Canada – Inuit Nunangat – United Kingdom Arctic Research Programme 2021-2025

Hydrokinetic Energy Resource of the Sylvia Grinnell River
A Component of the REMIROCaN Project

In collaboration with Nunavut Nukkiksautiit Corporation (NNC), a subsidiary of Qikiqtaaluk Corporation.

This work has been approved by the Nunavut Research Institute.

CINUK
CANADA – INUIT NUNANGAT – UNITED KINGDOM
ARCTIC RESEARCH PROGRAMME

Hydrokinetic (hydro = water, kinetic = speed) **energy facts:**
- The higher the **river speed**, the more **hydrokinetic energy** that can be extracted.
- Hydrokinetic power has **less impact** on **fish** and sediment/**nutrient** transport compared to traditional hydropower.
- The amount of **carbon** from a hydrokinetic turbine's operations, installation, and maintenance is estimated to be only **1.3%** of the diesel-based carbon.

Example of a Hydrokinetic Turbine
ORPC RivGen (40 kW):
- Igiugig, Alaska
- Offset community diesel use by 50%
- Community led & operated
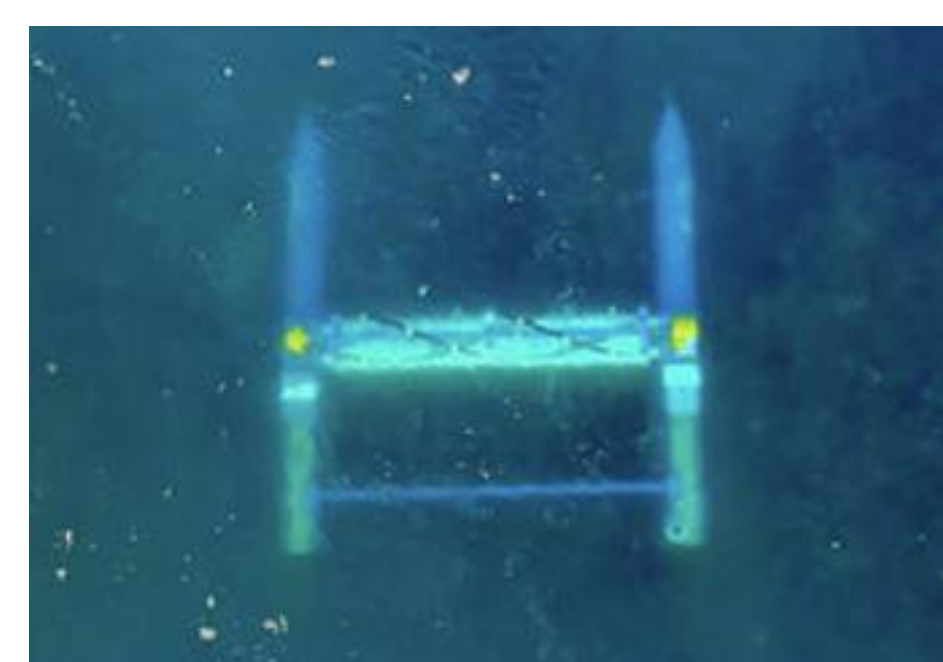
DATA COLLECTION

Method of Collecting Data
- Battery-powered remote-controlled boat

Study Location

Most promising location in the river is 3.5km upstream from Iqaluit airport runway

Equipment Used
Acoustic Doppler Current Profiler (ADCP)

Uses sound to measure:
- Speed and direction of water movement
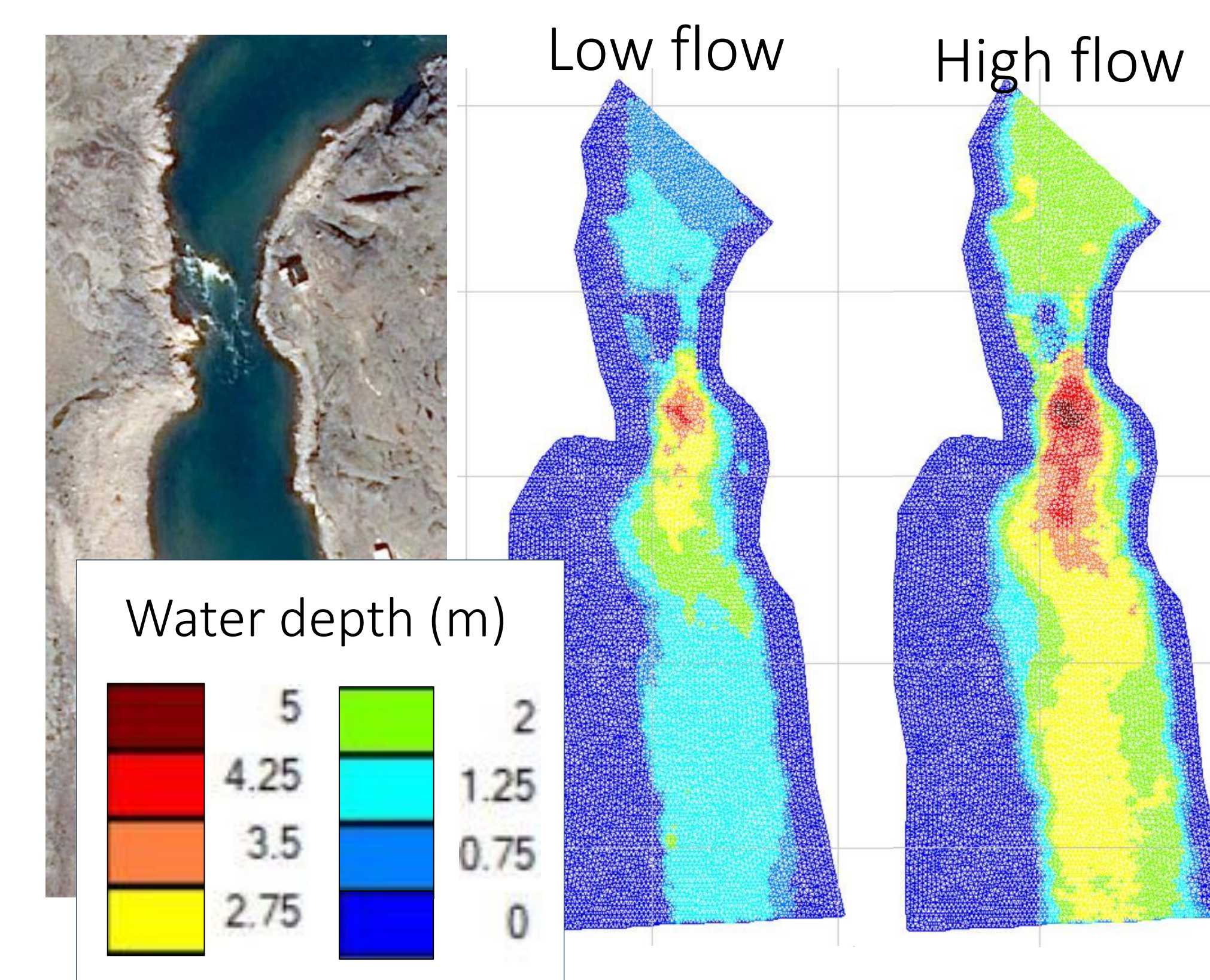- Height of water
- Distance to river bottom

RTK-GPS
- Improves positional accuracy of ADCP data

RESULTS

Measured water depth

Low flow   High flow

Water depth (m)

5	2
4.25	1.25
3.5	0.75
2.75	0

Power across different seasons

Low flow   Mid flow   High flow

Water speed (m/s)

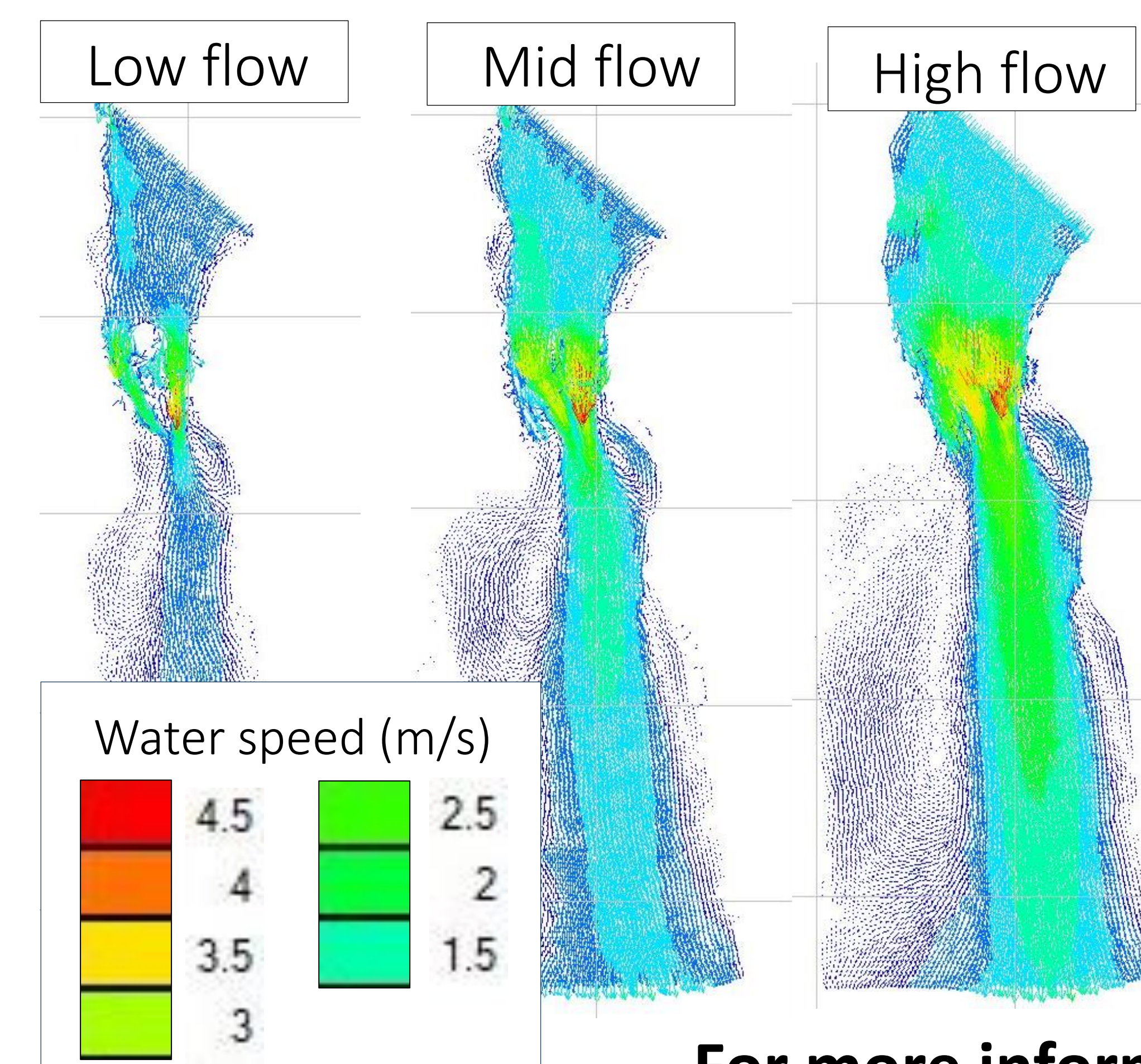|	
4.5	2.5
4	2
3.5	1.5
3	

The outcome of the research is data and information that has been transferred to the community (HTO & NCC). The community will maintain data ownership.

The Most Promising Location is Located Downstream of Rapids

Flow is sped up here by the rock formation.

High speed is expected throughout the open water season.

The Amount of River Hydrokinetic Energy Resource in the Sylvia Grinnell River

Extracting hydrokinetic energy from the Sylvia Grinnell River north of Iqaluit is likely **feasible** in **open water** conditions (turbine removed in winter).
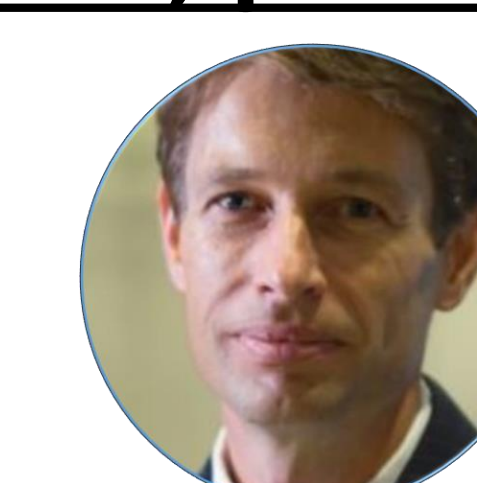
An average **75 MWh/year** of power is expected to be produced with one 10m^2 turbine. This could potentially power 13 houses with 1 turbine.

The power produced depends on the turbine. Larger turbines produce more power.

For more information, please contact:

Katelyn Kirby, Ph.D. Candidate
Email: kkirb087@uottawa.ca

Colin Rennie, Professor
Email: colin.rennie@uottawa.ca