ANNUAL REPORT

2021

Northwest Territories Power Corporation
Bluefish Power Generation Facilities

Water Licence No.: MV2020L4-0005

SUBMITTED TO:
MACKENZIE VALLEY LAND AND WATER BOARD

APRIL 2022

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LIST OF ABBREVIATIONS

CIRNAC	Crown-Indigenous Relations and Northern Affairs Canada
CRP	Closure and Reclamation Plan
DFO	Federal Government Department of Fisheries and Oceans Canada
DSR	Dam Safety Review
ENR	GNWT Department of Environment & Natural Resources
EPP	Emergency Preparedness Plan
GNWT	Government of Northwest Territories
IFR	In-stream Flow Release
km	Kilometers
kW	Kilowatt
m	metres
MVLWB	Mackenzie Valley Land and Water Board
MW	Megawatts
NSMA	North Slave Métis Alliance
NTPC	Northwest Territories Power Corporation
OMS	Operations, Maintenance, and Surveillance
SCP	Spill Contingency Plan
SNP	Surveillance Network Program
SOP	Standard Operating Procedures
WMP	Waste Management Plan
WMROP	Water Management and Reservoir Operating Plan
WSC	Water Survey of Canada

TABLE OF CONCORDANCE

The following Table of Concordance has been provided for NTPC to track Conditions for the current Water License No.: MV2020L4-0005, and how they were addressed in 2021, and a reference report where these are discussed.

Source and Topic	Comment	Report Addressing Condition
2020 Annual Report	2020 Annual Report not submitted by deadline (March 31, 2021)	The 2020 Annual Report not submitted by deadline of March 31, 2021. On March 26, 2021 NTPC requested an extension of the deadline to May 31, 2021 which was approved by the MVLWB. NTPC submitted the 2020 Annual Water Licence Report to ENR & MVLWB on May 31, 2021

The following Table of Concordance has been provided for NTPC to track Conditions for Water License No.: MV2005L4-0008 which was the previous Water Licence for Bluefish, how they were addressed in 2021.

Source and Topic	Comment	Report Addressing Condition
Missing Reports*	Outstanding Annual Water Licence Report 2019	Annual Water Licence Report 2019 was submitted on January 8, 2021
Missing Reports*	Outstanding Water Management and Reservoir Operating Plans: June 2016 December 2016 June 2017 June 2018 December 2018 June 2019	NTPC submitted outstanding Water Management and Reservoir Operating Plans attached for the Bluefish Hydroelectric Facility under MVLWB Water Licence MV2005L4-0008 on January 29, 2021.
Missing Reports*	Outstanding Surveillance Network Quarterly Reports for: Q2 Report- June 2018 Q4 Report- December 2018 Q2 Report- June 2019 Q3 Report- September 2019 Q4 Report- December 2019 Q1 Report- March 2020 Q2 Report- June 2020 Q3 Report- September 2020 Q4 Report- December 2020	NTPC submitted all outstanding Surveillance Network Quarterly Reports attached for the Bluefish Hydroelectric Facility under MVLWB Water Licence MV2005L4-0008 s on January 29, 2021.
Missing Reports*	Outstanding Water Management and Reservoir Operating Plans: December 2019	NTPC submitted the remaining outstanding Water Management and Reservoir Operating Plans attached for

Source and Topic	Comment	Report Addressing Condition
	June 2020 December 2020	the Bluefish Hydroelectric Facility under MVLWB Water Licence MV2005L4-0008 on February 26, 2021.

1 INTRODUCTION

This 2021 Annual Report has been prepared for submission by NTPC to MVLWB, as part of the requirements of the MVLWB Type A Water Licence No.: MV2020L4-0005 (Water Licence) reporting of operations between January 1 and December 31, 2021. The Water Licence came into effect April 3, 2021 and expires April 2, 2046.

The Water Licence regulates the storage and diversion of water for hydroelectric power generation and associated uses for the Bluefish Power Generation Facility (Bluefish Facility). The Water Licence entitles NTPC to use, divert, and store water from the McCrea River and the Yellowknife River to the Duncan and Bluefish lakes for the Class I hydroelectric power generation.

The Bluefish Facility is located on Prosperous Lake, approximately 40 km north of Yellowknife, in the Northwest Territories (Figure 1-1).

The facility includes the following features:

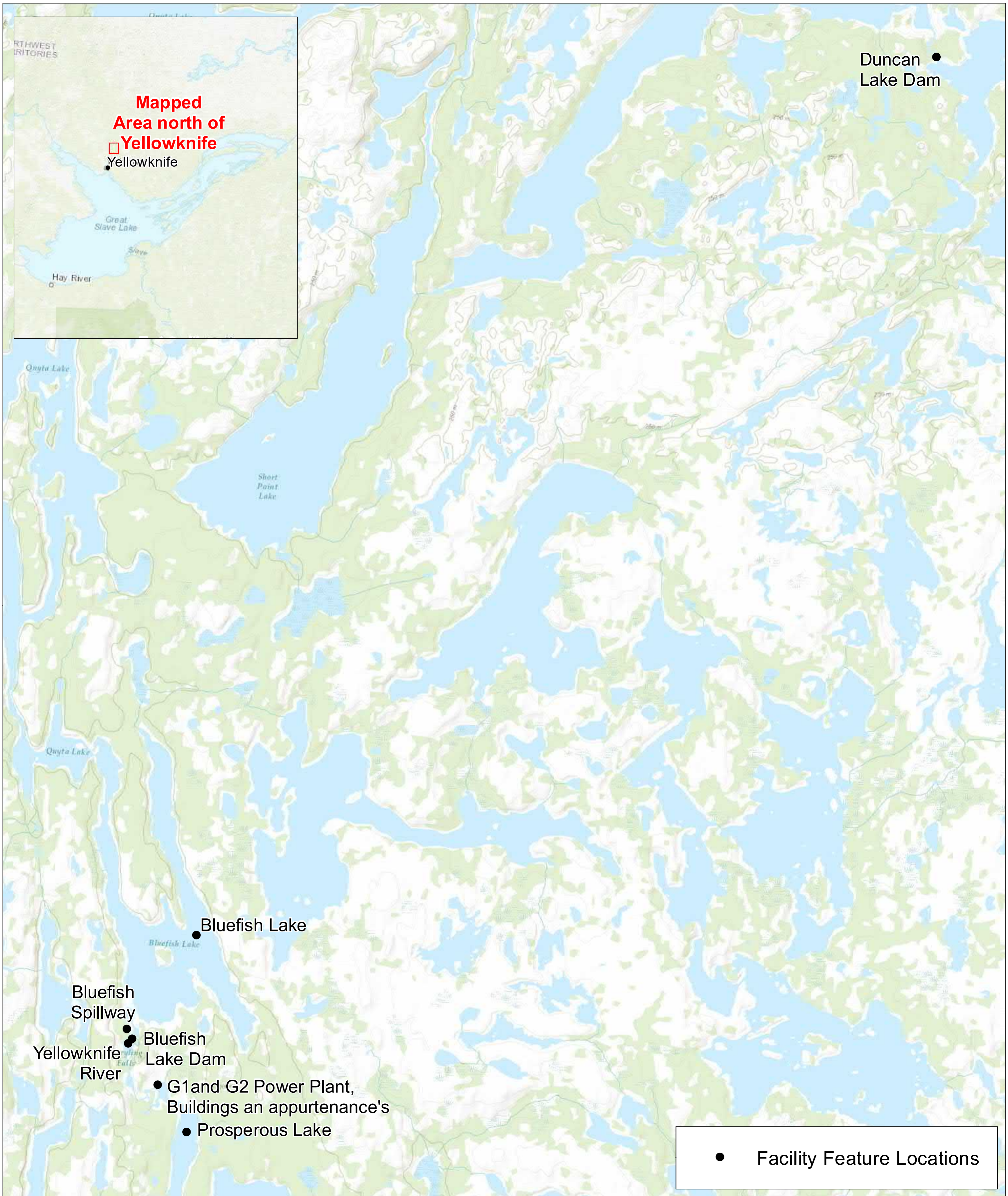
- Duncan Lake Dam
- Bluefish Lake Dam
- Debris curtain
- Duncan Lake Reservoir
- Bluefish Lake Reservoir
- G1 Powerhouse
- G2 Powerhouse
- Miscellaneous buildings and other appurtenances.

2 BACKGROUND

The Bluefish Facility was commissioned in 1938 to supply power to Giant Mine near Yellowknife. The Duncan Dam was constructed in 1942 at the outlet of Duncan Lake, approximately 20 km to the north and northeast of the facility, to increase storage.

The Bluefish Lake Dam was constructed in 2012 to replace the Timber Rockfill Dam at Bluefish Lake. Immediately south of the Bluefish Lake Dam is a debris curtain. The Bluefish Facility consists of two powerhouses (G1 and G2) for hydroelectric generation. The G1 Powerhouse was constructed in the 1940s and G2 was constructed in the 1990s. The G2 Powerhouse contains a standby diesel generator.

The Bluefish Facility currently provides electricity to the City of Yellowknife, the settlements of Ndilǫ, Dettah, Behchokǫ̀, and to a mining reclamation site.



NORTHWEST TERRITORIES
POWER
CORPORATION
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DATE: May 2021
DRAWN BY: DA

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BLUEFISH POWER GENERATION FACILITY

3 SUMMARY OF PROJECT ACTIVITIES

Project activities in 2021 includes the following:

- Breaker replacement on the G1 unit.
- Bluefish Road Work - The Bluefish Hydro barge road/winter road was washed out in spring 2021. Culverts were reinstalled and aggregate was added.
- Bluefish Camp Building Restoration – The Bluefish Camp roof was repaired to allow NTPC to evaluate in 2022 what additional work is required to return the camp to a usable condition.
- Bluefish Habitat Installation- Fisheries habitat features were installed below the G1 plant as required by *Fisheries Act Authorization* 18-HCAA-01487. Scope of work included transportation and storage of materials and equipment on site, installation of erosion and sediment control measures, completion of in-water installation work and demobilization from site. The following additional submissions were required for this work:
    a. A standalone Type B Water Licence MV2021L8-0007, which included a separate Annual Water Licence Report, submitted to the MVLWB

4 RESERVOIR WATER LEVELS AND FLOWS

The water level of the Bluefish Lake Reservoir is not to fall below 182.88 metres (NTPC Datum at Bluefish Lake). The WSC Station 07SB003 records the daily water levels (m) (assumed datum) and flow rates (m^3/s) in the Yellowknife River from below both powerhouses and above the inlet to Prosperous Lake. This station is the SNP Station 735-5. A minimum flow of 6 m^3/s was maintained throughout 2021 at this location (Water Licence MV2020L4-0005 Part F, Item 4).

A Water Management and Reservoir Operation Plan (WMROP) is submitted to the MVLWB every six months (before June 30 and December 31) (Water Licence MV2020L4-0005 Part F, Item 5) to show the forecasted monthly average river inflow and outflow rates (m^3/s) and subsequent reservoir levels above mean sea level. The following sections address Water Licence conditions (Schedule 1, b, c, and e, and Annex A, Part B) reflecting water levels (m) at the Bluefish Lake and Duncan Lake dam reservoirs, and mean water flows passing through the Bluefish Powerhouses, in the Yellowknife River, and at the inlet of Prosperous Lake.

4.1 WATER LEVELS

The Bluefish Lake Reservoir water levels are recorded by the WSC Station 07SB015 and correspond to SNP Station 735-4 and are reported in metres (NTPC Datum). NTPC Datum at Bluefish Lake Dam assumes the WSC benchmark elevation of 194.388 metres, which is the top of the drill steel cemented in bedrock, located at the top of the hill on the south of the dam.

In 2021, the mean daily water level in Bluefish Lake Reservoir was greater than the minimum permitted water level of 182.88 m (NTPC Datum) (Part F, Item 3) (Figure 4-1). Overall water levels in 2021 were lower than those seen in 2020. May to September has the annual water levels refresh with a drawdown between September to December.

The Duncan Lake Reservoir water levels are recorded by the WSC Station 07SB012, correspond to SNP Station 735-3, and are reported in metres (NTPC Datum). NTPC Datum at Duncan Lake assumes the WSC benchmark elevation of 214.605 metres, which is the brass cap in bedrock 23.3 metres northwest of shelter, 21.2 metres north of BM 88-2, and 19.5 metres northwest of BM 88-1.

There is no required minimum water level to maintain for Duncan Lake Reservoir (Figure 4-2).

The mean daily and mean monthly water level data for the Bluefish Lake Reservoir and the Duncan Lake Reservoir are provided in Appendix A (Tables A-1 and A-2, respectively).

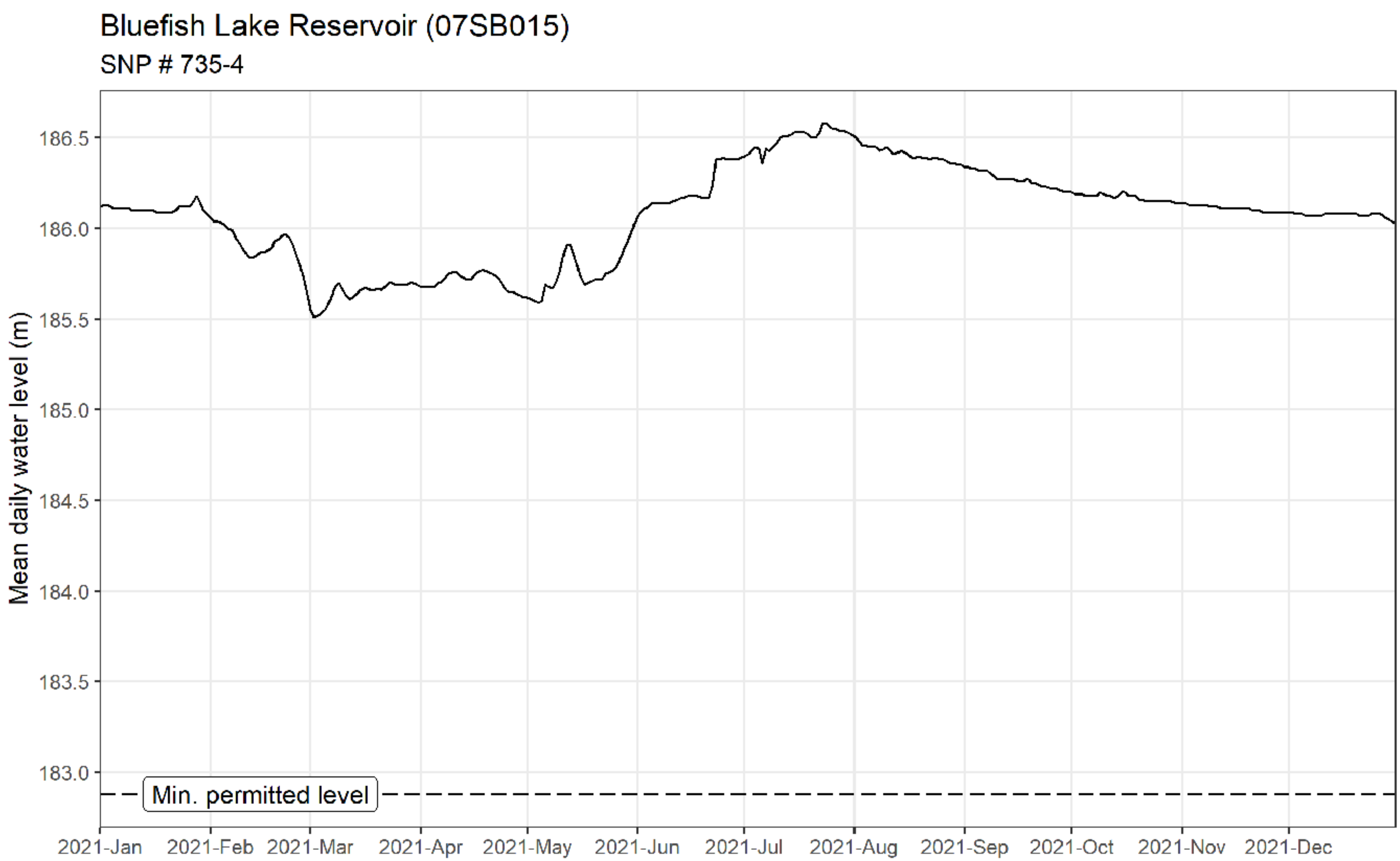

Figure 4-1 Mean Water Levels at Bluefish Lake Reservoir, SNP Station 735-4

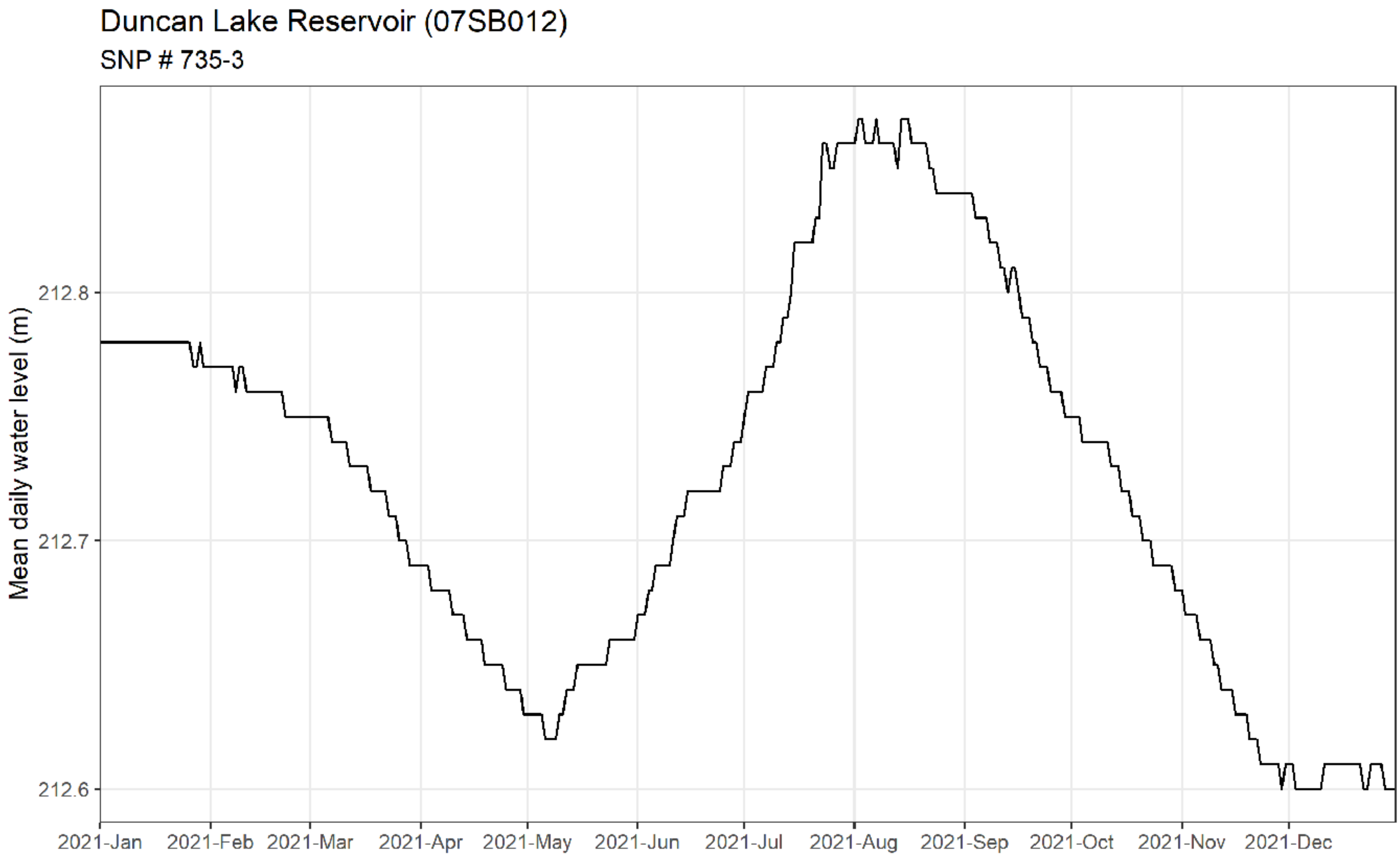

Figure 4-2 Mean Water Levels at Duncan Lake Reservoir, SNP Station 735-3

4.2 WATER FLOWS

The daily flow rates (m^3/s) through Powerhouse 1 and 2 (SNP Stations 735-1 and 735-2, respectively) at the Bluefish Facility were calculated and mean daily flow rates are presented on Figure 4-3. The tabulated mean daily flow and mean monthly flow data are provided in Appendix B, Tables B-1 and B-2, respectively. Both Bluefish Powerhouse units were shutdown for maintenance between June 22 and July 5. Powerhouse 1 was offline from June 22 at 1 PM to July 5 at 1 PM and Powerhouse 2 was offline from June 22 at 11 AM to July 5 at 4 PM for annual maintenance. Powerhouse 2 was offline from July 23 at 11 AM until August 2 at 1 PM for a fish habitat installation project.

The mean daily flows at SNP Station 735-5 on the Yellowknife River at the inlet to Prosperous Lake are provided on Figure 4-4, and the tabulated mean daily and mean monthly flow data are provided in Appendix B.

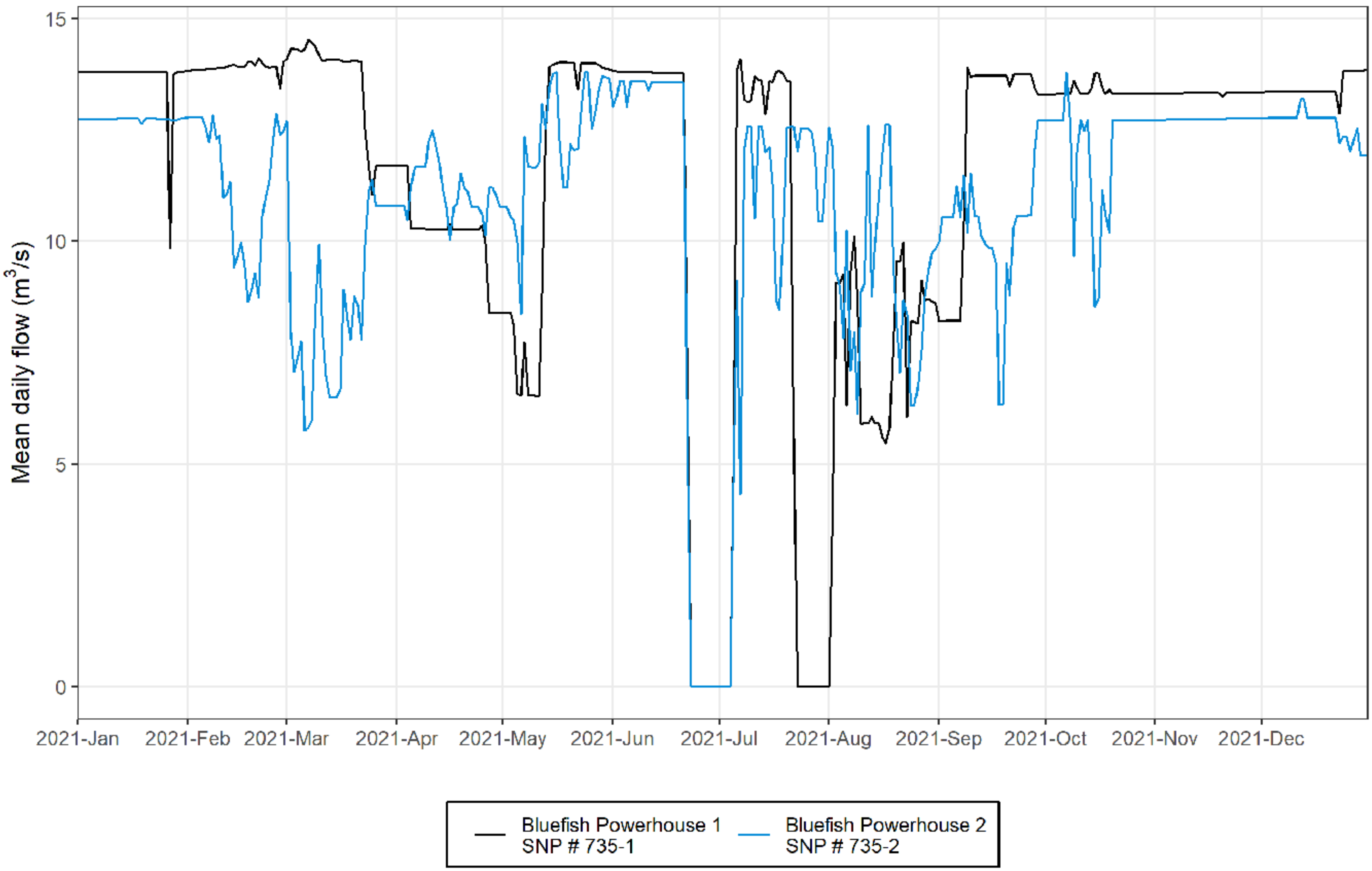

Figure 4-3 Mean Daily Flow Rates through Powerhouses 1 and 2, SNP Stations 735-1 and 735-2

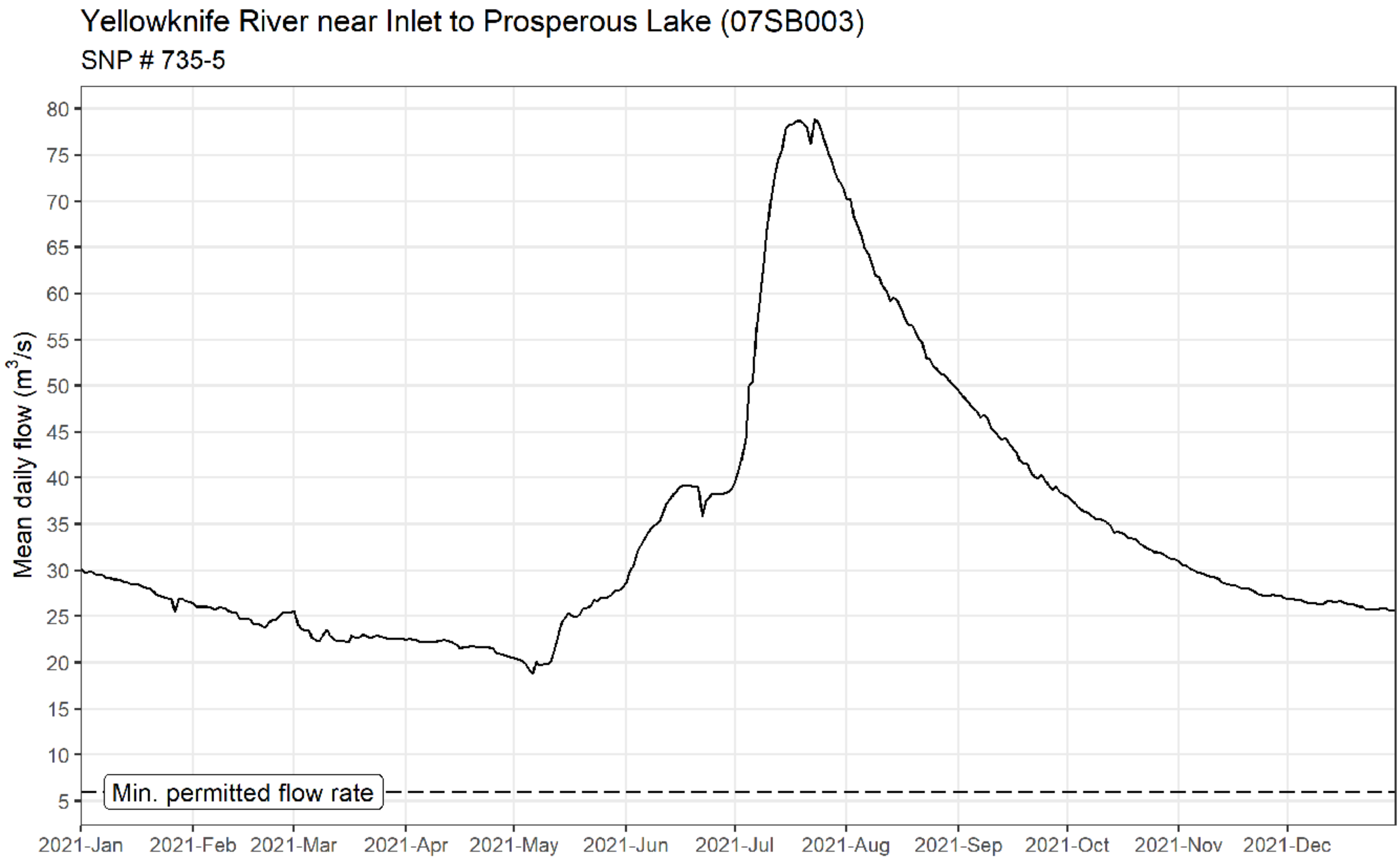

Figure 4-4 Mean Daily Flow in the Yellowknife River, SNP Station 735-5

5 EQUIPMENT CALIBRATION

NTPC contracts out the annual calibration and maintenance of the water gauges to Environment and Climate Change Canada. This work was completed in 2021.

6 ENGAGEMENT AND TRADITIONAL KNOWLEDGE

The updated Bluefish Hydro Facility – Engagement Plan was submitted to the MVLWB in July 2021 and accepted on September 13, 2021. The following sections discuss specific engagement activities conducted and traditional knowledge pertaining to the Bluefish Facility.

6.1 ENGAGEMENT ACTIVITIES FOR GENERAL OPERATIONS

High level engagement activities conducted by the NTPC in 2021 for general operations include the following:

- On March 8, 2021, NTPC emailed stakeholders with a notification letter regarding the removal of a stop log at Duncan Lake Dam, advising that ice conditions may change as a result.
- On June 4, 2021, NTPC emailed Yellow Dog Lodge, Inc. to provide advanced notice that NTPC Dam Safety Cres would be on site at the Duncan Dam for the 2021 Dam Safety Review in June and the annual inspection in July.
- On December 22, 2021, NTPC responded to an email correspondence between Yellow Dog Lodge, Inc. and the GNWT Lands department to provide information on historic water level data in Duncan Lake and the 2021 Comprehensive Dam Safety Review for the Bluefish Facility.

Detailed engagement for general operations is presented in Table 6.1

Table 6-1 General Operational Engagement

Date	Participant	Organization	Communication	Outstanding Items
March 8, 2021	All stakeholders outlined in Table 4-2 of the approved engagement plan	All stakeholders outlined in Table 4-2 of the approved engagement plan	Notification stating “NTPC is scheduled to pull 1 stop log at Duncan Lake Dam on Wednesday March 10, 2021. Please be advised ice conditions may change in the Neck Lake area and areas immediately downstream of Duncan Lake. Please use caution if travelling in these areas.	None
March 8, 2021	Shane Langlois slanglois@rtl.ca	Public	Thank you for the heads up	None
March 8, 2021	Clint Ambrose Clint_Ambrose@gov.nt.ca	GNWT Lands	Thanks for notification	None
March 8, 2021	Trevor Teed lands@denenation.com	Dene Nation/AFN Regional Office	Email inquiring “What will happen to ice conditions on Duncan Lake? In the past hanging ice conditions have been observed.”	Responded with info on ice conditions
March 8, 2021	Brett Wheler brett.wheler@tlicho.ca	Tłı̨chǫ Government	Email inquiring “Masi for your notification, Matt. Do you also have general public notices or signs that you put out for this type of thing to advise people travelling in the area?”	Responded with notification details
March 8, 2021	Gordon Gin gord@yellowdoglodge.ca	Yellow Dog Lodge	Email thanking for the notification and updating on ice conditions. Gord also forwarded the email to a few cabin owners which were already on the NTPC distribution list.	None

Date	Participant	Organization	Communication	Outstanding Items
March 8, 2021	Sheeva Nakhaie	Fisheries and Oceans Canada	Does this relate to an existing DFO file? If so, please provide the DFO file number.	Responded with DFO files numbers
March 9, 2021	Trevor Teed lands@denenation.com	Dene Nation/AFN Regional Office	Email to Trevor stating “There could be some changing ice conditions on Duncan as well. In the future I will mention this in the notification email. This is a new notification for NTPC as a result of the engagement process to renew the water licence.”	None
March 9, 2021	Gordon Gin gord@yellowdoglodge.ca	Yellow Dog Lodge	Email to Gord verifying that local cabin owners cc’d on last email were on initial notification.	None
March 9, 2021	Brett Wheler brett.wheler@tlicho.ca	Tłı̨chǫ Government	Email to Brett stating “This is a new notification that was requested by local stakeholders as part of the engagement process for the renewal of the water licence for the Bluefish Facility. All of the cabin users in the area are on the distribution list. There is no public notices or signage for this specific topic but lots of signage posted further downstream at the Bluefish facility. Let me know if there is any other info I can provide at this time”	None
March 8, 2021	Sheeva Nakhaie	Fisheries and Oceans Canada	Email to Sheeva stating “. NTPC holds a Type A Water Licence for the Bluefish Facility. NTPC has also held a past FAA for the facility and is currently completing two separate scopes of work with Jeff Moyer (18-HCAA-01487) and Caleb Green (file 2019-07234). Please let me know if there is any other information I can provide”	None

Date	Participant	Organization	Communication	Outstanding Items
June 4, 2021	Gordon Gin gord@yellowdoglodge.ca	Yellow Dog Lodge	Email to Gord verifying that NTPC Dam Safety crews are scheduled to be on site at the Duncan Dam to an inspection as part of the 2021 Bluefish Comprehensive Dam Safety Review between June 19-21, 2021 and again to complete the annual inspection/survey on July 6, 2021 weather pending.	None
December 22, 2021	Gordon Gin gord@yellowdoglodge.ca	Yellow Dog Lodge	Email regarding some high water elevations and top of dam datums in relation to 85 I/13-1-17-Verification of Lease.	Responded with reference material
December 22, 2021	Gordon Gin gord@yellowdoglodge.ca	Yellow Dog Lodge	Email to Gord providing links to Water Survey of Canada Gauge 07SB012 and the Comprehensive Dam Safety Review completed for Bluefish in 2021 for reference material.	Responded with reference material

6.2 ENGAGEMENT ACTIVITIES FOR MERCURY MONITORING STUDY

A detailed engagement process was completed by NTPC in 2021 to gather input on the development of the Mercury Monitoring Study Design Plan.

Some of the key milestones in the engagement process for the Mercury Monitoring Study Design Plan were:

- Notification email to all stakeholders was sent August 26, 2021 regarding the development of the submission of MMS Design Plan as required by Type A Water Licence MV2020L4-005 for the Bluefish Facility. Letter included general information about the MMS Design Plan and plans for a virtual workshop to be held on September 8, 2021.
- Follow up notification email to stakeholders was sent September 2, 2021 in the region with further details on the MMS Design Plan Virtual Workshop including time for the meeting on September 8, 2021, information on previous mercury monitoring completed at Bluefish and a link to the MVLWB registry to find more info on past mercury monitoring.
- MMS Design Plan Virtual Workshop was hosted on September 8, 2021 using Microsoft Teams software to gather input on the MSS Design Plan and included a presentation and online forum for discussion and questions. Workshop was attended by 6 stakeholder organizations.
- Virtual stakeholder engagement meetings were held with stakeholders that could not attend the workshop to gather input on the submission.
    - Virtual stakeholder engagement meeting with Tlicho Government was held on October 4, 2021
- Input was gathered from some stakeholders through detailed email correspondence as well.
    - Detailed email correspondence occurred with NSMA in late September and early October 2021.

A detailed summary of all engagement activities conducted by NTPC in 2021 for the Mercury Monitoring Study Design Plan is included in Mercury Monitoring Study Design Plan - Engagement Log in Appendix C.

6.3 ENGAGEMENT ACTIVITIES FOR TYPE B WL MV2021L8-0007

A detailed summary of all engagement activities conducted by NTPC in 2021 for the Bluefish Habitat Installation project under Type B Water Licence MV2021L8-0007 is included in Bluefish Habitat Installation-Type B WL MV2021L8 - 2021 Annual Water Licence Report submitted to the MVLWB on April 1, 2022.

6.4 TRADITIONAL KNOWLEDGE

Traditional knowledge was gathered as part of the engagement activities conducted by NTPC in 2021 for the Mercury Monitoring Study Design Plan. The details of this process and recommendations from traditional knowledge received and incorporated into the submitted plan is included in Mercury Monitoring Study Design Plan- Engagement Log in Appendix C.

7 MAJOR MAINTENANCE

The following maintenance activities were undertaken in 2021:

- Bluefish Rock Power Tunnel was completely dewatered, inspected by a Qualified Engineer, and scaled and/or rock bolted as required. Debris was removed and the Rock Trap in front of Penstock was inspected;
- The remainder of plant maintenance was performed in both units;
- Governor maintenance was performed by the OEM; and
- Transformer testing and Generator breaker maintenance was performed.

7.1 CULVERT PARTIAL WASHOUT

A partial washout occurred in July 2021 on a culvert along the Bluefish Hydro barge road/winter road following precipitation events. NTPC notified the GNWT and MVLWB on July 13, 2021. This road is regulated under Type A Land Use Permit MV2017X0005. A field inspection was completed on July 15, 2021.

The scope of work for the Bluefish Barge Road Culvert Reinstallation Project included:

- Temporarily repairing the road surface in July 2021 so it was safe for NTPC vehicles/equipment and members of the public using the portage route to travel over.
- Removal and Replace of Culverts in early September 2021 included:
  - Removal of old culverts which had failed;
  - Installation of replacement culverts to ensure proper drainage and stability of road embankment;
  - Reconstruction of road embankment and upstream and downstream protection; and
  - Installation of a culvert heat trace to thaw the frozen culverts in the spring There are two culverts in the location of the partial washout.

As per the requirements of the WL and LUP for Bluefish the environmental controls for the project included:

- Notification was made to the LUP and WL inspectors prior to the start of construction outlining scope of work, environmental controls, etc.
- Turbidity curtains were included in the design to be installed downstream of the work are during installation to avoid sediment moving downstream (was not required due to natural cofferdam).
- Spill kits were located on site during the work.
- Refuelling was not completed near any open water.
- Culverts were draining a low marshy area which was not defined as a watercourse, so Fisheries and Oceans Canada in-water work windows did not apply to this work.

8 MANAGEMENT PLAN ACTIVITIES

The following sections discuss 2021 activities carried out by NTPC related to the Water Management and Reservoir Operation Plan (WMROP), Waste Management Plan (WMP), Closure and Reclamation Plan (CRP) and Engagement Plan.

8.1 WATER MANAGEMENT AND RESERVOIRS OPERATION PLAN

The WMROP was submitted to the MVLWB on September 21, 2021.

The summary of activities conducted related to the WMROP include the following:

- Snow survey - results indicate the Yellowknife basin were 104% above average in early April. The model using this data suggests peak flows of 62.1 m^3/s, similar to the year 1993. Inflows during the first half of the calendar year have continued to follow this pattern, with values at or slightly below average.
- The final stop log was added to the spillway at Duncan Lake on September 20, 2019. At that time, the water level in Duncan Lake was at 212.51 m, which allowed a small amount of natural spill to continue. The level of Duncan Lake has continued to rise since the spillway was closed, creating enough natural outflow from Duncan Lake to support maximum generation at the Bluefish hydro plants without removing any stop logs during the first half of the 2020 calendar year.
- Duncan Reservoir rose to 212.87 m in June and is being monitored as inflows continue to increase.
- The Bluefish Lake Reservoir forebay level is presently in the top range of the operating level and will be operated to remain near there in order to have reserve capacity in the event of temporary issues arising at Snare Hydro.

8.2 WASTE MANAGEMENT PLAN

No activities related to the WMP were conducted in 2021.

8.3 CLOSURE AND RECLAMATION PLAN

There were no revisions to the CRP in 2021 and no activities conducted.

8.4 ENGAGEMENT PLAN

The Bluefish Hydroelectric Facility Engagement Plan was updated in June 2021 to include:

- A schedule of meetings and or workshops that will be organized to gather stakeholder input on Water Licence submissions, including, but not limited to:
    - The Mercury Monitoring Study Design Plan;
    - The Mercury Monitoring Study Report; and
    - The Interim Closure and Reclamation Plan

- A table that outlines how meetings and/or workshops align with the submission dates of the submissions.
- The methods by which stakeholders will be invited to; and/or notified of, the meetings and/or workshops.

The updated engagement plan was submitted to the MVLWB on July 21, 2021 and approved on September 13, 2021.

9 EROSION AND SEDIMENT CONTROL

Turbidity curtains were included in the culvert replace design to be installed downstream of the work area during installation to avoid sediment moving downstream. The installation was not required due to natural cofferdam created by low water level in the area during construction. Details on the Erosion and Sediment Control measures and monitoring implemented as part of the Bluefish Habitat Installation project are included in the Bluefish Habitat Installation-Type B WL MV2021L8- 2021 Annual Water Licence Report submitted to the MVLWB on April 1, 2022.[1]

10 INSPECTIONS

Inspections and Comprehensive Dam Safety Reviews (DSRs) are required to be completed by a Qualified Professional Geotechnical Engineer registered in the Northwest Territories, unless otherwise approved by the MVLWB or at the discretion of qualified engineers. The following sections discuss the annual inspection and DSRs for 2017 and 2021.

10.1 2021 ANNUAL DAM INSPECTION

The Annual Dam Inspection[2] was conducted on July 26, 2021 by Lloyd Courage, P. Geol., P. Eng. of Courage Projects Ltd. Table 10-1 presents a summary of Annual Dam Inspection Report recommendations and NTPC's actions conducted or future actions to be addressed.

Recurring maintenance activities completed in 2021 at Bluefish Dam included a survey of crests, slopes, and settlement monitoring points by Sub-Arctic Geomatics, and brushing of the downstream slope and toe areas by ACE Vegetation.

Other dam safety activities affecting the Bluefish Facility in 2021 included:

- Update of the Dam Safety Program document to better reflect Canadian Dam Association (CDA) guidelines in NTPC's dam safety practices.
- Revisions of the dam safety training, monthly dam inspection forms, and dam monitoring guide have been made with training provided to all hydro plant operators.

[1] Type B Water Licence MV2021L8-0007 Annual Report 2021 (mvlwb.ca)
[2] NTPC - Bluefish - Annual Dam Inspection Report - Nov9_21.pdf (mvlwb.ca)

- A Seepage Monitoring Program has been created to establish a record of all seepage locations at NTPC dams, along with monitoring methods and frequency, with plans to install cameras at select seepage locations for monitoring in 2022.

Table 10-.1 The 2021 Inspection Report Recommendations

Item	Description of Recommendation	NTPC Clarification / Response	Updates	Status
1	The crest of all Dams be surveyed the year before the next scheduled periodic Dam Safety Review or more often depending on the results of visual inspections.	Surveys are completed on a schedule - Taltson and Bluefish dams were completed this summer and Snare dams will be surveyed in spring 2022 in preparation for the 2023 DSR at Snare.	Bluefish was surveyed in 2021	Complete
2	Clearing of brush and trees be carried out as required to permit full visual inspection of the Dams including clearing of a 3-meter width along the toes.	Dam brushing is completed on a schedule - Taltson dams were brushed in 2019 and in 2021 brushing was focused on Snare and Bluefish dams.	Brushing was completed in October 2021	Complete
3	Measure leakage where present at each dam site.	Areas of leakage are documented for all NTPC dams in the Seepage Monitoring document which has been developed in 2021. Plans to improve leakage monitoring frequency, particularly at Dyke 1, 5B, and Twin Gorges, to better monitor and understand the relationship between reservoir water levels and observed seepage rates.	Minor area of seepage near left abutment of Bluefish dam remains unchanged.	Ongoing
7	Consideration be given to lowering the pond level beyond the toe of the Dam by outlet improvements and installing a weir for leakage monitoring at the high section	NTPC does not want to pursue this as it would likely require blasting near water and seepages in this area have been relatively minor with no signs of material loss. This area will continue to be		Addressed

Item	Description of Recommendation	NTPC Clarification / Response	Updates	Status
	of the Dam in the original riverbed.	inspected visually each month for any signs of increased seepage.		
8	Install control points in the Spillway Crest and survey prior to each Periodic Dam Safety Review to check for frost jacking. Alternately, inspect the crest yearly for any signs of cracking and/or increase in leakage in the downstream area.	The spillway will be inspected annually for signs of frost jacking, deterioration or leakage increases and surveyed if possible, when not spilling.	Nothing out of the ordinary in 2021, spillway appears in good condition.	Complete
9	It is recommended that concrete repairs be carried out on the upstream face of Duncan dam when the Lake is withdrawn to elevation 210.45 m.	It is planned to carry out this work in a low water year.	Given recent high-water levels in NWT, this work is unlikely to occur in 2022.	Outstanding

10.2 COMPREHENSIVE DAM SAFETY REVIEWS

A comprehensive DSR was completed in 2017 by Stantec at the Bluefish hydroelectric system. The recommendations from the report, NTPC Clarification/Response and current (outstanding) status are summarized in Table 10-2.

Table 10-2 Comprehensive Dam Safety Review Recommendations 2017

Item	Recommendation	NTPC Response	Update	Current Status
20	No monitoring of the tailwater/pond water elevation; install of a staff gauge to allow for periodic monitoring.	Staff gauge was installed in tailwater; operators take readings using binoculars, report to HSE.	Staff gauge was installed in tailwater; operators take readings using binoculars, report to HSE.	Complete
23	Only visual observation of seepage; explore options to install both a weir and a system to monitor both seepage rate and water quality/turbidity.	Installing a weir in this location is not possible for environmental reasons. After completion of the dam weekly monitoring of the seepage was completed and there were no changes noted. Monthly monitoring has been completed since then and will continue to be moving forward.	NTPC does not want to pursue this as it would likely require blasting near water and seepages in this area have been relatively minor with no signs of material loss. This area will continue to be inspected visually each month for any signs of increased seepage.	Addressed
24	Dam does not meet Factor of Safety against sliding; consider the addition of rock anchors.	Further investigation of this matter will take place in a separate study and proper course of action will be determined.	It is not planned to add rock anchors at this time. Substantial amounts of concrete were poured in 2007 to address voids and a washed-out section and the structure has not shown any signs of distress since.	Addressed
25	No indication of the actual rock to concrete friction values; confirm the value of concrete friction (20 to 34 degrees) before anchoring is undertaken.	Further investigation of this matter will take place in a separate study and proper course of action will be determined.	It is not planned to add rock anchors at this time. Substantial amounts of concrete were poured in 2007 to address voids and a washed-out section and the structure has not shown any signs of distress since.	Addressed

Item	Recommendation	NTPC Response	Update	Current Status
26	Original Design: Investigate and confirm if the original design used cohesion to satisfy the stability of the structure.	Further investigation of this matter will take place in a separate study and proper course of action will be determined.	It is not planned to add rock anchors at this time. Substantial amounts of concrete were poured in 2007 to address voids and a washed-out section and the structure has not shown any signs of distress since.	Addressed
27	High ice forces: Confirm the ice force, since the narrow approach channel to the structure may result in ice force lower than values from the CDA.	Further investigation of this matter will take place in a separate study and proper course of action will be determined.	It is not planned to add rock anchors at this time. Substantial amounts of concrete were poured in 2007 to address voids and a washed-out section and the structure has not shown any signs of distress since.	Addressed

The 2021 DSR was completed by Tulloch Engineering and submitted to the MVLWB on October 27, 2021 along with a NTPC Response and Recommendation Table recommendations are summarized in Table 10-3.

Table 10-3 2021 Dam Safety Review Recommendations

Number	Description of Recommendation	NTPC Response	Updates	Status
G-1	Routine DSIs, monitoring, gate/stoplog testing and maintenance.	This is currently completed (annual inspections, monthly inspections by operators, annual shutdown for maintenance). NTPC plans to test gates/stoplogs at least every 2 years in years when these are not in use.		Ongoing
G-2	Periodic DSR (Every 7 years).	Bluefish DSRs are on a schedule and will be completed within this timeframe.		Ongoing
G-3	Vegetation Control.	Dam brushing program is ongoing, set up on a recurring schedule and assessed yearly.	Brushing was completed in October 2021 at Bluefish dam.	Ongoing
G-4	Periodically survey the change of dam profiles.	This is ongoing with surveys scheduled to be completed every 3 years.	Survey was completed in 2021, next scheduled for 2024.	Ongoing
G-5	OMS and EPP updates based on comments in Sections 7 and 8.	Updates to the OMS Manual and EPP will be completed over the winter of 2022. These documents will continue to be updated as required in the future.	OMS and EPP documents have been updated based on these comments and will continue to be updated as a living document.	Complete
G-6	Consider mechanical recommendations provided in the Site Visit Report Appendix H.	This report and recommendations have been shared with the appropriate parties within NTPC. Many of these recommendations are completed as recurring maintenance by operations staff.		Ongoing
B-1	Complete to install the remaining corrosion	This will be assessed within a year. Corrosion instruments will be retrieved, and their	Remaining corrosion coupons were installed October 2021 on the	Complete

Number	Description of Recommendation	NTPC Response	Updates	Status
	monitoring coupons and maintain a regular monitoring and data interpretation to assess the performance of the stainless-steel membrane in time.	conditions documented annually. Any remaining instruments will be installed within this timeframe.	upstream side of the dam where originally intended. NTPC plans to retrieve these coupons annually to assess their condition.	
B-2	Verify readings of the shallow piezometers which were reported to be in a dry condition during the cooler months.	This will be reviewed, some of the piezometer readings were likely frozen over winter while others have been dry since installation.	Operators will mark depth at which water is frozen for piezometer readings taken in winter going forward.	Complete
B-3	Comprehensive monitoring data review.	Data for piezometers, thermistors, corrosion coupons, settlement monitoring plates are collected and stored. This data was organized over the winter of 20/21 and will be reviewed over winter of 21/22.	All instrument data from readings taken in 2021 has been put together in a document. No major anomalies or concerns were noted as per instrumentation procedures and caution values presented in the Bluefish OMS Manual. NTPC will continue to collect instrumentation data each year and will include reviews of this data in scope of work for future dam safety reviews.	Ongoing
D-1	Increase the inspection frequency when overtopping occurs during	If overtopping or very high water levels were observed at Duncan then additional inspections would be completed. The dam is inspected at a	Duncan dam will be inspected in 2022.	Ongoing

Number	Description of Recommendation	NTPC Response	Updates	Status
	extreme flood event to ensure the dam performance. Dam maintenance is required on an as needed basis.	minimum every year by a third-party engineer and NTPC engineering staff and is visited for stoplog adjustments or other maintenance as required by operations staff.		
D-2	Verify the successful grouting program in 2007, conduct further stability assessment based on as-built verification and develop dam rehabilitation plan if needed.	Concrete rehabilitation work was completed in 2017 on the downstream side of the dam. Annual inspections have recommended the upstream side be completed. This work is not urgent and will be completed in a year with lower reservoir levels. It will be assessed whether any further grouting is needed.	Duncan dam will be inspected in 2022.	Outstanding

11 MERCURY MONITORING

Version 1 of the MMS Design Plan was submitted to the MVLWB on October 8, 2021[3]. The MVLWB denied the Plan on December 2, 2021, requiring the NTPC to resubmit after addressing the recommendations, responses, and comments identified during review. On December 29, 2021 NTPC submitted the revised Mercury Monitoring Study Design Plan, V2. This plan was revised based on the comments received during the public review process as per the December 2, 2021 MVLWB Directive. A conformity table was included that summarized all comments from the ORS review and corresponding revisions, updates and responses in the updated MMS Design Plan.

12 SPILLS

A summary of activities conducted in accordance with the approved SCP, referred to in Part H, Condition 2 of the Water Licence, are discussed in the following sections.

12.1 UNAUTHORIZED DISCHARGES

There were no unauthorized discharges at the Bluefish Facility in 2021.

12.2 SPILL TRAINING

All new employees received training in the Spill Response Plan, Spill Response training, an introduction to the Hazardous Waste Management Plan and the Environmental Management System. Training in these systems is reviewed every three years. Spill procedures and contact numbers are posted in the plant control room, and spill kits are outside each plant. Spill response equipment was reviewed and updated in 2019 with additional/replacement spill response kits placed at key locations throughout the site, as identified in the Spill Response Plan.

In 2021, no NTPC staff received spill training. NTPC has determined that it would be prudent to provide refresher spill training to employees. Starting in 2022 NTPC will be providing spill training as a refresher course once every three years.

13 REGULATORY

The following sections summarize regulatory communication, related regulator inspections, concerns, non-compliances, or deficiencies.

13.1 NON-COMPLIANCE(S)

Submissions in response to a non-compliance audit in late 2020 in included in the Table of Concordance at the start of this document.

[3] Mercury Monitoring Study Design Plan Version 1 (mvlwb.ca)

The 2020 Annual Report not submitted by deadline of March 31, 2021. On March 26, 2021 NTPC requested an extension of the deadline to May 31, 2021 which was approved by the MVLWB. NTPC submitted the 2020 Annual Water Licence Report to ENR & MVLWB on May 31, 2021.

There were no additional non-compliances at the Bluefish Facility in 2021.

13.2 CORRESPONDENCE WITH THE MVLWB

- The Mackenzie Valley Land and Water Board (MVLWB) met on March 11, 2021 and reviewed NTPC's 2019 Annual Water Licence Report, which was submitted under Part B, item 1 of Licence MV2005L4-0008 on January 8, 2021. The Board accepted the 2019 Annual Water Licence Report as submitted.
- The MVLWB met on August 19, 2021 and reviewed NTPC's 2020 Annual Water Licence Report, which was submitted under Part B, item 1 of Licence MV2005L4-0008 on May 31, 2021. The MVLWB accepted the 2020 Annual Water Licence Report as submitted.
- On September 8, 2021 the MVLWB contacted NTPC to inquire about the status of:
    - Reservoir Operating Plan - Due Date June 30, 2021
    - Dam Safety Review Schedule (F8) - Due Date July 3, 2021
    - Annual Engineering Inspection Report (F7) - status
    - When was the annual geotechnical inspection completed?
    - Mercury Monitoring Study Design Plan (G2 – Schedule 3, condition1) - Due October 3, 2021
- On September 8, 2021 NTPC responded with an update for the requested items:
    - Reservoir Operating Plan - outstanding, will be submitted as soon as possible (submitted September 17, 2021);
    - Dam Safety Review Schedule (F8)- provided in April 23, 2021 Dam Safety Update notification;
    - Annual Engineering Inspection Report (F7)- will be submitted by October 31, 2021;
    - When was the annual geotechnical inspection completed- June 2021 as outlined in the April 24, 2021 submission; and
    - Mercury Monitoring Study Design Plan (G2 – Schedule 3, condition1)- on schedule for October 3, 2021 submission for the Mercury Monitoring Study.
- On September 13,2021 the MVLWB issued the approval for Engagement Plan V1.1 submitted on July 21, 2021, to fulfill the requirements under Part B condition 21 of Licence MV2020L4-0005.
- On September 29, 2021, NTPC provided an update on the Mercury Monitoring Design Study Plan.
- On October 27, 2021, NTPC submitted the Bluefish Comprehensive Dam Safety Review and a Response and Recommendation Table to the MVLWB.
- November 9, 2021 NTPC submitted a cover letter, the 2021 annual inspection report and the 2021 dam brushing report to the MVLWB.
    - December 2, 2021 NTPC provided an updated table with additional information for responses and recommendations.
    - December 6, 2021 MVLWB confirmed table was received and was sufficient.

There were no additional directives from the MVLWB for the Bluefish Facility in 2021.

13.3 CONCERNS OR DEFICIENCIES

There were no major deficiencies recorded or filed by an Inspector for the Bluefish Facility in 2021; and therefore, no concerns or deficiencies.

13.4 ANNUAL WATER LICENCE INSPECTION

The annual Type A Water Licence inspection was completed for the Bluefish Facility on August 31, 2021 with ENR Water Resource Officers, Ian Ziemann and David-Scott McQuinn. No formal inspection report was received by NTPC from ENR. No major deficiencies were recorded on site.

13.5 LEASE INSPECTION

On June 29, 2021 GNWT Lands completed an inspection for the Duncan Lake Water Storage Dam Lease 85J/16-002. The inspection is carried out to ensure general conditions of the lease are acceptable, improvements are made and maintained within the lease boundary and that proper methods of waste disposal and fuel storage are being implemented. Overall, the improvements were being adequately maintained and previously noted concerns have been addressed since the previous inspection however, the lease parcel requires another general clean-up to remain compliant with Covenant #15 of the agreement prior to the next scheduled inspection.

13.6 OTHER MVLWB REQUESTS

There was no other request from the MVLWB related to operating procedures before November 30, 2021.

CLOSURE

This 2021 Bluefish Annual Report was prepared by the Northwest Territories Power Corporation to meet the requirements of Water Licence MV2020L4-0005.

Respectfully submitted,

Alexander Love
Director, Hydro Operations
Northwest Territories Power Corporation

APPENDIX A – WATER LEVEL DATA

Table A-1 2021 Mean Daily Water Levels in Bluefish Lake Reservoir and Duncan Lake Reservoir

Date	Duncan Lake Reservoir SNP Station 735-3	Bluefish Lake Reservoir SNP Station 735-4
	Mean daily water level (m) (NTPC Datum)	
2021-01-02	212.78	186.13
2021-01-03	212.78	186.13
2021-01-04	212.78	186.12
2021-01-05	212.78	186.11
2021-01-06	212.78	186.11
2021-01-07	212.78	186.11
2021-01-08	212.78	186.11
2021-01-09	212.78	186.11
2021-01-10	212.78	186.1
2021-01-11	212.78	186.1
2021-01-12	212.78	186.1
2021-01-13	212.78	186.1
2021-01-14	212.78	186.1
2021-01-15	212.78	186.1
2021-01-16	212.78	186.1
2021-01-17	212.78	186.09
2021-01-18	212.78	186.09
2021-01-19	212.78	186.09
2021-01-20	212.78	186.09
2021-01-21	212.78	186.09
2021-01-22	212.78	186.1
2021-01-23	212.78	186.12

Date	Duncan Lake Reservoir SNP Station 735-3	Bluefish Lake Reservoir SNP Station 735-4
2021-01-24	212.78	186.12
2021-01-25	212.78	186.12
2021-01-26	212.78	186.12
2021-01-27	212.77	186.15
2021-01-28	212.77	186.18
2021-01-29	212.78	186.14
2021-01-30	212.77	186.1
2021-01-31	212.77	186.08
2021-02-01	212.77	186.06
2021-02-02	212.77	186.04
2021-02-03	212.77	186.04
2021-02-04	212.77	186.03
2021-02-05	212.77	186.02
2021-02-06	212.77	186
2021-02-07	212.77	185.99
2021-02-08	212.76	185.95
2021-02-09	212.77	185.92
2021-02-10	212.77	185.89
2021-02-11	212.76	185.86
2021-02-12	212.76	185.84
2021-02-13	212.76	185.84
2021-02-14	212.76	185.85
2021-02-15	212.76	185.87
2021-02-16	212.76	185.87
2021-02-17	212.76	185.88
2021-02-18	212.76	185.89
2021-02-19	212.76	185.93

Date	Duncan Lake Reservoir SNP Station 735-3	Bluefish Lake Reservoir SNP Station 735-4
2021-02-20	212.76	185.94
2021-02-21	212.76	185.96
2021-02-22	212.75	185.97
2021-02-23	212.75	185.95
2021-02-24	212.75	185.91
2021-02-25	212.75	185.86
2021-02-26	212.75	185.8
2021-02-27	212.75	185.73
2021-02-28	212.75	185.65
2021-03-01	212.75	185.55
2021-03-02	212.75	185.51
2021-03-03	212.75	185.52
2021-03-04	212.75	185.53
2021-03-05	212.75	185.55
2021-03-06	212.75	185.58
2021-03-07	212.74	185.63
2021-03-08	212.74	185.68
2021-03-09	212.74	185.7
2021-03-10	212.74	185.66
2021-03-11	212.74	185.63
2021-03-12	212.73	185.61
2021-03-13	212.73	185.62
2021-03-14	212.73	185.64
2021-03-15	212.73	185.66
2021-03-16	212.73	185.67
2021-03-17	212.73	185.67
2021-03-18	212.72	185.66

Date	Duncan Lake Reservoir SNP Station 735-3	Bluefish Lake Reservoir SNP Station 735-4
2021-03-19	212.72	185.66
2021-03-20	212.72	185.67
2021-03-21	212.72	185.66
2021-03-22	212.72	185.68
2021-03-23	212.71	185.7
2021-03-24	212.71	185.7
2021-03-25	212.71	185.69
2021-03-26	212.7	185.69
2021-03-27	212.7	185.69
2021-03-28	212.7	185.69
2021-03-29	212.69	185.7
2021-03-30	212.69	185.7
2021-03-31	212.69	185.69
2021-04-01	212.69	185.68
2021-04-02	212.69	185.68
2021-04-03	212.69	185.68
2021-04-04	212.68	185.68
2021-04-05	212.68	185.68
2021-04-06	212.68	185.7
2021-04-07	212.68	185.71
2021-04-08	212.68	185.73
2021-04-09	212.68	185.75
2021-04-10	212.67	185.76
2021-04-11	212.67	185.76
2021-04-12	212.67	185.74
2021-04-13	212.67	185.73
2021-04-14	212.66	185.72

Date	Duncan Lake Reservoir SNP Station 735-3	Bluefish Lake Reservoir SNP Station 735-4
2021-04-15	212.66	185.72
2021-04-16	212.66	185.74
2021-04-17	212.66	185.76
2021-04-18	212.66	185.77
2021-04-19	212.65	185.77
2021-04-20	212.65	185.76
2021-04-21	212.65	185.75
2021-04-22	212.65	185.74
2021-04-23	212.65	185.72
2021-04-24	212.65	185.69
2021-04-25	212.64	185.66
2021-04-26	212.64	185.65
2021-04-27	212.64	185.65
2021-04-28	212.64	185.64
2021-04-29	212.64	185.63
2021-04-30	212.63	185.62
2021-05-01	212.63	185.62
2021-05-02	212.63	185.61
2021-05-03	212.63	185.6
2021-05-04	212.63	185.59
2021-05-05	212.63	185.6
2021-05-06	212.62	185.69
2021-05-07	212.62	185.68
2021-05-08	212.62	185.67
2021-05-09	212.62	185.7
2021-05-10	212.63	185.76
2021-05-11	212.63	185.84

Date	Duncan Lake Reservoir SNP Station 735-3	Bluefish Lake Reservoir SNP Station 735-4
2021-05-12	212.64	185.91
2021-05-13	212.64	185.91
2021-05-14	212.64	185.86
2021-05-15	212.65	185.79
2021-05-16	212.65	185.73
2021-05-17	212.65	185.69
2021-05-18	212.65	185.7
2021-05-19	212.65	185.71
2021-05-20	212.65	185.72
2021-05-21	212.65	185.72
2021-05-22	212.65	185.72
2021-05-23	212.65	185.75
2021-05-24	212.66	185.76
2021-05-25	212.66	185.77
2021-05-26	212.66	185.79
2021-05-27	212.66	185.83
2021-05-28	212.66	185.88
2021-05-29	212.66	185.92
2021-05-30	212.66	185.97
2021-05-31	212.66	186.02
2021-06-01	212.67	186.07
2021-06-02	212.67	186.1
2021-06-03	212.67	186.11
2021-06-04	212.68	186.12
2021-06-05	212.68	186.14
2021-06-06	212.69	186.14
2021-06-07	212.69	186.14

Date	Duncan Lake Reservoir SNP Station 735-3	Bluefish Lake Reservoir SNP Station 735-4
2021-06-08	212.69	186.14
2021-06-09	212.69	186.14
2021-06-10	212.69	186.14
2021-06-11	212.7	186.15
2021-06-12	212.71	186.16
2021-06-13	212.71	186.17
2021-06-14	212.71	186.17
2021-06-15	212.72	186.18
2021-06-16	212.72	186.18
2021-06-17	212.72	186.18
2021-06-18	212.72	186.18
2021-06-19	212.72	186.17
2021-06-20	212.72	186.17
2021-06-21	212.72	186.17
2021-06-22	212.72	186.24
2021-06-23	212.72	186.38
2021-06-24	212.72	186.38
2021-06-25	212.73	186.39
2021-06-26	212.73	186.38
2021-06-27	212.73	186.38
2021-06-28	212.74	186.38
2021-06-29	212.74	186.38
2021-06-30	212.74	186.39
2021-07-01	212.75	186.4
2021-07-02	212.76	186.41
2021-07-03	212.76	186.43
2021-07-04	212.76	186.45

Date	Duncan Lake Reservoir SNP Station 735-3	Bluefish Lake Reservoir SNP Station 735-4
2021-07-05	212.76	186.44
2021-07-06	212.76	186.36
2021-07-07	212.77	186.44
2021-07-08	212.77	186.43
2021-07-09	212.77	186.45
2021-07-10	212.78	186.47
2021-07-11	212.78	186.5
2021-07-12	212.79	186.51
2021-07-13	212.79	186.51
2021-07-14	212.8	186.52
2021-07-15	212.82	186.53
2021-07-16	212.82	186.53
2021-07-17	212.82	186.53
2021-07-18	212.82	186.53
2021-07-19	212.82	186.52
2021-07-20	212.82	186.5
2021-07-21	212.83	186.5
2021-07-22	212.83	186.53
2021-07-23	212.86	186.58
2021-07-24	212.86	186.58
2021-07-25	212.85	186.56
2021-07-26	212.85	186.55
2021-07-27	212.86	186.55
2021-07-28	212.86	186.54
2021-07-29	212.86	186.54
2021-07-30	212.86	186.53
2021-07-31	212.86	186.52

Date	Duncan Lake Reservoir SNP Station 735-3	Bluefish Lake Reservoir SNP Station 735-4
2021-08-01	212.86	186.51
2021-08-02	212.87	186.49
2021-08-03	212.87	186.46
2021-08-04	212.86	186.46
2021-08-05	212.86	186.45
2021-08-06	212.86	186.45
2021-08-07	212.87	186.45
2021-08-08	212.86	186.43
2021-08-09	212.86	186.44
2021-08-10	212.86	186.45
2021-08-11	212.86	186.43
2021-08-12	212.86	186.41
2021-08-13	212.85	186.42
2021-08-14	212.87	186.43
2021-08-15	212.87	186.42
2021-08-16	212.87	186.41
2021-08-17	212.86	186.39
2021-08-18	212.86	186.39
2021-08-19	212.86	186.4
2021-08-20	212.86	186.39
2021-08-21	212.86	186.39
2021-08-22	212.85	186.38
2021-08-23	212.85	186.39
2021-08-24	212.84	186.39
2021-08-25	212.84	186.38
2021-08-26	212.84	186.38
2021-08-27	212.84	186.37

Date	Duncan Lake Reservoir SNP Station 735-3	Bluefish Lake Reservoir SNP Station 735-4
2021-08-28	212.84	186.36
2021-08-29	212.84	186.36
2021-08-30	212.84	186.35
2021-08-31	212.84	186.35
2021-09-01	212.84	186.34
2021-09-02	212.84	186.34
2021-09-03	212.84	186.33
2021-09-04	212.83	186.33
2021-09-05	212.83	186.32
2021-09-06	212.83	186.32
2021-09-07	212.83	186.32
2021-09-08	212.82	186.31
2021-09-09	212.82	186.29
2021-09-10	212.82	186.27
2021-09-11	212.81	186.27
2021-09-12	212.81	186.27
2021-09-13	212.8	186.27
2021-09-14	212.81	186.27
2021-09-15	212.81	186.27
2021-09-16	212.8	186.26
2021-09-17	212.79	186.26
2021-09-18	212.79	186.27
2021-09-19	212.79	186.27
2021-09-20	212.78	186.25
2021-09-21	212.78	186.25
2021-09-22	212.77	186.24
2021-09-23	212.77	186.23

Date	Duncan Lake Reservoir SNP Station 735-3	Bluefish Lake Reservoir SNP Station 735-4
2021-09-24	212.77	186.23
2021-09-25	212.76	186.22
2021-09-26	212.76	186.22
2021-09-27	212.76	186.22
2021-09-28	212.76	186.21
2021-09-29	212.75	186.2
2021-09-30	212.75	186.2
2021-10-01	212.75	186.2
2021-10-02	212.75	186.19
2021-10-03	212.75	186.19
2021-10-04	212.74	186.19
2021-10-05	212.74	186.18
2021-10-06	212.74	186.18
2021-10-07	212.74	186.18
2021-10-08	212.74	186.18
2021-10-09	212.74	186.2
2021-10-10	212.74	186.19
2021-10-11	212.74	186.18
2021-10-12	212.73	186.18
2021-10-13	212.73	186.17
2021-10-14	212.73	186.18
2021-10-15	212.72	186.2
2021-10-16	212.72	186.2
2021-10-17	212.72	186.18
2021-10-18	212.71	186.18
2021-10-19	212.71	186.18
2021-10-20	212.71	186.16

Date	Duncan Lake Reservoir SNP Station 735-3	Bluefish Lake Reservoir SNP Station 735-4
2021-10-21	212.7	186.16
2021-10-22	212.7	186.15
2021-10-23	212.7	186.15
2021-10-24	212.69	186.15
2021-10-25	212.69	186.15
2021-10-26	212.69	186.15
2021-10-27	212.69	186.15
2021-10-28	212.69	186.15
2021-10-29	212.69	186.15
2021-10-30	212.68	186.14
2021-10-31	212.68	186.14
2021-11-01	212.68	186.14
2021-11-02	212.67	186.14
2021-11-03	212.67	186.13
2021-11-04	212.67	186.13
2021-11-05	212.67	186.13
2021-11-06	212.66	186.13
2021-11-07	212.66	186.13
2021-11-08	212.66	186.13
2021-11-09	212.66	186.12
2021-11-10	212.65	186.12
2021-11-11	212.65	186.12
2021-11-12	212.64	186.11
2021-11-13	212.64	186.11
2021-11-14	212.64	186.11
2021-11-15	212.64	186.11
2021-11-16	212.63	186.11

Date	Duncan Lake Reservoir SNP Station 735-3	Bluefish Lake Reservoir SNP Station 735-4
2021-11-17	212.63	186.11
2021-11-18	212.63	186.11
2021-11-19	212.63	186.11
2021-11-20	212.62	186.11
2021-11-21	212.62	186.1
2021-11-22	212.62	186.1
2021-11-23	212.61	186.1
2021-11-24	212.61	186.09
2021-11-25	212.61	186.09
2021-11-26	212.61	186.09
2021-11-27	212.61	186.09
2021-11-28	212.61	186.09
2021-11-29	212.6	186.09
2021-11-30	212.61	186.09
2021-12-01	212.61	186.09
2021-12-02	212.61	186.09
2021-12-03	212.6	186.08
2021-12-04	212.6	186.08
2021-12-05	212.6	186.08
2021-12-06	212.6	186.07
2021-12-07	212.6	186.07
2021-12-08	212.6	186.07
2021-12-09	212.6	186.07
2021-12-10	212.6	186.07
2021-12-11	212.61	186.08
2021-12-12	212.61	186.08
2021-12-13	212.61	186.08

Date	Duncan Lake Reservoir SNP Station 735-3	Bluefish Lake Reservoir SNP Station 735-4
2021-12-14	212.61	186.08
2021-12-15	212.61	186.08
2021-12-16	212.61	186.08
2021-12-17	212.61	186.08
2021-12-18	212.61	186.08
2021-12-19	212.61	186.08
2021-12-20	212.61	186.08
2021-12-21	212.61	186.07
2021-12-22	212.6	186.07
2021-12-23	212.6	186.07
2021-12-24	212.61	186.08
2021-12-25	212.61	186.08
2021-12-26	212.61	186.08
2021-12-27	212.61	186.08
2021-12-28	212.6	186.06
2021-12-29	212.6	186.05
2021-12-30	212.6	186.04
2021-12-31	212.6	186.03

Table A-2 2021 Mean Monthly Water Level in Bluefish Lake Reservoir and Duncan Lake Reservoir

Month	Duncan Lake Reservoir SNP Station 735-3	Bluefish Lake Reservoir SNP Station 735-4
	Mean monthly water level (m) (NTPC Datum)	
January	212.78	186.11
February	212.76	185.91
March	212.73	185.64
April	212.66	185.71
May	212.64	185.76
June	212.71	186.21
July	212.81	186.50
August	212.86	186.41
September	212.80	186.27
October	212.72	186.17
November	212.64	186.11
December	212.61	186.07

APPENDIX B – WATER FLOW DATA

Table B-1 Mean Daily Water Flow at the Bluefish Powerhouses and the Yellowknife River

Date	Bluefish Powerhouse 1 SNP Station 735-1	Bluefish Powerhouse 2 SNP Station 735-2	Yellowknife River above Inlet to Prosperous Lake SNP Station 735-5
	Mean daily flow (m^3/s)		
2021-01-01	13.78	12.73	30.14
2021-01-02	13.78	12.73	29.69
2021-01-03	13.78	12.73	29.80
2021-01-04	13.78	12.73	29.82
2021-01-05	13.79	12.74	29.54
2021-01-06	13.79	12.74	29.55
2021-01-07	13.79	12.74	29.47
2021-01-08	13.79	12.74	29.16
2021-01-09	13.79	12.74	29.14
2021-01-10	13.79	12.74	29.05
2021-01-11	13.79	12.74	29.01
2021-01-12	13.79	12.75	28.92
2021-01-13	13.8	12.75	28.76
2021-01-14	13.8	12.75	28.67
2021-01-15	13.8	12.75	28.45
2021-01-16	13.8	12.75	28.46
2021-01-17	13.8	12.75	28.43
2021-01-18	13.8	12.75	28.30
2021-01-19	13.8	12.63	28.08
2021-01-20	13.8	12.75	28.04
2021-01-21	13.8	12.75	27.70
2021-01-22	13.8	12.75	27.36
2021-01-23	13.79	12.75	27.19

Date	Bluefish Powerhouse 1 SNP Station 735-1	Bluefish Powerhouse 2 SNP Station 735-2	Yellowknife River above Inlet to Prosperous Lake SNP Station 735-5
2021-01-24	13.79	12.74	27.08
2021-01-25	13.79	12.74	26.98
2021-01-26	13.79	12.74	26.86
2021-01-27	9.84	12.73	25.48
2021-01-28	13.75	12.7	26.88
2021-01-29	13.78	12.73	26.89
2021-01-30	13.8	12.75	26.70
2021-01-31	13.81	12.76	26.54
2021-02-01	13.82	12.77	26.36
2021-02-02	13.83	12.78	26.12
2021-02-03	13.83	12.78	26.01
2021-02-04	13.83	12.78	26.00
2021-02-05	13.84	12.79	26.02
2021-02-06	13.85	12.55	25.97
2021-02-07	13.86	12.22	25.80
2021-02-08	13.87	12.82	25.99
2021-02-09	13.88	12.29	25.96
2021-02-10	13.88	12.38	25.92
2021-02-11	13.88	10.97	25.53
2021-02-12	13.92	11.05	25.46
2021-02-13	13.94	11.34	25.41
2021-02-14	13.97	9.42	24.68
2021-02-15	13.92	9.65	24.68
2021-02-16	13.92	9.98	24.80
2021-02-17	13.91	9.43	24.56
2021-02-18	14.02	8.64	24.20
2021-02-19	14.02	8.94	24.18

Date	Bluefish Powerhouse 1 SNP Station 735-1	Bluefish Powerhouse 2 SNP Station 735-2	Yellowknife River above Inlet to Prosperous Lake SNP Station 735-5
2021-02-20	13.94	9.28	24.04
2021-02-21	14.1	8.74	23.79
2021-02-22	14	10.57	24.37
2021-02-23	13.93	10.99	24.61
2021-02-24	13.89	11.36	24.70
2021-02-25	13.91	12.26	25.02
2021-02-26	13.91	12.85	25.45
2021-02-27	13.42	12.38	25.52
2021-02-28	14.03	12.45	25.42
2021-03-01	14.08	12.7	25.62
2021-03-02	14.31	7.95	24.13
2021-03-03	14.31	7.06	23.64
2021-03-04	14.3	7.38	23.48
2021-03-05	14.25	7.76	23.48
2021-03-06	14.31	5.75	22.66
2021-03-07	14.53	5.81	22.42
2021-03-08	14.46	5.96	22.29
2021-03-09	14.37	8.38	22.97
2021-03-10	14.17	9.92	23.54
2021-03-11	14.04	8	22.88
2021-03-12	14.06	6.98	22.53
2021-03-13	14.06	6.5	22.28
2021-03-14	14.06	6.5	22.36
2021-03-15	14.06	6.5	22.32
2021-03-16	14.06	6.68	22.20
2021-03-17	14.03	8.91	22.98
2021-03-18	14.03	8.21	22.68

Date	Bluefish Powerhouse 1 SNP Station 735-1	Bluefish Powerhouse 2 SNP Station 735-2	Yellowknife River above Inlet to Prosperous Lake SNP Station 735-5
2021-03-19	14.04	7.78	22.74
2021-03-20	14.04	8.77	23.04
2021-03-21	14.04	8.54	22.90
2021-03-22	14.03	7.78	22.66
2021-03-23	12.51	9.92	22.82
2021-03-24	11.69	11.11	22.96
2021-03-25	11.04	11.37	22.85
2021-03-26	11.68	10.79	22.72
2021-03-27	11.68	10.79	22.61
2021-03-28	11.68	10.79	22.53
2021-03-29	11.68	10.79	22.52
2021-03-30	11.68	10.79	22.55
2021-03-31	11.68	10.79	22.59
2021-04-01	11.69	10.8	22.51
2021-04-02	11.69	10.8	22.57
2021-04-03	11.69	10.8	22.50
2021-04-04	11.69	10.47	22.43
2021-04-05	10.28	11.23	22.23
2021-04-06	10.28	11.66	22.26
2021-04-07	10.28	11.66	22.24
2021-04-08	10.28	11.66	22.26
2021-04-09	10.28	11.66	22.18
2021-04-10	10.26	12.25	22.37
2021-04-11	10.25	12.49	22.44
2021-04-12	10.25	12.18	22.43
2021-04-13	10.25	11.77	22.32
2021-04-14	10.25	11.12	22.12

Date	Bluefish Powerhouse 1 SNP Station 735-1	Bluefish Powerhouse 2 SNP Station 735-2	Yellowknife River above Inlet to Prosperous Lake SNP Station 735-5
2021-04-15	10.25	10.76	21.88
2021-04-16	10.37	10.03	21.53
2021-04-17	10.25	10.76	21.73
2021-04-18	10.25	10.85	21.66
2021-04-19	10.25	11.53	21.80
2021-04-20	10.25	11.19	21.74
2021-04-21	10.26	11.11	21.68
2021-04-22	10.26	10.77	21.69
2021-04-23	10.26	10.77	21.68
2021-04-24	10.26	10.77	21.66
2021-04-25	10.35	10.59	21.54
2021-04-26	9.95	10.12	21.03
2021-04-27	8.39	11.2	20.94
2021-04-28	8.39	11.2	20.81
2021-04-29	8.39	11.02	20.71
2021-04-30	8.39	10.77	20.51
2021-05-01	8.39	10.77	20.50
2021-05-02	8.39	10.77	20.37
2021-05-03	8.39	10.55	20.16
2021-05-04	8.1	10.46	19.93
2021-05-05	6.57	9.98	19.32
2021-05-06	6.54	8.36	18.84
2021-05-07	7.73	12.34	20.08
2021-05-08	6.55	11.67	19.70
2021-05-09	6.54	11.66	19.82
2021-05-10	6.53	11.64	19.84
2021-05-11	6.51	11.76	20.11

Date	Bluefish Powerhouse 1 SNP Station 735-1	Bluefish Powerhouse 2 SNP Station 735-2	Yellowknife River above Inlet to Prosperous Lake SNP Station 735-5
2021-05-12	8.81	13.07	21.25
2021-05-13	12.43	12.52	22.71
2021-05-14	13.92	13.47	24.31
2021-05-15	13.96	13.75	24.87
2021-05-16	13.99	13.79	25.39
2021-05-17	14.01	12.26	25.06
2021-05-18	14.01	11.22	24.89
2021-05-19	14.01	11.22	25.19
2021-05-20	14	12.17	25.84
2021-05-21	14	12.04	25.88
2021-05-22	13.4	12.07	26.17
2021-05-23	13.99	12.89	26.80
2021-05-24	13.99	13.78	26.67
2021-05-25	13.99	13.78	27.06
2021-05-26	13.99	12.51	26.96
2021-05-27	13.99	12.92	27.13
2021-05-28	13.97	13.37	27.41
2021-05-29	13.9	13.7	27.80
2021-05-30	13.87	13.67	27.86
2021-05-31	13.85	13.65	28.16
2021-06-01	13.82	13.02	28.70
2021-06-02	13.81	13.25	29.97
2021-06-03	13.8	13.6	30.58
2021-06-04	13.79	13.59	31.98
2021-06-05	13.78	13.02	32.67
2021-06-06	13.78	13.58	33.40
2021-06-07	13.78	13.58	34.10

Date	Bluefish Powerhouse 1 SNP Station 735-1	Bluefish Powerhouse 2 SNP Station 735-2	Yellowknife River above Inlet to Prosperous Lake SNP Station 735-5
2021-06-08	13.78	13.58	34.60
2021-06-09	13.78	13.58	34.97
2021-06-10	13.78	13.58	35.26
2021-06-11	13.78	13.38	36.10
2021-06-12	13.78	13.58	37.13
2021-06-13	13.77	13.57	37.69
2021-06-14	13.76	13.56	38.20
2021-06-15	13.76	13.56	38.64
2021-06-16	13.76	13.56	39.07
2021-06-17	13.76	13.56	39.19
2021-06-18	13.76	13.56	39.17
2021-06-19	13.76	13.56	39.13
2021-06-20	13.76	13.56	39.01
2021-06-21	13.76	13.56	39.01
2021-06-22	6.57	5.26	35.91
2021-06-23	0	0	37.54
2021-06-24	0	0	37.87
2021-06-25	0	0	38.30
2021-06-26	0	0	38.19
2021-06-27	0	0	38.25
2021-06-28	0	0	38.29
2021-06-29	0	0	38.46
2021-06-30	0	0	38.76
2021-07-01	0	0	39.54
2021-07-02	0	0	40.66
2021-07-03	0	0	42.24
2021-07-04	0	0	44.27

Date	Bluefish Powerhouse 1 SNP Station 735-1	Bluefish Powerhouse 2 SNP Station 735-2	Yellowknife River above Inlet to Prosperous Lake SNP Station 735-5
2021-07-05	4.71	4.56	49.99
2021-07-06	13.84	9.11	50.43
2021-07-07	14.09	4.31	55.79
2021-07-08	13.17	12.06	59.59
2021-07-09	13.11	12.58	63.25
2021-07-10	13.15	12.57	66.97
2021-07-11	13.7	10.51	70.18
2021-07-12	13.6	12.57	72.73
2021-07-13	13.6	12.57	74.42
2021-07-14	12.85	11.99	75.50
2021-07-15	13.59	12.12	77.85
2021-07-16	13.57	11.27	78.30
2021-07-17	13.8	8.67	78.38
2021-07-18	13.82	8.47	78.60
2021-07-19	13.75	10.19	78.72
2021-07-20	13.59	12.55	78.42
2021-07-21	13.59	12.56	78.06
2021-07-22	5.57	12.56	76.22
2021-07-23	0	12.02	78.86
2021-07-24	0	12.52	78.69
2021-07-25	0	12.52	77.61
2021-07-26	0	12.53	76.35
2021-07-27	0	12.44	75.14
2021-07-28	0	11.92	74.12
2021-07-29	0	10.44	72.86
2021-07-30	0	10.44	72.11
2021-07-31	0	11.66	71.32

Date	Bluefish Powerhouse 1 SNP Station 735-1	Bluefish Powerhouse 2 SNP Station 735-2	Yellowknife River above Inlet to Prosperous Lake SNP Station 735-5
2021-08-01	0	12.55	70.24
2021-08-02	3.93	12.09	70.25
2021-08-03	9.07	9.29	68.39
2021-08-04	9.07	8.97	67.34
2021-08-05	9.26	7.82	66.32
2021-08-06	6.32	10.24	64.97
2021-08-07	9.33	7.08	64.25
2021-08-08	10.1	7.96	63.05
2021-08-09	8.7	6.12	61.93
2021-08-10	5.9	8.86	61.78
2021-08-11	5.92	9.06	60.73
2021-08-12	5.91	12.59	60.35
2021-08-13	6.06	8.75	59.18
2021-08-14	5.91	9.95	59.51
2021-08-15	5.91	11.02	59.21
2021-08-16	5.59	11.99	58.35
2021-08-17	5.46	12.61	57.53
2021-08-18	5.8	12.61	56.60
2021-08-19	7.66	9.42	56.50
2021-08-20	9.55	8.23	55.95
2021-08-21	9.55	7.04	55.04
2021-08-22	9.97	8.67	54.60
2021-08-23	6.05	8.35	53.04
2021-08-24	8.19	6.3	52.89
2021-08-25	8.19	6.31	52.21
2021-08-26	8.17	6.71	51.72
2021-08-27	9.11	7.57	51.24

Date	Bluefish Powerhouse 1 SNP Station 735-1	Bluefish Powerhouse 2 SNP Station 735-2	Yellowknife River above Inlet to Prosperous Lake SNP Station 735-5
2021-08-28	8.67	8.77	51.16
2021-08-29	8.71	9.33	50.74
2021-08-30	8.65	9.73	50.25
2021-08-31	8.61	9.82	49.88
2021-09-01	8.2	9.99	49.42
2021-09-02	8.2	10.53	48.97
2021-09-03	8.21	10.54	48.49
2021-09-04	8.21	10.53	48.02
2021-09-05	8.21	10.53	47.52
2021-09-06	8.21	11.24	47.25
2021-09-07	8.21	10.54	46.58
2021-09-08	10.45	11.48	46.89
2021-09-09	13.89	10.18	46.48
2021-09-10	13.69	11.52	45.48
2021-09-11	13.71	10.56	45.03
2021-09-12	13.71	10.56	44.46
2021-09-13	13.71	10.12	44.18
2021-09-14	13.71	9.94	44.29
2021-09-15	13.71	9.85	43.75
2021-09-16	13.71	9.85	43.22
2021-09-17	13.72	9.52	42.75
2021-09-18	13.71	6.33	41.86
2021-09-19	13.71	6.33	41.50
2021-09-20	13.71	9.5	41.51
2021-09-21	13.47	8.79	40.67
2021-09-22	13.73	10.3	40.11
2021-09-23	13.73	10.57	39.99

Date	Bluefish Powerhouse 1 SNP Station 735-1	Bluefish Powerhouse 2 SNP Station 735-2	Yellowknife River above Inlet to Prosperous Lake SNP Station 735-5
2021-09-24	13.73	10.57	40.33
2021-09-25	13.73	10.57	39.67
2021-09-26	13.74	10.58	39.21
2021-09-27	13.74	10.58	38.72
2021-09-28	13.43	12.08	39.06
2021-09-29	13.29	12.7	38.48
2021-09-30	13.29	12.7	38.23
2021-10-01	13.29	12.7	38.01
2021-10-02	13.29	12.7	37.77
2021-10-03	13.29	12.7	37.36
2021-10-04	13.3	12.71	36.82
2021-10-05	13.3	12.71	36.56
2021-10-06	13.3	12.71	36.34
2021-10-07	13.3	13.77	36.27
2021-10-08	13.3	12.62	35.85
2021-10-09	13.6	9.67	35.47
2021-10-10	13.44	12	35.60
2021-10-11	13.3	12.71	35.40
2021-10-12	13.3	12.48	35.19
2021-10-13	13.3	12.71	34.88
2021-10-14	13.42	10.9	34.04
2021-10-15	13.76	8.53	34.17
2021-10-16	13.76	8.72	34.09
2021-10-17	13.44	11.14	33.91
2021-10-18	13.3	10.6	33.45
2021-10-19	13.4	10.19	33.45
2021-10-20	13.31	12.72	33.42

Date	Bluefish Powerhouse 1 SNP Station 735-1	Bluefish Powerhouse 2 SNP Station 735-2	Yellowknife River above Inlet to Prosperous Lake SNP Station 735-5
2021-10-21	13.31	12.72	32.94
2021-10-22	13.31	12.72	32.72
2021-10-23	13.31	12.72	32.40
2021-10-24	13.31	12.72	32.24
2021-10-25	13.31	12.72	31.98
2021-10-26	13.31	12.72	31.96
2021-10-27	13.31	12.72	31.88
2021-10-28	13.31	12.72	31.72
2021-10-29	13.31	12.72	31.43
2021-10-30	13.31	12.72	31.18
2021-10-31	13.31	12.72	31.16
2021-11-01	13.31	12.72	30.91
2021-11-02	13.31	12.72	30.59
2021-11-03	13.31	12.72	30.49
2021-11-04	13.32	12.73	30.19
2021-11-05	13.32	12.73	30.03
2021-11-06	13.32	12.73	29.83
2021-11-07	13.32	12.73	29.66
2021-11-08	13.32	12.73	29.56
2021-11-09	13.33	12.74	29.40
2021-11-10	13.33	12.74	29.30
2021-11-11	13.33	12.74	29.22
2021-11-12	13.33	12.74	29.07
2021-11-13	13.33	12.74	28.71
2021-11-14	13.33	12.74	28.56
2021-11-15	13.33	12.74	28.44
2021-11-16	13.33	12.74	28.31

Date	Bluefish Powerhouse 1 SNP Station 735-1	Bluefish Powerhouse 2 SNP Station 735-2	Yellowknife River above Inlet to Prosperous Lake SNP Station 735-5
2021-11-17	13.33	12.74	28.35
2021-11-18	13.33	12.74	28.10
2021-11-19	13.33	12.74	27.99
2021-11-20	13.24	12.74	28.06
2021-11-21	13.33	12.75	27.85
2021-11-22	13.34	12.75	27.68
2021-11-23	13.34	12.75	27.40
2021-11-24	13.34	12.75	27.31
2021-11-25	13.34	12.75	27.21
2021-11-26	13.34	12.75	27.27
2021-11-27	13.34	12.75	27.41
2021-11-28	13.34	12.75	27.29
2021-11-29	13.34	12.75	27.33
2021-11-30	13.34	12.75	27.02
2021-12-01	13.34	12.75	26.92
2021-12-02	13.35	12.75	26.91
2021-12-03	13.35	12.76	26.83
2021-12-04	13.35	12.76	26.81
2021-12-05	13.35	12.76	26.72
2021-12-06	13.35	12.76	26.55
2021-12-07	13.35	12.76	26.43
2021-12-08	13.35	12.76	26.41
2021-12-09	13.35	12.76	26.36
2021-12-10	13.35	12.76	26.34
2021-12-11	13.35	12.76	26.31
2021-12-12	13.35	13.18	26.70
2021-12-13	13.35	13.18	26.71

Date	Bluefish Powerhouse 1 SNP Station 735-1	Bluefish Powerhouse 2 SNP Station 735-2	Yellowknife River above Inlet to Prosperous Lake SNP Station 735-5
2021-12-14	13.35	12.76	26.55
2021-12-15	13.35	12.76	26.63
2021-12-16	13.35	12.76	26.64
2021-12-17	13.35	12.76	26.42
2021-12-18	13.35	12.76	26.35
2021-12-19	13.35	12.76	26.34
2021-12-20	13.35	12.76	26.22
2021-12-21	13.35	12.76	26.10
2021-12-22	13.35	12.76	26.04
2021-12-23	12.86	12.2	25.72
2021-12-24	13.81	12.34	25.84
2021-12-25	13.81	12.33	25.80
2021-12-26	13.81	12.01	25.80
2021-12-27	13.81	12.26	25.93
2021-12-28	13.82	12.54	25.99
2021-12-29	13.82	11.92	25.71
2021-12-30	13.83	11.92	25.68
2021-12-31	13.83	11.92	25.69

Table B-2 Mean Monthly Water Flows in Bluefish Powerhouses and the Yellowknife River

Month	Powerhouse 1 SNP Station 735-1	Powerhouse 2 SNP Station 735-2	Yellowknife River above Inlet to Prosperous Lake SNP Station 735-5
	Mean monthly flow (m^3/s)		
January	13.66	12.74	28.26
February	13.90	11.30	25.23
March	13.45	8.61	22.90
April	10.20	11.13	21.85
May	11.37	12.19	23.75
Une	9.86	9.62	36.34
July	7.33	9.60	67.97
August	7.40	9.22	58.55
September	12.28	10.30	43.40
October	13.36	12.09	34.18
November	13.33	12.74	28.62
December	13.45	12.61	26.30

APPENDIX C – ENGAGEMENT LOG

NORTHWEST TERRITORIES POWER CORPORATION

Empowering Communities

ENGAGEMENT LOG

MERCURY MONITORING STUDY DESIGN PLAN

BLUEFISH HYDROELECTRIC FACILITY

BLUEFISH LAKE, NORTHWEST TERRITORIES

Water Licence MV2020L4-0005

September 2021

DOCUMENT MAINTENANCE AND CONTROL

The Director, Health, Safety & Environment is responsible for the distribution, maintenance and updating of the Engagement Log.

DOCUMENT HISTORY				
Revision #	**Revised Section(s)**	**Description of Revision**	**Prepared by**	**Issue Date**
0	N/A	First Version	NTPC	Sept 2021

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1 INTRODUCTION

This Engagement Log provides an engagement record for the development of the Bluefish Hydroelectric Facility (Bluefish Facility) Mercury Monitoring Study Design Plan (MMS Design Plan) that outlines the process planned to continue monitoring mercury levels in fish in Bluefish Lake. The Bluefish Facility is primarily located on Prosperous Lake, 39 km north of Yellowknife, NT, on the Yellowknife River system.

The operation of the facility requires a water licence from the Mackenzie Valley Land and Water Board (MVLWB) under the direction of the Mackenzie Valley Resource Management Act and the Waters Act. Water Licence MV2020L4-0005 was issued to NTPC on April 3, 2021 and requires that NTPC design and implement an MMS Design Plan. Condition 1 of Part G of MV2020L4-0005 states "Within 6 months of the effective date of this Licence, the Licensee shall submit to the Board, for approval, an MMS Design Plan. The MMS Design Plan shall be in accordance with the requirements of Schedule 3, condition 1." This MMS Design Plan includes all requirements for reporting to the Mackenzie Valley Land and Water Board (MVLWB

As per Condition 1 of Schedule 2 of MV2020L4-0005 NTPC completed stakeholder engagement for the development of the MMS Design Plan throughout September and October 2021. Feedback from the stakeholder engagement process was directly incorporated into the MSS Study Design. Engagement will provided an opportunity for stakeholders to contribute knowledge and solutions to the process, which is mutually beneficial to all parties involved.

This log was developed to document the detailed engagement process that NTPC undertook in the months leading up to submitting MMS Design Plan. The engagement process was guided by the *Bluefish Hydro Facility- Engagement Plan- July 2020* (NTPC, 2020). Engagement also occurs under the Bluefish Hydro land use permit MV2017X0005 for the operation of the facility and winter road.

1.1 BLUEFISH FACILITY

The Bluefish facility makes use of water from the Yellowknife River drainage basin. Prior to the damming of Bluefish Lake in 1940 and diverting of the Yellowknife River through the Bluefish facility, the Yellowknife River connecting Bluefish and Prosperous Lakes went over a waterfall at the outlet from Bluefish Lake. Prosperous Lake is approximately 38 m lower than Bluefish Lake.

The Bluefish Facility is the oldest hydro facility in the N.W.T. with the original Bluefish Lake Dam constructed in 1940 and the G1 generating plant and Duncan Lake dam completed in 1942.The original Bluefish Lake Dam was a timber crib structure buttressed on the upstream and downstream with rock fill that was constructed at a waterfall at the outlet of Bluefish Lake The facility was constructed to provide electricity to operate the Cominco Gold Mine in Yellowknife. In 1994 the G2 generating plant was built 20m west of the G1generating plant Duncan Lake, 20 km north east of the Bluefish Lake, provides the majority of the water storage for the Bluefish facility. Water from Duncan Lake and the Yellowknife River flows into Bluefish Lake where it in enters the intake head gate. The intake leads to a 760 m long unlined rock tunnel. From the tunnel, a 3 m diameter, 150 m long steel penstock bifurcates and connects to two powerhouses each containing a single unit. NTPC generally operates the new unit and utilizes the old unit as a variable flow generator when the electrical demand exceeds the capacity of the new unit. There are several additional buildings located near the powerhouses, including two trailers housing operations employees.

The main storage reservoir for the Bluefish Facility is at Duncan Lake. Water flows from Duncan Lake through the Duncan Lake Dam along the McCrea River to Neck Lake, then to Short Point and Angle Lake. Water from Angle Lake flows into Quyta Lake where the McCrea River system joins the Yellowknife River system, and then on to Bluefish Lake.

The primary purpose of the Duncan Lake dam is to provide a water supply for power generation at the Bluefish Plants. The Duncan Lake control dam was originally built in 1942 as a rockfill timber crib structure, It was relocated and replaced in 1974 with a concrete gravity dam consisting of a stoplog opening and overflow spillway, and repaired in 1994, 2007, and 2017.

The Bluefish Hydroelectric Facility is outlined in Figures 1 and 2.

Figure 1: Bluefish Hydro Facility- General Site Location

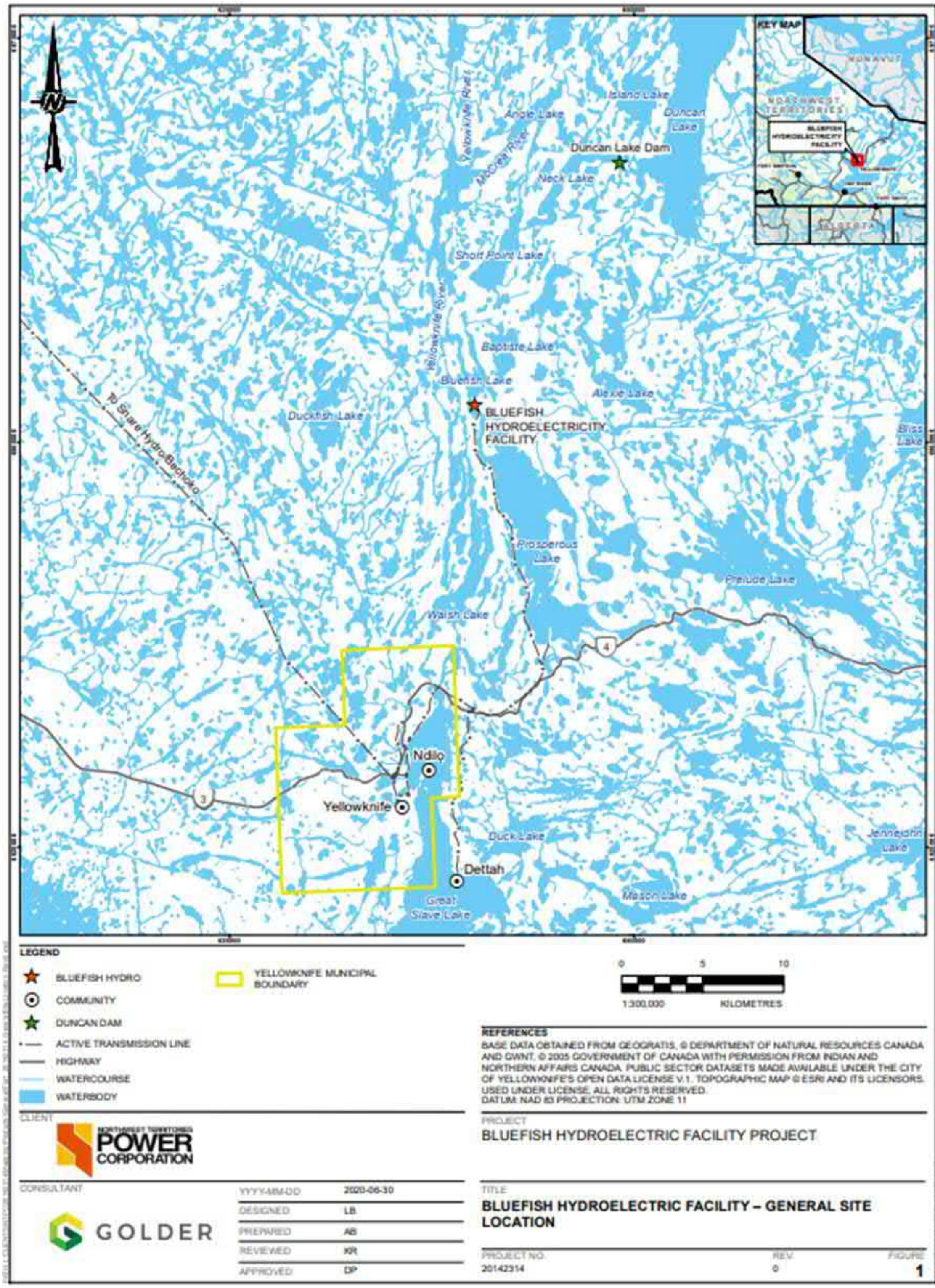
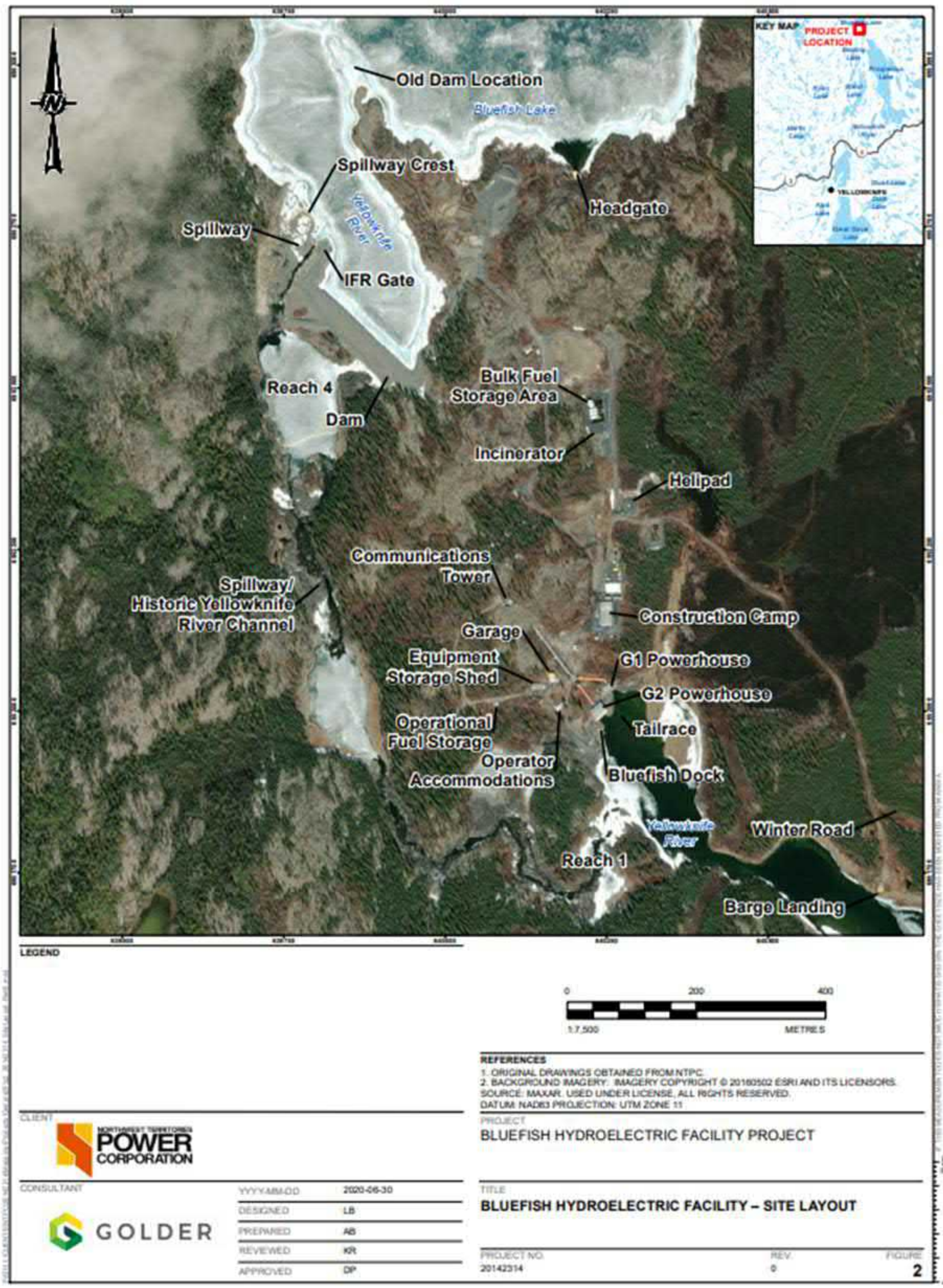


Figure 2: Bluefish Hydroelectric Facility



1.2 CORPORATE CONTACT INFORMATION

NTPC contact information for the Bluefish WL is as follows:

Matthew Miller
Senior Environmental Licensing Specialist
4 Capital Drive
Hay River, NWT X0E 1G2
Tel: (867) 874-5314 mmiller@ntpc.com

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Yellowknife, NT X1A 2P7
E: eileenhendry@ntpc.com
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C: 1-867-444-1170

Doug Prendergast
Manager, Communications
4 Capital Drive
Hay River, NWT X0E 1G2
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2 MMS DESIGN PLAN ENGAGEMENT

NTPC completed a thorough engagement process leading up the submission of the MMS Design Plan to gather input from stakeholders on the package.

The engagement process provided an opportunity for stakeholders to contribute knowledge and solutions to the MMS Design Plan.

The Engagement process was completed during the COVID-19 public health pandemic and in-person meetings and public information sessions were not possible due to social distance measures in place to protect public health

Some key tools that were employed in the engagement process are:

- Electronic mail (email) and notification letters;
- Phone conversations;
- Mercury Monitoring Study Workshop for the Bluefish Hydroelectric Facility hosted on Wednesday, September 8, 2021 (hosted using Microsoft Teams software);
- Engagement meeting withs stakeholders who could not attend the workshop to review presentation and gather feedback (hosted using Microsoft Teams software)
- Email correspondence regarding workshop presentation and proposed MMS Design Plan to gather feedback and answer questions

2.1 PARTIES ENGAGED

NTPC has identified a number of aboriginal, municipal, territorial and federal governments, governmental organizations and private organizations as parties to be engaged as part of the land-use permit application. These parties and organizations are presented in Table 2-1.

Table 2-1: Parties Engaged

Organization	Organization
Akaitcho IMA Implementation Office	CIRNAC - NWT Inspectors
Bathurst Inlet Development Ltd.	CIRNAC - Yellowknife
Bathurst Inlet Lodge	Katlodeeche First Nation
Canadian Northern Economic Development Agency - NWT Region	Lutsel K'e Dene First Nation - Chief or Wildlife, Lands and Environment
Cassidy Point Association	Local Lease Holders
CIRNAC-CARD	Mackenzie Valley Environmental Impact Review Board
City of Yellowknife	Manitoba Denesuline
Dene Nation	MVLWB
Deninu K'ue First Nation	New Discovery Mines Ltd.
Det'on Cho Corporation	New Nadina Explorations Limited
Environment and Climate Change Canada	North Slave Metis Alliance
Fisheries and Oceans Canada	Northwest Territory Metis Nation
Fort Resolution Metis Government	NWT & Nunavut Chamber of Mines
Forward Mining	NWT- OROGO
GNWT - ENR (Environment and Natural Resources)	Salt River First Nation
GNWT - ENR - EAM (Environmental Assessment and Monitoring)	Smith's Landing First Nation
GNWT - ENR - North Slave Region	Tlicho Government
GNWT - Executive and Indigenous Affairs	Tlicho Lands Protection Department
GNWT - INF (Infrastructure)	Tlicho Regulatory Specialist
GNWT - ITI (Industry, Tourism and Investment)	Town of Fort Smith
GNWT - Lands	Town of Hay River
GNWT - Lands - North Slave Region	Wek' eezhii Renewable Resources Board
GNWT - MACA (Municipal and Community Affairs)	West Point First Nation
GNWT - PPCA (Policy, Planning, Communications and Analysis (w/in ITI))	WLWB
GNWT - PWNHC (Prince of Wales Northern Heritage Centre (w/in ECE))	Yellowknives Dene First Nation
Hamlet of Fort Resolution	

3 ENGAGEMENT RECORD

3.1 ENGAGEMENT SUMMARY

A summary of all engagement undertaken leading up to the submission of the MMS Design Plan is presented below. This includes an entry for each engagement, including the following information:

- Date of engagement;
- Name of party or group;
- Format of engagement;
- Individuals attending;
- Issue or topic of discussion;
- Comments received by NTPC; and
- Description of issues that were jointly resolved or which remain outstanding.

An overview of the engagement results is presented in Table 3-1.

Some of the key milestones in the engagement process for the land use permit were:

1. Notification email to all stakeholders with notification regarding the development of the submission of MMS Design Plan as required by Type A Water Licence MV2020L4-005 for the Bluefish Facility. Letter included general information about the MMS Design Plan and plans for a virtual workshop to be held on September 8, 2021. The notification letter is included as Appendix A.
    a. Notification email to all stakeholders was sent August 26, 2021.
2. Follow up notification email to stakeholders in the region with further details on the MMS Design Plan Virtual Workshop including time for the meeting on September 8, 2021, information on previous mercury monitoring completed at Bluefish and a link to the MVLWB registry to find more info on past mercury monitoring. The follow up notification letter is included as Appendix A.
    a. Follow up notification email to all stakeholders was sent September 2, 2021.
3. MMS Design Plan Virtual Workshop was hosted to gather input on the MSS Design Plan and included a presentation and online forum for discussion and questions (hosted using Microsoft Teams software). Workshop was attended by 6 stakeholder organizations. MMS Design Plan Virtual Workshop details are provided in Appendix B including presentation slides and meeting notes
    a. MMS Design Plan Virtual Workshop was hosted on September 8, 2021.

4. Virtual stakeholder engagement meetings were held with stakeholders that could not attend the workshop to gather input on the submission. All stakeholder engagement meeting notes are include in Appendix D.
    a. Virtual stakeholder engagement meeting with Tlicho Government was held on October 4, 2021
5. Input was gathered from some stakeholders through detailed email correspondence as well. All detailed stakeholder emails are include in Appendix D.
    a. Detailed email correspondence occurred with NSMA in late September and early October 2021.

The points above only outline the major milestones of the engagement process. A detailed record of all engagement interaction with all stakeholders throughout the pre-submission engagement period is outlined in Table 3-1.

Table 3-1: Detailed Engagement Record

Date	Item	Parties	Cc'd	Description
2021-08-26	Email- to	All stakeholders outlined in Table 2-1, full email list provided in Appendix A		Notification email to all stakeholders with notification regarding the development of the submission of MMS Design Plan as required by Type A Water Licence MV2020L4-005 for the Bluefish Facility. See Appendix A.
2021-08-26	Email- from	jpellissey@wrrb.ca	rjennings@wrrb.ca	Email stating "Randi Jennings (rjennings@wrrb.ca) will attend the meeting on behalf of the Wek'èezhìı Renewable Resources Board.""
2021-08-26	Email- from	dave drwgcl.com <dave@drwgcl.com>		Email stating interest in attending and taking part in the workshop on Sept 8, 2021. "
2021-08-26	Email- to	Dave drwgcl.com <dave@drwgcl.com>		Verification of attendance and meeting invite for September 8 workshop. .
2021-08-26	Email- to	jpellissey@wrrb.ca	rjennings@wrrb.ca	Verification of attendance and meeting invite for September 8 workshop. .
2021-08-26	Email- from	Lee Ross <Lee_Ross@gov.nt.ca>		Email stating "I was invited by our ENR Assessment coordinator to attend a Mercury Monitoring Workshop for Blue Fish. I was wondering if you could give me some background on the mercury issue… If possible."
2021-08-30	Email- to	Lee Ross <Lee_Ross@gov.nt.ca>		Email stating "Thanks for your email. We will send out additional information this week. All of the background reports are in the MVLWB registry under Type A Water Licence- MV2005L4-0008 and now MV2020L4-0005 as well. Thanks for your time and we will send more info over this week. Let me know if you have any specific questions as well.
2021-08-30	Email- to	Jess.Hurtubise@nsma.net, lands@nsma.net		Email stating "Thanks for inquiring with NSMA about engagement for the proposed Mercury Monitoring Study for Bluefish. Unfortunately, we have too many other prior engagements for Sept 8 to have a meeting on that day. Would it be possible to receive summary documents of the key points, as NTPC normally does?"
2021-09-02	Email- from	patrick_clancy@gov.nt.ca	Bill Pain <Bill_Pain@gov.nt.ca>	Email stating "The Water Management and Monitoring Division, ENR will have one virtual attendee. For any zoom, or other information for the workshop, please contact Bill_Pain@gov.nt.ca or Rick_Walbourne@gov.nt.ca"
2021-09-02	Email- to	patrick_clancy@gov.nt.ca	Bill Pain <Bill_Pain@gov.nt.ca>	Email verifying workshop attendance for Bill and Rick
2021-09-02	Email- from	Bill Pain <Bill_Pain@gov.nt.ca>	Bill Pain <Bill_Pain@gov.nt.ca>	Email verifying workshop attendance for Bryana Mathews from ENR
2021-09-02	Email- to	All stakeholders outlined in Table 2-1, full email list provided in Appendix A		Follow up notification email to stakeholders in the region with further details on the MMS Design Plan Virtual Workshop including time for the meeting on September 8, 2021, information on previous mercury monitoring completed at Bluefish and a link to the MVLWB registry to find more info on past mercury monitoring. The follow up notification letter is included as Appendix A.
2021-09-02	Email- to	violetcamsellblondin@tlicho.com; Longinus Ekwe <longinusekwe@tlicho.com>		Email stating "Please let us know if you are able to attend the workshop Wednesday September 8 at 3:00pm. This topic was discussed in our engagement meetings with you and your team, and it would be great to have you attend and contribute to the Bluefish Mercury Monitoring Study Workshop."
2021-09-02	Email- to	Sarah Gillis <saraht@ykdene.com>; Jason Snaggs <jasons@ykdene.com>; Ryan Miller <ryanm@ykdene.com>		Email stating "Please let us know if you are able to attend the workshop Wednesday September 8 at 3:00pm. This topic was discussed in our engagement meetings with you and your team, and it would be great to have you attend and contribute to the Bluefish Mercury Monitoring Study Workshop."
2021-09-02	Email- from	Jen Potten <jpotten@mvlwb.com>	Tyree Mullaney <tyree@mvlwb.com>; Katherine Harris <kharris@mvlwb.com>	Email inquiring if there were different time slots available for workshop
2021-09-02	Email- from	David-Scott McQuinn <David-Scott_McQuinn@gov.nt.ca>		Verification of attendance and meeting invite for September 8 workshop.
2021-09-02	Email- to	Jen Potten <jpotten@mvlwb.com>	Tyree Mullaney <tyree@mvlwb.com>; Katherine Harris <kharris@mvlwb.com>	Email stating "We have scheduled the workshop 3-430 Wednesday September 8 but for anyone that can't make it we would be happy to send all presentation info and set up a separate call. Let me know if you would like to set up a separate call if the 8th doesn't work"
2021-09-03	Email- to	Tyree Mullaney <tyree@mvlwb.com>;	Katherine Harris <kharris@mvlwb.com> Jen Potten <jpotten@mvlwb.com>	Verification of attendance and meeting invite for September 8 workshop.
2021-09-08	Virtual Workshop	See Appendix B.		MMS Design Plan Virtual Workshop was hosted to gather input on the MSS Design Plan and included a presentation and online forum for discussion and questions (hosted using Microsoft Teams software). Workshop was attended by 6 stakeholder organizations. MMS Design Plan Virtual Workshop details are provided in Appendix B including presentation slides and meeting notes

Date	Item	Parties	Cc'd	Description
2021-09-09	Email- from	Ryan Miller <ryanm@ykdene.com>,	Sarah Gillis <saraht@ykdene.com>; Jason Snaggs <jasons@ykdene.com> Femi Baiyewun <femib@ykdene.com>	Email stating ".I apologize for the late response, I am cleaning up my emails after being away. I realize we have missed our opportunity to participate in this virtual meeting. In the future, your primary contact at YKDFN will be the Regulatory Manager, Femi Baiyewun cc'ed in this email. Also, Jason no longer works for the band"
2021-09-09	Email- to	Ryan Miller <ryanm@ykdene.com>,	Sarah Gillis <saraht@ykdene.com>; Jason Snaggs <jasons@ykdene.com> Femi Baiyewun <femib@ykdene.com>	Email stating "Appreciate your response and nice to connect with you Femi. We will follow up this week with the presentation and workshop notes. After we follow up with the meeting info it would be great to schedule a quick meeting next week to follow up if possible."
2021-09-21	Email- to	All attendees of the MMS Workshop. See Appendix B.		Email with workshop presentation and meeting minutes, see Appendix B. "
2021-09-21	Email- to	Femi Baiyewun <femib@ykdene.com>; Ryan Miller <ryanm@ykdene.com>; Sarah Gillis <saraht@ykdene.com>		Email stating "I have attached the presentation and meeting minutes from the Bluefish Mercury Monitoring Study Workshop on September 8, 2021. Please review the material and let us know if you have any questions or input we should incorporate into the study design. If possible it would be great to set up a quick meeting to discuss early next week. Let us know if there is a day and time that would for you and your team"
2021-09-21	Email- to	violetcamsellblondin@tlicho.com; Longinus Ekwe <longinusekwe@tlicho.com>; Brett Wheler <brett.wheler@tlicho.ca>; Jessica Pacunayen <Jessica.Pacunayen@tlicho.ca>		Email stating "I have attached the presentation and meeting minutes from the Bluefish Mercury Monitoring Study Workshop on September 8, 2021. It would be great if you and your team could review the material and let us know if you have any questions or input we should incorporate into the study design. If possible it would be great to set up a quick meeting to discuss early next week to gather input from the Tlicho team. We were looking at setting up a meeting for the Snare permits, we could possibly add some time on to the end of that meeting to discuss the Bluefish Mercury Monitoring Study as well. Let us know what would work for you."
2021-09-21	Email- to	Jess.Hurtubise@nsma.net, lands@nsma.net		Email stating "I have attached the presentation and meeting minutes from the Bluefish Mercury Monitoring Study Workshop on September 8, 2021. It would be great if you and your team could review the material and let us know if you have any questions or input we should incorporate into the study design. If possible it would be great to set up a quick meeting to discuss early next week to gather input from the Tlicho team. We were looking at setting up a meeting for the Snare permits, we could possibly add some time on to the end of that meeting to discuss the Bluefish Mercury Monitoring Study as well. Let us know what would work for you."
2021-09-27	Email- to	Femi Baiyewun <femib@ykdene.com>; Ryan Miller <ryanm@ykdene.com>; Sarah Gillis <saraht@ykdene.com>		Email stating "I wanted to follow up on the email below regarding input on the Bluefish Mercury Monitoring Study Workshop on September 8, 2021. Please review the material and let us know if you have any questions or input we should incorporate into the study design. Would it be possible to set up a quick meeting to discuss before Wednesday this week?. Let us know if there is a day and time that would for you and your team. Alternatively you could also provide comments through email as well. The MSS study will be submitted by October 3, 2012 as required in the WL."
2021-09-27	Email- to	Jess.Hurtubise@nsma.net, lands@nsma.net		Email stating I wanted to follow up on the email below regarding input on the Bluefish Mercury Monitoring Study Workshop on September 8, 2021. Please review the material and let us know if you have any questions or input we should incorporate into the study design. Would it be possible to set up a quick meeting to discuss before Wednesday this week?. Let us know if there is a day and time that would for you and your team. Alternatively you could also provide comments through email as well. The MSS study will be submitted by October 3, 2012 as required in the WL"

Date	Item	Parties	Cc'd	Description
2021-09-27	Email- to	violetcamsellblondin@tlicho.com; Longinus Ekwe <longinusekwe@tlicho.com>; Brett Wheler <brett.wheler@tlicho.ca>; Jessica Pacunayen <Jessica.Pacunayen@tlicho.ca>		Email stating “I wanted to follow up on the email below regarding input on the Bluefish Mercury Monitoring Study Workshop on September 8, 2021. Please review the material and let us know if you have any questions or input we should incorporate into the study design. Would it be possible to set up a quick meeting to discuss this and the Snare Quarry permits before Wednesday this week?. Alternatively you could also provide comments through email as well. The MSS study will be submitted by October 3, 2012 as required in the WL. Even if a meeting is not required to gather input on the MMS we would still like to meet with you and your team as early as possible to discuss the Snare Quarry permits. Let us know if there is a day and time that would for you and your team.”
2021-09-27	Email- from	Longinus Ekwe <longinusekwe@tlicho.com>;		Email to verify that Tlicho will get back to NTPC will comments on the details and timing for engagement meeting as part of the upcoming Water Licence Renewal.
2021-09-28	Email- from	Jess.Hurtubise@nsma.net, lands@nsma.net	Noah Johnson <Noah.Johnson@nsma.net>	Email with comments and questions from NSMA, Refer to Appendix D.
2021-09-29	Email- to	Longinus Ekwe <longinusekwe@tlicho.com>;		Email to verify meeting time with Tlicho Government Team .
2021-10-04	Email- to	Jess.Hurtubise@nsma.net, lands@nsma.net Noah Johnson <Noah.Johnson@nsma.net		Email responding to comments and questions from NSMA, Refer to Appendix D.
2021-10-04	Engagement Meeting	Longinus Ekwe <longinusekwe@tlicho.com> paulvecsei@tlicho.com		Engagement meeting to gather input on submission. Refer to Appendix C for meeting notes.
2021-10-05	Email- to	Longinus Ekwe <longinusekwe@tlicho.com> paulvecsei@tlicho.com		Email to verify Engagement meeting notes.
2021-10-04	Email- to	Femi Baiyewun <femib@ykdene.com>; Ryan Miller <ryanm@ykdene.com>; Sarah Gillis <saraht@ykdene.com>		Email Stating “NTPC has updated the Bluefish Mercury Monitoring Study Design based on stakeholder feedback from the workshop on September 8 and various meetings and discussions throughout September 2021. We provided the presentation and meeting minutes on September 21 and 27 but haven’t received any feedback yet. NTPC is submitting the Bluefish Mercury Monitoring Study Design on October 8, 2021. If you do have any questions or input please provide them by end of day tomorrow. If you have no questions or comments please lets us know as well.”
2021-10-05	Email- from	Femi Baiyewun <femib@ykdene.com>;	Ryan Miller <ryanm@ykdene.com>; Sarah Gillis <saraht@ykdene.com>	Email stating “Hi Matthew, Sorry for the delay in respond to your email and presentation. Thanks for the presentation which contain the information on the field activity, sampling, and results, but did not address eventualities and likelihood of approach or measure that can be put in place for unexpected exceedance. A review of some of the data from the sampling program indicated some occasional Hg spikes and subsequent stability. However, the probability of the mercury from power generating plants are obvious and the operation in Yellowknife River is included. s may be high or moderate (maybe occasionally), but I would suggest that you include a trigger action response plan or a risk assessment management program that will address consequences, mitigation and proactive mitigation that may be put in place as a trigger action to exceedance. If you consider a risk assessment approach this should involve an engagement session with the YKDFN membership and other stakeholders. The goal is to have a better understanding of mercury impact through fish consumption from NTPC. I look forward to a collaborative risk management session in the future. Thanks again”
2021-10-05	Phone Call to	Femi Baiyewun <femib@ykdene.com>;	Ryan Miller <ryanm@ykdene.com>; Sarah Gillis <saraht@ykdene.com>	Discussion to set up engagement meeting to review preseation from workshop and comments on MMS Plan
2021-10-04	Engagement Meeting	Femi Baiyewun <femib@ykdene.com>;		Engagement meeting to gather input on submission. Refer to Appendix C for meeting notes.

APPENDIX A

NOTIFICATION TO ALL STAKEHOLDERS

Matthew Miller

From: Matthew Miller
Sent: Thursday, August 26, 2021 10:46 AM
To: Matthew Miller
Subject: Bluefish Mercury Monitoring Study- September 8, 2021 Workshop

Hello,

The Northwest Territories Power Corporation (NTPC) owns and operates the Bluefish Hydroelectric Facility. The facility, which is located 39 km north of Yellowknife at the north end of Prosperous Lake on the Yellowknife River, contributes power to the North Slave electrical system. Throughout 2020 and early 2021 NTPC completed the renewal process for a Type A Water Licence for the Bluefish facility and the Mackenzie Valley Land and Water Board (MVLWB) issued Type A Water Licence MV2020L4-005 on March 10, 2021.

Under this Water Licence, NTPC is required to design and implement a Mercury Monitoring Study for Bluefish Lake. Prior to finalizing the scope and methodology of the study, NTPC wishes to receive input from interested stakeholders. NTPC is hosting a workshop that stakeholders can attend to learn more about the proposed study and provide feedback on its development.

Due to current COVID-19 restrictions, an in-person workshop is not currently possible; therefore, an online workshop will be held on Wednesday, September 8. NTPC will also be available to engage with stakeholders through phone calls, additional online meetings and/or emails for any action items from the workshop. Additional information on the workshop will sent out to all stakeholders next week.

Please confirm whether your organization wishes to be involved in this workshop and . provide a name and email address for all planning to attend. If you have any questions or comments or require further information about the upcoming workshop, please contact me at mmiller@ntpc.com.

Thanks for your time,

Matthew Miller, M.Sc., P.Eng.
Senior Environmental Licensing Specialist
Northwest Territories Power Corporation

Matthew Miller

From: Matthew Miller
Sent: Thursday, September 2, 2021 1:31 PM
To: Matthew Miller
Cc: screeningofficer@eastarm.com; boydw@bathurstinlet.com; barryt@arcticsafaris.ca; adrian.paradis@canada.ca; murray.somers@canada.ca; walexander@yellowknife.ca; lands@denenation.com; admin@dkfn.ca; ima@dkfn.ca; sao@dkfn.ca; cheryl.esmilla@detoncholandtran.com; ec.ea.nwt.ec@canada.ca; fisheriesprotection@dfo-mpo.gc.ca; trudy.king@nwtmetis.ca; info@forwardmining.ca; bill_pain@gov.nt.ca; laurie_mcgregor@gov.nt.ca; Nathen_Richea@gov.nt.ca; patrick_clancy@gov.nt.ca; Rick_Walbourne@gov.nt.ca; Robert_Jenkins@gov.nt.ca; gnwt_ea@gov.nt.ca; Heather E. Beck; Peter_Fast@gov.nt.ca; Alexis_Campbell@gov.nt.ca; Jon_Posynick@gov.nt.ca; stu_niven@gov.nt.ca; Benjamin_Teed@gov.nt.ca; Carol_Norris@gov.nt.ca; Melanie_Williams@gov.nt.ca; Brandon_Bradbury@gov.nt.ca; cheryl_larocque@gov.nt.ca; clint_ambrose@gov.nt.ca; joe_heron@gov.nt.ca; Nahum_Lee@gov.nt.ca; Scott_Stewart@gov.nt.ca; Iqbal_Arshad@gov.nt.ca; Olivia_Lee@gov.nt.ca; Evan_Walz@gov.nt.ca; Glen_Mackay@gov.nt.ca; Hilary_machtans@golder.com; Tasha_Hall@golder.com; Carolc.lands@gmail.com; sao.hfr1@gmail.com; tim.morton@canada.ca; dinah.elliott2@canada.ca; kfnchief@katlodeeche.com; kfnenvironmental@katlodeeche.com; chief.lkdfn@gmail.com; lkdfnlands@gmail.com; mcliffephillips@reviewboard.ca; ww.symbion@shawbiz.ca; jpotten@mvlwb.com; dave.white@aurorageosciences.com; lands@nsma.net; tim.heron@nwtmetis.ca; executivedirector@miningnorth.com; Pauline_DeJong@gov.nt.ca; ceo.srfn@northwestel.net; chief.srfn@northwestel.net; lands@slfn196.com; lands_assistant@slfn196.com; lands_culture@slfn196.com; georgemackenzie@tlicho.com; ginger.gibson@thefirelightgroup.com; gracemackenzie@tlicho.com; henryzoe@tlicho.com; violetcamsellblondin@tlicho.com; tyannasteinwand@tlicho.com; jhood@fortsmith.ca; pwsdirector@hayriver.com; jpellissey@wrrb.ca; land@wpfn.ca; rjudas@wlwb.ca; ebetsina@ykdene.com; drapes@ssimicro.com; nwtbraden@yahoo.ca; sambullock@denenation.com; Jeff.Moyer@dfo-mpo.gc.ca; Christian.Marcoux@dfo-mpo.gc.ca; Gerald.Fillatre@dfo-mpo.gc.ca; dave@drwgcl.com; Jessica Hurtubise; Adelaide Mufandaedza; Longinus Ekwe; debbiendoug@theedge.ca; karattray@gmail.com; vic.wanda@gmail.com; clyne.paul@gmail.com; korver.d@gmail.com; slanglois@rtl.ca; David-Scott McQuinn; Bryana Matthews; Sarah Gillis; Jason Snaggs; Doug Prendergast; Alex Love; Eileen Hendry; Eddie Smith; Belinda Whitford; Tyree Mullaney; Ian Ziemann; Panayi, Damian; Bonin, Laurence; Stevens, Cameron; Cory Strang; Paul Grant; Jeff.Moyer@dfo-mpo.gc.ca; Martine McKay; Fruin, Sarah; Bryana Matthews
Subject: RE: Bluefish Mercury Monitoring Study- September 8, 2021 Workshop

Good Afternoon,

The Bluefish Mercury Monitoring Study Virtual Workshop will be hosted on Wednesday September 8 at 3:00pm. Due to current COVID-19 restrictions an in-person workshop is not possible; therefore, the workshop will be hosted virtually using Microsoft Teams software.

Please let me know if you or someone in your organization would like to attend this workshop and please include name and email address. Invitations for the workshop will be sent out early next week to attendees.

NTPC is designing and implementing a Mercury Monitoring Study for Bluefish Lake as required by the Type A Water Licence for the Bluefish Facility MV2020L4-005. Prior to the MV2020L4-005 Water Licence NTPC was required to monitor mercury concentrations by previous Water Licence's MV2009L4-0004 (held for construction of the dam) and MV2005L4-0008 (held for the operation of the facility 2006-2021). Past Mercury Monitoring Reports for Bluefish are presented in the table below for reference. All previous Mercury Monitoring Reports are available on https://mvlwb.com/registry. NTPC will present a short summary of the monitoring results to date as part of the workshop.

Report Title	Year of Sampling	Fish Species Sampled for Mercury
Fisheries Investigations in Bluefish Lake	2011	Northern Pike, Lake Trout, Lake Whitefish
Bluefish Lake Fisheries Studies	2012	Slimy Sculpin, Northern Pike, Lake Trout
Bluefish Lake Hydroelectric Plant 2013 Fisheries and Flow Monitoring Report	2013	Slimy Sculpin
Bluefish Lake Hydroelectric Plant 2014 Fisheries and Flow Monitoring Report	2014	Slimy Sculpin
Bluefish Lake Hydroelectric Plant 2015 Fisheries and Flow Monitoring Report	2015	Slimy Sculpin
Bluefish Lake Hydroelectric Plant 2016 Fisheries and Flow Monitoring Report	2016	Northern Pike, Lake Trout
Bluefish Lake Hydroelectric Plant 2018 Fisheries and Flow Monitoring Report	2018	Slimy Sculpin, Northern Pike

Thanks for your time,

Matt

From: Matthew Miller
Sent: Thursday, August 26, 2021 10:46 AM
To: Matthew Miller <MMiller@ntpc.com>
Subject: Bluefish Mercury Monitoring Study- September 8, 2021 Workshop

Hello,

The Northwest Territories Power Corporation (NTPC) owns and operates the Bluefish Hydroelectric Facility. The facility, which is located 39 km north of Yellowknife at the north end of Prosperous Lake on the Yellowknife River, contributes power to the North Slave electrical system. Throughout 2020 and early 2021 NTPC completed the renewal process for a Type A Water Licence for the Bluefish facility and the Mackenzie Valley Land and Water Board (MVLWB) issued Type A Water Licence MV2020L4-005 on March 10, 2021.

Under this Water Licence, NTPC is required to design and implement a Mercury Monitoring Study for Bluefish Lake. Prior to finalizing the scope and methodology of the study, NTPC wishes to receive input from interested stakeholders. NTPC is hosting a workshop that stakeholders can attend to learn more about the proposed study and provide feedback on its development.

Due to current COVID-19 restrictions, an in-person workshop is not currently possible; therefore, an online workshop will be held on Wednesday, September 8. NTPC will also be available to engage with stakeholders through phone calls, additional online meetings and/or emails for any action items from the workshop. Additional information on the workshop will sent out to all stakeholders next week.

Please confirm whether your organization wishes to be involved in this workshop and . provide a name and email address for all planning to attend. If you have any questions or comments or require further information about the upcoming workshop, please contact me at mmiller@ntpc.com.

Thanks for your time,

Matthew Miller, M.Sc., P.Eng.
Senior Environmental Licensing Specialist
Northwest Territories Power Corporation

APPENDIX B

MMS DESIGN PLAN VIRTUAL WORKSHOP INFORMATION

Mercury Monitoring Study Design Plan

Bluefish Hydroelectric Facility

NORTHWEST TERRITORIES POWER CORPORATION
Empowering Communities

Overview

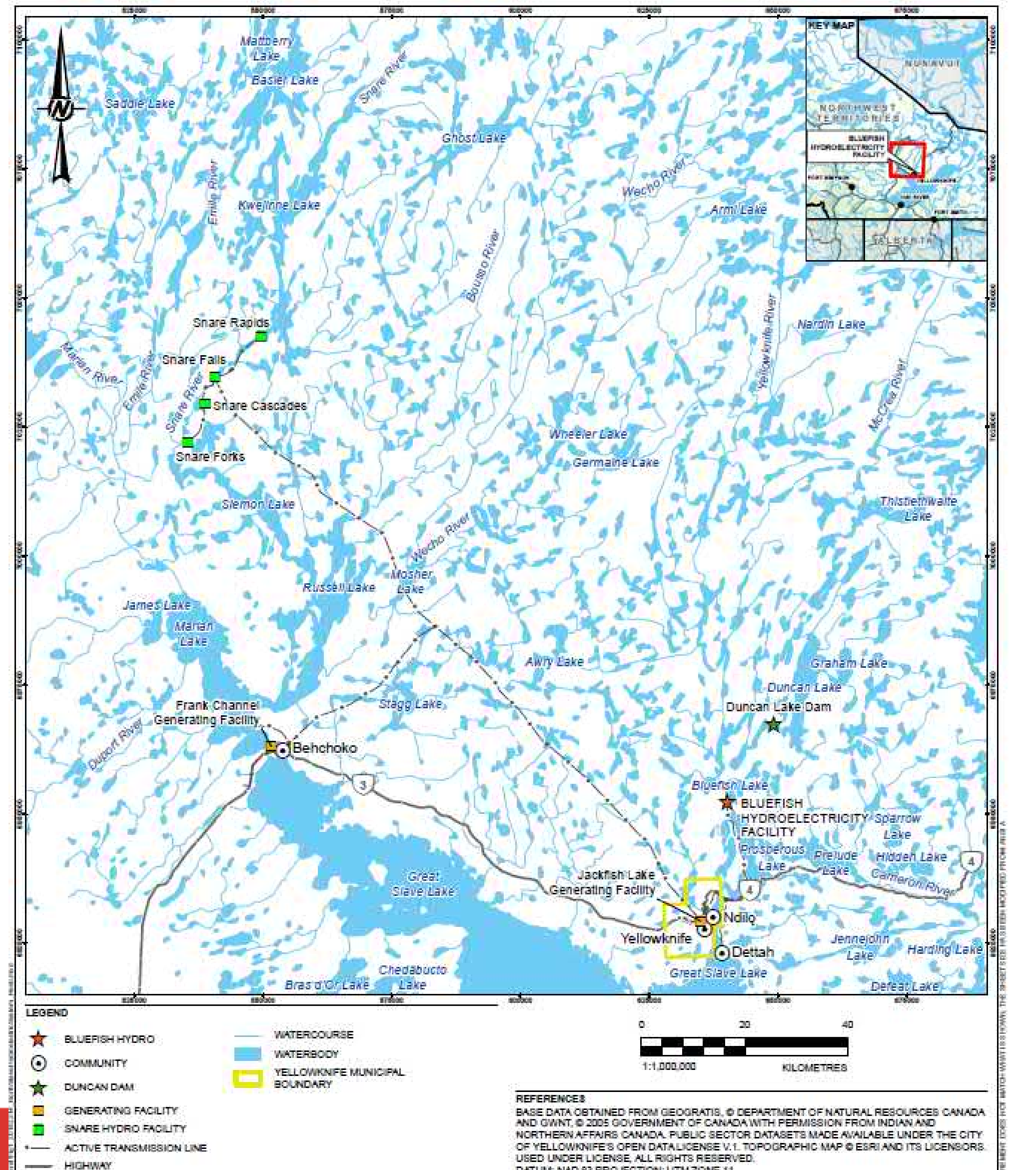
- Bluefish Facility Overview
- Bluefish Lake Dam Construction
- Mercury Monitoring to Date
- Proposed Mercury Monitoring Study

Facility Overview

- Bluefish Hydroelectric Facility is owned and operated by NTPC
  - Bluefish is the oldest hydro facility in the NWT
    - Bluefish Lake Dam constructed in 1940
    - G1 Generating Plant completed in 1942
- Facility operates under Mackenzie Valley Land and Water Board (MVLWB) Type A Water Licence (WL) MV2020L4-0005
- MV2020L4-0005 was issued in March 2021 after NTPC completed the WL renewal process in 2020 and early 2021

Facility Overview

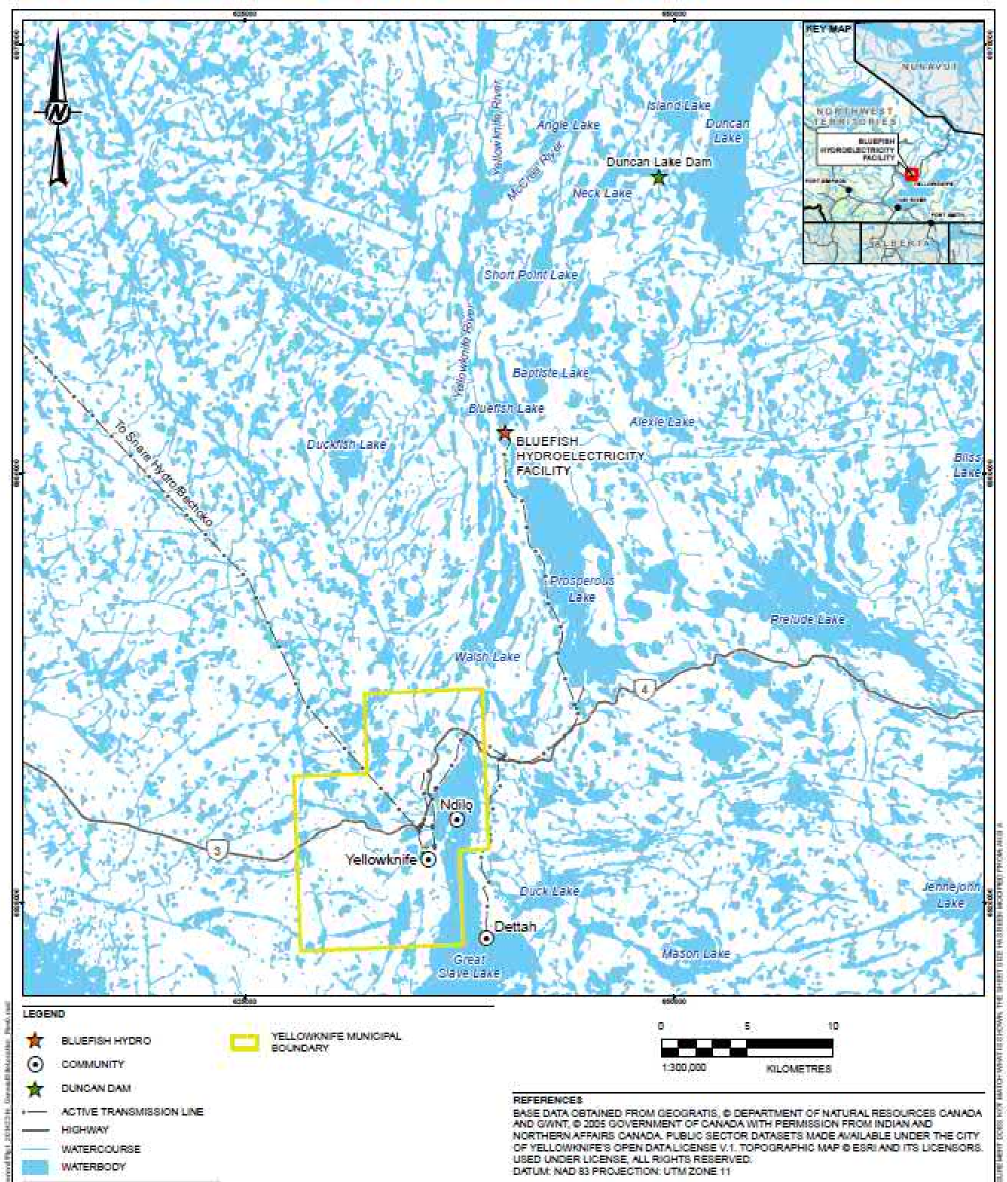
- Generates power used in the North Slave Electrical System
- Two power plants with total capacity of 7.5 MW
  - G1 Plant 3.5 MW
  - G2 Plant 4.0 MW
- North Slave Electrical System provides power to Yellowknife, Behchokǫ̀, Ndilǫ, and Dettah



NORTHWEST TERRITORIES POWER CORPORATION
Empowering Communities

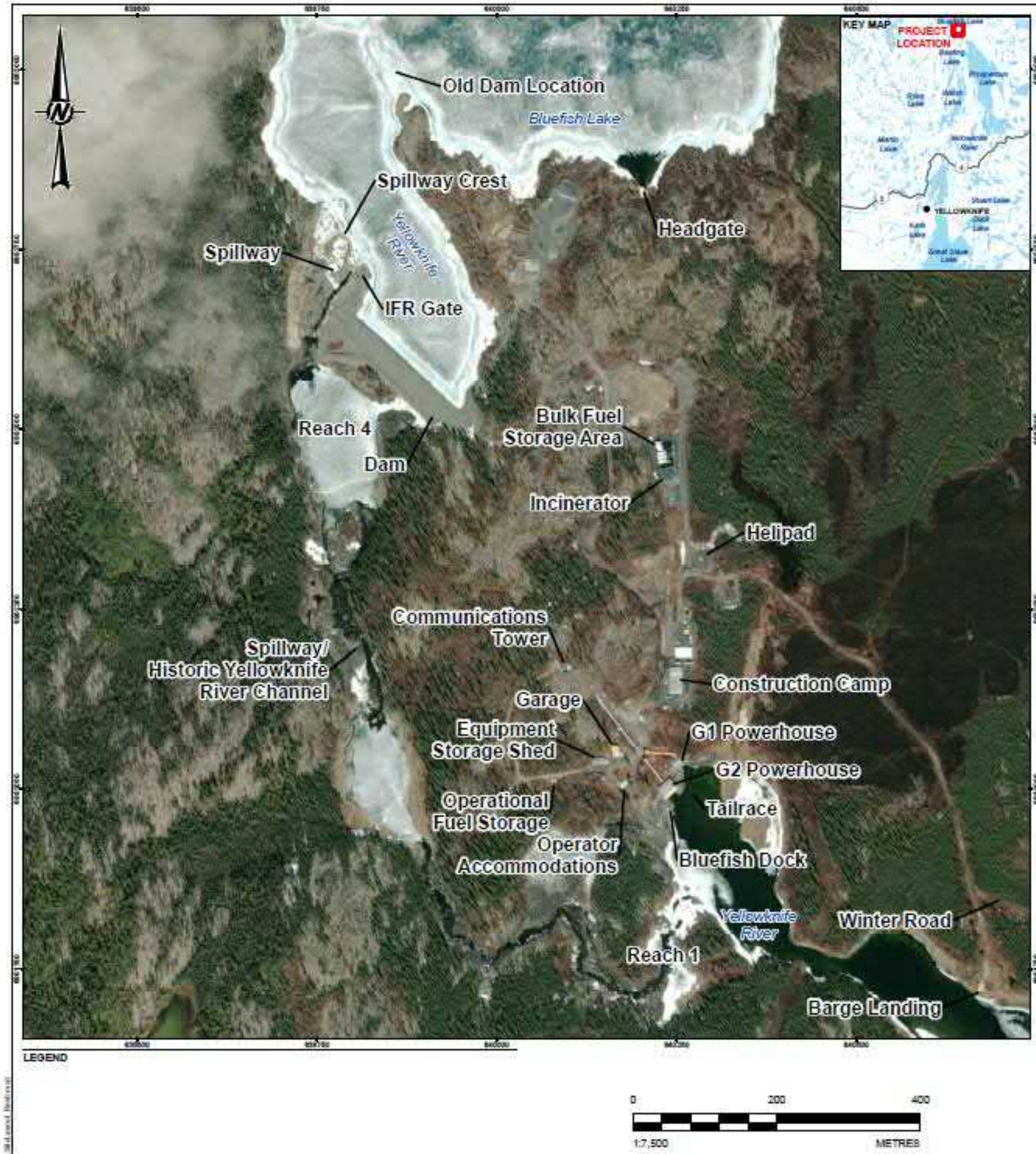
Facility Overview

- Located ~20 km north of Yellowknife on the Yellowknife River at north end of of Prosperous Lake
- Yellowknife River basin is the traditional territory of the Wiliideh Yellowknives Dene , the Tłįchǫ and North Slave Métis Alliance
- Bluefish facility powered Cominco Mine in Yellowknife until closure in 2003 when NTPC acquired it



NORTHWEST TERRITORIES POWER CORPORATION
Empowering Communities

Facility Overview



NORTHWEST TERRITORIES POWER CORPORATION
Empowering Communities

New Dam Construction

- In 2008 several deficiencies became apparent in the original Bluefish Lake Dam.
- NTPC determined that a new dam needed to be constructed.
- Construction of the new dam and spillway approximately 400 meters downstream of the original dam was completed in 2012.

New Dam Construction

- Original Bluefish Lake Dam visible on the left, new dam and spillway on the right.
- Increases in methyl-mercury production can be associated with flooding of wetlands and forests.
- Vegetation clearing and grubbing was completed prior to construction to reduce potential mercury releases

Completed Dam and Spillway

NORTHWEST TERRITORIES POWER CORPORATION
Empowering Communities

Bluefish Lake

- Inflow to Bluefish Lake is the Yellowknife River from Quyta Lake, indicated by the red arrow.
- The outflow is at the dam, and through the headgate to the turbines.
- The area inundated by the new dam is circled.
- The inundated area increased Bluefish Lake by 2.7% of the surface area and 2.4 % of the volume.

NORTHWEST TERRITORIES POWER CORPORATION Empowering Communities

Mercury Monitoring To Date

Report Title	Year of Sampling	Fish Species Sampled for Mercury
Fisheries Investigations in Bluefish Lake	2011	Northern Pike, Lake Trout, Lake Whitefish, Walleye
Bluefish Lake Fisheries Studies	2012	Slimy Sculpin, Northern Pike, Lake Trout
Bluefish Lake Hydroelectric Plant 2013 Fisheries and Flow Monitoring Report	2013	Slimy Sculpin
Bluefish Lake Hydroelectric Plant 2014 Fisheries and Flow Monitoring Report	2014	Slimy Sculpin
Bluefish Lake Hydroelectric Plant 2015 Fisheries and Flow Monitoring Report	2015	Slimy Sculpin
Bluefish Lake Hydroelectric Plant 2016 Fisheries and Flow Monitoring Report	2016	Northern Pike, Lake Trout
Bluefish Lake Hydroelectric Plant 2018 Fisheries and Flow Monitoring Report	2018	Slimy Sculpin, Northern Pike

- Water Licence MV2009L4-0004 required monitoring of mercury levels in the inundated area
- Mercury was monitored primarily in Slimy Sculpin as the indicator species
- Also Northern Pike and Lake Trout to confirm they are safe to eat
- Reference and control areas
- 2011 to 2018
- All results available on https://mvlwb.com/registry

Mercury Monitoring To Date

- Slimy Sculpin lethally sampled from 2012 to 2015
- Northern Pike and Lake Trout non-lethally sampled in 2016 and 2018
- 2016 indicated no increase for Trout, but slight increase in some Pike
- Sampling paused until 2018 to allow Sculpin to recover
- Pike re-sampled in 2018, no change detected
- Mercury in Sculpin declined between 2014 and 2018

Mercury Monitoring To Date

- Mercury concentrations in Pike and Lake Trout were compared to the Canadian Food Inspection Agency (CFIA) guidelines for chemical contaminants in fish for mercury in fish for sale
- Mercury in Sculpin were compared to the Canadian Council of Ministers of the Environment (CCME), Canadian Tissue Residue Guidelines for the Protection of Wildlife Consumers of Aquatic Biota
  - This is a guideline for methyl-mercury, and therefore precautionary when applied to total mercury
- In 2018, no exceedances for Pike, 13% of Sculpin exceeded the guideline
- Not unusual for fish in undisturbed lakes in the NWT to have elevated mercury, leading to HSS Fish Consumption Notices

PROPOSED MERCURY MONITORING STUDY FOR LICENCE MV2020L4-0005

NORTHWEST TERRITORIES POWER CORPORATION
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Mercury Monitoring Study Design

- MV2020L4-0005 requires that NTPC design and implement a Mercury Monitoring Study (MMS)
- As before, the MMS Design Plan focuses on monitoring the target species (Slimy Sculpin) and game fish (Northern Pike). Game fish monitoring will proceed only if the concentrations in target species meets the criteria for the respective Action Level.
- Lake Trout are not currently being considered for monitoring, as mercury levels in Lake Trout declined between 2012 and 2016.

Objectives for the MMS

- The objectives of the MMS Design Plan are to confirm that mercury levels in the target species in the flooded area of Bluefish Lake are stable or declining, and to provide evidence that game species remain safe for human consumption

NORTHWEST TERRITORIES POWER CORPORATION Empowering Communities

Sampling Areas

- Yellow indicates shoreline for backpack electrofishing for sculpin
- Pink indicates areas for angling for Pike
- Power analysis indicated that at least 15 Slimy Sculpin are required to detect a difference greater than the CCME guideline threshold (from the inundated area)
- Similarly, at least 15 Pike from other areas of the lake are predicted to be sufficient to detect trends in mercury levels

Slimy Sculpin

- **Abundant**
- **Small home range**
- **Collected using electroshocking**

Northern Pike

- **Pike are measured and samples collected**
- **A plug of muscle is removed, then the fish is returned live**

Analysis

- Lab analysis will consider total mercury
- Descriptive statistics will be calculated for fish length and mercury concentrations, based on species, year and area
- To determine whether mercury concentrations in fish tissue are changing over time, results will be compared to data collected between 2012 and 2018.
- Mercury concentrations will be compared in tissue across years, as well as spatially, from the RIA and control area, with total length as a covariate.
- Mercury concentrations in Northern Pike will be compared to the CFIA guidelines for chemical contaminants in fish of 0.5 mg/kg ww of mercury in fish and fish products for commercial sale (CFIA 2017).
- Mercury concentrations in Slimy Sculpin will be compared to the CCME Canadian Tissue Residue Guidelines for the Protection of Wildlife Consumers of Aquatic Biota, set at 0.033 mg/kg ww (CCME 2001).

Proposed Action Levels

Action Level	Measurement Indicator	Actions to Consider in the Design Plan or Response Plan
Low	Mercury levels in Slimy Sculpin in the RIA are statistically higher than 2015/2018 levels (i.e., trending higher), and, mercury levels are significantly higher in the RIA versus control area in Bluefish Lake, and, mercury levels in more than one collected sample are above CCME guidelines.	Continue monitoring of Slimy Sculpin, and initiate monitoring of Northern Pike for the following monitoring year
Moderate	Mercury levels in Slimy Sculpin in the RIA remain elevated compared to previous years for second consecutive year of monitoring, and, mercury levels in Slimy Sculpin remain statistically higher in the RIA versus control area in Bluefish Lake for second consecutive monitoring year, and, mercury levels in Northern Pike sampled from Bluefish Lake are statistically higher than 2016/2018 levels.	Continue mercury monitoring for Slimy Sculpin and Northern Pike, and, extend the duration of the monitoring period by a minimum of 1 year, and, expand the scope of the monitoring to include root analysis investigation on potential sources for Mercury
High	Mercury levels in Slimy Sculpin in the RIA have significantly increased over duration of three monitoring periods, and the majority (>50%) of collected samples show mercury levels exceeding CCME guidelines, and, mercury levels in Northern Pike sampled from Bluefish Lake remain elevated compared to previous years for third consecutive year of monitoring, and, the median level of mercury (for the median fish size) is above the CFIA guideline.	Continue mercury monitoring in target species and game fish species, and, extend the duration of the monitoring period by a minimum of 3 years, and, consider an ecological risk assessment or discuss findings with GNWT Department of Health and Social Services

POWER CORPORATION
Empowering Communities

Schedule and Reporting

- If any moderate or high Action Level established in the response framework is exceeded, the MVLWB and an Inspector will be notified by March 31, after sampling is completed the previous fall.
- If an MMS Response Plan is required, it will be submitted to the MVLWB for approval within three months following the MMS Annual Report.
- NTPC will submit an MMS Report summarizing the mercury sampling program and analytical laboratory results to the MVLWB by March 31, 2023 and no later than March 31 every three years thereafter.

Points for Discussion

- Sampling Design
  - Schedule
  - Locations
  - Monitoring of fish collection
  - Methods of sampling
  - Species
- Reporting
  - Format of report
  - Engagement for Results
- Any additional questions or comments?


Thank you

Mercury Monitoring Study Workshop - Bluefish Hydroelectric Facility
Wednesday, September 8, 2021
3:00 – 4:30 p.m.

Attendees:
Sarah Fruin, Golder Associates Ltd.
Damian Panayi, Golder Associates Ltd.
Cameron Stevens, Golder Associates Ltd.
Jen Potten, Regional Coordinator, MVLWB
Katherine Harris, Sr. Technical Advisor, MVLWB
Randi Jennings, Wildlife Biologist, Wekeezhii Renewable Resources Board
Bryana Matthews, Regulatory and Science Advisor, ENR
Eileen Hendry, NTPC
Matthew Miller, NTPC
Doug Prendergast, NTPC
Belinda Whitford, NTPC
David Scott-McQuinn, Water Resources Officer, North Slave, ENR
Dave Webb, New Discovery Mine Ltd.
Tyree Mullaney, Regulatory Specialist, MVLWB

D. Prendergast called the meeting to order. The meeting format was explained and all those in attendance were introduced.

M. Miller presented the Mercury Monitoring Study Design Plan for the Bluefish Hydroelectric Facility giving a high-level overview of the facility, the construction of the Bluefish Lake Dam and reported on some of the mercury monitoring that has taken place to date. Refer to attached Presentation.

Facility Overview – Slides 3-6

- The Bluefish Hydroelectric Facility is owned and operated by NTPC and is the oldest in the NWT.
    - Bluefish Lake Dam constructed in 1940
    - G1 Generating Plant completed in 1942
- It operates currently under the Type A Water Licence MV2020L4-0005

New Dam Construction – Slides 7-9

- Original dam built in 1940
- In 2008, several deficiencies were noted and after various assessments, dam was at risk and new dam needed to be constructed.
- Construction of the new dam and spillway approximately 400 meters downstream of the original dam; was completed in 2012.
- Pictures of the new dam were shown, along with the area inundated by the new dam. The inundated area only increased Bluefish Lake by 2.7% of the surface area and 2.4 % of the volume

Mercury Monitoring to Date – Slides 12-13

- Water Licence MV2009L4-0004 required monitoring of mercury levels in the inundated area
- Mercury was monitored primarily in Slimy Sculpin as the indicator species
- Sampling done in 2011 to 2018; all results available on https://mvlwb.com/registry
- Mercury is a dynamic subject; many reasons why it can go up and down in the ecosystem and why we include in the analysis.

Proposed Mercury Monitoring Study – Slides 14-16

- M. Miller presented the proposed mercury monitoring study to the group based on what has been done so far.
  - There's now a formal requirement for mercury monitoring in the water licence
  - As before, the MMS Design Plan focuses on monitoring the target species (Slimy Sculpin) and game fish (Northern Pike). Game fish monitoring will proceed only if the concentrations in target species meets the criteria for the respective Action Level.
  - Lake Trout are not currently being considered for monitoring, as mercury levels in Lake Trout declined between 2012 and 2016.
  - The objectives of the MMS Design Plan are to confirm that mercury levels in the target species in the flooded area of Bluefish Lake are stable or declining, and to provide evidence that game species remain safe for human consumption.
  - The sampling areas were shown to the group.

Analysis – Slide 20

- Will look at total mercury, the species and where the fish was caught.
- Already have a good database for this monitoring; can compare results from 2012 to 2018.
- Mercury concentrations in Northern Pike will be compared to the CFIA guidelines and Mercury concentrations in Slimy Sculpin will be compared to the CCME Canadian Tissue Residue Guidelines.

Proposed Action Levels – Slide 21

- M. Miller explained the action levels, the corresponding measurement indicators, and the actions to consider in the design plan or response plan.

Schedule and Reporting – Slide 22

- If any moderate or high Action Level established in the response framework is exceeded, the MVLWB and an Inspector will be notified by March 31, after sampling is completed the previous fall.
- If an MMS Response Plan is required, it will be submitted to the MVLWB for approval within three months following the MMS Annual Report.
- NTPC will submit an MMS Report summarizing the mercury sampling program and analytical laboratory results to the MVLWB by March 31, 2023 and no later than March 31 every three years thereafter.

Points for Discussion – Slide 23

M. Miller noted the following points for discussion and welcomed input from the group.

- Sampling Design
  - Schedule
  - Locations
  - Monitoring of fish collection
  - Methods of sampling
  - Species

- Reporting
  - Format of report
  - Engagement for Results

****

Q&A

Q- (Dave, ENR)– Was there only 1 year of Whitefish collection?

A – (Matt, NTPC)– *Yes only one year of whitefish data was collected as part of the environmental studies for the construction of the replacement dam.*

Q- (Dave, ENR)– What, if any reason, was whitefish not included in later testing outside of Slimy Sculpin and Northern Pike?

A- (Matt, NTPC)- *The scope of the initial study was wider than just mercury monitoring, it included defining habitat in Bluefish Lake and spillway and downstream in the facility that could further guide the water license. At that time, results from whitefish didn't prompt further testing into that fish.*

A-(Cam ,Golder)- *There was no reason to believe whitefish would respond in the same way as Slimy Sculpin or Pike. Mercury concentrations are very low in the NT and in that fish. They are a very mobile species compared to slimy sculpin so if there was a change in water quality, we would see the response in slimy sculpin*

Q-(Bryana. **For the locations that are being proposed, are they the same areas that were previously used?**

A-(Matt, NTPC)- *In general, yes. The two biggest distinctions is sampling within the inundated area and then the rest of Bluefish Lake in general.*

A-(Damian ,Golder)- *There is only so much area to sample as there is very limited habitat along the shoreline in much of Bluefish Lake for Slimy Sculpin. We try and focus on the same areas as the previous study as these areas were sampled.* **) The previous studies made a comparison between the inundated areas to the reference sites within the larger Bluefish area. Just because I'm thinking about the action levels, if there's any historical data that could also make that comparison?**

A-(Matt, NTPC)- *To the best of my knowledge the previous reports, at least in 2016 and 2018 compare results from the recently intended area to the rest of the lake. Cam can you verify?*

A-(Cam ,Golder)- *Yes the previous reports all had comparisons for results within and outside the recently inundated area.*

Q-(Jen, MVLWB) - Has any consideration been made for engaging the First Nations groups that were unable to attend the workshop?

A-(Matt, NTPC)- . *Yes, we have been including them on all correspondence and offered to set up a follow up call with them to get their input if they could not make the workshop today, especially from the parties that we worked with on this subject throughout the water licence renewal process. This was a topic that was brought up as part of the water licence renewal and we received responses from some of them and others indicated they could not attend today.*

Q (Randi,WRRB)- Why aren't there any sampling locations on the right arm of the lake?

A-(Damian ,Golder)- *It's mostly to do with habitat; it is very weedy and shallow on that side of the lake and not many fish. The YK River is entering from the western arm, in this location there are more fish, deeper water, etc.*

Q (Katherine, MVLWB- The action levels seem reasonable, however, if things go in a direction you are not anticipating, would you consider bringing in trout again, or if there's another species of concern the communities raised? Would NTPC consider bringing that in as a potential response action?

A-(Matt, NTPC)- *Yes, if identified as a species of interest and there was results that suggested that, we would look at it, however it's a small lake so want to minimize our impact, specifically on lake trout because you have to do it mostly with nets, but if there was a push from stakeholders or regulators, we would be open to test.* It was reiterated by Katherine that further conversations with community would be important to identify their concerns We also want to very clear and recognize that the actual designation of fish consumption and whether it's consumable or not; does not rest with NTPC nor the Water Board.

Q (Bryana, ENR). Re: scheduling, my first question is what time of year would testing occur

A-(Cam ,Golder)- *Easier to capture slimy sculpin in the Fall, September, early October when they are shallower with the colder water.*

Q. (Bryana, ENR). My second question on scheduling is in previous years' testing, there has been a gap in years to allow the population to populate. Is hat being considered in the design?

A-(Cam ,Golder)- It's no*t formally integrated in the design but can consider going forward. We either don't sample in same location year after year, would look for alternative solutions, or sample every 2nd year. Slimy Sculpin also have a high reproductive rate and are very resilient so not too concerned about having a major measurable impact on a slimy sculpin population…but it's possible.*

A-(Damian ,Golder)- *There is a bit of schedule locked into the water license, Part G, item 4 says that NTPC must report every 3 years. This is somewhat reflected in the action levels. Whether the sculpin monitoring happens annually or not, the MMS report only comes out every 3 years.*

Roundtable – Matt asked the group if they were opposed to not having lake trout included in the program right now. No concern raised.

D. Prendergast thanked everyone for participating. NTPC will continue to reach out to other stakeholders that couldn't attend today in hopes of gathering more information for the submission of a proposal. After submission, if there any further questions, Matthew and team may be contacted.

With no further business, the meeting adjourned at 3:53 p.m.

APPENDIX C

ENGAGEMENT MEETING NOTES

NORTHWEST TERRITORIES
POWER
CORPORATION
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October 4, 2021

STAKEHOLDER MEETING WITH TLICHO GOVERNMENT – MERCURY MONITORING STUDY DESIGN PLAN AT BLUEFISH HYDROELECTRICAL FACILITY

Microsoft Teams meeting
1:00 pm – 2:15 pm

Participants
Miller, Matthew – Northwest Territories Power Corporation (NTPC)
Ekwe, Longinus – Tlicho Government (Tlicho
Vecsei, Paul – Tlicho Government
Bonin, Laurence – Golder Associates Ltd. (Golder)
Panayi, Damian - Golder Associates Ltd.
Stevens, Cameron - Golder Associates Ltd.

1. NTPC Presentation

- Matthew Miller presents:
  - Presentation Agenda
    - Bluefish Facility Overview
    - Bluefish Facility Description
    - Mercury Monitoring to Date
    - Proposed Mercury Monitoring Study
  - Project Location
    - At the Bluefish Hydroelectrical Facility.
    - Downstream of Yellowknife River, in the Tailrace Area.
    - Operating under the Type A Water Licence MV2020L4-0005.
  - New Dam Constructed in 2008.
    - Mercury production can be associated with flooding wetlands and forests.
    - The inundated area was estimated to increase Bluefish Lake by 2.7% of the surface area and 2.4% of the volume.
  - Mercury Monitoring to date
    - Monitoring period: 2011 to 2018
    - Water Licence MV2009L4-0004 required monitoring of mercury levels in the inundated area.
    - Monitored primarily in Slimy Sculpin as indicator species.

        - Lake Trout and Northern Pike were also monitored to confirm they are safe to eat.
        - Monitoring was done in the recently inundated area (RIA) and Control area.
        - Observed a decrease trend for Mercury in the RIA from 2014 to 2018.
    - Mercury Monitoring Study Design
        - Bluefish Hydroelectrical Facility Water Licence MV2020L4-0005 requires that NTPC design and implement a Mercury Monitoring Study.
        - Same species will be monitored, Slimy Sculpin and Northern Pike.
        - Lake Trout are not considered in this study as the mercury levels declined between 2021 and 2016 for this species.
        - Slimy Sculpin are abundant, don't migrate, and can be collected using electrofishing.
    - Analysis
        - Total mercury.
        - Compared data to historical data.
        - Compared to the Canadian Food Inspection Agency (CFIA) guidelines for Pikes and Trout.
        - Compared data to the Canadian Council of Ministers of the Environment (CCME) guideline for Slimy Sculpin.
    - Proposed Action Levels
        - See table of Proposed Action Levels.
    - Schedule and Reporting
        - If moderate of high action level is triggered, the inspector will be notified by March 31.
        - If an MMS Response Plan is required, it will be submitted to the MVLWB for approval.
        - NTPC will submit an MMS Report summarizing the mercury sampling program and lab results.

2. Questions

Question #1

- Tlicho Government: Is the action levels based on the highest mercury levels? Are 2016/2018 the highest mercury levels recorded?
    - Data from 2016/2018 were chosen because it's the most recent data.
    - Currently there is a decreasing trend for mercury level in the RIA. If we find that this trend is increasing, we will potentially trigger an action level. Slimy Sculpin are the best target species because they don't migrate.

Question #2

- Tlicho Government: What if an uncontrolled event, like climate change, generate a raise in the mercury levels? Would that trigger a study? Is the Mercury Monitoring Plan designed to make the differentiation between a mercury level increased by the climate change and the plant?
    - In case of a scenario of climate change, the raise would be identified in the RIA and the Control Area. It would raise but not trigger a study. In case of the plant triggering a raise, this raise would be identified only in the RIA.
    - NTPC should perhaps re-word the proposed action levels to adapt to the climate change situation.
    - If mercury is increasing in the RIA only, NTPC is hitting the criteria and trigger a study. If there is an increasing trend, they would only trigger the lower level if they don't see an increase in the Control Area.

  - A Response Plan will be triggered if NTPC hit moderate and high action levels. These levels are all described in the Water Licence.
  - NTPC removed the soil and vegetation before flooding that was preventing the production of methyl mercury.
- Comment from Tlicho Government: Large bodied fish are triggered to be sampled because they are feeding in the Slimy Sculpin and would carry the mercury in the food chain. Slimy Sculpin are isolated in the RIA, but not the large bodied fish.

Question #3

- Tlicho Government: Do you know the impact of the dam construction on the Prosperous Lake mercury levels?
  - NTPC: The majority of the water moving from Bluefish Lake to the Prosperous Lake is going through the headgate, through the Plant, with the exception of a spill event. Regardless, the mercury is not transported through water.
  - NTPC did not conduct a study on mercury levels in Prosperous Lake and are not able to quantify the impacts, if any.

Question #4

- Tlicho Government: What are the reasons for spikes in mercury levels and how is this communicated to communities?
  - Workshops were a requirement from the Water Licence. The workshops' goal was to collect inputs from the communities to develop this plan in collaboration. NTPC is interested in any suggestions that Tlicho Government might have in terms of communications and is open to adjust the Engagement Plan based on their needs.
- Paul Vecsei: Tlicho Government should not worry too much about a small fluctuation of mercury in this area. It is not a high used area for the community.
  - NTPC will share the study results and will answer questions, but they will not provide recommendations on fish consumption. GNWT has the responsibility to provide guidance on fish consumption through their health program.

Question #5

- Tlicho Government: Was it because of Covid if the Study stopped in 2018?
  - The Study stopped in 2018 because the level decreased, and the work was done under the previous Water Licence. This work was not impacted by Covid. Next sampling needs to be done in 2022 and results in 2023. This is under the new Water Licence MV2020L4-0005.

Question #6

- NTPC: Is Tlicho Government providing general support to this Plan?
  - Tlicho Government will talk with their manager to see if they can provide feedbacks and a letter of support
- NTPC would greatly appreciate a letter of support, but a more informal email could work too.
- NTPC Matt will send the Draft Mercury Monitoring Plan and Meeting Notes to Tlicho Government.

NTPC thanks Tlicho Government for their time.

Attachment: NTPC PowerPoint Presentation

October 7, 2021

STAKEHOLDER MEETING WITH YELLOWKNIFE DENE FIRST NATIONS – MERCURY MONITORING STUDY DESIGN PLAN AT BLUEFISH HYDROELECTRICAL FACILITY

Microsoft Teams meeting
1:30 pm – 2:10 pm

Participants
Miller, Matthew – Northwest Territories Power Corporation (NTPC)
Baiyemun, Femi – Yellowknife Dene First Nations (YKDFN)
Bonin, Laurence – Golder Associates Ltd. (Golder)
Panayi, Damian - Golder Associates Ltd.

1. NTPC Presentation

- Matthew Miller presents:
  - Presentation Agenda
    - Bluefish Facility Overview
    - Bluefish Facility Description
    - Mercury Monitoring to Date
    - Proposed Mercury Monitoring Study
  - Project Location
    - Monitoring focusses on Bluefish Lake
    - Operating under the Type A Water Licence MV2020L4-0005.
  - New Dam Constructed in 2008.
    - Mercury production can be associated with flooding wetlands and forests.
    - Vegetation and soil were removed prior to inundation of the area between the old dam and the new dam.
    - The inundated area was estimated to increase Bluefish Lake by 2.7% of the surface area and 2.4% of the volume.
  - Mercury Monitoring to date
    - Monitoring period: 2011 to 2018
    - Water Licence MV2009L4-0004 required monitoring of mercury levels in the inundated area.
    - Monitored primarily in Slimy Sculpin as indicator species.
    - Lake Trout and Northern Pike were also monitored to confirm they are safe to eat.

  - Monitoring was done in the recently inundated area (RIA) and Control area.
  - Observed a decrease trend for Mercury in the RIA from 2014 to 2018.
- Mercury Monitoring Study Design
  - Bluefish Hydroelectrical Facility Water Licence MV2020L4-0005 requires that NTPC design and implement a Mercury Monitoring Study.
  - Same species will be monitored, Slimy Sculpin and Northern Pike.
  - Lake Trout are not considered in this study as the mercury levels declined between 2021 and 2016 for this species.
  - Slimy Sculpin are abundant, don't migrate, and can be collected using electrofishing.
- Analysis
  - Total mercury in muscle will be measured.
  - Compared data to historical data.
  - Compared to the Canadian Food Inspection Agency (CFIA) guidelines for Pikes and Trout.
  - Compared data to the Canadian Council of Ministers of the Environment (CCME) guideline for Slimy Sculpin.
  - NTPC will share the study results and will answer questions, but they will not provide recommendations on fish consumption. GNWT has the responsibility to provide guidance on fish consumption through their health program.
- Proposed Action Levels
  - See table of Proposed Action Levels.
- Schedule and Reporting
  - If moderate of high action level is triggered, the inspector will be notified by March 31.
  - If an MMS Response Plan is required, it will be submitted to the MVLWB for approval.
  - NTPC will submit an MMS Report summarizing the mercury sampling program and lab results.

2. Questions

Question #1

YKDFN: Why is the monitoring period not annual? Why was there a slight increase in the mercury levels for pikes in the past?

Sampling of sculpin is lethal. NTPC wants to reduce their impacts on Bluefish Lake, which is a small Lake. NTPC paused the monitoring to allow for the fish to recover. Also, they were not sampled every year because the mercury levels are quite low compared to the national median and the Water Licence requires sampling every three years, and we don't expect to be able to detect changes over one year.. The level of risk associated with these operations is low and the mercury levels are low and generally decreasing. As such, this program is more of a verification program to confirm mercury levels to the stakeholders rather than to address a direct issue.

Questions #2

YKDFN: How many fish are euthanized during the monitoring program?

The goal is approximately 40 to 80. The minimum number of fish to create a trend is 15 for Slimy Sculpin. Other species would have a different minimum. But in practice it is difficult to find this many.

Questions #3

YKDFN: Can we adapt the approach if an action level is triggered? Can we do a risk assessment and engage YKDFN?

The Water Licence requires sampling every 3 years. Every three years, the mercury levels will be reassessed. If we exceed an action level, NTPC would prepare a Response Plan that would have to include engagement and approval from the stakeholders. A risk assessment can be discussed in the context of a Response Plan.

Questions #4

YKDFN: How fast did the flooding occur after the construction of the dam?

The flooding was done slowly, in stages, over the construction of the dam and for a period of one year and half to two years.

NTPC runs a dam safety program yearly, as well as weekly and monthly inspections. NTPC needs to conduct various inspections, monitoring and review as required and outlined in the Water Licence MV2020L4-0005.

Questions #5

NTPC: Are there any specific inputs or changes you want to see in the Mercury Monitoring Plan?

Nothing to add except that YKDFN will be glad to contribute to any kind of engagement in case of exceedance of mercury levels. YKDFN are ready to support as needed.

NTPC are always interested in collaborating and organizing visit for the communities.

NTPC thanks YKDFN for their time.

Attachment: NTPC PowerPoint Presentation

APPENDIX D

ENGAGEMENT EMAILS

Matthew Miller

From: Jessica Hurtubise <Jess.Hurtubise@nsma.net>
Sent: Tuesday, September 28, 2021 10:15 AM
To: Matthew Miller
Cc: Noah Johnson
Subject: RE: Bluefish Mercury Monitoring Study- September 8, 2021 Workshop

Email originated outside NTPC.

Hi Matt,

Thanks for touching base. We do have a few questions but I think we can resolve this over email.

First, I'd like to introduce you to our newest Lead Regulatory Officer: Noah Johnson. Noah will be taking over my regulatory responsibilities as I move into the manager role. Please make him your primary contact for NTPC projects.

Noah and I reviewed the ppt and the meeting minutes. We have the following comments/questions:

- Slide 13 say it is not unusual for fish to have elevated mercury in this area. What is this compared to? What rate of local lakes show high mercury rates? How "unusual" is unusual?
- We are unsure if there are reliable assumptions that game fish will have safe mercury levels even if slimy sculpin levels are safe because longer lived predatory fish can have bio-accumulation over time in ways that are not directly correlated to other species.
- Sampling of trout was stopped because mercury levels decreased – why assume it will stay constant and not increase again, especially since that data is already >5yrs old? Changes in water chemistry and temperature can influence mercury cycling. Lake trout is important for NSMA harvest and we'd like to hear options of potential resuming of trout sampling in the future. For example, would NTPC consider sampling trout if mid to high mercury levels are detected in sculpin and pike?
- We believe there is too long of a delay between high mercury in sculpin detection before pike samples will reveal if mercury levels are a concern. With the current plan, sampling of pike is only triggered in the year following high detection in sculpin. This could mean up to 1.5yrs delay between detection in sculpin, sampling in pike, then informing parties/harvesters. We are concerned about the delay to inform fishers/harvesters of high mercury levels.
- Could you please provide further details on the timeline for detection notification? Slide 22 describes that detection notification must be done by March 31, following analytics of fall sampling. Would parties receive notification of a significant mercury detection within a few weeks of the fall sampling? Or would the notification only come on March 31? If it's the latter, we are concerned about the health of winter fishers if they are consuming high mercury level fish in the interim of getting notification.

Please let me know if you need any clarification. Our schedules are a bit busy today/tomorrow hence why I am submitting this to you via email; but if a call is required between now and tomorrow, we can attempt to schedule something with you to review the above.

Thanks,
Jess

Jessica Hurtubise
Environment Department Manager

North Slave Métis Alliance
32 Melville Dr
Yellowknife, NT X1A 0G2
Cellphone: (867) 446-4480
Office Phone: (867) 873-6762 x 1005
Fax: (867) 669-7442

From: Matthew Miller <MMiller@ntpc.com>
Sent: Monday, September 27, 2021 12:52 PM
To: Lands <lands@nsma.net>
Subject: RE: Bluefish Mercury Monitoring Study- September 8, 2021 Workshop

Hello Jess,

I wanted to follow up on the email below regarding input on the Bluefish Mercury Monitoring Study Workshop on September 8, 2021. Please review the material and let us know if you have any questions or input we should incorporate into the study design.

Would it be possible to set up a quick meeting to discuss before Wednesday this week?. Let us know if there is a day and time that would for you and your team. Alternatively you could also provide comments through email as well. The MSS study will be submitted by October 3, 2012 as required in the WL.

Thanks for your time,

Matt

From: Matthew Miller
Sent: Tuesday, September 21, 2021 10:39 AM
To: Lands <lands@nsma.net>
Subject: RE: Bluefish Mercury Monitoring Study- September 8, 2021 Workshop

Hello Jess,

I have attached the presentation and meeting minutes from the Bluefish Mercury Monitoring Study Workshop on September 8, 2021. It would be great if you and your team could review the material and let us know if you have any questions or input we should incorporate into the study design.

If possible it would be great to set up a quick meeting to discuss early next week to gather input. Let us know if there is a day and time that would for you and your team.

Thanks for your time,

Matt

From: Lands <lands@nsma.net>
Sent: Monday, August 30, 2021 3:44 PM
To: Matthew Miller <MMiller@ntpc.com>
Subject: RE: Bluefish Mercury Monitoring Study- September 8, 2021 Workshop

Email originated outside NTPC.

Hi Matt,

Thanks for inquiring with NSMA about engagement for the proposed Mercury Monitoring Study for Bluefish. Unfortunately, we have too many other prior engagements for Sept 8 to have a meeting on that day. Would it be possible to receive summary documents of the key points, as NTPC normally does?

Thanks,
Jess

Jessica Hurtubise
Environment Department Manager
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32 Melville Dr
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From: Matthew Miller <MMiller@ntpc.com>
Sent: Thursday, August 26, 2021 10:46 AM
To: Matthew Miller <MMiller@ntpc.com>
Subject: Bluefish Mercury Monitoring Study- September 8, 2021 Workshop

Hello,

The Northwest Territories Power Corporation (NTPC) owns and operates the Bluefish Hydroelectric Facility. The facility, which is located 39 km north of Yellowknife at the north end of Prosperous Lake on the Yellowknife River, contributes power to the North Slave electrical system. Throughout 2020 and early 2021 NTPC completed the renewal process for a Type A Water Licence for the Bluefish facility and the Mackenzie Valley Land and Water Board (MVLWB) issued Type A Water Licence MV2020L4-005 on March 10, 2021.

Under this Water Licence, NTPC is required to design and implement a Mercury Monitoring Study for Bluefish Lake. Prior to finalizing the scope and methodology of the study, NTPC wishes to receive input from interested stakeholders. NTPC is hosting a workshop that stakeholders can attend to learn more about the proposed study and provide feedback on its development.

Due to current COVID-19 restrictions, an in-person workshop is not currently possible; therefore, an online workshop will be held on Wednesday, September 8. NTPC will also be available to engage with stakeholders through phone calls, additional online meetings and/or emails for any action items from the workshop. Additional information on the workshop will sent out to all stakeholders next week.

Please confirm whether your organization wishes to be involved in this workshop and . provide a name and email address for all planning to attend. If you have any questions or comments or require further information about the upcoming workshop, please contact me at mmiller@ntpc.com.

Thanks for your time,

Matthew Miller, M.Sc., P.Eng.
Senior Environmental Licensing Specialist
Northwest Territories Power Corporation

Matthew Miller

From: Matthew Miller
Sent: Monday, October 4, 2021 3:53 PM
To: Jessica Hurtubise; Noah Johnson
Subject: RE: Bluefish Mercury Monitoring Study- September 8, 2021 Workshop
Attachments: Depew 2013 (1).pdf

Hey Jessica and Noah,

Please see NTPC responses to NSMA comments/questions below:

Please let me know if you have any further questions or if there is any other information we can provide. Let me know if you would like to set up a call to discuss as well.

We are planning on submitting the study design by October 8, 2021.

Thanks for your time,

Matt
875 7917

- Slide 13 say it is not unusual for fish to have elevated mercury in this area. What is this compared to? What rate of local lakes show high mercury rates? How “unusual” is unusual?
  - NTPC Response- There are both general and specific guidance for fish consumption in the NWT, usually focused on mercury. See the NWT Fish Consumption Guidance at Fish Consumption Guidance | Health and Social Services (gov.nt.ca). For an overview of mercury concentrations in freshwater fish species in Canada, please see Depew et al. (2013), which is published in the Canadian Journal of Fisheries and Aquatic Science (accessible at https://cdnsciencepub.com/doi/abs/10.1139/cjfas-2012-0338)
- We are unsure if there are reliable assumptions that game fish will have safe mercury levels even if slimy sculpin levels are safe because longer lived predatory fish can have bio-accumulation over time in ways that are not directly correlated to other species.
  - NTPC Response- It is important to reiterate that mercury levels in Northern Pike have never been observed to exceed Canadian Food Inspection Agency (CFIA) guidelines for fish for commercial sale in Bluefish Lake (Section 2.3.1.1). Furthermore, results from previous monitoring in Bluefish Lake have demonstrated the mercury concentrations in game fish have either remained unchanged from the expansion of the dam, or have returned to baseline concentrations since construction. The expectation is that fish in the vicinity on the area of inundation would be those most exposed to any localized increases in bioavailable mercury in the lake. Under this scenario, Slimy Sculpin were used as an indicator species because of their species life history strategy that allows a home range to be restricted to a relatively small area of the lake compared to a game fish (also see Section 4.1 of the MMS). Consistent with this understanding, previous monitoring at Bluefish Lake has shown a clearer trend or response in mercury levels in Slimy Sculpin to the dam expansion, when compared to gamefish.
- Sampling of trout was stopped because mercury levels decreased – why assume it will stay constant and not increase again, especially since that data is already >5yrs old? Changes in water chemistry and temperature can influence mercury cycling. Lake trout is important for NSMA harvest and we’d like to hear options of potential resuming of trout sampling in the future. For example, would NTPC consider sampling trout if mid to high mercury levels are detected in sculpin and pike?
  - NTPC Response- Section 3.0 of the MMS describes how mercury levels can increase immediately after a flooding event, and decline thereafter. It is most likely that the current mercury levels in fish tissue are more representative of baseline (pre-construction) levels rather than an effect of a minor increase in the size of Bluefish Lake that occurred 10 years ago, in 2012. The supplemental value of continued monitoring of Lake Trout is minimal if considering the low risk of mercury exposure from fish in Bluefish Lake and the high likelihood that any existing mercury levels in Bluefish Lake Trout are similar to baseline or returning to baseline.

- We believe there is too long of a delay between high mercury in sculpin detection before pike samples will reveal if mercury levels are a concern. With the current plan, sampling of pike is only triggered in the year following high detection in sculpin. This could mean up to 1.5yrs delay between detection in sculpin, sampling in pike, then informing parties/harvesters. We are concerned about the delay to inform fishers/harvesters of high mercury levels.
    - NTPC Response- The approach is consistent with other monitoring programs in NWT, and considers the limitation of the time it requires to get full lab results, analyze the data, prepare reports, undertake engagement, and apply for permits to undertake a follow up study. If mercury levels were to change, they would change slowly and in response to natural environmental factors (non-Project drivers), so there is no rush to complete follow up surveys within a single year.
- •Could you please provide further details on the timeline for detection notification? Slide 22 describes that detection notification must be done by March 31, following analytics of fall sampling. Would parties receive notification of a significant mercury detection within a few weeks of the fall sampling? Or would the notification only come on March 31? If it's the latter, we are concerned about the health of winter fishers if they are consuming high mercury level fish in the interim of getting notification.
    - NTPC Response- It is not appropriate for NTPC to make determinations regarding the safety of eating fish from Bluefish Lake. This responsibility lies with GNWT Department of Health and Social Services (HSS), Environmental Health division. Useful general advice and site specific consumption notices are provided at Fish Consumption Guidance | Health and Social Services (gov.nt.ca). It is reiterated that mercury levels in Northern Pike have not been observed to exceed CFIA guidelines for fish for commercial sale. Previous monitoring has showed that mercury levels in Lake Trout have declined, and in only a few instances did they exceed CFIA guidelines for fish for commercial sale. As these few cases were of old Lake Trout, this result is not unusual and reflective of natural background levels rather than impacts of the 2012 construction of the new Bluefish Lake dam (for example, see the HSS guidance on the consumption of large Lake Trout, in the General Fish Consumption Guidelines). Finally, the March 31 reporting deadline is defined within the Water Licence, and reflects the time required to collect the fish (usually in fall when the fish are both active and near surface), obtain the results of the laboratory analysis, and complete data analysis and reporting.

From: Jessica Hurtubise <Jess.Hurtubise@nsma.net>
Sent: Tuesday, September 28, 2021 10:15 AM
To: Matthew Miller <MMiller@ntpc.com>
Cc: Noah Johnson <Noah.Johnson@nsma.net>
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Under this Water Licence, NTPC is required to design and implement a Mercury Monitoring Study for Bluefish Lake. Prior to finalizing the scope and methodology of the study, NTPC wishes to receive input from interested stakeholders. NTPC is hosting a workshop that stakeholders can attend to learn more about the proposed study and provide feedback on its development.

Due to current COVID-19 restrictions, an in-person workshop is not currently possible; therefore, an online workshop will be held on Wednesday, September 8. NTPC will also be available to engage with stakeholders through phone calls, additional online meetings and/or emails for any action items from the workshop. Additional information on the workshop will sent out to all stakeholders next week.

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Thanks for your time,

Matthew Miller, M.Sc., P.Eng.
Senior Environmental Licensing Specialist
Northwest Territories Power Corporation

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	Mean Daily Water Level (masl)		Mean Daily Flow Rates (m	
Date	Duncan Lake near Yellowknife (07SB012)	Bluefish Lake near Yellowknife (07SB015)	Yellowknife River at Inlet to Prosperous Lake (07SB003)	Powerhouse BF1
SNP Station	**SNP 735-3**	**SNP 735-4**	**SNP 735-5**	**SNP 735-1**
1/1/2021	212.78	186.12	30.14	
1/2/2021	212.78	186.13	29.69	
1/3/2021	212.78	186.13	29.80	
1/4/2021	212.78	186.12	29.82	
1/5/2021	212.78	186.11	29.54	
1/6/2021	212.78	186.11	29.55	
1/7/2021	212.78	186.11	29.47	
1/8/2021	212.78	186.11	29.16	
1/9/2021	212.78	186.11	29.14	
1/10/2021	212.78	186.1	29.05	
1/11/2021	212.78	186.1	29.01	
1/12/2021	212.78	186.1	28.92	
1/13/2021	212.78	186.1	28.76	
1/14/2021	212.78	186.1	28.67	
1/15/2021	212.78	186.1	28.45	
1/16/2021	212.78	186.1	28.46	
1/17/2021	212.78	186.09	28.43	
1/18/2021	212.78	186.09	28.30	
1/19/2021	212.78	186.09	28.08	
1/20/2021	212.78	186.09	28.04	
1/21/2021	212.78	186.09	27.70	
1/22/2021	212.78	186.1	27.36	
1/23/2021	212.78	186.12	27.19	
1/24/2021	212.78	186.12	27.08	
1/25/2021	212.78	186.12	26.98	
1/26/2021	212.78	186.12	26.86	
1/27/2021	212.77	186.15	25.48	
1/28/2021	212.77	186.18	26.88	
1/29/2021	212.78	186.14	26.89	
1/30/2021	212.77	186.1	26.70	
1/31/2021	212.77	186.08	26.54	
2/1/2021	212.77	186.06	26.36	
2/2/2021	212.77	186.04	26.12	
2/3/2021	212.77	186.04	26.01	
2/4/2021	212.77	186.03	26.00	

2/5/2021	212.77	186.02	26.02
2/6/2021	212.77	186	25.97
2/7/2021	212.77	185.99	25.80
2/8/2021	212.76	185.95	25.99
2/9/2021	212.77	185.92	25.96
2/10/2021	212.77	185.89	25.92
2/11/2021	212.76	185.86	25.53
2/12/2021	212.76	185.84	25.46
2/13/2021	212.76	185.84	25.41
2/14/2021	212.76	185.85	24.68
2/15/2021	212.76	185.87	24.68
2/16/2021	212.76	185.87	24.80
2/17/2021	212.76	185.88	24.56
2/18/2021	212.76	185.89	24.20
2/19/2021	212.76	185.93	24.18
2/20/2021	212.76	185.94	24.04
2/21/2021	212.76	185.96	23.79
2/22/2021	212.75	185.97	24.37
2/23/2021	212.75	185.95	24.61
2/24/2021	212.75	185.91	24.70
2/25/2021	212.75	185.86	25.02
2/26/2021	212.75	185.8	25.45
2/27/2021	212.75	185.73	25.52
2/28/2021	212.75	185.65	25.42
3/1/2021	212.75	185.55	25.62
3/2/2021	212.75	185.51	24.13
3/3/2021	212.75	185.52	23.64
3/4/2021	212.75	185.53	23.48
3/5/2021	212.75	185.55	23.48
3/6/2021	212.75	185.58	22.66
3/7/2021	212.74	185.63	22.42
3/8/2021	212.74	185.68	22.29
3/9/2021	212.74	185.7	22.97
3/10/2021	212.74	185.66	23.54
3/11/2021	212.74	185.63	22.88
3/12/2021	212.73	185.61	22.53
3/13/2021	212.73	185.62	22.28
3/14/2021	212.73	185.64	22.36
3/15/2021	212.73	185.66	22.32
3/16/2021	212.73	185.67	22.20
3/17/2021	212.73	185.67	22.98
3/18/2021	212.72	185.66	22.68
3/19/2021	212.72	185.66	22.74
3/20/2021	212.72	185.67	23.04
3/21/2021	212.72	185.66	22.90
3/22/2021	212.72	185.68	22.66
3/23/2021	212.71	185.7	22.82

3/24/2021	212.71	185.7	22.96
3/25/2021	212.71	185.69	22.85
3/26/2021	212.7	185.69	22.72
3/27/2021	212.7	185.69	22.61
3/28/2021	212.7	185.69	22.53
3/29/2021	212.69	185.7	22.52
3/30/2021	212.69	185.7	22.55
3/31/2021	212.69	185.69	22.59
4/1/2021	212.69	185.68	22.51
4/2/2021	212.69	185.68	22.57
4/3/2021	212.69	185.68	22.50
4/4/2021	212.68	185.68	22.43
4/5/2021	212.68	185.68	22.23
4/6/2021	212.68	185.7	22.26
4/7/2021	212.68	185.71	22.24
4/8/2021	212.68	185.73	22.26
4/9/2021	212.68	185.75	22.18
4/10/2021	212.67	185.76	22.37
4/11/2021	212.67	185.76	22.44
4/12/2021	212.67	185.74	22.43
4/13/2021	212.67	185.73	22.32
4/14/2021	212.66	185.72	22.12
4/15/2021	212.66	185.72	21.88
4/16/2021	212.66	185.74	21.53
4/17/2021	212.66	185.76	21.73
4/18/2021	212.66	185.77	21.66
4/19/2021	212.65	185.77	21.80
4/20/2021	212.65	185.76	21.74
4/21/2021	212.65	185.75	21.68
4/22/2021	212.65	185.74	21.69
4/23/2021	212.65	185.72	21.68
4/24/2021	212.65	185.69	21.66
4/25/2021	212.64	185.66	21.54
4/26/2021	212.64	185.65	21.03
4/27/2021	212.64	185.65	20.94
4/28/2021	212.64	185.64	20.81
4/29/2021	212.64	185.63	20.71
4/30/2021	212.63	185.62	20.51
5/1/2021	212.63	185.62	20.50
5/2/2021	212.63	185.61	20.37
5/3/2021	212.63	185.6	20.16
5/4/2021	212.63	185.59	19.93
5/5/2021	212.63	185.6	19.32
5/6/2021	212.62	185.69	18.84
5/7/2021	212.62	185.68	20.08
5/8/2021	212.62	185.67	19.70
5/9/2021	212.62	185.7	19.82

5/10/2021	212.63	185.76	19.84
5/11/2021	212.63	185.84	20.11
5/12/2021	212.64	185.91	21.25
5/13/2021	212.64	185.91	22.71
5/14/2021	212.64	185.86	24.31
5/15/2021	212.65	185.79	24.87
5/16/2021	212.65	185.73	25.39
5/17/2021	212.65	185.69	25.06
5/18/2021	212.65	185.7	24.89
5/19/2021	212.65	185.71	25.19
5/20/2021	212.65	185.72	25.84
5/21/2021	212.65	185.72	25.88
5/22/2021	212.65	185.72	26.17
5/23/2021	212.65	185.75	26.80
5/24/2021	212.66	185.76	26.67
5/25/2021	212.66	185.77	27.06
5/26/2021	212.66	185.79	26.96
5/27/2021	212.66	185.83	27.13
5/28/2021	212.66	185.88	27.41
5/29/2021	212.66	185.92	27.80
5/30/2021	212.66	185.97	27.86
5/31/2021	212.66	186.02	28.16
6/1/2021	212.67	186.07	28.70
6/2/2021	212.67	186.1	29.97
6/3/2021	212.67	186.11	30.58
6/4/2021	212.68	186.12	31.98
6/5/2021	212.68	186.14	32.67
6/6/2021	212.69	186.14	33.40
6/7/2021	212.69	186.14	34.10
6/8/2021	212.69	186.14	34.60
6/9/2021	212.69	186.14	34.97
6/10/2021	212.69	186.14	35.26
6/11/2021	212.7	186.15	36.10
6/12/2021	212.71	186.16	37.13
6/13/2021	212.71	186.17	37.69
6/14/2021	212.71	186.17	38.20
6/15/2021	212.72	186.18	38.64
6/16/2021	212.72	186.18	39.07
6/17/2021	212.72	186.18	39.19
6/18/2021	212.72	186.18	39.17
6/19/2021	212.72	186.17	39.13
6/20/2021	212.72	186.17	39.01
6/21/2021	212.72	186.17	39.01
6/22/2021	212.72	186.24	35.91
6/23/2021	212.72	186.38	37.54
6/24/2021	212.72	186.38	37.87
6/25/2021	212.73	186.39	38.30

6/26/2021	212.73	186.38	38.19
6/27/2021	212.73	186.38	38.25
6/28/2021	212.74	186.38	38.29
6/29/2021	212.74	186.38	38.46
6/30/2021	212.74	186.39	38.76
7/1/2021	212.75	186.4	39.54
7/2/2021	212.76	186.41	40.66
7/3/2021	212.76	186.43	42.24
7/4/2021	212.76	186.45	44.27
7/5/2021	212.76	186.44	49.99
7/6/2021	212.76	186.36	50.43
7/7/2021	212.77	186.44	55.79
7/8/2021	212.77	186.43	59.59
7/9/2021	212.77	186.45	63.25
7/10/2021	212.78	186.47	66.97
7/11/2021	212.78	186.5	70.18
7/12/2021	212.79	186.51	72.73
7/13/2021	212.79	186.51	74.42
7/14/2021	212.8	186.52	75.50
7/15/2021	212.82	186.53	77.85
7/16/2021	212.82	186.53	78.30
7/17/2021	212.82	186.53	78.38
7/18/2021	212.82	186.53	78.60
7/19/2021	212.82	186.52	78.72
7/20/2021	212.82	186.5	78.42
7/21/2021	212.83	186.5	78.06
7/22/2021	212.83	186.53	76.22
7/23/2021	212.86	186.58	78.86
7/24/2021	212.86	186.58	78.69
7/25/2021	212.85	186.56	77.61
7/26/2021	212.85	186.55	76.35
7/27/2021	212.86	186.55	75.14
7/28/2021	212.86	186.54	74.12
7/29/2021	212.86	186.54	72.86
7/30/2021	212.86	186.53	72.11
7/31/2021	212.86	186.52	71.32
8/1/2021	212.86	186.51	70.24
8/2/2021	212.87	186.49	70.25
8/3/2021	212.87	186.46	68.39
8/4/2021	212.86	186.46	67.34
8/5/2021	212.86	186.45	66.32
8/6/2021	212.86	186.45	64.97
8/7/2021	212.87	186.45	64.25
8/8/2021	212.86	186.43	63.05
8/9/2021	212.86	186.44	61.93
8/10/2021	212.86	186.45	61.78
8/11/2021	212.86	186.43	60.73

8/12/2021	212.86	186.41	60.35
8/13/2021	212.85	186.42	59.18
8/14/2021	212.87	186.43	59.51
8/15/2021	212.87	186.42	59.21
8/16/2021	212.87	186.41	58.35
8/17/2021	212.86	186.39	57.53
8/18/2021	212.86	186.39	56.60
8/19/2021	212.86	186.4	56.50
8/20/2021	212.86	186.39	55.95
8/21/2021	212.86	186.39	55.04
8/22/2021	212.85	186.38	54.60
8/23/2021	212.85	186.39	53.04
8/24/2021	212.84	186.39	52.89
8/25/2021	212.84	186.38	52.21
8/26/2021	212.84	186.38	51.72
8/27/2021	212.84	186.37	51.24
8/28/2021	212.84	186.36	51.16
8/29/2021	212.84	186.36	50.74
8/30/2021	212.84	186.35	50.25
8/31/2021	212.84	186.35	49.88
9/1/2021	212.84	186.34	49.42
9/2/2021	212.84	186.34	48.97
9/3/2021	212.84	186.33	48.49
9/4/2021	212.83	186.33	48.02
9/5/2021	212.83	186.32	47.52
9/6/2021	212.83	186.32	47.25
9/7/2021	212.83	186.32	46.58
9/8/2021	212.82	186.31	46.89
9/9/2021	212.82	186.29	46.48
9/10/2021	212.82	186.27	45.48
9/11/2021	212.81	186.27	45.03
9/12/2021	212.81	186.27	44.46
9/13/2021	212.8	186.27	44.18
9/14/2021	212.81	186.27	44.29
9/15/2021	212.81	186.27	43.75
9/16/2021	212.8	186.26	43.22
9/17/2021	212.79	186.26	42.75
9/18/2021	212.79	186.27	41.86
9/19/2021	212.79	186.27	41.50
9/20/2021	212.78	186.25	41.51
9/21/2021	212.78	186.25	40.67
9/22/2021	212.77	186.24	40.11
9/23/2021	212.77	186.23	39.99
9/24/2021	212.77	186.23	40.33
9/25/2021	212.76	186.22	39.67
9/26/2021	212.76	186.22	39.21
9/27/2021	212.76	186.22	38.72

9/28/2021	212.76	186.21	39.06
9/29/2021	212.75	186.2	38.48
9/30/2021	212.75	186.2	38.23
10/1/2021	212.75	186.2	38.01
10/2/2021	212.75	186.19	37.77
10/3/2021	212.75	186.19	37.36
10/4/2021	212.74	186.19	36.82
10/5/2021	212.74	186.18	36.56
10/6/2021	212.74	186.18	36.34
10/7/2021	212.74	186.18	36.27
10/8/2021	212.74	186.18	35.85
10/9/2021	212.74	186.2	35.47
10/10/2021	212.74	186.19	35.60
10/11/2021	212.74	186.18	35.40
10/12/2021	212.73	186.18	35.19
10/13/2021	212.73	186.17	34.88
10/14/2021	212.73	186.18	34.04
10/15/2021	212.72	186.2	34.17
10/16/2021	212.72	186.2	34.09
10/17/2021	212.72	186.18	33.91
10/18/2021	212.71	186.18	33.45
10/19/2021	212.71	186.18	33.45
10/20/2021	212.71	186.16	33.42
10/21/2021	212.7	186.16	32.94
10/22/2021	212.7	186.15	32.72
10/23/2021	212.7	186.15	32.40
10/24/2021	212.69	186.15	32.24
10/25/2021	212.69	186.15	31.98
10/26/2021	212.69	186.15	31.96
10/27/2021	212.69	186.15	31.88
10/28/2021	212.69	186.15	31.72
10/29/2021	212.69	186.15	31.43
10/30/2021	212.68	186.14	31.18
10/31/2021	212.68	186.14	31.16
11/1/2021	212.68	186.14	30.91
11/2/2021	212.67	186.14	30.59
11/3/2021	212.67	186.13	30.49
11/4/2021	212.67	186.13	30.19
11/5/2021	212.67	186.13	30.03
11/6/2021	212.66	186.13	29.83
11/7/2021	212.66	186.13	29.66
11/8/2021	212.66	186.13	29.56
11/9/2021	212.66	186.12	29.40
11/10/2021	212.65	186.12	29.30
11/11/2021	212.65	186.12	29.22
11/12/2021	212.64	186.11	29.07
11/13/2021	212.64	186.11	28.71

11/14/2021	212.64	186.11	28.56
11/15/2021	212.64	186.11	28.44
11/16/2021	212.63	186.11	28.31
11/17/2021	212.63	186.11	28.35
11/18/2021	212.63	186.11	28.10
11/19/2021	212.63	186.11	27.99
11/20/2021	212.62	186.11	28.06
11/21/2021	212.62	186.1	27.85
11/22/2021	212.62	186.1	27.68
11/23/2021	212.61	186.1	27.40
11/24/2021	212.61	186.09	27.31
11/25/2021	212.61	186.09	27.21
11/26/2021	212.61	186.09	27.27
11/27/2021	212.61	186.09	27.41
11/28/2021	212.61	186.09	27.29
11/29/2021	212.6	186.09	27.33
11/30/2021	212.61	186.09	27.02
12/1/2021	212.61	186.09	26.92
12/2/2021	212.61	186.09	26.91
12/3/2021	212.6	186.08	26.83
12/4/2021	212.6	186.08	26.81
12/5/2021	212.6	186.08	26.72
12/6/2021	212.6	186.07	26.55
12/7/2021	212.6	186.07	26.43
12/8/2021	212.6	186.07	26.41
12/9/2021	212.6	186.07	26.36
12/10/2021	212.6	186.07	26.34
12/11/2021	212.61	186.08	26.31
12/12/2021	212.61	186.08	26.70
12/13/2021	212.61	186.08	26.71
12/14/2021	212.61	186.08	26.55
12/15/2021	212.61	186.08	26.63
12/16/2021	212.61	186.08	26.64
12/17/2021	212.61	186.08	26.42
12/18/2021	212.61	186.08	26.35
12/19/2021	212.61	186.08	26.34
12/20/2021	212.61	186.08	26.22
12/21/2021	212.61	186.07	26.10
12/22/2021	212.6	186.07	26.04
12/23/2021	212.6	186.07	25.72
12/24/2021	212.61	186.08	25.84
12/25/2021	212.61	186.08	25.80
12/26/2021	212.61	186.08	25.80
12/27/2021	212.61	186.08	25.93
12/28/2021	212.6	186.06	25.99
12/29/2021	212.6	186.05	25.71
12/30/2021	212.6	186.04	25.68

12/31/2021	212.6	186.03	25.69

$ı^3$/s)

Powerhouse BF2

SNP 735-2

	Mean Monthly Water Level (masl)			Mean Monthly Flow (m^3/s)	
Month	Duncan Lake near Yellowknife (07SB012)	Bluefish Lake near Yellowknife (07SB015)	Yellowknife River at Inlet to Prosperous Lake (07SB003)	Bluefish Powerhouse 1	Bluefish Powerhouse 2
SNP Station	**SNP 735-3**	**SNP 735-4**	**SNP 735-5**	**SNP 735-1**	**SNP 735-2**
1	212.78	186.11	28.26		
2	212.76	185.91	25.23		
3	212.73	185.64	22.90		
4	212.66	185.71	21.85		
5	212.64	185.76	23.75		
6	212.71	186.21	36.34		
7	212.81	186.50	67.97		
8	212.86	186.41	58.55		
9	212.80	186.27	43.40		
10	212.72	186.17	34.18		
11	212.64	186.11	28.62		
12	212.61	186.07	26.30		