

Resolving Water Challenges in the North





We Understand Northern Communities

At Northwest Hydraulic Consultants (NHC), we understand the increasing challenges facing Northern communities to meet competing cultural, societal, and environmental demands, especially in the face of climate change and threats to economic viability. Addressing these issues and resolving their impacts requires careful understanding of each region, communication with residents, knowledge of economic challenges, and novel ways to enhance economic viability.

Successful project outcomes require thoughtful, thorough exploration of each region, while accommodating inherent logistical transportation and other challenges unique to the north.

We take pride in providing solutions to mitigate, respond, and adapt to the specific needs and challenges faced by each northern community we serve.

Research

We take the time to understand the issues, needs, and concerns of your community members.

Communicate

We engage with local champions during each phase of your project because we understand how critical local knowledge is to the success of your project.

Community Culture

Each community has its own customs and traditions. We adapt our work to respect cultural beliefs and boundaries.



A Unique Approach to Working with Northern Communities

Our professionals at NHC understand that every project faces specific challenges and every community has unique perspectives that require understanding, respect, and accommodation – particularly in geographically and logistically isolated regions. Our project teams offer in-depth experience adapting to seasonal constraints inherent with transporting people and materials in northern environments. We know how to respond to weather and temperature effects

on construction activities, and we are adept at scheduling work so it won't interfere with local customs, traditions, and subsistence lifestyles.

When we support a northern project, we also take the time to research and understand each community's needs and concerns by engaging with local champions early and often, and by informing and serving northern communities throughout all phases of a project's lifecycle.

Logistics

Road access issues, seasonal transportation constraints, high freight and shipping costs, and severe weather that impacts construction activities – we understand the logistical challenges facing northern communities, and we solve logistical challenges while meeting project timelines.

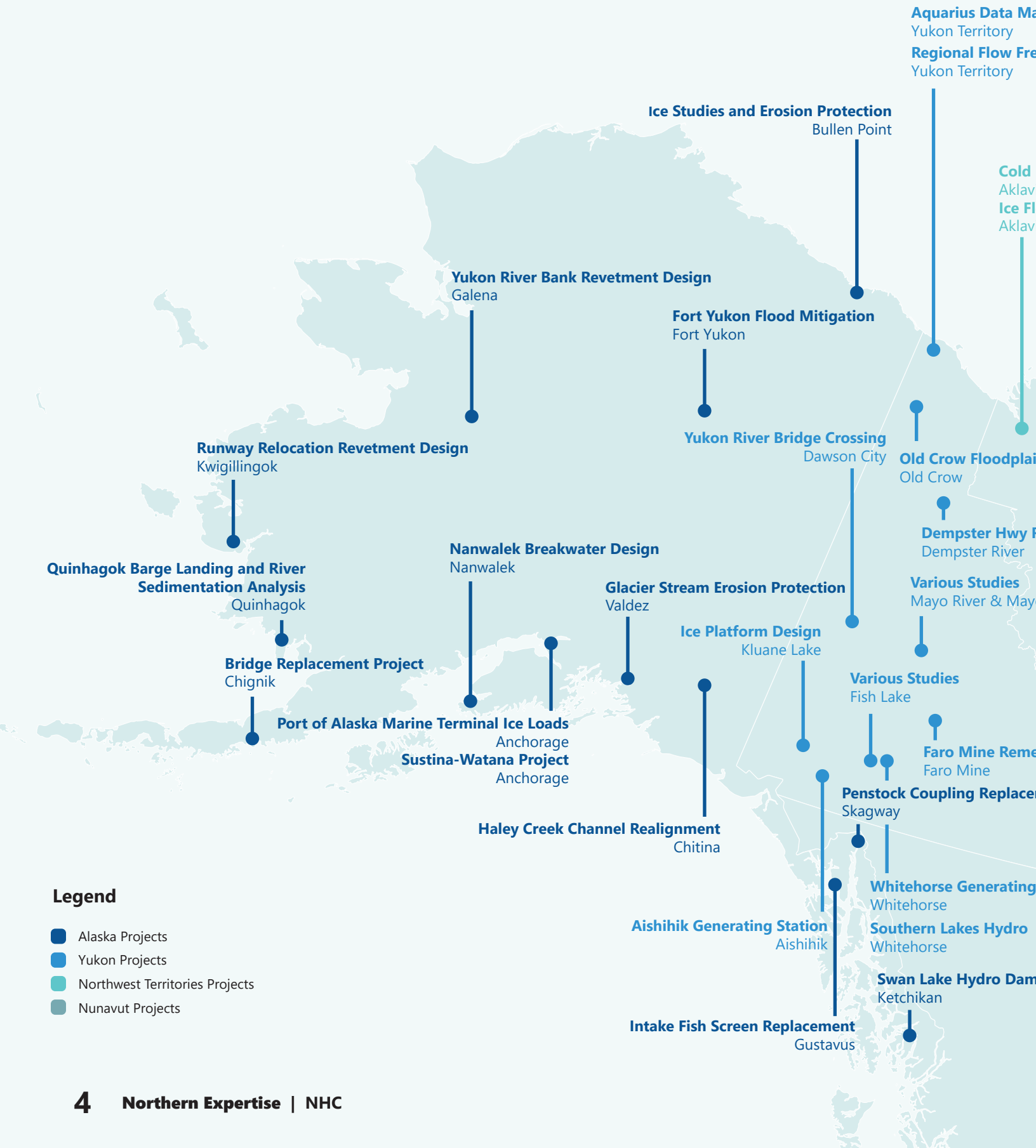
Permitting

We understand permitting requirements and have forged respected relationships with government agencies, so we can prioritize project permitting needs while adhering to legislated requirements.

Grants

We bring extensive knowledge of local, regional, provincial, territorial, and federal grant funding programs, and we are keen to support you during the grant application process.

Demonstrated Experience in Northern Communities



Management Support

Frequency Analysis

Regions Flood Study

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Flooding Disaster Mitigation
ik

Erosion Protection
Tuktoyaktuk

n Mapping

River Engineering

o Lake

adiation Project

ment

Station

Spillway Raise

Great Bear River Bridge

Tulita

Intake Ice & Sediment Effects Assessment

Tulita

Great Bear River Low Head
Hydropower Feasibility Study

Deline

Cold Regions Hydrology Study

Izok Mine

Cold Regions Flood Study

Fort Sampson

Cold Regions Flood Study

Hay River

Ice Platform Design

Hay River

Mackenzie Bridge Hydraulics

Fort Providence

Ice Conditions Assessment

Prairie Creek Mine

Bridge Hydraulics for 25 Crossings

Mackenzie Highway

Wharf Ice and Wave Analysis

Yellowknife

Wharf Coastal Processes Assessment

Rankin Inlet

Coastal Engineering and Geomorphology

Coastal engineering and geomorphology services will continue to be critical in ensuring the long-term safety and viability of northern coastal communities. Our coastal engineering and geomorphology team brings communities more than three decades of experience solving complex coastal flooding and erosion issues in remote northern locales. Our services include:

- Nature based design and habitat restoration
- Tsunami and long wave modeling
- Shoreline restoration
- Flood and erosion protection design
- Coastal process studies
- Climate change and sea level rise impacts studies
- Numerical and physical modelling
- Hazard and risk assessment





River Engineering and Geomorphology

NHC's river experts specialize in engineering and geomorphology in dynamic environments. We work with both numerical and physical models and offer North America's largest physical modelling labs, where we develop and test complex hydraulic issues at work in the projects we support. Our studies provide critical insight into the evolution, stability, and behaviour of rivers, estuaries, and other natural features and processes, enabling us to successfully design viable, sustainable solutions for managing and restoring rivers. Our services include:

- Hydrometric monitoring
- Hydrologic and hydraulic design
- Physical and numerical modelling
- Channel and floodplain studies and effects on aquatic and riparian habitat
- Watershed and stream condition analysis

Ice and Cold Weather Engineering

The cold regions of the world are home to NHC's ice and cold weather engineers. Our experts in ice and its formation provide essential knowledge for siting and designing engineering facilities, including hydroelectric plants, intakes, bridges, docks, and flood protection levees. We also understand the integral need for ice bridges in winter transportation and construction in remote areas. And we value the vital role of ice conditions when assessing river hydraulics, collecting flow measurements, conducting environmental studies, and mapping flood hazards. Our services include:

- Field assessments of ice conditions
- Numerical modeling of ice processes
- Assessment of ice forces on structures
- Physical modelling of ice conditions
- Ice thicknesses determinations for moving and static loads





Climate Change Impacts and Adaptation

Climate change effects on sea level rise, sea ice cover, and storm patterns and intensity are increasing flood and erosion risk in coastal areas around the world. Less snowfall and accumulation in the winter decreases local water supply, alters flood and drought frequency and severity, changes permafrost and ground ice, and reduces aquatic habitat. NHC's experts develop climate change adaptation strategies as integral components of our hydrologic and hydraulic analysis and water planning and design services. Our services include:

- Climate change impact assessments
- Evaluation of flood risk in future climate scenarios
- River morphology change projections
- Analysis of changing river ice regimes and impacts
- Aquatic habitat impact assessments
- Investigations of water availability and storage

Flood and Erosion Hazard Mitigation

NHC's flood and erosion experts design robust, science-based hydraulic modelling programs while working directly with our policy, planning, and project managers to provide effective flood management, particularly in northern regions. In fact, we pioneered the approach now used to develop long-term climate change adaptation programs that predict future sea level rise and changes in land-use. Our services include:

- Flood risk assessment and mapping
- Flood hazard reduction studies
- Numerical and physical modeling
- Design of erosion protection
- Field surveys including bathymetric surveys
- Coastal and riverine process data collection





Celebrating 50+ Years of Water Engineering Expertise

Our mission is to
provide innovative
science and
engineering solutions
to water-related
challenges.

NHC is an internationally recognized, employee-owned firm of consulting engineers and scientists providing professional services to develop, manage, and protect the world's water resources. Our expertise includes coastal and river engineering, flood and erosion hazard engineering and risk assessment, engineering in cold regions, and geomorphology assessment.

A private firm incorporated in 1972, NHC remains unique in our degree of specialization, as shown in our physical hydraulic laboratories, our development and leadership of research programs, and our continuous testing of hydraulic instrumentation and structures. We have acquired our specialized expertise and experience from supporting more than 5,000 water resource projects across Canada, the US, and the world.

Contact Us

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