

Overview of Taltson Hydroelectric Facility and Nonacho Lake Operations

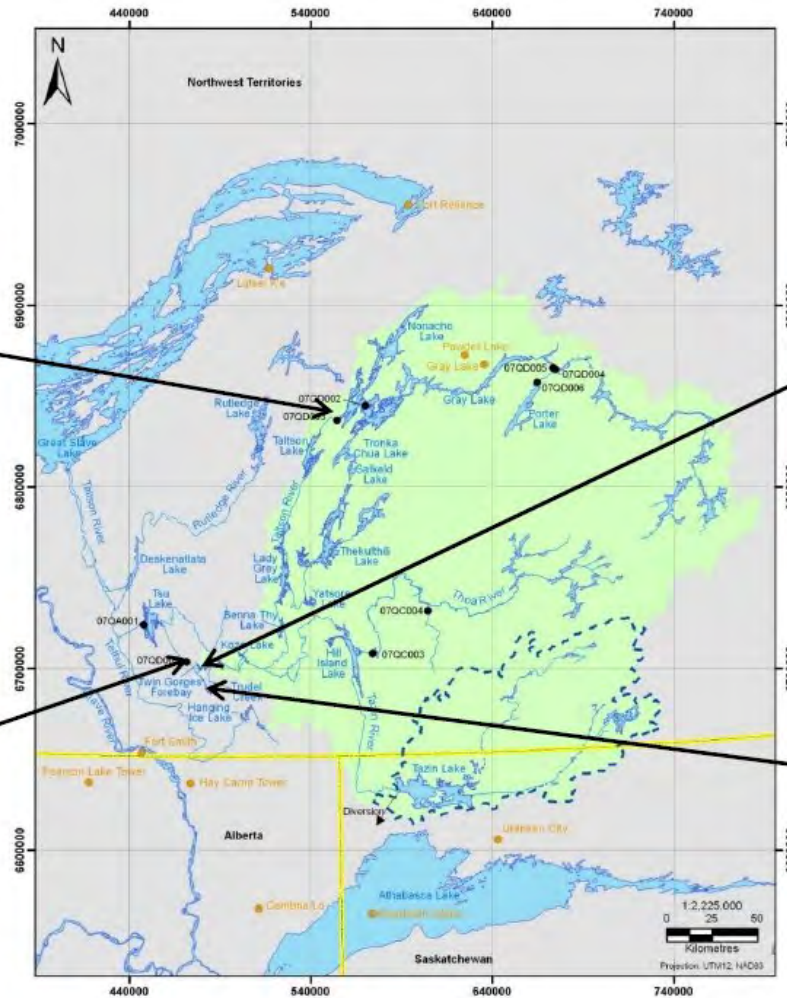


Overview



1. Summary of all the facilities in the Taltson Hydroelectric System
 - Location
 - Operational Overview
2. Detailed outline of operations at Nonacho Lake
3. Overview of environmental licences and ongoing monitoring for Taltson

Taltson Hydroelectric System



History



1965

- Twin Gorges Generating Station installed to provide hydroelectric power to Pine Point Mine

1968

- Nonacho Lake Dam installed for additional storage to meet energy demands of mine

1986

- Closure of Pine Point Mine
- Hydroelectric power provided to Hay River, Enterprise, Fort Smith and Fort Resolution
- Flow in the Taltson River greatly exceeds power production requirements, therefore no flow regulation at Nonacho Lake for power generation

Twin Gorges Generating Station



- Installed in 1965
- 18 MW power generation capacity
- Since the closure of Pine Point Mine has run under capacity at 8-12 MW
- Operates similar to a run-of-river power generation facility



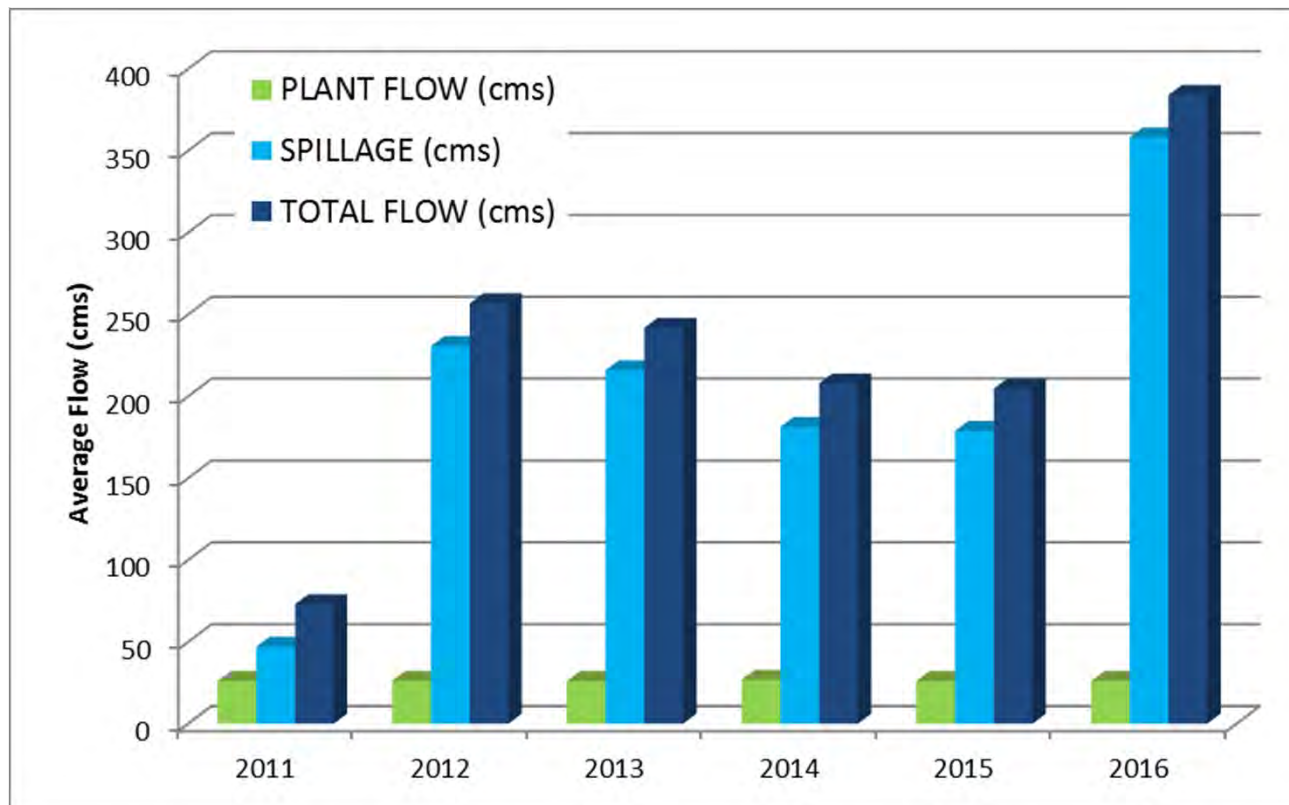
Twin Gorges Reservoir



- Provides storage for Twin Gorges Generating Station
- Excess water spills through the South Valley Spillway located 6 km upstream of the main dam
- Power generation has minimal impact on flows in the basin as much more water flows through spillway than through the plant

Twin Gorges Reservoir

- Average outflow from Twin Gorges Reservoir 2011-2016



South Valley Spillway



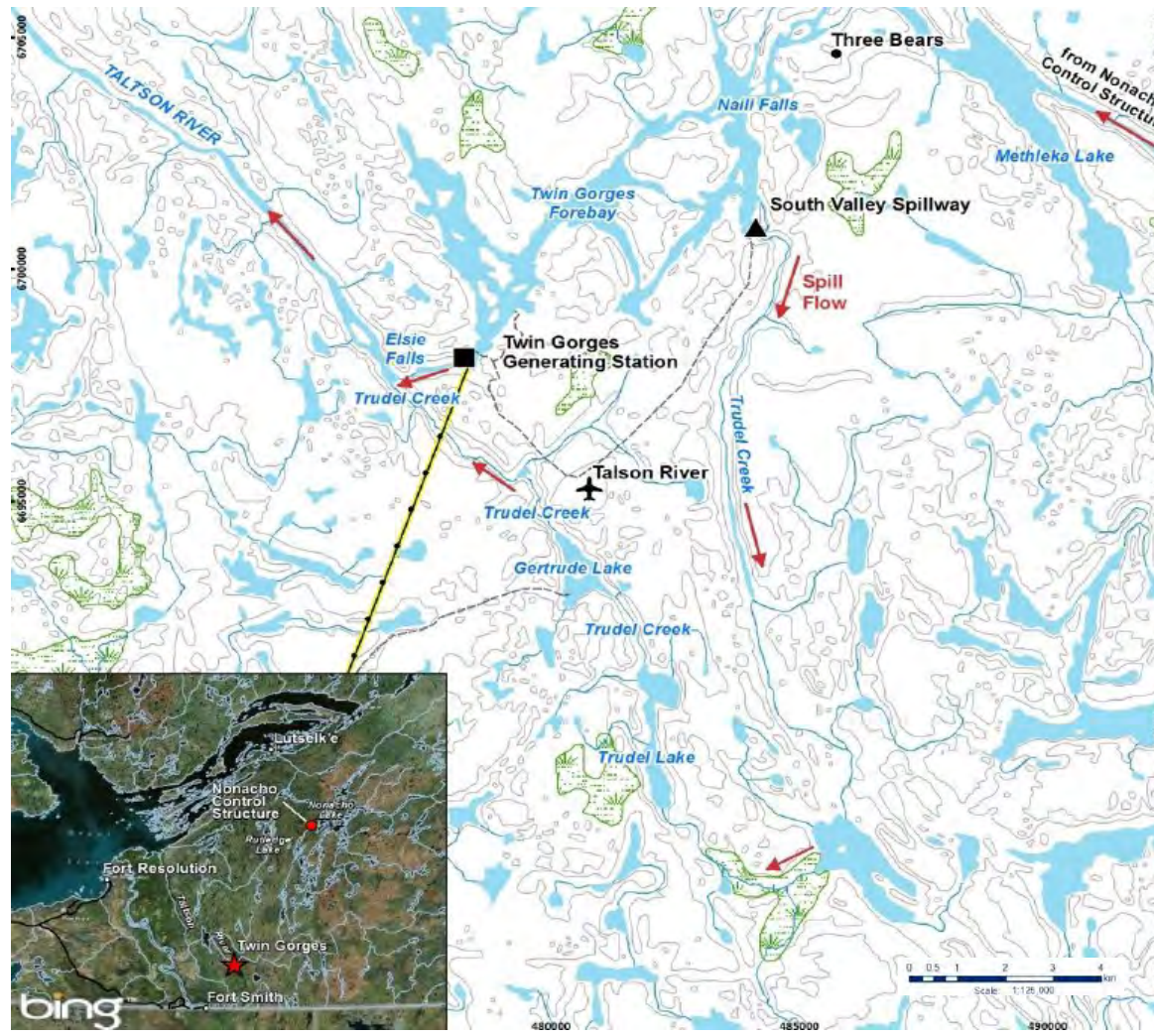
- Uncontrolled spillway from Twin Gorges Reservoir into Trudel Creek
- Amount of spill is determined by elevation of water in Reservoir
- Main spillway is a 100m long concrete structure
- Trudel Creek flows in a loop that rejoins the Taltson River downstream of Twin Gorges Dam

South Valley Spillway

- Has been continuously spilling since mine closure in 1986

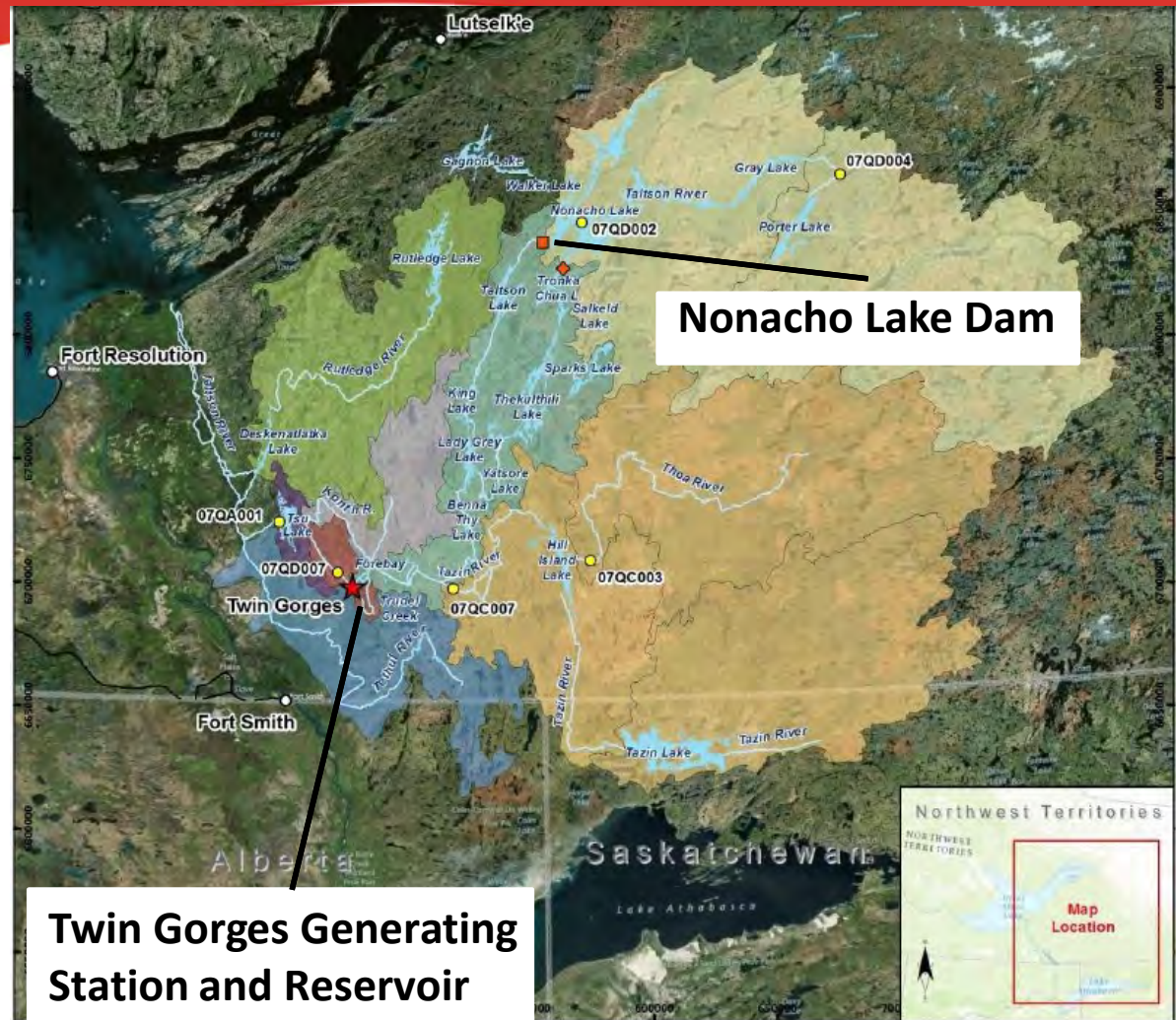


Twin Gorges System



Taltson Hydroelectric System

- Nonacho Lake Dam is 160km upstream from Twin Gorges Reservoir



Legend

Watersheds	WSC Gauge
Konth River	Community
Nonacho Lake	Project Location
Rutledge River	Nonacho Lake Dam
Taltson River	Tronka Chua Gap
Tazin River	
Tethul River	
Trudel Creek	
Tsu Lake	

Images courtesy of BING and ESRI. National Atlas Database (NTDB) compiled by the government of Canada, Natural Resources Canada (NRCAN) at 1:2,000,000. Watersheds boundaries provided by Rescan.

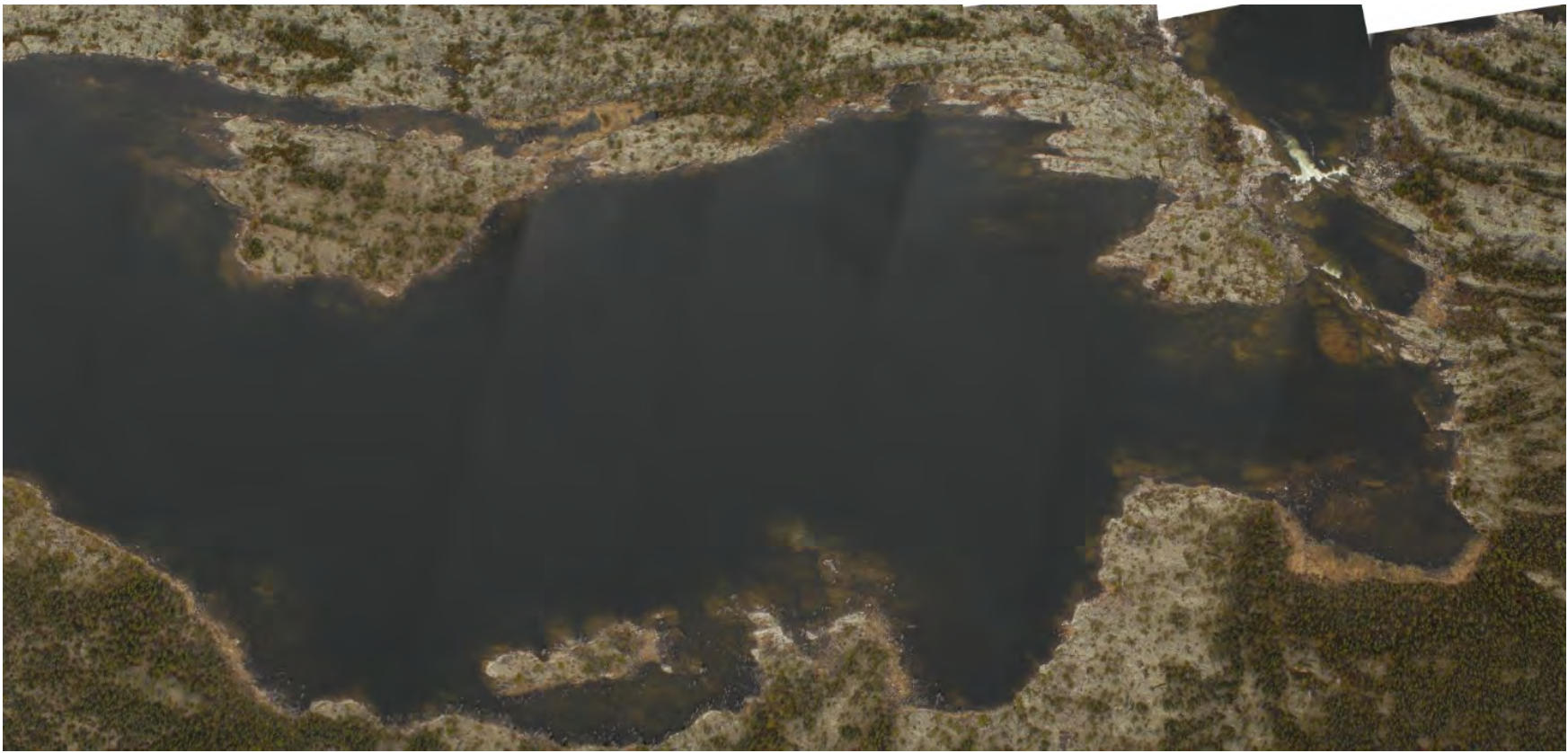
NO.	DATE	REVISION	BY
1	08/09/10	Initial Data Collection	DBA
2			
3			
4			

Date Saved: 10/12/2010
Coordinate System: NAD 1983 UTM Zone 12N

ECOFISH RESEARCH | **Map 1**

Tronka Chua Gap

- Secondary outlet out of Nonacho Lake
- Controlled by water level only



Nonacho Lake Dam



- Constructed in 1968 at the outlet of Nonacho Lake
- 160km upstream of Twin Gorges
- Installed for additional storage for the Taltson Twin Gorges generating station
- Consists of:
 - Natural overflow spillway adjacent to the dam
 - Impermeable rock fill dam
 - Control structure

Nonacho Lake Dam

- Since closure of Pine Point Mine in 1986 Nonacho has not been operated for power generation



Nonacho Lake Dam

Natural Overflow Spillway

- Natural spillway over a rock barrier adjacent to the dam
- Width of 67m and a crest elevation of about 320.0m



Nonacho Lake Dam

Impermeable Rock Fill Dam

- Leakage of approximately $8.5 - 10 \text{ m}^3/\text{s}$
- Helicopter access only
- Width of approximately 100m



Nonacho Lake Dam

Control Structure

- Three 1.8m x 1.8m passages through the dam
- Three gates within the dam control passages
- One gate conveys 14.5-16.5 m³/s
- Minimal control of flow compared with spillway



Nonacho Lake Dam

Control Structure

- Not operated for power generation
- NTPC has only operated control structure once since 2010

NTPC Nonacho Operations Log 2010-2017		
Year	Gate Configuration	Operations Taken
2010	One gate open	None
2011	One gate open	None
2012	One gate open	None
2013	One gate open	None
2014	One gate open until June 5, all gates closed for remainder of the year	One Gate closed on June 5
2015	All gates closed	None
2016	All gates closed	None

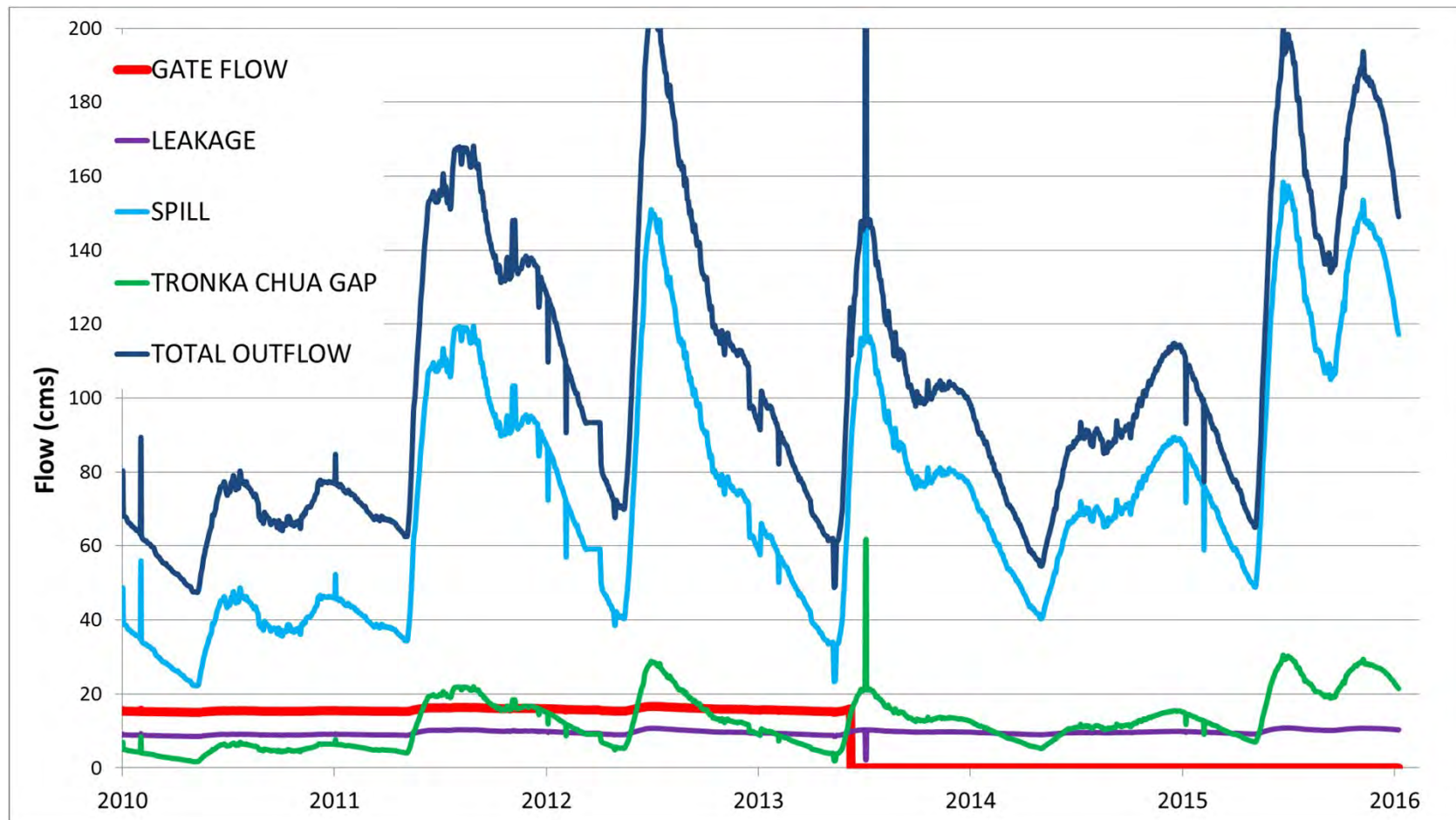
Nonacho Lake Dam

Control Structure

- Not operated for generation since 1986
- Only operated to maintain water level elevations in Nonacho established in water licence
 - Maximum water elevation of 321.6m
 - Minimum water elevation of 319.3m
- NTPC operations now mitigate high and low flows based on water licence conditions
 - i.e., gate was closed in 2014 to reduce impact of low water

Outflows from Nonacho Lake

- Only gate flow controlled by NTPC



Taltson Water Licences

1996

- Water licence N1L4-0154 renewed for a 15 year period
- Water Effects Monitoring Program (WEMP) developed
 - Terms of Reference (TOR) for the WEMP were developed in 1999 following consultation with regulators, communities and a workshop with a Community Advisory Committee

2011

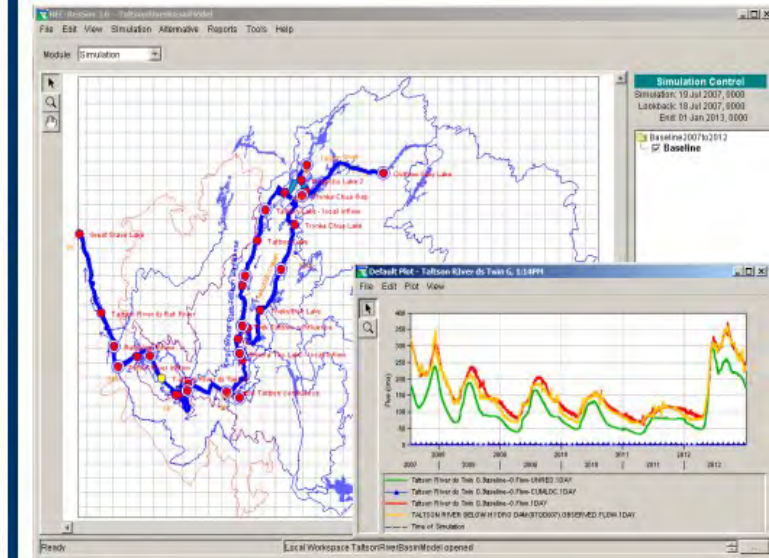
- Went through water licence application process including public meetings, hearings and reviews
- Water licence MV2011L4-0002 issued by the Mackenzie Valley Land and Water Board (MVLWB)



Taltson Water Licences

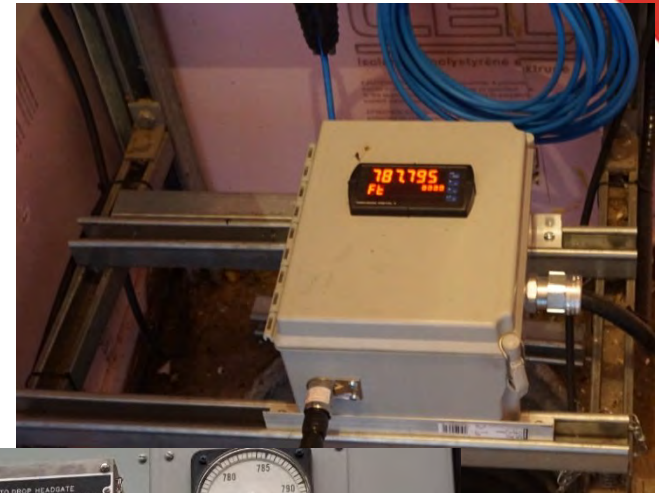
Key Monitoring Programs required by water licence MV2011L4-0002

- Surveillance Network Program
- Aquatic Effects Monitoring Program
- Sediment and Erosion Management Plan



Surveillance Network Program

- Monitors water levels upstream and downstream of facilities
- Monitors flow through facilities and spillways
- Completed in conjunction with Water Survey of Canada (WSC)
- WSC data available real-time and NTPC data reported quarterly to the MVLWB and publically available on the Registry



Aquatic Effects Monitoring Program

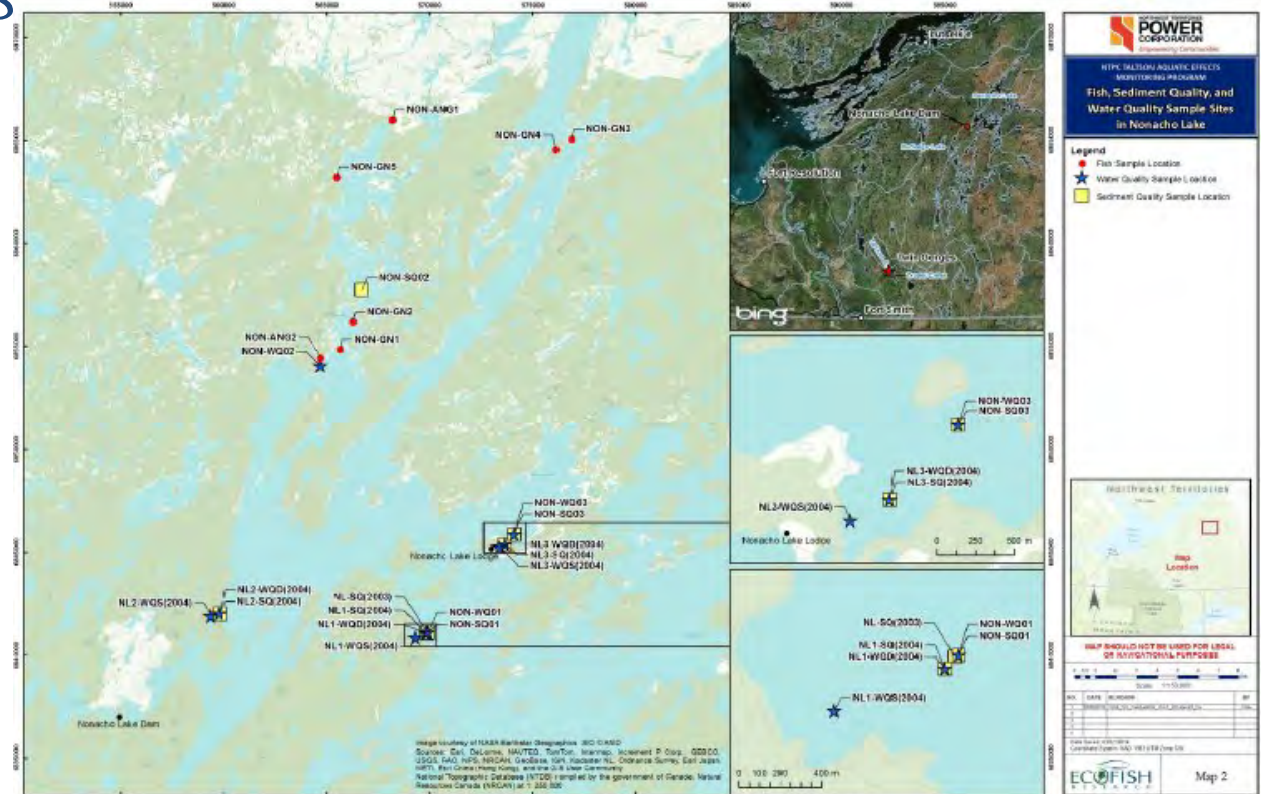
- Developed following consultation with regulators and communities and approved by MVLWB
- Guided by commitments made by NTPC to stakeholders during the regulatory review process and requirements of the water licence
- Implemented in 2012 and runs until 2026
- Builds on baseline information collected throughout the Taltson River watershed over the past water licences



Aquatic Effects Monitoring Program

The specific monitoring programs that comprise the AEMP include:

1. Riparian Habitat and Fish Usage Assessment
2. Trudel Creek and Lower Taltson River Fish Stranding Monitoring
3. Mercury in Sediment and Fish Flesh Monitoring

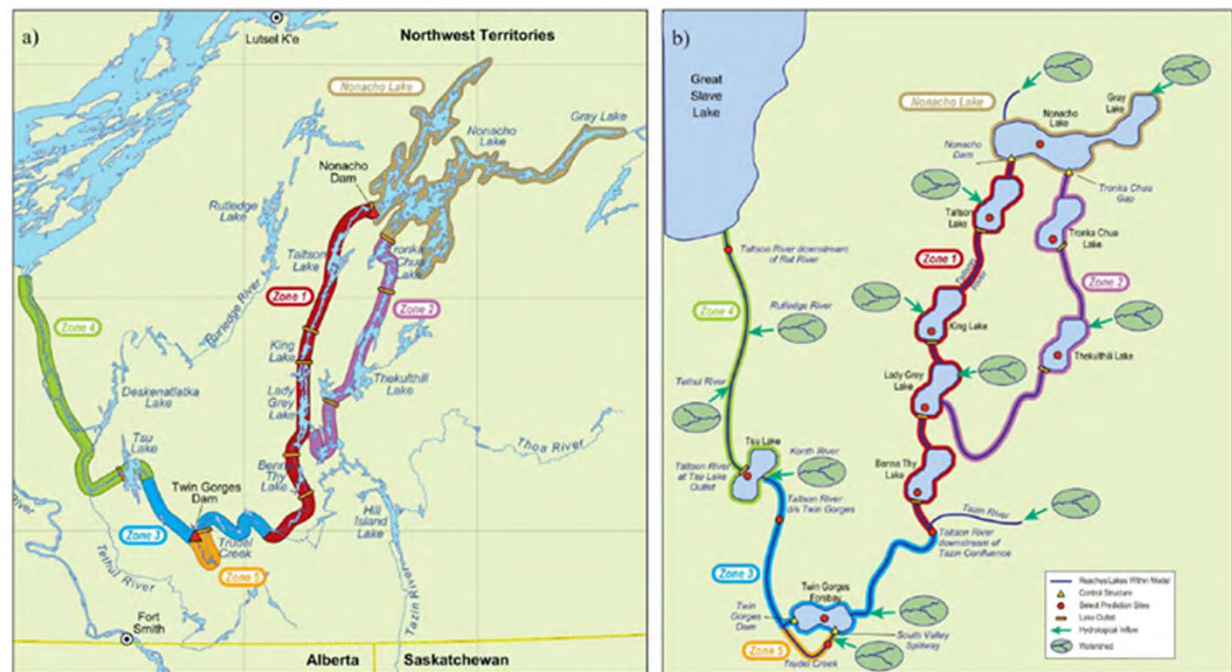


Aquatic Effects Monitoring Program

The specific monitoring programs that comprise the AEMP include:

4. Desktop Fish Mortality Assessment
5. Nonacho Lake and Lower Taltson River Flow Analysis
6. Taltson Hec-ResSim Hydrologic Modeling Update

Figure 1. a) The Taltson River Basin. b) The HEC-ResSim model representation of the Taltson River Basin. This figure is reproduced from Rescan (2009).



Aquatic Effects Monitoring Program

AEMP monitoring schedule

Monitoring Program	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Riparian Habitat and Fish Usage Assessment								X							X	
Trudel Creek and Lower Taltson River Fish Stranding Monitoring		X														
Mercury in sediment and Fish Flesh Monitoring		X						X							X	
Desktop Fish Mortality Assessment		X														
Nonacho Lake and Lower Taltson River Flow and Water Level Analysis				X												
Taltson Hec-ResSIM Hydrologic Model Update		X	X					X					X			

Sediment & Erosion Management Plan

- Focuses on Nonacho Lake and Trudel Creek
- Developed following consultation with regulators and communities and approved by MVLWB
- Guided by commitments to stakeholders made by NTPC during the regulatory review process and requirements of the water licence
- Implemented in 2012 and runs until 2026
- Builds on the limited baseline information available



Sediment & Erosion Management Plan

The specific monitoring programs that comprise the SEMP include:

1. Reconnaissance Level Survey
2. Monitoring of Erosion Stations
3. Develop Prevention and Mitigation Procedures and Practices

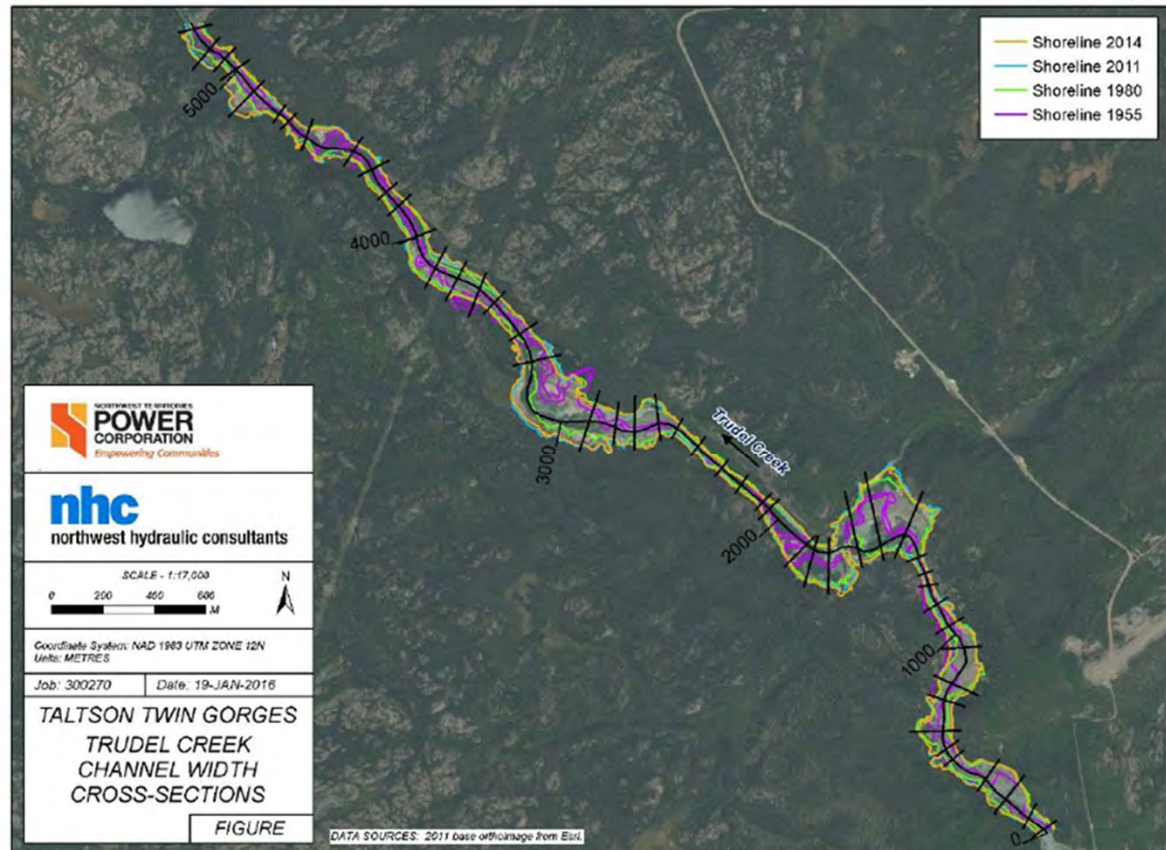


Figure 2-10. Trudel Creek banklines 2014-1955 with cross-section measurement locations.

Sediment & Erosion Management Plan

SEMP monitoring schedule for Nonacho Lake and Trudel Creek

Management Plan Task	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Task 1: Reconnaissance Level Survey		X														
Task 2: Monitoring Erosion Stations			X					X							X	
Task 3: Prevention and Mitigation Procedures				X												



Taltson Water Licences

- All monitoring requirements have been met and results submitted to MVLWB
 - All results publically available on the Registry
 - Monitoring in conjunction with other environmental regulators such as Fisheries and Oceans Canada, Environment Canada
- Operations at Taltson and Nonacho have remained in accordance with all conditions and regulations in water licence MV2011L4-0002

Thank you



From: [Shannon Allerston](#)
To: [Permits](#)
Subject: FW: NTPC Presentation for Carter Family Re-Hearing
Date: Friday, May 12, 2017 8:39:02 AM
Attachments: [NTPC Presentation for Carter Family Re-Hearing.pdf](#)

MV2011L4-0002

NTPC Compensation Claim Re-Hearing Presentation

From: Sean Parker [mailto:sparker@mross.com]
Sent: May-11-17 5:08 PM
To: Shannon Allerston
Cc: Amanda Gauthier; Doug Evanchuk; sheldon@dragontoner.ca; caroline@dragontoner.ca; eolszewski@mltaikins.com
Subject: NTPC Presentation for Carter Family Re-Hearing

Good afternoon,

Please find attached NTPC's presentation for the compensation re-hearing, in both powerpoint and pdf.

Regards,



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