

SURVEYING THE SHIELD:

EXPLORING INDUSTRIAL DISTURBANCE IN AN ONTARIO MILL TOWN

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*A practicum submitted to the Faculty of Graduate
Studies of the University of Manitoba in partial
fulfillment of the requirements of the degree of*

Master of Landscape Architecture

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*A Landscape Architecture Design Practicum
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ABSTRACT

Kenora, Ontario is a city with a strong industrial identity, linked specifically to forestry. Historically sawmills were situated on waterfront properties for purposes of harnessing energy and transporting logs. As technology has evolved, the proximity to water is no longer integral and industry has become less centralized in the city. This practicum explores the implications of the loss of an industrial presence, and the impact of industrial disturbance in both the urban fabric as well as the surrounding region. A design proposal for a specific site, that has been home to a sawmill for over a century, reacts to the research through the design of a large scale public landscape intended to remediate the post industrial conditions and take advantage of the strong historical past.



FIG. 1 *A hat referencing the modernization of the local pulp and paper mill*

ACKNOWLEDGEMENTS

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To my Kenora family, thank you for generously sharing your knowledge and experience of the region.

Finally, to my partner Kyle, thank you for introducing me to the Lake of the Woods and the boreal forest. Your presence, both as a guide in the landscape and as a constant source of creative conversation was always a joy.

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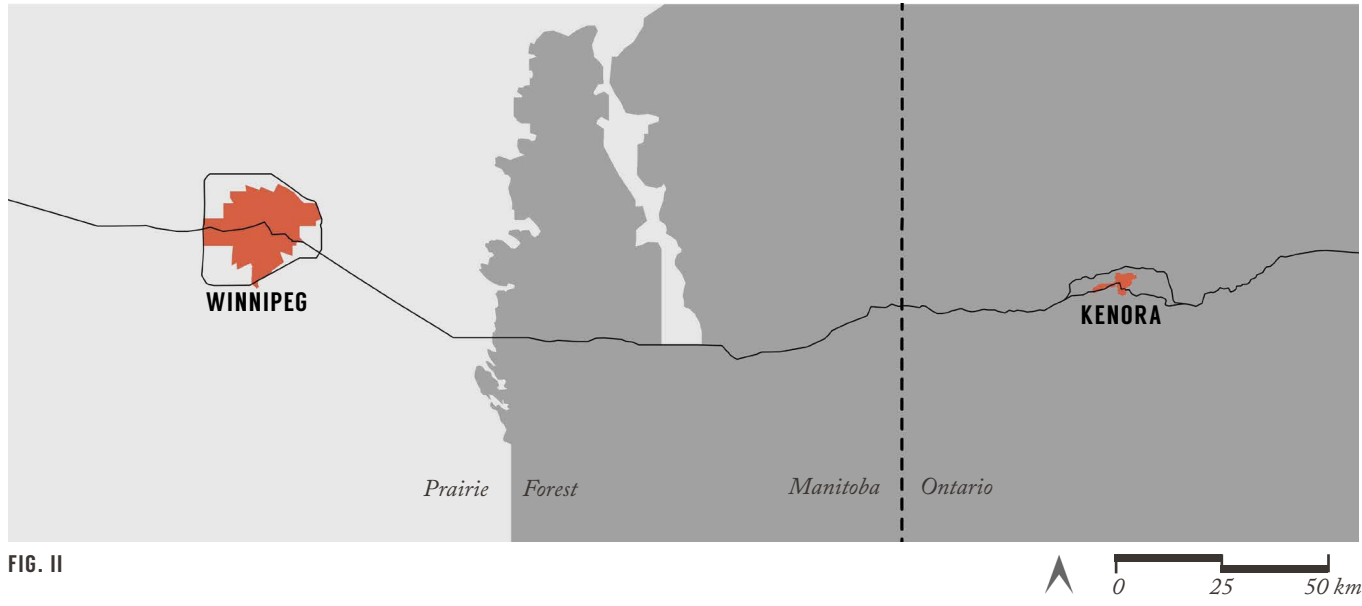


FIG. II

PREFACE

The shift from prairie to forest is abrupt in eastern Manitoba. In the span of a few kilometers, the flat agricultural land transitions into rolling hills and dense stands of boreal forest. The tidy grid of fields suddenly collides with the wild, almost fluid, forest landscape.

I have lived my entire life in the prairies and feel comfortable in the sparse riparian forests, fields of grass and pockets of hardy shrubs that are found in southwestern Manitoba. Until quite recently I had not had a lot of experience with any other type of landscape. A few years ago, I met my partner who is from Kenora and who is passionate about the mosaics of lakes and dense trees that make up Northwestern Ontario. Since then, my perception and relationship with the forest landscape has entirely changed.

I have had the privilege of exploring the Lake of the Woods on a recreational level by land and by water. I never quite feel like a tourist, but yet I am definitely not a local. I am simply an appendage to people who know the landscape, and have a lifetime of learned knowledge and experience. I often take for

granted my position to simply paddle behind as an observer as I am guided through the landscape.

As well as being exposed to the rich landscape of Kenora, I have also spent many hours around a dinner table with a family who has worked directly or indirectly with the forestry industry for the past twenty-five years. A family who has personally endured the ever-fluctuating and relentless forestry industry. Over the years, I have become increasingly curious about the industry and the larger role it has played in the development of the city, economically, physically and culturally.

I started this practicum with a simple question: “how has the forestry industry impacted the city of Kenora, Ontario and the landscape of the Lake of the Woods?”. With such a broad question to answer – I tried to act as a surveyor, observing, recording and reflecting as a way to get a more informed perspective of a place without a clear end objective. This document is intended to share the answers to my original question and explain how I have reacted to the research through a design proposal for a site that is currently home to a sawmill.



GREAT LAKES TO THE GREAT PLAINS

GETTING LOST ON LAKE OF THE WOODS

Lake of the Woods is home to over fourteen-thousand islands, which amount to a shoreline of over one hundred thousand kilometres, a length that far surpasses the shoreline of all the Great Lakes combined (LOTWDC 2013 a, 5). The mosaic of islands have created a lake that is notoriously difficult to navigate. Earl Chapin's essay "Magic Lake" illustrates the unique characteristics of the region with a story explaining the creation of the lake by a wendigo, a "lesser god of the Crees" (1972). Chapin describes the lake as "magical", accounting for the shifting colors of the water, the composition of the vegetation from native to seemingly exotic and finally for the "treasures" of minerals that can be found along its shores. The wendigo explains his intentions to "make a maze" of the lake and to "place puzzles ... that will perplex men forever" as a method to "confound those who might seek to drive [his] people" from the area (Ibid.). The essay concludes with the wendigo reflecting: "I have created a paradox of beauty and desolation, of riches and poverty, of bounty and starvation" (Ibid.).

There is evidence that people have inhabited the region for over eight-thousand years (Huck 2002, 132), yet trying to

navigate the wendigo's 'puzzles' of the lake proved difficult for early European explorers. Colonel Garnet Wolseley, exploring the lake in the mid nineteenth century poignantly explains,

"To lose one's way upon an expanse of water like the Lake of the Woods, and to wander about in a boat ... through its maze of uninhabitable islands, where no sound was to be heard but the dip of the oars at regular intervals, or the distant and weird-like whistle of the loon, is to experience the exquisite sensation of solitude in all its full intensity" (Wolseley 1871, 300).

The Lake of the Woods image series on the following page was created using historical maps. The series illustrates how the lake was perceived throughout time and is less concerned with the actual geographical conditions. The earliest image, a very simple body of water littered with islands, evolves into a more sophisticated understanding as exploration increases. The articulation of the maps can be interpreted to reveal the major trends of the area: first as part of a larger trading route, then the establishment of trading posts, and then the exploration of the land for resources.



1755



1791



1813



1828

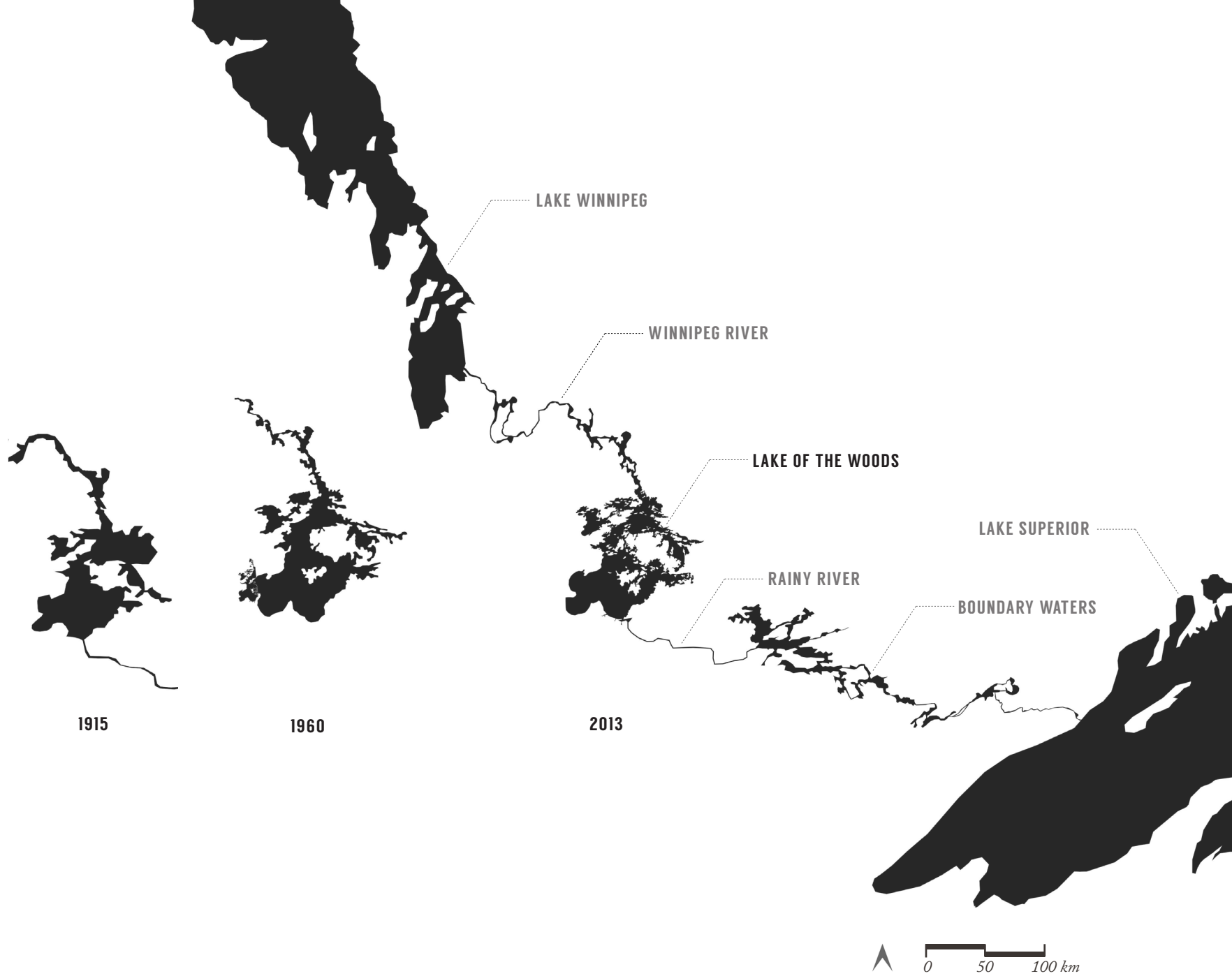


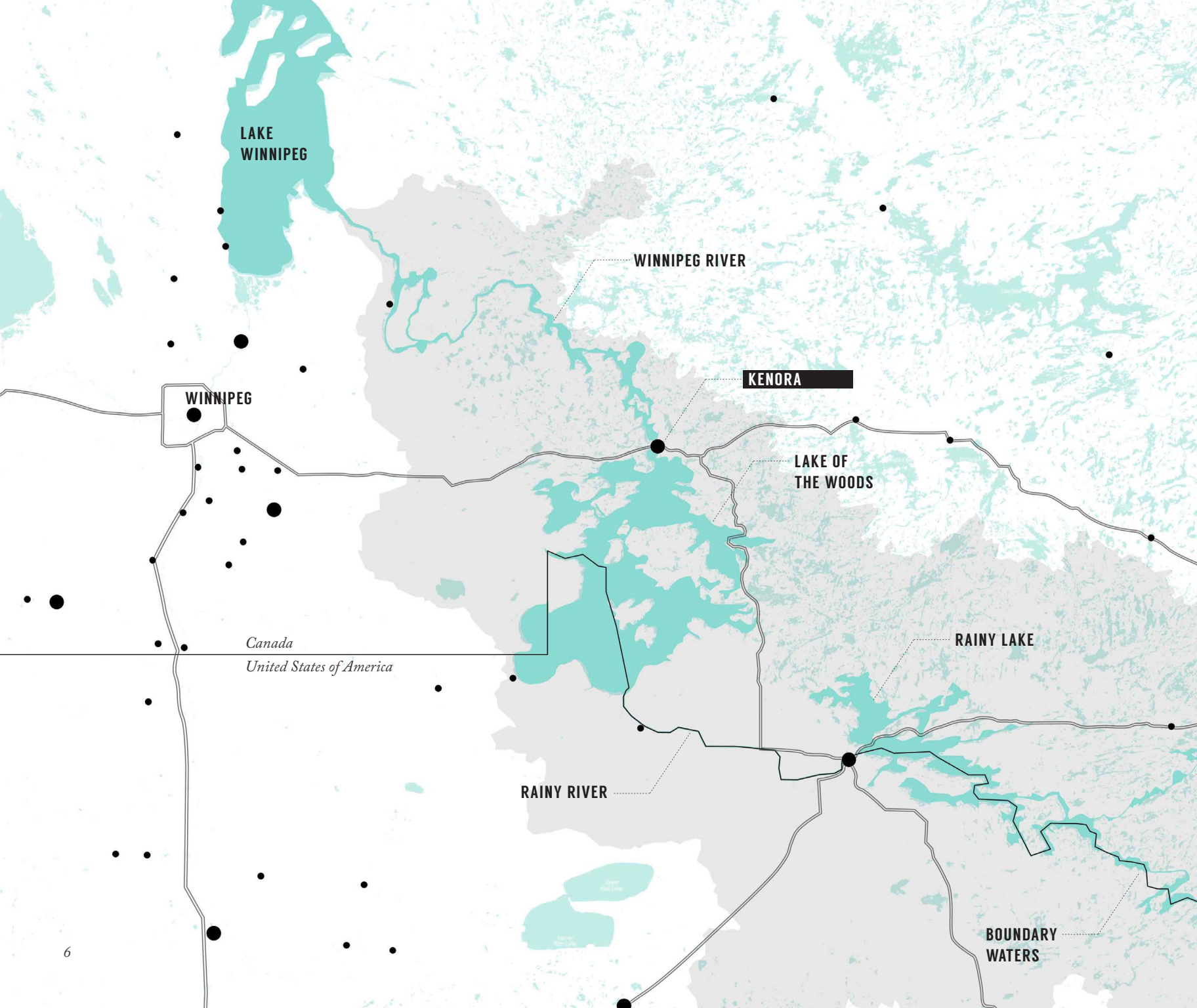
1865



1881

FIG. 1.0





LAKE
WINNIPEG

WINNIPEG RIVER

WINNIPEG

KENORA

LAKE OF
THE WOODS

Canada
United States of America

RAINY LAKE

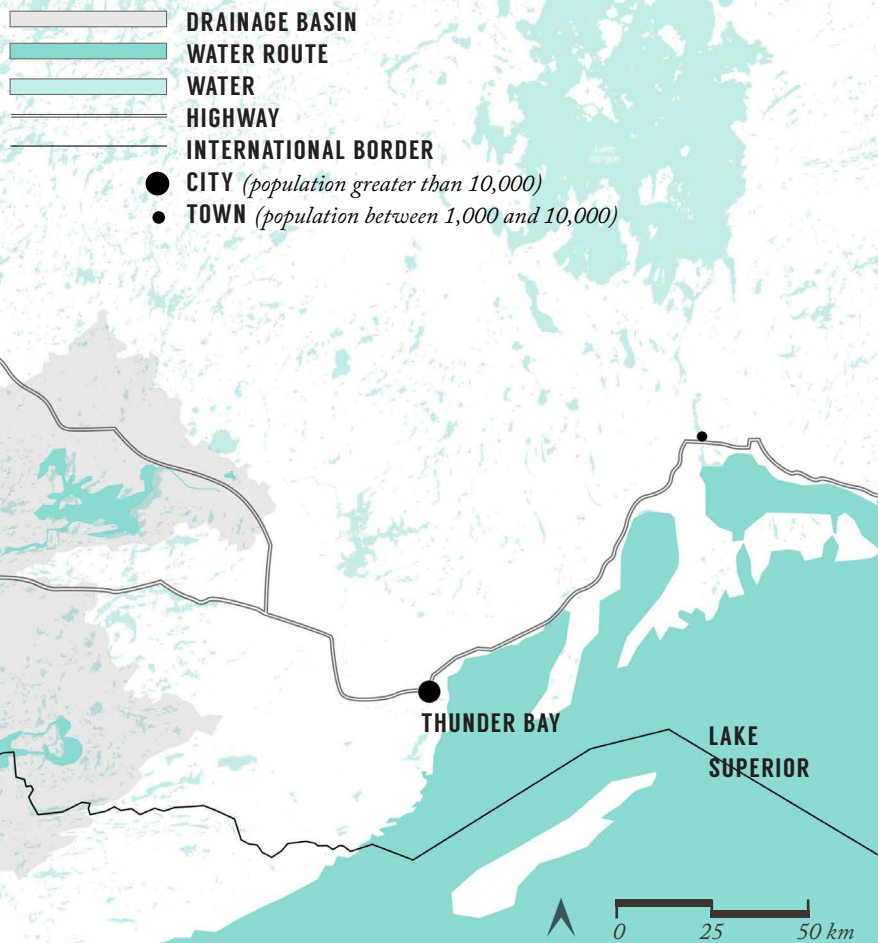
RAINY RIVER

BOUNDARY
WATERS



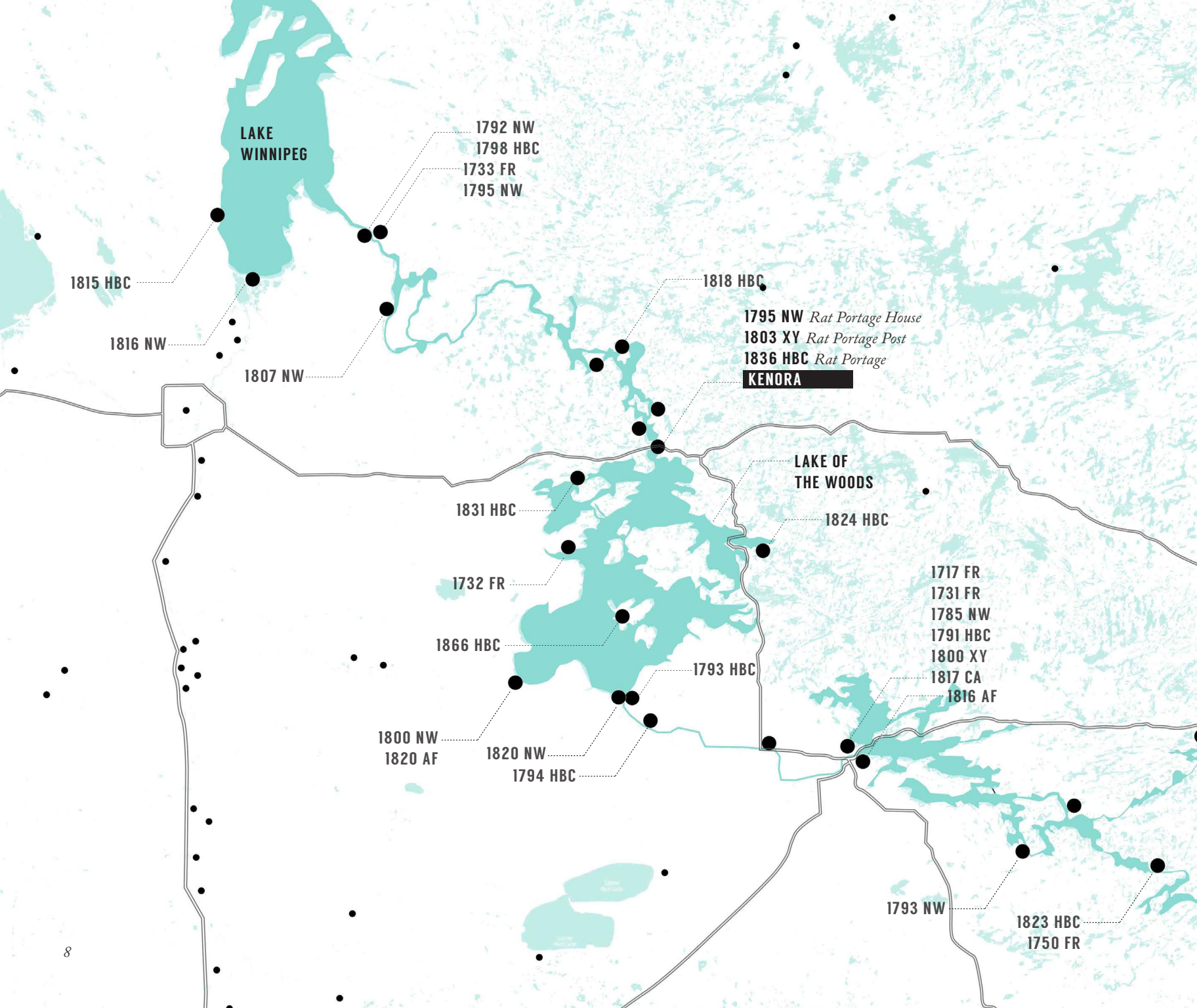
FIG. 1.1 Northern Lake of the Woods rocky shoreline

FIG. 1.2 Rainy River - Lake of the Woods Drainage Basin



Lake of the Woods spans both provincial and international borders, occupying Minnesota to the south, Ontario to the north and Manitoba to the west. The lake is part of the Rainy River - Lake of the Woods Drainage Basin, which reaches over six hundred kilometres west from Lake Winnipeg. The basin begins with the Minnesota-Ontario Boundary Waters that are “embraced in granite basins, guarded by fissured cliffs [and] connected by narrow streams” (Huck 2002, 140). Continuing north, through the Rainy River, the southwest end of Lake of the Woods is “relatively shallow and edged with marshes” (Ibid., 149), while the north end is “a place of deep water, rocky shores and thousands of islands” (Ibid.). Continuing north, the Winnipeg River “was once a river of spectacular falls and rapids” (Ibid., 152), but today it is mostly tamed by dams. Finally, the basin concludes as the Winnipeg River drains into Lake Winnipeg.

The story of the waters of the area is explored on the following pages as three main trends: fur, forest and fun. Kenora, the focus of this practicum, shares a collective history with the region as it is positioned between Lake of the Woods and the Winnipeg River.



LAKE
WINNIPEG

1792 NW
1798 HBC
1733 FR
1795 NW

1815 HBC

1816 NW

1807 NW

1818 HBC

1795 NW *Rat Portage House*
1803 XY *Rat Portage Post*
1836 HBC *Rat Portage*

KENORA

LAKE OF
THE WOODS

1831 HBC

1824 HBC

1732 FR

1717 FR
1731 FR
1785 NW
1791 HBC
1800 XY
1817 CA
1816 AF

1866 HBC

1793 HBC

1800 NW
1820 AF

1820 NW

1794 HBC

1793 NW

1823 HBC
1750 FR

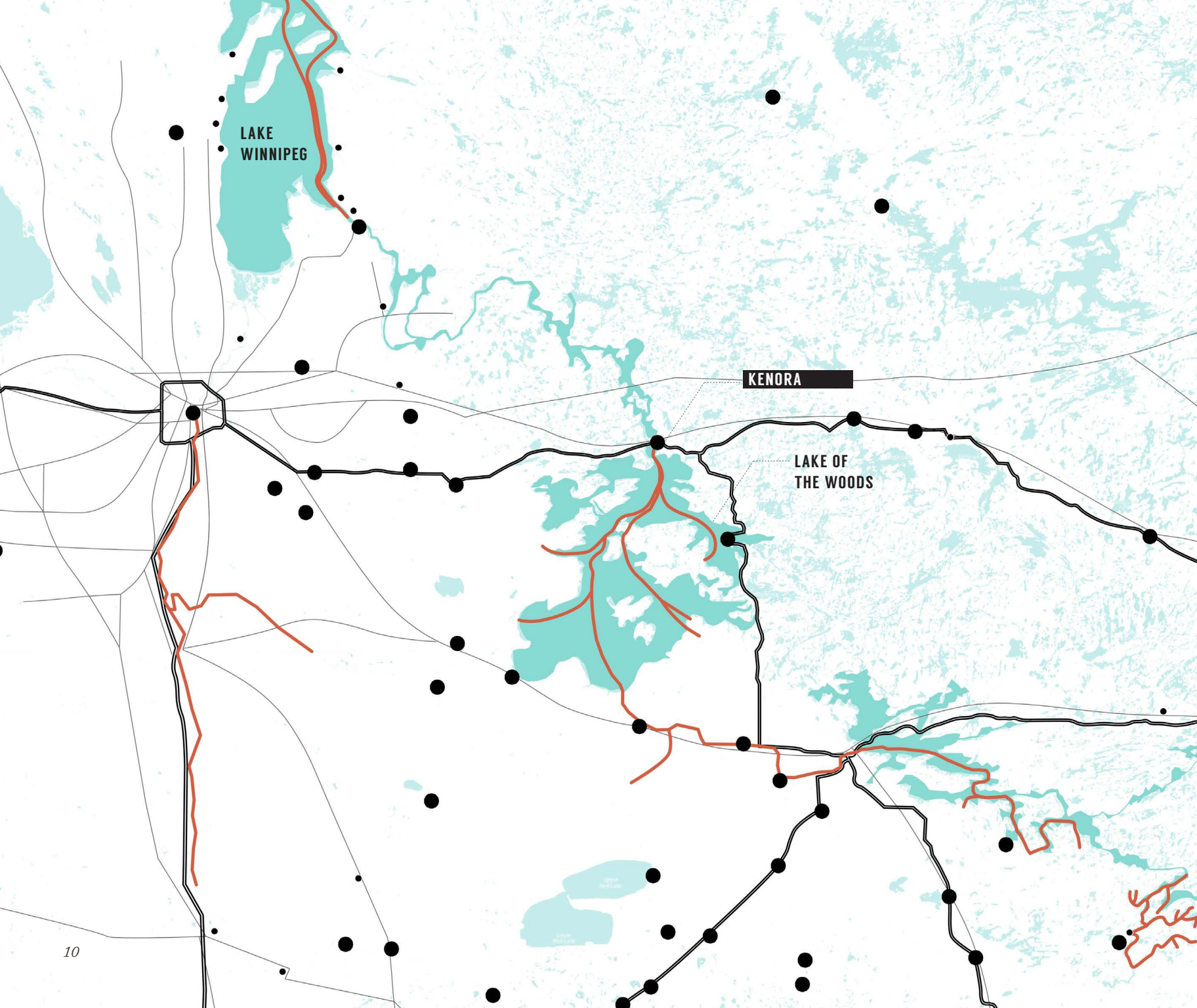


FUR

Prior to the railway being built in the late nineteenth century, the rivers, lakes and marshes that connect Lake Superior to Lake Winnipeg acted as a water highway from the east to the northwest (Gale 1893, 277). The water system was used as a trade route by the First Nations peoples for thousands of years (Huck 2002, 132) and by the European explorers starting in the late seventeenth century (Lund 1984, 19). The objectives of the early explorers were to find a route to the western sea and to locate new sources of furs (Ibid.). Two major routes, the Grand Portage/Pigeon River and the Kaministiquia River, connected Lake Superior to the waters east of Rainy Lake and were traveled with varying popularity throughout the fur trade (Huck 2002, 134). Although the route appears to be continuous at the illustrated scale, many obstacles and portages exist along its path.

Trading companies that once operated in the Rainy River - Lake of the Woods Drainage Basin are as follows:

AF	<i>American Fur Co.</i>
CA	<i>Canadian</i>
CF	<i>Columbia Fur Co.</i>
FR	<i>French</i>
HBC	<i>Hudson's Bay Co.</i>
NW	<i>Northwest Co.</i>
XY	<i>XY Co.</i>



LAKE
WINNIPEG

KENORA

LAKE OF
THE WOODS

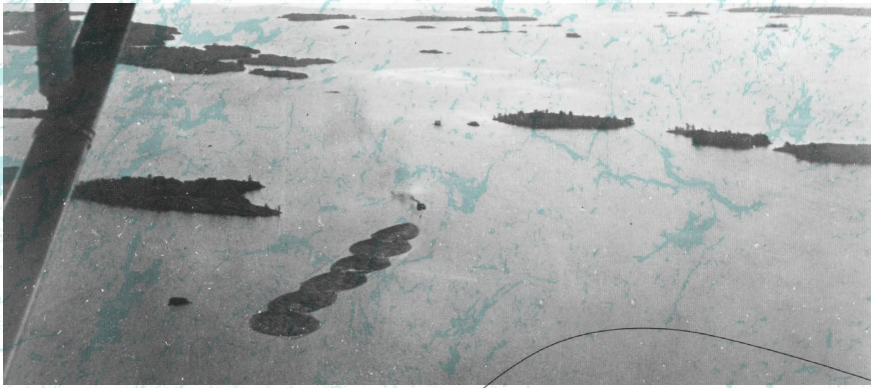
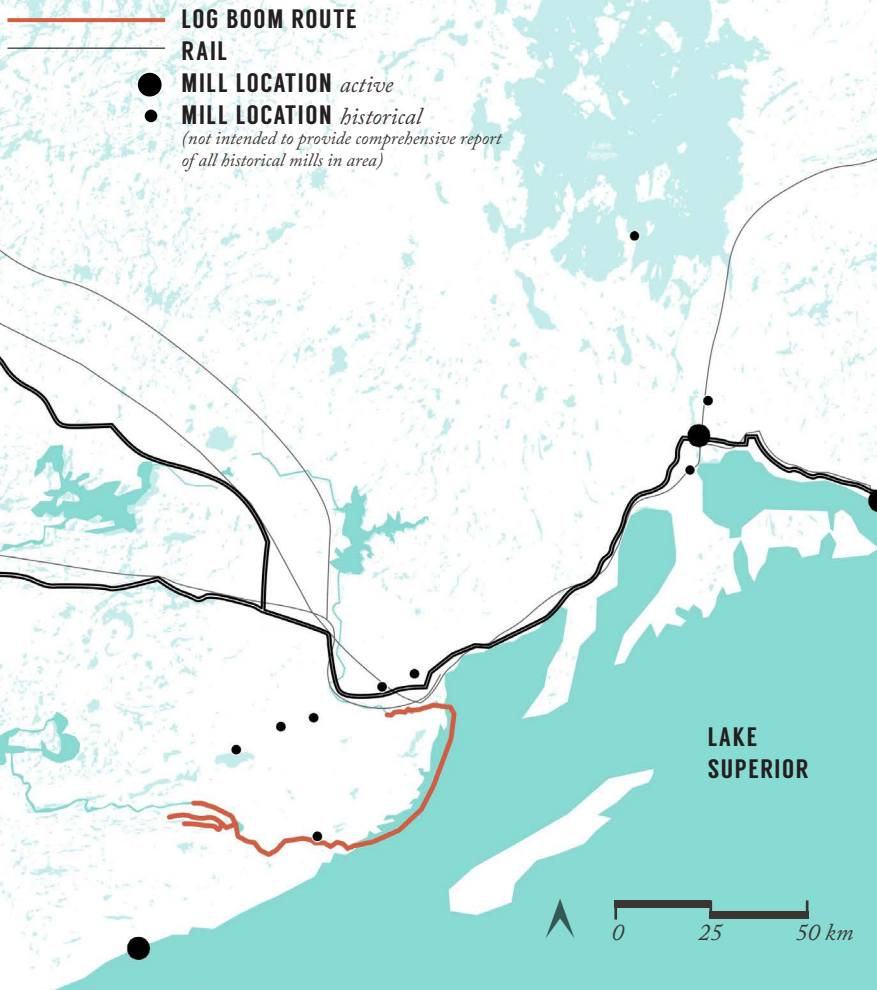


FIG. 1.4 Towing six pockets of pulpwood, 1950.

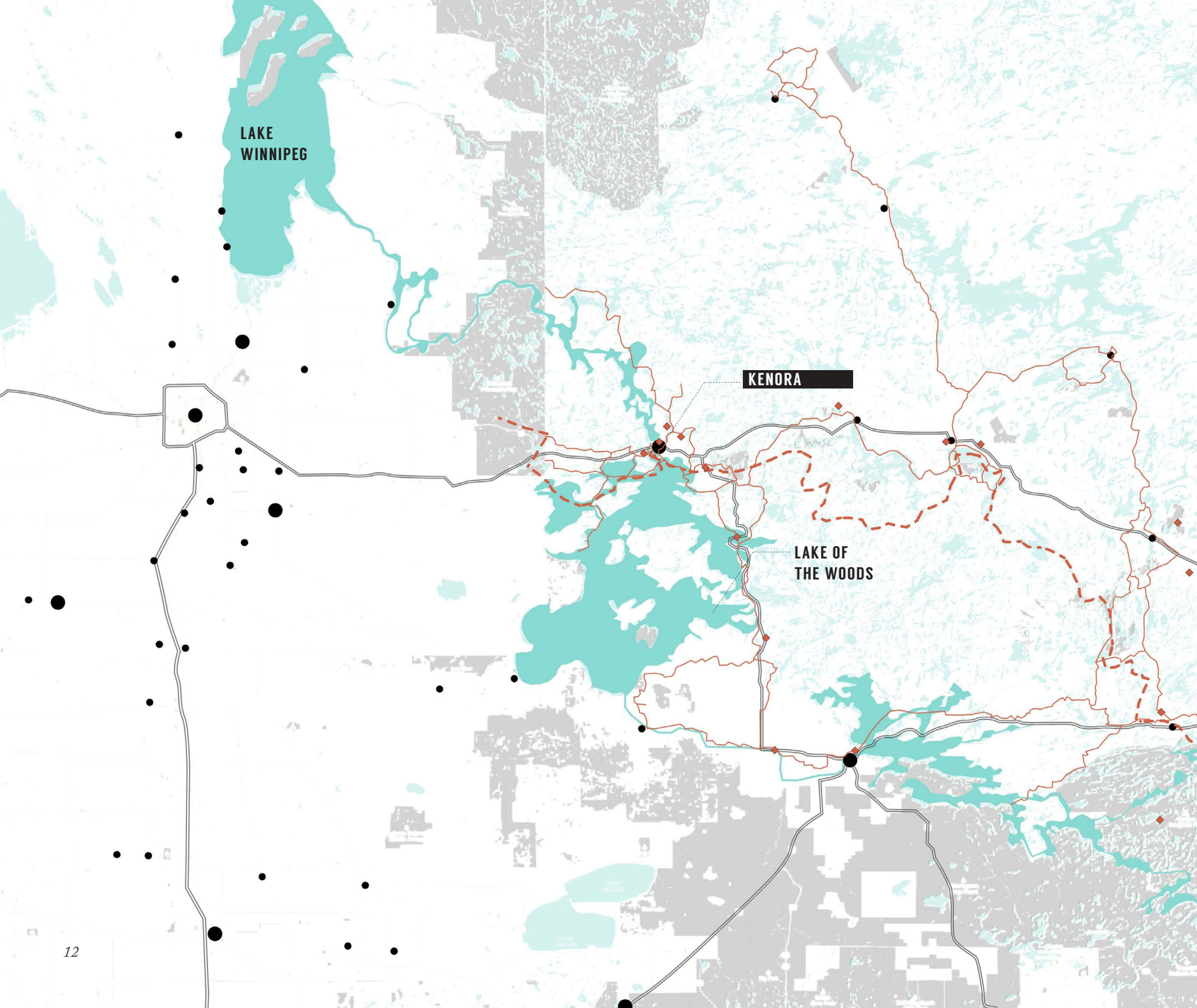
FIG. 1.5 Forestry processing and transportation network



FOREST

The mid-nineteenth century saw the fur trade decrease, while “exploration, prospecting for minerals, timber looking, and claim staking” (Heinselman 1996, 97) increased. The water route shifted from transporting furs to transporting timber. Harvesting timber occurred in the winter months to accommodate the network of ice roads necessary for transporting supplies to the logging camps (Robertson and McCracken 2003, 123). Timber was cut inland and transported to a waterway to await the spring melt and floated to local mills. Transporting logs by lake required a tugboat to haul logs collected by a boom, while transporting logs by river utilized the current, be it natural or artificial, of the water. Depending on the conditions of the waterway, dams were built to control the intensity of the current and could transform “little streams into torrents large enough to float logs” (Manitoba Historic Resources 2000, 12).

Transporting logs by water was mostly phased out as the railroad was built in the late nineteenth century, but rail access did not penetrate south into Lake of the Woods area, and as such tug boats continued to haul log booms to Kenora mills until 1985 (Our Logging Heritage 1999). The ecological damage of transporting logs by water can still be observed as “accumulation of bark on the bottoms of some streams and lakes and the large numbers of lost logs that remain” (Heinselman 1996, 109) in many bodies of water. The damage done by river damming could be more extreme, in some cases, permanently altering the water level (Ibid.).



LAKE WINNIPEG







KENORA

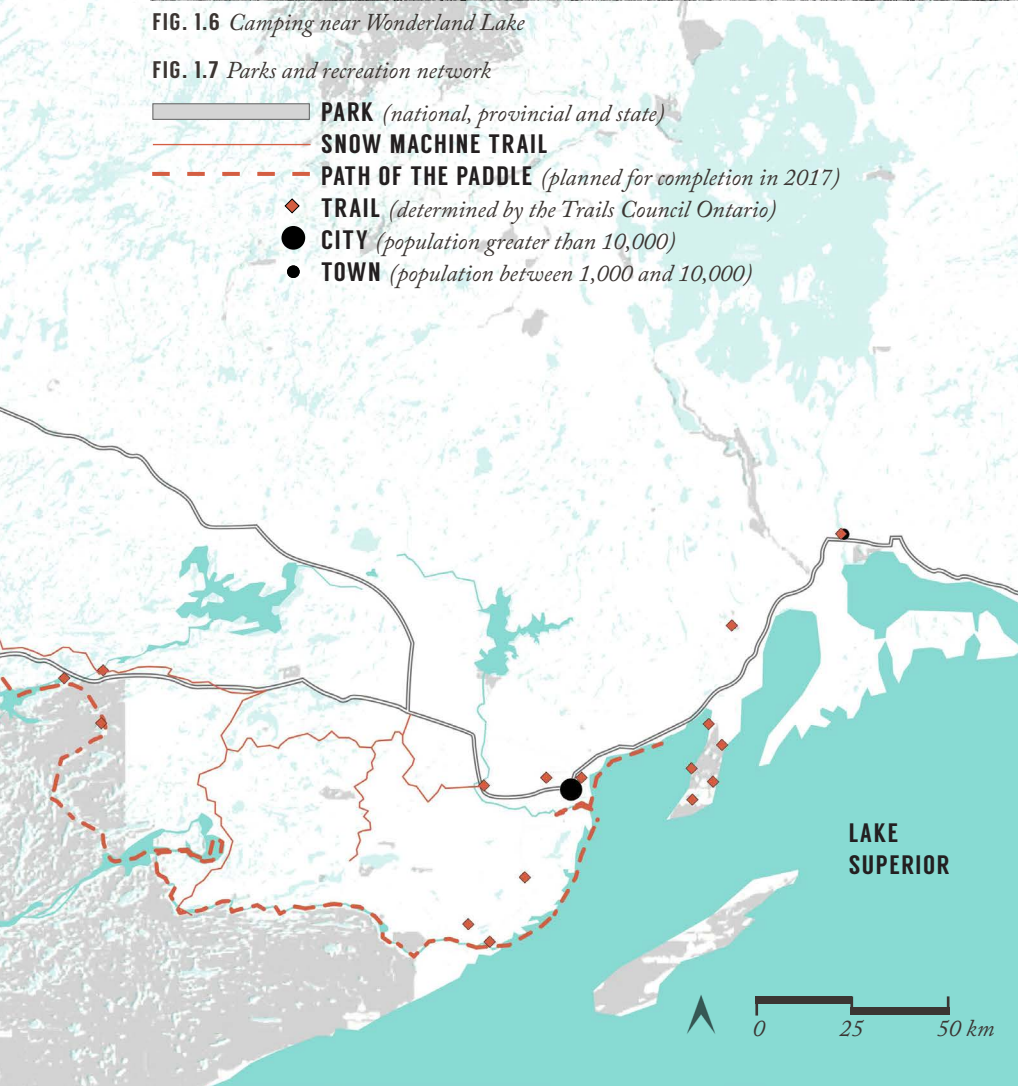
LAKE OF THE WOODS



FIG. 1.6 *Camping near Wonderland Lake*

FIG. 1.7 *Parks and recreation network*

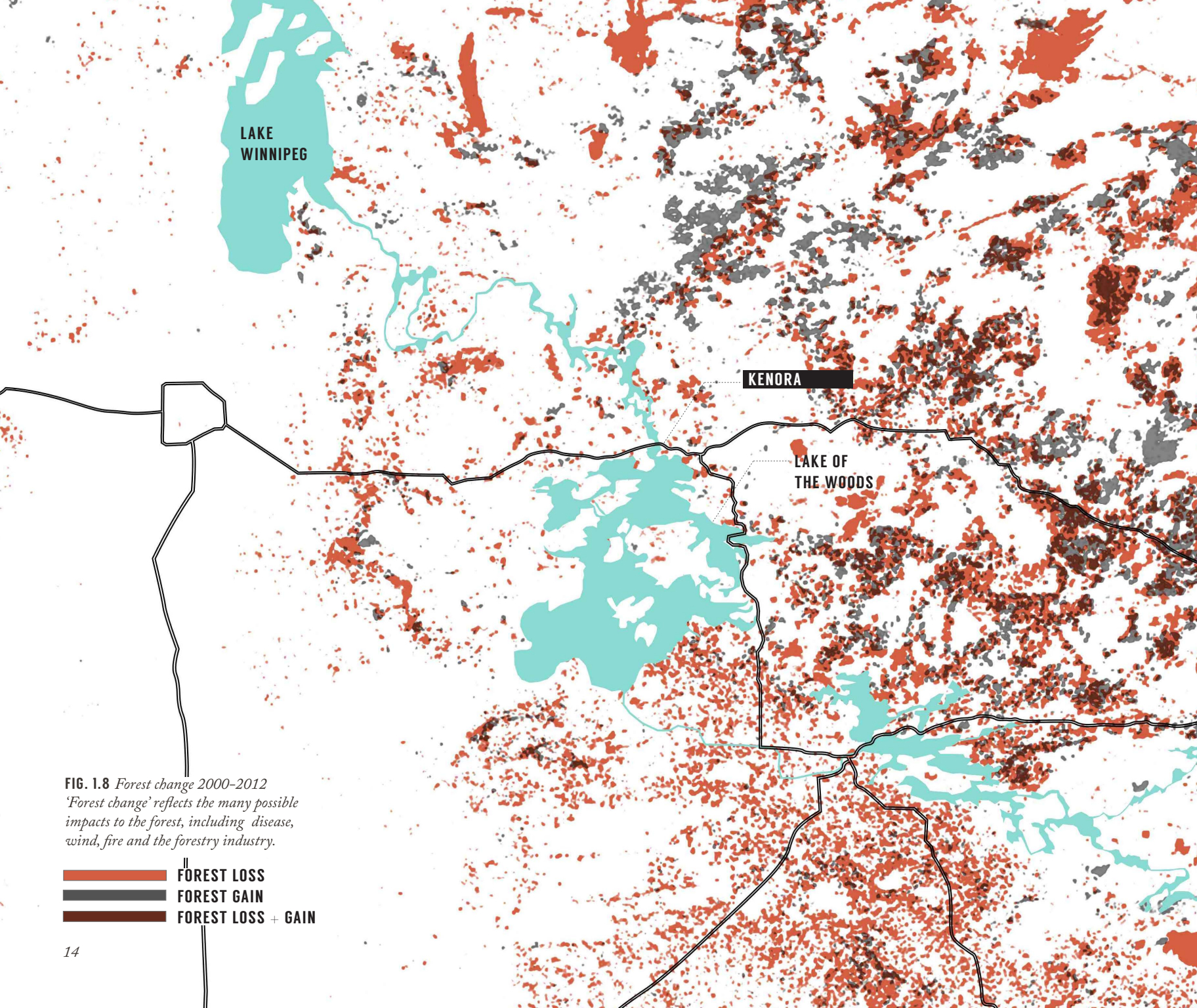
-  **PARK** (national, provincial and state)
-  **SNOW MACHINE TRAIL**
-  **PATH OF THE PADDLE** (planned for completion in 2017)
-  **TRAIL** (determined by the Trails Council Ontario)
-  **CITY** (population greater than 10,000)
-  **TOWN** (population between 1,000 and 10,000)



FUN

The users of the ancient trade route from Lake Superior to Lake Winnipeg have changed from the First Nations people, to the fur trader, to the timber seeker and logger and now to the adventurer. Although forestry persists in the area, the waterways are now home to a strong tourism and recreation industry of fishing, boating, camping, and the like.

Much of the land adjacent to the water system has been designated as public: federal and state parks south of the border and public forest lands, or Crown Land north of the border (OMNR 2012 a). The water route could be interpreted as a spine for the activity of the fur trade, but as transportation has shifted away from the water and towards road vehicles, the highways now experience the concentration of destinations. The users of the water now travel to a destination, a jumping off point, as a way of entering the region of forest and water. Cities and towns are situated along major transportation routes and many have become tourist hubs. Kenora, positioned on the Trans-Canada Highway, Lake of the Woods and Winnipeg River has become a prominent tourist destinations.



LAKE
WINNIPEG

KENORA

LAKE OF
THE WOODS

FIG. 1.8 Forest change 2000-2012
'Forest change' reflects the many possible impacts to the forest, including disease, wind, fire and the forestry industry.

- FOREST LOSS
- FOREST GAIN
- FOREST LOSS + GAIN



DECIPHERING DISTURBANCE

The story of the region can partly be told through historical documentation as the previous pages have attempted to do, but the tangible remnants and disturbances are not as accessible. Besides a few preserved trading posts and other memorialized objects, the presence of previous users are difficult to decipher in the landscape. Lake of the Woods is advertised as a “pristine wilderness” (Morson Tourism Association Ontario 2014), but the forests and waters are far from untouched.

Disturbances to the landscape were not always intentional; Heinselmann’s research of the impact of operating horses as part of timber harvesting illustrates the more nuanced effects of industry. Supply transports from the towns to the logging camps included the feed for the workhorses; this feed contained seeds of species not native to the area being logged (Heinselmann 1996, 110). Evidence of these introduced species can be found at former logging operations, and “some of these species have now become ubiquitous throughout the region, even in areas never logged” (Ibid.).

Other disturbances, such as altering the water level or the composition of the forest, are clearly intentionally and continue to impact the landscape today. Much like contemporary industry, early industry on the lake required a consistent source of energy and reliable navigational routes. Dams were built across the Eastern and Western Outlets of the Lake of the Woods to regulate water levels and to satisfy the energy needs of the prospering industry and growing

community (LWCB 2002, 7). Water levels increased by nearly one metre as a result of these initial control measures, “flooding ... the Ojibwe’s wild rice beds, hay meadows and fish spawning grounds” (Robertson and McCracken 2003, 130). Hydroelectric generation continues to be a priority in the region with a dozen stations located further north in the basin along the Winnipeg River (LWCB 2002, 2). While Kenora’s forestry industry no longer requires reliable navigation, the city’s identity and tourist industry rely heavily on the lake and its navigability.

Finally, the forest itself is evidence of disturbance from the forestry industry. Miron Heinselmann tracked the species composition of the forest surrounding the Boundary Waters to reveal the affects of the early logging era, which saw “conversion of [mature] pine stands to aspen and birch forests” (1996, 110). The pulpwood logging era saw jack pine forests replaced by red pine and white spruce and a “reduced representation of native conifers in the overstory canopy” (Ibid., 125). It is apparent that the demand for specific wood products intentionally influenced species composition and the forestry industry continues this practice today.

To be present on the waters of the Lake of the Woods or in the surrounding forest, ones initial reaction may be to revel in the scenery of the seemingly wild landscape. This practicum does not seek to shift that reaction to something less pleasurable, only to deepened the understanding of the place by recognizing the long history of disturbance.



KENORA REGION

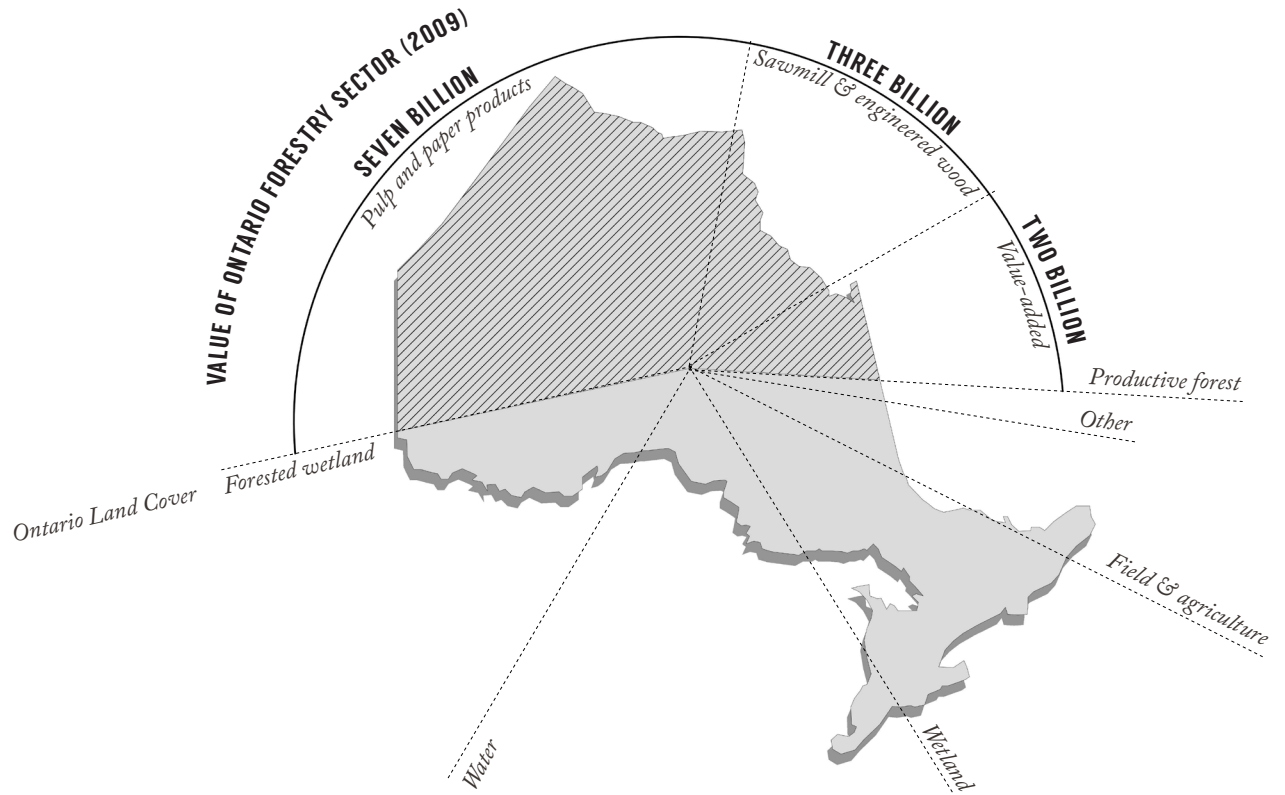
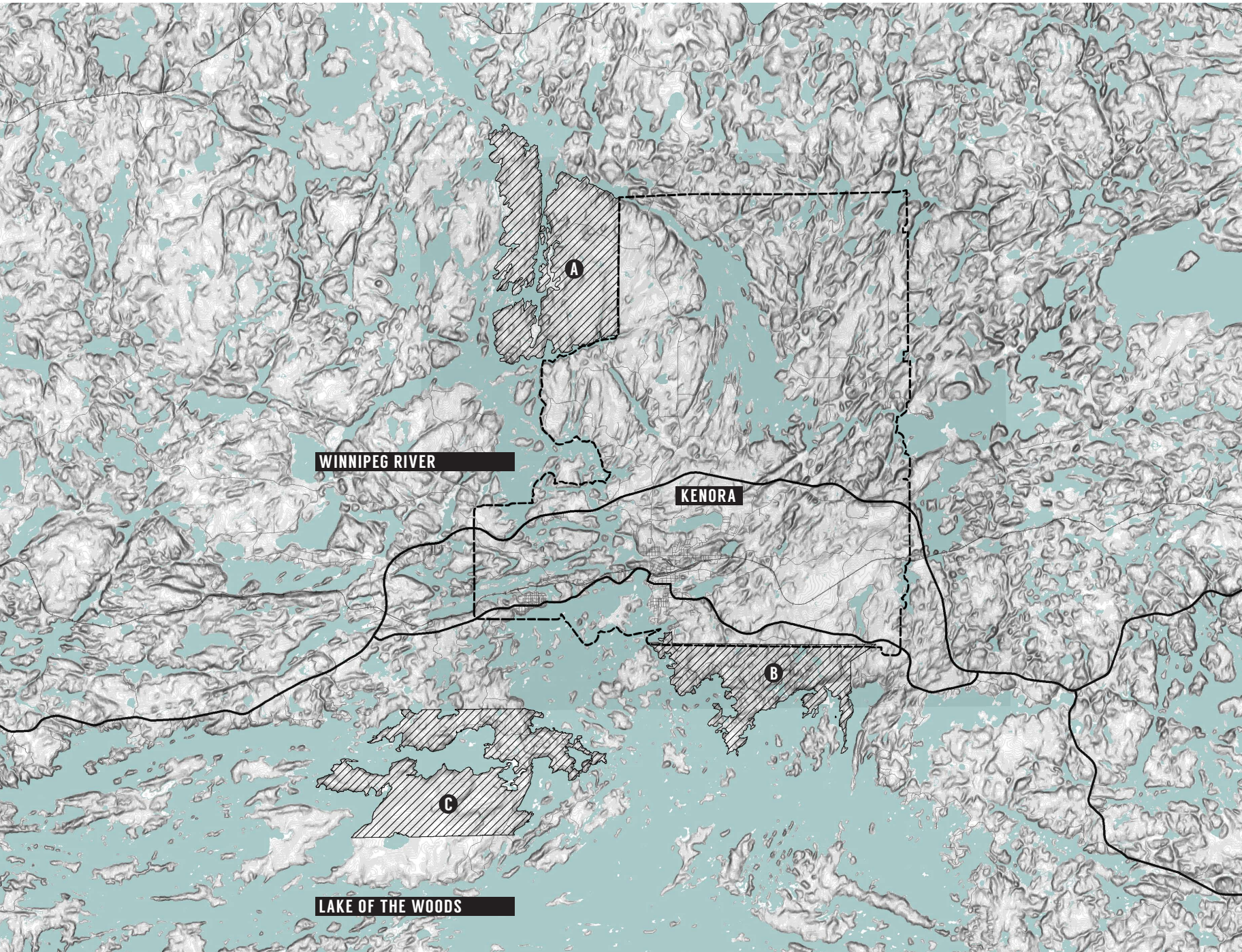


FIG. 2.0



WINNIPEG RIVER

KENORA

LAKE OF THE WOODS

A

B

C

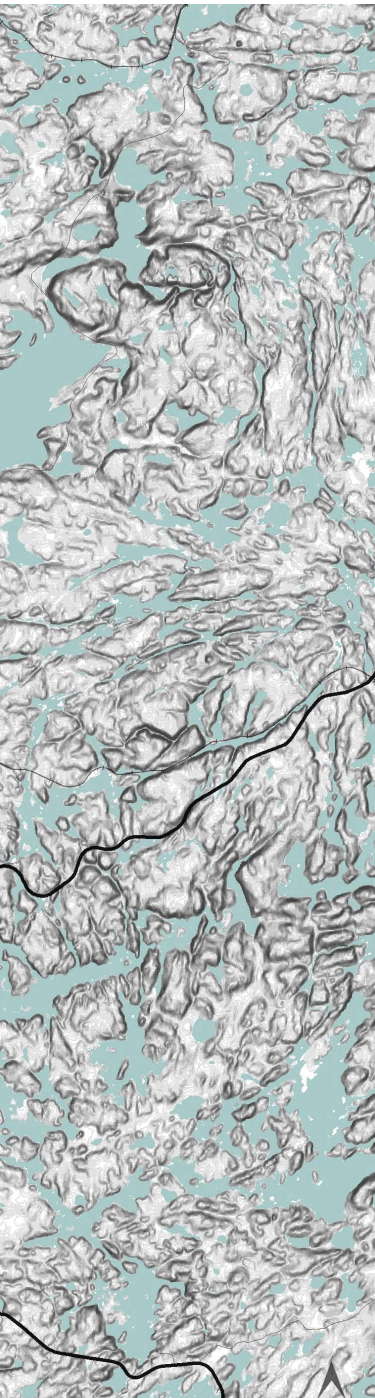


FIG. 2.1 Kenora region landform



- HIGHWAY
- ROAD
- + + + + + RAIL
- WATER
- - - - - KENORA CITY LIMIT
- FIRST NATION RESERVE

- a. *Ochiichagwe'babigo'ining (Dalles)*
- b. *Wauzhushk Onigum (Rat Portage)*
- c. *Obashkaandagaang (Washagamis Bay)*



FIG. 2.2 Key map

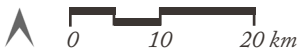
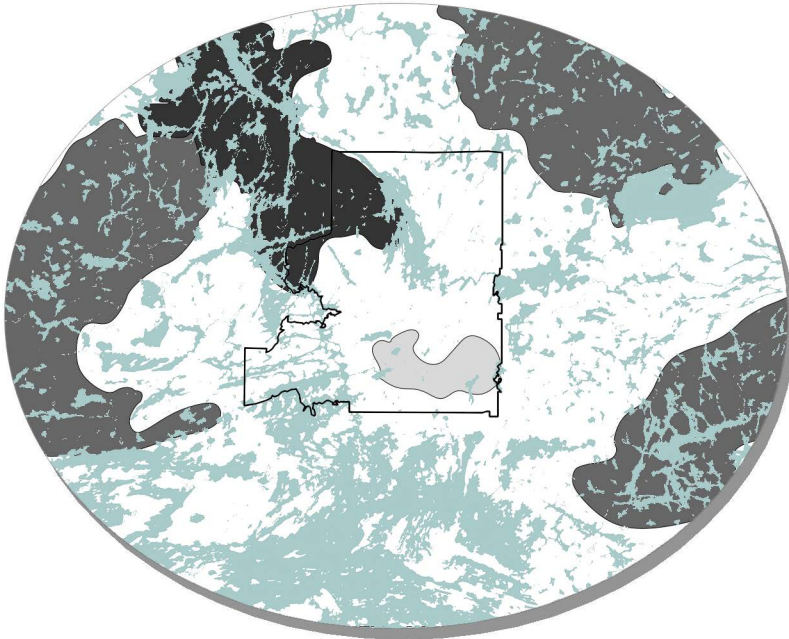
RESOURCE RICH





The resource rich landscape of rocks, water and forest that surrounds Kenora has enabled the city to act as trading centre, a wood processing hub and now as a tourist destination. The city has been built to take advantage of the water, most notably being the Lake of the Woods to the south and the Winnipeg River to the north. The shape of the built area does not align with the shape of the city limits. Most of the development occurs in the far south, with much of the northern land being considered *rural*. Three First Nations reserves are located immediately outside the limits of Kenora, with the remainder of the land considered to be “unorganized territory ... not incorporated for municipal purposes” (Ontario Ministry of Municipal Affairs and Housing 2011).

Typical of the Canadian Shield, a thin layer of soil can be found on bedrock. Soil in this area is mainly ground morain (silty to sand till) with some lacustrine deposits and outcrops of bare bedrock (Ontario Department of Lands and Forests 1965). The area north of Lake of the Woods is mostly intrusive rocks, while the lake region is composed of metavolcanic rocks, which are rich in minerals. Mineral deposits and mining operations in Lake of the Woods area have included: copper, gold, zinc, molybdenum, uranium, nickel, mica, feldspar, and talc and soapstone (OMNR 1979).

SOILS

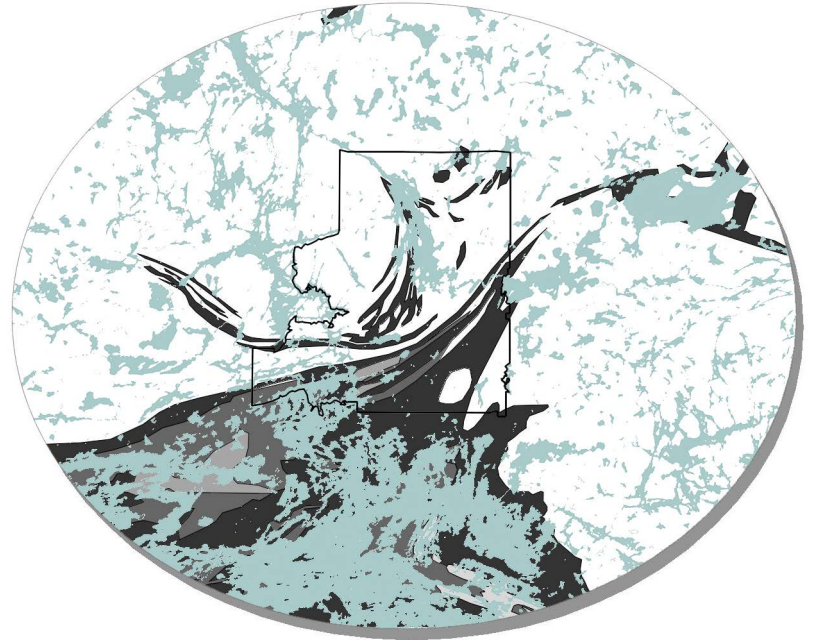
FIG. 2.3








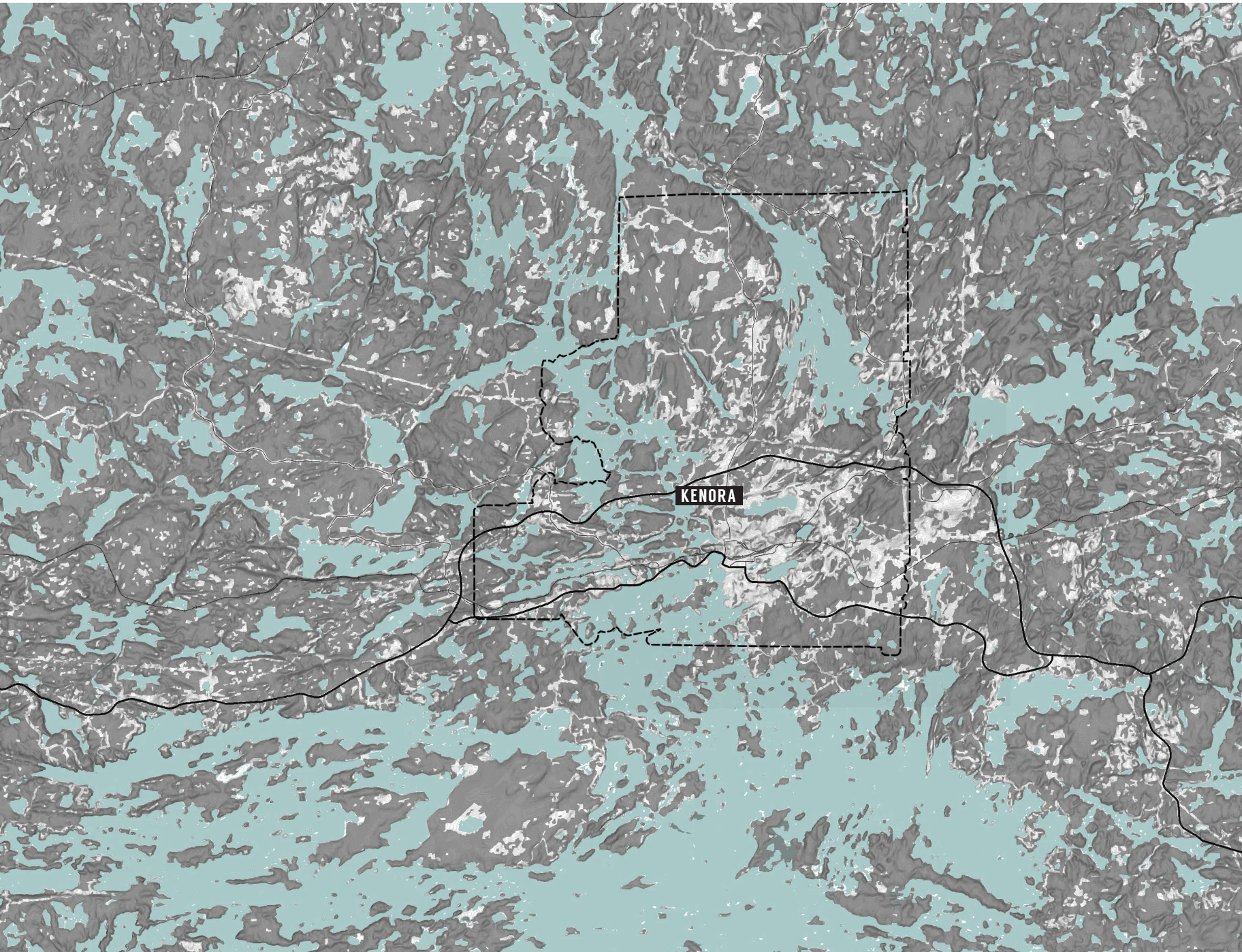
-  GROUND MORAINE
-  OUTWASH DEPOSITS
-  BARE BEDROCK
-  LACUSTRINE DEPOSITS

GEOLOGY

FIG. 2.4



-  FELSIC AND INTERMEDIATE INTRUSIVE ROCKS
-  MAFIC INTRUSIVE ROCKS
-  CLASTIC METASEDIMENTS
-  FELSIC TO INTERMEDIATE METAVOLCANICS
-  MAFIC METAVOLCANICS



KENORA

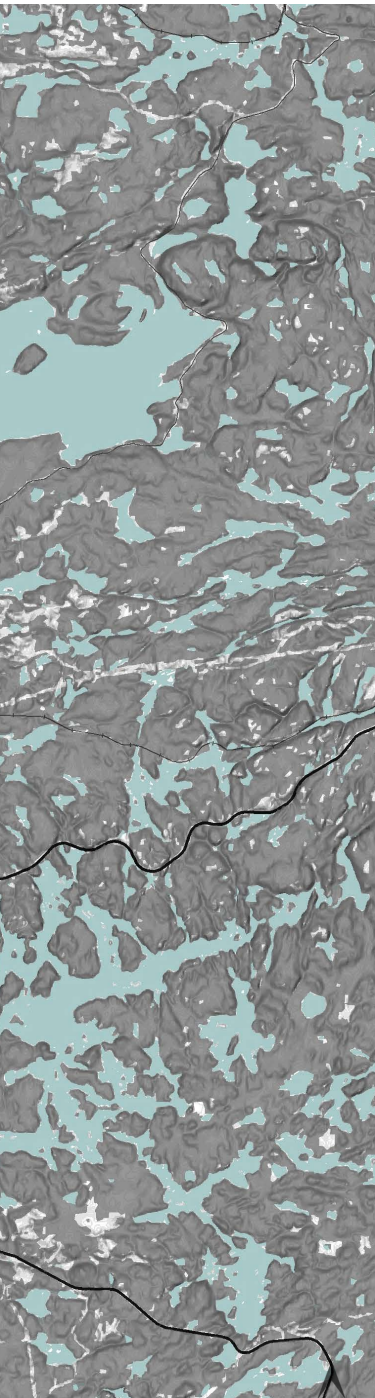


FIG. 2.6 *Kenora region forest*

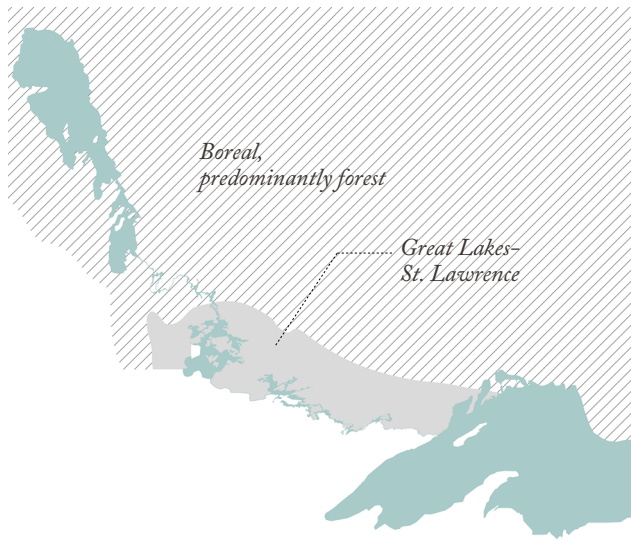
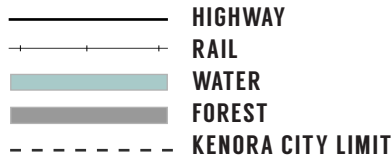


FIG. 2.7 *Forest regions*

Characteristics of the Boreal, Predominantly Forest and the Great Lakes - St. Lawrence Forest regions can be identified in the Kenora area (Rowe 1972). The boreal forest is populated with white spruce, black spruce, balsam fir, jack pine, white birch and trembling aspen while the Great Lakes - St Lawrence forest exhibits red pine, eastern white pine, eastern hemlock, yellow birch, maple, oak (Ibid., 6-11).

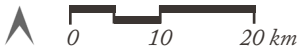
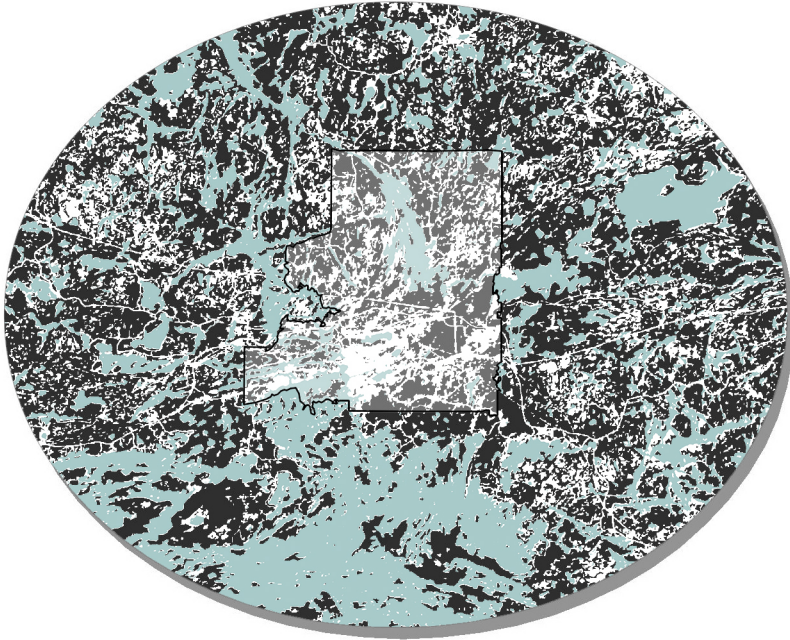
Kenora's position on the water made it an ideal location to receive timber transported by water from logging operations further south. The connections of the railway in the late nineteenth century and the rich surrounding forest enabled the city to become a major wood-processing hub. Forestry continues to be a prominent part the local economy.

While the forest is a resource for timber it is also an important ecological system. The forests of Northwestern Ontario provide essential habitat for a plethora of animal species ranging from songbirds to large mammals to fish. Animals emblematic of the Canadian Boreal region can be found in the Kenora area, some of which are: eagle, blue heron, marten, deer, lynx, fox, coyote, bear, muskrat and walleye (OMNR 2008).

The lakes, rocks and forests that have attracted the resource extraction industries have also attracted the tourists. There is a strong culture of hunting, fishing, camping, boating and snow machining among other outdoor activities in the area by locals and visitors.

FOREST

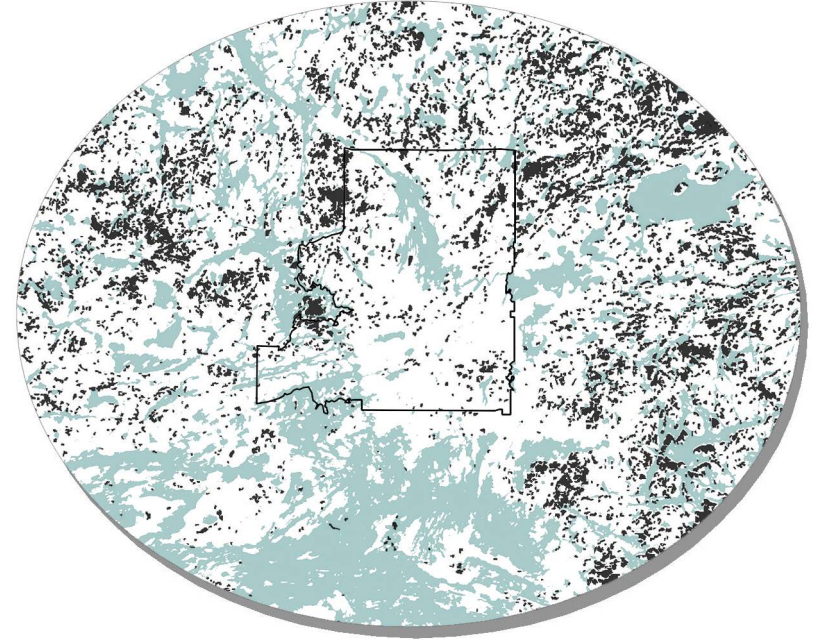
FIG. 2.8



DECIDUOUS
WATER
KENORA CITY LIMIT

FOREST

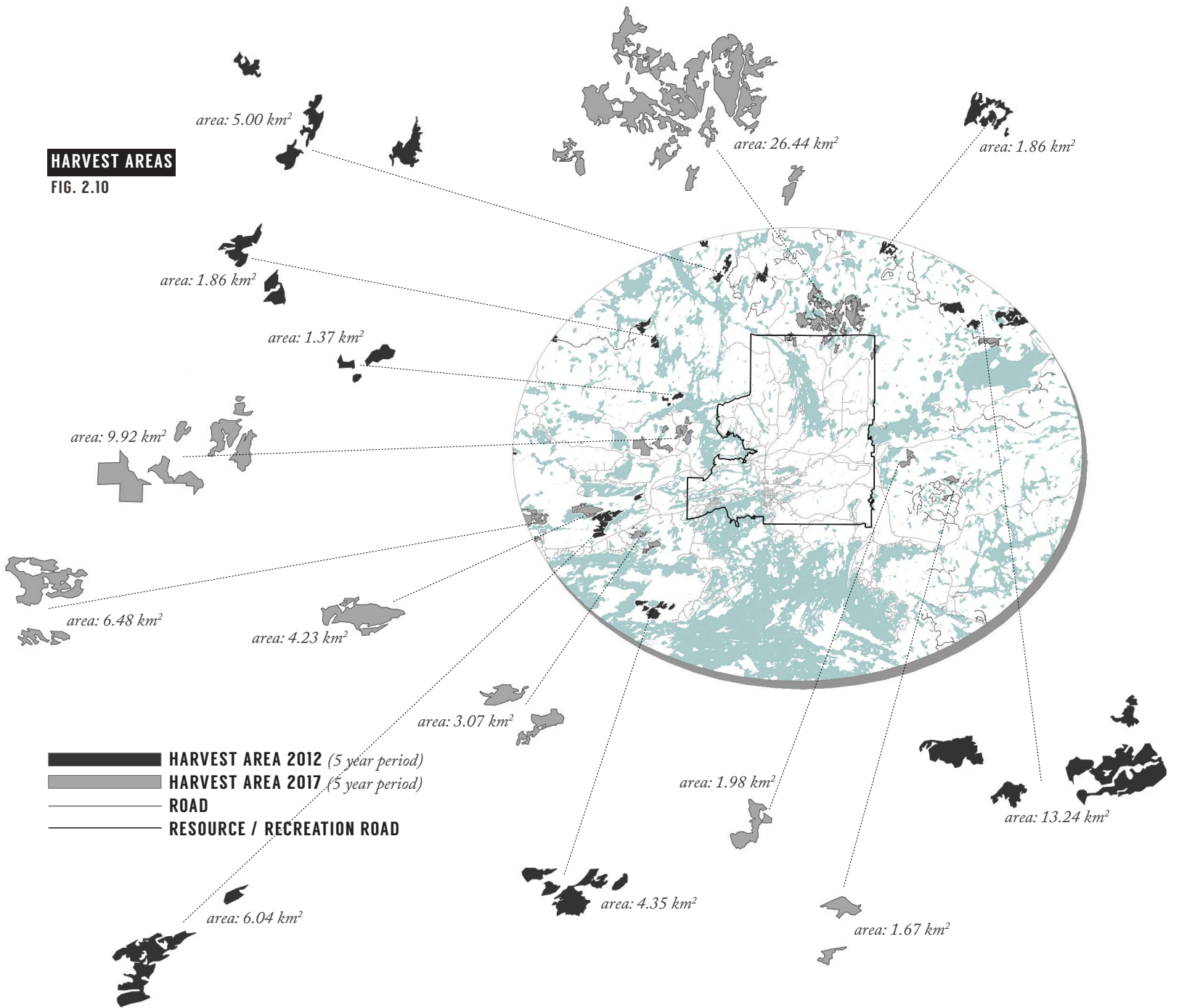
FIG. 2.9



CONIFEROUS

HARVEST AREAS

FIG. 2.10



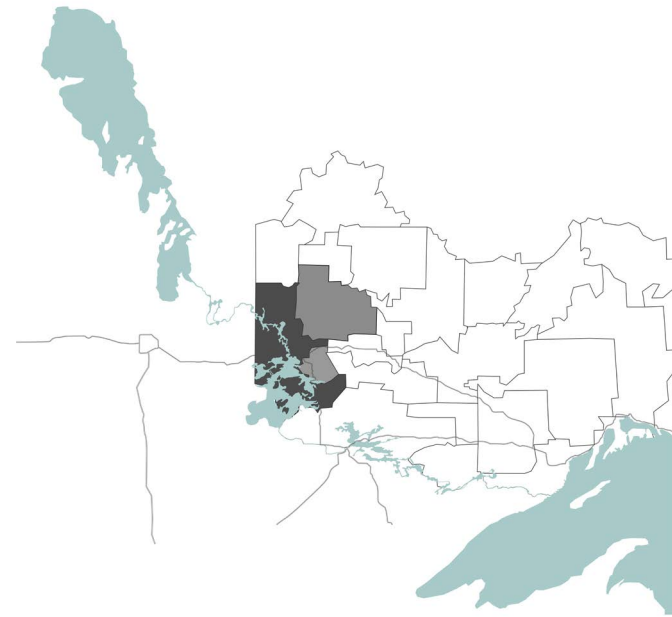
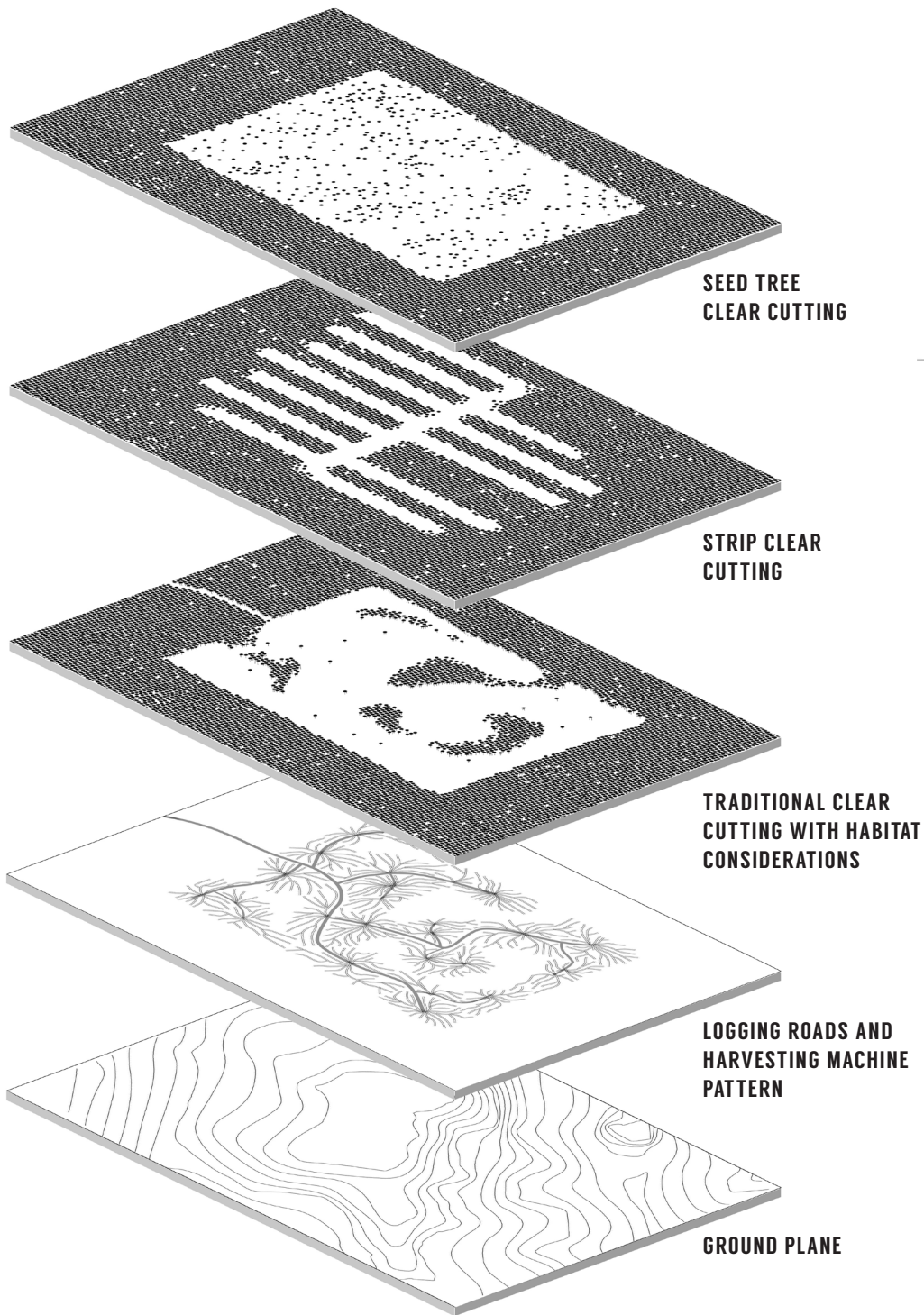


FIG. 2.11 *Forest Management Units*

KENORA FOREST UNIT
 WHISKEY JACK FOREST UNIT
 UNIT BOUNDARY

FIG. 2.12 *Clearcutting patterns*

CLEAR CUT



Ontario Ministry of Natural Resources uses the term *Forest Management Units* to, as the name suggests, divide the forest into areas intended for planning and management (OMNR 2013 c). The boundaries do not appear to consider the physiography of the area. A management plan, an agreement between Natural Resources and the forestry company, exists for each unit. The plan outlines harvesting, renewal, maintenance, and all other accepted policies and practices (Ibid.). Kenora mills receive most timber from the *Kenora Forest* with some potential to increase harvesting from the *Whiskey Jack Forest* (LOTWDC 2013 b, 10).

Ontario's forests are managed in line with one of three silvicultural systems, listed from least to most intensive: Selection, Shelterwood and Clearcut (OMNR 2013 b, 1-2). Clearcutting represents nearly ninety percent of the province's forestry operation area as "the majority of the managed forest in Ontario are in the Boreal Forest Region, where the natural disturbance regime suggests Clearcutting to be the most appropriate silvicultural system" (Ibid., 5). The Boreal Forest is "disturbance driven and dominated by species that are adapted to ... fire, wind and insect" (OMNR 1997, 14), damage that often affects large expanses of forest. Disturbance initiates the regeneration of the forest, creating an even-aged stand. The Clearcut System involves harvesting large areas in a way that mimics this natural disturbance (Ibid.) and is targeted to "stands composed of tree species that have adapted to regenerating in full sunlight" (OMNR 2013 b, 2) after said disturbance. Stands composed of jack pine, black spruce, trembling aspen, white birch, balsam fir and white spruce are common candidates for clearcutting (Ibid., 4).

The method a forest is harvested is determined by soil type, terrain, composition of stand, and the objectives defined in the management plan (OMNR 1997, 14-18). Figure 2.12 illustrate the basic cut patterns, interpreted from the acceptable harvesting methods as outlined by the Ministry of Natural Resources (Ibid.). Conventional cutting involves the harvesting of a stand, or multiple stands in a single operation (Ibid., 15). Strip, block or patch cutting often involves harvesting a stand in a pattern that is "determined by site and seed dispersal characteristics" (Ibid., 16) to encourage natural regeneration from adjacent uncut areas. For example, strip-cutting orientation is partly determined by the predominant wind direction on site as to achieve maximum seed dispersal of some tree species (Ibid.). Finally, the seed-tree harvesting method involves the preservation of some seed bearing trees, either individual or a group, in attempt to naturally regenerate the area (Ibid., 17).

Each method involves a strong shape cut from the forest. The public's understanding and opinion, be it for or against the practice of clearcutting, generally includes this geometric shape cut from the forest. The collective understanding of what clearcutting entails is a theme that will be further discussed in relation to the design intervention.

In order to better understand the operations of the forestry industry and the spatial implications of clearcutting, a cut block in the Caution Lake area, fifty kilometres northeast of Kenora, was visited (see following pages). The forest appeared to be predominantly jack pine (*Pinus banksiana*) and the renewal method appeared to be aerial seeding.



FIG. 2.13 *Caution Lake clearcut, located in the Kenora Forest Management Unit, scheduled to be harvested/re-planted between 2012 and 2017 (OMNR 2012 b).*



FIG. 2.15



FIG. 2.15 *Tire tracks in clearcut*

POST HARVEST

Field observations:

Throughout the multiple cuts there were many single trees and small patches of forest remaining for animal habitat. The former forest floor was a spongy texture full of debris interspersed with large machine tracks and tool marking from the harvesting equipment.

Industry operations:

Depending on the site conditions, the land may be disturbed in order to create “favorable” growing conditions for renewal; this disturbance is referred to as “site preparation” (von der Gönna 1992, 4). Site preparation can include chemical applications, or mechanical means, which involve the disruption of the forest floor and upper soil profile (OMNR 1997, 24–26).



FIG. 2.16 *Caution Lake cut block regeneration*



FIG. 2.17

REGENERATION

Field observations:

New growth was chaotic and diverse, unlike the clear grid of trees that would exist in a black spruce operation. The use of herbicides to control competition was not apparent as many species of vegetation, including grasses and shrubs existed among the young jack pine trees.

Industry operations:

Reforestation methods range from natural to artificial (OMNR 1997, 30). Taking advantage of the natural processes of seeding, sprouting or suckering results in the maintenance of the local gene pool but provides little control over “spacing, density and species composition” (Ibid., 31) in a given stand. A more artificial approach of direct seeding or planting can provide higher control of stand characteristics, “opportunity to introduce genetically improved stock,” which could increase the likelihood of achieving the management plan objectives (Ibid., 33).

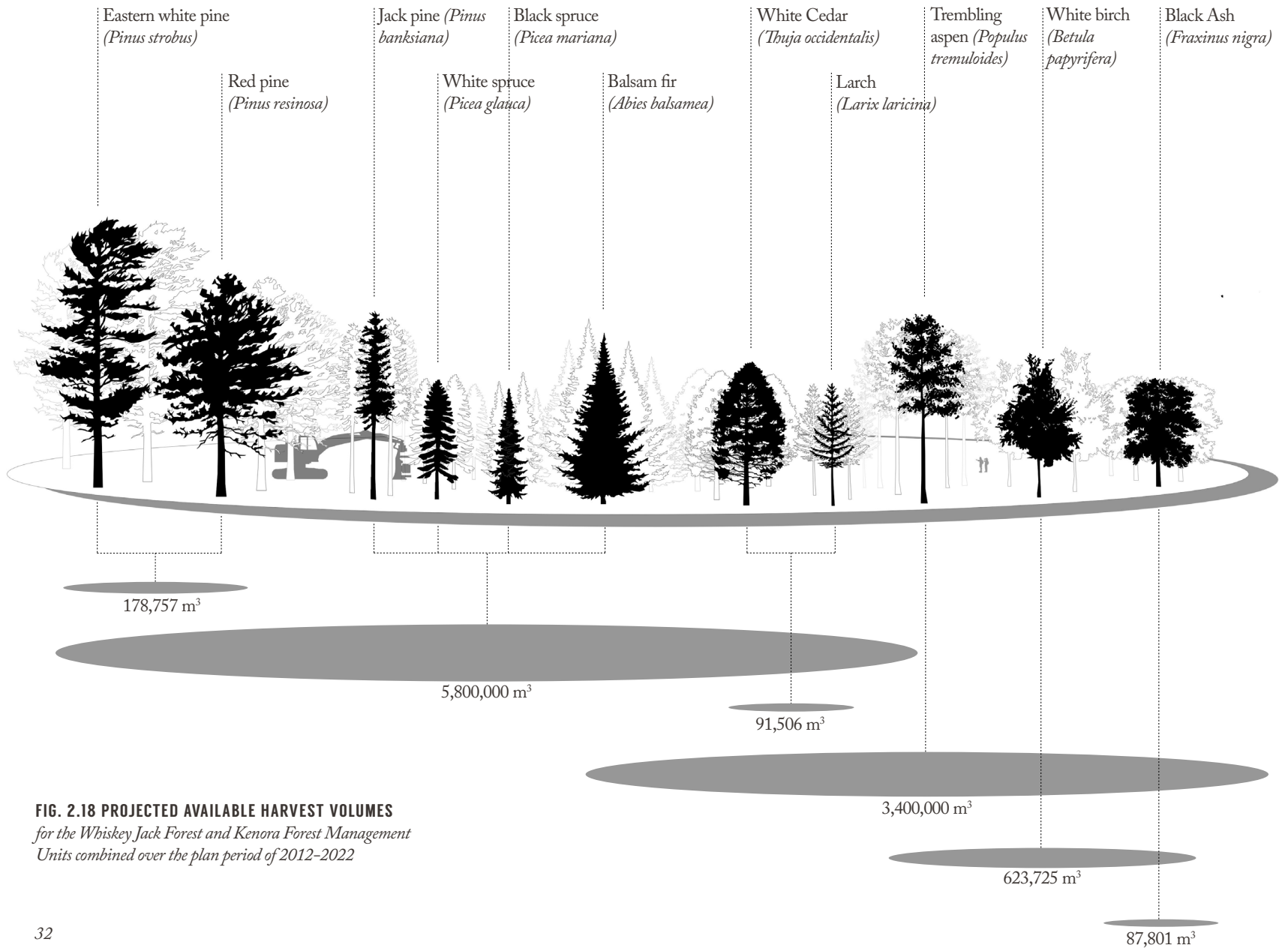


FIG. 2.18 PROJECTED AVAILABLE HARVEST VOLUMES
 for the Whiskey Jack Forest and Kenora Forest Management
 Units combined over the plan period of 2012-2022

SHARING THE FOREST

The forestry industry views the forest as a resource that can be extracted and processed, the tourist industry views the forest as a resource that can be experienced and inhabited. These two industries share one resource. Unlike the grid of the Manitoban prairies that have very clear edges, the boundaries of the Management Units are not as tangible. It is easy to look out over an agricultural field and understand it is a managed landscape, but much more difficult to perceive the forest in a similar manner. Over eighty percent of Ontario's forests are considered to be on Crown Land (OMNR 2012 a) and in the absence of planting or harvesting operations the industry of the forest is not apparent.

As discussed previously, the appearance of the forest in terms of its composition and form has been manipulated by the forestry industry. There is a long history of planting tree species most suited to the type of product in demand, most notably, lumber and pulp (Heinselmann 1996, 110-125). As technology advances

and wood products in demand shift, the experience of the forest will inevitably shift with the market. For example, walking in a red pine forest in comparison to an aspen and birch forest, a common conversion during the early logging era (Ibid. 110), is extremely different in terms of spatial experience.

Despite positive or negative opinions about the forestry industry, its network of logging roads undeniably plays an important role in the tourist industry. Resource roads allow access to a landscape of lakes and Crown forest that would otherwise be inaccessible by vehicle. The logging roads in relatively close proximity to Kenora are well used; campsites adjacent to the roadway and trucks hauling all-terrain vehicles and canoes are common.

The following images are of the author's personal experience, as a tourist, in multiple forest management units in Northwestern Ontario.



FIG. 2.19 *Dog sledding in the Dryden Forest Management Unit*



FIG. 2.20 *Snowmobiling in the Kenora Forest Management Unit*



FIG. 2.21 *Walking the Kirkup Trails in the Kenora Forest Management Unit*



FIG. 2.22 *Kayaking on Wonderland Lake. Accessed canoe route via logging road in the Whiskey Jack Forest Management Unit.*



CITY OF KENORA

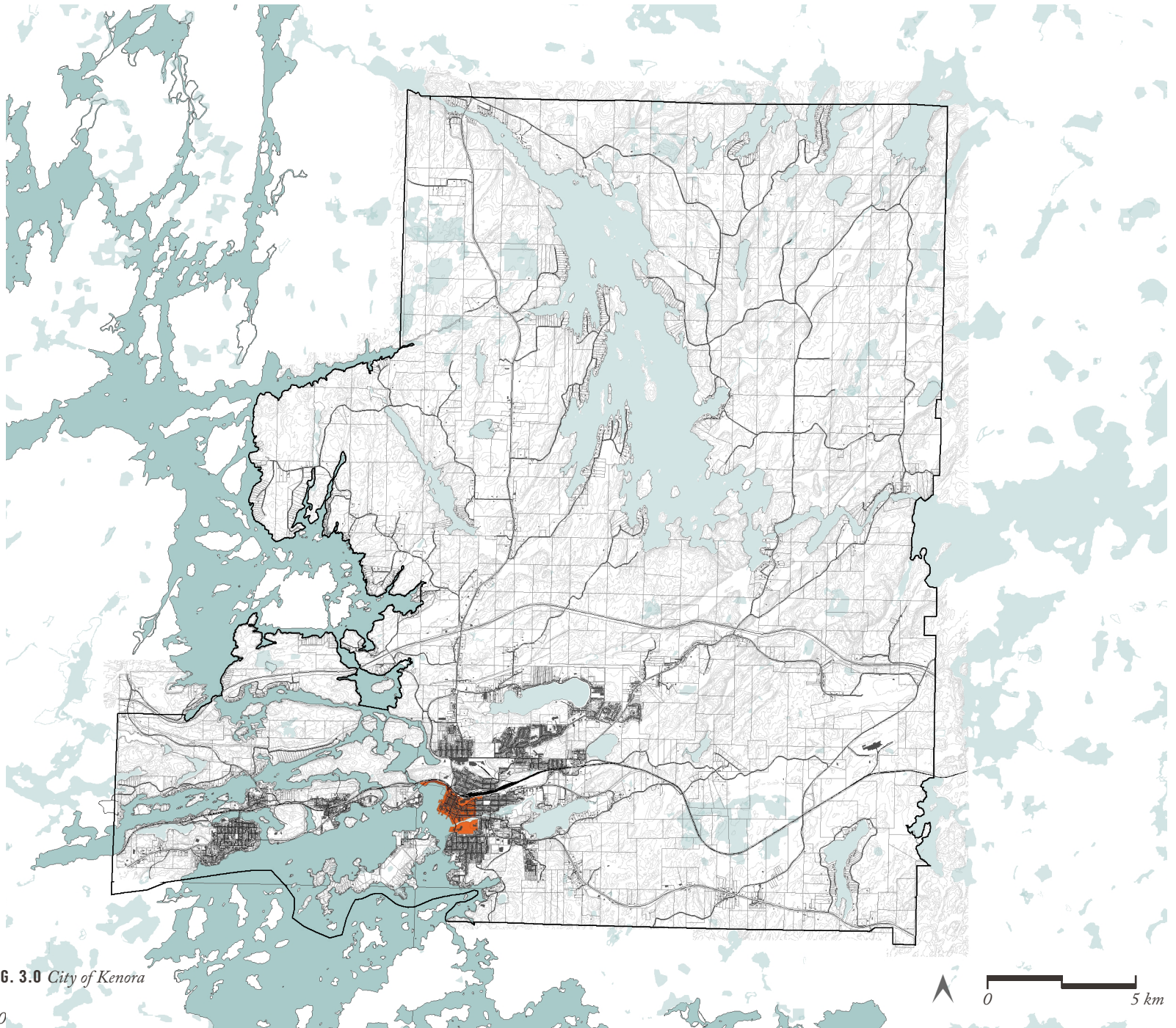
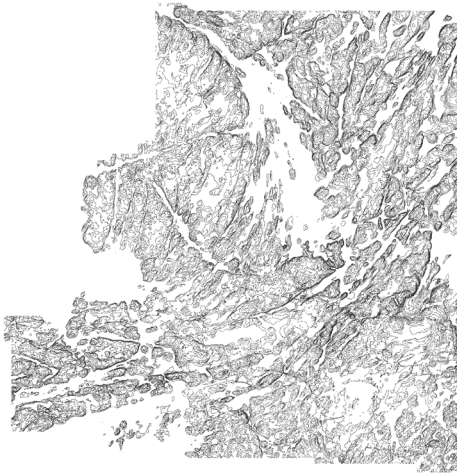


FIG. 3.0 *City of Kenora*

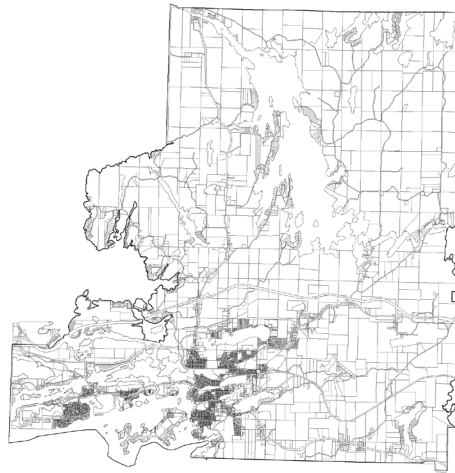
Kenora is a small city with a population of just over fifteen thousand permanent residents (Statistics Canada 2011) and during peak summer months the population more than doubles with visitors and seasonal residents (LOTWDC 2013 a, 11). The established area is located in the southern portion of the city limits with the remaining area being considered rural. The surrounding resource rich landscape has supported resource extraction industries, which continue to be important in the local economy, yet the city intends to shift “economic and land use focus away from the primary resource industries” and shift towards the industry of tourism (City of Kenora 2010 a, 1-2). This shift is evident in the recent branding campaign by the city

that has labeled Kenora as “North America’s Premier Boating Destination” (LOTWDC 2013 a, 10).

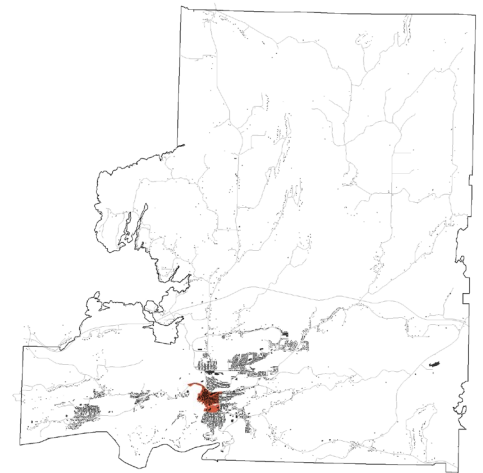
A strong tourism industry currently exists and continues to grow as both the city and local businesses have “invested in year-round attractions, sports events, festivals, new venues, and other amenities” (Ibid., 5). Over seven hundred thousand tourists visited the Kenora District in 2008, spending over two hundred million dollars (Ibid., 19). The summer months continue to be the most active, it is estimated that “approximately 8,000 to 10,000 powerboats and larger sailboats” utilize the Lake of the Woods each season (Ibid., 26).



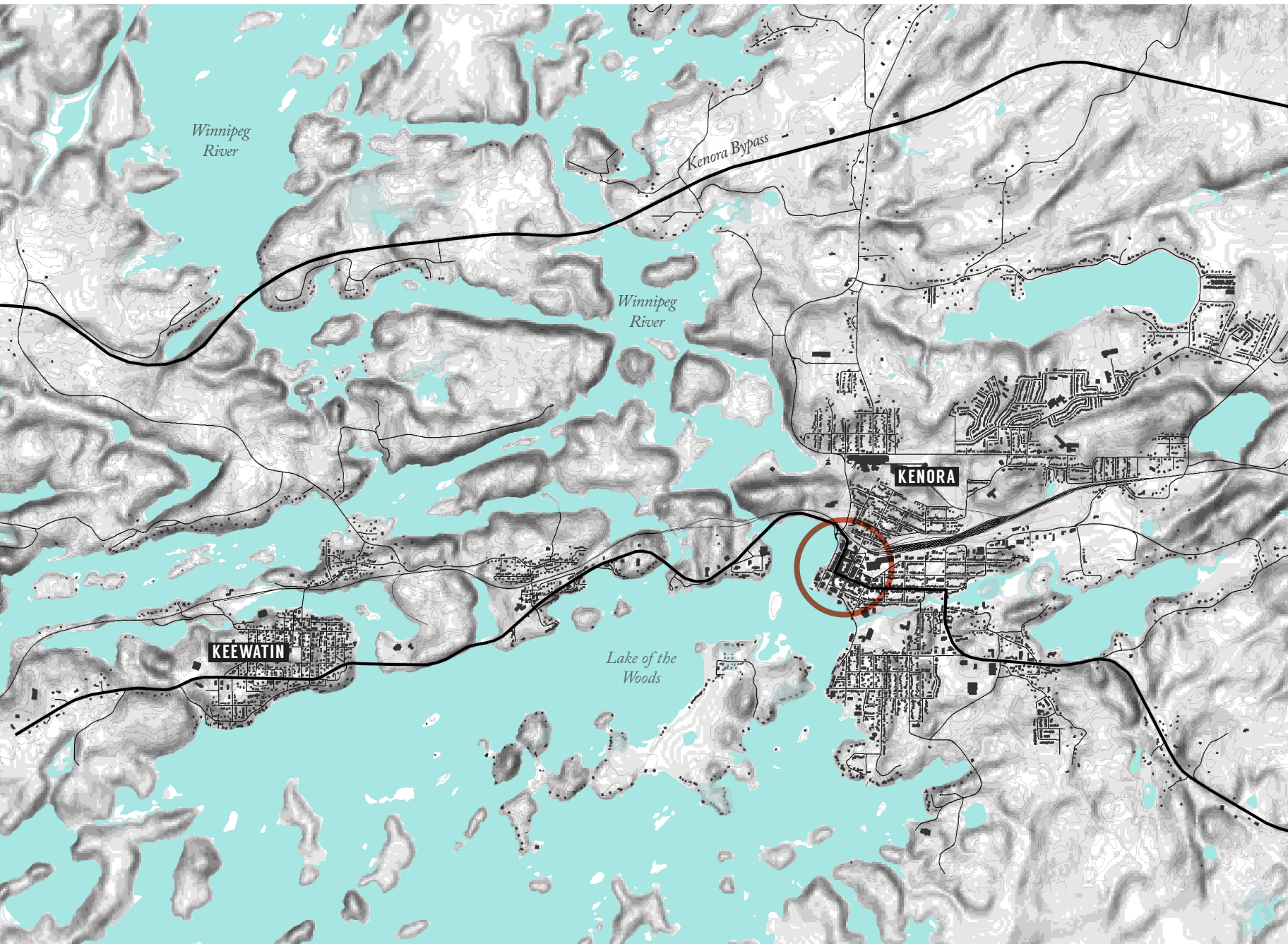
CONTOURS (5m intervals)



PROPERTY PARCELS



ROADS, BUILDINGS AND DOWNTOWN
(Harbourtown centre)



Winnipeg
River

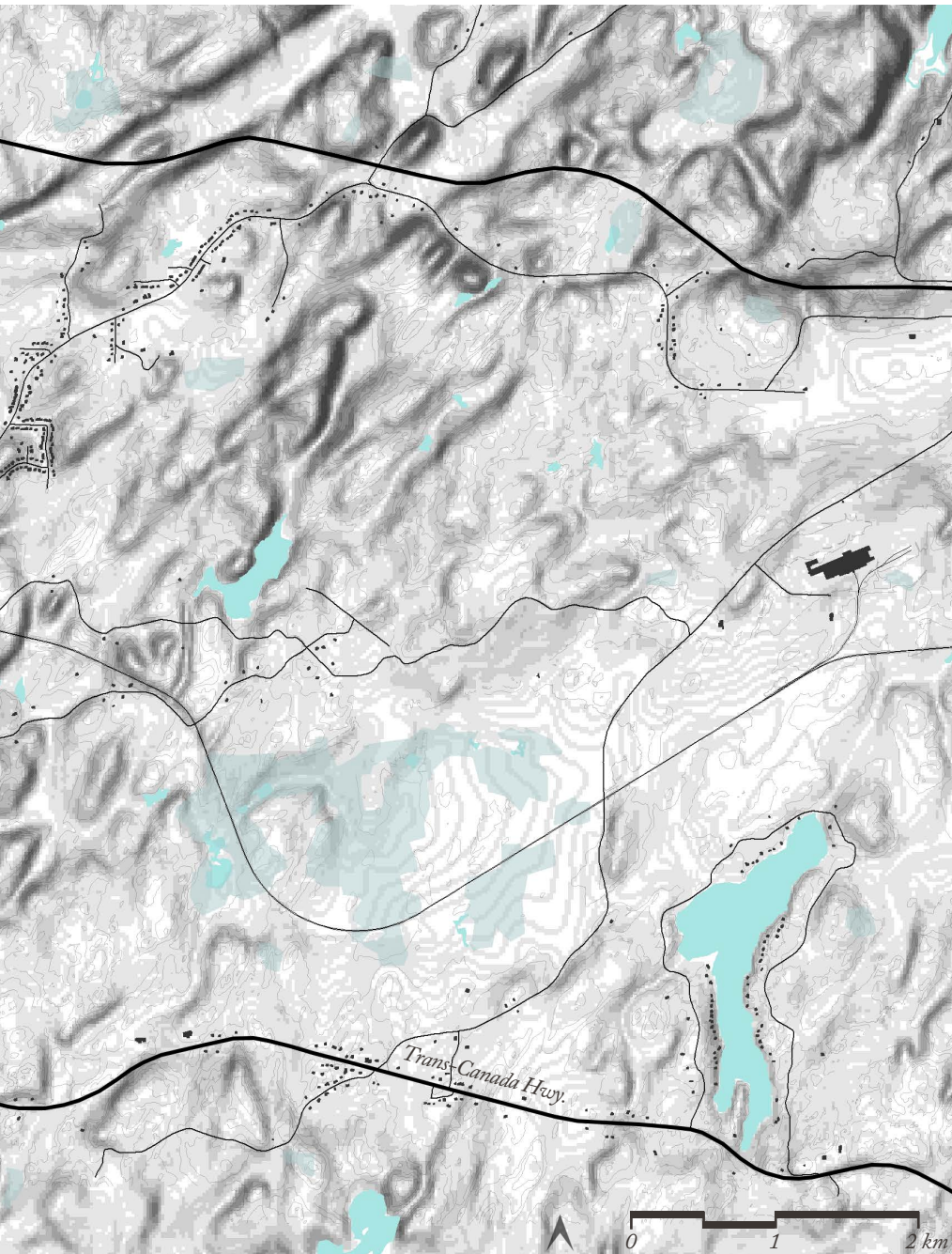
Kenora Bypass

Winnipeg
River

KENORA

KEEWATIN

Lake of the
Woods



The developed areas of Kenora are stretched across multiple landforms and are connected west to east by the Trans Canada Highway. There are two clusters of development: in the west is the neighborhood of Keewatin, formerly a separate town, and in the east lies the majority of the development and the downtown. Keewatin and Kenora were established almost simultaneously, growing independently to one another, as the land was not fully connected, despite the rail line, until the highway was built in the 1930s (Lake of the Woods Museum 2012).

The building pattern can appear chaotic, but it has been highly influenced by access to water and the shape of the landform. Areas experiencing steep slopes or large bedrock outcrops appear to generally be avoided, assuming because of the difficulties and increased costs of building on such sites.

There is a vibrant downtown, referred to as Harbourtown Centre, which radiates east from the shore of the Lake of the Woods. Much of the tourist focused development has been occurring in this area, which includes an entire redesign of the main street and the building of the Whitecap Pavilion which now acts as the core venue for many events and festivals.

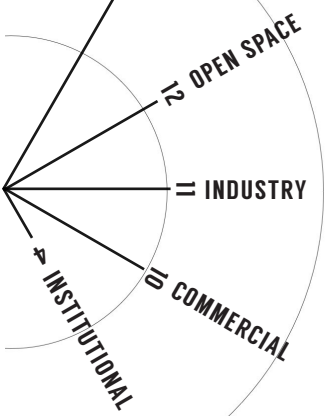
FIG. 3.1 City of Kenora, southern developed area





FIG. 3.2 *above, view east of Harbourtown Centre waterfront*

FIG. 3.3 *Percentage of land districts within one hundred metres of water*



The proximity to water has been essential in forming the shape of the city. To better understand the public's relationship to the water, analysis of the shoreline was completed using Geographic Information System (GIS) software. A buffer of one hundred metres, a dimension chosen in order to illustrate possible access and direct views, was applied to the shoreline and zoning layers. This analysis revealed that close to thirty percent of all buildings in the city are built within one hundred metres of water. Close to eighty percent of the shoreline is zoned as land districts considered private; ten percent zoned as commercial, which entails an increased level of public access and the remainder, twelve percent, zoned as public open space.



STUDY AREA

The landscape of water has enabled the forestry and tourism industries to flourish around Lake of the Woods. Early industry required a consistent source of energy and reliable navigational routes. Dams were built across the Eastern and Western Outlets of the Lake of the Woods to regulate water levels and to satisfy the energy needs of the prospering industry and growing community (LWCB 2002, 7). Hydroelectric generation continues to be a priority in the region with a dozen stations located further north in the drainage basin along the Winnipeg River (Ibid., 2). While Kenora's forestry industry no longer requires reliable navigation, Kenora's identity and tourist industry rely heavily on the lake and its navigability.

Sawmills were historically situated on sites accessible by water for purposes of transporting logs, and sites accessible by rail for distributing processed lumber to market. All of the historic mills in Kenora were situated adjacent to the water to receive logs from the cut site and store logs while waiting processing. 1060 Lakeview Drive has been home to a sawmill since the late nineteenth century, preserving the fifty-hectare site from any substantial development. Kenora Forest Products, able to employ over one hundred people and produce eighty millions board feet per year of studs (LOTWDC 2013 a, 6), currently resides on the property. The sawmill is planning to relocate in the coming years and the future of the site is undetermined.

The site is desirable to developers as lake front property is in high demand and the topography of the site allows for views of the lake from almost every location. A glimpse of what type of development could happen on the site occurred when the previous owners of the mill were considering the future of the site, the possible development included a large residential area with single family subdivisions, commercial areas including motels, restaurants, condominiums, a marina and boat storage area (KGS Group 1994 a, 3).

The vision of housing does not align with the current climate of the city's growth and development forecast. Kenora is a slow growing city, estimating a two and half percent increase in population over the next twenty years (City of Kenora 2010 a, 1-4). The increase in population would "generate a demand for 234 housing units to the year 2031" (Ibid.). Currently, there is ample land available near the city centre that has potential for increased density and infrastructure connectivity to satisfy the future housing needs. The future of the 1060 Lakeview Drive site is further explored in the design intervention portion of this practicum.

The following pages (48-51) track the mill locations in the city through time and illustrate the most current land districts present on the former industrial properties.

FIG. 3.4

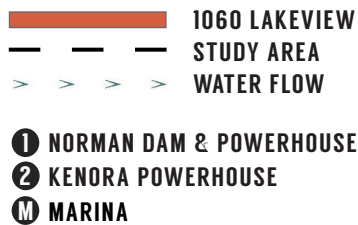
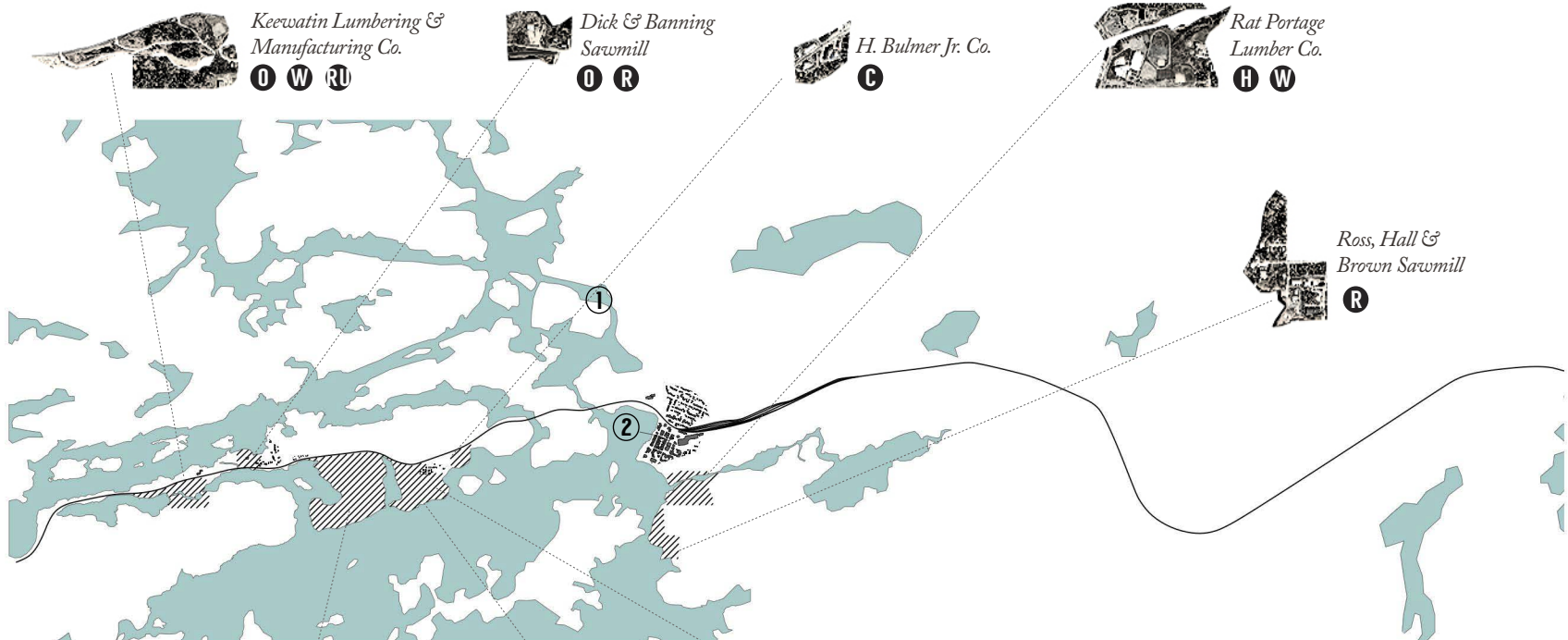


FIG. 3.5 Population time line (continued on next page)



1880-1899
FIG. 3.6 Extent of populated area in 1900 and active mills



Note: the most recent name of each mill has been used.

- ① 1836-1861 Hudson Bay Company, Rat Portage Trading Post
- ② 1861-1918 (Mead 1981, 44 & Lake of the Woods Museum)

19|00 | Pop. 4,900

19|05 | Pop. 4,200

19|10 | Pop. 5,100

19|15 | Pop. 5,300

GROWTH PATTERN

Jack Sbord's Tie Mill

H



1900-1919

FIG. 3.7 Extent of populated area in 1920 and active mills

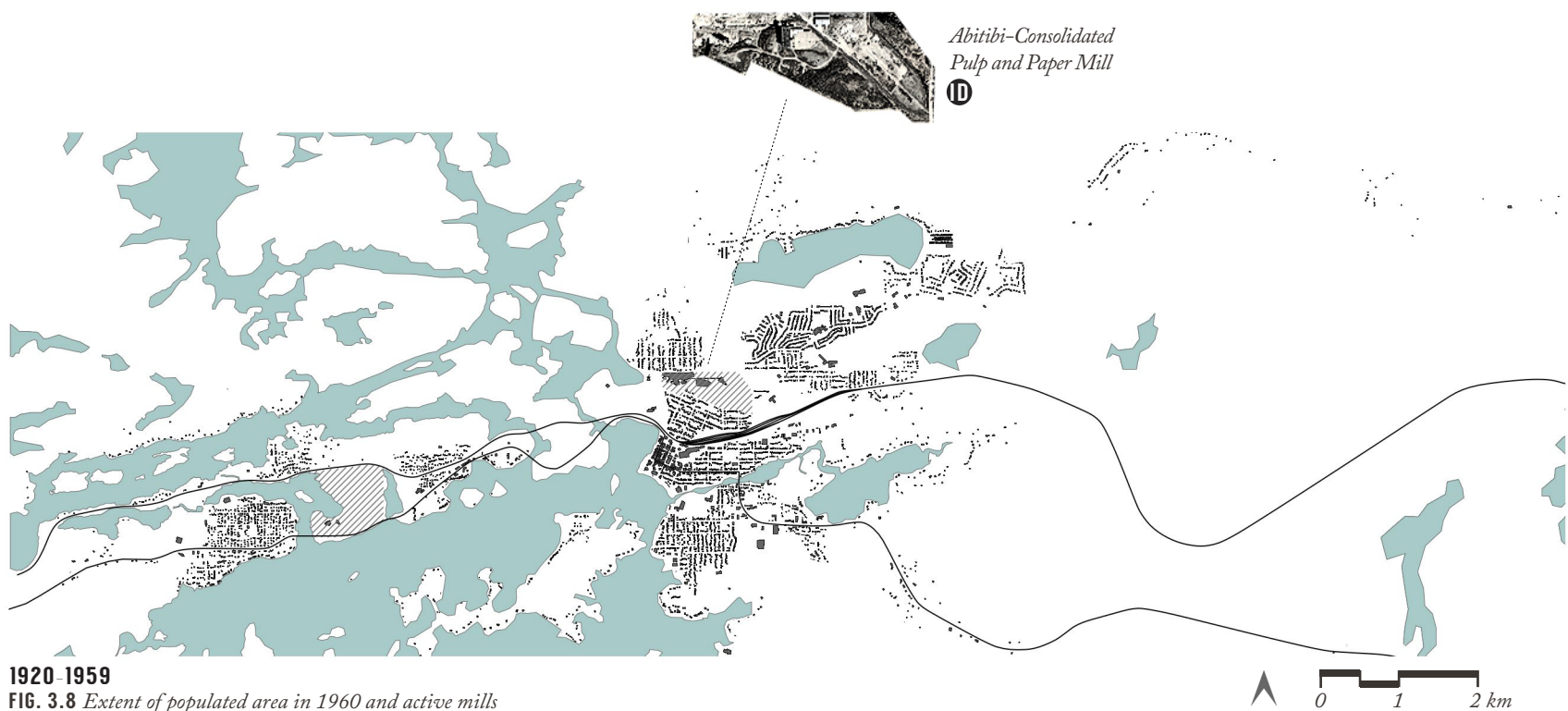
//// //// ACTIVE MILL

- A ACTIVE
- O OPEN SPACE
- R RESIDENTIAL

- H HARBOURTOWN CENTRE
- C COMMERCIAL
- I INSTITUTIONAL

- ID INDUSTRY
- W PROVINCIALY SIGNIFICANT WETLANDS
- RU RURAL

19|20 | Pop. 5,200 | 19|30 | Pop. 7,600 | 19|40 | Pop. 8,200 | 19|50 | Pop. 8,500 | 19|60 | Pop. 10,400



1920-1959
FIG. 3.8 *Extent of populated area in 1960 and active mills*

19|80

19|90

20|00

20|11

Pop. 9,700

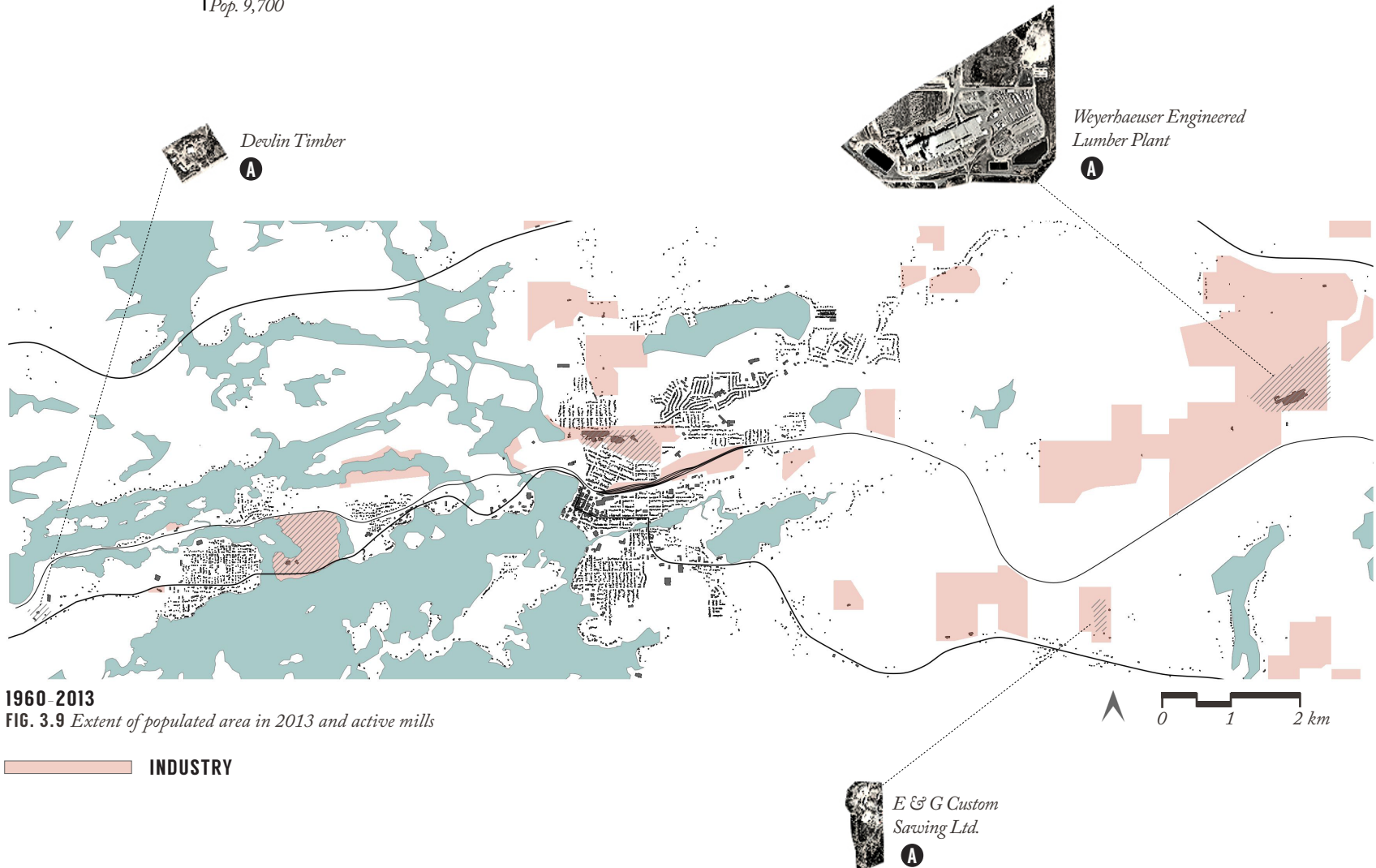




FIG. 3.10 *top, log booms in Keewatin Bay at Keewatin Lumber Co. 1060 Lakeview Drive Property.*



FIG. 3.11 *bottom, log trucks at Kenricia Corner (Main St. and 2nd St. Intersection downtown)*

INDUSTRY PRESENCE

Early industry dominated the young town's shoreline. By the beginning of the twentieth century, many of the early-established mills were winding down, which resulted in the transitioning of the industrial waterfront locations to park space, commercial and in some cases, residential. As the log booms were usually much larger than simply the mill property frontage, the shores of the public space were sometimes filled with floating logs waiting for processing. For many decades, there was a strange collision of industry and the public. Logs booms were commonplace in Kenora throughout the twentieth century until the practice was phased out in 1985 (Our Logging Heritage 1999).

The tugboat, James McMillan, began operating on the lake in the mid 1950s and hauled the last boom into town in May of 1985 (McLeod's Park, Plaque). The last haul marked "the end of an intricate ballet on the lake, a process which can be in turn mind-dulling in its monotony, mind boggling in its enormity and gut wrenching when sudden misfortune arrives" (Harper 1985, 109). Five thousand pounds of logs could be towed by the forty-eight foot long tugboat, moving at a speed of less than two kilometers an hour. A journalist was aboard to experience the final haul of logs, he reflected that "there was no glamour, no ceremony, nothing to distinguish it from thousands of other hauls over [the last] 105 years" (Ibid., 109). As the city has been built around the water, the removal of the log booms from the

views of the lake most definitely affected the cultural identity of Kenora. The identity of 'mill town' would no longer be as accessible and encompassing.

Log transportation was shifted to large trucks, marking a new way of doing business and a new relationship between the public and the industry. The Trans-Canada Highway runs through the city and experiencing trucks transporting logs down Main Street was common. The public's relationship with the logs went from the water to their streets, until the Kenora bypass was built in the early 1990s, which moved the highway traffic north of the city. Many industries began to migrate east, to access the new highway (see figure 3.9). Today, the presence of the forestry industry is difficult to decipher, despite a local resurgence of forest products since the early 2000s.

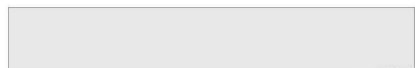
To further understand the extent of the loss of the visual connection to the forestry industry, three mill sites were investigated (pages 54-55). Sections illustrate the proximity from a mill to the adjacent public roadway. The visual connection to the forestry industries appears to be limited to neatly stacked lumber, logs or piles of byproduct positioned on the mill property.

The shifting relationship between the forestry industry and the public is further explored in Section Six, Design Intervention.



DEVLIN TIMBER

ROAD



KENORA FOREST PRODUCTS



PUBLIC



ABITIBI CONSOLIDATED PULP AND PAPER MILL (*closed 2005*)

FIG. 3.12



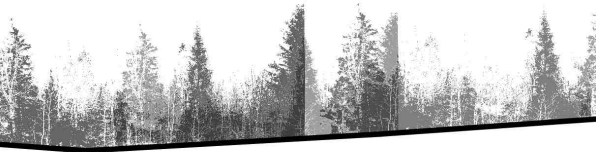


FIG. 3.13 *top, view north of Devlin Timber from Trans-Canada Hwy.*

FIG. 3.14 *view north of Kenora Forest Products, mid 1990s*



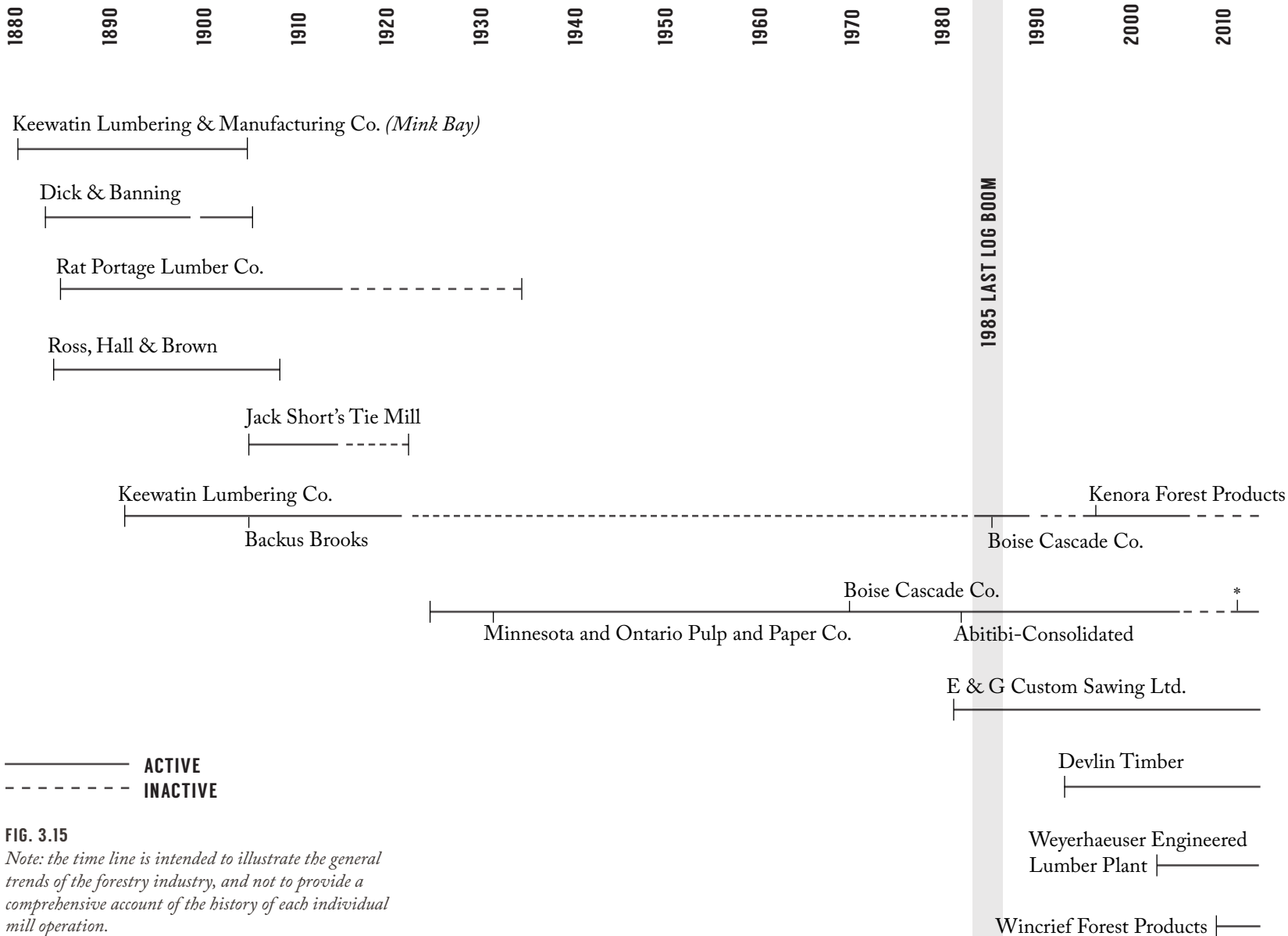


FIG. 3.15

Note: the time line is intended to illustrate the general trends of the forestry industry, and not to provide a comprehensive account of the history of each individual mill operation.

* Wincrief Forestry Products and Lake of the Woods Forest Products' pole peeling plant

INDUSTRY TRENDS

Early lumber mills began by producing railway ties, dimensional lumber and shingles, as the industry has evolved more specialized products, including engineered lumber and cross-laminated timber, are now common. Despite transporting logs by water, rail or truck, and advances in technology, mills (saw, pulp and paper) have always been vulnerable to the boom-bust cycle indicative of resource-based industries. The mills' reaction to the variable climate of the industry is to slow or stop production until the economy becomes more favorable, which could be months or even years, meaning the mill site simply sits inactive. Mill operation data in Figure 3.15 is intended illustrate the larger trends of the forestry industry in Kenora.

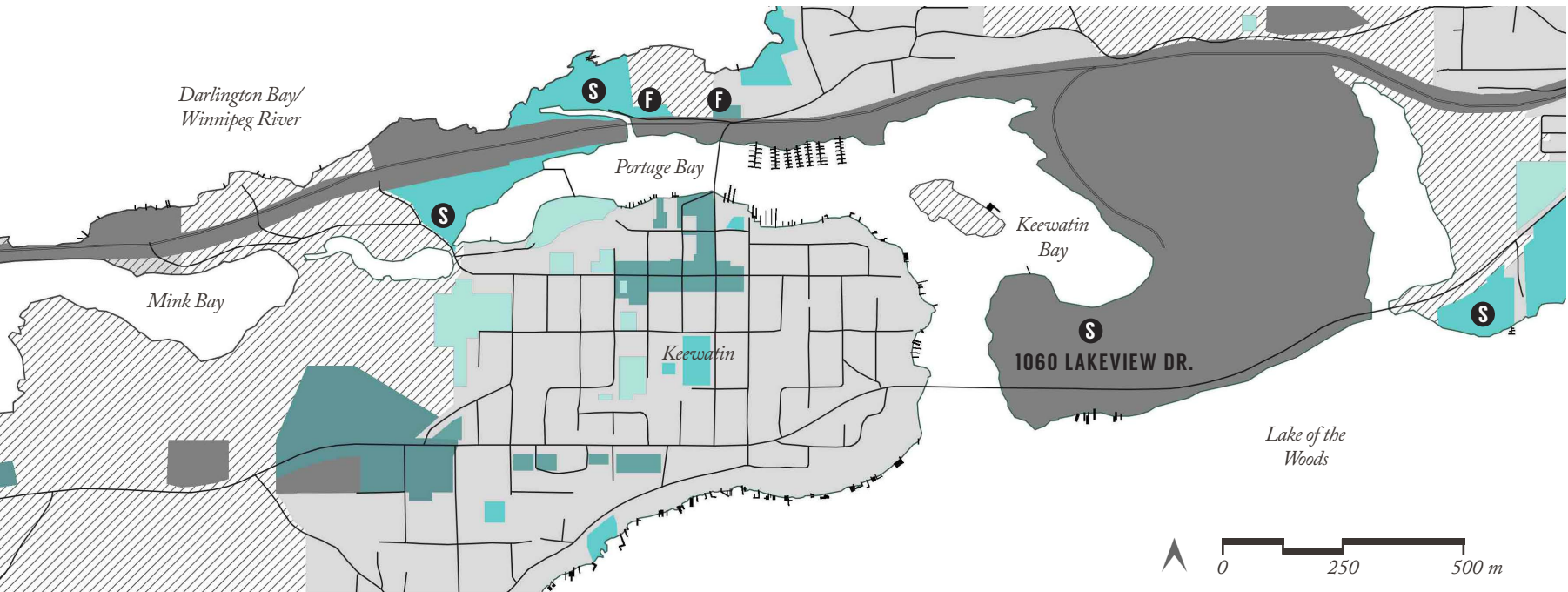
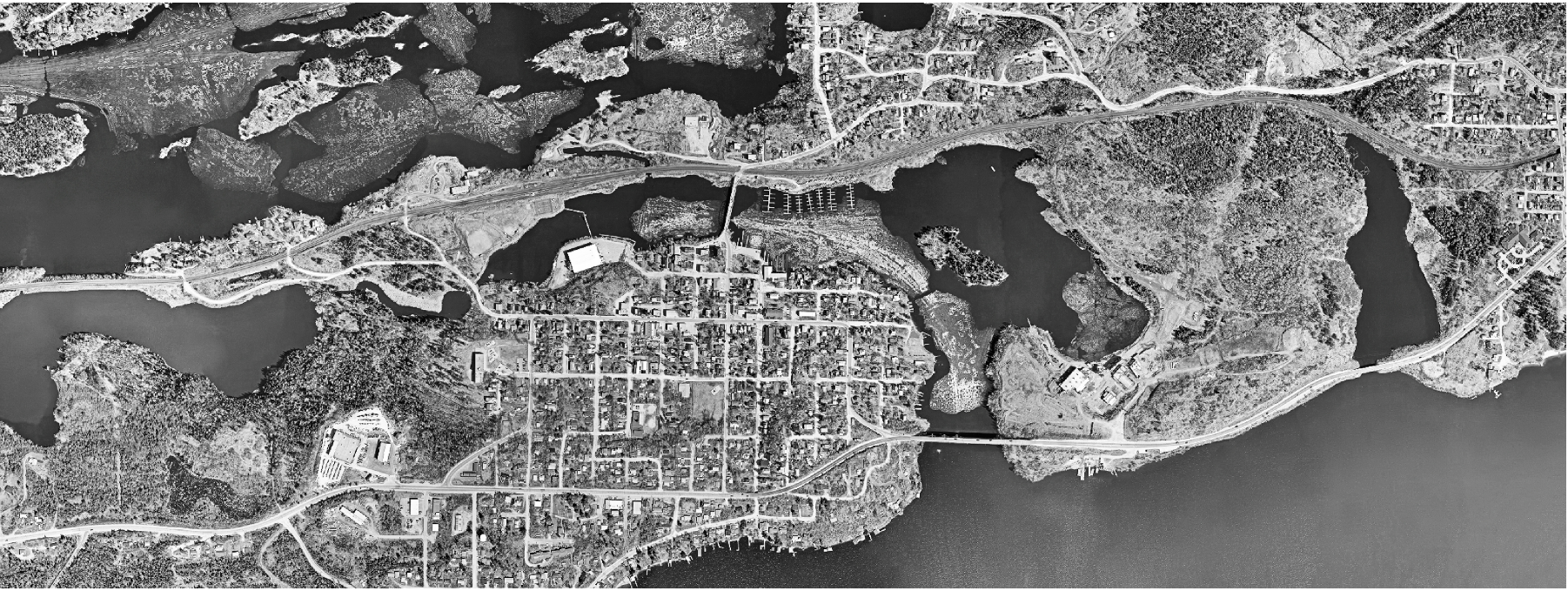
By analyzing Figure 3.15, it is apparent that mill activity was prosperous during the early years of the city's history. Mill operations appear to have decreased at the beginning of the twentieth century, with a low level of activity persisting until the 1990s, when the industry appears to experience a resurgence that continues today. The Kenora Forest Products has, and will again, contribute to the local forestry industry resurgence when it resumes operations in 2014.

To perpetuate the future locations of industry to the east of the established city area, a large parcel of land has been designated as "Industrial Development Area" that encompasses the Jones

Road Industrial Park and the Airport Park (City of Kenora 2010 b). There are "shovel-ready sites" available at both locations, which the city hopes will be home to new industry, specifically the value-added forestry sector (LOTWDC 2013 b, 4). The Lake of the Woods Development Commission outlined the advantages of doing business in Kenora as "access to a stable supply of wood fiber residuals from regional mills, crown timber from the region's Boreal forest, access to a highly-skilled labour force, excellent industrial infrastructure, and a highly supportive local and provincial government" (Ibid.). Wood fiber residuals are of particular interest, as historic disposal of such will be explored further in Section Four and the potential products speak to the term "value added". Residuals such as sawdust, planar shavings, off-grade fibre, short strands, bark and wood chips can be used to manufacture a variety of products including, pelletized fuel (biofuels), pallets, latticework, mulch and building materials such as oriented strand board (OSB) and medium-density fibreboard (MDF) (Ibid., 4, 8). Although the forestry industry may not be as evident in the cultural identify of the city, it remains an important economic player, employing eight percent of the city's labour force (Ibid., 16).



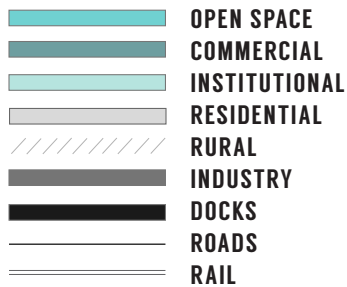
NEIGHBORHOOD OF KEEWATIN



The exposure to the forestry industry as an active layer in the urban landscape has evolved just as the wood products being produced have. Traces of earlier industrial eras persist and continue to affect the place. The 1060 Lakeview Drive sawmill property has endured the long history of the forestry industry and the proposed design intervention reacts to this rich historical past. To understand the context, the Keewatin, Keewatin Bay and Portage Bay area was researched further, focusing on the historical evolution of the urban form as well as the persistent industrial traces. This area is of particular interest as four sawmills and two flour mills once inhabited the shores and a large sawmill is planned to resume operation after a six-year recess. The area is an interesting archive of post-industrial sites, an important recreation link, be it boating or snow-machining and it is soon to regain a strong industrial presence.

FIG. 4.0 top left, aerial view of Keewatin

FIG. 4.1 left, Keewatin zoning



FORMER LOCATION OF:

- S SAWMILL
- F FLOUR MILL

During the early years of mill operation, Keewatin was known as *Slabtown*, “named for the scrap ends of sawn logs that ... [were] burned for fuel” (Robertson and McCracken 2003, 123) by the local workers who settled in the area. Small lots and single detached houses are densely positioned on the peninsula, with little to no front yards and variable topography. Although there is a grid pattern apparent in the road network, navigation can be difficult as there are many dead ends and there is parking permitted along the already narrow streets. The character of the neighborhood can seem rural at times

as a network of hydro lines hover above and some roads are unpaved while most do not have curbs.

Keewatin is mostly low density residential with a concentration of commercial that reaches to the southern shore of Portage Bay, which could be labeled as the town centre. Public access to the water is limited to a few docking areas and small recreation field north of the bay. Throughout Keewatin’s long history the 1060 Lakeview Drive property, has remained largely undeveloped, with either an active or idling mill residing. The site is largely inaccessible to the public by land as a rail line borders the north and the highway and topography restrict the south. It is also inaccessible by water as there are shallow areas, thick aquatic vegetation, floating logs and the area east of the island is not included on boaters navigational charts. The location of the site, its history, and its current and future uses make it an ideal canvas to explore ideas of cultural identity and industrial heritage through landscape intervention.

The forestry industry and its affects on the city as a whole have been addressed in the previous section, the following pages illustrate specifically, and in detail, how Keewatin has been shaped by its industrial past. Mapping the shoreline revealed a major shift in the perception of the water, from a way of life, to industrial necessity to a recreation opportunity.

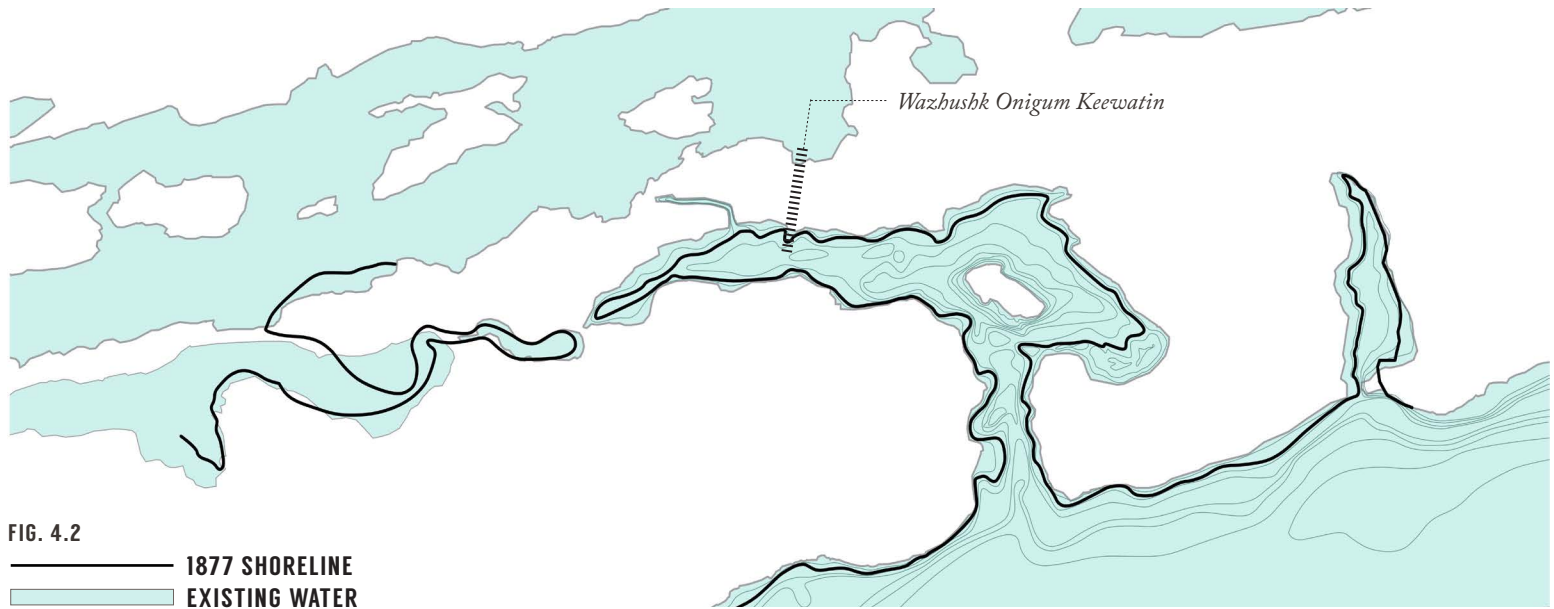


FIG. 4.2

— 1877 SHORELINE
 ■ EXISTING WATER

RELATIONSHIP WITH THE WATER

PRIOR TO EUROPEAN SETTLEMENT

Beginning with the First Nations people and subsequent explorers, the highlighted area was the location of a major portage route from Lake of the Woods to Winnipeg River. The bay used to be slow moving, shallow water, making for a shorter portage than the rapids at the other two outlets of the lake further east (Huck 2002, 150). The land separating the lake and the river was home to an ancient First Nations camp known as *Wazhushk Onigum Keewatin*, meaning “northern portage to the muskrat country” (Robertson and McCracken 2003, 8).

321 M. 1877 water level

FIG. 4.3

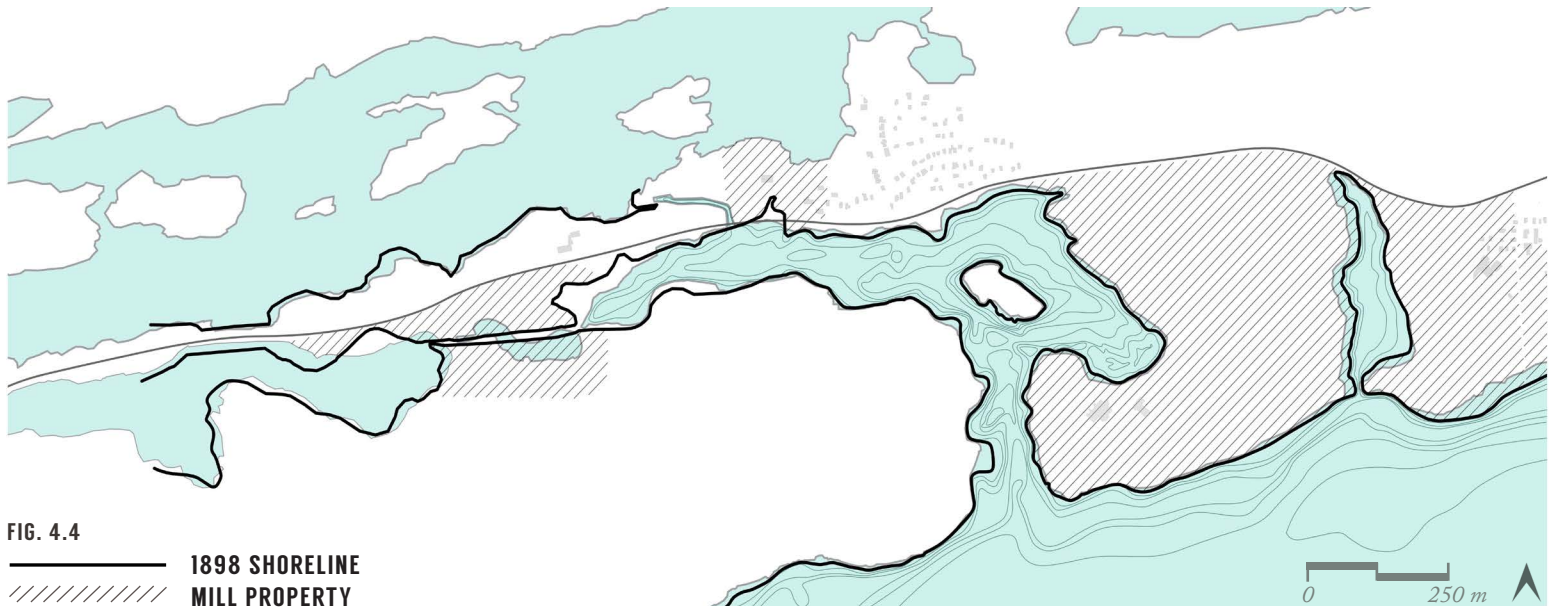


FIG. 4.4

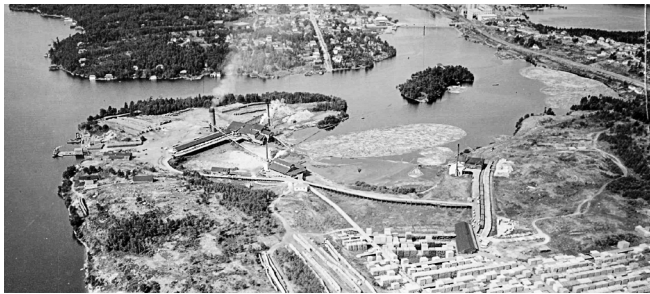


FIG 4.5 View west of 1060 Lakeview Dr. mill property, 1920. Prior to construction of Trans-Canada Hwy and Keewatin Channel Bridge.

EARLY MILL TOWN

Sawmills were historically situated on sites accessible by water for purposes of transporting logs, and sites accessible by rail for distributing processed lumber to market. Floating log booms filled the bay and the shoreline was manipulated to harness energy from the water. The shoreline began to shift as sawmills were built and the necessary energy-generating infrastructure followed, raising the level of the water dramatically (Robertson and McCracken 2003, 29). The early years were prosperous with six sawmills in operation in the city.

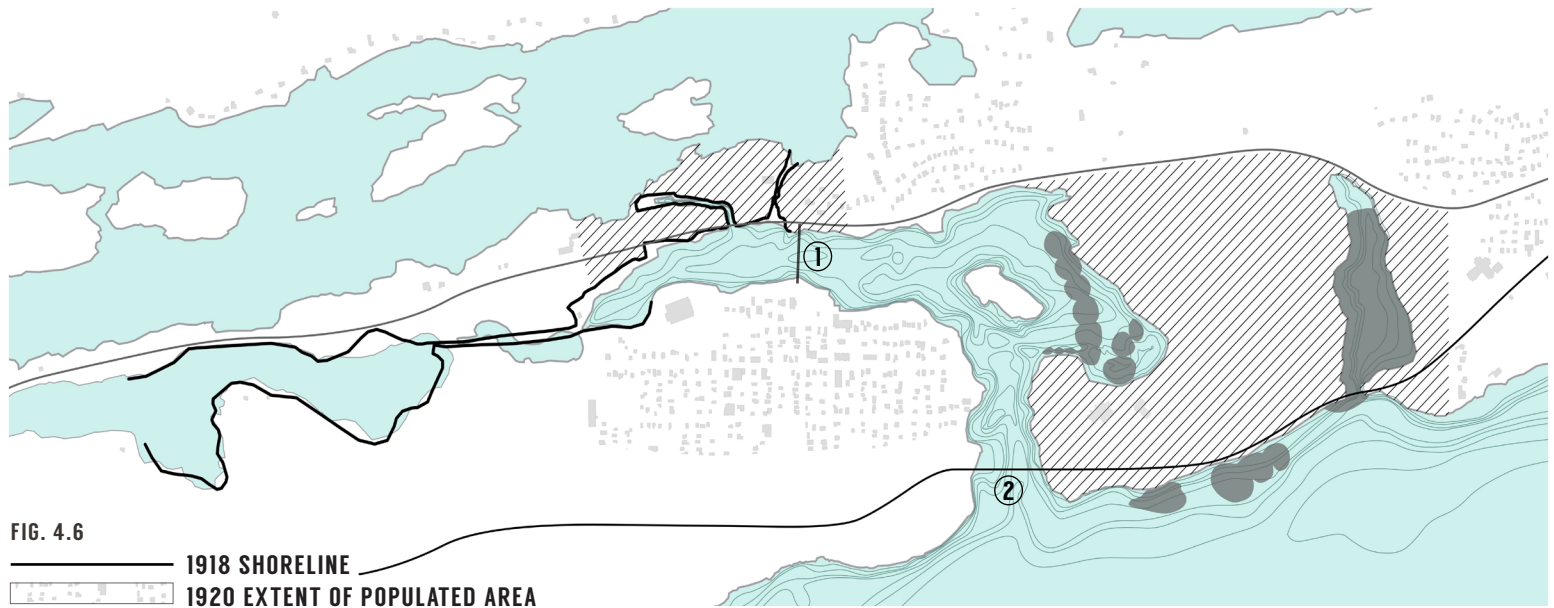


FIG. 4.6

— 1918 SHORELINE
 ■ 1920 EXTENT OF POPULATED AREA
 ■ LOG BOOMS

- ① 1925 *Keewatin Bridge*
- ② 1939 *Keewatin Channel Bridge*

EARLY TO MID NINETEENTH CENTURY

Only a few sawmills continued into the early twentieth century. Prior to the construction of the Keewatin Channel Bridge, Keewatin remained largely disconnected from Kenora. The rail line was “the shortest [connecting] pedestrian route” (Robertson and McCracken 2003, 248). Water transportation was important, rowboats were used by sawmill employees to connect the neighborhood of Keewatin across the channel to the 1060 Lakeview Drive mill property (Sweet 1975, 16). The shores continued to be filled with booms and the water continued to be manipulated for energy. Most notably were the channels blasted in the bedrock, that formerly acted as the ancient portage route, to power flour mills.

324.32 M. 1916 and 1950 flood level
 highest water level on record

FIG. 4.7

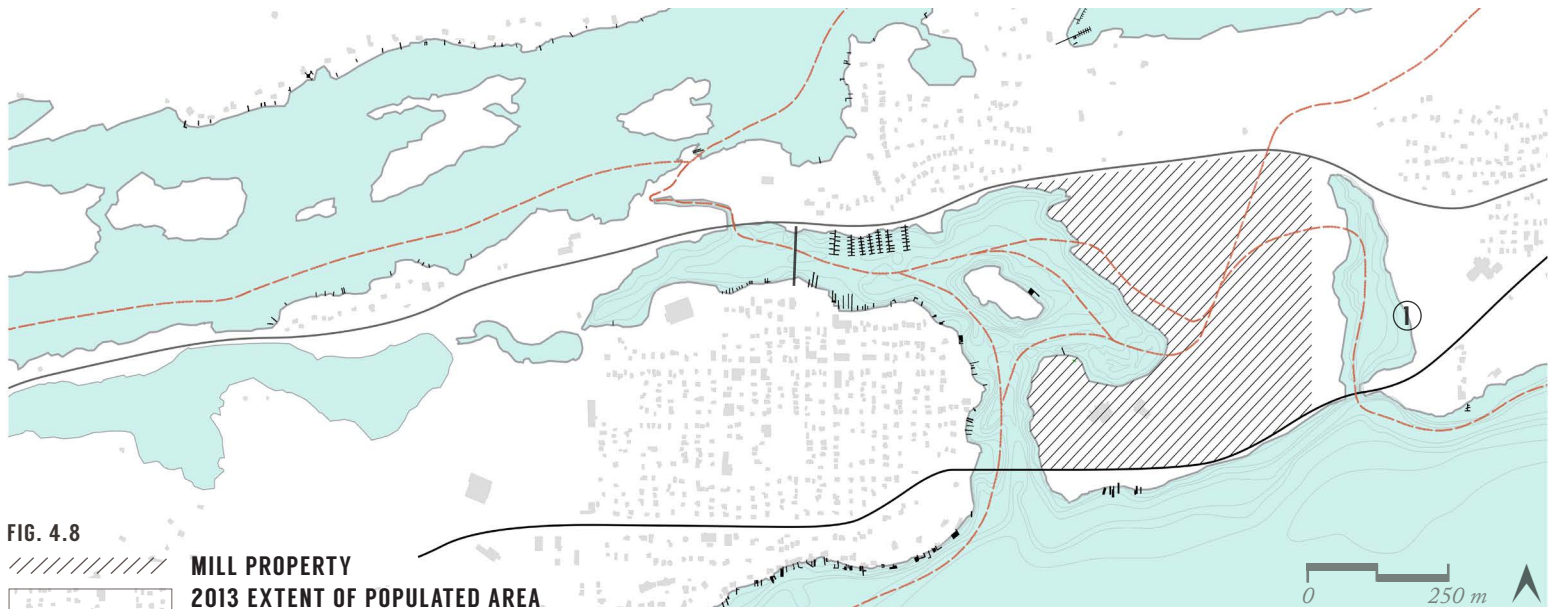


FIG. 4.9 *View South of snow machines entering Lake of the Woods under the Keewatin Channel Bridge*

TODAY

Currently, the shore is dense with docks and a marina, with construction and development plans for further marina space underway. Lake of the Woods water levels are highly regulated between the elevations of 321.87 and 323.47 metres, and have been since the early twentieth century (LWCB 2002, 9). Under the current regulations, “the operating range is defined as 1.6 m,” but “the average annual variation in water level has been only 0.8 m” (LWCB 2011). It is difficult to decipher exactly how much the water has risen due to industry and water control structures in the Portage/Keewatin Bay area. From the few historical records available, the average water level in 2013 was nearly 1.8 metres above measurements prior to settlement (LWCB 2014).

323.47 M

321.87 M *Regulated water level allowance*



FIG. 4.10 *Photo of desk top. Desk used in Winnipeg based sign writing shop for over thirty years. Author inherited from grandfather.*

INDUSTRIAL DISTURBANCE

Reviewing the history of the city and the Keewatin area in relation to the forestry industry, it is clear that the active industry has become less and less present in the everyday experience of the place. The traces left behind by the industry persist on the land in the form of disturbances. Similar to a well-used desktop, where the traces of past creation are evident in the residual tool markings, the industrial remnants can be uncovered to reveal a more nuanced story. Large-scale industrial disturbances, such as the shifting composition of the forest or the increased water levels are present in the landscape but difficult to recognize. At the scale of the Keewatin/Portage Bay area, the more tangible disturbances or remnants can be revealed and can attribute to the experience of the place.

Guided by the shoreline research, photography was used to document areas of disturbance as a result of the industry as well as to capture the character and the potential beauty of the sites. Similar to a well-used desk top where the traces of past creation are evident in the residual tool markings, the photographic inventory is intended to reveal the marks made on the land. The most apparent traces were those directly relating to the built form of the industrial buildings or infrastructure. For example, a portion of one of the flour mill raceways remains intact, along with a sunken wood structure at the earliest mill site. Less

obvious but more common were the byproducts remaining from the industrial sawmill operations, such as woodwaste and sunken timbers.

Elizabeth K. Meyer, in her essay *Seized by Sublime Sentiments*, compares the industrial remnants of Gas Works Park, a former power plant site, and Bloedel Reserve gardens, an area previously logged (1998). Meyer concludes that both types of remnants act as “mnemonic devices that bring to mind changes initiated by humans’ need to harness nature for power production and building materials” (Ibid., 8). Parallels can be drawn between Meyer’s thinking and many of the remnants found in the Keewatin/Portage Bay area, specifically the remnants exhibiting intense disturbance, such as the channel blasted through rock to create the flour mill raceway. In contrast, the logs and woodwaste, the byproducts, are not as impressive but instead bring to mind a sense of past work being completed. The nuances of the tool markings on the desk top and the accumulation of the wood waste reveal evidence of routine, by both machines and humans, that results in a byproduct or disturbance.

The following pages are the results of the exploration of the Keewatin/Portage Bay area, effectively acting as the first site visits and proving to be highly influential to the design in Section Six.

INFRASTRUCTURE



FIG. 4.11 *View east of snow machine tracks in former Flour Mill "A" raceway*

There are few artifacts of the structures of sawmill or flour mill buildings remaining, but there is evidence of the infrastructure associated with the mills. Most prevalent are the alterations made to the natural watercourses. The image above depicts one of the channels blasted through the rock to create a raceway to power a flour mill. The channel no longer connects to the Winnipeg River to the north but was instead kept partially open to be used a boat launch. It is now part of the designated trail system for snow-machines. The other channel blasted by the flour mill has since been filled in.



FIG. 4.12 *Key map*



FIG. 4.13 *View south of remnant of a lock at the outlet of the channel*

The channel and the lock appear to simply be left behind by the industry, with no evidence of preservation or remediation. The patina of the concrete is more evocative of its old age than the rock of the channel appears. The large rock cut also does not appear out of place in the Kenora area, as blasted rock cuts are common.





FIG. 4.14 *View west of channel leading to Mink Bay, part of the Mink Bay Wetlands.*

Mink Bay, home to the site of the first mill established in the area, has been transformed into “provincially significant wetlands” (City of Kenora 2010 b). The above image depicts a thin channel blasted for a turbine to produce power for the sawmill (OMNR 1999, 48). There has been an effort to restore the area to its former more natural shape. Although the edges have been softened with rocks and plantings, the channel form still remains and large unprocessed logs continue to line the bottom of the channel.





FIG. 4.15 *View south of remnant log structure submerged in Mink Bay*

Mink Bay Wetlands have experienced little development since the mill burned over one hundred years ago. Only recently has the city established a trail system and encouraged its use (Sapong 2012). The city has chosen to simply leave some of the industrial remnants as “historical elements” and has posted historical photos explaining their significance.



BYPRODUCT



FIG. 4.16 *View west of Mink Bay shore*

The remnants pertaining to infrastructure simply exist and are relatively static, but there is another category of remnants that could be classified as byproducts. Byproducts are the residual materials produced as a result of industry. Piles of unprocessed timber can be observed floating in Mink Bay, a byproduct of the log booms.





FIG. 4.17 *View west of residual rock along Mink Bay shore*

Much of the Mink Bay shoreline is composed of rocks, which are a byproduct of blasting the channel to power the sawmill (OMNR 1999, 48). Although the byproducts are less obvious as an industrial trace than the infrastructural elements, the byproducts connect to the more nuanced, human actions of the industry: the piling of blasted rocks, the booming of logs and the cutting of wood.





FIG. 4.18 *View south of Cameron Bay*

Sunken logs, or “deadheads” - partially submerged logs, were an inevitable byproduct of log booming and can be found throughout the area. In areas not accessible by powerboat traffic, logs can be observed floating along the surface, usually grouped near the shore. The above image depicts residual logs floating in Cameron Bay, which was a well-used storage area for the 1060 Lakeview Dr. mill located west of the bay.





FIG. 4.19 *Residual logs and lumber on Cameron Bay shore*

A new marina is currently planned for the eastern shore and the removal of all the logs is necessary prior to construction. The logs lining the lake bottom must also be removed for if they are disturbed the large logs could float to the surface causing damage to the infrastructure and prove dangerous for boaters.





FIG. 4.20 *Water damaged log on shore of Keewatin Bay*

Depending on the situation, sunken logs can create valuable fish habitat or can restore habitat once removed (Fisheries and Oceans Canada). As log booms were phased out in Kenora almost three decades ago, the logs have been present for at least that amount of time and removing them “has the potential to reduce the amount of near shore cover, increase the amount of suspended sediments and destabilize shorelines and banks of the water body” (Ibid).





FIG. 4.21 *Residual log and chain used to create barrier to contain logs in boom*

The sheer size of some of the logs speaks to a former time, when logs of all lengths were floated instead of being cut into consistent lengths to be neatly stacked on a truck. Depending on the size and the quality of the wood, some of sunken timbers are valuable and are sought after.

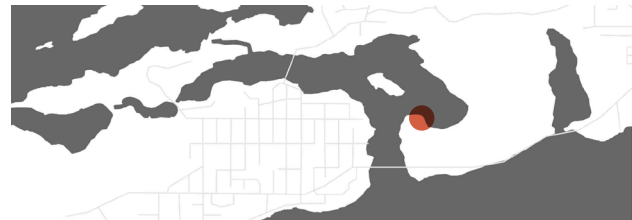




FIG. 4.22 *View west of woodwaste deposit. Deposited between 1965–1982 and measuring 1.2–1.8 metres thick (KGS Group 1994 a, 37–38)*



Woodwaste, a byproduct of the milling process, is composed of bark, wood-chips, planar shavings and sawdust. Large deposits of woodwaste can be found both near the former mill in Mink Bay and the 1060 Lakeview Drive property.

During early sawmill operations it was common to dispose of woodwaste into adjacent waterbodies, in fact “several acres of Seattle are built atop fifteen feet of just this type of residue, a byproduct of the city’s founding sawmill” (Mihalyo 1997, 9). There is some evidence of woodwaste disposal into the Lake of the Woods from Kenora area mills as noted by Alex McQueen, a fisheries inspector for the Dominion of Canada in 1887. McQueen reports that many of the mills were “... in the habit of allowing saw dust to escape into the lake, to the detriment of fish” (1887, 317).

There is evidence that the practice of burning woodwaste in wood burners was common among local mills, historical photographs depict burners at Rat Portage Lumber Co. (1900) and the former mill on the 1060 Lakeview Drive site (1918). Woodwaste burning was a method of disposal, with no energy recovery objective. Burners were eventually phased out in the 1970s and early 1980s due to the environmental impact and the woodwaste “was allowed to accumulate on site and/or was sold to secondary users (landscaping mulch, pulp and paper mills, etc.)” (Knutson 2013). There was one pulp and paper

mill operating in the Kenora area between the years of 1923 to 2005, but the amount of woodwaste it accepted from local mills throughout history is unclear. Depending on the proximity to a pulp and paper mill, the cost of transport may have exceeded the potential profit.

Sawmills that employed a kiln to dry lumber instead of air-drying may have used woodwaste to create steam for heating the kiln but “when fossil fuels were relatively inexpensive, the cost of adding the complexity of sizing the biomass fuel, the material handling ... the boiler fuel feed system and ash removal systems, etc. may have resulted in the decision to pile the woodwaste as cheaply as possible and burn oil or natural gas” (Ibid.).

As the cost of energy has increased, mills have become more energy efficient and the use of woodwaste has increased (Ibid.). Woodwaste is now used as biofuel or in value-added wood products. These secondary uses require a certain level of quality regulation of the byproduct and are not suited for waste that has spent many decades or in the case of the Mink Bay deposit (found on following page), over a century, exposed to the elements (KGS Group 1994 b, 3). Currently, and for the past few decades, woodwaste created at the Kenora Forest Products mill has not been deposited on site, instead it is shipped to pulp and paper mills for use.



FIG. 4.23 *View west of Mink Bay and woodwaste*

Large mounds of woodwaste are tucked along the eastern shore of Mink Bay, not directly accessible by a marked trail. Barbara Manson, the Parks Supervisor with the City of Kenora, has confirmed in an e-mail conversation with the author on September 16, 2013, that the woodwaste is indeed a byproduct of the first sawmill and has remained on site since the early 1900s.





FIG. 4.24 *View west of Mink Bay and woodwaste*





0 2.5 cm 5 cm



FIG. 4.25 Woodwaste deposit in Mink Bay Wetlands, deposited prior to 1905 (Manson 2013).

Experiences seasonal flooding



0 2.5 cm 5 cm



FIG. 4.26 Woodwaste deposit on 1060 Lakeview Dr. property, deposited between 1965 and 1982 (KGS Group 1994 a, 34).

Experiences little standing water



0 2.5 cm 5 cm



FIG. 4.27 Woodwaste deposit on 1060 Lakeview Drive property, deposited prior to Kenora Forest Products ceasing operations in 2008.

Experiences little standing water

There is evidence of some species of vegetation capable of growing in the woodwaste but it is largely clear of any plant life. The runoff in contact with the woodwaste contains leachate, “water-soluble material dissolved from the wood” (Masbough 2005, 553). Woodwaste leachate contains multiple pollutants, most notably is the increased “organic matter and phosphate” (Scholz 2011, 104). The collection of all water runoff in contact with woodwaste is required to reduce the amount of leachate entering the environment. The amount of leachate produced could be reduced by applying a “low permeability cap (i.e. silty clay) and a layer of seeded topsoil to minimize infiltration of precipitation” (KGS Group 1994 a,17). Whether the woodwaste is covered or exposed, building atop the material is not recommended (Ibid., 4).

Very little information about woodwaste as a surface material was available and obtained. Multiple deposits of the material was found in the Keewatin area, exposed to the elements, and as such, observations and comparisons of multiple waste deposits were completed. Woodwaste, when found in a large deposit, appears to decompose very slowly. The presence of water, or rather a wet/dry cycle, appears to have some impact on the rate of decomposition. Water does not permeate the waste deposit easily. Digging into the deposit revealed a saturated top layer and a dry layer located quite close to the surface. From a local account, the red color of the deposit found near Mink Bay is caused by ‘wood rot’ as the material is exposed to water.

The photographic exploration of the area revealed that the presence of each disturbance, be it infrastructural or a byproduct, affects the story of the place. Each of these disturbances has persisted in the landscape and demands a certain level of sensitivity and respect in the future plans for the neighborhood.



1060 LAKEVIEW DRIVE



FIG. 5.0 *View north of active Kenora Forest Products sawmill from highway*





FIG. 5.1 *View northwest of active mill operation*





0 100 250 m





1060 Lakeview Drive has been home to a sawmill since the late nineteenth century, preserving the fifty-hectare site from any substantial development. Kenora Forest Products currently resides on the property. The mill has been idling since 2008 as its business relies heavily on the housing market in the United States (Thompson 2011), but plans to restart operations in the near future. The sawmill is planning to relocate in the coming years and the future of the site is undetermined. As previously explained, the possible vision of large-scale development on the site does not align with the current climate of Kenora's growth and development forecast (City of Kenora 2010 a, 1-4).

The drive into the City of Kenora from the west along the Trans-Canada Highway is underwhelming. The highway is lined with sparse industry and commercial with large rock cuts and power lines impeding many of the potential views of the lake. The first expansive view of the lake occurs at the Keewatin Channel Bridge, immediately before passing the 1060 Lakeview Drive site. The City of Kenora has identified the need to create a stronger feeling of arrival. The Kenora Official Plan has designated Keewatin as a "gateway from the west" and has been working on a re-branding plan for the neighborhood (City of Kenora 2010 a, 1-2). From the perspective of the City, the high level of exposure and strategic position of the 1060 Lakeview Drive site could make it ideal for tourism and commerce based development.

A large rock cut was created for the Trans-Canada Highway in

the early twentieth century that removed the direct waterfront access from the southern portion of the sawmill site. The highway closely hugs the lakefront, limiting development directly on the waters edge. The real estate potential along the top of the rock cut is very valuable as there is an outstanding view and no chance of future development impeding that view. Pedestrians can often be seen using the wide shoulder of the highway.

At first impression the mill and surrounding fifty hectares of land seemed inactive, but upon closer inspection there were quiet moments of activity. During business hours the few managerial employees, who have remained throughout the closure, ensure one or two vehicles parked in front, the locked gate on the road swung open and the road cleared of snow. A well-used snow machine route, marked with small orange signs fastened to tree trunks, crosses the site from northeast to southwest. The forest is peppered with makeshift forts, camp sites and bike jumps assumingly from local children and tree stands, a blind tent and deer decoy from hunters. Bow hunting is permitted on the site during the hunting season of four weeks beginning in the first weeks of September (OMNR 2013 a) to help combat the large urban deer population in Kenora.

Access was granted by Kenora Forest Products to explore the property. Multiple site visits were conducted in different seasons to better understand the conditions and qualities of the place. Site analysis in the form of mapping, photography and illustrations can be found on the following pages.

FIG. 5.2 *Aerial view of 1060 Lakeview Dr. property and Kenora Forest Products mill*

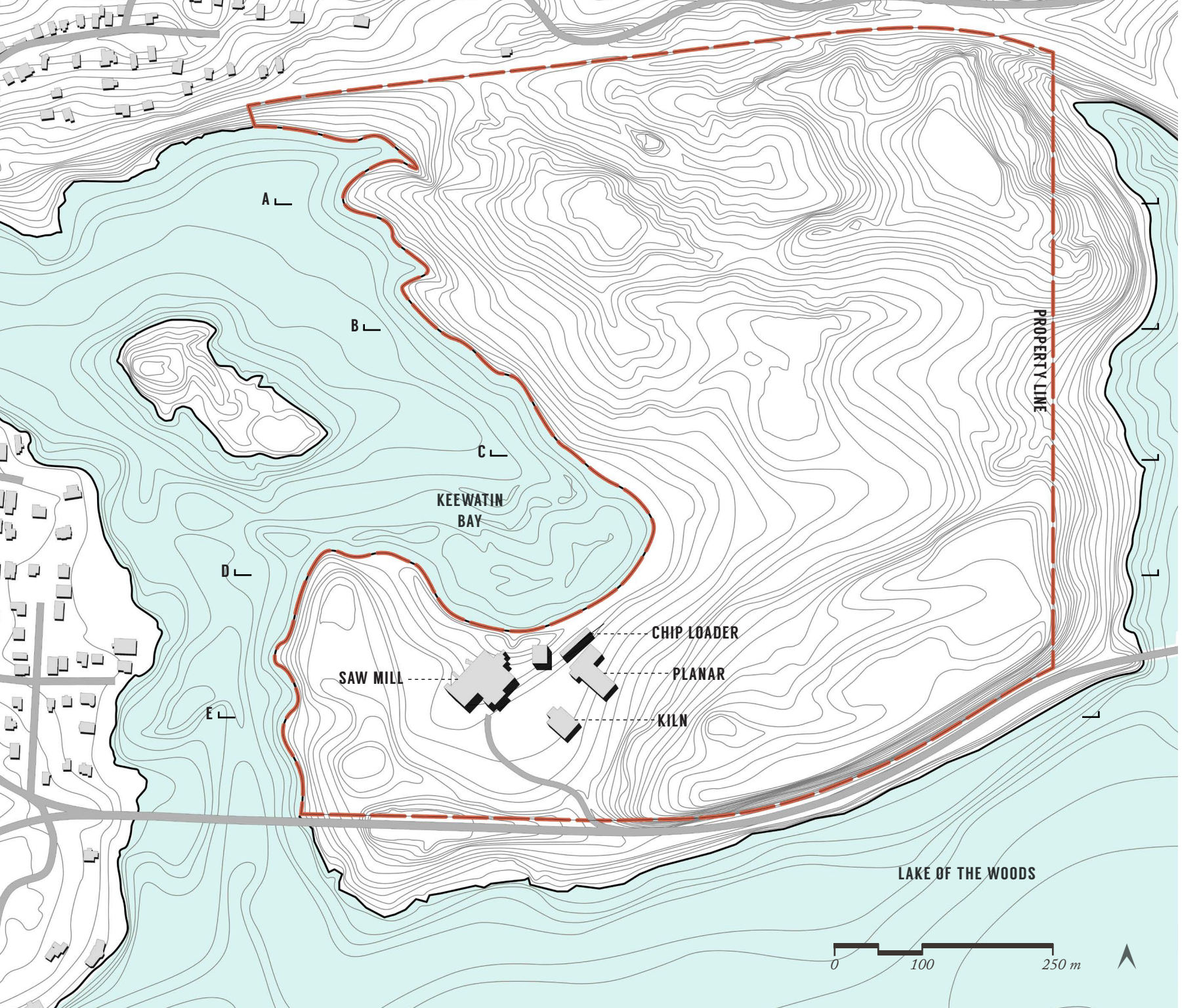


FIG. 5.3 *View east of Kenora Forest Products from highway*





FIG. 5.4 *View east of Lake of the Woods from highway*



A

B

C

D

E

KEEWATIN
BAY

SAW MILL

CHIP LOADER

PLANAR

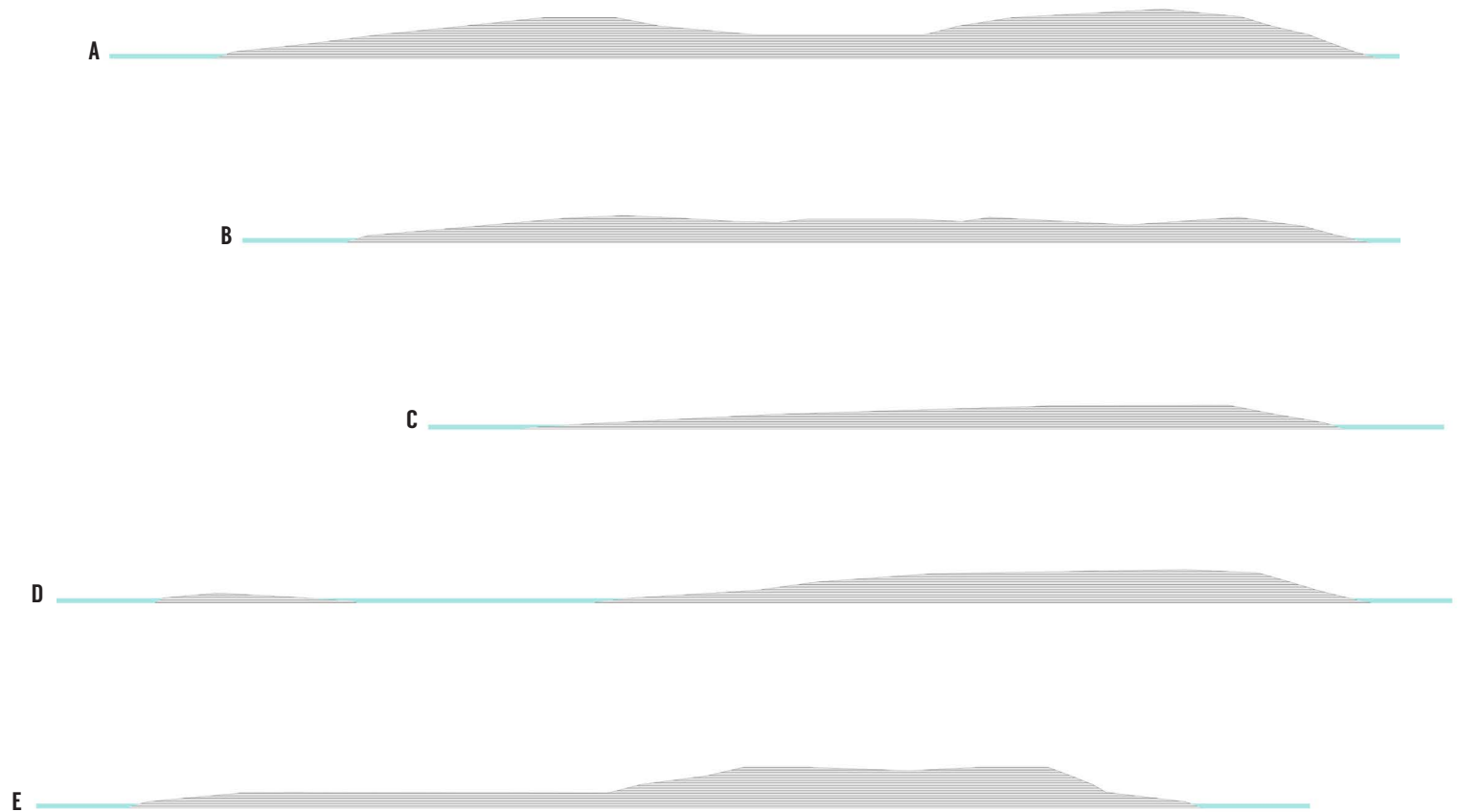
KILN

PROPERTY LINE

LAKE OF THE WOODS

0 100 250 m





SITE ANALYSIS

FIG 5.5 *above, east-west sections, view north*

FIG 5.6 *Contour map, one metre contour intervals*

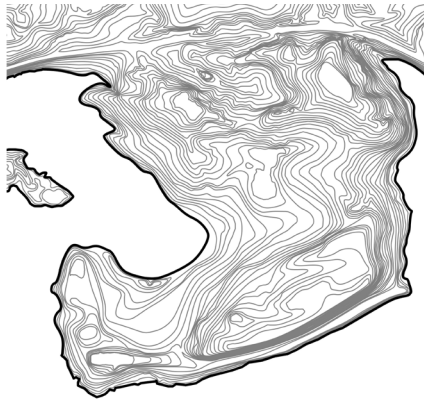
To illustrate the variable topography of the site, a contour map was studied and corresponding east to west sections created. The landform is highest in the north, sloping south and towards the shore. There is a difference of twenty-seven metres from the highest point to the shoreline. The land slopes up towards the south, which transitions into a dramatic cut that was blasted for the highway. The mill is positioned on the lower, flatter land, close to the former log boom area.



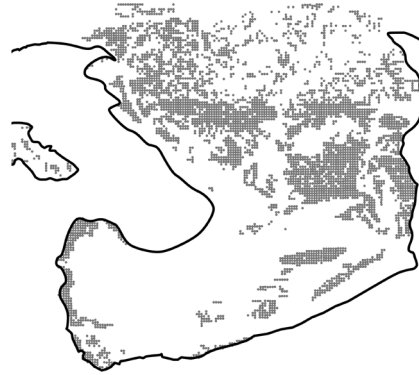
KEEWATIN
BAY

LAKE OF THE WOODS

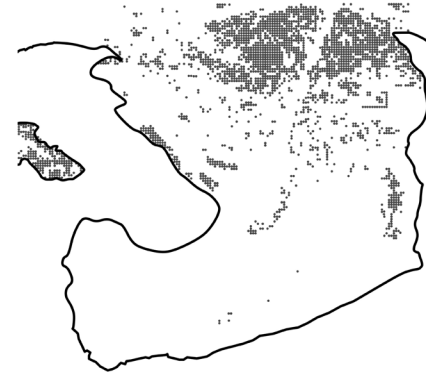




LANDFORM *one metre contour intervals*



TREES *deciduous*



TREES *coniferous*



TRANSPORTATION *roads and rail*



STORAGE *logs and lumber*



MOVEMENT *hydro corridor and snow machine routes*






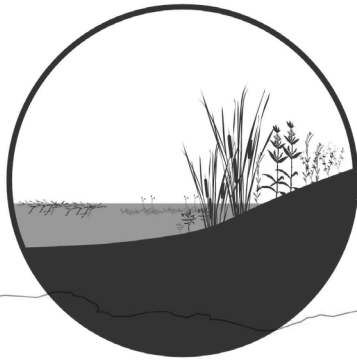
-  **RAIL**
-  **HYDRO LINE**
-  **LOG AND WOOD STORAGE**
-  **DECIDUOUS TREE**
-  **CONIFEROUS TREE**

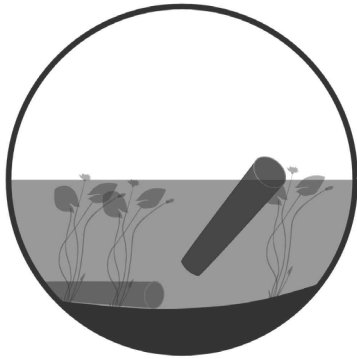
FIG 5.7 *above, deconstructed layers of 1060 Lakeview Drive existing conditions plan*

FIG 5.8 *left, 1060 Lakeview Drive existing conditions*



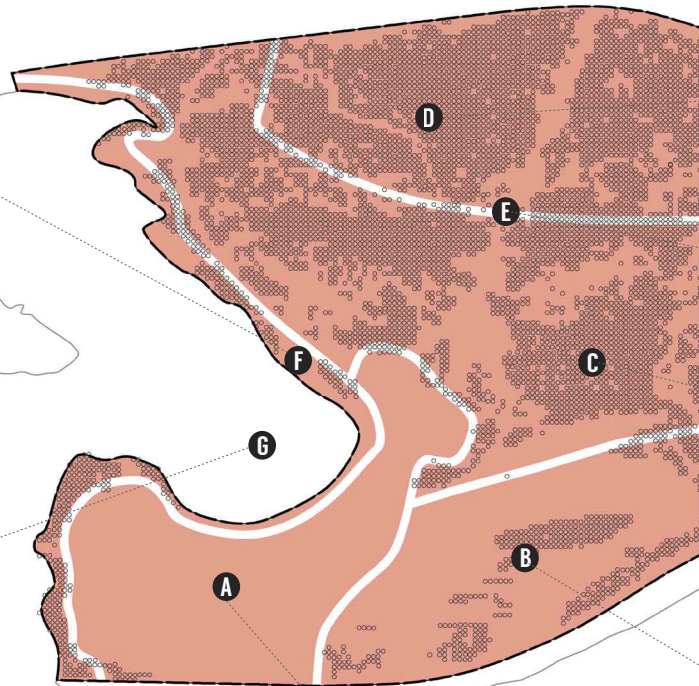
F. SHORE

*Elevation range: 322-324 m
above sea level*



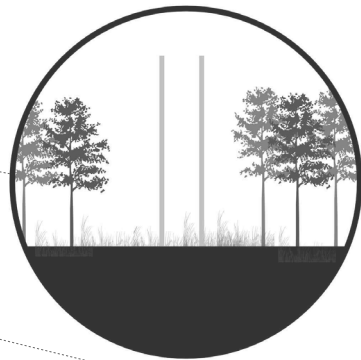
G. WATER

*Elevation range: 318-323 m
above sea level*



A. BUILT

*Elevation range: 324-335 m
above sea level*



E. HYDRO CORRIDOR

*Elevation range: 335–350 m
above sea level*



D. FOREST

*Elevation range: 335–350 m
above sea level*



C. MEADOW AND FOREST

*Elevation range: 330–345 m
above sea level*



B. MEADOW

*Elevation range: 333–346 m
above sea level*

FIG 5.9 *Map, divisions of site into zones*

FIG 5.10 *Diagrams representing features evocative of each zone*

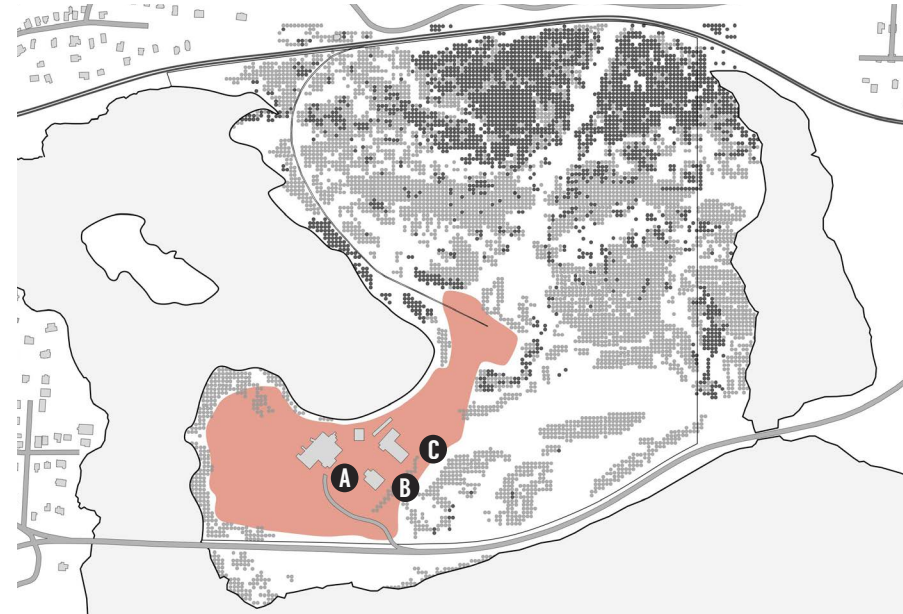
In order to illustrate the existing site conditions, the area was divided into zones. Six zones, determined by vegetation, materials, topography, program and level of industrial impact, were identified on the property. The zones are categorized as, 1.) built; 2.) meadow; 3.) forest and meadow; 4) forest; 5.) hydro corridor, and 6.) lake and shore.



FIG 5.11 *left (a), view south of sawmill building and Trans-Canada Hwy. in background*

FIG 5.12 *middle (b), view northwest of kiln in foreground and sawmill buildings in background*

FIG 5.13 *right (c), view west of mill operation.*



BUILT

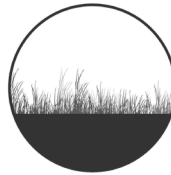
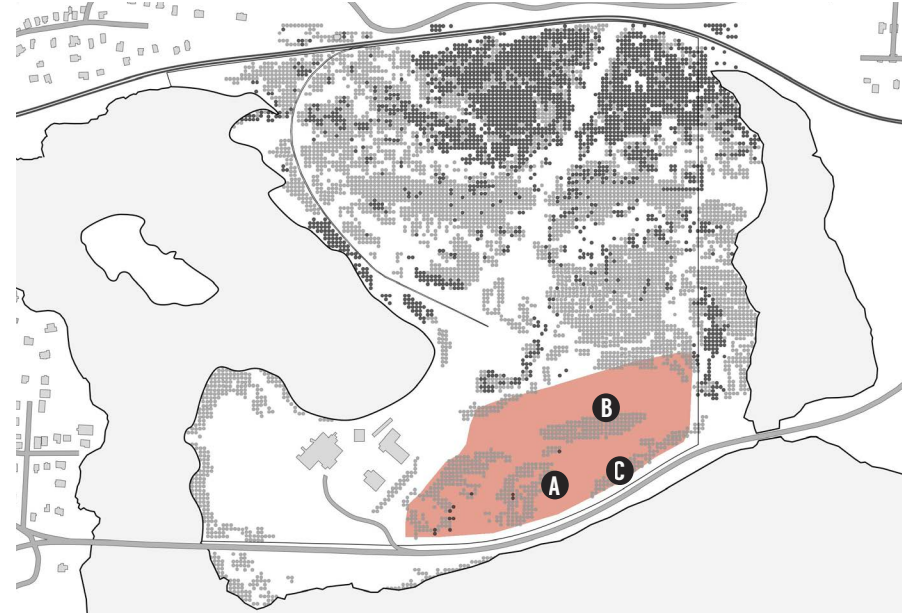
The area where industry mostly occurs is defined as 'built' and can be identified by black crushed gravel and little plant growth. The built area occurs on the lowest and flattest elevation of the property, as proximity to the lake was historically significant for the industry. The boundary of the area and subsequent boundaries of programmed space (storage, parking, etc.) are not clearly identifiable through the surface material. The site employs an informal organization of space, which could be intentional as required space for storage and processing must remain flexible during operation. Much of the woodwaste deposits on the property are located in this area. The 'built' zone exhibits a high level of industrial impact.



FIG 5.14 *left (a), view east of bedrock and meadow in wood storage area*

FIG 5.15 *middle (b), view north of deer decoy in grass*

FIG 5.16 *right (c), view east of slope towards edge of property and steep elevation drop*



MEADOW

A variety of grasses, wild flowers and shrubs cover the land used for storage, be it machinery or lumber, since the mill ceased operations six years ago. The surface is also composed of gravel, bedrock outcrops, and woodwaste. Kenora has a large urban deer population and hunting within city limits is allowed on designated sites to combat the growing number of deer. Permission to hunt on the Kenora Forest Products site has been granted in the past and evidence of this activity is present in the 'meadow' area. A portion of the woodwaste deposited on the property is located in this zone. The 'meadow' zone exhibits a medium to high level of industrial impact.

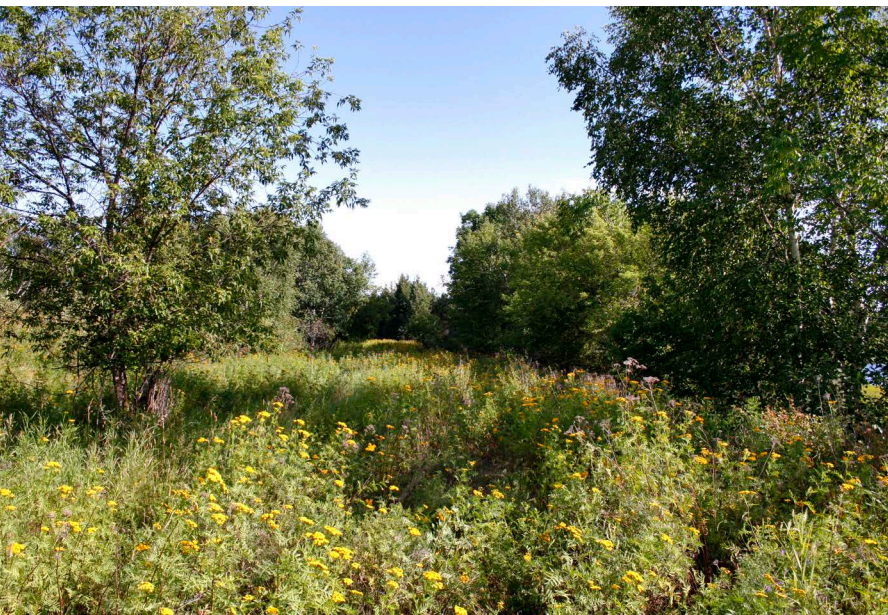
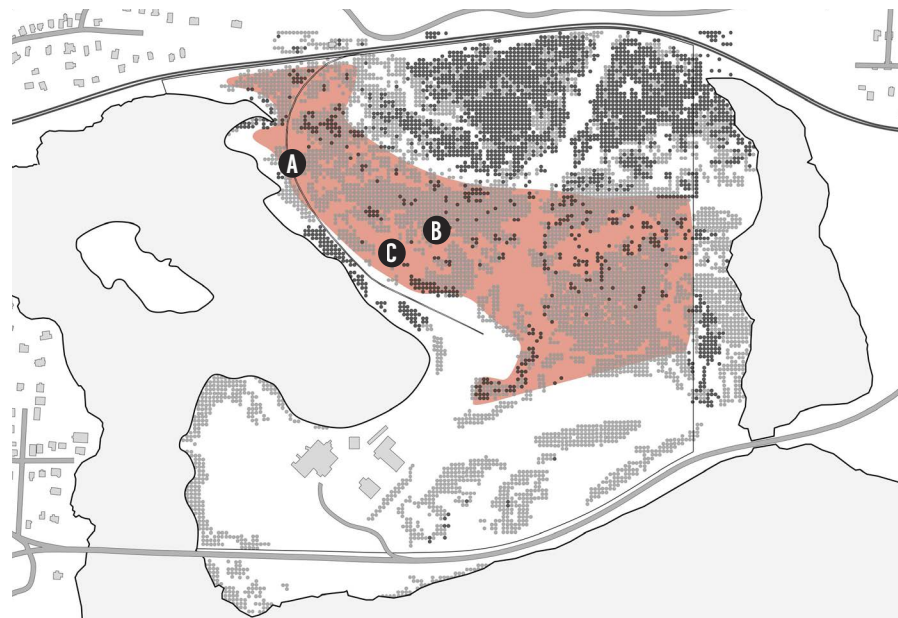


FIG 5.17 *left (a), view south of overgrown railway corridor*

FIG 5.18 *middle (b), view east of sparse forest and clearing*

FIG 5.19 *right (c), view south of Keewatin Bay and mill in background*



MEADOW AND FOREST

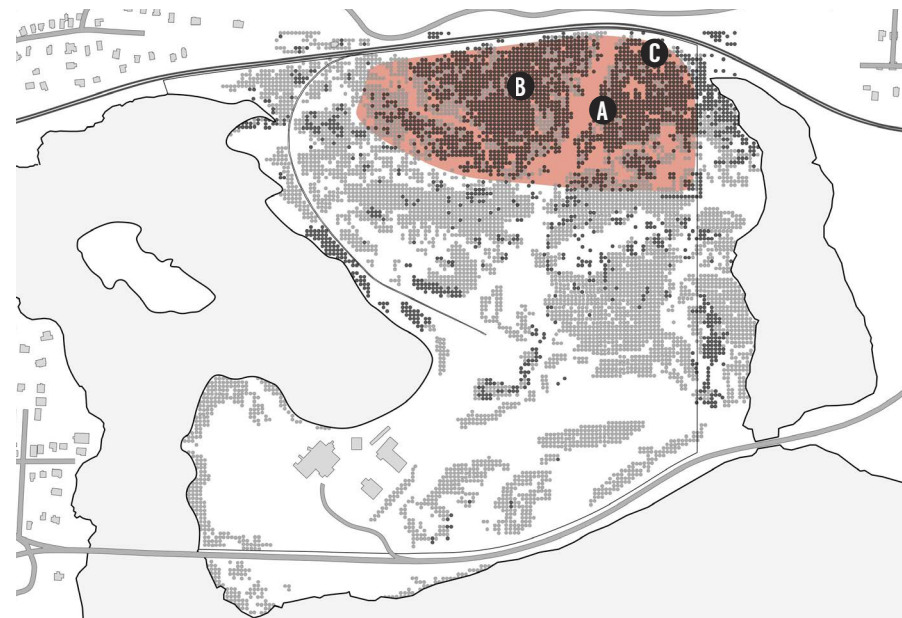
The 'meadow and forest' zone is just that, a mixture of sparse to medium density forest along with prairie grass and outcrops of bedrock. The forested areas are mainly composed of trembling aspen (*Populus tremuloides*), white birch (*Betula papyrifera*) and balsam poplar (*Populus balsamifera*). A few occurrences of bur oak (*Quercus macrocarpa*) were located near the edges of clearings along with the common juniper (*Juniperus communis* and *Juniperus horizontalis*). An old spur rail line, which is no longer operational, runs north south and has become overgrown with grasses. Evidence was found of people using the area for recreational purposes. The 'meadow and forest' zone exhibits a medium to low level of industrial impact.



FIG 5.20 *left (a), view east of natural trail
from hydro corridor to bush*

FIG 5.21 *middle (b), view north of forest
and trees blown down*

FIG 5.22 *right (c), view west of blasted
granite from railway*



FOREST

The most northern zone, the 'forest', has the most dramatic topography on the property, with many large protruding rock outcrops. The area is mainly composed of thick stands of balsam fir (*Abies balsamea*), black spruce (*Picea mariana*) and white spruce (*Picea glauca*). White birch (*Betula papyrifera*) and largetooth aspen (*Populus grandidentata*) can be found along the edges of clearings and the hydro corridor. A rail line bounds the northern edge of the property but there is no additional physical barrier limiting public access. Evidence was found of the area being used for recreational purposes, in the form of forts made of blown down trees, flattened camping tents and bonfire pits. The 'forest' zone exhibits a low level of industrial impact.



FIG 5.23 *left (a), view south of hydro corridor, Lake of the Woods in background*

FIG 5.24 *middle (b), view south*

FIG 5.25 *right (c), view north of rail and Norman Dr.*



HYDRO CORRIDOR

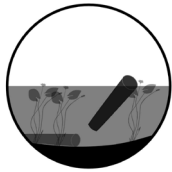
The hydro corridor exhibits the conditions of the adjacent zones, yet it is kept clear of any large trees or shrubs. Walking along the corridor, it is apparent that the area plays an important role in navigating the larger site. Many of the trails, both subtle and established, radiate from the corridor and most of the evidence of unprescribed recreational activities appeared to take place within a relatively short distance from the periphery of the corridor. It is common in the region to utilize hydro corridors as a recreational asset, most commonly by people on snow machines.



FIG 5.26 *left (a), view northwest of shore and Keewatin Bay*

FIG 5.27 *middle (b), view southwest of aquatic plants and grasses along shore*

FIG 5.28 *right (c), view south of chip loader and mill buildings from boat*



LAKE AND SHORE

The shore is a relatively low-lying marsh condition near the mill and it becomes steeper further north. Thick aquatic vegetation exists throughout Keewatin Bay. Logs are visible on the lake bottom from a boat, partially floating throughout the bay, and along the shore. Due to the aquatic vegetation and sunken and floating logs, navigation can be difficult. The bathymetric data east of the island is not included on local navigational boating charts, making powerboat traffic nearly impossible.



FIG. 5.29 *View north of mill buildings and snow machine tracks*



FIG. 5.30 *View south of Lake of the Woods and the Keewatin Channel Bridge*



FIG. 5.31 (a) *View north of woodwaste deposit*

Estimated total woodwaste on site:
76.455 M³ (KGS Group 1994 a, 9)

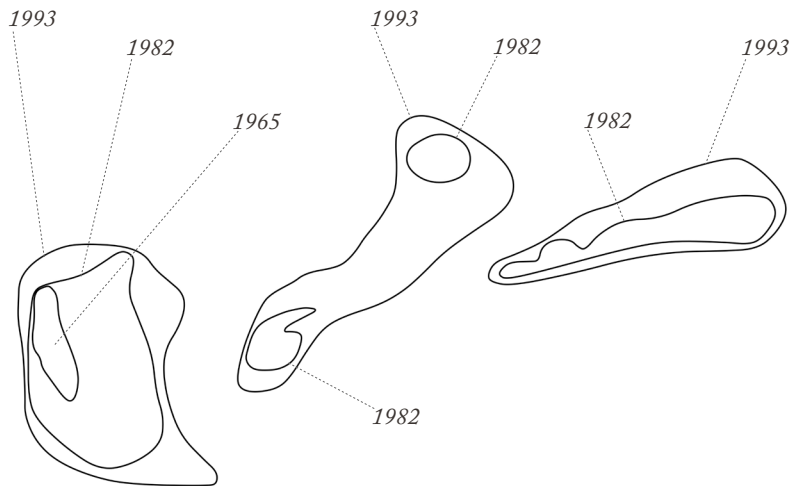


FIG. 5.32 Limits of woodwaste deposit

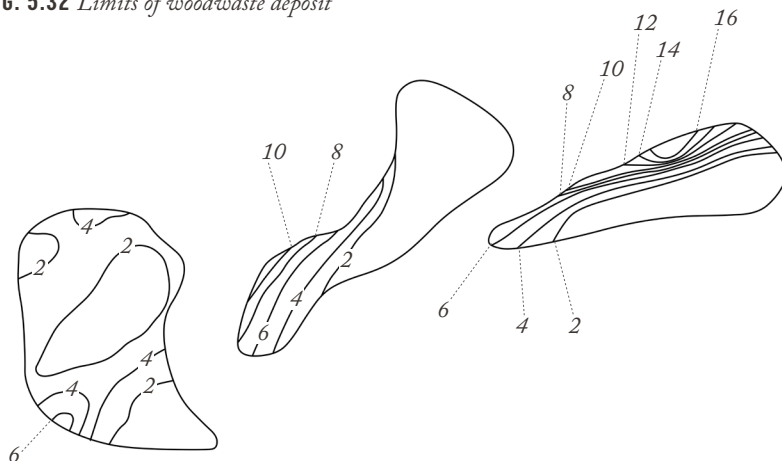
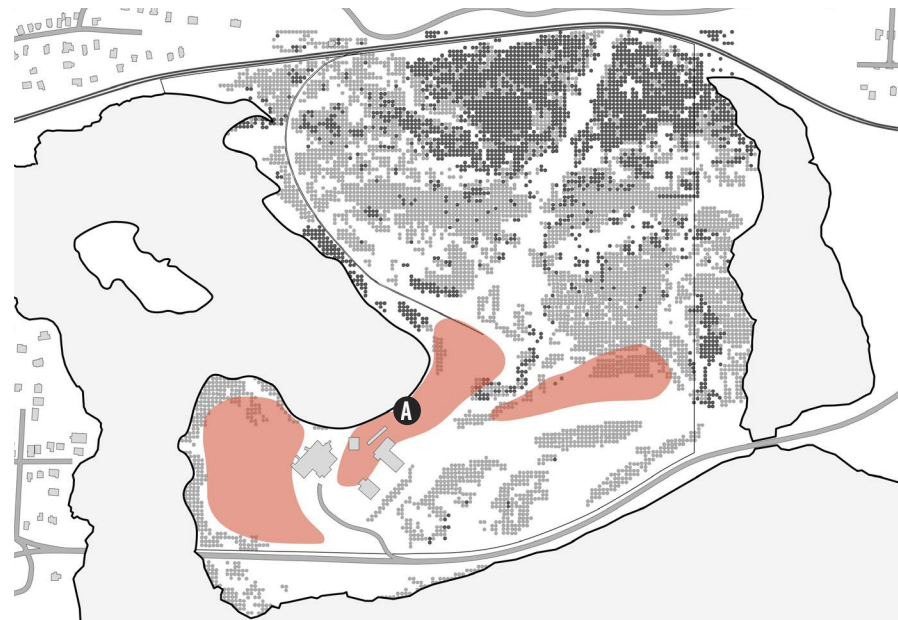
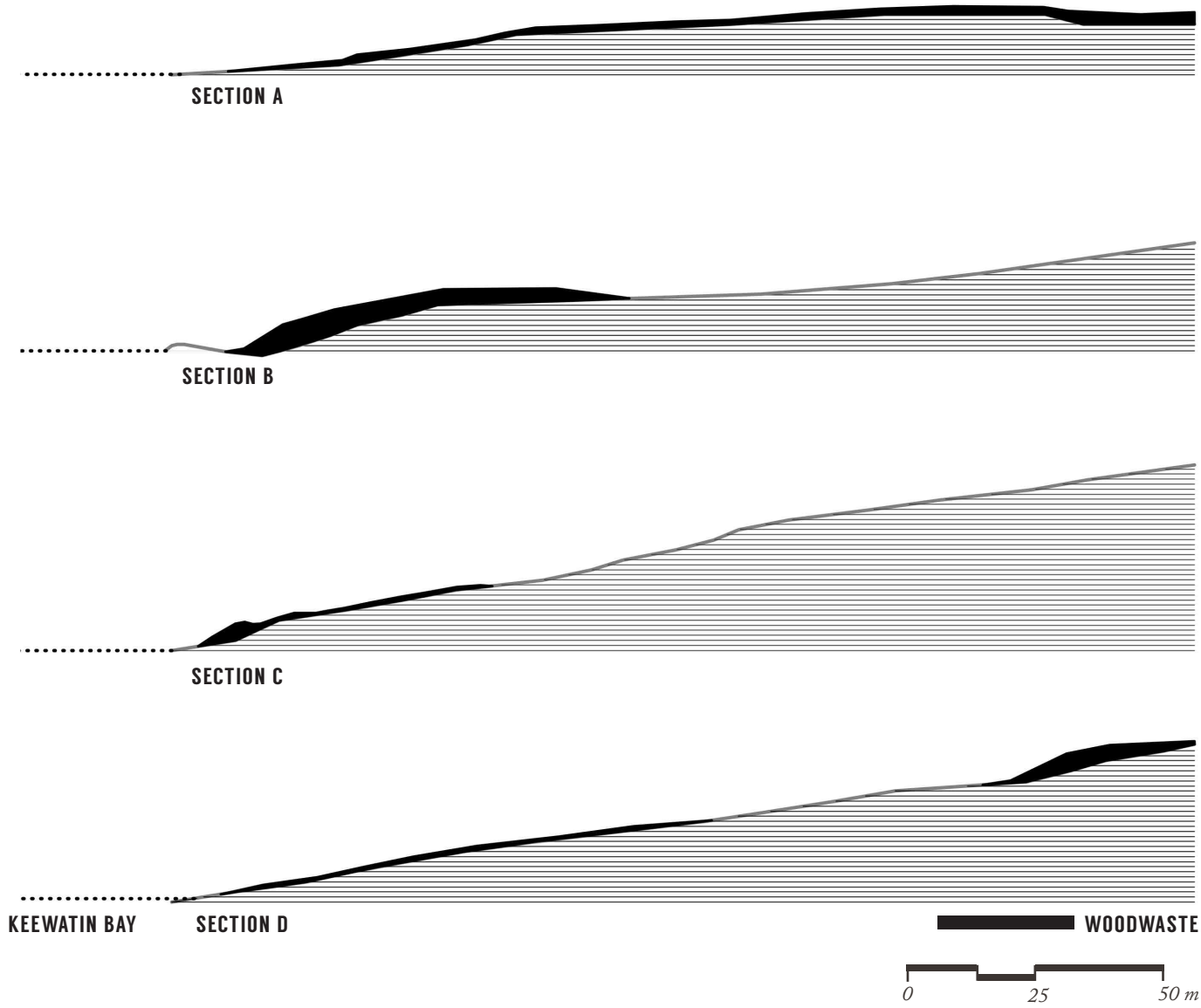


FIG. 5.33 Woodwaste thickness (ft)



WOODWASTE

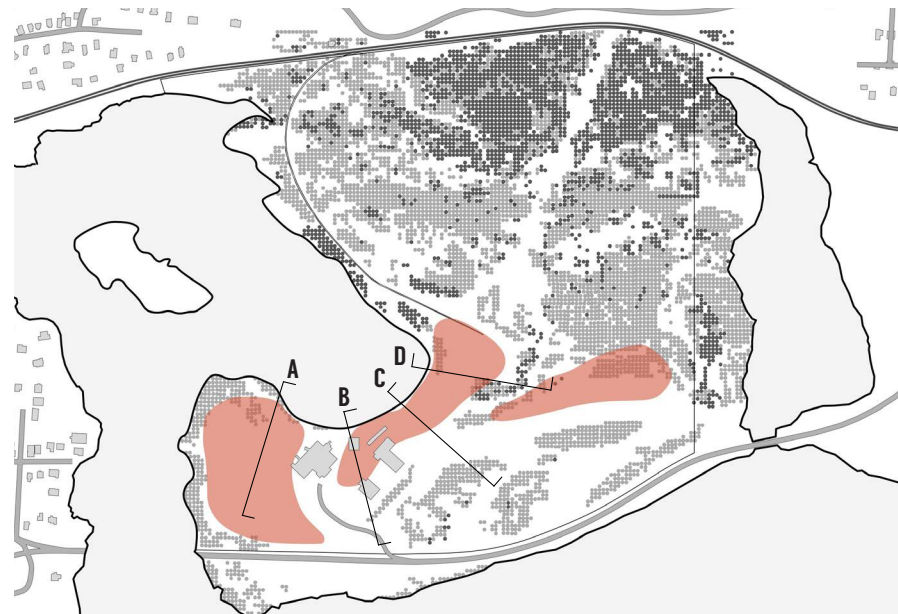
Woodwaste was observed in three of the six zones. Woodwaste, as explained in the previous section, is a byproduct of sawmill operations and is composed of sawdust, bark, wood chips, and planar shavings. Prior to the closure of the Abitibi-Consolidated Pulp and Paper Mill, the woodwaste created at 1060 Lakeview Drive mill was used as boiler fuel at the paper mill (Clayton, 2013). When the mill begins operations the woodwaste will be transported to a pulp and paper mill in Dryden, a city located one hundred and forty kilometres east of Kenora (Ibid.). Three large areas of woodwaste exist on the 1060 Lakeview Drive property, all of which were deposited prior to the mill transferring ownership to the now Kenora Forest Products sawmill. Estimates date the woodwaste deposits occurred between the years of 1965 and 1993, and as such exhibit varying levels of decomposition (KGS Group 1994 a, 38).



	SITE	LOTW	PWQO
pH	7.40	7.50-8.00	
Calcium	16.80	11.00-15.00	
Magnesium	6.10	0.50-4.50	
Sodium	4.00	1.50-3.25	
Potassium	1.22	0.85-1.10	
Sulfate	10.00	3.00-5.50	
Chloride	3.10	1.00-2.25	
T. Alkalinity	58.00	46.00-55.00	
Boron	<0.01		0.20
Cadmium	<0.004		0.0002
Aluminum	0.50	0.025-0.15	0.075
Iron	0.77	0.01-0.12	0.30
Nickel	<0.02		0.025
Phosphorus	<0.20	0.015-0.04	0.02

FIG. 5.35 Water comparison: 1060 Lakeview Drive (site), Lake of the Woods (LOTW) and Provincial Water Quality Objectives (PWQO)

FIG. 5.34 left, sectional study of woodwaste thickness and proximity to waterbody



The runoff in contact with the woodwaste contains leachate, “water-soluble material dissolved from the wood” (Masbough 2005, 553). A Water Analysis Report prepared for the property explained that the “leachate is slightly acidic with a higher concentration of dissolved solids” (KGS Group 1994 a, 9). In order to understand the potential environmental implications of the woodwaste leachate, the Water Analysis Report was compared to the existing water quality of Lake of the Woods as well as the Provincial Water Quality Objectives. This comparison revealed the leachate exhibits elevated levels of calcium, magnesium, sodium, potassium, iron, sulfate, chloride, aluminum and phosphorous (DeSellas 2009, 45-48; KGS Group 1994 a, 57; Ontario Ministry of the Environment 1994, 43-61).

The above table reveals the results of the comparison (only the categories exhibiting elevated levels were included in table).

The recommendations for the clean up of the woodwaste include consolidating the material into a single area and applying a clay ‘cap’ while also capturing and treating the leachate runoff, or to remove the material and place it in a landfill (KGS Group 1994 b, 17). The infographic on the following page reveals the reality of transporting the large amount of woodwaste to a landfill and the lost opportunity of removing the material. The design is Section Six explores how the potentials of the material can be harnessed and treatment of the woodwaste can occur and remain on site.



FIG. 5.36 *Volume of woodwaste on site in perspective*



To transport the existing 76,455 m³ of woodwaste to a landfill would require 3,324 loads in a standard dump truck (23 m³).





FIG. 5.37 *View south of chip loader and woodwaste*

POST-INDUSTRIAL

The term *post-industrial* evokes images of abandoned industrial buildings and restricted access, while *post-industrial landscape* evokes images of public parks that harness the opportunities of the former industry. Landschaftspark Duisburg-Nord and Gas Works Park, are prominent post-industrial parks, where rather than demolishing the industrial structures and infrastructure it has been preserved as a central feature of the park (Tate 2001, 114). The massive scale and “lack of functional context” (Meyer 1998, 16) of the industrial ruins evokes a sense of awe of humans’ ability to “control nature, space and time through technology” (Ibid.). In contrast, the sawmill structures on the 1060 Lakeview Drive property are transient, able to be dismantled and rebuilt at a different location. The only remaining “ruins” will be the building foundations and industrial byproduct. Without the industrial structures to create a core narrative that the park can identify with, the sawmill will rely on a more dispersed

experience of disturbance.

As was discussed in relation to the ancient trading route from Lake Superior to Lake Winnipeg, the landscape is far from pristine, exhibiting layers of disturbance from the composition of the forest to the level of the water. For example, prior to industry Keewatin/Portage Bay was a place of shallower, slow moving, wetland waters (Huck 2002, 150) and as a consequence of damming the water was raised nearly one metre. The 1060 Lakeview Drive site can be understood as a representation of a larger geographical context in which to explore the seemingly latent and the more apparent traces of the industrial era. The design intention is not to simply restore a former reality or preserve a current one, but to seize the opportunities created by these conditions to determine a possible future for the site.



DESIGN INTERVENTION



SITE PLAN AND PROPOSAL

A large-scale containment and treatment system for the existing woodwaste is proposed for the 1060 Lakeview Drive property. All existing woodwaste would remain on site for remediation and for the public to experience. The intervention is mostly limited to the areas most affected by the industry. The intention is to maintain the industrial quality while taking influences from the wider forestry industry in terms of the formal design language. The experience of the clear cut as well as the hydro corridor as a navigation tool was highly influential in the design process.

The site plan depicts an alternating pattern of boreal forest and woodwaste positioned east to west adjacent to the highway. Further north, the alternating strips engulf the remaining foundations of the mill buildings. A treatment wetland area is proposed near Keewatin Bay to intercept the polluted runoff from the woodwaste prior to entering the water. A few of the foundations are located near the water and would inhabit this wetland environment. Moving further north to the Bay, the existing wetland condition is enhanced with rolling topography. Two piers are superimposed on the three spaces: the forest, the treatment wetland and the enhanced wetland.

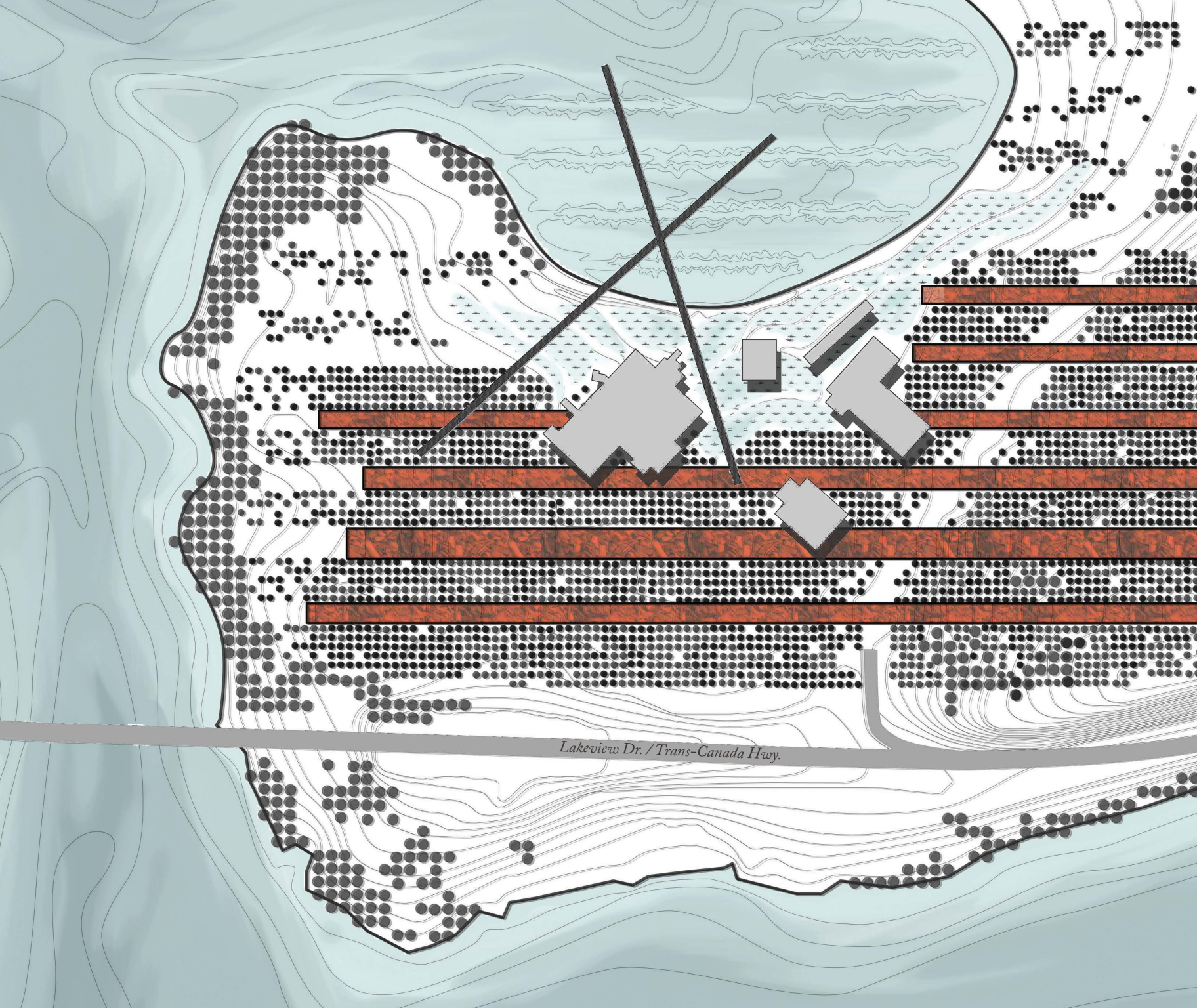
An analogy of snakes and ladders, the board game, was critical in the design process; the ladder representing the slow and patient task of navigating through a forest and

the snake representing an abrupt cut (i.e. clear cut or hydro corridor) as an exciting shortcut through the forest. The piers exhibit qualities aligned with the 'snake' portion of the analogy, abruptly slicing from the forest into the Bay.

The design intervention does not include an established circulation pattern of how one should navigate the site. Evidence found in the existing forest of people using the area for recreational purposes was influential in the decision to employ a less formal circulation design in hopes that the intervention might also be used in this less ridged manner. The hydro corridor, established along the north-south axis, is positioned perpendicular to the alternating forest and woodwaste. The experience of walking in the corridor would offer clear views between the forests and reveal the foundations and wetlands, while at the same time, encouraging users to enter into the woodwaste clearings and navigate in more of an informal manner.

Limiting the intervention to the area most impacted by the industry is intended to allow for possible future development to occur. If the long term vision for the site does include residential, commercial, and a marina, it would be required to react to the intervention. The intervention preserves a larger portion of the shoreline for public use, while the deeper shore further north could accommodate marina space.

FIG. 6.0 *Proposed site plan*
Section A on pages 130-131



Lakeview Dr. / Trans-Canada Hwy.

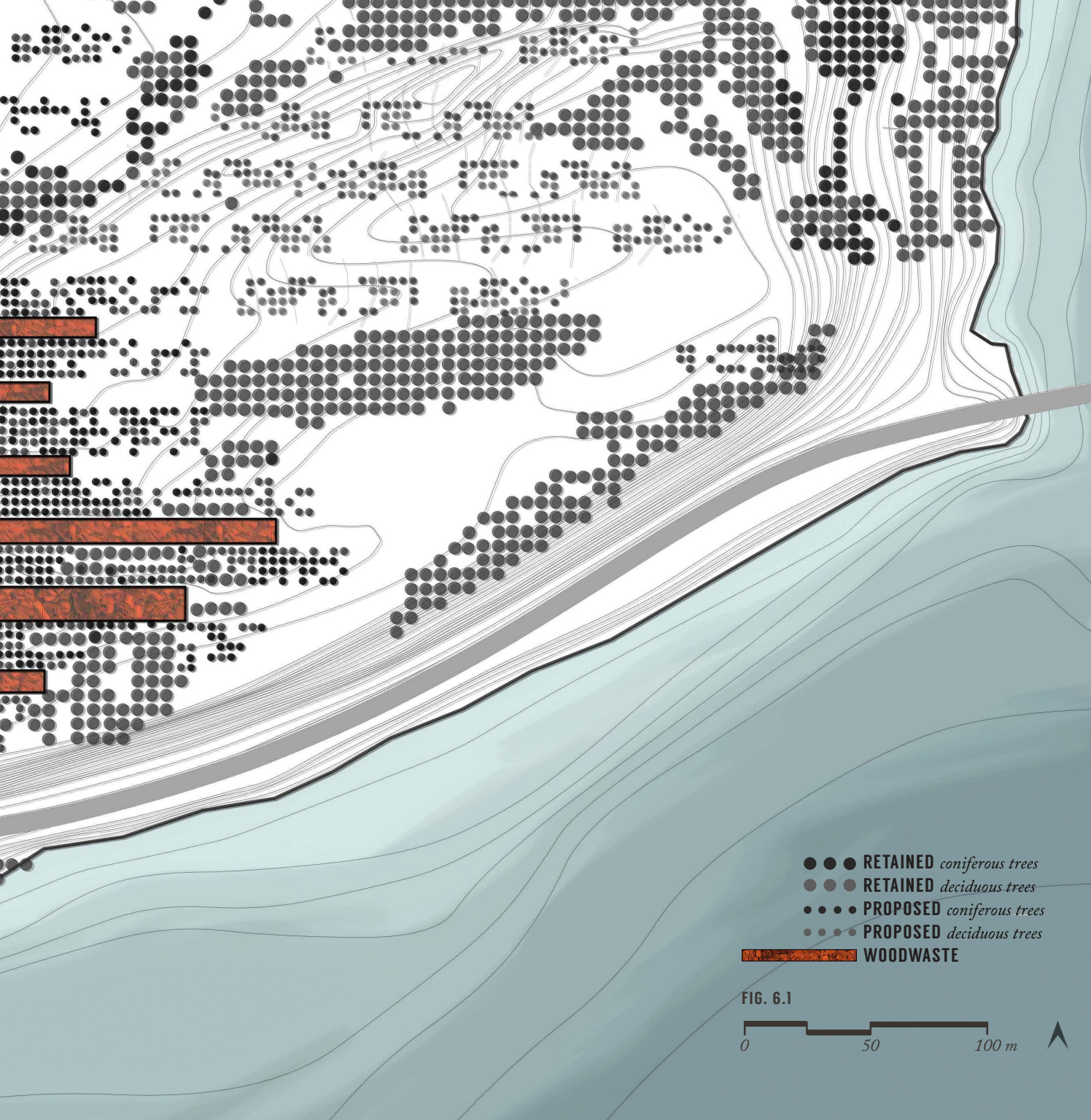


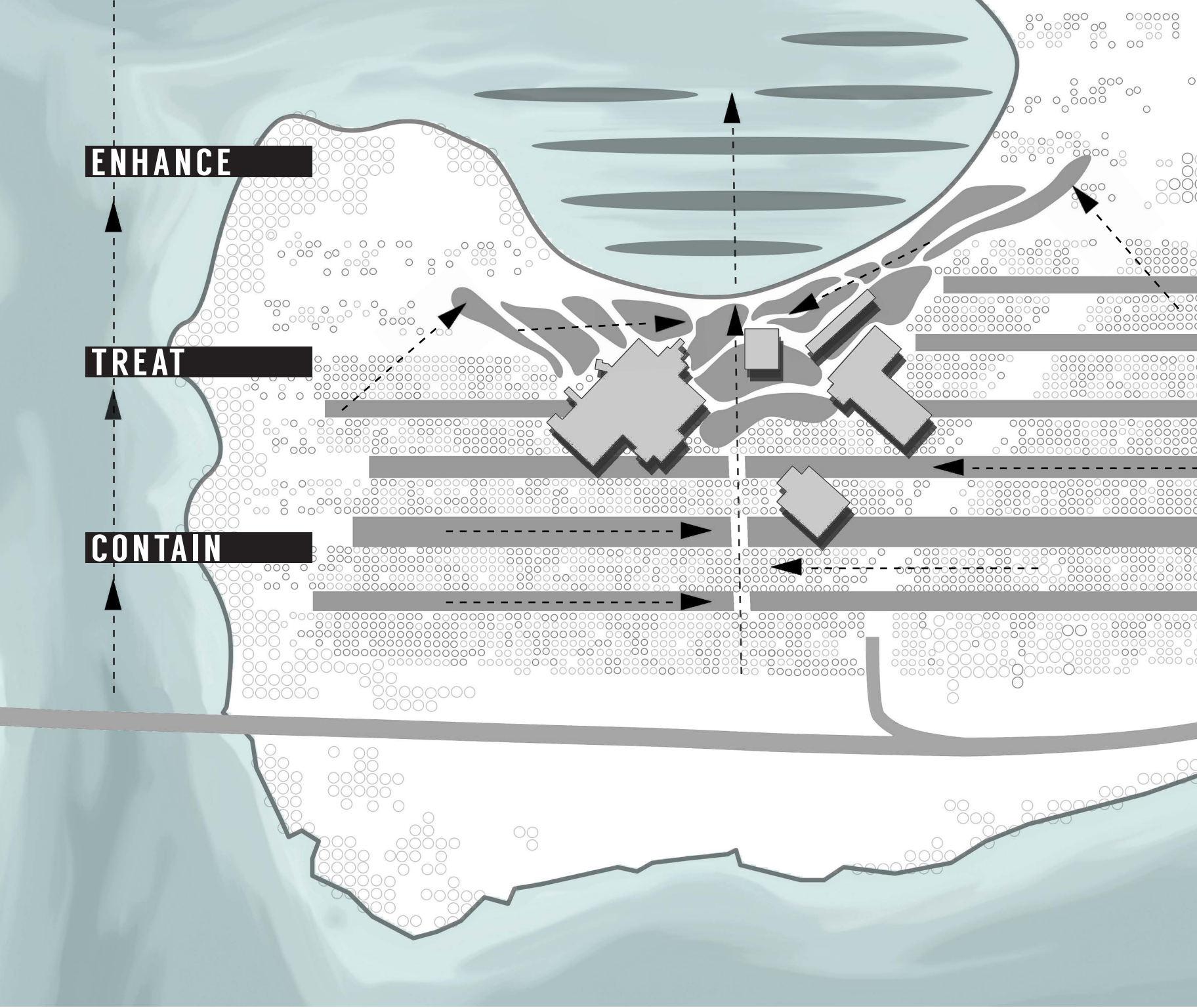
FIG. 6.1



ENHANCE

TREAT

CONTAIN





← - - - DRAINAGE PATTERN

FIG. 6.2



The simplified site plan clearly illustrates the functional aspects of the design; the intervention is divided into three components: the containment of the woodwaste, the treatment of the leachate and the enhancement of the existing wetlands.

By studying the existing landform, it is apparent that surface water runoff moves from the south, the elevated area near the highway, to Keewatin Bay. The east-west orientation of the strips of forest and woodwaste is intended to take advantage of the existing drainage pattern, guiding runoff first to the lowest area in the centre and then north towards the treatment wetlands. Swales reach past the limits of the wetland to capture the remainder of the leachate runoff. The lengths of the woodwaste elements were determined by the existing topography, stretching as far west as possible until the natural drainage shifted from on-site to the lake.

In addition to drainage, east-west orientation is important for creating optimal conditions for wetland plants by providing maximum southern exposure.

The following pages present the design intervention as it is divided into three elements: contain, treat and enhance.



FIG 6.3 *View east from highway*



East-west orientation, in addition to drainage and southern exposure, is critical in engaging the highway driver. Lakeview Drive is a major roadway, for both tourist and locals and the east-west orientation would provide an evocative view of the design intervention. The area once

filled with stacks of wood and machinery would be replaced with strong clear cuts of public space. The strong design gesture would play an important role in establishing a sense of arrival that is fitting of a city with such a strong resource-based history.

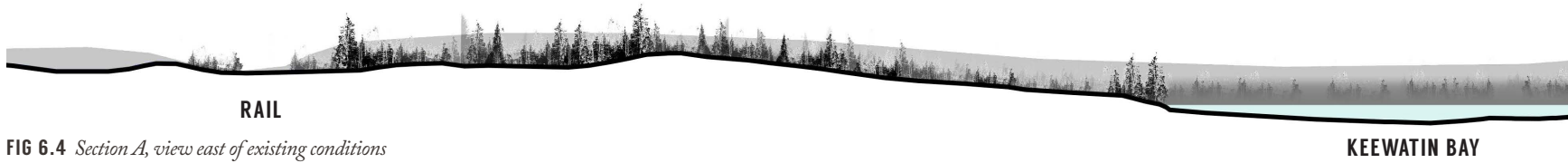


FIG 6.4 *Section A, view east of existing conditions*

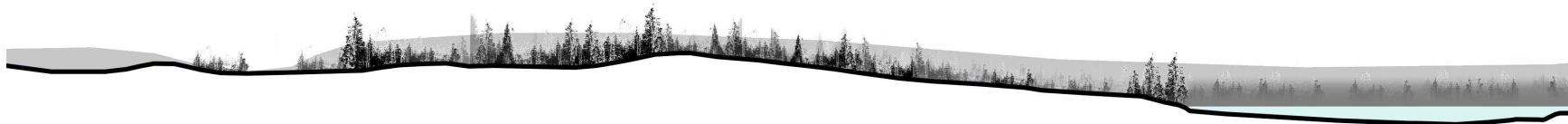
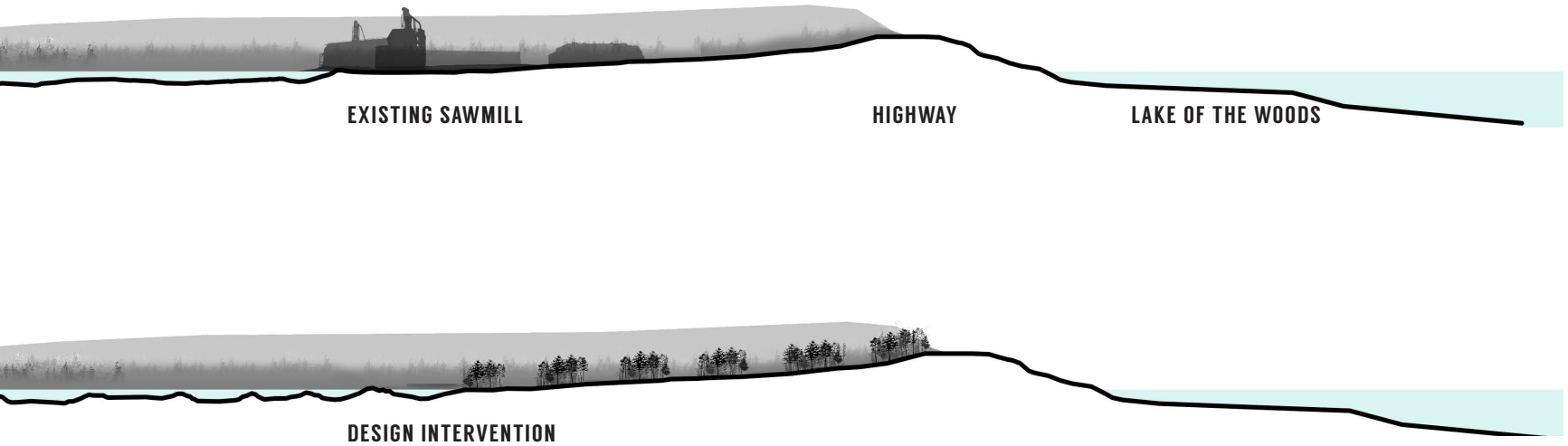


FIG 6.5 *Section A, view east of proposed conditions*





Interpreting the existing site was critical in determining the topographical alterations, incorporating data relating to drainage patterns, proximity to Keewatin Bay and the condition of the soil. Managing the different levels of contamination of the soil and woodwaste on site was a focus of the design process. The intervention does not require the

input of any additional soil, but simply the reorganization of the existing surface materials. Soil not contaminated by leachate or industrial processes is to be used for enhancing the wetlands, while the contaminated soil is to be placed farther south to ensure the runoff is treated prior to entering the Bay.

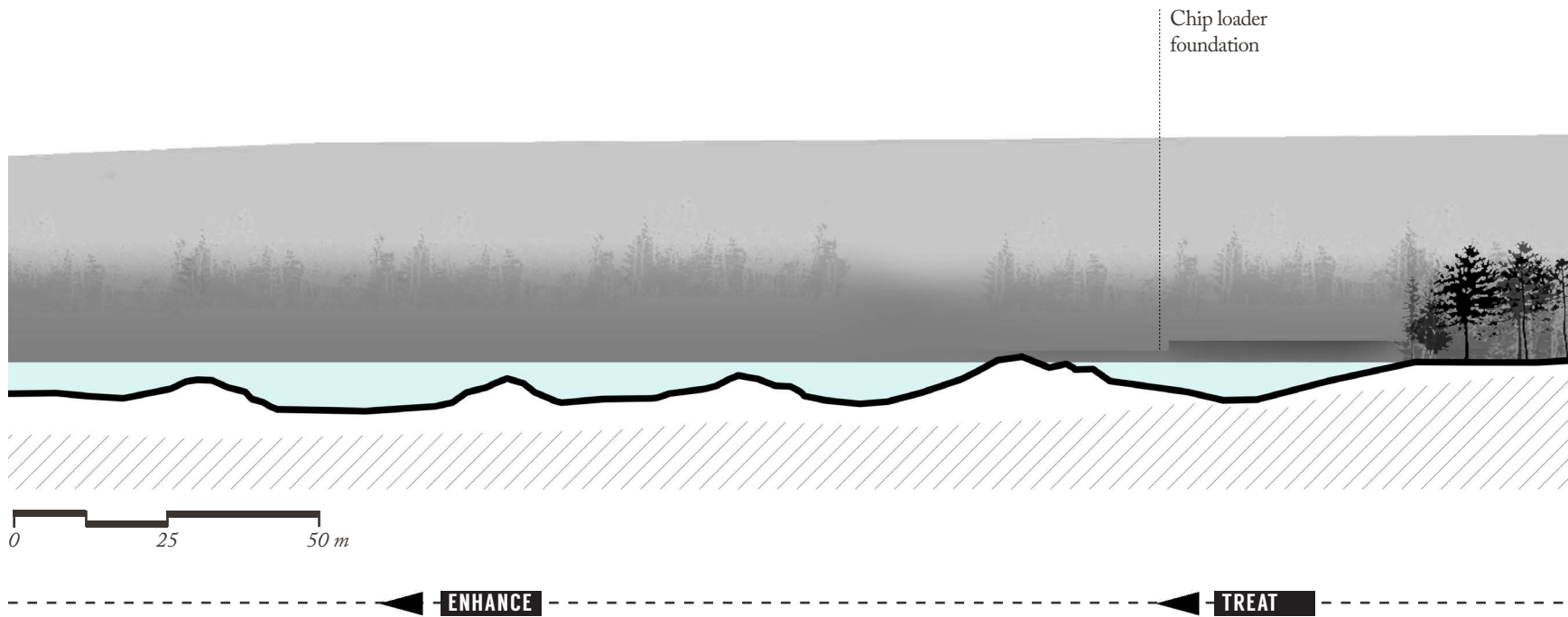
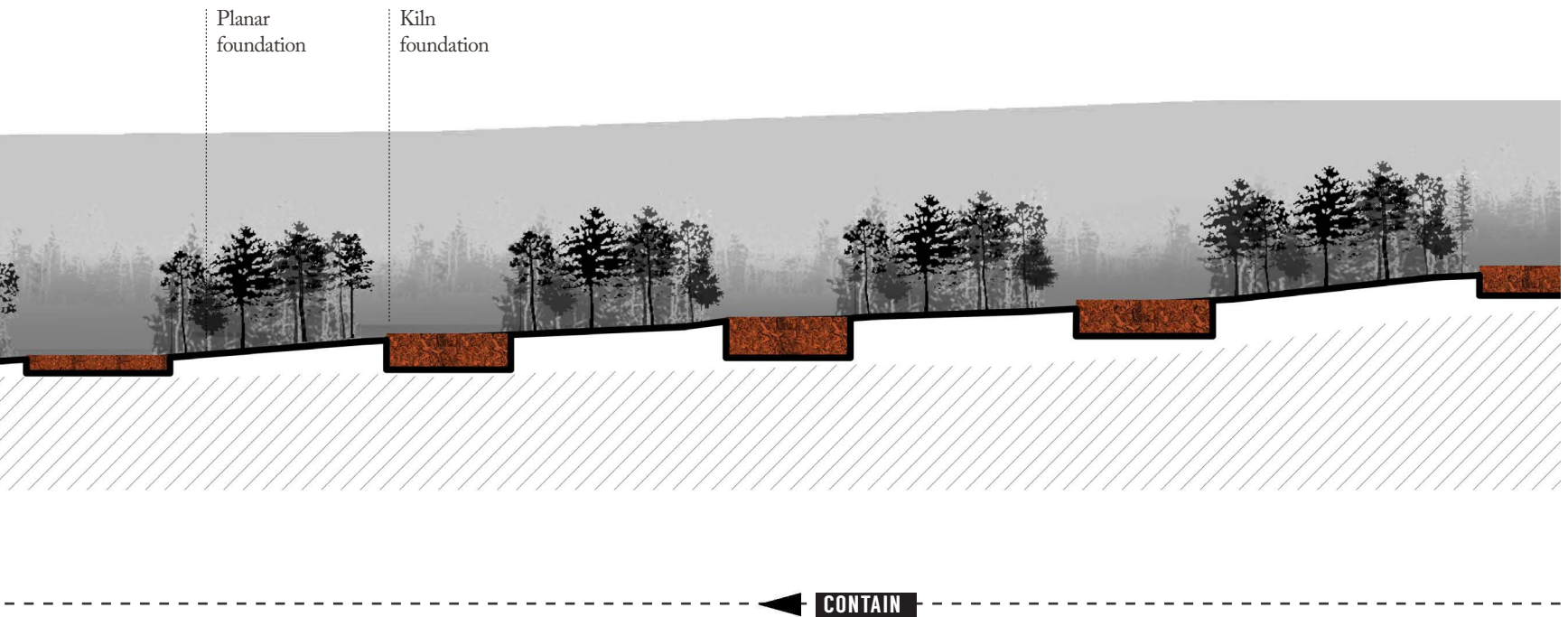


FIG 6.6 Section A, view east of proposed conditions



CONTAIN: the woodwaste is contained by concrete at ground level at varying depths depending on the presence of bedrock.

TREAT: the majority of the runoff from the intervention is collected in the treatment wetland before flowing into the lake at controlled locations. The treatment area is largely separated from Keewatin Bay by landform that exceeds the high water level of the lake.

ENHANCE: Keewatin Bay is enhanced by the addition of a series of topographical undulations intended to increase the planting area as well as the diversity of wetland species.



CONTAIN

The existing woodwaste is located in three large deposits, with depths varying from half a metre to five metres (KGS Group 1994 a, 37). There is not currently a system in place to collect and treat the woodwaste leachate. The design intervention satisfies the space requirements of the woodwaste in seven contained areas, averaging a depth of three metres as part of a larger system of leachate collection and treatment.

The presence of water or a cycle of wet and dry appears to accelerate the decomposition process of the woodwaste, as explained on pages 82-83. Utilizing this principle, the drainage pattern is intentionally elongated to travel parallel to the containers to a centre collector area, which then carries the water to the treatment wetlands. By elongating the existing pattern of drainage that allows water to travel from south to north, more water is absorbed into the woodwaste or soil.

FIG. 6.7 *Diagram site plan, woodwaste containment area highlighted*
Section B on page 136 and 137





FIG. 6.8 *Section B, view east of existing conditions*
EXISTING

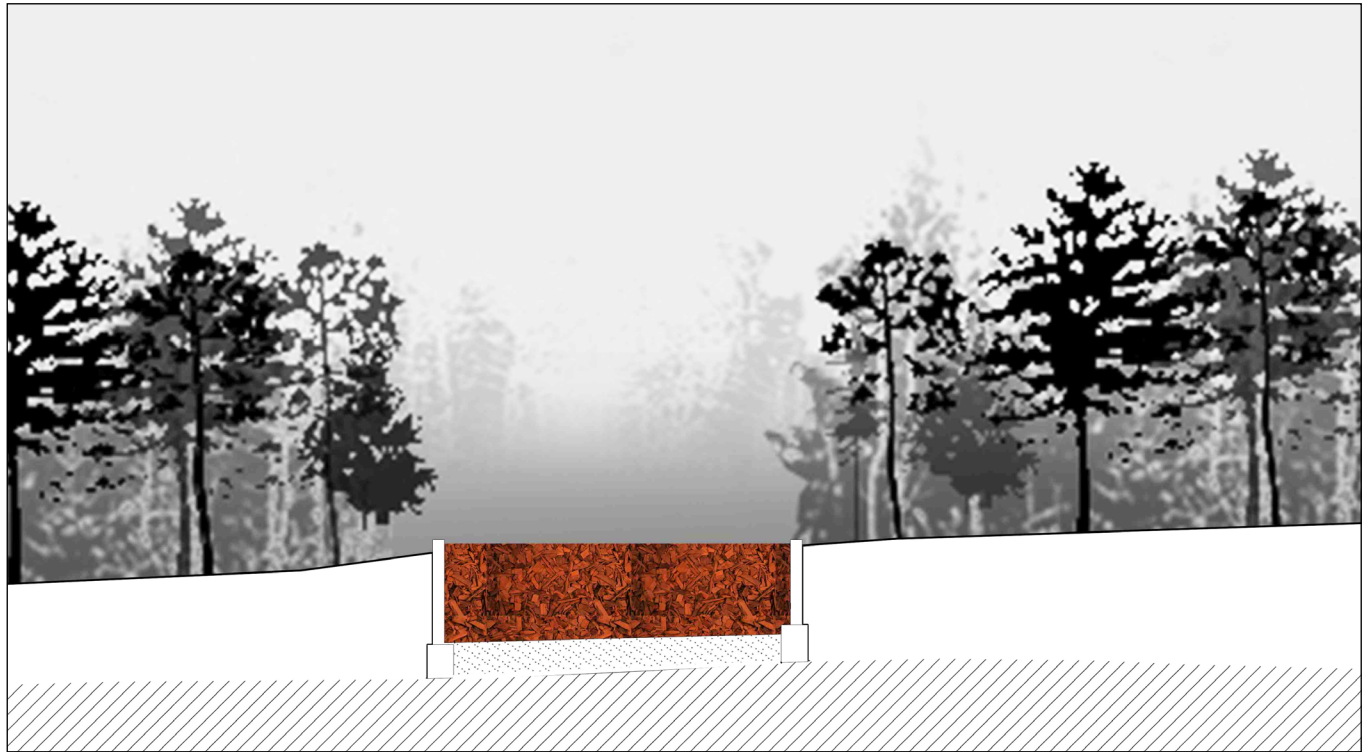


FIG. 6.9 Section B, view east of proposed conditions

PROPOSED



-  **WOODWASTE**
-  **SOIL**
-  **BEDROCK**

Concrete forms the walls of the container while gravel and an impermeable liner create the bottom. The impermeable liner is necessary to prevent the leachate from seeping into the groundwater. Further research, beyond the scope of the design practicum, would be necessary in order to design the underground infrastructure of the system. The design intervention is intended to provide a suggestive idea of what could be possible and not an exhaustive detailed design.



FIG 6.10 *View east from highway*



In the winter months the intervention would appear simply as clearings in a forest. Woodwaste has been highlighted in the above image to illustrate the fluid design of the containers, which unroll like a carpet over the topography. Plants were not observed growing in the woodwaste,

ensuring the clear cuts in the forest endure throughout the seasons with little maintenance. The clearings are intended to provide the public, especially the locals of the Keewatin neighborhood, with much needed open space.



Although the leachate produced from the woodwaste can cause damage to the environment when not diluted and treated, the material itself is safe for humans to interact with. The wood is not chemically treated during the milling process, allowing the byproduct to be safe for such uses as animal bedding and garden mulch (LOTWDC 2013, 4, 8).

Prescribed or programmed space, despite the treatment of leachate, is intentionally absent from the design. There may not be assigned programs, yet the open space afforded by the woodwaste containers meet the requirements of a plethora of recreational activities. A rendering of people participating in archery illustrates one way that the long, gently sloping strips of open space could be utilized. Keewatin is a neighborhood of small lots and few large open spaces. The design intervention is intended to provide the people of Keewatin, who have known the 1060 Lakeview Drive

as an inaccessible industrial operation, with quality park space. The design allows access to a place once reserved for employees and deer hunters.

An inventory of tree species observed on the property during the site analysis phase, as well as an understanding of the regional forest composition, guided the design of the forest. Red pine (*Pinus resinosa*), jack pine (*Pinus banksiana*), balsam poplar (*Populus balsamifera*), trembling aspen (*Populus tremuloides*) and white birch (*Betula papyrifera*) are the main trees proposed to create the strips of boreal forest. Pattern of plantings would be based loosely on a grid, with hopes of creating more a wild forest condition over time. The depth of soil, level of exposure to leachate and topography would determine the composition of the forest throughout the design.



RED PINE
(*Pinus resinosa*)



JACK PINE
(*Pinus banksiana*)



BALSAM POPLAR
(*Populus balsamifera*)



TREMBLING ASPEN
(*Populus tremuloides*)



WHITE BIRCH
(*Betula papyrifera*)

FIG 6.11 Archery in the woodwaste clearing

FIG 6.12 Tree species of the boreal forest strips



The widths of the woodwaste containers measure nearly ten metres on average. The largest container measures fourteen metres across, providing ample space for the woodwaste to be flooded in the winter on the flattest area of land. Flooding a woodwaste container creates opportunities for recreational activities like shinny hockey and skating, and as Keewatin currently does not have access to an outdoor rink within walking distance (City of Kenora 2010 c), the design could provide the local people with a place to enjoy the outdoor winter environment.

Activities occurring in the clearings have been illustrated to highlight the potentials of the woodwaste as a surface material. Very little plant growth occurs in the woodwaste ensuring the clear gestures of the clearings remain strong with little maintenance.

FIG 6.13 *Playing hockey in the woodwaste clearing*



FIG. 6.14 *Diagram site plan, treatment wetlands highlighted Section C on page 146 and 147*

TREAT

Treatment of the runoff from the woodwaste is necessary to ensure the pollutants in the leachate do not negatively impact the ecosystem of Keewatin Bay and the larger Lake of the Woods. The composition of the pollutants in leachate are determined by “tree species, age of wood, and duration and amount of precipitation” (Scholz 2011, 92-93). Many different technologies, from biological to chemical and with varying intensities, are capable of treating woodwaste leachate (Ibid., 95-96). The design intervention includes a low intensity treatment wetland capable of reducing contaminants in woodwaste.

Leachate contaminants of most concern of entering the water column are “organic matter and phosphate” (Scholz 2011, 104). The conditions created in a well-designed wetland can “provide an ideal microenvironment for the sedimentation, filtration, absorption and bacterial decomposition of wastewater constituents” (Masbough 2005, 554). Treatment of leachate in constructed wetlands has “shown to be effective for reducing the concentrations of organic matter and phosphorus” (Scholz 2011, 103), but the

research is in the initial stages and does not provide design recommendations. Further research of types of treatment wetlands effective in removing contaminants in general was conducted to supplement the information pertaining specifically to woodwaste leachate.

Multiple treatment cells exhibiting conditions of varying water depths encourage the processes of sedimentation, filtration and absorption necessary to reduce contamination in runoff (France 2003, 55). For maximum contamination removal, fifteen percent of the wetland surface is considered to be *open water*, fifteen percent *deep marsh* and seventy percent *shallow marsh* (Ibid.). The drainage pattern guides water to a series of inflow locations to orchestrate how the runoff is exposed to the multiple treatment cells. Vegetated swales reach out both east and west from the wetland to capture runoff from woodwaste not guided to the centre channel. Edge conditions of the cells are irregular to increase the available planting area and in turn the available treatment surface as well as reducing the speed of the water (Ibid., 51).





FIG. 6.15 *Section C, view east of existing conditions*
EXISTING

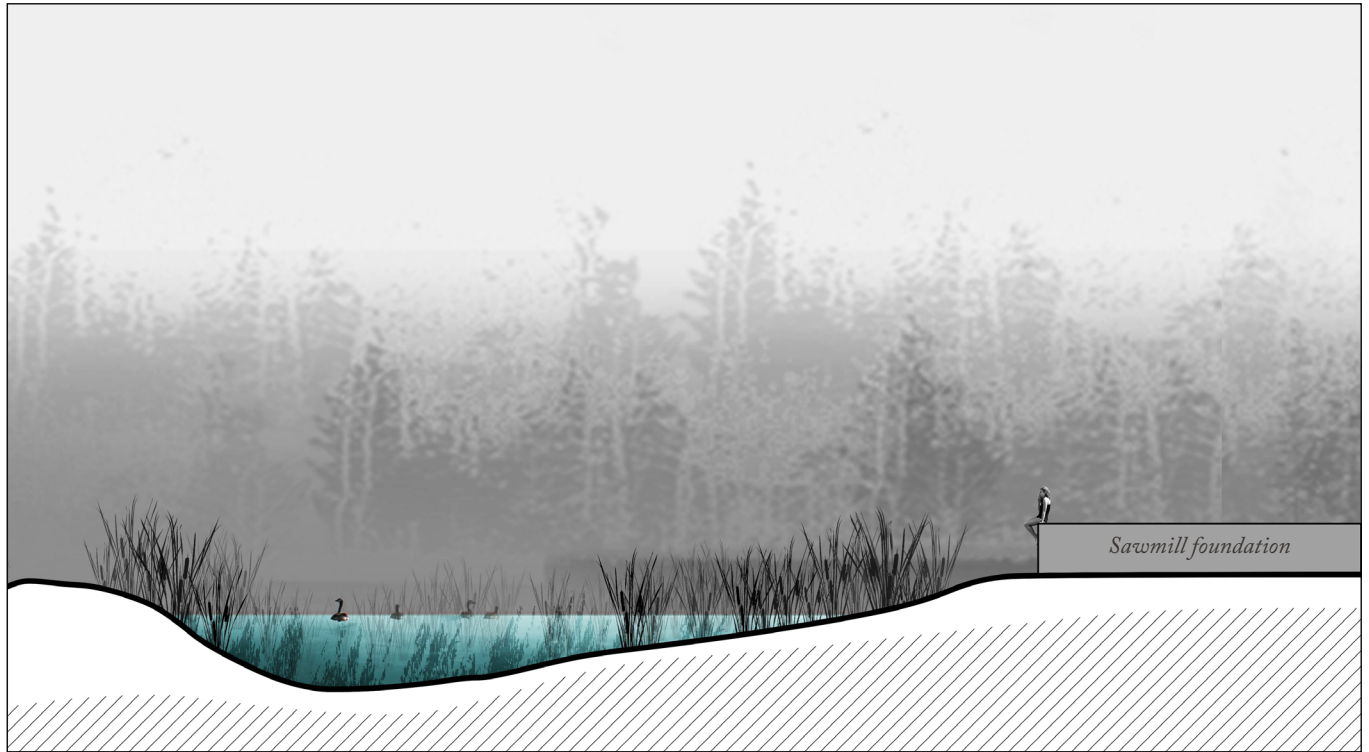


FIG. 6.16 Section C, view east of proposed conditions

PROPOSED

After the buildings are dismantled, the foundations remain to preserve the footprint. The foundation of the main sawmill building sits more than a metre above the ground plane and once the mill is relocated, only a large concrete floor surrounded by forest and wetlands with an unimpeded view of the lake would remain.



-  **TREATMENT WETLAND**
-  **SOIL**
-  **BEDROCK**

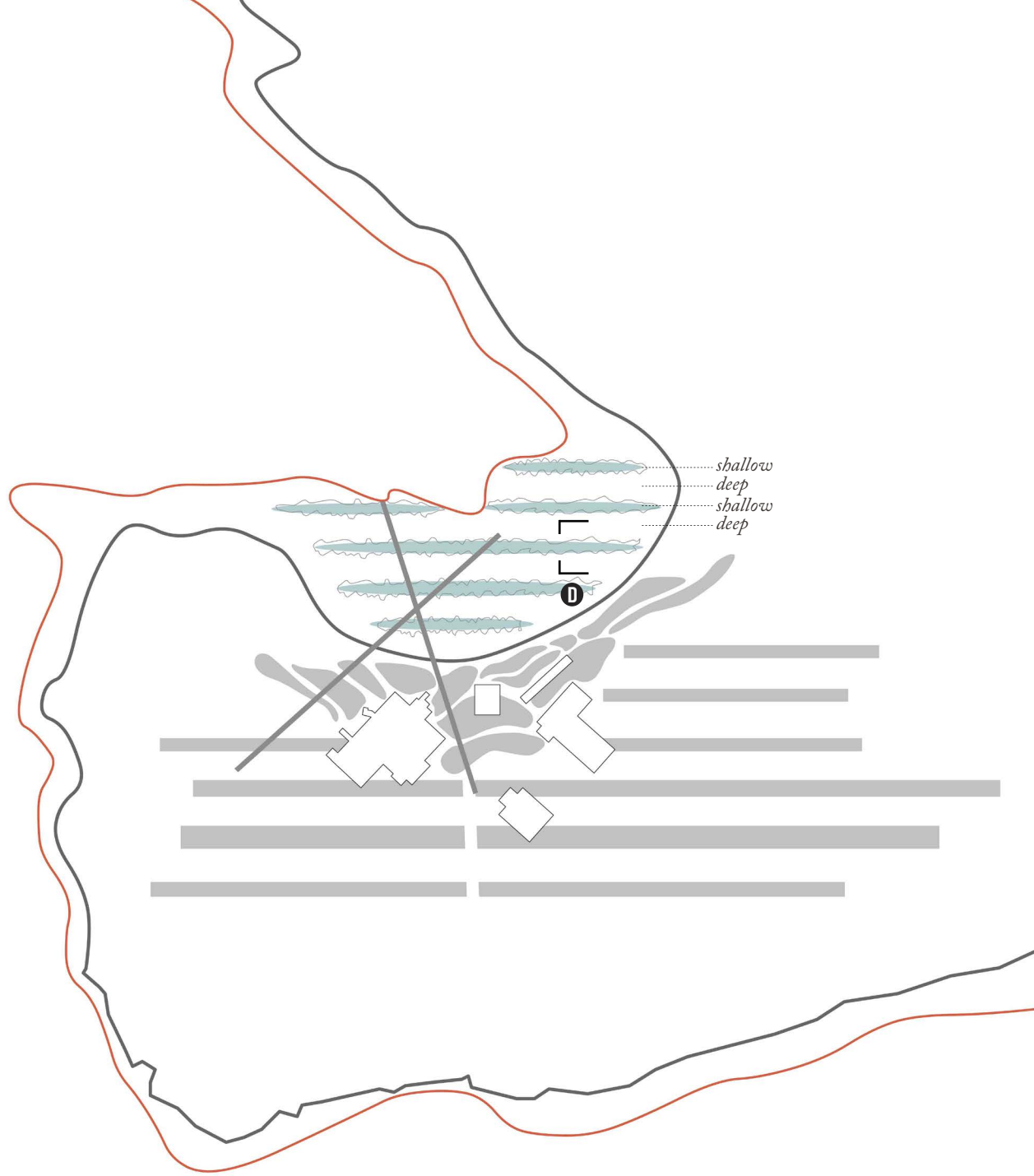


Currently woodwaste exists near the mill buildings and the water. As the design proposes to relocate the woodwaste to containers further south, a depression would result from the material relocation. The depths of the depressions in the land were factored into the design of the varying depths of the treatment cells. Although there has been a mill on the site for over one hundred years, the existing mill in particular was built in the 1980s (KGS Group 1994 a, 4) and the chip loading structures were built on top of one of the woodwaste deposits. By removing the waste, the concrete slab floor and foundation pilings would be revealed.

Vegetation is integral to the effectiveness of the wetland treatment system. Emergent plants including cattails, reeds and rushes create “an ideal microenvironment for the sedimentation, filtration . . . [and] absorption” (Masbough 2005, 554) processes, required for treatment, to occur. Cattails, the species *Typha latifolia* specifically, planted in a deep marsh environment, have been recorded to reduce

woodwaste leachate contaminants by up to sixty percent in preliminary tests (Scholz 2011, 99). The treatment wetlands are composed of cattails (*Typha latifolia*) and a plethora of species observed in the Mink Bay Wetlands. Mink Bay Wetlands were used as a reference of the species capable of thriving in the contaminated waters as the Mink Bay vegetation has adapted to leachate seepage from the submerged woodwaste deposit found along its shore.

The design of the treatment wetlands was influenced by the existing conditions and the functional requirements of a productive wetland to create a unique experience for the users of the site. The space between the treatment cells is lined with gravel and is intended to encourage the exploration of the wetlands, the shore and the foundations. The area once dominated by industrial buildings and heavy machinery would be transformed into an environment of slow moving waters and a playground of concrete remnants.



ENHANCE

Keewatin Bay, formerly known as Sawmill Bay (KGS Group 1994 a, 11), is surrounded by the 1060 Lakeview Drive property. The woodwaste runoff would flow into the Bay upon completion of the treatment cycle. The enhanced wetland area is intended to extend the treatment potential of the landscape, to act as a “final polishing” (France 2003 59) stage prior to the water entering the greater Lake of the Woods further south.

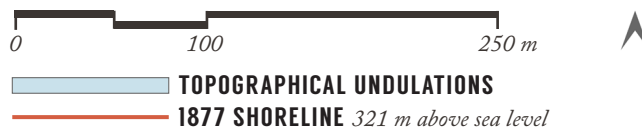
Strips of elevated topography are positioned perpendicular to the inflow from the treatment wetlands to ensure the water travels through both deep and shallow water. The varying depths created by the topography encourage particle settlement while also acting to slow the water down (Ibid. 55). East-west alignment of the enhanced wetland is important in order to maximize southern exposure for most efficient plant establishment and growth.

The rounded southern shoreline creates a natural container to store log booms in Keewatin Bay. Many logs, partially floating or sunken, remain in the Bay and would be disrupted during the construction of the enhanced wetland

area. Although the disruption of sunken logs has the potential to disrupt valuable fish habitat (Fisheries and Oceans Canada), the proposed design would increase the amount of valuable habitat for both birds and fish. The logs of good quality would be utilized as a building material while the logs of poor building quality would remain on site. In order to reduce water pollution, the logs would be placed in the treatment wetlands, as water in contact with logs produces leachate in the same manner as woodwaste. Removing the logs from the Bay also reduces the safety concerns associated with partially floating logs known as ‘deadheads’ and the presence of powerboats.

Piers cut through the design intervention, the forested areas, the treatment wetland and the enhanced wetlands. Keewatin Bay, prior to European settlement, was a place of shallower slow moving water. (Huck 2002, 150). The piers reach out into the Bay to provide the users with an experience of the lake and the wetlands but also to recognize the impact of the larger industry. The pier reaching farthest north marks the location of the former shoreline.

FIG. 6.18 *Diagram site plan, enhanced wetlands highlighted*
Section D on pages 152 and 153



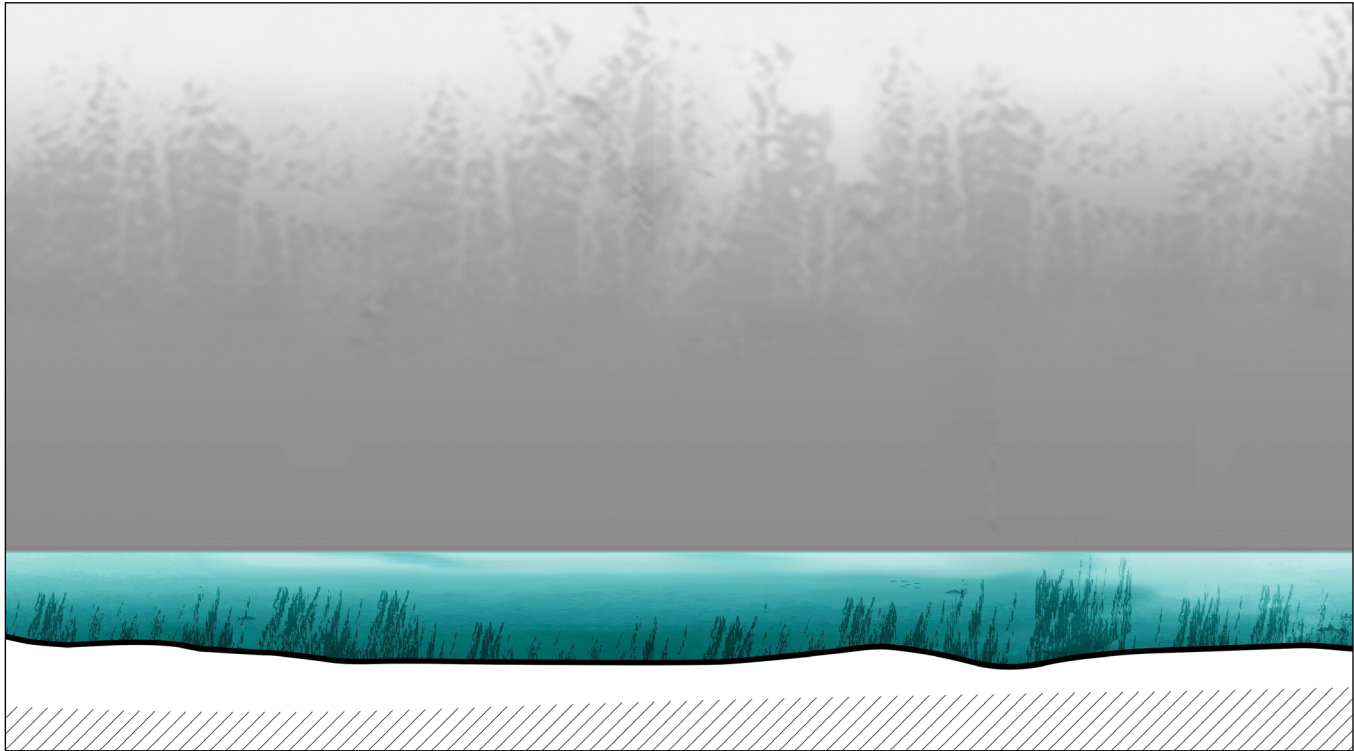


FIG. 6.19 *Section D, view east of existing conditions*

EXISTING

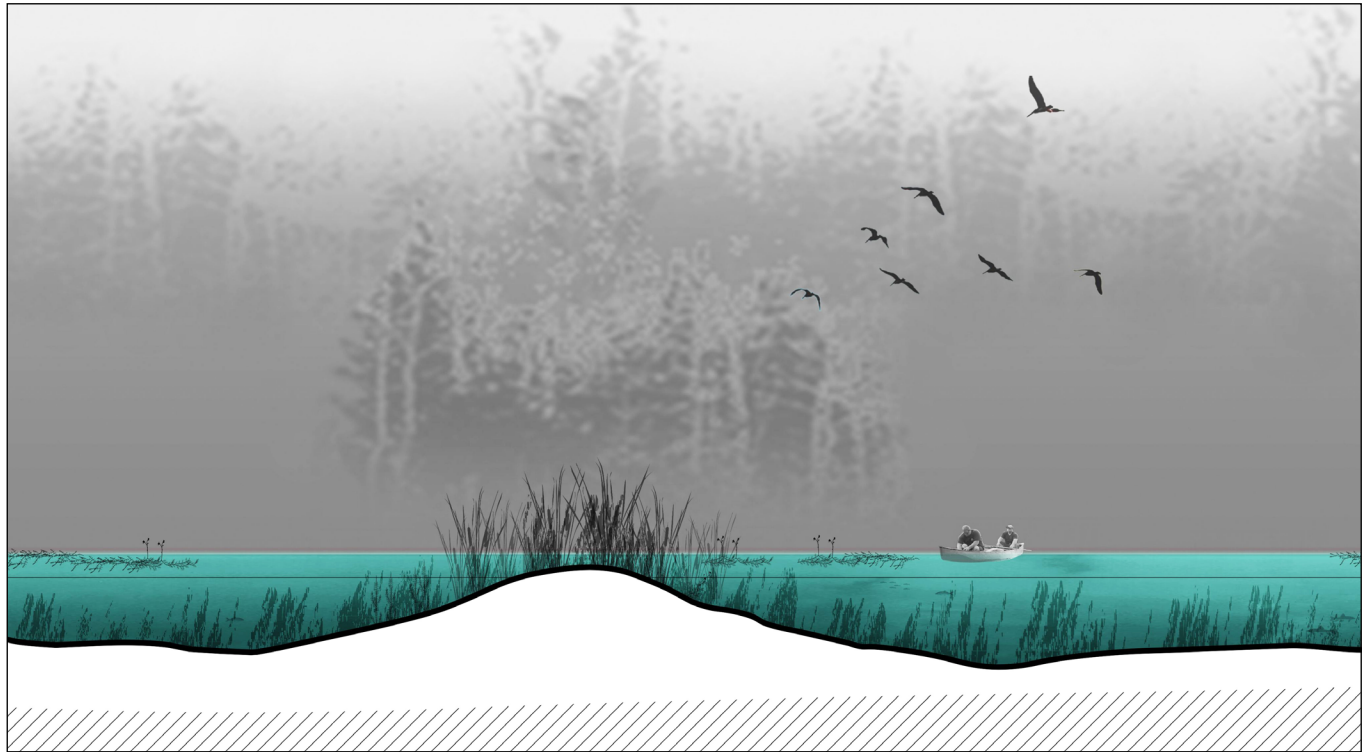
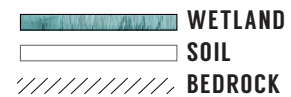


FIG. 6.20 *Section D, view east of proposed conditions*

PROPOSED



Thick aquatic vegetation currently exists in the open water. The design simply increases the edge condition and widens the planting zone to include deep and shallow marsh conditions. The design is intended to provide refuge for the paddlers of the area, as much of the lake is dominated by powerboat traffic.



Piers interrupt the wetlands, allowing the user to experience a more ecologically diverse lake environment than is currently common in the area. Although there are docks in the city that protrude far into the lake, very few are open to the public as areas of leisure.

The introduction of topographical undulations creates a variety of possible planting zones, including shallow marsh, deep marsh and open water (France 2003, 61). The diverse planting conditions allow for multiple growth forms to flourish in the enhance wetland area, from woody forms at the shore to free floating forms in deep water (see figure 6.22 on following page). Emergent growth forms “inhabit the shoreline ... growing out of and above the water (Lahring 2003, 11), most notably in figure 6.21 being the emergent Cattails (*Typha latifolia*) growing one to two metres out of the water (Johnson 1995, 217). Floating growth forms include anchored floating plants like the Northern Water Lily (*Nymphaea tetragona Georgi*) found in deep marsh, and free-floating plants like the Coontail (*Ceratophyllum demersum L.*) that form large colonies on the water surface of deep marsh and open water (Lahring 2003, 191-192). Finally, submerged growth forms exist mostly underwater, but most also have “an emergent life stage (Lahring 2003, 11), like the flowers of the Northern Water Milfoil (*Myriophyllum sibiricum Komarov*), which are found just above the water surface in both shallow and deep marsh conditions (Ibid., 232).

The proposed design for the enhanced wetlands affects an area of roughly two hectares of Keewatin Bay, an area large enough to act as important wildlife habitat and attraction (France 2003, 55). Animal presence in Mink Bay was used as a valuable reference for the possibilities of the 1060 Lakeview Drive site. Mink Bay Wetlands are home to many animal species, such as mink, red fox, beaver, muskrat, otter, short-tailed weasel and deer (OMNR 1999, 11). Depending on the water level, the wetlands act as “staging/feeding area” for white pelican and bald eagles and as spawning area for northern pike, muskellunge, suckers and minnows (Ibid. 48-49). Although Keewatin Bay does not have fast moving waters and rapids, as Mink Bay does, that are necessary for spawning habits of certain fish species, the area could still provide valuable spawning, nursery, feeding and cover habitat for an array of fish species (see figure 6.22 on following page) (Hall-Armstrong, et all. 1996). Specific plant species were selected for the design in consideration of the preferred habitat requirements of potential bird and fish species.

The following page illustrates the bird and fish families that could potentially take advantage of the proposed habitat and some of the proposed vegetation. A full list of bird and plant species observed in Mink Bay can be found on pages 162-164. A list of fish species observed to use wetlands, specifically shallow marsh, deep marsh and open water wetland conditions, in Northwestern Ontario can be found on page 165.

FIG 6.21 *View south of pier in enhanced wetland*

BITTERN / HERON
 COMMORANT
 DUCKS / GEESE

EAGLE
 EMBERIZIDS
 FALCON

JAYS, CROWS, RAVENS
 LOON
 PELICAN

bloom color



FREE FLOATING

HORNWORT

Coontail

BLADDERWORT

*Common
Bladderwort*



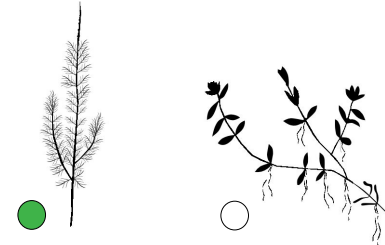
FLOATING ANCHORED

WATER LILY

*Northern
Water Lily*

BUTTERCUP

*Curly White
Water Crowfoot*



SUBMERGED

WATER MILFOIL

*Northern Water
Milfoil*

WATER STARWORT

*Submerged Water
Starwort*



EMERGENT

BUCKWHEAT

*Water
Smartweed*

BOWFIN
 CARPS / MINNOWS
 CATFISH

MUDMINNOW
 PIKE
 PERCH

STICKLEBACK
 SUNFISH
 TROUT



PRIMROSE

*Tufted
Loosestrife*



ROSE

*Marsh
Cinquefoil*



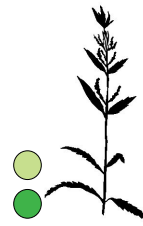
CATTAIL

*Common
Cattail*



MINT

*Field or
Common Mint*



NETTLE

Stinging Nettle



**EVENING
PRIMROSE**

*Marsh
Willow Herb*



BEDSTRAW

*Small
Bedstraw*

WOODY

FIG 6.22 *Aquatic vegetation proposed for enhanced wetland area. Bird and fish families listed could represent possible users of the habitat created. See Appendix 1 for full list of plant, fish and bird species.*

CONCLUSION

Kenora and the landscape of Lake of the Woods have been greatly impacted by the forestry industry. The impacts range from physical, to economical to cultural. Physically, the industry has altered the landscape by the manipulation of water levels, forest composition, forest management and the urban form of the city. Economically, the industry is a prominent business and employer in the community, and the creation and loss of jobs ultimately affects the number of people who call Kenora home. Culturally, the industry has shaped the public's relationship with the water and the forest. The design intervention was a reaction to the research, including subtleties of the larger disturbance of the region to the very local understanding of the site as post-industrial public space. This practicum seeks to better understand a place, through careful observation, recording and reflecting, in attempt to ignite thoughtful conversation about the future opportunities of one site and its role in the larger identity of a community.



APPENDIX 1

VEGETATION

MINK BAY WETLANDS

BEDSTRAW

Small Bedstraw, *Galium trifidum* L.

BLADDERWORT

Common Bladderwort, *Utricularia vulgaris* L.

BUCKWHEAT

Water Smartweed, *Polygonum amphibium* L.

Marsh Pepper, *Polygonum hydropiper* L.

Arrow-Leaved Tear-thumb, *Polygonum sagittatum* L.

Great Water Dock, *Rumex orbiculatus* A. Gray

BUTTERCUP

Curly White Water Crowfoot, *Ranunculus longirostris*
Gordon

*CATTAIL

Common Cattail, *Typha latifolia*

Narrow-leaved Cattail, *Typha angustifolia*

DOGWOOD

Red Osier Dogwood, *Cornus stolonifera* Michaux

HORNWORT

Coontail, *Ceratophyllum demersum* L.

EVENING PRIMROSE

Fireweed, *Epilobium angustifolium* L.

Marsha Willow Herb, *Epilobium palustre* L.

MINT

Northern Bugleweed, *Lycopus uniflorus Michaux*

Field or Common Mint, *Mentha arvensis L.*

Woundwort, *Stachys palustris L.*

NETTLE

Stinging Nettle, *Urtica dioica L.*

PRIMROSE

Tufted Loosestrife, *Lysimachia thyrsiflora L.*

ROSE

Marsh Cinquefoil, *Potentilla palustris (L.) Scop.*

Common Raspberry, *Rubus idaeus L.*

Narrow-leaved Meadow Sweet, *Spiraea alba Duroi*

ST. JOHNSWORT

Marsh St. Johnswort, *Triadenum fraseri (Spach) Gleason*

VERVAIN

Blue Vervain, *Verbena hastata L.*

WATER LILY

Fragrant Water Lily, *Nymphaea odorata Dryander ex Aiton*

Northern or Least Water Lily, *Nymphaea tetragona Georgi*

WATER MILFOIL

Northern Water Milfoil, *Myriophyllum sibiricum Komarov*

WATER STARWORT

Submerged Water Starwort, *Callitriche hermaphroditica L.*

Common Water Starwort, *Callitriche palustris L.*

WILLOW

Lowland Pussy Willow, *Salix discolor Mublenb.*

Slender Willow, *Salix petiolaris Smith*

Pear-leaved or Balsam Willow, *Salix pyrifolia Andersson*

(OMNR 1999, 45-46)

BIRDS

Birds recorded or observed in the Mink Bay Wetlands by the Ontario Ministry of Natural Resources.

BITTERNS AND HERONS

Great Blue Heron, *Ardea herodias*
American Bittern, *Botaurus lentiginosus*

CORMORANTS

Double-crested Cormorant, *Phalacrocorax auritis*

DUCKS. GEESE AND SWANS

Mallard, *Anas platyrhynchos*
Redhead, *Athya americana*
Ring-necked Duck, *Aythya collaris*
Canada Goose, *Branta canadensis*
Bufflehead, *Bucephala albeola*
Common Goldeneye, *Bucephala clangula*
Hooded Merganser, *Lophodytes cucullatus*
Common Merganser, *Mergus merganser*

EMBERIZIDS

Red-winged Blackbird, *Agelaius phoeniceus*
Yellow-rumped Warbler, *Dendroica coronata*
Swamp Sparrow, *Melospiza georgiana*
Common Grackle, *Quiscalus quiscula*
White-throated Sparrow, *Zonotrichia albicollis*

FALCONS

Merlin, *Falco columbarius*

JAYS. CROWS AND RAVENS

American Crow, *Corvus brachyrhynchos*
Common Raven, *Corvus corax*
Blue Jay, *Cyanocitta cristata*

KITES. EAGLES AND HAWKS

Bald Eagle, *Haliaeetus leucocephalus*

LOONS

Common Loon, *Gavia immer*

PELICANS

American White Pelican, *Pelecanus erythrorhynchos*

(OMNR 1999, 47)

FISH

Fish species who prefer a habitat of Open water marsh or marsh for spawning, nursery, feeding and cover in Northwestern Ontario.

BOWFINS

Bowfin, *Amia calva*

CARPS AND MINNOWS

Northern redbelly dace, *Phoxinus eos*

Finescale dace, *Phoxinus neogaeus*

Carp, *Cyprinus carpio*

Brassy minnow, *Hybognathis bankinsoni*

Blacknose shiner, *Notropis heterolepis*

Spottail shiner, *Notropis hudsonius*

Mimic shiner, *Notropis volucellus*

Fathead minnow, *Pimephales promelas*

Pearl dace, *Semotilus margarita*

CATFISH

Black bullhead, *Ictalurus melas*

Brown bullhead, *Ictalurus nebulosus*

MUDMINNOWS

Central mudminnow, *Umbra limi*

PERCHES

Iowa darter, *Etheostoma exile*

PIKES

Northern pike, *Esox lucius*

Muskellunge, *Esox masquinongy*

SALMON AND TROUT

Brook trout, *Salvelinus fontinalis*

STICKLEBACKS AND TUBESNOTS

Brook (fivespine) stickleback, *Culaea inconstans*

Ninespine stickleback, *Pungitius pungitus*

Threespine stickleback, *Gasterosteus aculeatus*

Fourspine sticklebacks, *Apeltes quadracus*

SUNFISHES

Rock bass, *Ambloplites rupestris*

Green sunfish, *Lepomis cyanellus*

Pumpkinseed, *Lepomis gibbosus*

Bluegill, *Lepomis macrochirus*

Largemouth bass, *Micropterus salmoides*

Black crappie, *Proxys nigromaculatas*

(Hall-Armstrong et al. 1996, 12-46)

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LIST OF FIGURES

PLEASE NOTE:

Photographs and drawings have been produced by the author, unless otherwise stated. All copyrights have been obtained, where required. Permission to use personal photographs has been granted and credit has been given, where required.

COVER IMAGE - Photograph: Pile of logs (April 29, 2013).

FIG. I - Photograph: a hat referencing the modernization of the local Boise Cascade Pulp and Paper Mill (May 1, 2013).

FIG. II - Map: created in VectorWorks.

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FIG. 1.1 - Photograph: Northern Lake of the Woods rocky shoreline (June 4, 2011).

FIG. 1.2 - Map: Rainy River - Lake of the Woods Drainage Basin. Created in VectorWorks.

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FIG. 1.4 - Photograph: towing six pockets of pulpwood, 1950. Catalogue no. 2006.8.11. Lake of the Woods Museum.

FIG. 1.5 - Map: forestry processing and transportation network. Created in VectorWorks.

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FIG. 1.6 - Photograph: camping near Wonderland Lake (August 3, 2013).

FIG. 1.7 - Map: parks and recreation network. Created in VectorWorks.

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FIG. 2.0 - Diagram: created in VectorWorks.

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FIG. 2.1 - Map: Kenora region landform. Created in ArcGIS. GIS files: Canadian Digital Elevation Data, CanVec and City of Kenora.

FIG. 2.2 - Map: key. Created in VectorWorks.

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[90.7798456,6z](https://www.google.ca/maps/@50.7677286,-90.7798456,6z) (accessed April 10, 2013).

FIG. 2.3 - Map: soils. Created in ArcGIS and VectorWorks. GIS files: CanVec.

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FIG. 2.4 - Map: geology. Created in ArcGIS and VectorWorks. GIS files: Canvec.

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FIG. 2.5 - Map: minerals. Created in ArcGIS and VectorWorks. GIS files: Canvec and Land Information Ontario - MNR.

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FIG. 2.6 - Map: Kenora region forest. Created in ArcGIS. GIS files: CanVec, Land Cover and City of Kenora.

FIG. 2.7 - Map: forest regions. Created in VectorWorks.

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FIG. 2.8 - Map: forest. Created in ArcGIS. GIS files: Canvec, Land Cover and City of Kenora.

FIG. 2.9 - “ ”

FIG. 2.10 - Map: harvest areas. Created in ArcGIS and VectorWorks. GIS files: CanVec and City of Kenora.

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FIG. 2.11 - Map: Forest Management Units. Created in VectorWorks. Google. *Maps*. 2013. <https://www.google.ca/maps/@50.7677286,-90.7798456,6z> (accessed April 10, 2013).

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FIG. 2.12 - Diagram: created in VectorWorks and Adobe Photoshop.

FIG. 2.13 - Photograph: Caution Lake clear cut, located in the Kenora Forest Management Unit (July 27, 2013).

FIG. 2.14 - Map: created in ArcGIS. GIS files: Canvec.

FIG. 2.15 - Photograph: tire tracks in clear cut (July 27, 2013).

FIG. 2.16 - Photograph: Caution Lake cut block regeneration (July 27, 2013).

FIG. 2.17 - “ ”

FIG. 2.18 - Diagram: projected available harvest volumes. Created in VectorWorks.

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FIG. 2.19 - Photograph: dog sledding in the Dryden Forest Management Unit (December 29, 2013).

FIG. 2.20 - Photograph: snowmobiling in the Kenora Forest Management Unit (February 20, 2013).

FIG. 2.21 - Photograph: walking the Kirkup Trails in the Kenora Forest Management Unit (June 7, 2012).

FIG. 2.22 - Photograph: kayaking on Wonderland Lake (July 1, 2011).

FIG. 3.0 - Map: City of Kenora. Created in ArcGIS and VectorWorks. GIS files: Canvec and City of Kenora.

FIG. 3.1 - Map: City of Kenora southern developed area. Created in ArcGIS and VectorWorks. GIS files: Canadian Digital Elevation

Data, Canvec and City of Kenora.

FIG. 3.2 - Photograph: view east of Harbortown Centre waterfront (August 25, 2013).

FIG. 3.3 - Diagram: created in VectorWorks. GIS files: City of Kenora.

FIG. 3.4 - Map: created in ArcGIS and VectorWorks. GIS files:

Canadian Digital Elevation Data, Canvec and City of Kenora.

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FIG. 3.5 - Diagram: created in Adobe InDesign.

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FIG. 3.6 - Map: created in ArcGIS and VectorWorks and Adobe Photoshop. GIS files: Canvec and City of Kenora.

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FIG. 3.7 - “ ”

FIG. 3.8 - “ ”

FIG. 3.9 - “ ”

FIG. 3.10 - Photograph: log booms in Keewatin Bay at Keewatin Lumber Co. 1918. Catalogue no. 964.54.18. Lake of the Woods

- Museum.
- FIG. 3.11** - Photograph: pulp trucks Kenricia Corner. Catalogue no. 976.87.46. Lake of the Woods Museum.
- FIG. 3.12** - Illustration: created in VectorWorks and Adobe Photoshop.
- FIG. 3.13** - Photograph: view north of Devlin Timber from Trans-Canada Hwy. (April 29, 2013).
- FIG. 3.14** - Photograph: view north of Kenora Forest Products, mid 1990s. "Untitled". Supplied by Prendiville Industries.
- FIG. 3.15** - Diagram: created in Adobe InDesign.
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- FIG. 4.0** - Aerial Photograph: aerial view of Keewatin. Generated in ArcGIS. GIS files: City of Kenora.
- FIG. 4.1** - Map: Keewatin zoning. Created in ArcGIS and Adobe InDesign. GIS files: City of Kenora.
- FIG. 4.2** - Illustration: created in ArcGIS, VectorWorks and Photoshop. GIS files: City of Kenora.
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- Safety Bay Depth Chart - Lake of the Woods Boating & Fishing.
- FIG. 4.3** - “ ”
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- FIG. 4.5** - Photograph: view west of 1060 Lakeview Dr. mill property, 1920. Catalogue no. 964.17.13. Lake of the Woods Museum.
- FIG. 4.6** - Illustration: created in ArcGIS, VectorWorks and Photoshop. GIS files: City of Kenora.
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FIG. 4.7 - Illustration: created in ArcGIS, VectorWorks and Photoshop. GIS files: City of Kenora.

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FIG. 4.8 - Illustration: created in ArcGIS, VectorWorks and Photoshop. GIS files: City of Kenora.

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FIG. 4.9 - Photograph: view South of Snow Machines entering Lake of the Woods (March 29, 2013).

FIG. 4.10 - Photograph: desk top (December 2, 2013).

FIG. 4.11 - Photograph: view east of snow machine tracks in former Flour Mill "A" raceway (February 19, 2013).

FIG. 4.12 - Map: created in ArcGIS and Adobe InDesign. GIS files: City of Kenora.

FIG. 4.13 - Photograph: view south of remnant of a lock at the outlet of the channel (February 19, 2013).

FIG. 4.14 - Photograph: view west of channel leading to Mink Bay, part of the Mink Bay Wetlands (April 29, 2013).

FIG. 4.15 - Photograph: view south of remnant log structure submerged in Mink Bay (April 29, 2013).

FIG. 4.16 - Photograph: view west of Mink Bay shore (April 29, 2013).

FIG. 4.17 - Photograph: view west of residual rock along Mink Bay shore (April 29, 2013).

FIG. 4.18 - Photograph: view south of Cameron Bay (November 1, 2013).

FIG. 4.19 - Photograph: residual logs and lumber on Cameron Bay shore (November 1, 2013).

FIG. 4.20 - Photograph: water damaged log on shore of Keewatin Bay (November 1, 2013).

FIG. 4.21 - Photograph: residual log and chain used to create barrier to contain logs in boom (August 25, 2013).

FIG. 4.22 - Photograph: view west of woodwaste deposit (November 1, 2013).

FIG. 4.23 - Photograph: view west of Mink Bay and woodwaste (April 29, 2013).

FIG. 4.24 - " "

FIG. 4.25 - Photograph: woodwaste deposit in Mink Bay Wetlands (July 1, 2013).

FIG. 4.26 - Photograph: woodwaste deposit on 1060 Lakeview Dr. property (July 29, 2013).

FIG. 4.27 - " "

FIG. 5.0 - Photograph: view north of active Kenora Forest Products sawmill from highway. "Untitled". Supplied by Prendeville Industries.

FIG. 5.1 - Photograph: view northwest of active mill operation. "Untitled". Supplied by Prendeville Industries.

- FIG. 5.2** - Aerial Photograph: aerial view of 1060 Lakeview Dr. property and Kenora Forest Products mill. Generated in ArcGIS. GIS files: City of Kenora.
- FIG. 5.3** - Photograph: view east of Kenora Forest Products from highway (February 17, 2014).
- FIG. 5.4** - Photograph: view east of Lake of the Woods from highway (February 17, 2014).
- FIG. 5.5** - Diagram: east-west sections, view north. Created in VectorWorks. GIS files: City of Kenora.
- FIG. 5.6** - Map: contour map. Created in ArcGIS and VectorWorks. GIS files: City of Kenora.
- FIG. 5.7** - Diagram: deconstructed layers of 1060 Lakeview Dr. map. Created in ArcGIS and VectorWorks. GIS files: City of Kenora.
- FIG. 5.8** - Map: 1060 Lakeview Dr. existing conditions. Created in ArcGIS and VectorWorks. GIS files: City of Kenora.
- FIG. 5.9** - Map: Divisions of site into zones. Created in VectorWorks.
- FIG. 5.10** - Diagrams: representing features evocative of each zone. Created in VectorWorks.
- FIG. 5.11** - Photograph: view south of sawmill building and Trans-Canada Hwy. in background (July 29, 2013).
- FIG. 5.12** - Photograph: view northwest of kiln in foreground and sawmill buildings in background (July 29, 2013).
- FIG. 5.13** - Photograph: view west of mill operation (July 29, 2013).
- FIG. 5.14** - Photograph: view east of bedrock and meadow in wood storage area (July 29, 2013).
- FIG. 5.15** - Photograph: view north of deer decoy in grass (July 29, 2013).
- FIG. 5.16** - Photograph: view east of slope towards edge of property and steep elevation drop (July 29, 2013).
- FIG. 5.17** - Photograph: view south of overgrown railway corridor (August 10, 2013).
- FIG. 5.18** - Photograph: view east of sparse forest and clearing (August 10, 2013).
- FIG. 5.19** - Photograph: view south of Keewatin Bay and mill site in background (August 10, 2013).
- FIG. 5.20** - Photograph: view east of natural trail from hydro corridor to bush (November 1, 2013).
- FIG. 5.21** - Photograph: view north of forest and trees blown down (November 1, 2013).
- FIG. 5.22** - Photograph: view west of blasted granite from railway (November 1, 2013).
- FIG. 5.23** - Photograph: view south of hydro corridor (November 1, 2013).
- FIG. 5.24** - “ ”
- FIG. 5.25** - Photograph: view north of road and Norman Dr. (November 1, 2013).
- FIG. 5.26** - Photograph: view northwest of shore and Keewatin Bay (July 29, 2013).
- FIG. 5.27** - Photograph: view southwest of aquatic plants and grasses along shore (July 29, 2013).
- FIG. 5.28** - Photograph: view south of chip loader and mill buildings from boat (August 25, 2013).
- FIG. 5.29** - Photograph: view north of mill buildings and snow machine tracks (March 29, 2013).
- FIG. 5.30** - Photograph: view north of Keewatin Channel Bridge and snow machine tracks (March 29, 2013).
- FIG. 5.31** - Photograph: view north of woodwaste deposit (August 25, 2013).
- FIG. 5.32** - Diagram: limits of woodwaste deposit. Created in VectorWorks.
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- FIG. 5.33** - Diagram: woodwaste thickness. Created in VectorWorks.
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- FIG. 5.34** - Diagram: sectional study of woodwaste thickness and proximity to waterbody. Created in VectorWorks.
- FIG. 5.35** - Table: comparison of water qualities.
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FIG. 5.36 - Illustration: volume of woodwaste on site in perspective. Created in Adobe Photoshop.

FIG. 5.37 - Photograph: view south of chip loader and woodwaste (July 29, 2013).

FIG. 6.0 - Map: Proposed site plan. Created in ArcGIS, VectorWorks and Adobe Photoshop. GIS files: City of Kenora.

FIG. 6.1 - “ ”

FIG. 6.2 - “ ”

FIG. 6.3 - Composite image: view east from highway. Created in Adobe Photoshop.

FIG. 6.4 - Illustration: section A, view east of existing conditions. Created in VectorWorks and Adobe Photoshop.

FIG. 6.5 - Illustration: section A, view east of proposed conditions. Created in VectorWorks and Adobe Photoshop.

FIG. 6.6 - “ ”

FIG. 6.7 - Diagram: site plan. Created in VectorWorks.

FIG. 6.8 - Composite image: section B, view east of existing conditions. Created in VectorWorks and Adobe Photoshop.

FIG. 6.9 - Composite image: section B, view east of proposed conditions. Created in VectorWorks and Adobe Photoshop.

FIG. 6.10 - Composite image: view east from highway. Created in

Adobe Photoshop.

FIG. 6.11 - Composite image: archery in the woodwaste clearings. Created in Adobe Photoshop.

FIG. 6.12 - Diagram: Tree species of the boreal forest strips. Created in VectorWorks.

FIG. 6.13 - Composite image: playing hockey in the woodwaste clearing. Created in Adobe Photoshop.

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FIG. 6.14 - Diagram: site plan. Created in VectorWorks.

FIG. 6.15 - Composite image: section C, view east of existing conditions. Created in VectorWorks and Adobe Photoshop.

FIG. 6.16 - Composite image: section C, view east of proposed conditions. Created in VectorWorks and Adobe Photoshop.

FIG. 6.17 - Composite image: exposed foundation in treatment wetland cell. Created in Adobe Photoshop.

FIG. 6.18 - Diagram: site plan. Created in VectorWorks.

FIG. 6.19 - Composite image: section D, view east of existing conditions. Created in VectorWorks and Adobe Photoshop.

FIG. 6.20 - Composite image: section D, view east of proposed conditions. Created in VectorWorks and Adobe Photoshop.

FIG. 6.21 - Composite image: view south of pier in enhanced wetland. Created in Adobe Photoshop.

FIG. 6.22 - Diagram: aquatic vegetation proposed for enhanced wetland area. Created in VectorWorks and Adobe InDesign

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FIG. 6.23 - Map: Proposed site plan. Created in ArcGIS, VectorWorks and Adobe Photoshop. GIS files: City of Kenora.

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- FIG. 1.4** - Towing six pockets of pulpwood, 1950. Catalogue no. 2006.8.11. Lake of the Woods Museum.
- FIG. 3.14** - View north of Kenora Forest Products, mid 1990s. "Untitled". Prendeville Industries.
- FIG. 3.10** - Log booms in Keewatin Bay at Keewatin Lumber Co.1918. Catalogue no. 964.54.18. Lake of the Woods Museum.
- FIG. 3.11** - Pulp trucks Kenricia Corner. Catalogue no. 976.87.46. Lake of the Woods Museum.
- FIG. 3.15** (Component) - Short's Tie Mill (Present site of McLeod Park). 1905. Catalogue no. 977.51.1. Lake of the Woods Museum.
- FIG. 4.5** - View west of 1060 Lakeview Dr. mill property, 1920. Catalogue no. 964.17.13. Lake of the Woods Museum.
- FIG. 5.0** - View north of active Kenora Forest Products sawmill from highway. "Untitled". Prendeville Industries.
- FIG. 5.1** - View northwest of active mill operation. "Untitled". Supplied by Prendeville Industries.
- FIG. 6.13** (Component) - Farrell, Michael. 2009. *Outdoor hockey championships*. Curves & Levels. <http://shadowdetail.typepad.com/.a/6a010535dd09de970b0111688f61e7970c-> (accessed March 2, 2014).

METADATA

CANADIAN DIGITAL ELEVATION DATA

This file is part of the Canadian Digital Elevation Data (CDED), produced jointly by federal, territorial, and provincial agencies. Data is used in environmental impact assessments, water and climate studies, and resource studies as a critical dataset for sustainable development purposes. Elevation is in meters.

Published April 13, 2006, by the Government of Canada, Natural Resources Canada, Earth Sciences Sector, Mapping Information Branch, Centre for Topographic Information.

This file was created March 2013 by author by merging 052E09, LONGBOW LAKE; 052E10, CLEARWATER BAY; 052E15,

KEEWATIN and 052E16, KENORA files.

Content gathered between 1978 and 1995 and is considered current as of publication date.

Information is complete and will be updated as needed.

Available from <http://www.geobase.ca>

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SupportGeoBase@nrcan.gc.ca

CANVEC

CanVec digital topographical dataset of areas represented using the National Topographical System (NTS), as part of a standardized and current representation of the entire Canadian landmass. From this dataset, the following were extracted and used: Contour; Elevation Point; Municipality; Aboriginal Lands; Railway; Road Segment; Single Line Watercourse; Waterbody and Wetland. Content gathered between 1982 and 2012. Published November 14, 2012 by the Government of Canada, Natural Resources Canada, Earth Sciences Sector, Mapping Information Branch, Centre for Topographic Information.

052E09, LONGBOW LAKE

Horizontal positional accuracy to between 2 and 100 meters; Vertical position accuracy to between 8 and 20 meters.

052E10, CLEARWATER BAY

Horizontal positional accuracy to between 3 and 100 meters; Vertical position accuracy to between 8 and 10 meters.

052E15, KEEWATIN

Horizontal positional accuracy to between 3 and 100 meters; Vertical position accuracy to between 8 and 20 meters.

052E16, KENORA

Horizontal positional accuracy to between 3 and 26 meters; Vertical position accuracy to within 20 meters.

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CITY OF KENORA

The following files were provided to author by Charlotte Caron, IT and Asset Supervisor of the City of Kenora, in April 2013. No metadata provided.

Aerial_Photos

Folder contains aerial imagery from years 2001, 2004 and 2009. 2001 and 2004 imagery cropped to area specified by author. 2009 imagery cropped to city outline.

Buildings

Building footprints categorized into two files: Buildings_Main and Building_Secondary.

Contours

5 metre contour interval.

Roads

Parcel

Railway

Zoning

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LAND COVER

These files are part of a project to create a Canada-wide Land Cover base. Data is a vectorization of Landsat 5 and Landsat 7 orthophotographs. This project is a collaboration involving federal

initiatives, as well as provincial and territorial governments.

Published April 26, 2009, by Natural Resources Canada, Earth Sciences Sector, Mapping Services Branch, Centre for Topographic Information. From this dataset, the following were extracted and used: Wetland; Coniferous Forest and Deciduous Forest. Content was generated between 1999 and 2001 and is considered complete. No updates or maintenance is planned.

052E, KENORA

Available from <http://www.geobase.ca>

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LAND INFORMATION ONTARIO - MNR

Mineral Deposit Inventory – 2010

Ontario Geological Survey 2010. December 2010 release.

Content was compiled by the Resident Geologist Program between 1970 and 2010 and is considered complete at time of publication.

Available from <http://www.ontario.ca/geology>

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