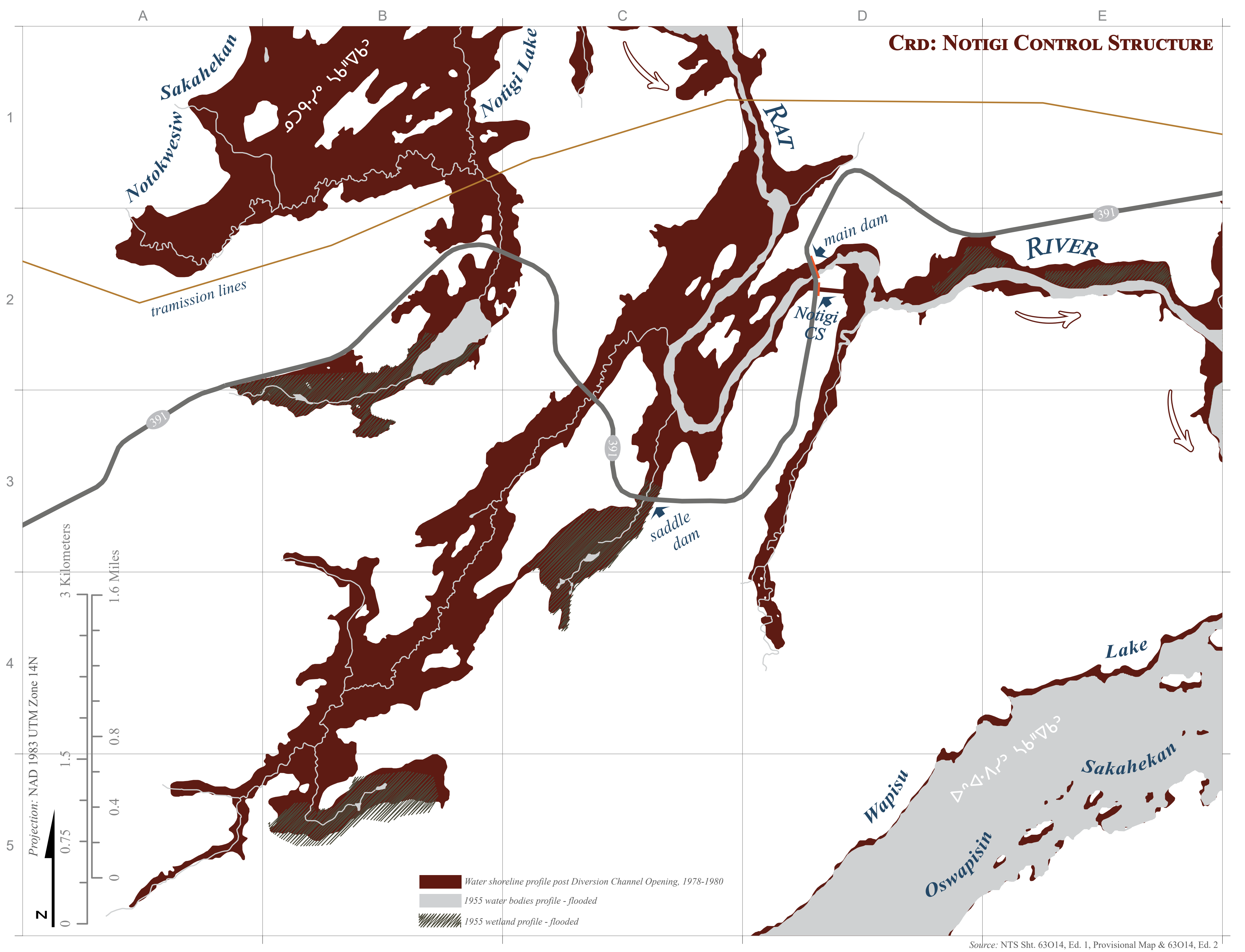
Source: NTS Shts. 64B06, Ed. 1, Provisional Map; 64B11, Ed. 1, Provisional Map; 64B06, Ed. 2; 64B11, Ed. 3

Crd: Diversion Channel to Karsakuwigamak Lake

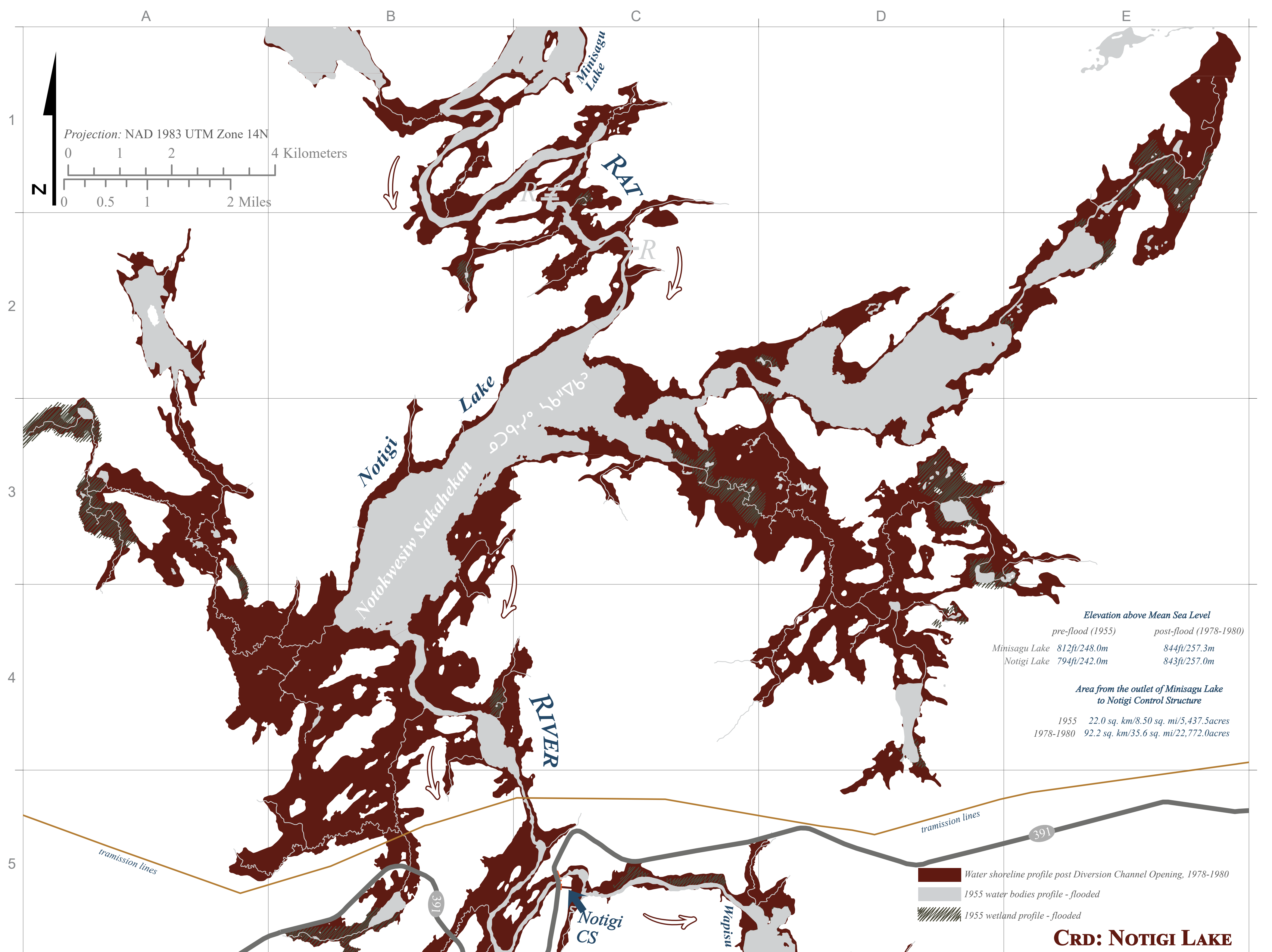




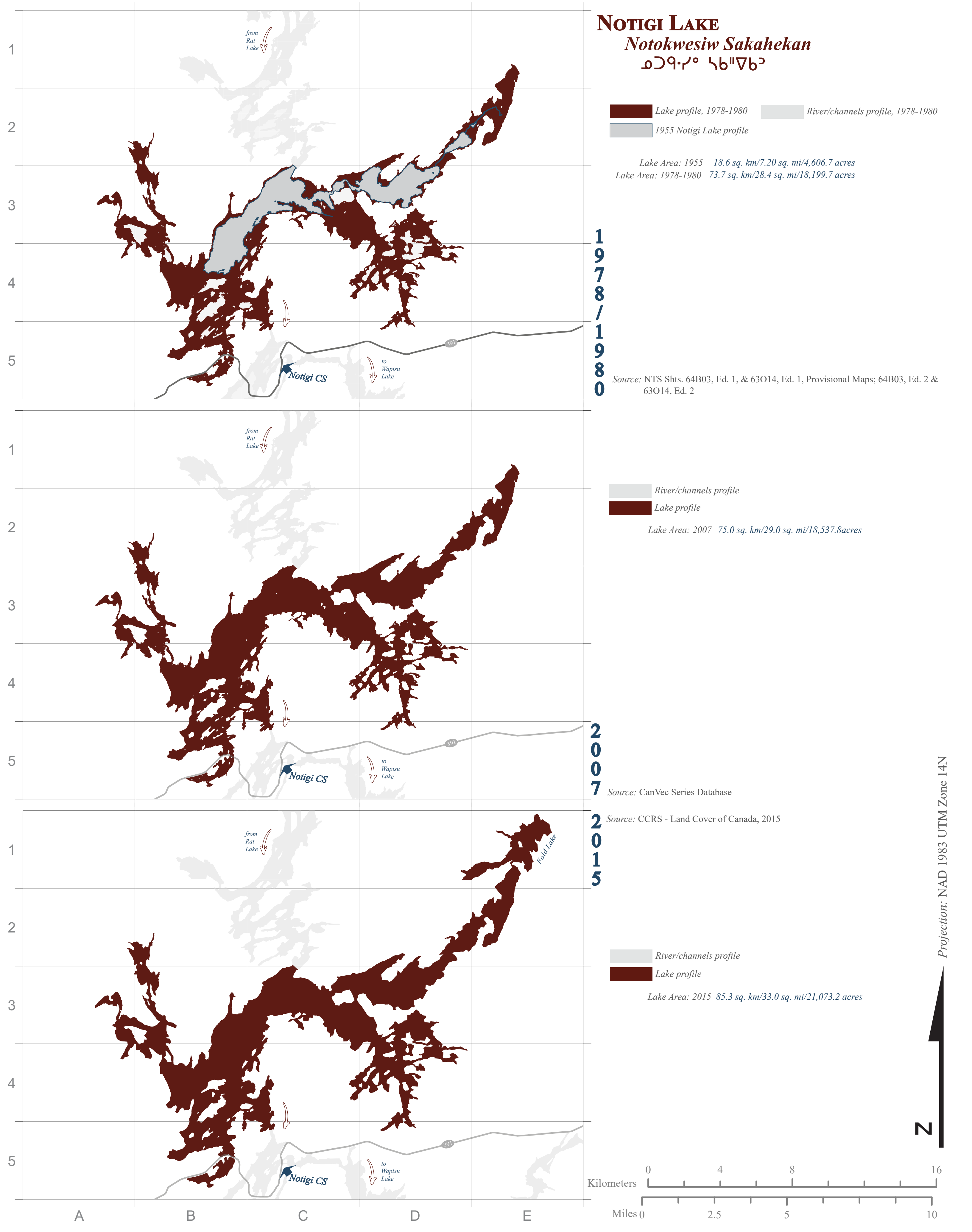
Source: NTS Sht. 64B11, Ed. 1, Provisional Map; NTS Sht.64B11, Ed. 3



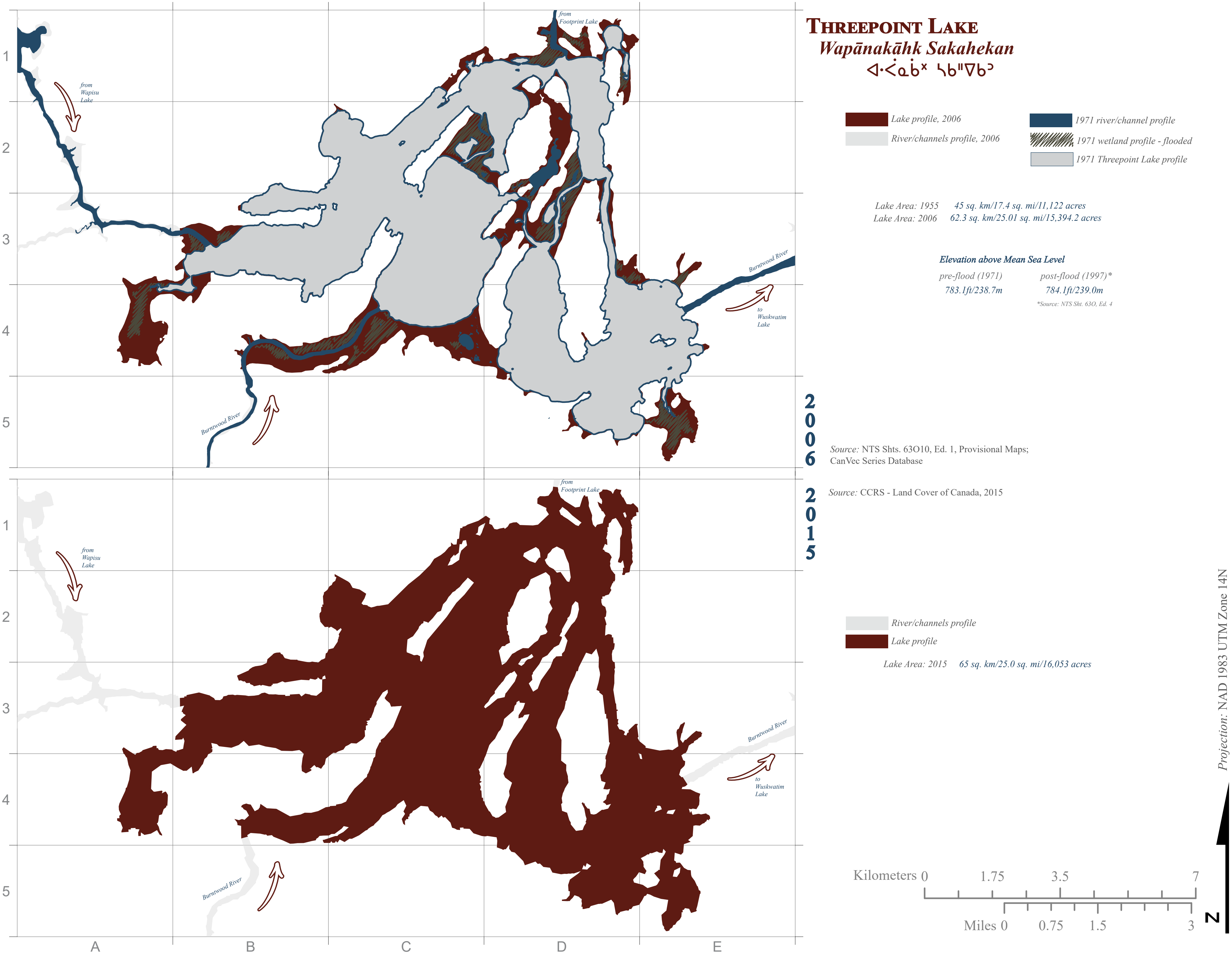
Source: NTS Sht. 63O14, Ed. 1, Provisional Map & 63O14, Ed. 2

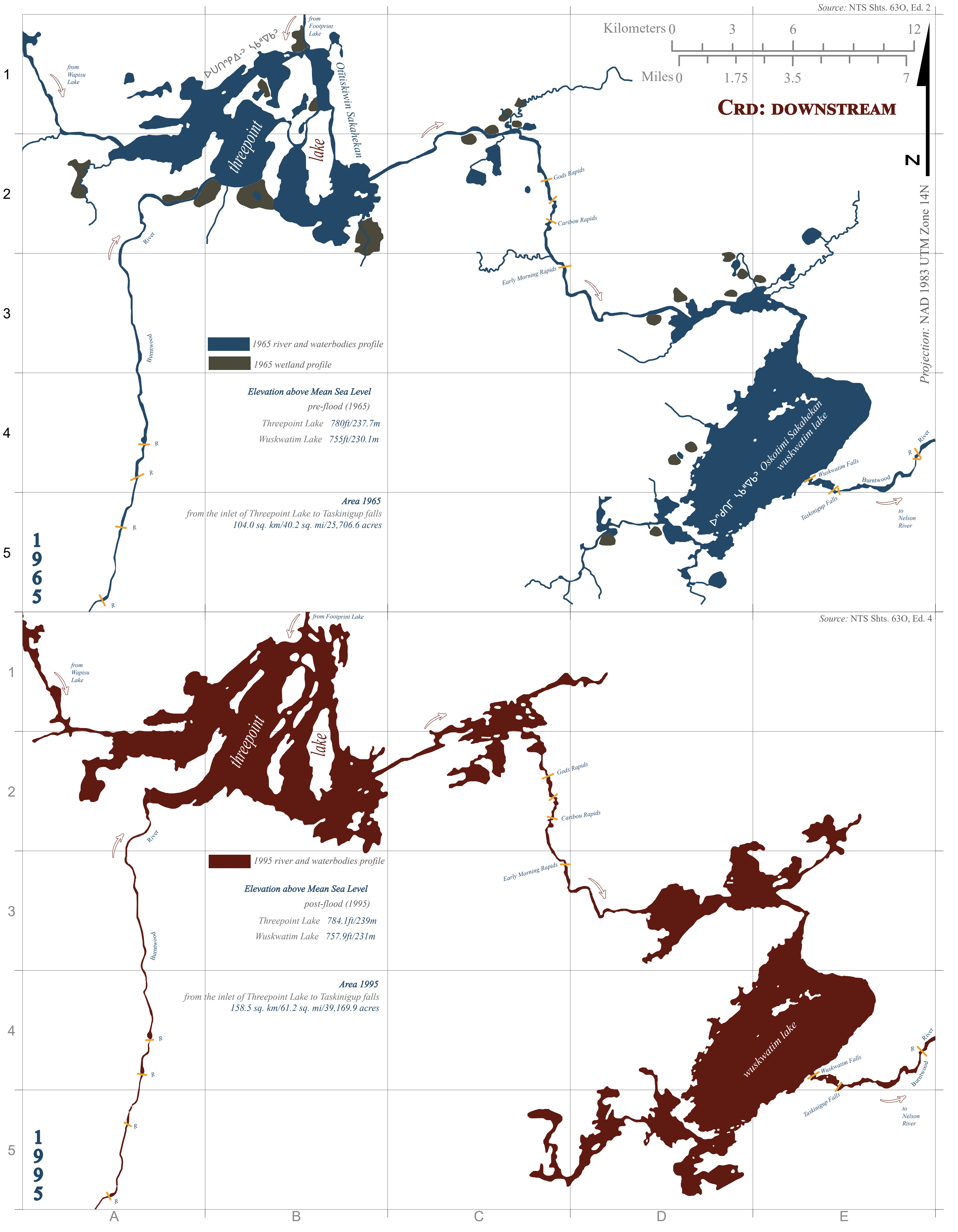


Source: NTS Shts. 64B03, Ed. 1, & 63O14, Ed. 1, Provisional Maps; 64B03, Ed. 2 & 63O14, Ed. 2

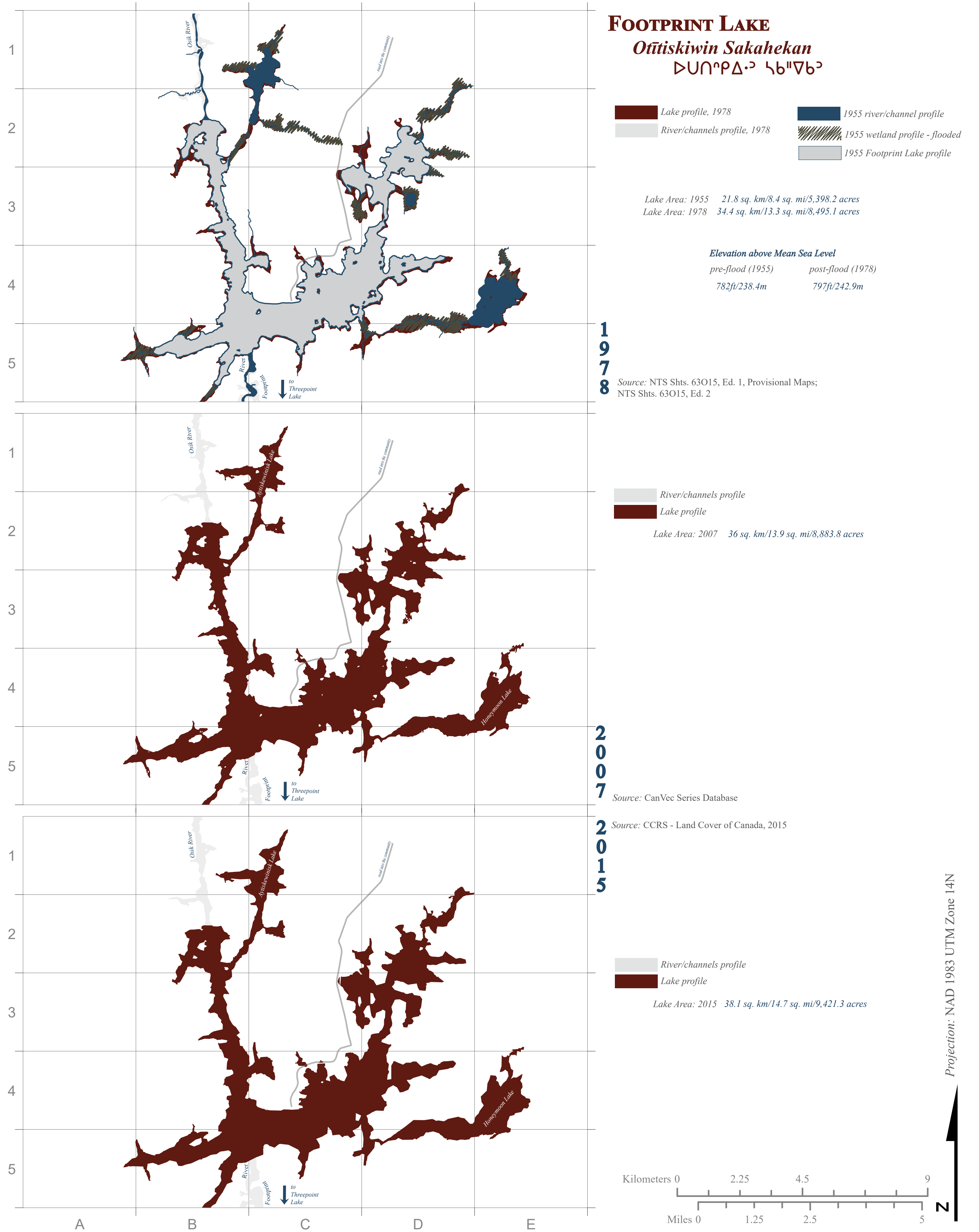


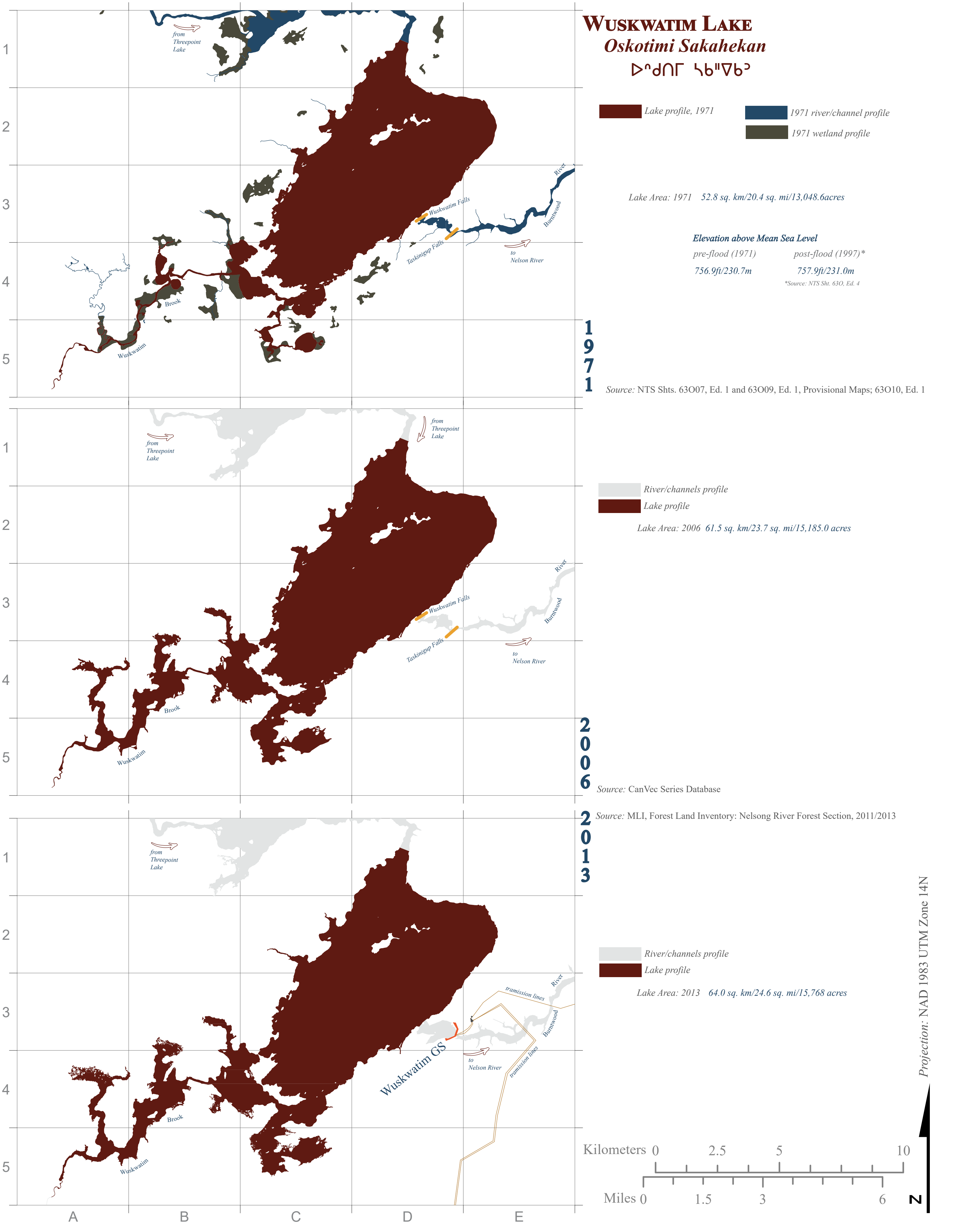
Notigi Lake
Notokwesiw Sakahekan
ᓄᑐᑫᐧᓯᐤ ᓴᑲᐦᐁᑲᐣ
Lake profile, 1978-1980
River/channels profile, 1978-1980
1955 Notigi Lake profile
Lake Area: 1955 18.6 sq. km/7.20 sq. mi/4,606.7 acres
Lake Area: 1978-1980 73.7 sq. km/28.4 sq. mi/18,199.7 acres
1978/1980
Source: NTS Shts. 64B03, Ed. 1, & 63O14, Ed. 1, Provisional Maps; 64B03, Ed. 2 & 63O14, Ed. 2
River/channels profile
Lake profile
Lake Area: 2007 75.0 sq. km/29.0 sq. mi/18,537.8acres
2007
Source: CanVec Series Database
2015
Source: CCRS - Land Cover of Canada, 2015
River/channels profile
Lake profile
Lake Area: 2015 85.3 sq. km/33.0 sq. mi/21,073.2 acres
from Rat Lake
to Wapisu Lake
Notigi CS
391
Fold Lake
1
2
3
4
5
A
B
C
D
E
Projection: NAD 1983 UTM Zone 14N
N
Kilometers 0 4 8 16
Miles 0 2.5 5 10


THREEPOINT LAKE
Wapānakāhk Sakahekan
ᐊᐧᐹᓇᑳᕽ ᓴᑲᐦᐁᑲᐣ
Lake profile, 2006
River/channels profile, 2006
1971 river/channel profile
1971 wetland profile - flooded
1971 Threepoint Lake profile
Lake Area: 1955 45 sq. km/17.4 sq. mi/11,122 acres
Lake Area: 2006 62.3 sq. km/25.01 sq. mi/15,394.2 acres
Elevation above Mean Sea Level
pre-flood (1971) 783.1ft/238.7m
post-flood (1997)* 784.1ft/239.0m
*Source: NTS Sht. 63O, Ed. 4
2006
Source: NTS Shts. 63O10, Ed. 1, Provisional Maps; CanVec Series Database
2015
Source: CCRS - Land Cover of Canada, 2015
River/channels profile
Lake profile
Lake Area: 2015 65 sq. km/25.0 sq. mi/16,053 acres
from Wapisu Lake
from Footprint Lake
Burntwood River
to Wuskwatim Lake
A
B
C
D
E
1
2
3
4
5
Kilometers 0 1.75 3.5 7
Miles 0 0.75 1.5 3
N
Projection: NAD 1983 UTM Zone 14N



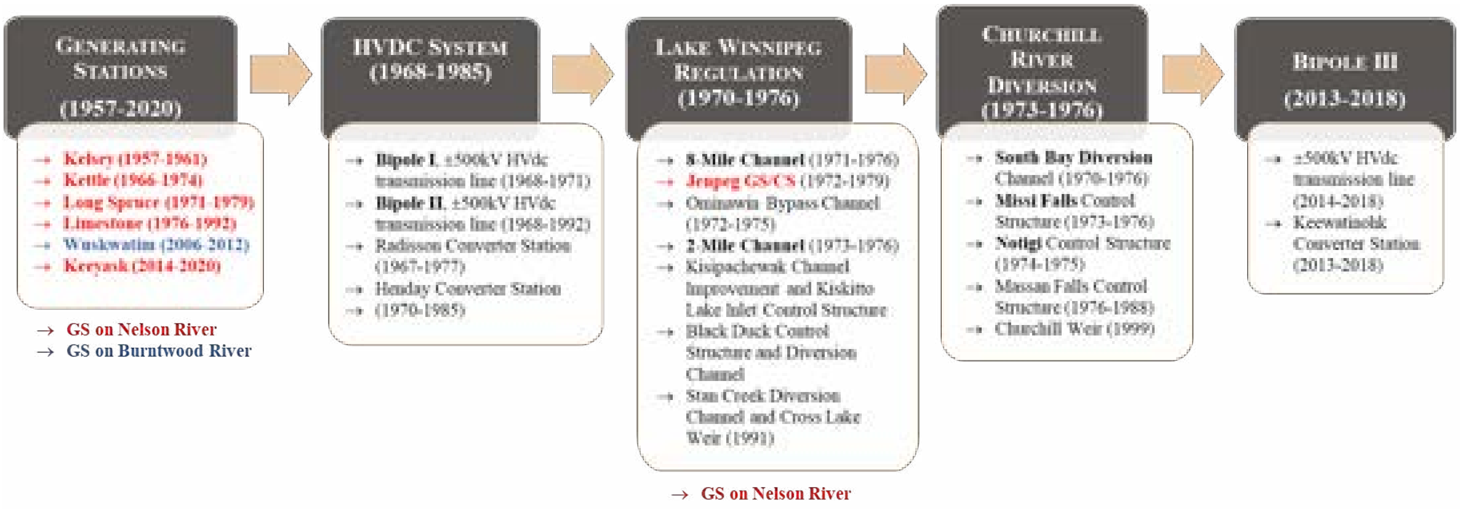
Source: NTS Shts. 63O, Ed. 2
Kilometers 0 3 6 12
Miles 0 1.75 3.5 7
CRD: DOWNSTREAM
N
Projection: NAD 1983 UTM Zone 14N
from Wapisu Lake
from Footprint Lake
Otiskiwin Sakahekan
threepoint
lake
River
Burntwood
Gods Rapids
Caribou Rapids
Early Morning Rapids
Oskotimi Sakahekan
wuskwatim lake
Wuskwatim Falls
Taskinigup Falls
Burntwood
River
to Nelson River
R
1965 river and waterbodies profile
1965 wetland profile
Elevation above Mean Sea Level
pre-flood (1965)
Threepoint Lake 780ft/237.7m
Wuskwatim Lake 755ft/230.1m
Area 1965
from the inlet of Threepoint Lake to Taskinigup falls
104.0 sq. km/40.2 sq. mi/25,706.6 acres
1965
Source: NTS Shts. 63O, Ed. 4
from Footprint Lake
from Wapisu Lake
threepoint
lake
River
Burntwood
Gods Rapids
Caribou Rapids
Early Morning Rapids
1995 river and waterbodies profile
Elevation above Mean Sea Level
post-flood (1995)
Threepoint Lake 784.1ft/239m
Wuskwatim Lake 757.9ft/231m
Area 1995
from the inlet of Threepoint Lake to Taskinigup falls
158.5 sq. km/61.2 sq. mi/39,169.9 acres
wuskwatim lake
Wuskwatim Falls
Taskinigup Falls
Burntwood
River
to Nelson River
R
1995
1
2
3
4
5
A
B
C
D
E


FOOTPRINT LAKE
Otītiskiwin Sakahekan
ᐅᑌᑎᐢᑭᐏᐣ ᓴᑲᐦᐁᑲᐣ
Lake profile, 1978
River/channels profile, 1978
1955 river/channel profile
1955 wetland profile - flooded
1955 Footprint Lake profile
Lake Area: 1955 21.8 sq. km/8.4 sq. mi/5,398.2 acres
Lake Area: 1978 34.4 sq. km/13.3 sq. mi/8,495.1 acres
Elevation above Mean Sea Level
pre-flood (1955) post-flood (1978)
782ft/238.4m 797ft/242.9m
1978
Source: NTS Shts. 63O15, Ed. 1, Provisional Maps; NTS Shts. 63O15, Ed. 2
Osik River
Footprint River
to Threepoint Lake
River/channels profile
Lake profile
Lake Area: 2007 36 sq. km/13.9 sq. mi/8,883.8 acres
Honeymoon Lake
2007
Source: CanVec Series Database
2015
Source: CCRS - Land Cover of Canada, 2015
River/channels profile
Lake profile
Lake Area: 2015 38.1 sq. km/14.7 sq. mi/9,421.3 acres
Projection: NAD 1983 UTM Zone 14N
Kilometers 0 2.25 4.5 9
Miles 0 1.25 2.5 5
N
A B C D E
1 2 3 4 5



WUSKWATIM LAKE
Oskotimi Sakahekan
ᐅᐢᑯᑎᒥ ᓴᑲᐦᐁᑲᐣ
Lake profile, 1971
1971 river/channel profile
1971 wetland profile
Lake Area: 1971 52.8 sq. km/20.4 sq. mi/13,048.6acres
Elevation above Mean Sea Level
pre-flood (1971)
post-flood (1997)*
756.9ft/230.7m
757.9ft/231.0m
*Source: NTS Sht. 63O, Ed. 4
1971
Source: NTS Shts. 63O07, Ed. 1 and 63O09, Ed. 1, Provisional Maps; 63O10, Ed. 1
from Threepoint Lake
Wuskwatim Falls
Taskinigup Falls
to Nelson River
Burntwood River
Brook
Wuskwatim
River/channels profile
Lake profile
Lake Area: 2006 61.5 sq. km/23.7 sq. mi/15,185.0 acres
2006
Source: CanVec Series Database
2013
Source: MLI, Forest Land Inventory: Nelsong River Forest Section, 2011/2013
River/channels profile
Lake profile
Lake Area: 2013 64.0 sq. km/24.6 sq. mi/15,768 acres
tramission lines
Wuskwatim GS
Projection: NAD 1983 UTM Zone 14N
Kilometers 0 2.5 5 10
Miles 0 1.5 3 6
N
A B C D E
1 2 3 4 5

Appendix I: *Manitoba's Northern Hydro-Electrical Generation Project*[1][2]



[1] Manitoba Hydro. (2015). *Regional cumulative effects assessment for hydroelectric developments on the Churchill, Burntwood and Nelson River systems: Phase II hydroelectric development project description in the region of interest.* URL https://www.hydro.mb.ca/-regulatory_affairs/rcea/

[2] Manitoba Hydro. (n.d). Bipole lines. URL https://www.hydro.mb.ca/corporate/facilities/bipole_lines/

→ *Generating Stations (1957-2020)*

Kelsey GS
(1957-1961)
Operations: *A Run-of-River Generating Station.*
Its forebay is maintained just below the full supply level of 605 ft (184.4 m);
Length of Main dam: 950 ft (290 m); **Maximum height:** 120 ft (37.0 m);
Reservoir/forebay elevation, Full supply level (FSL) (max): 605 ft (184.404 m);
Flooded Area: 64 mi^2 (165.8 km^2);
9-gated Spillway Discharge Capacity: 322,458 ft^3/s (9,131 m^3/s), and
Capacity: 292 MW.
1.5km spam across the Nelson River

Kettle GS
(1966-1974)
Operations: *A Daily and Weekly cycling pattern.*
Length of dams: North, 2,400 ft (730.0 m) and South, 1,000 ft (300.0 m);
Maximum height: North Dam, 164.0 ft (50.0 m) and South Dam, 167.0 ft (51.0 m);
Reservoir/forebay elevation, Full supply level (FSL) (max): 463.0 ft (141.122 m);
Flooded Area: 85.2 mi^2 (220.6 km^2);
8-gated Spillway Discharge Capacity: 360,210 ft^3/s (10,200 m^3/s), and
Capacity: 1220 MW.
1.4km spam across the Nelson River

Long spruce GS
(1971-1979)
Operations: *A Run-of-River Generating Station and with flow patterns similar to Kettle GS.*
Length of dams: North, 3,000 ft (914.4 m) and South, 750 ft (228 m);
Maximum height: North and South Dams, 140 ft (42.7 m);
Reservoir/forebay elevation, Full supply level (FSL) (max): 361.0 ft (110.0 m);
Flooded Area: 5.3 mi^2 (13.7 km^2);
6-gated Spillway Discharge Capacity: 342,552 ft^3/s (9,700 m^3/s), and
Capacity: 98 MW.
1.4km spam across the Nelson River

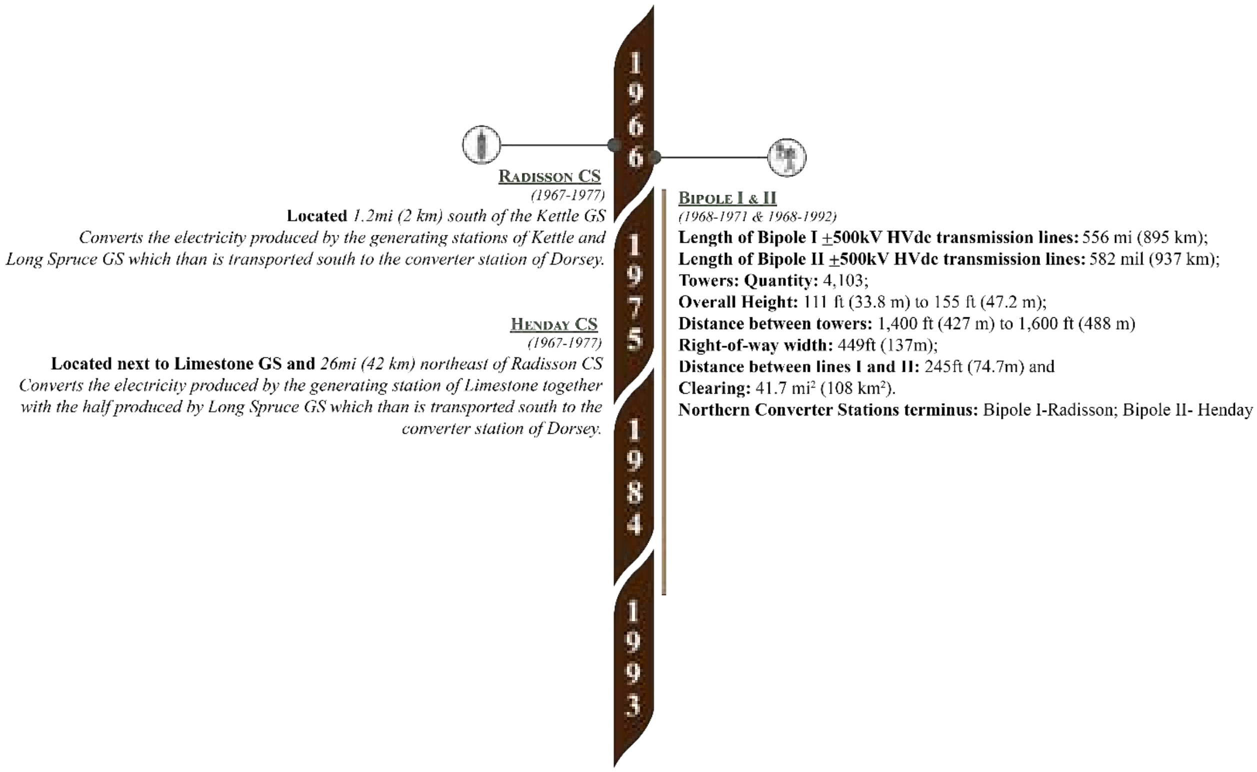
Limestone GS
(1976-1992)
Operations: *A Run-of-River Generating Station and with flow patterns similar to Long Spruce GS.*
Length of dams: North, 230 ft (70.0 m) and South, 2,362 ft (720 m);
Maximum height: North and South Dams, 131 ft (40.0 m);
Reservoir/forebay elevation, Full supply level (FSL) (max): 279.9 ft (85.313 m);
Flooded Area: 0.8 mi^2 (2.1 km^2);
7-gated Spillway Discharge Capacity: 339,021ft^3/s (9,600m^3/s), and
Capacity: 1350 MW.
1.3km spam across the Nelson River

Wuskwatim GS
(2006-2012)
Operations: *Meet the needs of the load growth.*
Length of dam: 1,056 ft (322 m);
Maximum height: 46.3 ft (14.1 m);
Reservoir/forebay elevation, Full supply level (FSL) (max): 767.71 ft (234.0 m);
Flooded Area: 0.1mi^2 (0.4 km^2);
3-gated Spillway Discharge Capacity: 381,577 ft^3/s (2,310m^3/s), and
Capacity: 214 MW.
0.6km spam across the Burntwood River

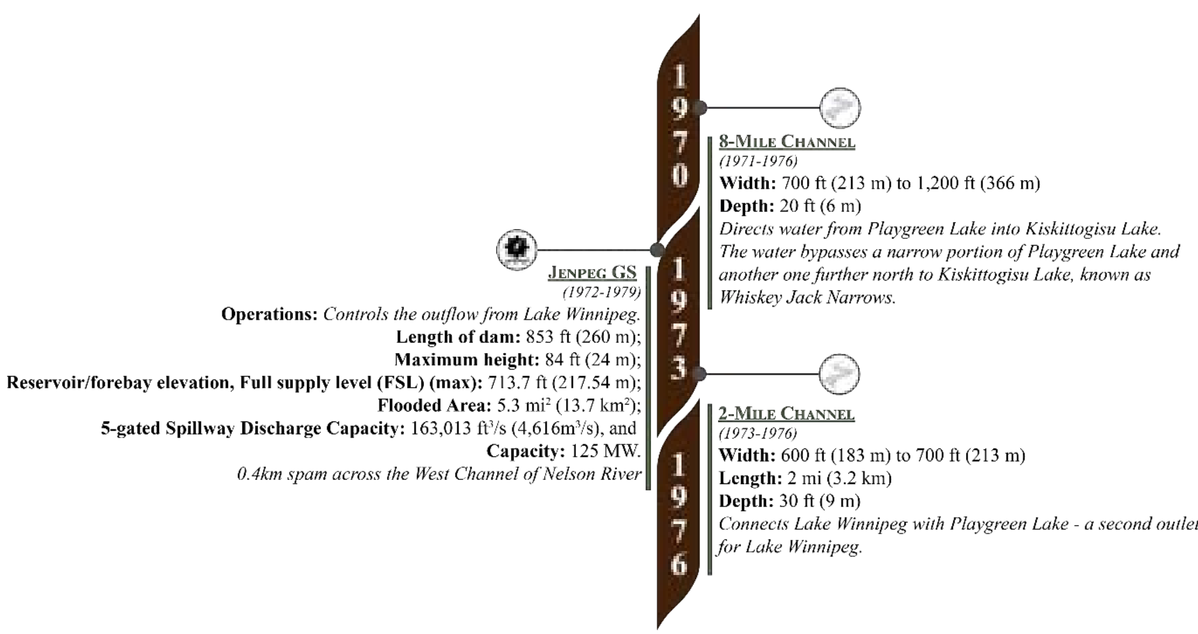
Keeyask GS
(2014-2020)
Length of dams: North, 328 ft (100 m), Central, 5,249 ft (1,600 m), and South, 1,854 ft (565 m);
Maximum height: Central Dam, 91.9 ft (28 m);
Reservoir/forebay elevation, Full supply level (FSL): 521.65 ft (159.00 m);
Flooded area: 17.4 mi^2 (45 km^2);
7-gated Spillway Discharge Capacity: 399,585 ft^3/s (11,315 m^3/s), and
Capacity: 695 MW.
2.7km spam across the Nelson River

1957 1966 1975 1984 1993 2002 2011 2020

→ *HVDC System (1968-1985)*



→ *Lake Winnipeg Regulation (1970-1976)*



* Additional hydrological engineering works:

- Kisipachewuk Channel improvements increase water flow from Kiskittogisu Lake. Improvements included excavations on the river bed.
- Kiskitto Lake Inlet Control Structure regulates the water flow and imprevent flooding.
- Black Duck Control Structure and Diversion Channel regulates the amount of water which is diverted from Kiskitto Lake into the Minago River.
- Stan Creek Diversion Channel regulates the local drainage into Kiskitto Lake.
- Cross Lake Weir (1991) reduces the impact of Lake Winnipeg Regulation on Cross Lake.

→ *Churchill River Diversion (1973-1976)*

1970

SOUTH BAY DIVERSION CHANNEL
(1970-1976)
Width: 200 ft (61 m)
Length: 5.8 mi (9.3 km)
Diverts water from Southern Indian Lake into the Rat-Burntwood River System which takes and leads the flow towards the Nelson.

1973

MISSI FALLS CONTROL STRUCTURE
(1973-1976)
Located *at the natural outlet of South Indian Lake*
Forebay elevation: 847.5 ft (258.32 m).
6-gated Spillway Discharge Capacity: 113,000 ft^3/s (3,200 m^3/s).
Other structures include a south channel dam, a north channel dam, a main dam together with a south dyke.

NOTIGI CONTROL STRUCTURE
(1974-1975)
Located *on the Rat River network, between the waterbodies of the lakes of Notigi and Wapisu. It regulated the diverted water.*
Forebay elevation: 847.5 ft (258.32 m). .
3-gated Spillway Discharge Capacity: 66,000 ft^3/s (1,869 m^3/s) .
Other structures include a main dam, a saddle dam together with an electrical service substation.

1976

* Additional hydrological engineering works:
- Manasan Falls passive control structure (1976-1988) intent to reduce the risk of flooding in the northern city of Thompson. Located approximately 5 mi (8 km) upstream from Thompson, on the Burntwood River.
- Churchill Weir (1999) constitutes a mitigation structure built 6 mi (10 km) south of the northern city of Churchill.

→ *Bipole III (2013-2018)*

2012

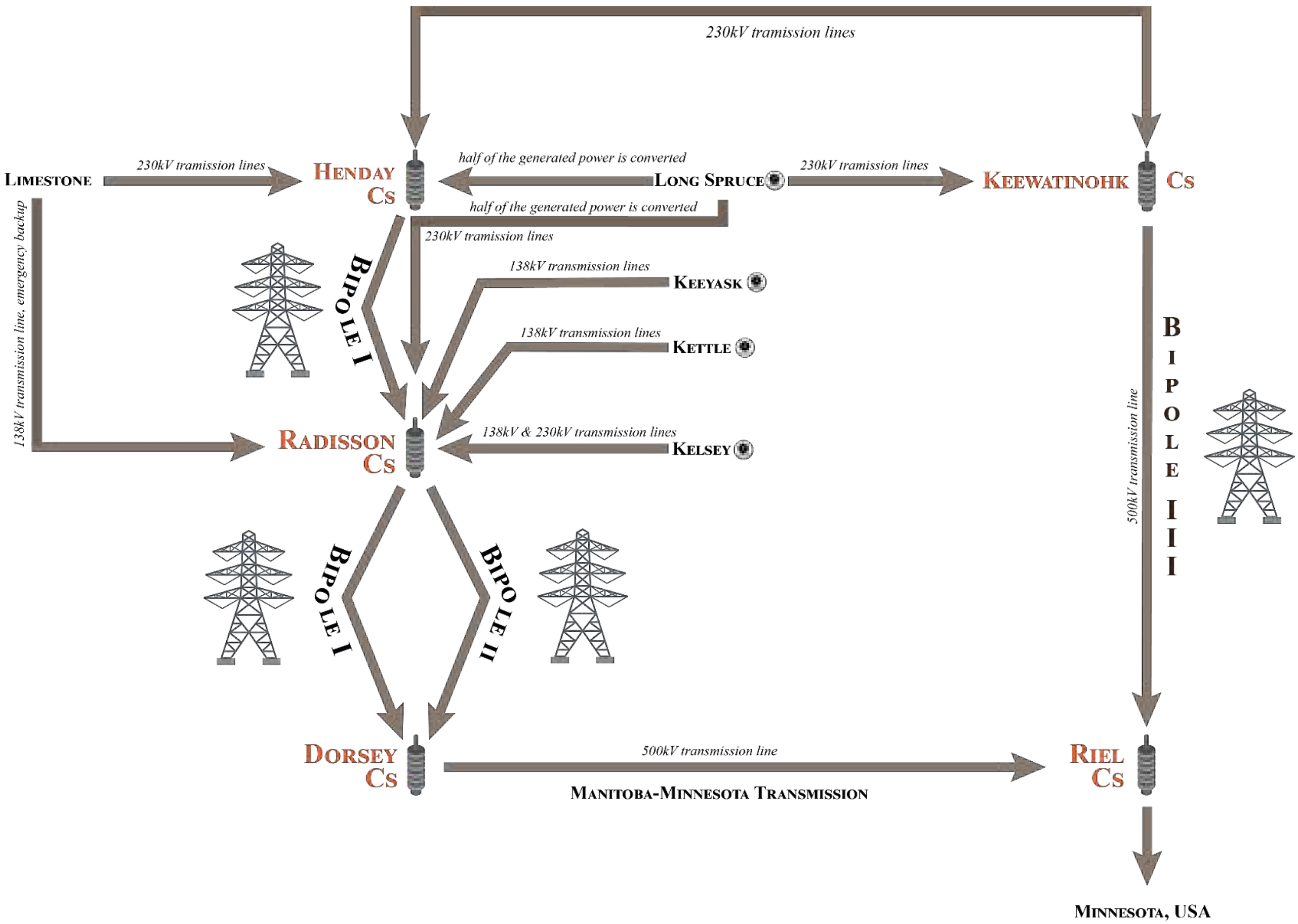
KEEWATINOHK CS
(2013-2018)
Located *northeast of the northern town of Gillam*
Transmission of electricity dependent on deman and electrical load conditions.

BIPOLE III
(2013-2018)
Length of Bipole III ±500kV HVdc transmission lines: 860 mi (1,384 km);
Towers: Quantity: 3,078;
Overall Height: 108ft (33 m) to 150ft (46 m);
Distance between towers: 1,400 ft (427 m) to 1,600 ft (488 m)
Right-of-way width: 216.5ft (66m); and
Clearing: 35.37 mi^2 (91.61 km^2).
Southern Converter Station terminus: Riel

2015

2018

→ *Transmission Lines Schematics*[3]



[3] Manitoba Hydro. (2015). *Regional cumulative effects assessment for hydroelectric developments on the Churchill, Burntwood and Nelson River systems: Phase II hydroelectric development project description in the region of interest.* URL https://www.hydro.mb.ca/-regulatory_affairs/rcea/
Manitoba Energy Board. (2018). Project Application [Filing A81054]. URL https://www.neb one.gc.ca/pplctnflng/mjrpp/mntbmnnst/index eng.html

Appendix J: *National Topographical Survey Sheets Series*

→ Scale 1:50,000

- Rat-Burntwood River Network

*NTS Sht. 63O07, Ed. 1, Information Current: 1971, Printed: 1977.
♦NTS Sht. 63O09, Ed. 1, Provisional Map, Air Photos: 1955-1956, Printed: 1961.
*NTS Sht. 63O10, Ed. 1, Information Current: 1971, Printed: 1977.
*NTS Sht. 63O11, Ed. 1, Information Current: 1971, Printed: 1977.
♦NTS Sht. 63O14, Ed. 1, Provisional Map, Air Photos: 1955, Field Surveys: 1955, Printed: 1972.
*NTS Sht. 63O14, Ed. 2, Aerial Photographs: 1978-1980, Culture Check: 1981, Printed: 1984.
♦NTS Sht. 63O15, Ed. 1, Provisional Map, Air Photos: 1955, Field Surveys: 1964, Printed: 1972.
*NTS Sht. 63O15, Ed. 2, Aerial Photographs: 1978, Printed: 1981.
♦NTS Sht. 64B03, Ed. 1, Provisional Map, Air Photos: 1955, Field Surveys: 1959-1964, Printed: 1971.
*NTS Sht. 64B03, Ed. 2, Aerial Photographs:1978-1980, Printed: 1985.
♦NTS Sht. 64B06, Ed. 1, Provisional Map, Air Photos: 1955, Field Surveys: 1959-1964, Printed: 1971.
*NTS Sht. 64B06, Ed. 2, Field Surveys: 1978-1980, Printed: 1985;
♦NTS Sht. 64B11, Ed. 1, Provisional Map, Air Photos: 1955, Field Surveys: 1959-1964, Printed: 1971.
*NTS Sht. 64B11, Ed. 3, Field Surveys: 1978-1980, Printed: 1985.

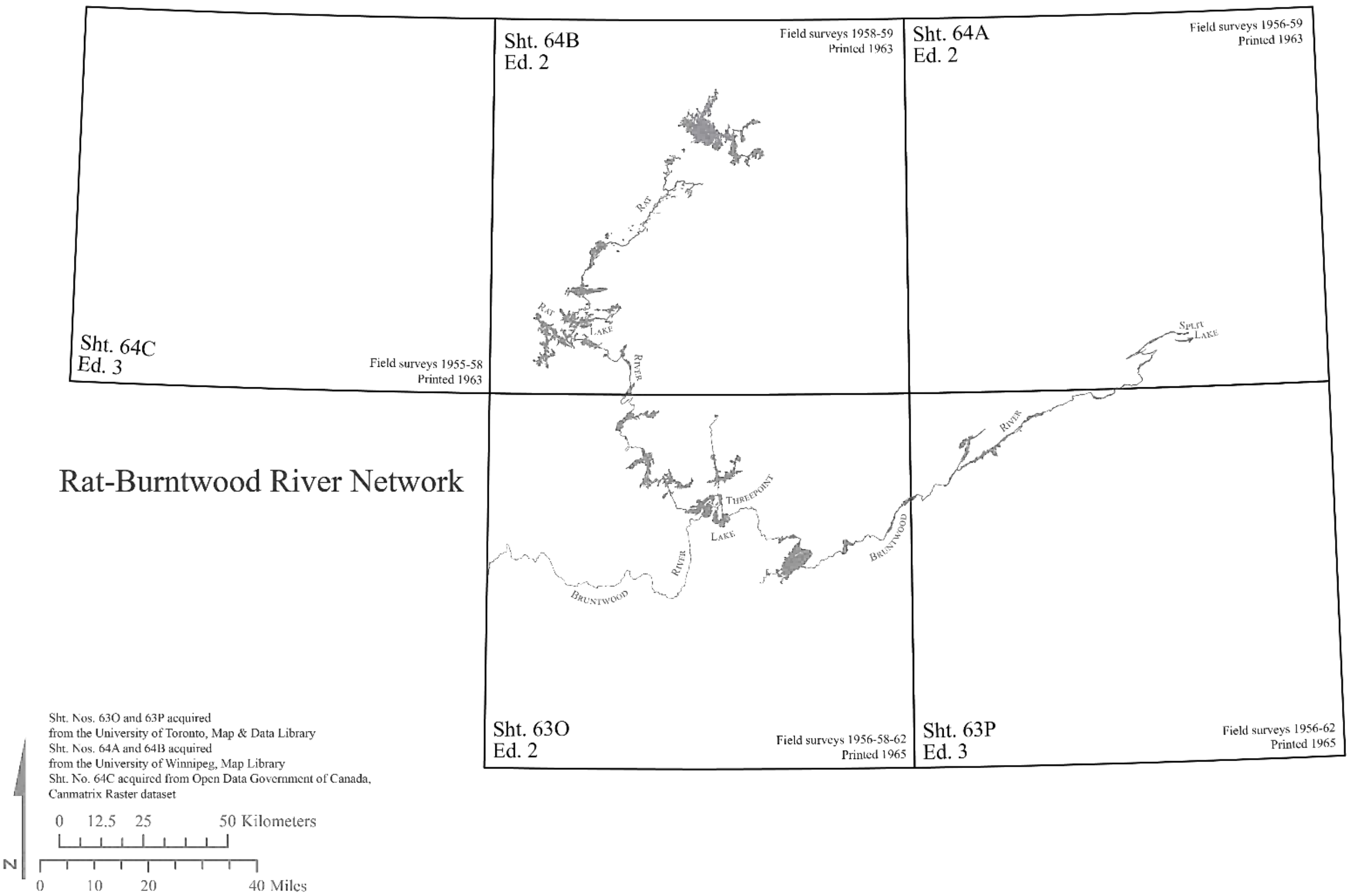
*Sheets acquired online from Open Data Government of Canada, Canmatrix Raster Database.
♦Sheets acquired online from University of Toronto, Map & Data Library.

- Nelson River*

a) NTS Sht. 54D06, Ed. 1, Air Photos: 1954-1955, Printed: 1973;
b) NTS Sht. 54D07, Ed. 1, Printed: 1973;
c) NTS Sht. 54D08, Ed. 2, Information Current: 1992, Printed: 1995; and
d) NTS Sht. 54D09, Ed. 2, Information Current: 1992, Printed: 1995.

*Sheets acquired online from Open Data Government of Canada, Canmatrix Raster Database.

→ Scale 1:250,000



Nelson River