

Via Email

Mr. Mason Mantla
Chair
Wek'èezhì Land and Water Board
1-4905 48 STREET
YELLOWKNIFE NT X1A 3S3

MAY 23 2023

Dear Mr. Mantla:

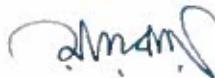
Submission of the Water Licence (W2020L8-001) Annual Report 2022 for the Tłı̨chǫ All-Season Road/Tłı̨chǫ Highway

The Government of the Northwest Territories' Department of Infrastructure is pleased to submit the attached Tłı̨chǫ Highway Type A Water Licence (WL) Annual Report 2022 for WL W2020L8-0001, which was issued by the Wek'èezhì Land and Water Board on November 19, 2020. The WL Annual Report 2022 was prepared in compliance with Part B, Condition 14 and Schedule 1, Part B, Conditions 1, 2 and 3 of the WL. This report includes information on Operation and Maintenance related activities from January 1, 2022 to December 31, 2022.

In accordance with Part B, Condition 23 and Schedule 1, Part B, Condition 1, Item P of the Water Licence W2020L8-0001, where necessary, summaries of activities used as sources of information for Traditional Knowledge have been included in the Annual Report.

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.

Sincerely,



Ziaur Rahman
Manager, Surface Design and Construction
Department of Infrastructure

Attachment

- c. Ms. Bertha Rabesca-Zoe, Tłı̨chǫ Executive Officer
Tłı̨chǫ Government

Document Name: 2022 Water Licence W2020L8-0001 Annual Report	0	50
Reporting Period: January 1 st to December 31 st , 2022	Rev.	Total Pages

Dave Green – Sr. Project Environmental Manager

Signature : 

Date : 2023-04-21

Table 1-1: Document Revision History

REVISION	REASON FOR ISSUE	REVISION DATE	DESCRIPTION OF REVISION
0	IFR	2023-04-29	Issued for review

Table 1-2: Document Approval

	NAME	SIGNATURE	DATE
Prepared by:	Dave Green, R.T.Bio, R.B.Tech		2023-05-19
Reviewed by: Environmental Manager	Caroline Walmsley, R.B.Tech		2023-05-19
Project Manager Approval Approved by:	Devon Stephenson		2023-05-19

TABLE OF CONTENTS

1. Introduction	6
2. Measures and reporting on water and waste	8
2.1. Calibration and Status of Meters	8
2.2. Monthly and Annual water quantities	8
3. Waste Stream Management and Quantities	10
3.1. Solid Waste	10
3.2. Domestic/Office Waste	10
3.3. Construction Waste	11
3.4. Wood Waste	12
3.5. Recycling	12
3.6. Hazardous Waste	12
3.7. Sewage	13
3.8. Waste Management Methods	13
3.9. Water quality and ARD/ML Testing	16
3.10. Surveillance Network Program	16
4. Management Plan and Activities	16
4.1. Engagement	16
4.2. Details of work completed	17
4.3. Modifications or major maintenance work	17
4.4. Closure and reclamation summary of activities	19
4.5. Erosion and Sediment Plan Activity Summary	19
5. Wildlife management and monitoring plan	20
5.1. Measures 6-1, Part 1: Develop and implement range plans	20
5.2. Traditional Knowledge	20
5.3. Tłı̨chǫ Harvesters and methods to monitor the state of barren-ground caribou winter habitat	20
5.4. Tłı̨chǫ Government Monitoring Program	20
5.5. Recreational, Traditional, or non-Traditional Activities	20
5.6. Measure 6-1, Part 2: Information and adaptive management requirements: 22	22
5.7. Measure 6-2: Determine sustainable harvest levels for boreal caribou (tǫdžı) and implement measures to ensure harvest is sustainable if required	25
5.8. Measure 6-3: Habitat offset and restoration plan	25

5.9. Measure 7-1: Incorporate Traditional Knowledge into monitoring of barren-ground caribou (ɂekwǫ̀)	26
5.10. Measure 7-2: Barren-ground caribou mitigation and policy changes ...	27
6. Management Plan Updates and Revisions	28
6.1. WMMP Updates.....	29
6.2. Waste Management Plan	29
6.3. Quarry Operations Plan	29
6.4. Permafrost Management Plan	29
7. Spills and Unauthorized Discharges	29
7.1. Spills.....	30
7.2. Unauthorized Discharges	30
7.3. Spill Training and communication.....	30
8. Other Reporting requirements.....	30
9. Water Monitoring plan Reporting	30
10. Summary of Wildlife Monitoring	32
10.1. Wildlife Road Surveys.....	32
10.2. Wildlife Sightings.....	32
10.3. Wildlife Surveillance Survey.....	32
10.4. Wildlife Incidents / Mortalities	32
10.5. Mitigations triggered by boreal caribou collar data maps	33
11. TASR crossings by collared boreal caribou.....	34
12. Moose ABUNDANCE survey	35
13. EA Monitoring Results.....	35
13.1. Measure 10-2, Part 2: Wildlife Management and Monitoring Plan update during permitting	36
14. References	37
Appendix A: Water tracking spreadsheets	38

TABLES

Table 1-1: Document Revision History.....	2
Table 1-2: Document Approval.....	2
Table 2-1: Monthly and Annual Water Quantities extracted from approved water sources.....	9
Table 5-1: Adult female survival and calf: cow ratios are used together to estimate the annual population growth rate, or lambda (λ). A value of 1.0 indicates a stable population; a value less than 1 indicates a declining growth rate; values higher than 1 indicate an increasing growth rate.	22
Table 10-1: Wildlife Incidents	32

FIGURES

Figure 1-1 General Project Location.....	7
Figure 2-1: July 2022 Duport, James, and LaMarte Rivers Combined Water Withdrawal Volumes..	3
Figure 3-1: 2021 Monthly Solid Waste Quantities.....	4
Figure 3-2: 2021 Monthly Domestic Waste Quantities.....	5
Figure 3-3: 2021 Monthly Construction Waste Quantities.....	5
Figure 3-4: 2021 Hazardous Waste Quantities.....	6
Figure 3-5: 2022 Sewage Monthly Quantities.....	7
Figure 3-6: Camp and Maintenance Laydown	15
Figure 4-1: Looking at the fish exclusion rock plug installed on the downstream side of the culverts at 46+220.....	18
<i>Figure 4-2: Looking at the fish exclusion rock plug installed on the upstream side of the culverts at 46+220.....</i>	19
Figure 5-1. Daily traffic counts from 1 January to mid-October, 2022, recorded at two Department of Infrastructure traffic counters on the Tłı̨chǫ Highway at KM 18 (top panel) and KM 60 (bottom panel).....	21
Figure 5-2: Boreal Caribou North Slave (TASR) Study Area, and other adjacent boreal caribou study areas in the southern NWT.....	22
Figure 5-3 Forest fires within the North Slave region that received fire suppression during the 2021 fire season.	28
Figure 11-1. Total number of collared boreal caribou crossing the TASR alignment during each month, based on movement paths from GPS-collared boreal caribou between March 30, 2017 and March 30, 2022. Crossings are segregated into direction of crossing the road.....	34
Figure 12-1 Moose abundance survey areas conducted in March 2021. Results are reported for the area encompassing the TASR alignment, shown in blue.....	35

GLOSSARY AND ACRONYMS

ASR	All Season Road
CDC	Career Development Coordinator
CCL	Community Coordinator Lead
CWG	Community Working Group
DFO	Department of Fisheries and Ocean Canada
EMPs	Environmental Management Plans
GNWT	Government of Northwest Territories
GNWT -ECC	Government of Northwest Territories – Department of Environment and Climate Change
GNWT-INF	Government of Northwest Territories – Department of Infrastructure
NSMA	North Slave Metis Alliance
RoW	Right-of-way
SAR	Species at Risk
SCP	Spill Contingency Plan
TASR	Tłı̨chǫ All Season Road
TG	Tłı̨chǫ Government
TH	Tłı̨chǫ Highway
WLWB	Wek'èezhìi Land and Water Board
WMP	Water Monitoring Plan
WMMP	Wildlife Management and Monitoring Plan
WRRB	Wek'èezhìi Renewable Resource Board
YKDFN	Yellowknives Dene First Nation

1. INTRODUCTION

Peter Kiewit Sons (ULC) was retained by the Government of the Northwest Territories (GNWT) to construct the Tłı̨chǫ All Season Road (TASR), also known as the Tłı̨chǫ Highway, which is a 97km long, two-lane gravel road connecting KM 196 along Highway 3 near Behchokǫ to the community government boundary of Whatì in the Northwest Territories (see Figure 1-1). Additionally, North Star Infrastructure has been awarded the Operations and Maintenance contract for a 25-year period which began after the opening of the road in November of 2021.

To satisfy reporting requirements outlined in Water License W2020L8-0001 issued October 5, 2020 (replacing W2016L8-0001) and Water License W2021L9-0001, Schedule 1, Part B, Condition 14 an annual report will include, but not be limited to:

- (i) Measuring and Reporting on Water and Waste
- (ii) Management Plan Activities
- (iii) Spills and Unauthorized Discharges
- (iv) Other Reporting Requirements
- (v) Wildlife Management and Monitoring

This report has been structured to clearly summarize the above noted environmental requirements/conditions as well as elements of the applicable Component Environmental Management Plans that were conducted and observed during the Operations and Maintenance period between January 1, 2022 and December 31, 2022.



REV.	DATE	DESCRIPTION / REVISION	AUTH. BY
0	2018.06.25	DRAFT	SJT

TLICHO ALL SEASON ROAD (TASR)			
KEY PLAN			
DATE	SCALE (HALF SIZE)	DRAWING No.	SHEET
2019.07.08	N/A	H355788-20-260-SEG0-0101	1 OF 1

2. MEASURES AND REPORTING ON WATER AND WASTE

2.1. CALIBRATION AND STATUS OF METERS

Schedule 1- Part B, Condition 1(a): No meters were used during 2022 that required calibration or maintenance. As was the case during the construction of the Tłı̨chǫ Highway, no flow meters or gauges were utilized to track water quantities in 2022. Rather, truck load counts were used to document consumptive water use. These water withdrawal load count records were provided to the Environmental Manager at the end of each day where they were entered into an Excel spreadsheet for tracking and compliance purposes.

2.2. MONTHLY AND ANNUAL WATER QUANTITIES

Schedule 1 - Part B, Condition 1(b): The following tables provides details of the water volumes (m³) that were withdrawn from all approved water sources in 2022.

As outlined in the Type A Water License W2020L8-0001, the WLWB set various requirements for GNWT-INF to comply with to withdraw water and minimize the impact to the environment. The following Conditions were adhered to when withdrawing water for use during project construction:

- The Licensee may only withdraw up to 900 m³/day of Water for the Project.
- The Licensee shall only obtain water from the approved Water Sources
- In any single year, the Licensee shall not withdraw greater than 10% of the available water volume of any Water Source.
- In any single ice-covered season, the Licensee shall not withdraw greater than 10% of the available water volume of any Water Source, as calculated using the appropriate maximum expected ice thickness.
- The Licensee shall not withdraw greater than 10% of instantaneous flow.
- Prior to locating a water intake in a fish-bearing watercourse, the Licensee shall obtain written authorization for the location from an Inspector.

The monthly and annual quantities of water withdrawn from approved water sources is provided in Table 2-1. The consumptive use of water was only for the purposes of dust suppression including the annual application of calcium chloride. Water volumes extracted from approved sources were tracked and reported (see Appendix A). A breakdown of July daily water withdrawal volumes is detailed below in Figure 2-1 to demonstrate that no exceedance of the allowable limit (900 m³/per day) occurred during the 2022 reporting period.

During the 2022 reporting period, standing ditch water was infrequently used for dust suppression whenever possible to adhere to the Land Use Permit (W2016E0004) condition 26(1)(f) to control or prevent ponding of water, flooding, erosion, slides and subsidence of land while simultaneously reducing the volume of water required from natural sources. All extraction locations within the ditch lines were inspected and approved by the Environmental Department to ensure that there were no impacts to adjacent watercourses, lakes or ponds.

Table 2-1: Monthly and Annual Water Quantities extracted from approved water sources

Source	January	February	March	April	May	June	July	August	September	October	November	December	Annual Total Volume (m ³)
LaMartre River	-	-	-	-	-	296	708	-	-	-	-	-	1004
Duport River	-	-	-	-	-	-	80	-	-	-	-	-	80
James River	-	-	-	-	-	-	860	32	-	-	-	-	892

July 2022 Combined Daily Water Withdrawal

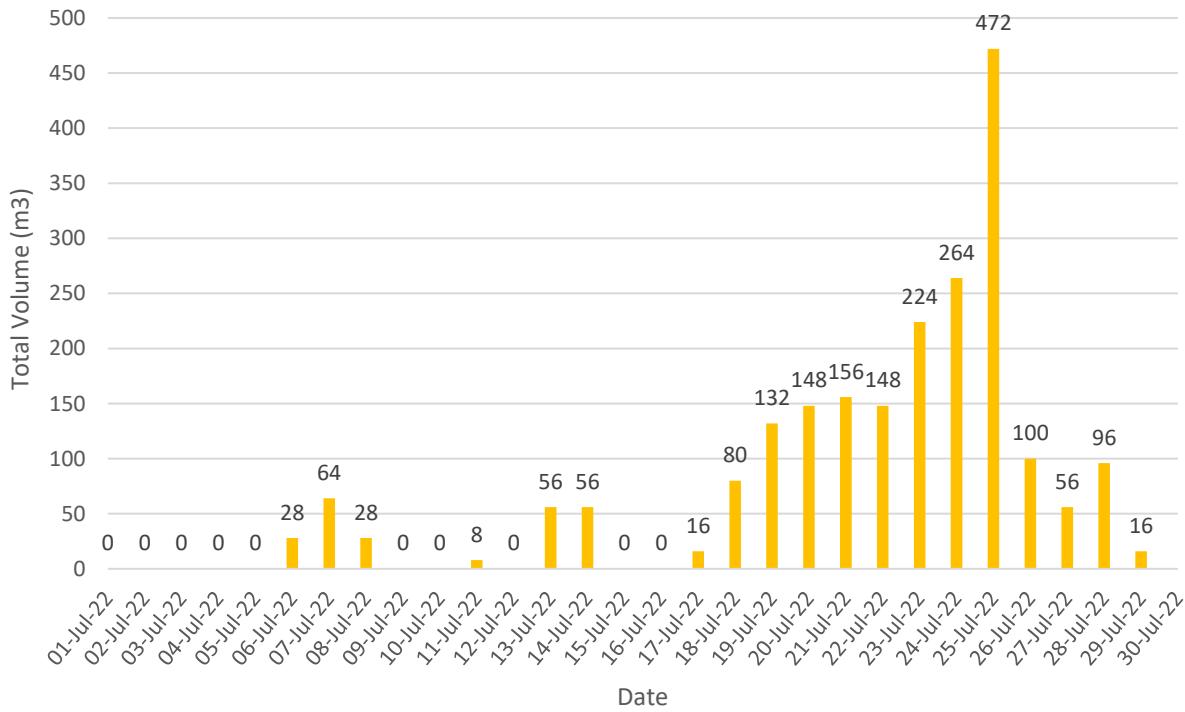


Figure 2-1: July 2022 Duport, James, and LaMartre Rivers Combined Water Withdrawal Volumes

3. WASTE STREAM MANAGEMENT AND QUANTITIES

The Waste Management Plan (Revision 1.3) developed for the TASR project was drafted to guide site personnel on the waste management goals, objectives and procedures to follow during construction and ultimately operation of the road. Adherence to the plan ensures the protection of the environment as well as aesthetic and land use values, ultimately meeting the regulatory requirements for the project. During the Operations and Maintenance phase, the plan requires the segregation of various waste streams and provides direction on how each of the streams should be managed and ultimately disposed of. As part of the Water License reporting requirements these waste streams are to be segregated and reported. The following sections detail the segregated waste streams (by type) generated during the reporting period.

3.1. SOLID WASTE

Schedule 1 - Part B, Condition 1(c): Figure 3-1 shows the overall solid waste generated for the year 2022 during the Tłı̨chǫ Highway operations and maintenance program. The graph below illustrates the waste generated from all waste streams which are not associated with hazardous waste or sewage. This includes waste such as domestic waste, recyclables, and construction waste. A total of 7.79 MT of solid waste was generated or collected during the 2022 reporting period. Quantities for each individual waste stream applicable to operations and maintenance that is classified as solid waste are discussed in more detail below:

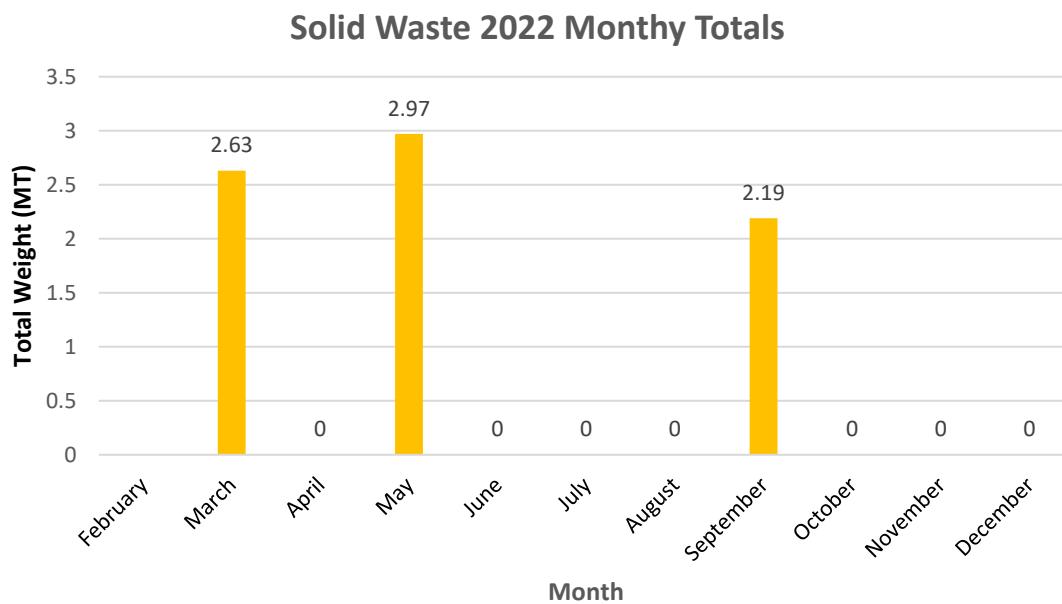


Figure 3-1: 2021 Monthly Solid Waste Quantities

3.2. DOMESTIC/OFFICE WASTE

Schedule 1 - Part B, Condition 1(c): Figure 3-2 illustrates the overall domestic waste generated during the operation and maintenance of the Tłı̨chǫ Highway during the 2022 reporting period. A total of 1.6 MT of waste was generated or collected during the 2022 reporting period. The primary source of domestic and mixed waste was from the office facilities and from the garbage collected from the roadside pull outs.

Domestic/Office Waste 2022 Monthly Totals

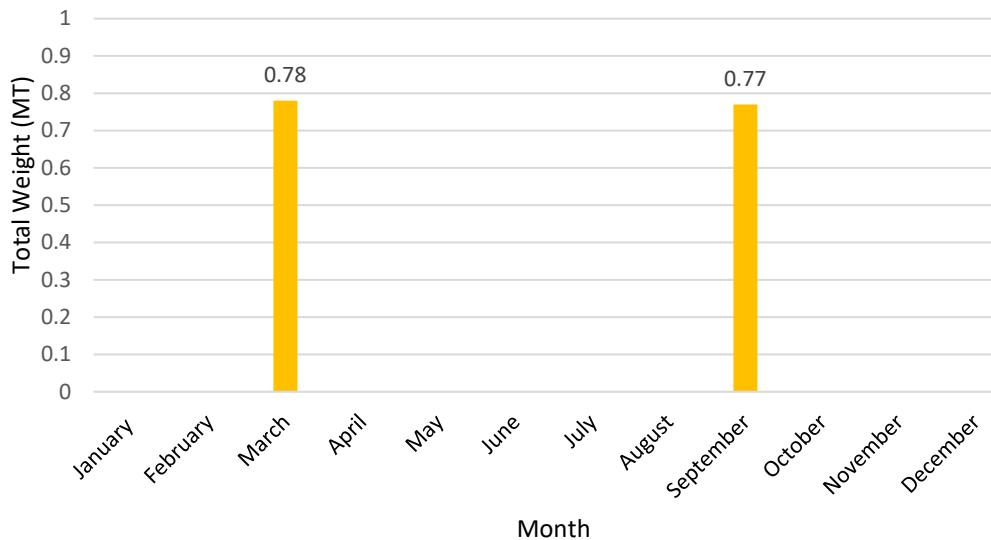


Figure 3-2: 2021 Monthly Domestic Waste Quantities

3.3. CONSTRUCTION WASTE

Schedule 1 - Part B, Condition 1(c): Figure 3-3 illustrates the overall construction waste generated during the operation and maintenance of the Tłı̨chǫ Highway during the 2022 reporting period. A total of 6.24 MT of construction waste was generated or collected during the 2022 reporting period. The maximum amount of construction waste, approximately 2.97 MT, was collected in May 2022.

Construction Waste 2022 Monthly Totals

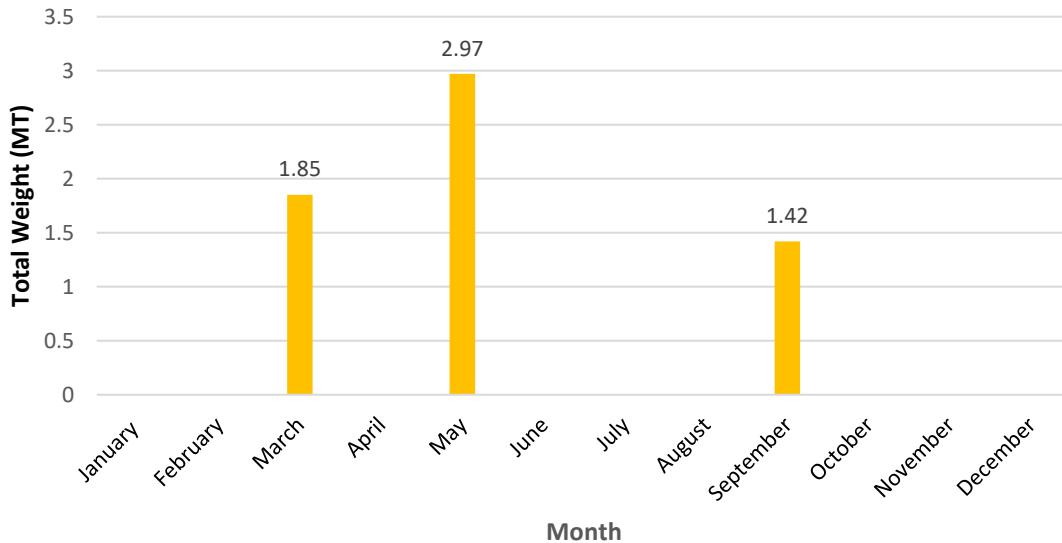


Figure 3-3: 2021 Monthly Construction Waste Quantities

3.4. WOOD WASTE

Schedule 1 - Part B, Condition 1(c): No wood waste was generated during the Operations and Maintenance of the Tłı̨chǫ Highway during 2022.

3.5. RECYCLING

Schedule 1 - Part B, Condition 1(c): There was no hauling of recycled material from the Tłı̨chǫ Highway during 2022. The extremely small quantities of recyclable materials (plastics, cans, paper) were managed internally with this material being taken to Yellowknife as required.

3.6. HAZARDOUS WASTE

Schedule 1 - Part B, Condition 1(c): Figure 3-4 confirms that very little (3,600Kg) hazardous waste was generated during the 2022 Operations and Maintenance program. All hazardous waste generated during the 2022 reporting period was collected by KBL Environmental Ltd, a registered hazardous waste carrier. The waste was transported and disposed at their approved facility for treatment/disposal.



Figure 3-4: 2021 Hazardous Waste Quantities

3.7. SEWAGE

Schedule 1 - Part B, Condition 1(c): Figure 3-5 shows the sewage generated during the 2022 reporting period. The maximum amount of sewage generated during the reporting period occurred in the month of November amounting to 14.5 m³ of sewage waste generated. Wastewater was collected by Kavanaugh Brothers and hauled to the sewage treatment facility in Yellowknife.

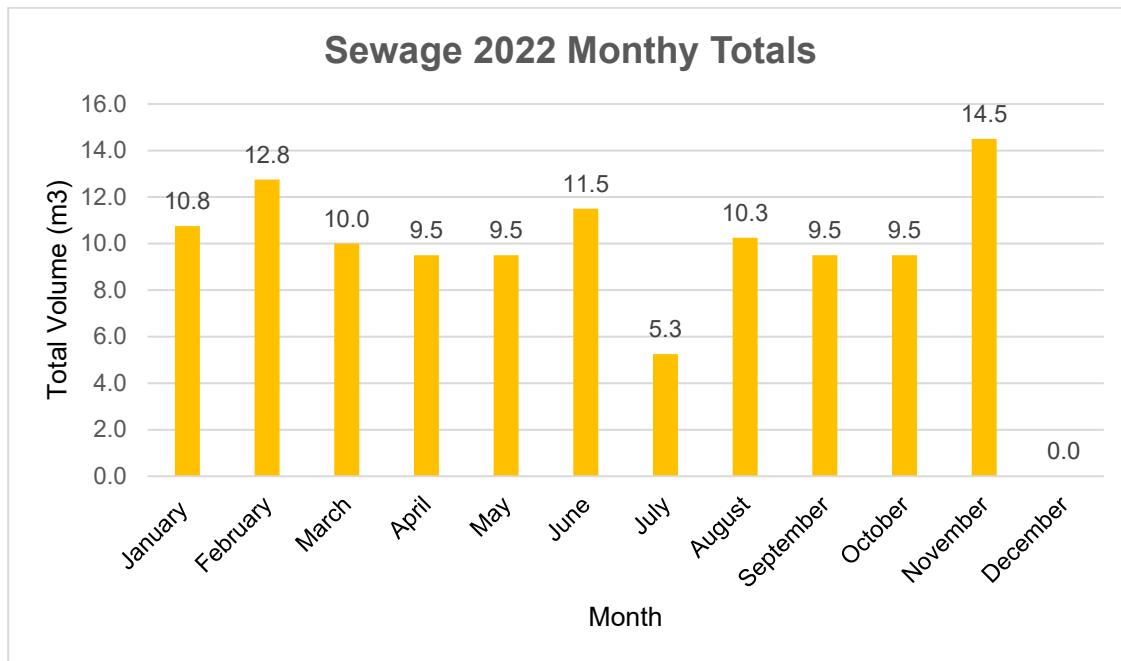


Figure 3-5: 2022 Sewage Monthly Quantities

3.8. WASTE MANAGEMENT METHODS

Schedule 1 - Part B, Condition 1(d), various waste streams are generated during the Maintenance and Operation of the Tł'chǫ Highway. It is essential that the waste is handled, stored and managed in a safe and environmentally responsible manner. The waste management program implemented during Operations and Maintenance of the Tł'chǫ Highway follows the principles of reducing the use of materials, reusing materials (whenever possible), recycling materials and recovering value from used materials. The management methods for each of the different waste streams that are generated on site are discussed in more detail below:

3.8.1. SOLID WASTE

The solid waste streams that are generated on site consist of:

- domestic waste,
- wood,
- metal,
- recyclables and
- construction waste

All the solid waste streams were stored in a designated location at Kilometer 19+800 (Maintenance Laydown) as outlined in Section 26 (1) Condition 57 of the Land Use Permit. Each waste stream is segregated and stored in 30 yd roll-off bins that are clearly labeled. The waste types are removed from site by Kavanaugh Brothers and offloaded at the City of Yellowknife Landfill or the recycle depot and Precision North Recycling (steel).

3.8.2. HAZARDOUS WASTE

Potential hazardous waste generated at the site during Operations and Maintenance comes from various waste streams that under various categories including:

- Contaminated soils
- Waste oils
- Used oil filters
- Oily absorbent rags
- Contaminated plastic containers
- Antifreeze
- Solvents
- Batteries

These various hazardous waste streams are actively segregated and stored within the maintenance laydown area (Figure 6.1). All hazardous waste containers are covered from the elements and each container is clearly marked noting content and date of generation. The containers are inspected regularly to ensure waste is properly segregated and no leaks are detected in the containments. Secondary containment for storage containers is either integrated or supplemented externally and are also inspected and maintained to ensure effectiveness and maximum volume is available.

As noted in Section 3.0, the waste is removed from the laydown as requested by site and transported by KBL Environmental Ltd and Kavanaugh Brothers Ltd who are registered hazardous waste carriers. The waste is transported and disposed at their approved facility for treatment/disposal.



Tlicho All Season Road Project

Main Camp
Waste Bin and Sewage Tank Locations



Legend

Waste Bin Locations

- Cardboard
- Construction Waste
- Domestic Waste
- Scrap Metal
- Wood

Sewage Lift Stations

- Dorm A & B Lift Station
- Dorm C Lift Station
- Dorm D Lift Station
- Kitchen Lift Station
- Waste Water Storage Tank

Data Source: Satellite Image 2020 (NAD83)

Created By:	Date Created:	Revision No:
Kiewit Environmental Dept.	March 16, 2021	0

Figure 6-1



This map is for general illustration only and should not be considered a legal document.
All geographic information has limitations due to the scale, resolution, date and source data.
Kiewit is not responsible for any interpretation or conclusions based on the data shown.
This map is not to be used in whole without the permission of Kiewit.

3.8.3. SEWAGE

The storage of sewage at the TASR project is primarily at the Maintenance Laydown or in porta-potties stationed throughout the sites if and when they are required. Sewage waste is removed by Kavanaugh Brothers on an as-needed basis. Sewage was hauled to the City of Yellowknife sewage treatment facility for treatment/disposal. As per **Schedule 1 - Part B, Condition 1(e)** the sewage generated on the TASR project are not sent to the local communities of Whati and Behchokǫ for disposal. Kiewit continued to use its established vendor to collect and dispose of the sewage generated from the project to the City of Yellowknife.

3.8.4. SOLID WASTE ACCEPTED BY LOCAL COMMUNITIES

Schedule 1 - Part B, Condition 1(e): The solid waste streams generated on the TASR project are not sent to the local communities of Whati and Behchokǫ for disposal. Kiewit continued to use its established vendors to collect and dispose of the waste generated from the project to the City of Yellowknife.

3.9. WATER QUALITY AND ARD/ML TESTING

Schedule 1 - Part B, Condition 1(g): There are no water quality or acid rock drainage/metal leaching results arising from the operation and maintenance of the Tłı̨chǫ Highway.

3.10. SURVEILLANCE NETWORK PROGRAM

Schedule 1 - Part B, Condition 1(h): There has been no data or information collected during the operation and maintenance of the Tłı̨chǫ Highway during the reporting period.

4. MANAGEMENT PLAN AND ACTIVITIES

4.1. ENGAGEMENT

4.1.1. SUMMARY OF ENGAGEMENT ACTIVITIES

Schedule 1 - Part B, Condition 1(i): Throughout the reporting period, INF and NSI have conducted engagement on a variety of subjects with affected parties in accordance with the approved Engagement Plan. Engagement efforts have been centered around informing potentially affected parties of Water License cancellations and amendments. Additionally, NSI attends and contributes to the review and approval of management plans, collaboration on various plans as required by the Report of Environmental Assessment Measures, and the annual Tłı̨chǫ Highway Corridor Working Group meetings. Engagement methods have included written notification, telephone calls, face-to-face meetings, and workshops. Full details of the engagement undertaken can be found in Engagement Records found on the Wek'èezhìi Land and Water Boards [website](#).

Face-to-face or virtual meetings and workshops that have taken place include:

- The Tłı̨chǫ Highway Corridor Working Group Meeting was on June 13, 2022, in the Community of Whati. Representatives from organizations, departments and groups that attended the meeting included the YKDFN, NSMA, CGW, CGB, TG, WLWB, WRRB, GNWT-ECC, GNWT-FIN, ECE, DFO ECCC, and the GNWT-INF.
- A second meeting of the Corridor Working Group was held on December 7, 2022, in Yellowknife. Parties that attended included the YKDFN, NSMA, CGW, CGB, TG, WLWB, WRRB, GNWT-ECC, GNWT-INF, GNWT-Lands, PWNHC, DFO, and the ECCC.

- NSI and GNWT-INF submitted a request to cancel the Type B Water License #W2021L8-0001 on June 27, 2022, which was secured for Quarry Prospect 80 at the direction of WLWB. On July 7, 2022, the WLWB identified that the cancellation application was incomplete and required that an Engagement Record was submitted as well as confirmation that Quarry Prospect 80 had been successfully closed reclaimed. In response, NSI and GNW-INF undertook engagement activities to advise affected parties of the request for cancellation of at the direction of WLWB. Notification letters were issued on November 25-26, 2022, and a follow up letter was circulated on August 7, 2022. The package was resubmitted to WLWB which was received on December 15, 2022. The public review process concluded on February 27, 2023, and the Licence was cancelled.

4.2. DETAILS OF WORK COMPLETED

Schedule 1 - Part B, Condition 1(j-k): The operations and maintenance of the Tłı̨chǫ Highway involves (as seasonally required):

- snow removal
- scarification of the road surface
- broadcasting winter grit
- cleaning and repairing/replacing signage and delineators
- collection of garbage from the roadside pullouts along with the right-of-way (RoW)
- managing debris arising from the collection of firewood and natural tree fall
- road grading and shoulder repairs
- loose material removal from bridge decks
- dust suppression activities including annual, calcium chloride application

4.3. MODIFICATIONS OR MAJOR MAINTENANCE WORK

Schedule 1 - Part B, Condition 1(l): The only modification that was completed during the reporting period was completed at Station 46+220. In the spring of 2022, with the approval of the Department of Fisheries and Oceans (DFO), Kiewit installed rock plugs on the upstream and downstream sides of the culverts at ~46+220 that was proposed by NSI to ensure that fish cannot access an area where stranding may occur. This work was completed on May 5, 2022, and DFO provided a letter on June 16, 2022, stating that the work has effectively met the fish exclusion strategy and addressed any residual fisheries concerns.



Figure 4-1: Looking at the fish exclusion rock plug installed on the downstream side of the culverts at 46+220



Figure 4-2: Looking at the fish exclusion rock plug installed on the upstream side of the culverts at 46+220

4.4. CLOSURE AND RECLAMATION SUMMARY OF ACTIVITIES

Schedule 1 - Part B, Condition 1(m): All closure and reclamation activities were completed prior to the Tłı̨chǫ Highway opening in November of 2021. No activities occurred in 2022.

4.5. EROSION AND SEDIMENT PLAN ACTIVITY SUMMARY

Schedule 1 - Part B, Condition 1(n)(i): No updates or changes to the process or facilities required for the management of erosion and sedimentation occurred in 2022.

Schedule 1 - Part B, Condition 1(n)(ii): No erosion susceptible areas were encountered in 2022. The Tłı̨chǫ Highway culverts and structure crossings/approaches along with road shoulders and slopes in the Highway RoW were all stable throughout 2022.

Schedule 1 - Part B, Condition 1(n)(iii): As noted above, no activities were required in 2022 to prevent or mitigate erosion.

Schedule 1 - Part B, Condition 1(n)(iv): As noted above, no assessment of performance of mitigation measures can be offered in 2022 as no work occurred.

Schedule 1 - Part B, Condition 1(n)(v): As noted above, no monitoring results were collected and therefore a summary/interpretation of results and Action Level exceedances cannot be provided in 2022.

Schedule 1 - Part B, Condition 1(n)(vi): As noted above, there were no Action Level exceedances and therefore no description can be offered for 2022.

5. WILDLIFE MANAGEMENT AND MONITORING PLAN

Schedule 1 - Part B, Condition 1(o): The following section reports on the GNWT's activities undertaken with respect to Measures 6-1, 6-2, 6-3, 7-1 and 7-2 of the Report of Environmental Assessment (REA).

5.1. MEASURES 6-1, PART 1: DEVELOP AND IMPLEMENT RANGE PLANS

Schedule 1 - Part B, Condition 1(o)(i-ii):

Please refer to section 5.6

5.2. TRADITIONAL KNOWLEDGE

Schedule 1 - Part B, Condition 1(o)(iii): Please refer to section 5.9. Additionally, and as part of the CWG meetings, TK is always sought. However, no TK was provided during the reporting period at those forums. However, during the CWG meetings in 2022, it was agreed that monitoring of Bison movement along the alignment should continue, and if the need arises, GNWT-INF/ECC will seek TK during formal engagement with the communities to manage Bison movement into the Whati Community.

5.3. TŁIČHQ HARVESTERS AND METHODS TO MONITOR THE STATE OF BARREN-GROUND CARIBOU WINTER HABITAT

Please refer to Section 5.9 reporting on Measure 7-1.

5.4. TŁIČHQ GOVERNMENT MONITORING PROGRAM

Please refer to Section 5.9 reporting on Measure 7-1.

5.5. RECREATIONAL, TRADITIONAL, OR NON-TRADITIONAL ACTIVITIES

Timber harvesting:

In early 2022, timber cutting permits became available on the Tłı̨chǫ Highway. From KM 0-5, any timber cutting permit holder is permitted to harvest timber. No timber harvesting is permitted from KM 5-8. From KM 8-12, a limited number (40 at any one time) of permits are available to non-aboriginal harvesters with a 2-month expiry date from issue date, and a 5 cord limit. KM 8-75 are open to all indigenous people with a permit for timber harvesting. All areas past KM 75 require Tlicho Lands Authorization for timber harvesting.

Schedule 1 - Part B, Condition 1(o)(iv): No training sessions related to quarry operations were conducted in 2022 as all the pits and quarries had been closed prior to the Tłı̨chǫ Highway opening in November of 2021.

Schedule 1 - Part B, Condition 1(o)(v): Traffic Monitoring Results -Traffic counter data from the TASR alignment (now Tłı̨chǫ Highway) are downloaded in the spring after the ground thaws, and data is then compiled for the previous year.

The Department of Infrastructure has two traffic counters on the Tłı̨chǫ Highway at KM 18 and KM 60. Daily traffic totals at those locations in 2022, are shown in Figure 5-1. Traffic at KM 18 averaged 37 vehicles per day (range 4-131 vehicles) from Jan 1- December 31, 2022. During the same period, the traffic at KM 60 averaged 22 vehicles per day (range 3-82 vehicles). These vehicle counts are of traffic in both directions.

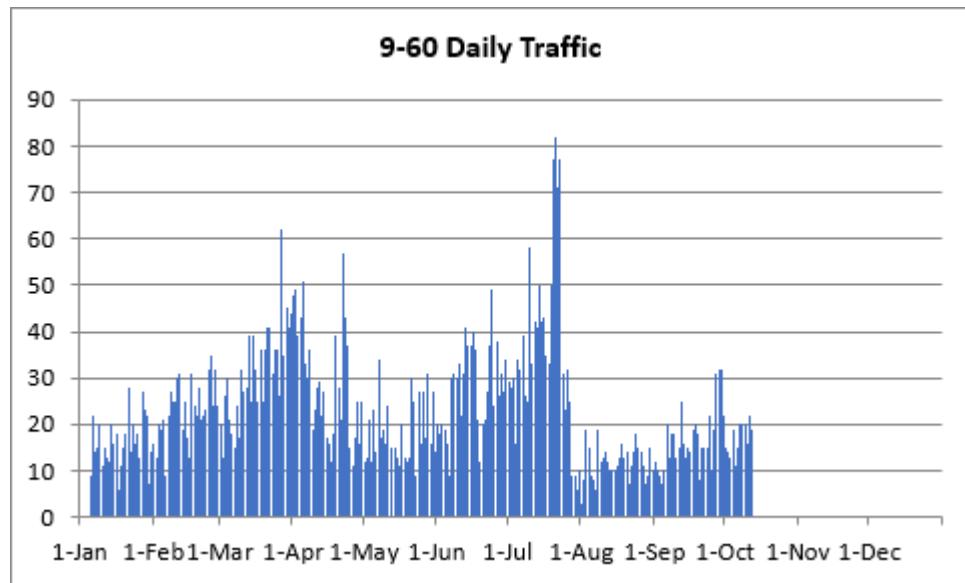
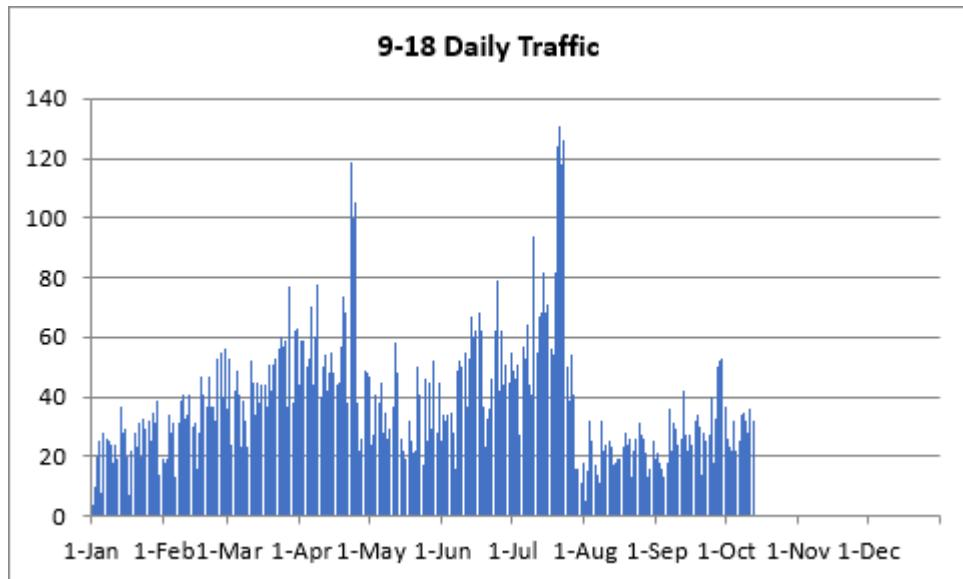


Figure 5-1. Daily traffic counts from in 2022, recorded at two Department of Infrastructure traffic counters on the Tłı̨chǫ Highway at KM 18 (top panel) and KM 60 (bottom panel).

Wek'èezhii Boreal Caribou Range Plan:

Participants of the Wek'èezhii range planning working group include the Wek'èezhii Renewable Resources Board (WRRB), Tłı̨chǫ Government (TG), Yellowknives Dene First Nation (YKDFN), North Slave Métis Alliance (NSMA), Environment and Climate Change Canada (ECCC) and the GNWT departments of Environment and

Climate Change, Industry, Tourism and Investment, Lands and Executive and Indigenous Affairs. A final draft of the interim Wek'èezhìi range plan was completed by the working group at the end of June 2021, and following a public review period, was approved by the WRRB on December 09, 2021. The final interim Wek'èezhìi range plan is available at:

<https://www.enr.gov.nt.ca/en/interim-wekeezhii-boreal-caribou-range-plan-plan-provisoire-pour-laire-de-repartition-du-caribou>

The working group continued to work in 2022 on completing the full Wek'èezhìi range plan. On March 4, the working group met to discuss changes or additions needed to the interim Range Plan. On December 1, the working group met for IGOs to present the results of their Traditional Knowledge Community Mapping workshops and discuss changes to the maps in the interim range plan.

5.6. MEASURE 6-1, PART 2: INFORMATION AND ADAPTIVE MANAGEMENT REQUIREMENTS:

a) Monitoring to determine population trends, abundance, and distribution [of boreal caribou]

Boreal Caribou Population Trend

ECC initiated a boreal caribou monitoring program in the North Slave region focused on the TASR corridor in March 2017, with the deployment of 20 GPS collars on adult female caribou. Additional collars were deployed in subsequent years to replace collars scheduled to drop off, any mortalities, any premature collar releases, and to bring the target sample size up to 30 collars. Five additional collars were deployed in March 2018, seven were deployed in March 2019, there were no deployments in 2020, and 23 were deployed in March 2021. The 2021 deployment was larger than typical because the collars deployed in 2017 were scheduled to drop off in March 2021. Ten collars were deployed in February 2022. There were 36 active collars in the TASR study area as of December 2022, with 6 collars scheduled to drop in early 2023. GNWT-ECC intends to maintain the number of collared females within the TASR (North Slave Tłı̨chǫ Highway) study area at 30 individuals annually for at least 5 years during the operational period of the road, to obtain more precise estimates of female survival.

Annual survival rates of collared female caribou, as well as spring classification surveys used to estimate calf: cow ratios conducted in February or March each year, are used to estimate annual rates of population trend (λ =adult female survival/[1-female calf recruitment]) following Latham et al.'s (2010) modification of Hatter and Bergerud's (1991) equation. The 2022 spring classification survey took place February28 – March 2. Table 13-1 below provides the annual adult female survival rate, calf: cow ratios and population trend index for the first 5 years of the monitoring program. To date ECC has observed high annual female survival rates, and an increasing population trend in all years, but the population trend index was lower in 2021-22 than the previous four years of the program.

Table 5-1: Adult female survival and calf: cow ratios are used together to estimate the annual population growth rate, or lambda (λ). A value of 1.0 indicates a stable population; a value less than 1 indicates a declining growth rate; values higher than 1 indicate an increasing growth rate.

YEAR (APRIL 01-MARCH 31)	ADULT FEMALE SURVIVAL	CALF:COW RATIO	POPULATION TREND (LAMBDA)
2017-18	0.95	32.6 : 100	1.10

2018-19	1.00	37.2 : 100	1.19
2019-20	0.97	26.2 : 100	1.09
2020-21	0.96	31.0 : 100	1.11
2021-22	0.89	27.3 : 100	1.01

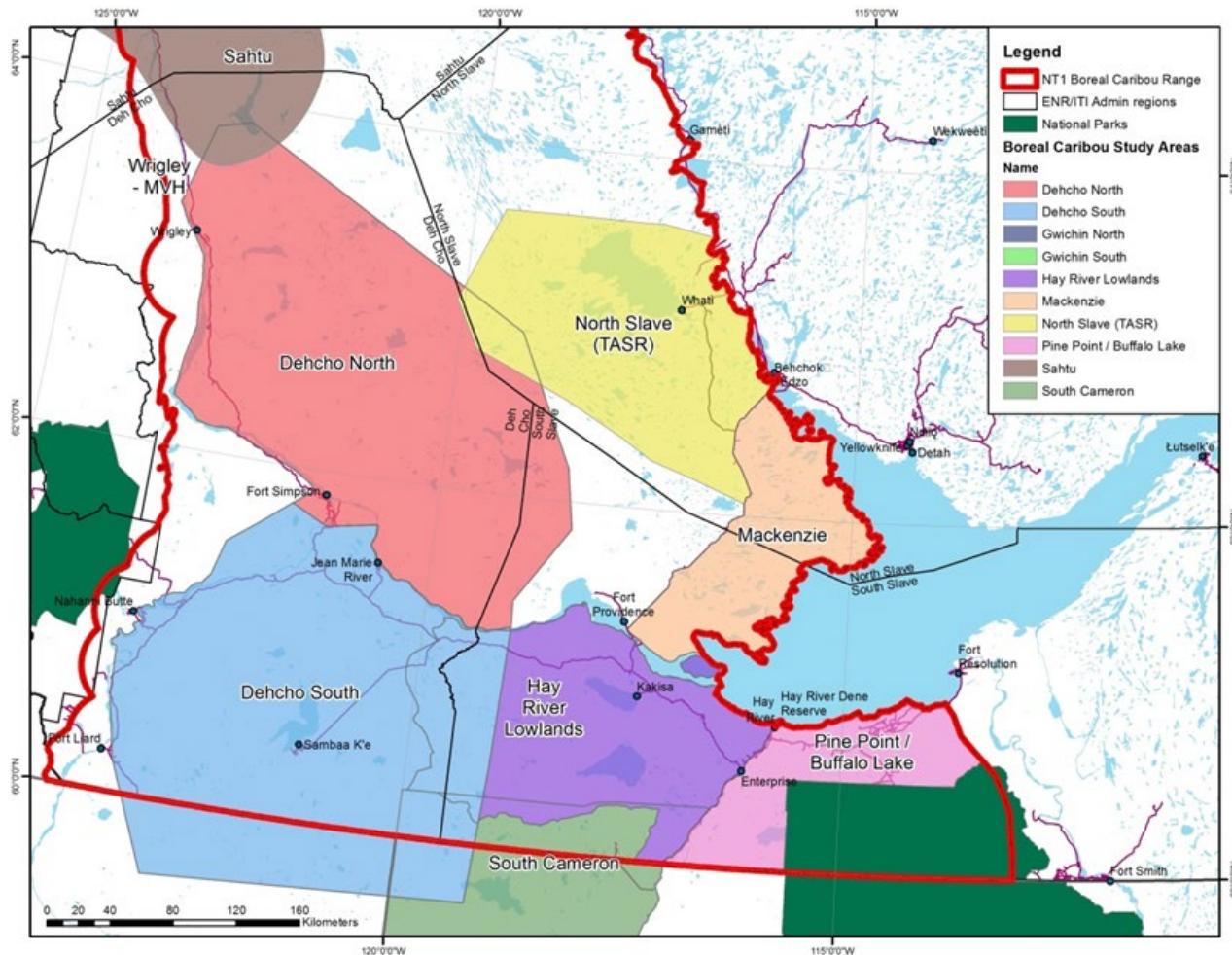


Figure 5-2: Boreal Caribou North Slave (TASR) Study Area, and other adjacent boreal caribou study areas in the southern NWT.

No boreal caribou abundance surveys took place in 2022.

b) Determination of population thresholds and triggers to inform adaptive management.

No updates

c) Harvest monitoring and reporting

The Tłı̨chǫ Government developed a proposal for a monitoring program to address Measures 7-1 and 9-1 of the Report of EA. In August 2020, GNWT-INF committed funds to support the Tłı̨chǫ Government to undertake this program. Measure 9-1 relates to the development of a non-mandatory harvest monitoring and reporting

program. The information from this program will provide information that will also support implementation of Measures 6-2 and 7-2, as well as inclusion of traditional knowledge as required by Measures 9-3 and 10-2. Further information on implementation of this program is provided in Section 13.5 of this report.

In addition to the program led by the Tłı̨chǫ Government, GNWT-ECC Renewable Resources Officers from Whatì and Behchokǭ conducted approximately 200 patrols on the Tłı̨chǫ Highway in 2022.

d) Determining sustainable harvest levels

See Measure 6-2 regarding activities related to determination of sustainable harvest levels

e) Identifying critical habitat

GNWT-ECC completed a range-wide (NT1) habitat selection analysis (resource selection functions) project using boreal caribou collar data from across the NWT to model and generate predictive maps of boreal caribou habitat selection during different seasons (NWT CIMP Project #202). The predictive habitat selection maps are being used to assist with identifying important areas for boreal caribou to support range planning and were also used in the draft TASR habitat offset plan for boreal caribou.

f) Ongoing habitat disturbance monitoring

ECC measures and updates fire disturbance on an annual basis and contributes this data to the National Burn Area Composite (NBAC) and Canadian National Fire Database (CNFDB) datasets maintained by Natural Resources Canada (NRCan). ECC uses a combination of the NBAC (1986-2020) and CNFDB (pre-1986) datasets to calculate fire disturbance within the NWT boreal caribou range. As of fall 2021, the Wek'èezhìi portion of the boreal caribou range had 30.6% fire disturbance (≤ 40 yrs old), 0.8% human disturbance (including 500 m buffer; data current to 2015 [source ECCC]), and 31.0% total combined fire/human disturbance. These regional estimates do not yet include the final footprint of the TASR project (road alignment and borrow sources plus a 500 m buffer); however, based on the proposed alignment and all 21 potential borrow sources, the human disturbance footprint in the region would increase to 0.92%. ECC is working with a contractor to map the as-built final footprint of the TASR project, and this will be available in 2023. The NT1 range as a whole had 20.4% fire disturbance, 9.1% human disturbance and 28.0% total disturbance. Fire polygons from 2022 are not yet available to update disturbance estimates current to fall 2022.

g) Setting disturbance thresholds for critical habitat and, to the greatest extent possible, managing habitat towards meeting these disturbance thresholds for each range planning region

Disturbance limits and human disturbance management thresholds have been defined for each boreal caribou range planning region within the NWT Framework for Boreal Caribou Range Planning.

h) Monitoring predator populations including densities, movements and predation rates

As part of the TASR WMMP and research program in partnership with Laval University (funded by the Sentinel North program), ECC deployed 2 GPS collars on black bears in the study area between Fort Providence and Behchokǭ, and along the TASR corridor, in 2022. The purpose of this program is to evaluate the influence of the TASR and Highway 3 on black bear movements and to assess predation rates of black bears on boreal caribou, moose and bison calves. The broader purpose of the Sentinel North project is to study food web dynamics between boreal caribou, moose, bison, wolves and bears and to understand how the food web is influenced by natural and human landscape disturbance as well as climate change. The black bear collars are equipped with a video camera to capture short video clips at regular intervals to document black bear predation events as well

as to learn more about their behaviour and food habits. A total of 7 bears were captured and fitted with GPS collars in the study area in 2021 – 6 males and 1 female, and 2 additional bears in 2022 – 1 male and 1 female.

To assess the abundance of wolves in the TASR area, aerial wolf population surveys were conducted in two 5000 km² blocks in February and March 2022. Survey methods followed those used in previous wolf surveys conducted in the Northwest Territories (e.g., Serrouya et al. 2016). One survey repeated the Tłı̨chǫ All-Season Road alignment block surveyed in 2020. Wolf density in this area was estimated to be 2.0 – 2.8 wolves/ 1000 km². A 5000 km² reference block was placed within the north end of the Mackenzie boreal caribou monitoring study area east of HWY 3. Wolf density in the reference block was estimated to be 1.4 wolves per 1000 km².

In 2022, GPS collars were used to begin monitoring wolves to assess predator movements. Four wolves were captured and fitted with GPS collars (Telonics model TGW-4577-4) in the boreal caribou range of the North Slave area. GPS collars allow for monitoring the movements, distribution and habitat selection of wolves, including their use or avoidance of the Tłı̨chǫ Highway and of other linear features. A male and female wolf were collared east of HWY 3 on February 24 and 25, 2022, respectively. On each of March 1 and 3, 2022, a male wolf was collared west of HWY 3. Wolf collars are programmed to release approximately 1.5 years after deployment.

5.7. MEASURE 6-2: DETERMINE SUSTAINABLE HARVEST LEVELS FOR BOREAL CARIBOU (TQDZI) AND IMPLEMENT MEASURES TO ENSURE HARVEST IS SUSTAINABLE IF REQUIRED

ECC hired a contractor to conduct population modeling to evaluate sustainable harvest levels using available demographic data from boreal caribou monitoring programs in the Dehcho, South Slave and North Slave regions. The report was completed as of March 31, 2020. On September 27, 2021, GNWT circulated the report to Indigenous Governments and Organizations (IGOs) and released the report on ECC's website. The findings of the report were presented on November 10, 2021 at the *Wildlife Act Section 15* meeting, as well as at specific meetings with the Tłı̨chǫ Government and North Slave Métis Alliance on October 28, 2021. ECC also held meetings to discuss the report with four other Indigenous Governments and Organizations from the South Slave and Dehcho regions in fall 2021. Copies of the full report, plain language summary and fact sheet can be found at:

https://www.enr.gov.nt.ca/sites/enr/files/resources/gnwt_boreal_caribou_population_model_report_final_bil_1.pdf

https://www.enr.gov.nt.ca/sites/enr/files/resources/plain_lanugage_summary_boreal_caribou_sustainable_harvest_report_sep2021_0.pdf

https://www.enr.gov.nt.ca/sites/enr/files/resources/boreal_caribou_sustainable_harvest_fact_sheet.pdf

There are no updates for the reporting period.

5.8. MEASURE 6-3: HABITAT OFFSET AND RESTORATION PLAN

Funding has been secured for an Implementation Plan development in 2024. Currently, an RFP is being prepared for the Implementation Plan development.

A Final Caribou Habitat Offset Plan ([The Final Plan](#)) was completed and submitted to the WRRB on July 16, 2021 prior to opening of the road to the public as directed by Measure 6-3. The WRRB approved the [Final Plan](#) on September 2, 2021, paving the way for opening the road to the public on November 30, 2021 after completion of construction.

5.9. MEASURE 7-1: INCORPORATE TRADITIONAL KNOWLEDGE INTO MONITORING OF BARREN-GROUND CARIBOU (ʔEKWØ)

The following update was provided by the Tłı̨chǫ Government:

Regarding the implementation of Measure 7-1 from the Tłı̨chǫ Highway (TH; formerly known as the Tłı̨chǫ All Season Road) EA, incorporating Traditional Knowledge into monitoring of ʔekwø (barren-ground caribou), the following key actions were undertaken by the Tłı̨chǫ Government (TG) in 2022 and are described in greater detail below:

- **Tłı̨chǫ Tlı̨li Deè Committee Meetings** – Meetings were held on April 14-15, and Nov 8-9, 2022, to provide guidance to the development of the Tłı̨chǫ Highway Wildlife Monitoring Program, including review of key plans, materials and methods.
- April 14-15 Committee meeting - all aspects of monitoring program, including data collection, monitoring, reporting, and decision-making were finalized based on the direction and guidance provided by the Tłı̨chǫ Tlı̨li Deè Committee in the April 2022 meeting.
- Nov 8-9 Committee meeting - reviewed summer programs and work for the next year.
- **Tłı̨chǫ Tlı̨li Deè Committee Site Tour** – Based on the direction from the Tłı̨chǫ Tlı̨li Deè Committee that they needed to be able to see and experience the road firsthand to guide the program, a Committee trip to the Tłı̨chǫ Highway was completed on June 23, 2022.
- **Program Knowledge Exchange** - The Tłı̨chǫ Monitors and DCLP staff continue to collaborate with members of the the Imryuk Community Monitoring Program for the Inuvik Tuktoyaktuk Highway. In August 2022, members of the Imryuk program attended the Tlicho Government 100-year treaty celebration and were able to participate in some of the vegetation survey work. They also participated in the November 2022 Tłı̨chǫ Tlı̨li Deè Committee Meeting to provide an update on their program to the Tłı̨chǫ Government. This continues to be a positive and collaborative relationship where Indigenous Nations work and learn alongside one another.
- **Vegetation Surveys** –Based on direction from the Tłı̨chǫ Tlı̨li Deè Committee that more baseline habitat information was needed prior to the official opening of the road, vegetation surveys were completed along the Tłı̨chǫ Highway in late August 2022. This was an addition to the 2021 vegetation surveys completed in 2021. These vegetation surveys focused primarily on species abundance and composition, as well as ground cover composition, general site health, and arboreal lichen loads. Data analysis for the surveys was completed in an October 2022 report.
- **Ongoing Monitoring** – Since the Tłı̨chǫ Highway opened, harvest monitors have been working on the TH every day, using their field books and taking part in monthly team check ins. Quarterly reports are provided based on monitor observations and reporting.
- Additional monitoring is taking place each year at the water crossings along the Tłı̨chǫ Highway, as led by a team in the TG Department of Culture and Lands Protection. This monitoring helps TG and its elders to better understand the quality and quantity of fish, and overall fish health, in the waterbodies along the highway.
- **Funding** – GNWT ECC was able to supply us with additional funding and TG also supplied funding for the TH Wildlife Monitoring Program.
- **Dust Monitoring** - Based on direction from the Tłı̨chǫ Tlı̨li Deè Committee meeting, the TG is undertaking a dust study along the Tłı̨chǫ Highway. In efforts to improve collaborations and cost efficiencies, the TG is partnering with NRCan, who is going to support TG with in-kind contributions by

way of dust cannisters, technical support, and data analysis. TG and NRCan will be entering into an MoU for this work, which will support the implementation and promotion of an Indigenous-led dust study along an all-season road. TG received passive dust fall sampling equipment in 2022 and the equipment will be installed before the summer of 2023.

- **Wildlife Camera Study** – In 2021, initial discussions were held with GNWT regarding partnering on a wildlife camera study, possibility to plot cameras where the Tłı̨chǫ Tłı̨ Deè Committee deems preferable based on knowledge of ɂekwǫ̀ habitat, crossing, and use. GNWT-INF has shared the current camera locations with TG. For the reporting period, TG did not propose alternative locations for the cameras.

5.10. MEASURE 7-2: BARREN-GROUND CARIBOU MITIGATION AND POLICY CHANGES

5.10.1. MEASURE 7-2, PART A: COMPLETE THE BATHURST CARIBOU RANGE PLAN

The Bathurst Caribou Range Plan (BCRP) was released on August 21, 2019. The BCRP was developed by a multi-stakeholder working group and will help decision-makers manage activities on the land in a way that supports the recovery of the Bathurst herd, while providing clarity on land use and access for developers, regulators and residents of the Northwest Territories (NWT). It includes guidance for managing the overall amount of disturbance on the land, as well as seven management tools to reduce and manage impacts to caribou and caribou habitat. Actions are currently underway to support implementation of the recommendations contained in the BCRP. The BCRP is available on ECC's website at

https://www.enr.gov.nt.ca/sites/enr/files/resources/bathurst_caribou_range_plan_2019_-_plan_pour_la_repartition_des_caribous_de_bathurst_2019.pdf

In 2022, GNWT-ECC approached industry to test two guidance documents for the implementation of Mobile Caribou Conservation Measures (MCCM). A Framework Document describes the intent of MCCM and how they would operate, and an Operational Guidance document provides direction for companies with exploration camps that might need to implement MCCM at their site. The MCCM will be tested by Mountain Diamond Province (Kennedy North Exploration Project), Rio Tinto (Diavik Diamond Mine), and Blue Star Gold Corp (Ulu Gold Project) in 2023. Also, GNWT-ECC conducted a desktop pilot project of MCCM in Fall 2020. The pilot project was conducted as a desktop exercise as exploration camps were not operational due to COVID-19. Results of the pilot project are reported in the MCCM Operational Guidance document and show how often caribou interacted with the sites, how long they resided nearby, what type of mitigation measures would have been triggered and for how long.

5.10.2. MEASURE 7-2, PART B: CONSIDER PROTECTING BARREN-GROUND CARIBOU HISTORIC WINTER HABITAT FROM FIRES:

The BCRP contains a recommendation to: "On an annual basis, identify large, strategically-located patches of forest in the central Bathurst winter range for the GNWT fire management "Values at Risk" database. Response to fires in these areas would be based on an +analysis of the current fire load, fire environment, resource availability and similar considerations of the management options at the time of the fire event."

ECC has been exploring ways to identify areas as values at risk for boreal and barren-ground caribou based on habitat selection models, areas identified as important habitat by communities, availability and location of fire management resources, and logistical constraints. ECC staff met in summer and fall 2019 to discuss different options and this work is ongoing. The Tłı̨chǫ Government held a workshop to identify areas of critical winter

habitat for boreal and barren-ground caribou and shared the spatial data from the workshop with ECC in late summer 2019.

Priority areas for fire management for boreal caribou were identified in the interim Wek'èezhì plan in 2021. Priority areas were identified based a late-winter habitat selection model and predictive map to target patches of highly selected habitat >60km² in size. These maps of key late-winter habitat patches were provided to GNWT-ECC Forest Management Division, along with the priority areas identified by Tłı̨chǫ Government in 2019 and the map of Basic, Enhanced and Intensive management areas defined in the interim range plan, for incorporation into their fire management decision mapping support tool called “SPARCS” (Spatial Precipitation and Risk Calculation System).

Data is not yet available for the 2022 reporting period

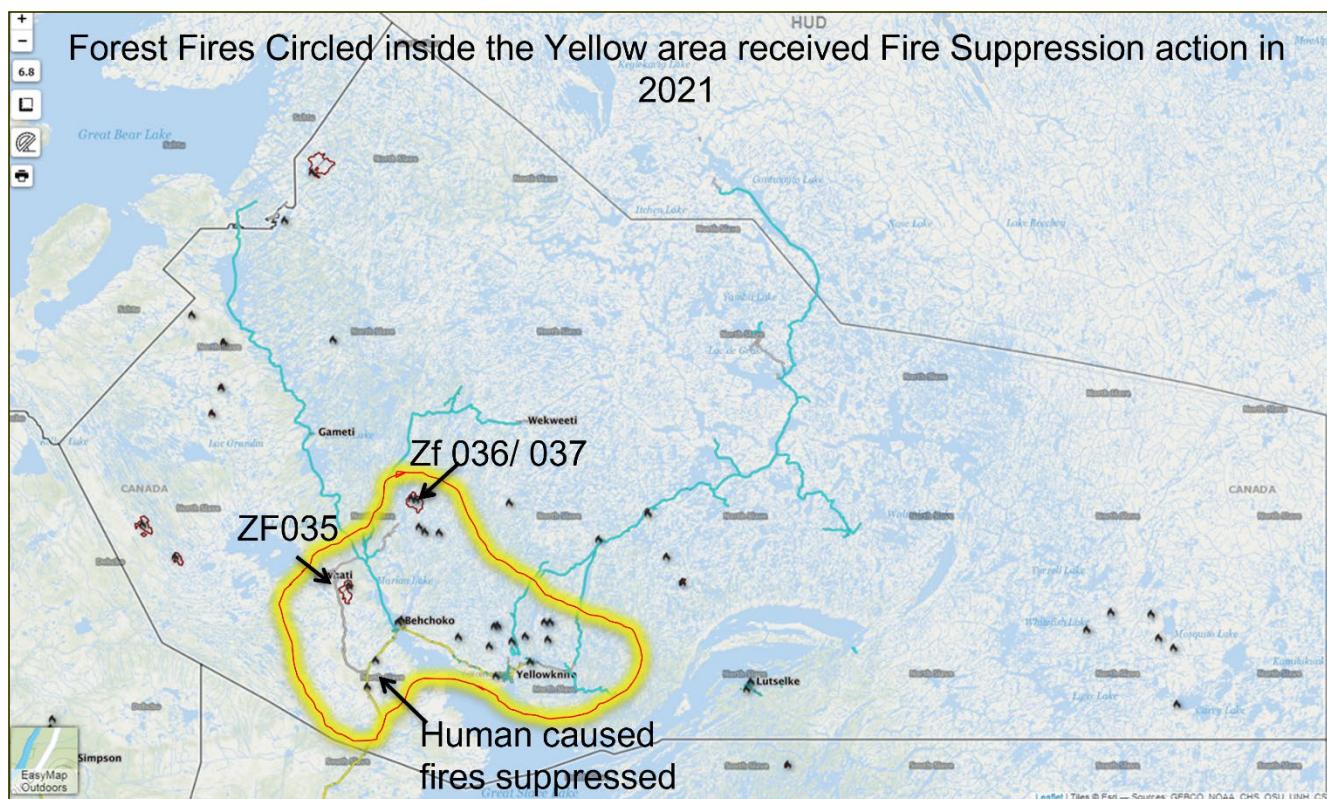


Figure 5-3 Forest fires within the North Slave region that received fire suppression during the 2021 fire season.

6. MANAGEMENT PLAN UPDATES AND REVISIONS

Schedule 1 - Part B, Condition 1(p): Updates were required to one (1) of the plans guiding the Tłı̨chǫ Highway Operation and Maintenance during the 2022. The list below details the primary and pertinent management plans for the Tłı̨chǫ Highway and revisions completed and approved in 2022.

- **Engagement Plan** - updates/revisions not required to Revision 1.2 in 2022.
- **Erosion and Sediment Control Plan** – updates/revisions not required to Revision 1.2 in 2022.
- **Waste Management Plan** – Version 1.3 remained unchanged for 2021 but the authorization from the City of Yellowknife to allow for the continuation of solid waste and wastewater to their facilities was extended to December 31, 2022.

- **Spill Contingency Plan** – updates/revisions not required to Revision 1.0 in 2022
- **Water Monitoring Plan** – updates/revisions not required to Revision 1.2 in 2022.
- **Quarry Operations Plan** – updates/revisions not required to Revision 5.0 in 2022.
- **Permafrost Management Plan** – updates/revisions not required to Revision 2.0 in 2022.
- **Fish and Fish Habitat Management Plan** – updates/revisions not required to Revision 1.1 in 2022
- **Wildlife Management and Monitoring Plan** – Version 6.0 was submitted to the WLWB and ECC on January 20, 2023, respectively to commence the public review process. Version 6.0 was posted to the WLWB's Online Review System (ORS) for public comments. Following the public comment period, Version 6.1 was submitted to the WRRB on April 13, 2023 for their review and approval. The WRRB posted Version 6.1 to their website for public comments. The public comment period ended on May 15, 2023. The WRRB meets on May 24-25, 2023 to consider Version 6.1. Version 6.2 will be submitted to the WLWB and ECC by June 30, 2023 for final approval.
-
- **Archaeological Chance Find Protocol** - updates/revisions not required to Revision 1.0 in 2022
- **Closure and Reclamation Plan** - updates/revisions not required in 2022

6.1. WMMP UPDATES

For the reporting period and in compliance with EA Measure 10-2, Part 3, the WMMP was revised and updated in collaboration with ECC and submitted to the WLWB and ECC for public review. A 30-day public review period was undertaken, with submissions made to the WLWB's Online Review System by Environment and Climate Change Canada, North Slave Metis Alliance, and WRRB. In consultation with ECC staff, INF developed responses to comments received, revised the WMMP to address the comments.

The WMMP Version 6.1 was submitted to the WRRB on April 13, 2023 for their review and approval. Following the public comment period, Version 6.1 was submitted to the WRRB on April 13, 2023 for their review and approval. The WRRB posted Version 6.1 to their website for public comments. The public comment period ended on May 15, 2023. The WRRB meets on May 24-25, 2023 to consider Version 6.1. Version 6.2 will be submitted to the WLWB and ECC by June 30, 2023 for final approval.

6.2. WASTE MANAGEMENT PLAN

The Waste Management Plan (Version 1.3) remained unchanged during the reporting period. Authorization from the City of Yellowknife to continue receiving waste at the Yellowknife Solid Waste Facility was extended until December 31, 2022 and further extended till December 31, 2023 at the time of this reporting.

6.3. QUARRY OPERATIONS PLAN

During the reporting period, the Quarry Operations Plan Version 5.0 not updated nor required as part of the Operations and Maintenance phase of the project. As mentioned in Section 3.1.1, during the reporting period, NSI/GNWT-INF sought and obtained a cancellation approval for the Type B Water License (W2021L8-0001) that WLWB required to support the development of Quarry Prospect 80.

6.4. PERMAFROST MANAGEMENT PLAN

No update to the Permafrost Management Plan was required during the reporting period.

7. SPILLS AND UNAUTHORIZED DISCHARGES

As required in Part 1 of the Water Licence (2020L8-0001), a Project specific Spill Contingency Plan (SCP) including prevention planning and response of hazardous material spill and unauthorized discharge of waste was developed for the Tłı̨chǫ Highway. The SCP was developed in accordance with the Guidelines for Spill Contingency Planning prepared by Indian and Northern Affairs Canada (INAC 2007) and the Spill Contingency Planning and Reporting Regulations issued under the Environmental Protection Act (EPA).

The purpose of the SCP is to provide a guide to all site personnel in the event of an accidental release of fuel or other materials during the operation and maintenance of the Tłı̨chǫ Highway. All Project personal and contractors are required to read and be familiar with the SCP, which is required to meet the minimum standards set out in the Project specific SCP.

All reporting, remediation and documentation of hazardous material releases and unauthorized discharges of waste is carried out as per the requirements outlined in the Project specific SCP.

7.1. SPILLS

Schedule 1 - Part B, Condition 1(q): A total of two (2) spills were documented since the start of the Operations and Maintenance phase of the Tłı̨chǫ Highway in 2022. The releases were a result of human-error or mechanical failure. All impacted soils resulting from these releases were fully remediated and the contaminated materials were disposed offsite at a licensed facility. The first spill (EIR-SP-001) was a result of a failed hydraulic line which released ~1L of hydraulic fluid to ground (snow) at the Maintenance Yard on February 21, 2022, at 3:00pm. The second spill (EIR-SP-002) was a result of damaged quick connection hydraulic hose on an excavator which allowed the release of ~ 3L of hydraulic fluid to ground at the Maintenance Yard entrance on May 4, 2022, at 4:30pm.

7.2. UNAUTHORIZED DISCHARGES

Schedule 1 - Part B, Condition 1(q): There was no unauthorized discharge of materials that were reportable to the 24-Hour NWT – Nunavut Emergency Spill Reporting Line during the reporting period (January 1st – December 31, 2022).

7.3. SPILL TRAINING AND COMMUNICATION

Schedule 1 - Part B, Condition 1(r): Spill training was limited to remote support provided by the Environmental Manager and Operation and Maintenance staff familiarity with the Spill Contingency Plan.

8. OTHER REPORTING REQUIREMENTS

Schedule 1 - Part B, Condition 1(s): No annual inspection was conducted during the 2022 Operation and Maintenance period.

Schedule 1 - Part B, Condition 1(t): No studies required by the Board related to this water license were required during the 2022 Tłı̨chǫ Highway Operation and Maintenance period.

Schedule 1 - Part B, Condition 1(u): No construction activities occurred during the 2022 Operation and Maintenance period that required a schedule update.

9. WATER MONITORING PLAN REPORTING

Schedule 1 - Part B, Condition 1(v)(i): All watercrossing activities that represented a risk of sedimentation to watercourses were completed during the construction season in 2020. No inwater or near water activities occurred during the reporting period and therefore no further water quality monitoring was required.

Schedule 1 - Part B, Condition 1(v)(ii): Discussed in Section 2.1 of this report, no calibration of meters and devices were required during the 2022 Operation and Maintenance period as there was no water quality data collected.

Schedule 1 - Part B, Condition 1(v)(iii): Please see Section 2.2 of this report for the annual quantity of water (m³) obtained from each of the approved sources.

Schedule 1 - Part B, Condition 1(v)(iv): No actions under the response framework of the Water Monitoring Plan were required during the 2022 Tłı̨chǫ Highway Operation and Maintenance period.

Schedule 1 - Part B, Condition 1(v)(v): No water sampling was required during the 2022 Tłı̨chǫ Highway Operation and Maintenance period as all the inwater or near water construction activities were completed by November of 2021.

Schedule 1 - Part B, Condition 1(v)(vi): There were no changes to any procedures related to water sampling as no sampling was required in 2022.

Schedule 1 - Part B, Condition 1(v)(vii): As discussed above, no water sampling was conducted and therefore QA/QC interpretation was not required in 2022.

10. SUMMARY OF WILDLIFE MONITORING

Schedule 1 - Part B, Condition 2(a): Please refer to section 5.9.

Schedule 1 – Part B, Condition 2(b): Survey and monitoring results did not trigger additional mitigation measures that required updating the applicable sections of the WMMP.

Schedule 1 - Part B, Condition 2(c): There was no active management or protection of migratory birds and bird species at risk required during the 2022 Tłı̨chǫ Highway Operation and Maintenance period.

Schedule 1 - Part B, Condition 2(d): With a financial support from GNWT-INF, TG has put in place a daily monitoring program with monitors patrolling the Tłı̨chǫ Highway, but there hasn't been any TK recommendations for harvesting, mitigation, monitoring, or adaptively management for the reporting period.

Schedule 1 - Part B, Condition 2(e): There were no construction activities during the 2022 Tłı̨chǫ Highway Operation and Maintenance period that occurred during any sensitive periods for wildlife.

Schedule 1 - Part B, Condition 2(f): No relevant monitoring plans were updated for the reporting period. The Engagement Plan is expected to be updated before the next report is due.

10.1. WILDLIFE ROAD SURVEYS

No wildlife road surveys were conducted by NSI during the 2022 Tłı̨chǫ Highway Operation and Maintenance period.

10.2. WILDLIFE SIGHTINGS

The maintenance of a wildlife sighting log is not a requirement of the Operation and Maintenance of the Tłı̨chǫ Highway. With a financial support from GNWT-INF, TG has put in place a daily monitoring program with monitors patrolling the Tłı̨chǫ Highway. All sightings are documented by the TG.

10.3. WILDLIFE SURVEILLANCE SURVEY

Wildlife surveillance monitoring is not a requirement of Operation and Maintenance of the Tłı̨chǫ Highway as there are no active camps.

10.4. WILDLIFE INCIDENTS / MORTALITIES

During the annual reporting period a total of two (2) wildlife incidents occurred on the Tłı̨chǫ Highway during the 2022 Operation and Maintenance period. Details of this incident can be found in the table below. This incident was reported to the appropriate regulatory agency following the established protocol.

Table 10-1: Wildlife Incidents

DATE	INCIDENT ID	DISCHARGE TYPE	DESCRIPTION	ACTION TAKEN
12-Jan-22	EIR-WL-001	Spruce Grouse Mortality	On January 12, 2022, a Spruce Grouse was collected from the Tłı̨chǫ Highway surface after having been struck by a road user.	The Site Superintendent removed the Spruce Grouse carcass from the active roadway and disposed of it outside of the RoW where scavengers could feed on the carcass in an area removed from any traffic. The GNWT-ECC was notified by email of the mortality on January 13, 2022. A Wildlife Incident Record was completed.
28-Sep-22	EIR-WL-002	Black Bear Mortality	On September 28, 2022 at ~ 7:30 am, a bear carcass was found at KM34 during a routine road inspection of the Tłı̨chǫ Highway. It was determined that the bear was struck by an unknown road user and left on the edge of the roadway.	The Site Superintendent contacted GNWT-ECC (Whati) to inform them of the mortality and to collect the carcass. A Wildlife Incident Record was completed.

10.5. MITIGATIONS TRIGGERED BY BOREAL CARIBOU COLLAR DATA MAPS

Procedures to mitigate impacts to boreal caribou from construction of the TASR is not a requirement of the Operation and Maintenance of the Tłı̨chǫ Highway.

11. TASR CROSSINGS BY COLLARED BOREAL CARIBOU

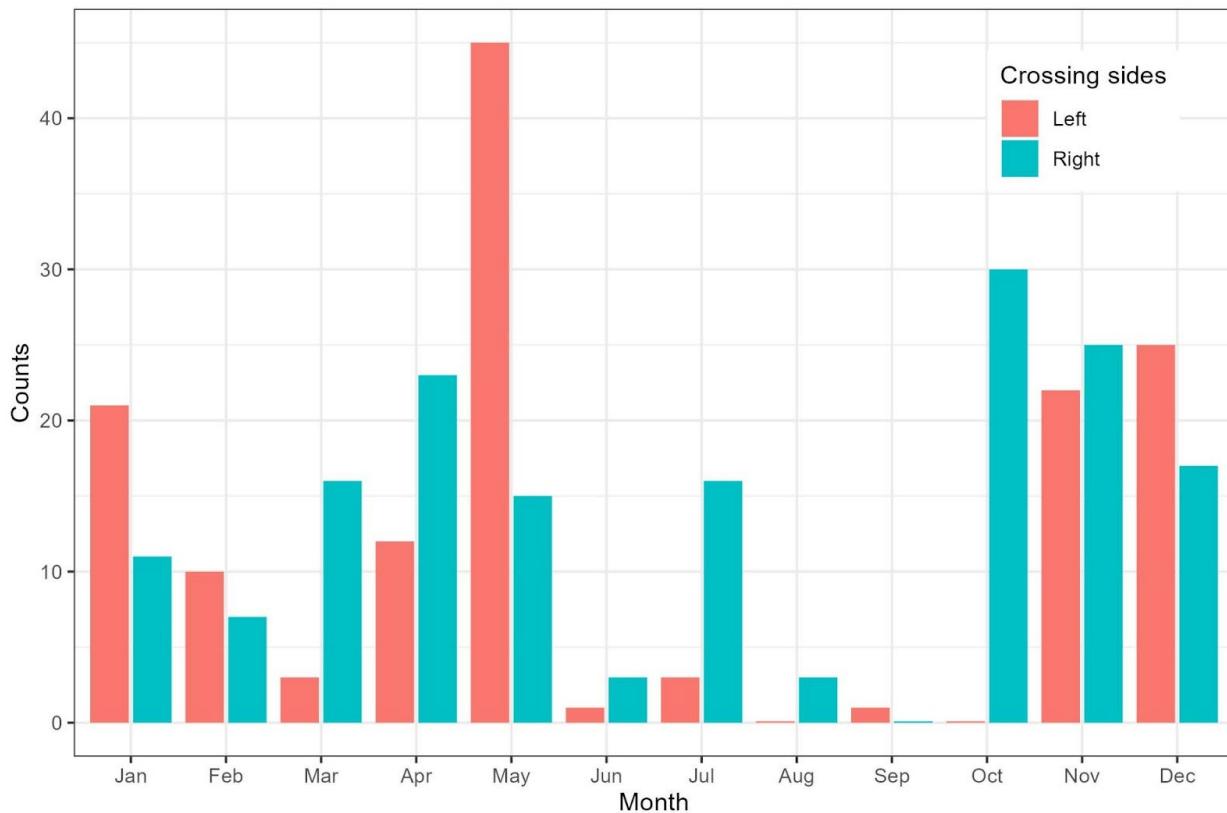


Figure 11-1. Total number of collared boreal caribou crossing the TASR alignment during each month, based on movement paths from GPS-collared boreal caribou between 30, 2017 and March 30, 2022. Crossings are segregated into direction of crossing the road.

12. MOOSE ABUNDANCE SURVEY

An ECC North Slave Region moose abundance survey was conducted in March 2021. The aerial survey used a distance sampling design and was flown using tighter transect spacing over the TASR alignment to obtain an estimate of moose density specific to that area (Figure 19-1). Results were not available to include in the 2021 annual report and are reported here. The density estimate for the TASR area was 3.7 moose / 100 km² (95% CV = 1.1 to 2.6 moose/ 100 km², CV = 22.2%). The abundance estimate was 195 moose (95% CI = 125 to 305, CV = 22.2%).

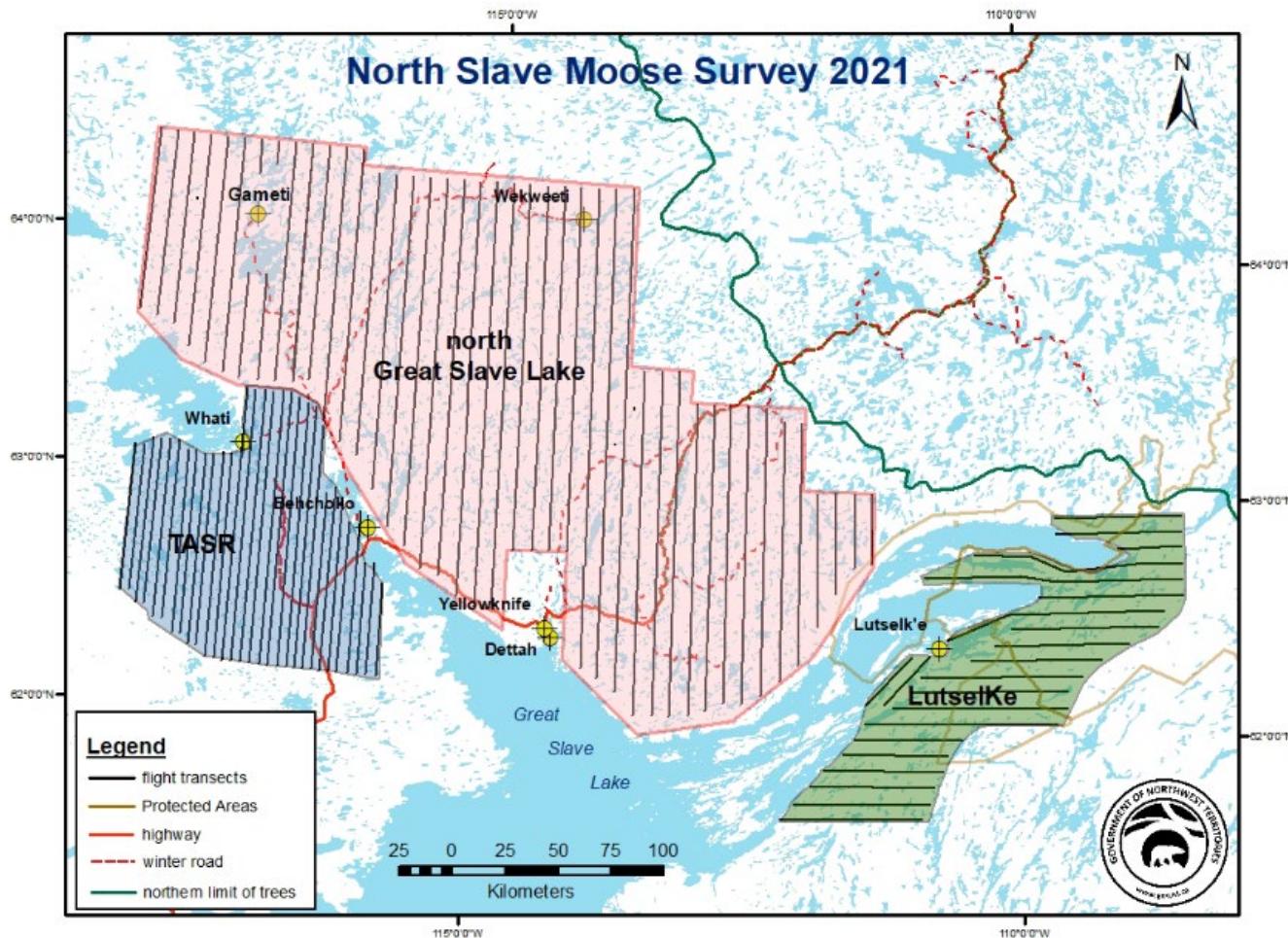


Figure 12-1 Moose abundance survey areas conducted in March 2021. Results are reported for the area encompassing the TASR alignment, shown in blue.

13. EA MONITORING RESULTS

Measure 10-1, Part 2: Use of results from pre-construction bird surveys required under Measure 10-1, Part 1 to inform mitigations

Results from the pre-construction bird surveys did not require additional mitigation measures, and therefore, no updates during the current reporting period were made.

13.1. MEASURE 10-2, PART 2: WILDLIFE MANAGEMENT AND MONITORING PLAN UPDATE DURING PERMITTING

During the permitting, the developer worked collaboratively with Environment and Climate Change Canada, GNWT-ECC, Wek'èezhì Renewable Resources Board, Tłı̨chǫ Government and Indigenous groups and harvesters to develop an updated WMMP.

Traditional knowledge (TK) was provided by The Tłı̨chǫ Government and the Yellowknives Dene First Nations. The TK was incorporated into the WMMP with respect to caribou and will also be incorporated into a Caribou Habitat Offset Plan.

GNWT-ECC approved version 3.3 of the WMMP on August 30, 2019, following review and approval of the WMMP by the Wek'èezhì Renewable Resources Board under Section 12.5.1 of the Tłı̨chǫ Agreement which included a period of public review.

The WMMP version 4.1 was submitted to the WRRB on November 6, 2020 for review and approval. Following the approval of version 4.1 by the WRRB, version 4.2 was submitted to the WLWB and ECC, respectively for their review and approval. The WLWB approved the version 4.2 on February 25, 2021 while ECC approved its version on March 1, 2021.

For the reporting period and in compliance with EA Measure 10-2, Part 3, the WMMP was revised and updated in collaboration with ECC and submitted to the Wek'èezhì Land and Water Board (WLWB). A 30-day public review period was undertaken, with submissions made to the WLWB's Online Review System by Environment and Climate Change Canada, North Slave Metis Alliance, and Wek'èezhì Renewable Resources Board (WRRB). In consultation with ECC staff, INF developed responses to comments received, revised the WMMP to address the comments.

The WMMP version 5.1 was submitted to the WRRB on November 6, 2021 for review and approval. Following the approval of version 5.1 by the WRRB on December 9, 2021, it was submitted to the WLWB and ECC, respectively for their review and approval. The WLWB approved the version 5.2 on February 09, 2022 while ECC approved its version on March 21, 2022.

The WMMP Version 6.1 was submitted to the WRRB on April 13, 2023 for their review and approval. The WRRB posted Version 6.1 to their website for public comments. The public comment period ended on May 15, 2023. The WRRB meets on May 24-25, 2023 to consider Version 6.1. Version 6.2 will be submitted to the WLWB and ECC by June 30, 2023 for final approval.

14. REFERENCES

Hatter, I.W., and W.A. Bergerud. 1991. Moose recruitment, adult mortality, and rate of change. *Alces* 27: 65-73.

Latham , A.D.M., Latham, M.C., McCutchen, N.A. and S. Boutin. 2011. Invading white-tailed deer change wolf-caribou dynamics in north-eastern Alberta. *Journal of Wildlife Management* 75(1):204-212.

Serrouya, R., van Oort, H., DeMars, C., and Boutin, S. 2016. Human footprint, habitat, wolves and boreal caribou population growth rates. https://www.nwt-esrf.org/sites/default/files/2016-10/Human%20Footprint%2C%20Habitat%2C%20Wolves%20and%20Boreal%20Caribou%20Population%20Growth%20Rates_2016.pdf. Accessed December 12, 2018.

APPENDIX A WATER TRACKING SPREADSHEETS



Tlicho Highway (Water Volume Tracking)



Record No. KWT-TASR-ENV-TBL-001

SOURCE: LaMartre River

WATER TRACKING:	Max # of loads per Day = 45	UTM Location	11V 0501229 6997761		Permit No.	
	Max (L) Taken per Day* = 380,000				W2020L8-0001	
Date	Location	Number of Truck Loads (8000 L/truck)		Volume Taken (L)		Comments
01-Jun-22		0		0		
02-Jun-22		0		0		
03-Jun-22		0		0		
04-Jun-22		0		0		
05-Jun-22		0		0		
06-Jun-22		0		0		
07-Jun-22		0		0		
08-Jun-22		0		0		
09-Jun-22		0		0		
10-Jun-22		0		0		
11-Jun-22		0		0		
12-Jun-22		0		0		
13-Jun-22		0		0		
14-Jun-22	LaMartre River	7		56000		
15-Jun-22	LaMartre River	8		64000		
16-Jun-22	LaMartre River	4		32000		
17-Jun-22	LaMartre River	6		48000		
18-Jun-22		0		0		
19-Jun-22		0		0		
20-Jun-22	LaMartre River	7		56000		
21-Jun-22		0		0		
22-Jun-22	LaMartre River	5		40000		
23-Jun-22		0		0		
24-Jun-22		0		0		
25-Jun-22		0		0		
26-Jun-22		0		0		
27-Jun-22		0		0		
28-Jun-22		0		0		
29-Jun-22		0		0		
30-Jun-22		0		0		
Total		37		296000		



Tlicho Highway

(Water Volume Tracking)



Record No. KWT-TASR-ENV-TBL-001

SOURCE: LaMartre River



Tlicho Highway (Water Volume Tracking)



Record No. KWT-TASR-ENV-TBL-001

SOURCE: LaMartre River

WATER TRACKING:	Max # of loads per Day = 45	UTM Location	11V 0501229 6997761		Permit No.
	Max (L) Taken per Day* = 380,000				
Date	Location	Number of Truck Loads (8000 L/truck)	Volume Taken (L)		Comments
01-Aug-22		0		0	
02-Aug-22		0		0	
03-Aug-22		0		0	
04-Aug-22		0		0	
05-Aug-22		0		0	
06-Aug-22		0		0	
07-Aug-22		0		0	
08-Aug-22		0		0	
09-Aug-22		0		0	
10-Aug-22		0		0	
11-Aug-22		0		0	
12-Aug-22		0		0	
13-Aug-22		0		0	
14-Aug-22		4		32000	
15-Aug-22		0		0	
16-Aug-22		3		24000	
17-Aug-22		0		0	
18-Aug-22		0		0	
19-Aug-22		0		0	
20-Aug-22		0		0	
21-Aug-22		0		0	
22-Aug-22		0		0	
23-Aug-22		0		0	
24-Aug-22		0		0	
25-Aug-22		0		0	
26-Aug-22		0		0	
27-Aug-22		0		0	
28-Aug-22		0		0	
29-Aug-22		0		0	
30-Aug-22		0		0	
31-Aug-22		0		0	
Total		7		56000	



Tlicho Highway

(Water Volume Tracking)



Record No. KWT-TASR-ENV-TBL-001

SOURCE: LaMartre River

WATER TRACKING:	Max # of loads per Day = 12	UTM Location	11V 0501229 6997761		Permit No. W2020L8-0001
	Max (L) Taken per Day* = 380,000				
Date	Location	Number of Truck Loads (28000 L/tanker)	Volume Taken (L)	Comments	
01-Jul-22		0	0		
02-Jul-22		0	0		
03-Jul-22		0	0		
04-Jul-22		0	0		
05-Jul-22		0	0		
06-Jul-22	LaMartre River	1	28000		
07-Jul-22	LaMartre River	2	56000		
08-Jul-22	LaMartre River	1	28000		
09-Jul-22		0	0		
10-Jul-22		0	0		
11-Jul-22		0	0		
12-Jul-22		0	0		
13-Jul-22	LaMartre River	2	56000		
14-Jul-22	LaMartre River	2	56000		
15-Jul-22		0	0		
16-Jul-22		0	0		
17-Jul-22		0	0		
18-Jul-22	LaMartre River	2	56000		
19-Jul-22	LaMartre River	3	84000		
20-Jul-22	LaMartre River	3	84000		
21-Jul-22	LaMartre River	3	84000		
22-Jul-22	LaMartre River	3	84000		
23-Jul-22		0	0		
24-Jul-22		0	0		
25-Jul-22		0	0		
26-Jul-22		0	0		
27-Jul-22		0	0		
28-Jul-22		0	0		
29-Jul-22		0	0		
30-Jul-22		0	0		
31-Jul-22		0	0		
					616000



Tlicho Highway

(Water Volume Tracking)



Record No. KWT-TASR-ENV-TBL-001

SOURCE: Duport River



Tlicho Highway (Water Volume Tracking)



Record No. KWT-TASR-ENV-TBL-001

SOURCE: James River

WATER TRACKING:	Max # of loads per Day = 30	UTM Location	11V 0504468 6982694		Permit No.
	Max (L) Taken per Day* = 240,000				
Date	Location	Number of Truck Loads (8000 L/truck)	Volume Taken (L)		Comments
Total		0	0		
01-Jul-22		0	0		
02-Jul-22		0	0		
03-Jul-22		0	0		
04-Jul-22		0	0		
05-Jul-22		0	0		
06-Jul-22		0	0		
07-Jul-22	James River	1	8000		
08-Jul-22		0	0		
09-Jul-22		0	0		
10-Jul-22		0	0		
11-Jul-22	James River	1	8000		
12-Jul-22		0	0		
13-Jul-22		0	0		
14-Jul-22		0	0		
15-Jul-22		0	0		
16-Jul-22		0	0		
17-Jul-22		0	0		
18-Jul-22		0	0		
19-Jul-22	James River	6	48000		
20-Jul-22	James River	8	64000		
21-Jul-22	James River	9	72000		
22-Jul-22	James River	8	64000		
23-Jul-22	James River	22	176000		
24-Jul-22	James River	23	184000		
25-Jul-22	James River	20	160000		
26-Jul-22	James River	4	28000		
27-Jul-22		0	0		
28-Jul-22	James River	6	48000		
29-Jul-22		0	0		
30-Jul-22		0	0		
31-Jul-22		0	0		



Tlicho Highway (Water Volume Tracking)



Record No. KWT-TASR-ENV-TBL-001

SOURCE: James River

WATER TRACKING:	Max # of loads per Day = 30	UTM Location	11V 0504468 6982694		Permit No.	
	Max (L) Taken per Day* = 240,000					
					W2020L8-0001	
Date	Location	Number of Truck Loads (8000 L/truck)		Volume Taken (L)		
		108		860000		
01-Aug-22		0		0		
02-Aug-22		0		0		
03-Aug-22		0		0		
04-Aug-22		0		0		
05-Aug-22		0		0		
06-Aug-22		0		0		
07-Aug-22		0		0		
08-Aug-22		0		0		
09-Aug-22		0		0		
10-Aug-22		0		0		
11-Aug-22		0		0		
12-Aug-22		0		0		
13-Aug-22		0		0		
14-Aug-22		0		0		
15-Aug-22		0		0		
16-Aug-22		0		0		
17-Aug-22	James River	1		8000		
18-Aug-22		0		0		
19-Aug-22		0		0		
20-Aug-22		0		0		
21-Aug-22		0		0		
22-Aug-22		0		0		
23-Aug-22		0		0		
24-Aug-22		0		0		
25-Aug-22	James River	3		24000		
26-Aug-22		0		0		
27-Aug-22		0		0		
28-Aug-22		0		0		
29-Aug-22		0		0		
30-Aug-22		0		0		
31-Aug-22		0		0		



Tlicho Highway (Water Volume Tracking)



Record No. KWT-TASR-ENV-TBL-001

SOURCE: James River

WATER TRACKING:	Max # of loads per Day = 30	UTM Location	11V 0504468 6982694		Permit No.
	Max (L) Taken per Day* = 240,000				
Date	Location	Number of Truck Loads (8000 L/truck)	Volume Taken (L)		Comments
Total		4	32000		
01-Sep-22		0	0		
02-Sep-22		0	0		
03-Sep-22		0	0		
04-Sep-22		0	0		
05-Sep-22		0	0		
06-Sep-22		0	0		
07-Sep-22		0	0		
08-Sep-22		0	0		
09-Sep-22		0	0		
10-Sep-22		0	0		
11-Sep-22		0	0		
12-Sep-22		0	0		
13-Sep-22		0	0		
14-Sep-22		0	0		
15-Sep-22		0	0		
16-Sep-22		0	0		
17-Sep-22		0	0		
18-Sep-22		0	0		
19-Sep-22		0	0		
20-Sep-22		0	0		
21-Sep-22		0	0		
22-Sep-22	James River	2	16000		
23-Sep-22		0	0		
24-Sep-22		0	0		
25-Sep-22		0	0		
26-Sep-22		0	0		
27-Sep-22	James River	2	16000		
28-Sep-22	James River	3	24000		
29-Sep-22	James River	3	24000		
30-Sep-22		0	0		

