# Saltwater Intrusion into Rupert Bay Environmental Follow-Up 2010

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Hydro Québec Production


La Grande Rivière
Baie de Rupert
Hydro Québec
Géomatique
Image Landsat
Data SIO, NOAA, U.S. Navy, NGA, GEBCO

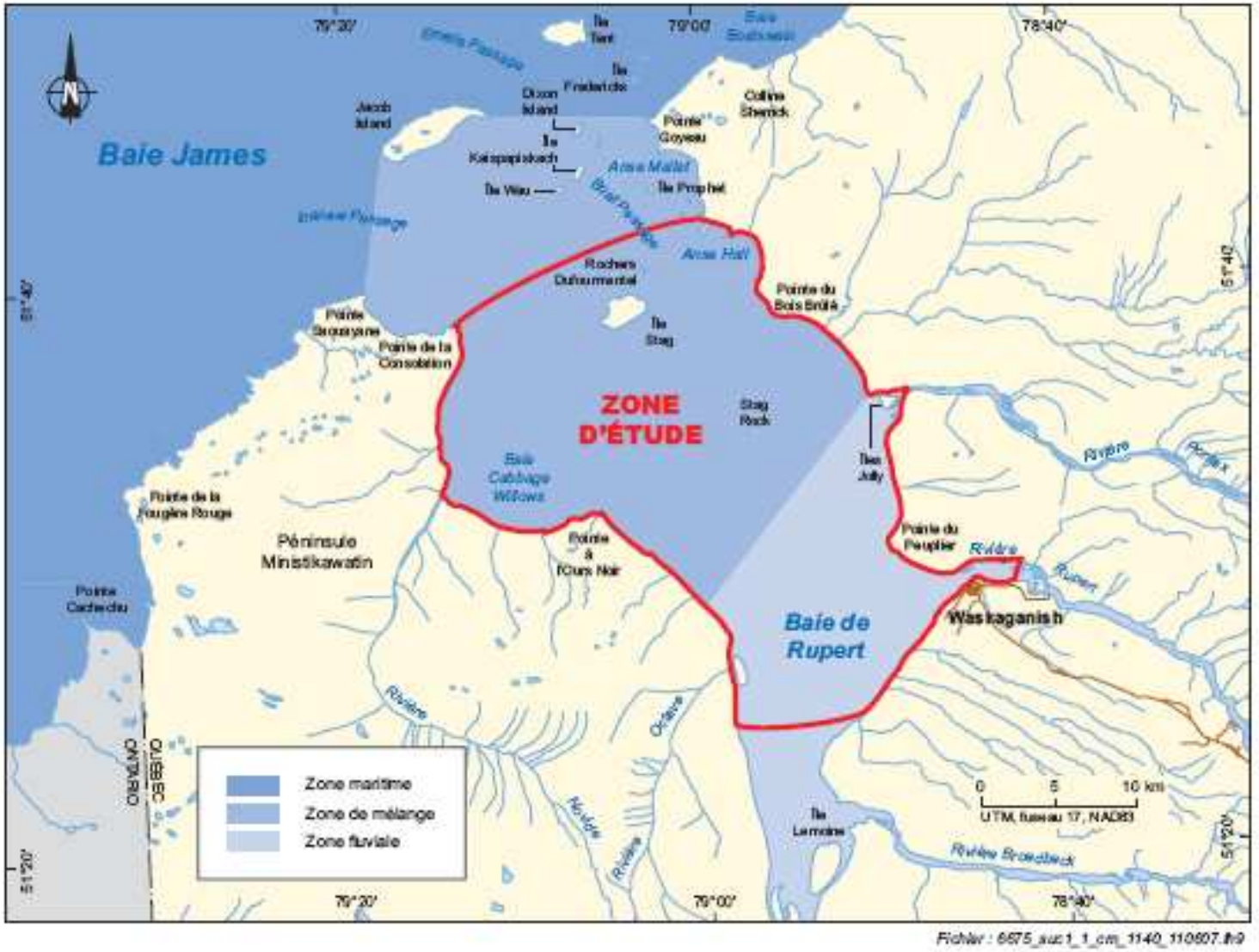

Stag Island
Rivière Pontax
Rivière Rupert
Rivière Broadback
Rivière Nottaway

# Objectives - Saltwater Intrusion

- Measure limit of saltwater intrusion into the Baie de Rupert
- Measure limit saltwater intrusions at the mouth of the Rivière Pontax
- Compare the water levels in the Baie de Rupert and Rupert estuary

- Open-water and ice cover conditions

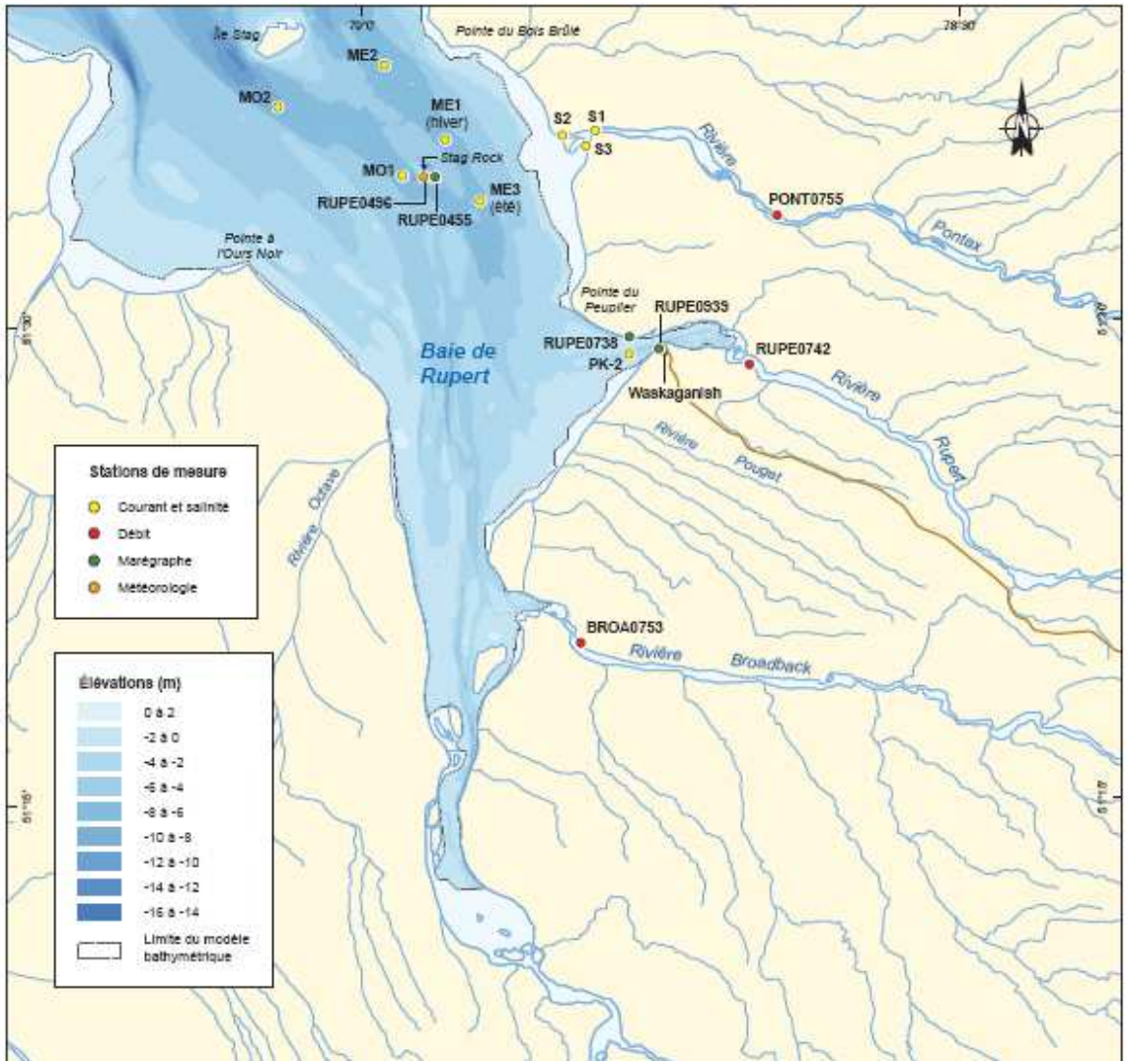
# Study Area


Baie James
ZONE D'ÉTUDE
Péninsule Minsiskawatin
Baie de Rupert
Waskaganish
Zone maritime
Zone de mélange
Zone fluviale
ONTARIO
QUÉBEC
0 5 10 km
UTM, fuseau 17, NAD83

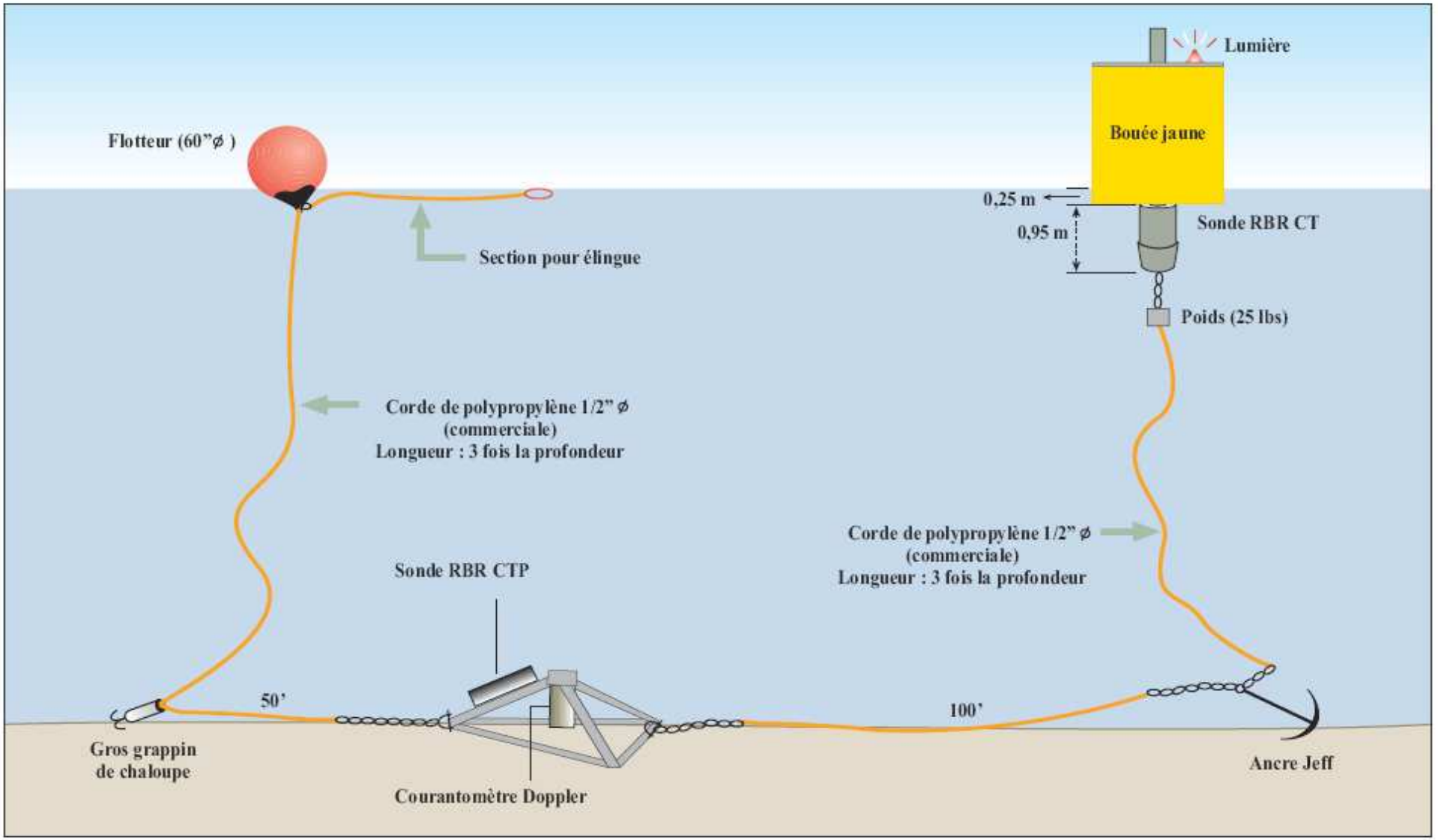
# 2010 Timeframe

- 6 to 8 weeks  continous measurements
  - During open water and with ice cover
  - 4 locations in Baie de Rupert
    - Water T°C, conductivity, depth (CTD)
    - Salinity, current (ADCP)

# Continuous measurement stations



# Open water mooring



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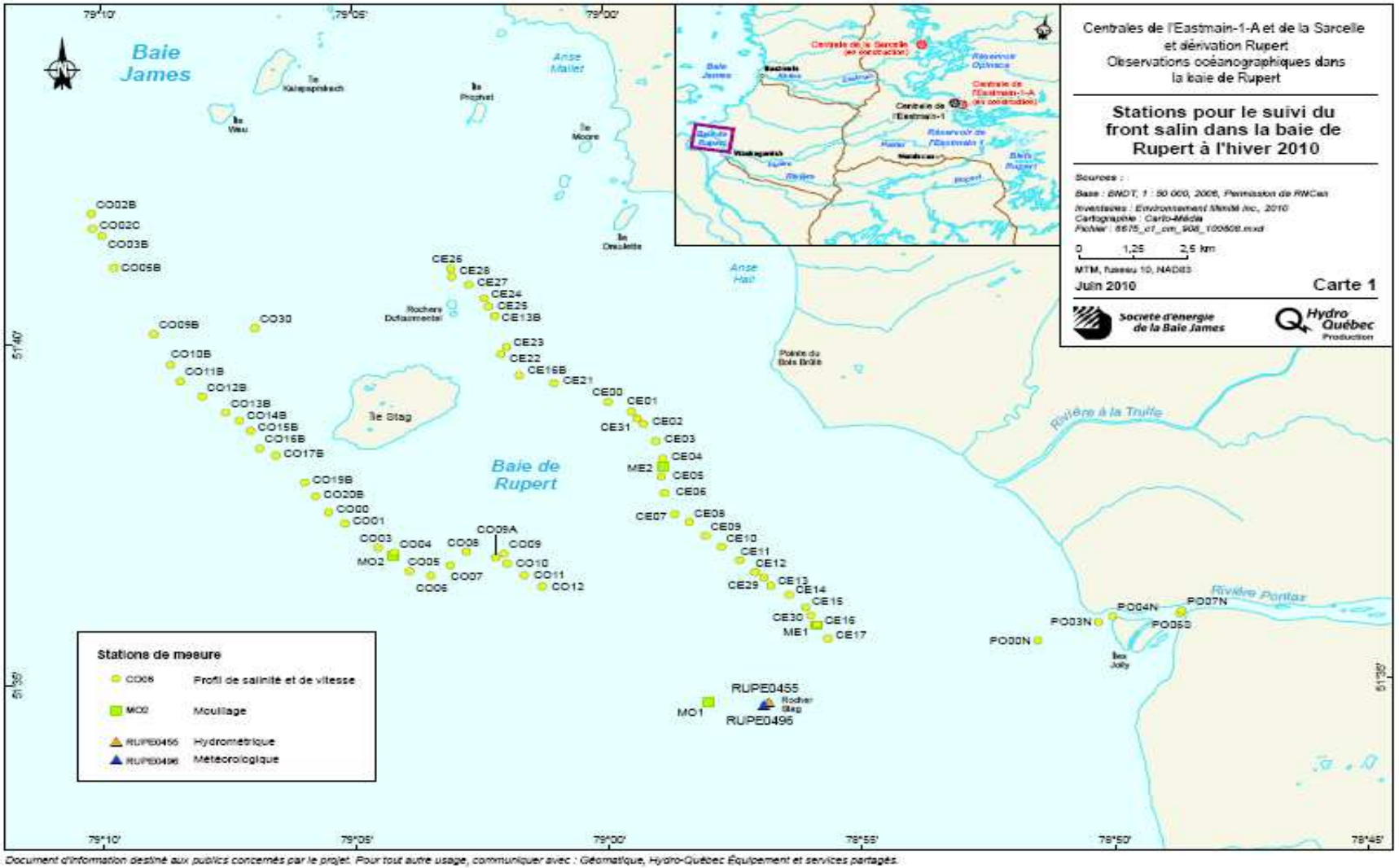
  - 4 field campaigns profiling
    - Water T°C, conductivity, depth (CTD)
    - Salinity, current (ADCP)
  - Cree were integrated in the survey teams

# Example of the profiling transects realized in winter 2010

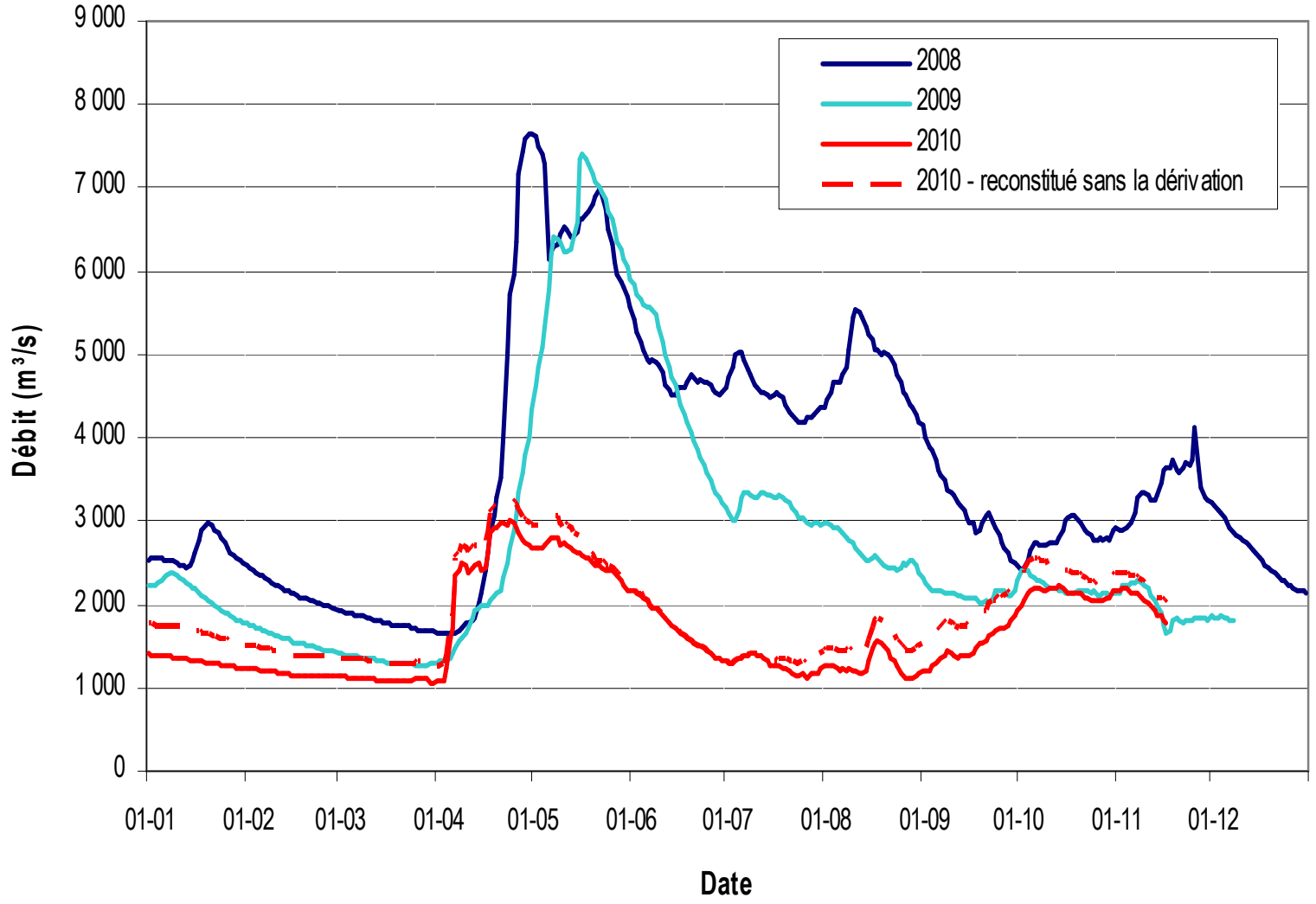



*Document d'information destiné aux publics concernés par le projet. Pour tout autre usage, communiquer avec : Géomatique, Hydro-Québec Équipement et services partagés.*

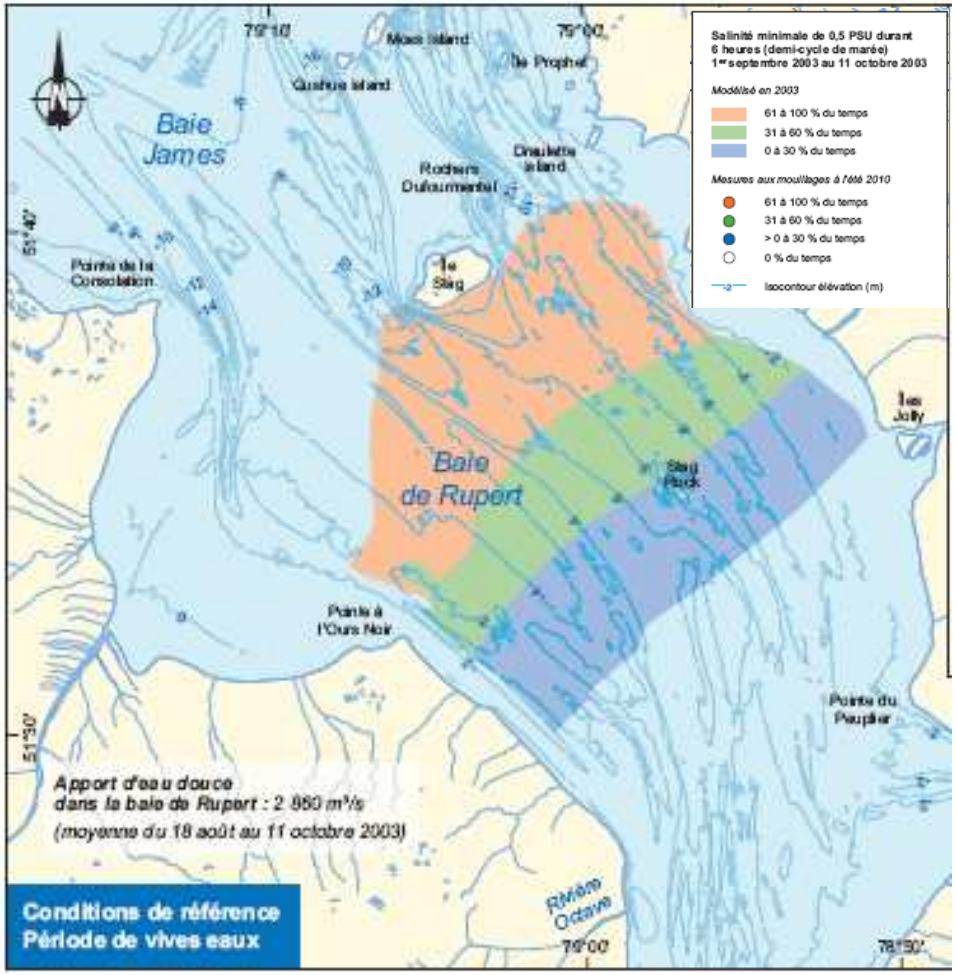
# Cree Traditional Knowledge 2010

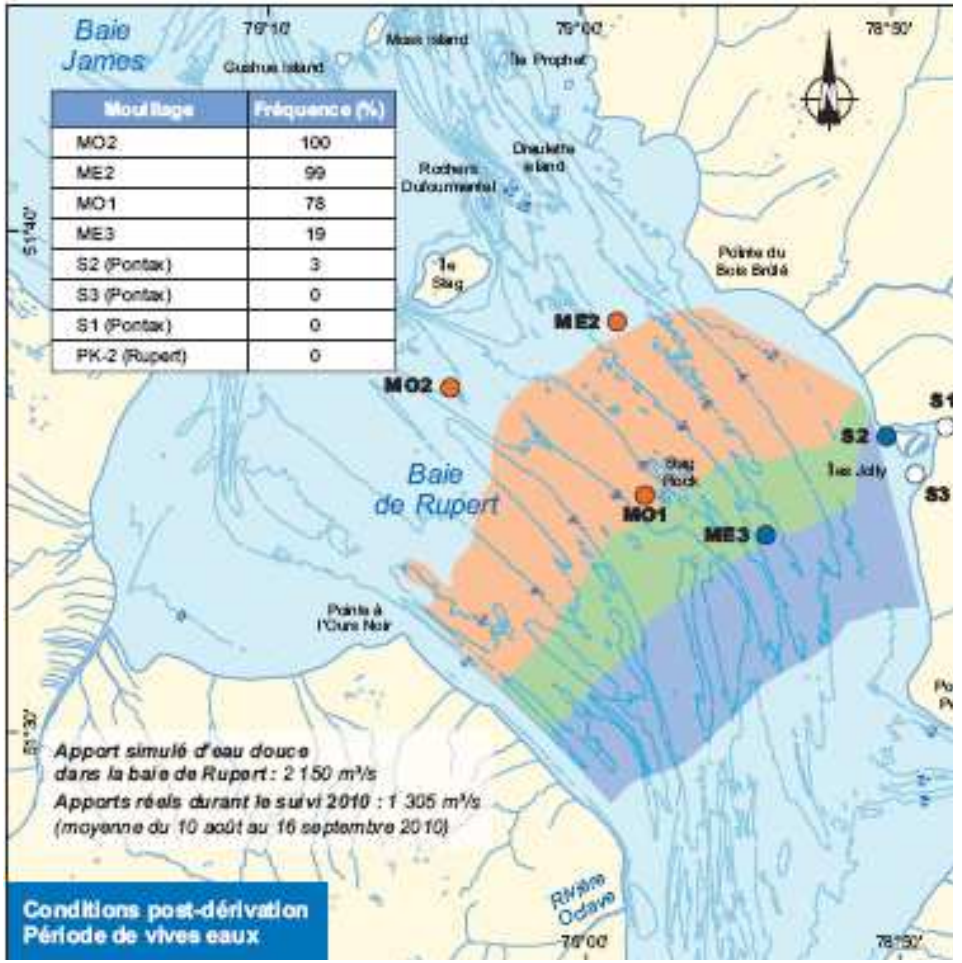
- Collecting Cree knowledge :
  - 2 interviews carried out with Crees familiar with the mouth of the Pontax area:
    - Tallyman of R4 trapline
    - Cree culture teacher at Wiinibekuu school
  - Informal gathering with Crees integrated in the survey team
- Results :
  - Characterisation of pre-diversion water salinity and fishing activities at the mouth of the Pontax
  - Some criteria used by the Crees to determine water salinity :
    - Direct tasting or splash when boating
    - Type of grass growing along the shores

# Total freshwater input of the Pontax, Rupert, Broadback, Nottaway rivers



# Intrusion and retreat limits of saltwater, Baie de Rupert, Open water

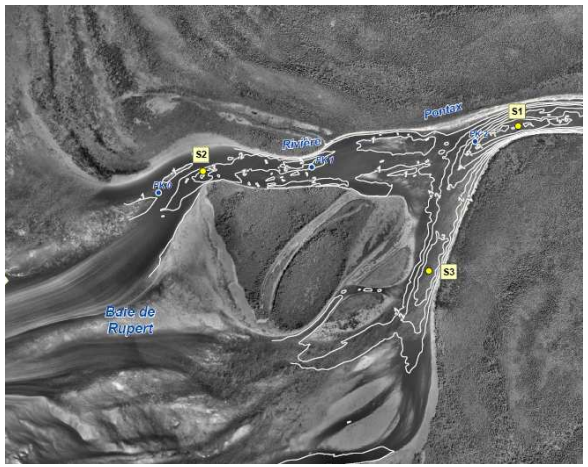


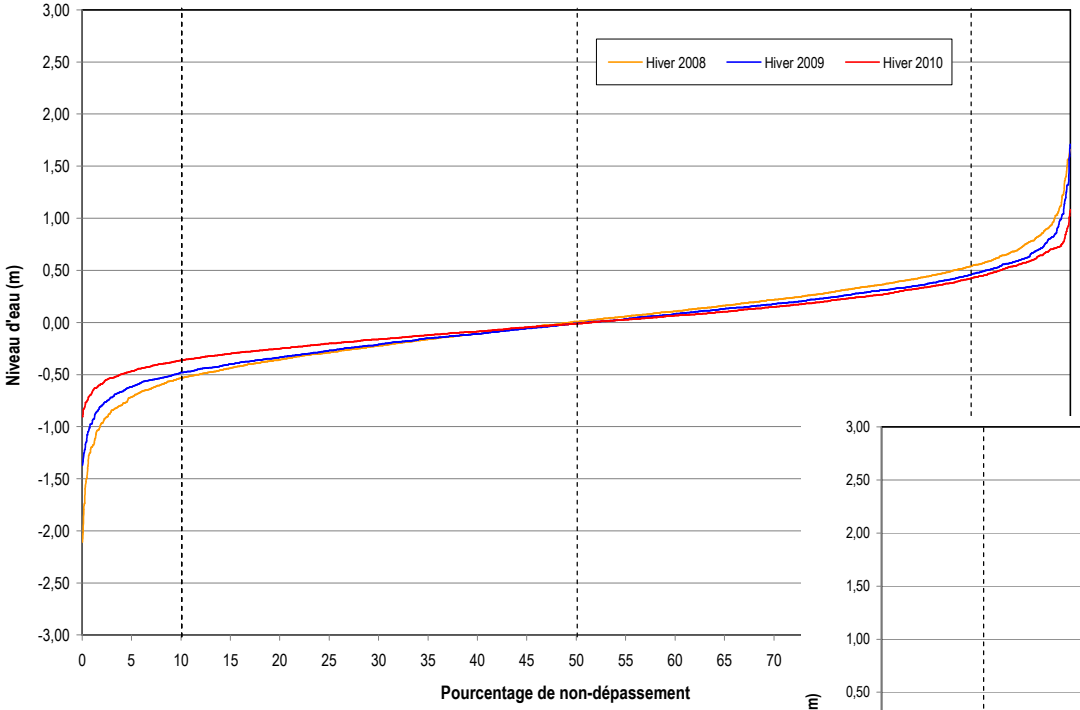

| Mouillage | Fréquence (%) |
|---|---|
| MO2 | 100 |
| ME2 | 99 |
| MO1 | 78 |
| ME3 | 19 |
| S2 (Pontax) | 3 |
| S3 (Pontax) | 0 |
| S1 (Pontax) | 0 |
| PK-2 (Rupert) | 0 |

# Saltwater Intrusion in Pontax estuary

- 2-3 saltwater intrusion events in 2008 and 2009
- 8 saltwater intrusion events in 2010 in the North arm
  - All related to high spring tide with high westerly winds
  - All events are controlled by tides

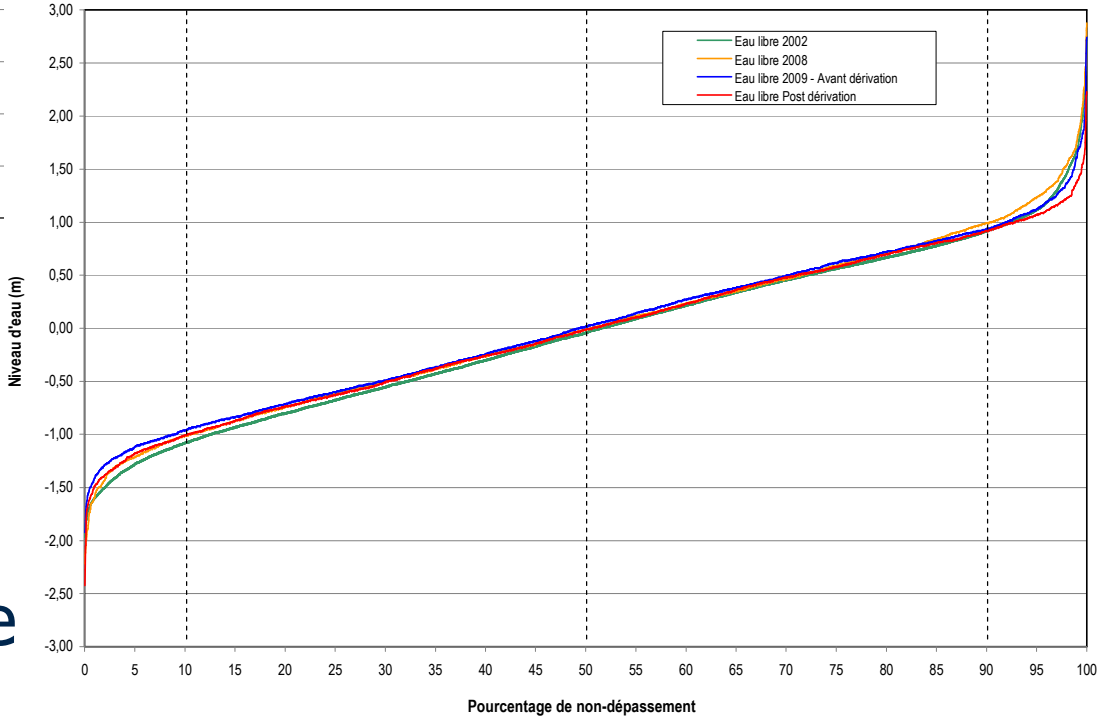



# Water level in Baie de Rupert (Stag Rock)




Ice cover

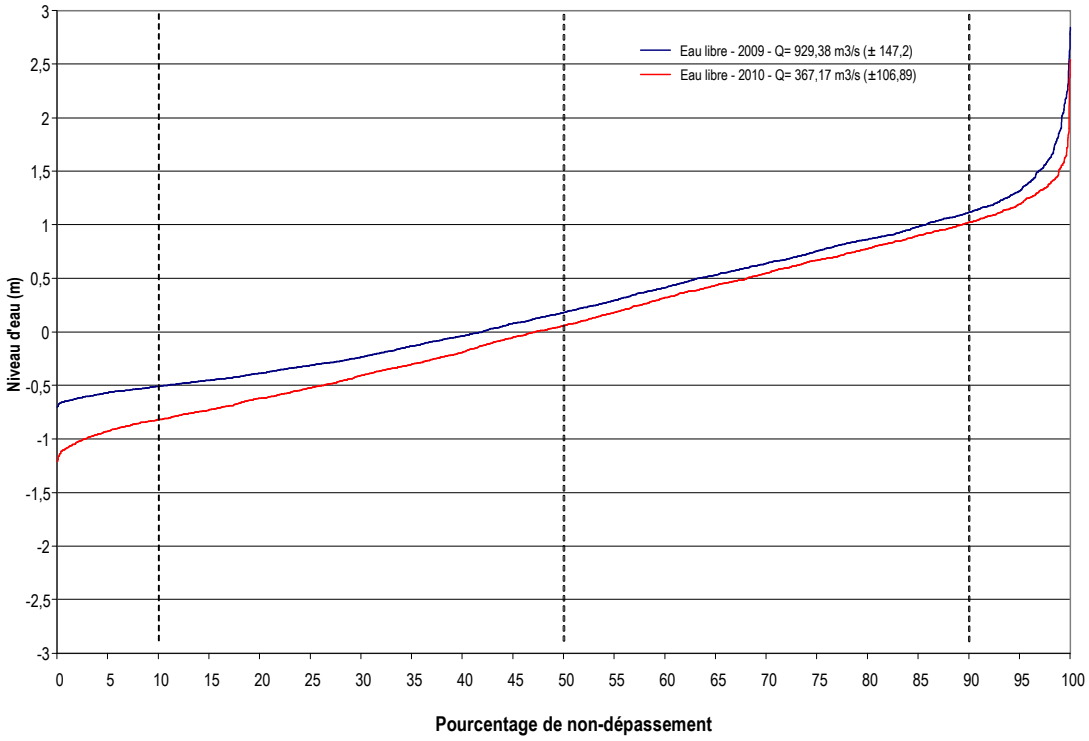
No difference




Open water

No difference

# Water level in Rupert estuary (Waskaganish)




Open water

Mean: 10-15 cm lower

Low tide: up to 30 cm lower

# Conclusions 2010

- Saltwater intrusion
  - Freshwater-saltwater interface moved 5 km upstream in Baie de Rupert (close to Stag Rock)
  - Rivière Pontax saltwater intrusion related to high tides and strong westerly winds
- Water levels
  - Baie de Rupert : No difference post diversion
  - Waskaganish : 10-30 cm lower post-diversion

- These results were predicted in the EIA

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