SaaS: Cumulative Effects Platform

Environmental Impact Assessment

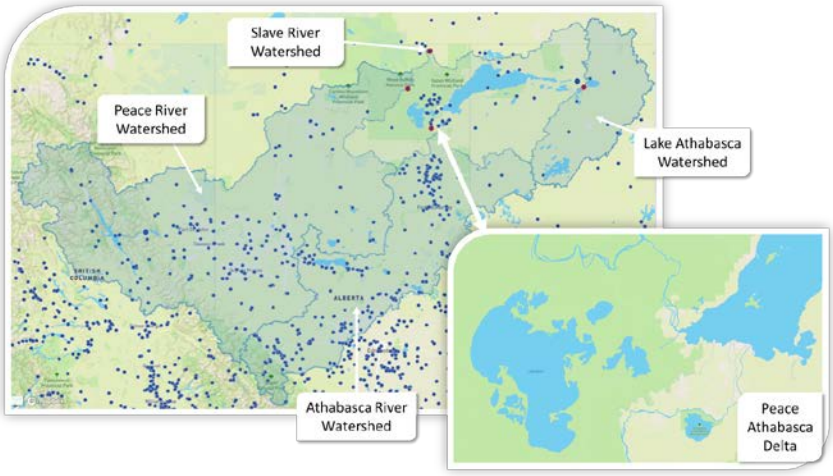
THREATS™ THE HEALTHY RIVER ECOSYSTEM ASSESSMENT SYSTEM

Flow Regime and Hydraulics Analysis of the Peace Athabasca Delta: Building Understanding of Conditions for Flooding

Client: Mikisew Cree First Nation

Location: Peace-Athabasca (Rivers) Delta, Alberta (Canada)

Project Timeline: 2020 – 2023



Greenland was retained by **Mikisew Cree First Nation** (MCFN) in 2021 to conduct a Flow Regime and Hydraulics Analysis of the Peace-Athabasca Delta (PAD), located in north-eastern Alberta. PAD is home to many Indigenous communities, where decades of hydrological alternations along the Athabasca and Peace Rivers have caused a decrease in flood inundation into the lakes and perched basins.

This project answered key questions of the community that can be used for a future management plan, which include:

- Identifying conditions that lead to regenerative flooding of the enormous delta in the past, pre- and post-regulation;
- Balancing the fine line between regenerative flooding and preventing loss to community infrastructure; and
- Determining controls or regulations required to ensure regenerative flooding to maintain the health of the PAD.

Greenland's web-based decision support system known as **THREATS™** (**T**he **H**ealthy **R**iver **E**cosystem **A**ssessmen**T S**ystem) was used to undertake parts of the analysis.

Key aspects of the study included:

- Analysis of flow regime, contributing areas and impacts of regulation through comparison with historical data and reporting;
- Hydraulics analysis and navigation index concept were used to identify the frequency and flow conditions that permit navigation and access to Traditional Lands. Integrated traditional knowledge and data into platform.
- Findings of Consultations on what the community is seeking;
- Overview of trends over time, hydrometric station analysis, water levels and flow; reversal conditions, PAD storage and saturation, effects of water control structures;
- Delineated historical water inundated areas using Landsat satellite imagery during reference years;
- Evaluated historical ice jam analysis and prior water storage conditions as contributing factors to flooding; and,
- Suggested actionable steps for mitigation and enabling beneficial flooding.