Via Email

JAN 2 4 2022

Ms. Jody Pellissey
Executive Director
Wek'èezhìı Renewable Resources Board
102A 4504 49 AVENUE
YELLOWKNIFE NT X1A 1A7

Dear Ms. Pellissey:

The Tłı̨chǫ Highway: Submission of Fisheries Management Plan

The Government of the Northwest Territories' Department of Infrastructure (GNWT-INF) is pleased to submit the Fisheries Management Plan (FMP) for the Tłı̨chǫ Highway, formerly known as the Tłı̨chǫ All-Season Road (TASR), to the Wek'èezhìı Renewable Resources Board (WRRB) for their review and approval in accordance with Section 12.5.1 of the Tłı̨chǫ Agreement. This submission is to satisfy Measure 8-1 of the Mackenzie Valley Review Board's *Report of the Environmental Assessment (EA) and Reasons for Decision* for the Tłı̨chǫ All-Season Road Project (EA-1617-01).

As required by the EA, development of the FMP was led by the Department of Fisheries and Oceans Canada and the Tłı̨chǫ Government, with the support of GNWT-INF, and in collaboration with the WRRB. The FMP was reviewed by the Department of Environment and Natural Resources and the TASR Corridor Working Group.

Construction of the Tłı̨chǫ Highway was substantially completed and opened to the public on November 30, 2021. Should you have any questions or concerns please contact me at (867) 767-9086 ext. 31117 or by email at Ziaur_Rahman@gov.nt.ca at your earliest convenience.

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Sincerely,

Ziaur Rahman
Manager, Surface Design and Construction
Department of Infrastructure

Ms. Laura Duncan
Tlicho Executive Officer
Tłı̨chǫ Government

Fisheries Management Plan

for the

Tłı̨chǫ Highway and Lac la Martre

Prepared for the

Wek'èezhìı Renewable Resources Board

January 24, 2022

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Introduction

This Fisheries Management Plan is required under Measure 8-1 of the 2018 Mackenzie Valley Environmental Impact Review Board's (MVEIRB) Report of Environmental Assessment and Reasons for Decision for the Tłı̨chǫ Highway Road. Measure 8-1 was one of 23 measures in the Report, which are required to be implemented for the Tłı̨chǫ Highway (TH) project to be approved.

The development of the all-season TH from Highway 3 to the community boundary of Whatì is expected to be completed in November of 2021 (Figure 1). Increased accessibility to the area may result in impacts to fish populations due to associated increased fishing pressure on the rivers and lakes adjacent to, and accessible by the road.

This plan is one component of the prescribed requirements of the Report on Environmental Assessment (Report on EA) and describes the fishery, potential impacts from the Tłı̨chǫ Highway project, mitigation measures and monitoring plans to manage future changes as required. Specifically, this document identifies fisheries-related concerns caused by the Tłı̨chǫ Highway and establishes mitigating actions, and its overall purpose is to prevent significant detrimental impacts on existing fish populations. Once this plan is approved and implemented by the proponent it will then complete the prescribed requirement of the EA.

This Tłı̨chǫ Highway Fisheries Management Plan (TH FMP) is divided into two parts. Part 1 concerns the recreational and domestic fisheries along the TH corridor and the La Martre River, and Part 2 concerns fisheries (recreational, domestic and potential commercial) on Lac la Martre. The high rate of occurrence of valued fishes in Lac la Martre (located near the end of the Tłı̨chǫ Highway) necessitated the separate sections within this plan.

A separate, more detailed Lac la Martre Fisheries Management Plan, modelled on the structure of a formal Integrated Fisheries Management Plan (IFMP) is in process, and when complete it will address management measures for the effective management of fishery resources in areas along the all-season road corridor and in Lac la Martre. It will also provide a framework for a potential commercial fisheries development and will ensure the resources are protected and conserved, safeguard the long-term sustainability of the fishery and aim to provide social/economic benefits to local communities.

Upon implementation, this Tłı̨chǫ Highway Fisheries Management Plan will be reviewed and evaluated annually by the Fish and Fish Habitat Protection Program of Fisheries and Oceans Canada, the Wek'èezhìı Renewable Resources Board (WRRB) and, the Tłı̨chǫ Government - Lands Protection and Renewable Resources. Submission to the WRRB is a requirement under Section 12.5.1 of the Tłı̨chǫ Agreement. The plan integrates applicable federal and territorial legislation, policies and regulations, and recognizes existing constitutionally protected Aboriginal fishing rights to domestic/subsistence fishing.

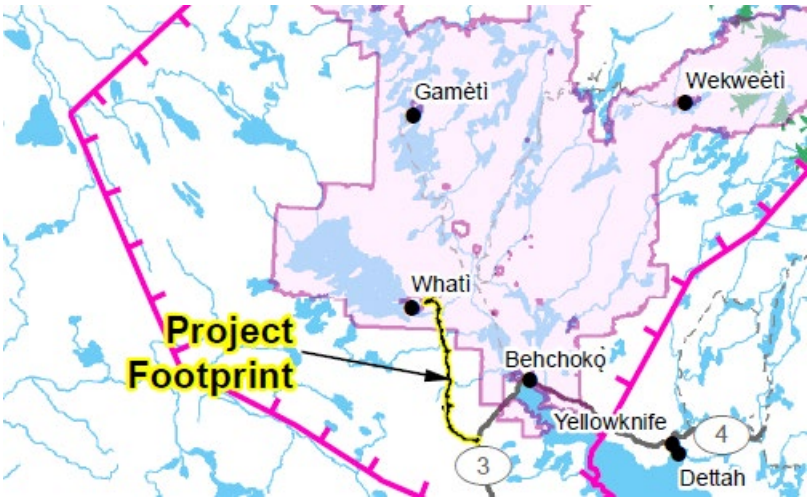


Figure 1. Location of the TH. The shaded area is Tłı̨chǫ Land and the pink border indicates the limits of the Wek'èezhìı Resource Management Area.

Governance and Management

In 2005, the Tłı̨chǫ, the Government of Canada, and the Government of the Northwest Territories agreed to and entered into a modern-day Land Claim and Self Government Agreement known as the "*Tłı̨chǫ Agreement*." The Tłı̨chǫ Agreement provides certainty in respect of rights of the Tłı̨chǫ relating to land, resources and self-government. Within the defined boundaries of the Tłı̨chǫ traditional use area of Mǫwhì Gogha Dè Nı̨ı̨tłèè, which includes the Wek'èezhìı Management area, and Tłı̨chǫ lands, (Figure 1) Tłı̨chǫ may practice their constitutionally protected rights.

The *Tłı̨chǫ Agreement* also established the Wek'èezhìı Management area, within which the TASR project is built. The Wek'èezhìı Management area is located within the boundaries of Mǫwhì Gogha Dè Nı̨ı̨tłèè. The WRRB was established through the Tłı̨chǫ Agreement as a management authority for wildlife and fish in Wek'èezhìı. All wildlife management proposals created by the Tłı̨chǫ Government, Government of Canada or the Government of the Northwest Territories, including fisheries management plans, must be submitted to the WRRB for approval under section 12.5.1 of the *Tłı̨chǫ Agreement*.

In addition to the above, the Tłı̨chǫ Government has law-making powers under the *Tłı̨chǫ Agreement* which can govern fishing activities which take place in waters on Tłı̨chǫ lands, such as Lac la Martre, under section 7.4.3 of the *Tłı̨chǫ Agreement*. In addition to a fisheries management plan which regulates some fishing activities within Wek'èezhìı, Tłı̨chǫ Government, under authority of the *Tłı̨chǫ Agreement* may pass laws in a number of areas including, but not limited to:

- who may harvest fish in waters on Tłı̨chǫ lands;
- which Tłı̨chǫ citizens may harvest fish within Mǫwhì Gogha Dè Nı̨ı̨tłèè;
- use of waters on Tłı̨chǫ lands to promote fishery opportunities or activities such as aquaculture, fish stocking, fish hatcheries, trophy fish harvesting or catch and release fishing;

- limits, other than total allowable harvest levels, on any species or stock of fish which may be harvested,

    (i) by any person, in waters on Tłı̨chǫ lands, and
    (ii) by Tłı̨chǫ Citizens in Mǫwhì Gogha Dè Nı̨ı̨tłèè ;

- limits on when fish harvesting may occur, including non-quota limitations such as limits on location, methods, quantities and seasons,

    (i) in relation to any person, in waters on Tłı̨chǫ lands, and
    (ii) in relation to Tłı̨chǫ Citizens, in Mǫwhì Gogha Dè Nı̨ı̨tłèè ;

- restrictions on the type of equipment or gear that may be used for fish harvesting, including methods of use and identification of gear and harvested fish (i) by any person, in waters on Tłı̨chǫ lands, and (ii) in relation to Tłı̨chǫ Citizens, in Mǫwhì Gogha Dè Nı̨ı̨tłèè and

- identification designating

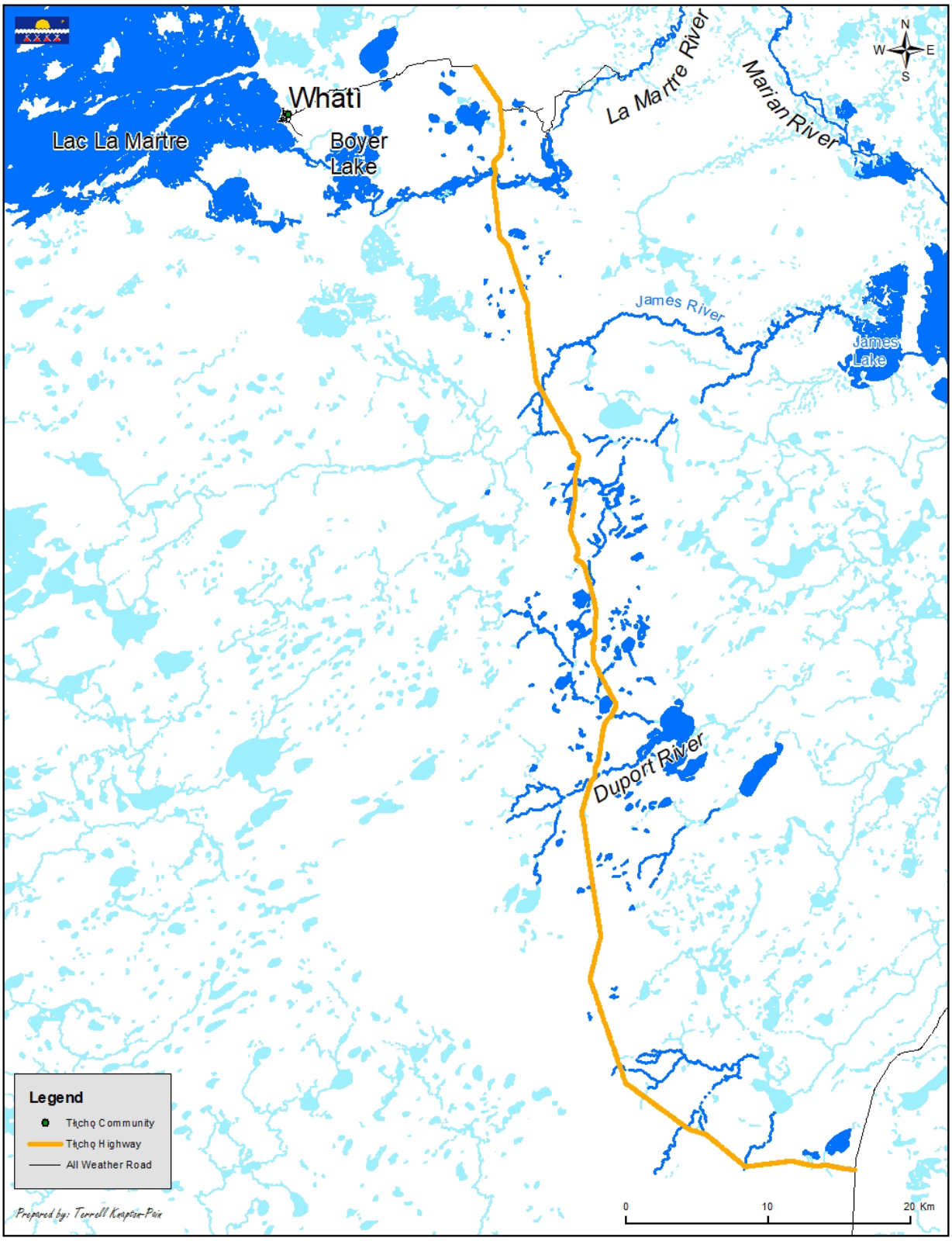
    (i) any person who is authorized to harvest fish in waters on Tłı̨chǫ lands, and
    (ii) a Tłı̨chǫ Citizen who is authorized to harvest fish in Mǫwhì Gogha Dè Nı̨ı̨tłèè .

Future laws passed by Tłı̨chǫ Government which govern the activities listed in chapter 7 of the Tłı̨chǫ Agreement concerning the harvesting of fish or fishing activities in waters on Tłı̨chǫ lands and within Mǫwhì Gogha Dè Nı̨ı̨tłèè may necessitate amendments to this Fisheries Management Plan. Any necessary amendments to this FMP will be submitted to the WRRB for consideration and approval.

Part 1: Highway Corridor/La Martre River

Figure 2 shows the thirteen of the 16 streams in the highway corridor that are crossed by the Tłı̨chǫ Highway. These were evaluated (Golder 2016) and deemed to have no or minimal habitat for large-bodied fish; they are small, shallow or undefined with ephemeral flow (NWT Transportation 2016). It is unlikely that these smaller streams provide overwintering habitat due to complete freezing and/or their intermittent nature (Golder 2017), although there may be some seasonal migratory access by some fish species.

The La Martre River possesses substantial habitat for large-bodied fishes. It drains Lac la Martre and enters the Marian River, which flows southward into Marian Lake before draining into the North Arm of Great Slave Lake. The Marian River between the La Martre River confluence and Marian Lake ranges from 65 to 133 m wide and is up to 6 to 7 m deep below the first rapids but becomes shallower at 2 to 5 m in the upper reaches below the La Marte/Marian confluence. The Marian River enters the north end of Marian Lake, which is a shallow to a maximum depth of 2.5 m, a waterbody with a maximum length and width of 32.9 km and 15.9 km, respectively.


Whatì
Lac La Martre
Boyer Lake
La Martre River
Marian River
James River
James Lake
Duport River
N
W
E
S
Legend
Tłı̨chǫ Community
Tłı̨chǫ Highway
All Weather Road
Prepared by: Terrell Knapton-Pau
0
10
20 Km

Fish Species

A total of 18 fish species have the potential to occur within the watercourses that cross the TH corridor (Golder 2017). The fishes of value identified in the MVEIRB Environmental Assessment were Arctic Grayling, Whitefishes (including Round Whitefish, Lake Whitefish, Ciscoes and Inconnu), Walleye, Northern Pike, and Lake Trout (Mackenzie Valley Review Board 2018). These species occur in different locations in the Tłı̨chǫ Highway corridor area: Boyer Lake, Duport River, La Martre River, and James River are the only areas of occupancy by these species. Inconnu are not directly within the corridor but occur as far upstream as the Whatì Falls on the La Martre River. The La Martre River has the most intense local fishery of all the watercourses and is the river of most significance to Whatì residents.

Historically, there has been little fishing pressure on rivers in the TH corridor due to their relative inaccessibility. There is relatively little known about fisheries in this area in general, but a few relevant studies (Chang-Kue 1987, Golder 2017, Mackenzie Valley Review Board 2018, Northwest Territories Transportation 2016) have been undertaken.

Areas of Concern

There are four main areas of concern that are crossed by, or accessible by the new Tłı̨chǫ Highway. These include Boyer Lake, Duport River, James River, and the La Martre River.

Boyer Lake is a mid-sized lake (approximately 11 km^2) that is fished by Whatì residents due to its proximity to the community and high abundance of Burbot, Round Whitefish, Lake Whitefish, Lake Trout, Northern Pike, and Walleye. It is a key source of food for Whatì residents. White Sucker are also found in Boyer Lake.

Duport River averages 3.5-5 m in width and has many seasonally connected floodplain pools. It possesses potential for seasonal foraging, rearing, migration and spawning for Northern Pike. Walleye have been documented in this river.

James River has an average width of 10 m. It supports Artic Grayling, Lake Trout, Lake Whitefish, Northern Pike, and Round Whitefish. Minor seasonal harvests of these fishes have occurred. It has potential habitat for foraging, rearing and migration for Longnose Suckers and White Sucker.

The La Martre River is crossed by the new highway. River width at the bridge site is 73 m. The La Martre River will also likely be impacted further down the watershed due to general increased accessibility to the Whatì Falls and area (Figure 3).

Longnose Sucker, Northern Pike, and Round Whitefish were the main species inhabiting the upper La Martre river as determined by sampling (gill nets, beach seines and minnow traps) and a tagging program (Chang-Kue 1987). Surveys undertaken downstream of the falls were undertaken throughout the summer and Inconnu were likely missed due to the timing of this sampling, as congregations of spawning Inconnu have been observed in the lower river below the falls in the fall season. Walleye were notably absent, and Arctic Grayling were rare in the upper river but common downstream of the falls

Combining Lac la Martre, Boyer Lake and the Upper La Martre River, Golder (2017) documented occurrences of all of the valued species, Arctic Grayling, Inconnu, Ciscoes, Lake Trout, Lake Whitefish, Northern Pike, Round Whitefish and Walleye.

Conservation Concerns

Conservation concerns within the La Martre watershed primarily relate to the potential exploitation of seasonal spawning congregations of Inconnu stocks below the Whatì falls due to increased access as a result of the TH. Other fish species (Walleye and Whitefish) spawn seasonally in the area. The La Martre River and Whatì Falls can be accessed by a small east-west access road that originates in Whatì and terminates approximately seven km past the falls. The Whatì Falls (Figure 3) is an impassable barrier to upstream fish movement, and is the upper extent of Inconnu migration. The river section for one km downstream from the Whatì Falls is 70 to 140 m wide and characterized by a high-gradient, confined, singular channel form dominated by rapid/boulder garden habitat. Water depths reach a maximum of 0.5 to 3.0 m in the main channel during the spring freshet. The absence of sizeable pools and the predominance of bedrock and boulder substrates in this section suggest this is not likely the main staging or spawning area for Inconnu.

Directly downstream of the falls, the river consists of a network of boulder gardens and cascading rapids. Approximately 2 kms further downstream, the river transitions into a lower-gradient, less-confined channel (50 to 120 m wide and 1 to 3 m deep), with occasional braiding, small islands and a repeating series of run-rapid-pool complexes. The area offers migratory fish with numerous holding/staging areas and bottom substrate transitions to a mix of cobble and gravel. This area was sampled for Inconnu eggs in 2016 and the identity of the eggs was subsequently confirmed by DFO lab analysis. A follow-up survey was undertaken by Golder Associates in 2018 and large concentrations of pre-spawn Inconnu were filmed underwater in an area 3.3 to 4 kms downstream of the falls. The spawning locations are typically in erosional habitats with a depth ranging from 0.5 cm to 2 m.

Inconnu have been identified as the species that is most immediately vulnerable to impact by the new highway. Inconnu are large fish and exhibit rapid growth, reaching a fork length of 800 mm and a weight of 8 to 12 kg or more in 10 to 15 years (Day and Low 1993, Howland et al. 2004).

Inconnu are notably vulnerable because they are highly migratory which leads to a concentration of fish both spatially (i.e., in restricted river channels) and temporally (e.g., concerted spawning run) which makes these populations especially susceptible to exploitation. Increased anthropogenic activities such as flow regulation have impacts on Inconnu in other Northwest Territory rivers, including the Talston, Yellowknife and Buffalo River (Tallman and Howland 2017). Populations of Inconnu are at relatively low levels in Great Slave Lake as a result of significant overharvest that occurred in the 1970s. In the Northwest Territories, Inconnu have been identified as “sensitive” in the NWT (Working Group on General Status of NWT Species 2016). The importance of this species in the domestic and subsistence fishery, and to the local Indigenous communities, is discussed in further detail below.

History, Traditional Knowledge and Cultural Factors

Except for Boyer Lake and in the La Martre River downstream of the Tłı̨chǫ Highway, subsistence harvest directly along the corridor has been limited, as Whatì community members focus their harvest efforts on Whitefish and Lake Trout, which are not commonly found at road access points along the corridor.

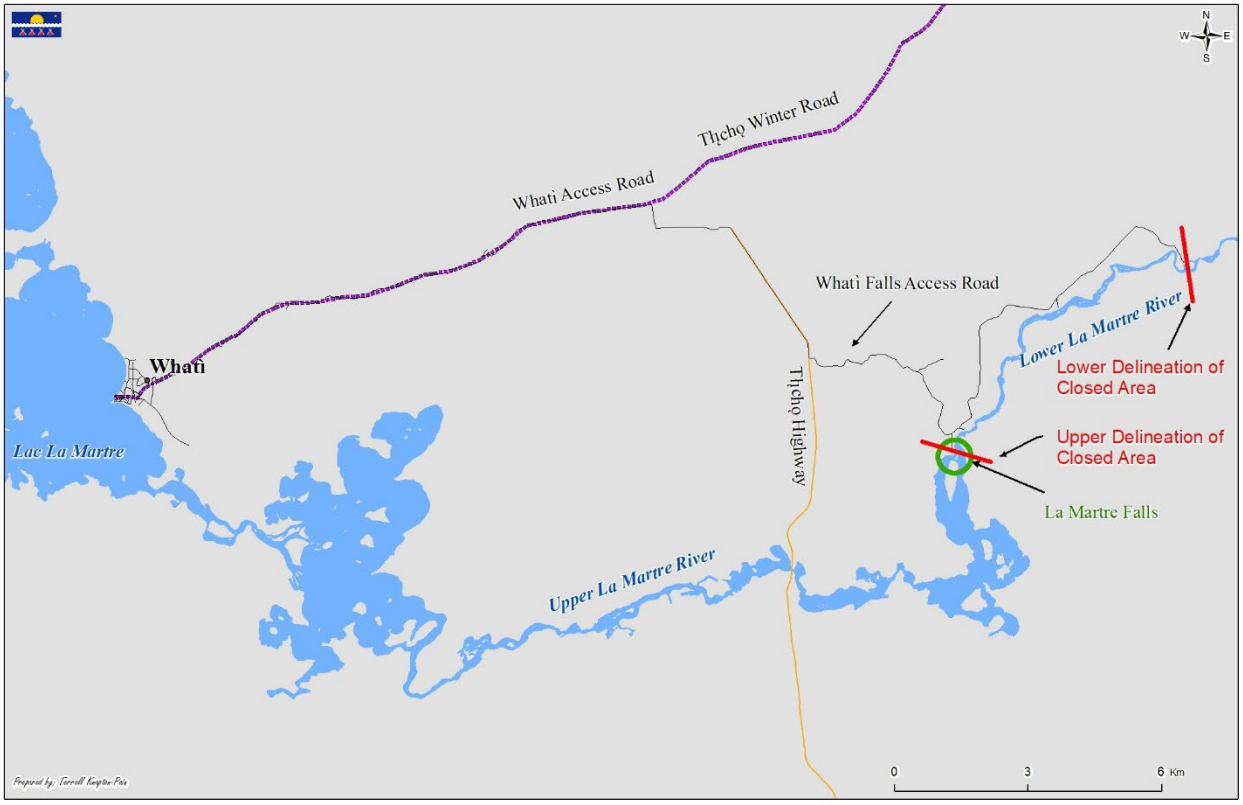


Figure 3. Map of Whatì, Lac la Martre and the La Martre River.

On the La Martre River downstream of the highway, Inconnu has a long history as a major food source for the Dene people (Receveur et al. 1997, Morrison et al. 1995). In the past, Inconnu were an ideal food source for sled dogs and the oil was extracted and used as lamp fuel. Throughout the Great Slave Lake watershed, annual campsite locations and seasonal communities were closely tied to the migration of the Inconnu into the numerous large tributaries.

Discussions concerning Inconnu abundance, importance and subsistence fisheries by communities took place during the 2010 Tłı̨chǫ Marian Lake fish camp, sponsored by the WRRB. Participating Elders had a lengthy discussion of the history of netting in the area. Elders from Behchokǫ̀ state that for a period in the 1970s-1980s, Inconnu became rare and eventually absent throughout the Marian and La Martre River (Vecsei Whatì community meeting, 2021), indicating a collapse of the stock. Historically, Inconnu were highly vulnerable to commercial gillnets throughout the main basin of Great Slave Lake where the Marian-La Martre stock resides when not migrating to its spawning grounds. Subsistence fisheries harvest was thought to have minimal impact on Inconnu stocks. Conservation measures protecting Inconnu stocks and the decrease of the commercial fishery played a significant role in preventing a basin-wide collapse of stocks. By the early 2000s, Inconnu numbers had increased substantially enough to be noticed by the domestic Indigenous fishers operating in Frank Channel and Marian Lake (Harry Apples 2010, pers. comm.). Large spawning migrations of Inconnu are now annually observed throughout the Marian River as they migrate upstream.

Historically, the arrival of the Inconnu was marked by ceremonial practices. Today, the Inconnu receives less attention, but it is still an integral part in the diet and life of community members in Behchokǫ̀ and for community members from Whatì who travel the La Martre-Marian waterway.

The Tłı̨chǫ are strongly opposed to the concept of catch-and-release angling. Community members are concerned about the number of Inconnu that become injured and may die as a result of improper catch-and-release fishing practices and consider these practices as being disrespectful to fish and therefore conflict with their traditional ethics. These ethics teach that when animals are mistreated, the natural order becomes disrupted which in turn leads to future food shortages. When disrupted by activities such as “recreational” angling, the fish will leave the area and may never return.

Mitigation and Conservation Steps

Data is relatively scarce regarding existing harvest rates of fish stocks along the corridor, so a precautionary approach to managing these fisheries must be adopted.

In the fall, spawning Inconnu are known to congregate in the La Martre River below Whatì Falls. Given that this area may be accessed via the new highway, additional conservation regulations are required to ensure over-exploitation of this spawning stock does not occur. Hence, the Tłı̨chǫ government is planning to close an area to fishing that encompasses the area of the La Martre River directly from the falls (63°08’ 15” N - 116°53’ 56” W) to an area 8.34 km downstream (63°10’ 16” N - 116° 47’ 43” W) from August 15 to November 15. In support of this, it is recommended that DFO create a Variation order to NWT fishing regulations such that possession and daily catch limits will be reduced to zero Inconnu for that portion of La Martre River.

Monitoring

Harvest, fishing effort, and incidental catch information from Lac la Martre and waterways along the Tłı̨chǫ Highway is limited or absent. This essential catch per unit effort (CPUE) data is required to inform the sustainability of local fish stocks. Overfishing by recreational anglers risks collapsing a fishery by reducing the number of mature spawning individuals contributing to sustainable population levels. In this region, the recovery potential is unknown. A voluntary Angler Diary would allow the TG and DFO to monitor stock trends over time using a standardized approach. Together with fishers, indigenous governments, authorities, and researchers, these Angler Diaries will allow catch and effort data to help fisheries managers make informed decisions to establish accurate conservation goals for each species.

Since creel surveys are labor intensive and expensive, a voluntary Angler Diary is recommended during the first three years following the opening of the Tłı̨chǫ Highway. The level of participation during this time will determine if periodic creel surveys are required.

Fishers will be able to pick up and return an Angler Diary to drop-boxes that will be set up at the two Tłı̨chǫ Highway pullout areas where information boards will be located. Signage will be erected at both ends of the Tłı̨chǫ Highway and at the La Martre River crossings that will provide information about the new regulations and Angler Diary.

Angler Diary data will then be collected by TG and summarized annually by the TG in collaboration with DFO.

Fisher Registration

Sport fishers must obtain a valid fishing license from the Government of NWT and will be encouraged to register with the TG to fish within Tłı̨chǫ lands. Importantly, this includes the La Martre River highway crossing. Fisher registration will enable better compliance with completion of angler diaries as contact information could be collected from all fishers at the time of registration. This registration will promote participation in the angler diary, as the details provided in the registration process will enable follow-up of fishers for which angler diaries were not submitted.

Enforcement

The TG is planning to develop a community-based monitoring program (see below) such that, during peak fishing times, trained community members known as Fishery Guardians, will check and educate fishers to ensure that regulations are being followed. Any violations or issues that arise will be reported to DFO Conservation and Protection and/or ENR for enforcement action. For the east-west access road to the Whatì falls area, signage will be posted, and the road will be gated beyond the falls and useable only for community members.

Communication and Education

Communicating the changes to fishing restrictions found within this plan are of key importance to ensure effective management of the fish stocks within the Tłı̨chǫ Highway corridor. Distribution and posting of a pamphlet that outlines the relevant fishing restrictions within this fishing plan is essential. These pamphlets will be made available at the entrance to the highway at the Angler Diary drop box locations. Also, ENR is hiring staff to monitor the area as part of the Tlicho All-Season Road Wildlife Management and Monitoring Plan. It is recommended that these staff be provided copies of this pamphlet for distribution to increase public exposure to this FMP. This pamphlet will address the specific rules that apply to the areas of concern, the intent of these new conservation measures, and will inform fishers about the importance of the angler diary program.

A workshop for Whatì and area residents will be organised so that all community members can be made aware of the fishing plan and associated changes in regulations.

Community Based Monitoring

The TG is interested in pursing a community-based monitoring program. This program would serve both monitoring and outreach purposes. Specifically, members would advise fishers of the new restrictions, the angler diary program and document violations. Members of these monitoring programs have no regulation enforcement role but instead will serve largely in an educational capacity. Violations observed by the monitoring program should be reported to GNWT's Environmental and Natural Resources Department or DFO's Conservation and Protection Fishery Officers.

Adaptive Management

To monitor the fishery and to observe potential impacts, all fishers within the Tłı̨chǫ Highway area will be requested to fill out an angler diary detailing their fishing effort, the number of fish, and what species were caught. This multi-year (minimum three years) monitoring project will allow for the TG and DFO to summarize datasets to enable adaptation of regulations/access as required in response to any concerns relating to changes in fish stocks as mentioned above. The angler diary data, and restrictions imposed by this plan will be reviewed on an annual basis by the Tłı̨chǫ All Season Road Fisheries Management Working Group (consisting of DFO, TG, WRRB and GNWT) and any revisions will be implemented within

this plan. The working group will report to DFO, TG, WRRB and the general Tłı̨chǫ All Season Road working group.

Part 2: Lac la Martre

Lac la Martre (63° 25'N; 118° 00'W) is approximately 190 Km northwest of Yellowknife, NWT (Figure 1). The area of the lake is 1784 Km², of which 1693 Km² is water. The drainage area is 14,976 Km². The Riviere Grandin enters the lake in the northwest shore and is the only major inflow to the lake. Lac la Martre drains southeastward through the La Martre River (Figure 4) and Marian River into the north arm of Great Slave Lake. The lake depth is between 8 and 12 m in most places, with a maximum depth of 18 m in the western basin (Figure 4). Total dissolved solids range from 150 to 170 ppm, and the secchi disc transparency is 5 - 7 m. Surface water temperatures may exceed 15°C during the summer and frequent storms result in more or less isothermal conditions at that time of year.

Fish Species

Lac la Martre is home to primarily Lake Whitefish, Lake Trout and Northern Pike. Lake Whitefish are a culturally important food source to the indigenous people of the Northwest Territories. Lake Whitefish are the most common in water between 5 m and 15 m of Lac la Martre. Information on habitat use and distribution exists from the post-commercial fishery assessment (Bond 1973) and traditional knowledge passed on by community elders. Spawning sites are typically near shore in less than 5 m of water over rock substrates (Freeberg et al. 1990) along the exposed windward shorelines or reefs. Stream spawning is common within the Great Slave Lake watershed with upstream migrations from lakes to riverine habitat observed for several stocks of Lake Whitefish (DFO 2018, Baldwin et al. 2017, Tallman 1996).

In Lac la Martre, Lake Trout also have a long history of providing food for the community through an intensive subsistence fishery. During the brief commercial fishery, which operated between 1969 and 1972, Lake Trout represented approximately 20 to 25% of the value of annual Lake Whitefish landings in any given year.

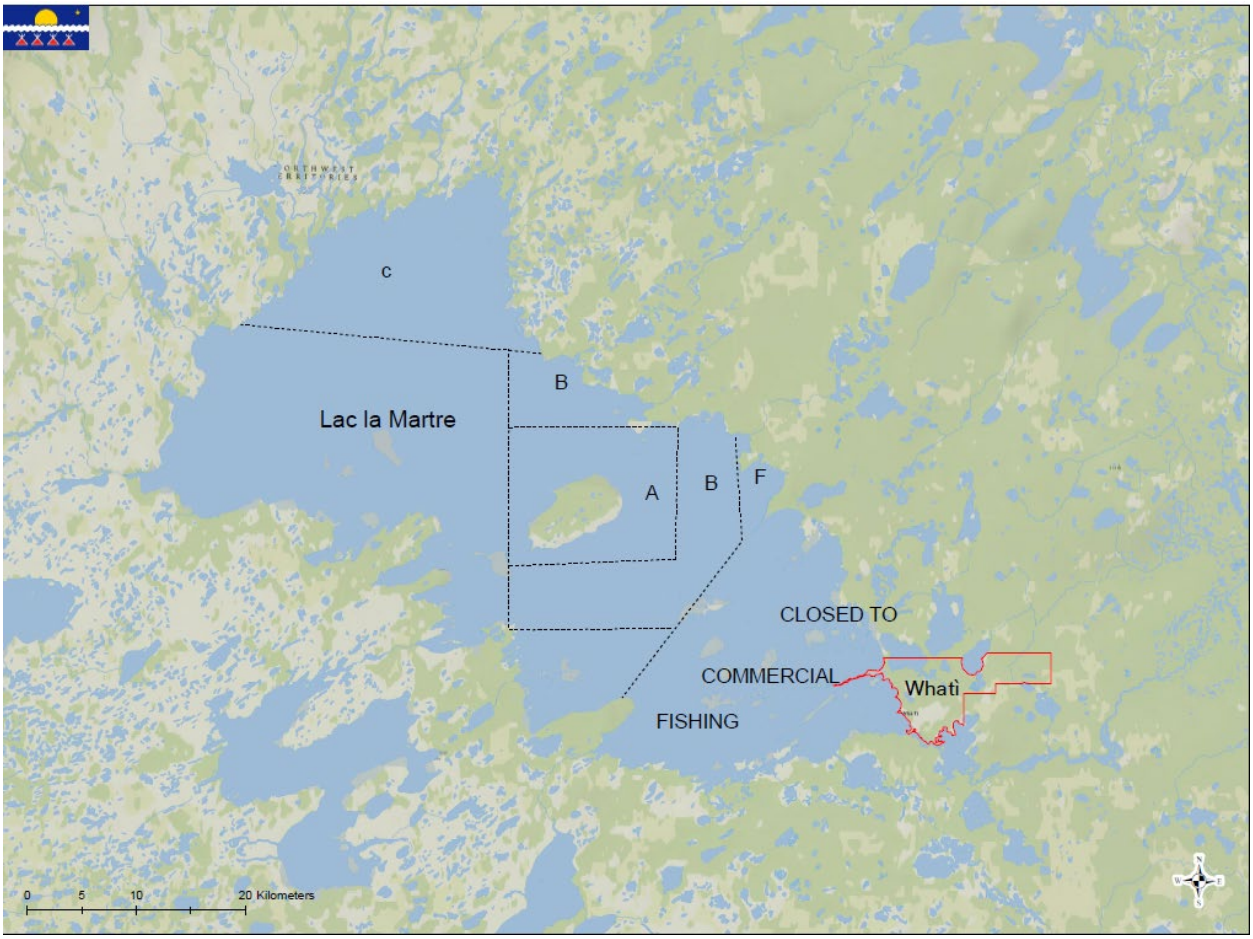


Figure 4. Lac La Martre and historic fisheries management zones.

Estimates of commercially exploited species abundance may be strongly influenced by seasonal movement patterns so an understanding of the spatial dynamics of fish populations is important for assessing and managing fisheries (Pelletier and Parma 1994). No study has been undertaken on Lac la Martre regarding seasonal migrations, spawning areas or even preferred habitat.

Northern Pike distribution is similar to Lake Trout, but its habitat preference differs, residing in the shallower, weedier parts of lakes. They are particularly abundant throughout the NWT and a sport fishery on Lac la Martre is well established via a local lodge. Information about stock size of Northern Pike is difficult to obtain because of the intensive effort involved in obtaining accurate population estimates but habitat and environmental requirements of Northern Pike are already well known despite receiving no attention during past Lac la Martre surveys. No study has been undertaken to determine productivity or standing stock biomass. Limited CPUE data exists from previous fish camp fishing efforts, but it can not be considered baseline data since areas fished were better suited for Lake Whitefish and Lake Trout.

White Suckers have been caught and harvested in the subsistence fishery but were always culled in the historic commercial fishery. White Suckers are bottom oriented and are wide-spread throughout Lac la Martre in shallow weedy bays as well as over rock substrate in deeper habitat.

Burbot are seemingly rare in Lac la Martre. Their size makes them susceptible to gillnets but the biomass is probably low, and they continue to be infrequently caught in the subsistence fishery.

Areas of Concern

The Lac la Martre ecosystem has remained relatively stable due to the remoteness and limited access to the watershed. Mining activity and road access could negatively impact the surrounding environment. Lack of development along shoreline wetlands, which serves as fish nurseries and habitat, contributes to high productivity in the lake. Unlike many oligotrophic lakes in the region, Lac la Martre is relatively shallow and therefore does not have a large expanse of unproductive "under-the-thermocline" habitat. The potential increase in annual temperatures may significantly increase aquatic vegetation and affect species composition throughout much of the lake, for example, Lake Trout habitat could decrease at the expense of increased Northern Pike habitat.

Conservation Concerns

Lac la Martre is a large lake with fish resources that have historically been harvested through commercial, subsistence and sport fishing. During the years of commercial fishing the mean catch was 94,637 kgs of Lake Whitefish and 19,344 kgs of Lake Trout. The subsistence fishery has a long tradition on the lake and is the primary method for Whatì residents to obtain their food fish. When last assessed in 1972, it was determined that 99,790 kgs of Lake Whitefish and Lake Trout were harvested annually. The recreational fishery currently consists of a single outfitter that operates in relatively low capacity at the northwest end of the lake. Prior to the construction of the TH, anglers could access the lodge by fly-in only in the pursuit of Northern Pike and Lake Trout.

With the completion of the all-season road, and if a commercial fishery is re-established, all three of these fisheries are likely to increase in the number of participants and seasonal effort. The all-season road presents the accessibility to the fishery with both potential risks and opportunities.

Once completed, transportation costs for harvested fish to the fish processing plant in Hay River will be reduced from historical levels, which may stimulate the re-development of a commercial fishery. This fishery would co-exist with the current protected-by-rights subsistence fishery but would likely be very small scale (compared to 1960s) and will be competing with a limited, yet productive recreational fishery made possible by direct access to Lac la Martre via the new highway.

History, Traditional Knowledge and Cultural Factors

Lake Whitefish and Lake Trout are culturally important species to Indigenous people across the Territory. In periods of limited food availability, the fish resources have always provided sustenance for the entire community.

Recently, the fishery in Lac la Martre consisted of a small-scale subsistence fishery and an outfitter's lodge for anglers. The brief commercial fishery undertaken in the late 1960s was carefully monitored, providing valuable information on landings, CPUE, species prominence in the catch, biological data and fishers' incomes. Due to logistical constraints and other non-cost effective aspects of the commercial fishery, the short lived venture was terminated by the fishers by the early 1970s.

Tłı̨chǫ Traditional Ecological Knowledge (TEK) is an important component of management decisions for the Lac la Martre fishery. The Tłı̨chǫ have accumulated a great deal of historical, ecological, and environmental expertise that provided the basis for their survival as it related to food sources and signs

of resource decline in a given area. This TEK is used in combination with scientific knowledge for effective fisheries decision-making in the region and provides communities with the opportunity to observe and learn about Tłı̨chǫ methods of resource management and work collaboratively to combine TEK with scientific monitoring methods.

Mitigation and Conservation Steps

Existing policies and regulations, such as the NWT Fishery Regulations, NWT Sport Fishing Regulations, and the *Fisheries Act*, will be applied to ensure that the Lac la Martre fishery resource is used in a responsible and sustainable manner.

The biggest conservation concern is with respect to the potential development of a commercial fishery on Lac la Martre. Management measures outline the control rules adopted for the fishery, including stock conservation and sustainable management measures. Management measures for any potential Lac la Martre commercial fishery would include controls related to annual quotas (see Figure 4 for historic quota areas and closure zones), openings and notice for the closure of fisheries; licensing; and reporting requirements, including by-catch and discards and the use of fishers' logbooks. These measures will be identified in the separate La Martre Fisheries Management Plan which is under development.

In addition, controls, such as those utilized in the previous commercial fishery on Lac la Martre will also be considered through discussions with local commercial fishers at community forums. It is possible that the allocated quota would not be attained during the open water period and a winter fishery may be considered.

Bond (1973) recommended that the annual lake quota for the commercial fishery be set at 45,000 kgs (measured in round weight) of Lake Whitefish and Lake Trout and include both open-water and ice-cover periods. Depending on fishers' preferences, fishing activity may be seasonal and made to accommodate logistical, economic and food regulatory realities within the community.

Fisheries and Oceans Canada's "Fishery Decision-Making Framework Incorporating the Precautionary Approach" has been successfully used in management of fisheries; including commercial, recreational, and subsistence fisheries. This Framework requires that total annual catch remain moderate when the stock status is healthy, to promote rebuilding when stock status is low, and to stop irreversible harm to the stock. If exploited stocks show signs of over-fishing, a rebuilding plan is implemented. Even a significant increase in recreational fishing may impact Lake Trout stocks in Lac la Martre.

It is not clear at what level of exploitation the Lake Trout would be considered over-fished. This will be further developed in a separate IFMP if a commercial fishery is proposed. An Exploratory Fishery may be considered to address data deficiencies.

Through the Lac la Martre fishing lodge, there has been more than a five-decade recreational fishery for Lake Trout, and, with the access provided by the all-season road, it is expected that there will be increased activity in the recreational fishing sector.

The recreational angling fishery will adhere to rules outlined in the Northwest Territories Fishery Regulations and Northwest Territory Sport Fishing Regulations with additional controls relevant for the region. Anglers will also be requested to fill out and submit a voluntary angling diary.

Monitoring

TG recommends the implementation of an angler diary program for all Lac la Martre anglers similar to (and likely in conjunction with) the process recommended above for the TH corridor fisheries. A more substantial and thorough monitoring program would be necessary for the development of a possible future commercial fishery. The channel of information/data for a hypothetical commercial fishery would be a mandatory commercial log book, required by all participants of the limited entry fishery.

Fisheries and Oceans Canada will continue to consult and engage with resource users and rights holders on Lac la Martre fisheries management (e.g., stock assessment studies, quotas, management measures) and will incorporate these views and traditional knowledge in the development of any scientific research and fishery management plans.

In recent years, Tłı̨chǫ elders were given the opportunity to voice their knowledge, concerns and observations concerning changes to the lake during numerous discussion sessions with DFO representatives at traditional fish camp locations. The future monitoring and current formulation of management policies must be done with community consultation and in particular, must seek out elders who have the expertise in natural resources. Traditional Ecological Knowledge contributes to an understanding of long-term changes in environments that ultimately affect the management of the Lac la Martre fishery.

Harvest, fishing effort, and incidental catch information from Lac la Martre is limited or absent. This essential CPUE data is required to inform the sustainability of fish stocks. Until a commercial fishery is deemed viable, angler diaries will be used to monitor harvest levels. The data will be accessible to both the DFO and TG. Supplementary biological data from opportunistic community fish sampling will complement the angler diary data. The level of participation during this time will determine if periodic creel surveys are required.

Community Based Monitoring

The TG is interested in pursing a community-based monitoring program. This program would serve both monitoring and outreach purposes. Specifically, members would advise fishers of the new restrictions, the angler diary program and document violations. Members of these monitoring programs have no regulation enforcement role but instead will serve largely in an educational capacity. Violations observed by the monitoring program should be reported to GNWTs Environmental and Natural Resources Department (ENR) or DFO's Conservation and Protection Fishery Officers, as appropriate.

Enforcement

With respect to fishery activities of Lac la Martre, inclusive of the commercial, recreational, and subsistence fisheries, compliance and enforcement is the responsibility ENR and DFO's Conservation and Protection (C&P) sector as they retain responsibility for the *Fisheries Act* and its regulations until such time as the Tłı̨chǫ Government enact their own regulations. Conservation and Protection are responsible for enforcement related to commercial and subsistence fisheries, while ENR lead enforcement of the recreational fishery with C&P support. The Department of ENR intends to staff a new resource officer in the region that will work collaboratively with TG to enforce NWT sport fishing regulations.

Communication and Education

A workshop for Whatì and area residents is recommended to highlight challenges and opportunities for Lac la Martre fisheries in light of the opening of the road.

Ongoing engagement and consultation will occur regularly to assess potential opportunities for persecution of a commercial fishery and associated conservations risks.

Updates on the development of fishery management plans have occurred at the TH Corridor Working Group (CWG), which is comprised of communities, Indigenous groups and other stakeholders.

Once the angler diary data from the first year following the opening of the highway is available, it will be summarized to the community of Whatì. Communication of the results to communities will focus on the larger findings rather than the technical aspects and will relate the findings back to the concerns and questions previously voiced by the community.

Adaptive Management

Adaptive management is a widely recognized solution in dealing with the uncertainty in fisheries stocks that are subjected to exploitation by commercial, recreational or subsistence fisheries. In its Report of EA, the MVEIB concluded that an adaptive management plan is required in this plan as part of the overall mitigation strategy needed to prevent significant adverse impact son the environment form the TH. Adaptive management requires long-term monitoring by fisheries managers.

Management of the recreational and commercial fishery on Lac la Martre will need to be flexible and responsive to social, economic and environmental change. Effective management will require the following, adapting to social change, including greater access to other communities by residents of Whatì; adapting to economic change including declines in the subsistence fishing and the possibility of an economically viable commercial fishery exists in the future; and adapting to climate change, which may affect water temperature, vegetation in the lake and lead to significant consequences for Lake Trout and Northern Pike.

Adaptive management must include consideration of Traditional Knowledge; engagement with communities, Indigenous rights holders and other stakeholders; the identification of the monitoring program or mechanism that will provide information on project effects and how data; and the set action levels that will ensure significant adverse impacts do not occur. All action levels must be below the threshold of a significant adverse impact assessment of cumulative impacts of TH on fisheries ecosystem in the Lac la Martre

Adaptive management activities consist of collecting information, analyzing information, reporting the results, and planning how to respond to the results by allowing flexibility of the plan to best suit changing conditions or newly emerging issues.

During information analysis using angler diary data sets, TG will be expected to translate the information acquired in the previous step into knowledge that can be used for decision-making within the adaptive management framework. The information analysis will be the responsibility of TG but local experts, land-users, elders, TK holders, community members, and government experts may become involved.

Annually the TH FMP Working Group will review the data acquired to ensure fishing is occurring as sustainable levels, and if not, to address these with proper remedial actions in a revised FMP.

Reporting will consist of an annual plain language summary/update. In the future, if a commercial fishery were to be implemented, a more detailed technical analysis would be conducted for inclusion in a future IFMP.

TG proposes the establishment of action Levels for those monitored parameters that will be most useful in assessing potential trends towards the significance thresholds of overfishing. Action Levels will be set for measured ecological indicators of a Valued Ecosystem Component and will be fully developed in a separate IFMP to address development of a commercial fishery. A valued ecosystem component (VEC) is an element of the environment that has biological, economic, social or cultural significance and determined on the basis of science and perceived public concerns. For the purpose of this FMP, VEC is applicable to two fish species; Lake Whitefish and Lake Trout.

Recreational anglers will target primarily Lake trout and DFO has existing daily quotas and possession limits in place for all waterbodies of the NWT. However, TG recommends that for the adaptive management plan, a response framework be put in place based on magnitude of angling pressure. If the angling pressure exceeds the Moderate threshold, then DFO would implement a stock assessment based on CPUE of females, identify conservation concerns and implement actions to reverse the trend of over-exploitation.

Conclusion

Post season reviews will be conducted on an annual basis by the Working Group. Progress on achieving and implementing of management measures identified in this Management Plan will be reviewed. It is hoped that this current Fisheries Management Plan will meet the long-term objectives of maintaining a sustainable fishery throughout the Wek'èezhìi Management Area that can be enjoyed by all those using the Tłı̨chǫ Highway and surrounding resources.

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Appendix A. Images of highway corridor water crossings and Lac la Martre.

Figure 1. A small standing water area at one of the numerous culverts along the Tlicho Highway. Such waterbodies may be seasonally or annually ephemeral.

Figure 2. James River showing bridge structure. Some small-bodied fish were observed.

Figure 3. La Martre Falls is the limit to upstream migration for all fishes within the North Arm-Marian watershed.

Figure 4. La Martre River downstream of the falls. This area has gravel/cobble substrate and flow that is suitable for fall spawning Inconnu and adfluvial Lake Whitefish.

Figure 5. The lower portion of the Inconnu and Lake Whitefish spawning grounds. This area has several deeper pools where Inconnu congregate prior to spawning events. Arctic Grayling are also abundant here.

Figure 6. Inconnu schooling in swift water shortly before spawning. All Inconnu spawning throughout the La Martre River are from Great Slave Lake.

Figure 7. Southeast shoreline of Lac La Martre. This area had an abundance of Lake Whitefish and Lake Trout.

Figure 8. Community members from Whati return from a productive day of subsistence netting.