

Monitoring River Ice Processes at Newfoundland HydroNet sites

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Project SNG 3.4 - Winter Stressors for Fish in Rivers

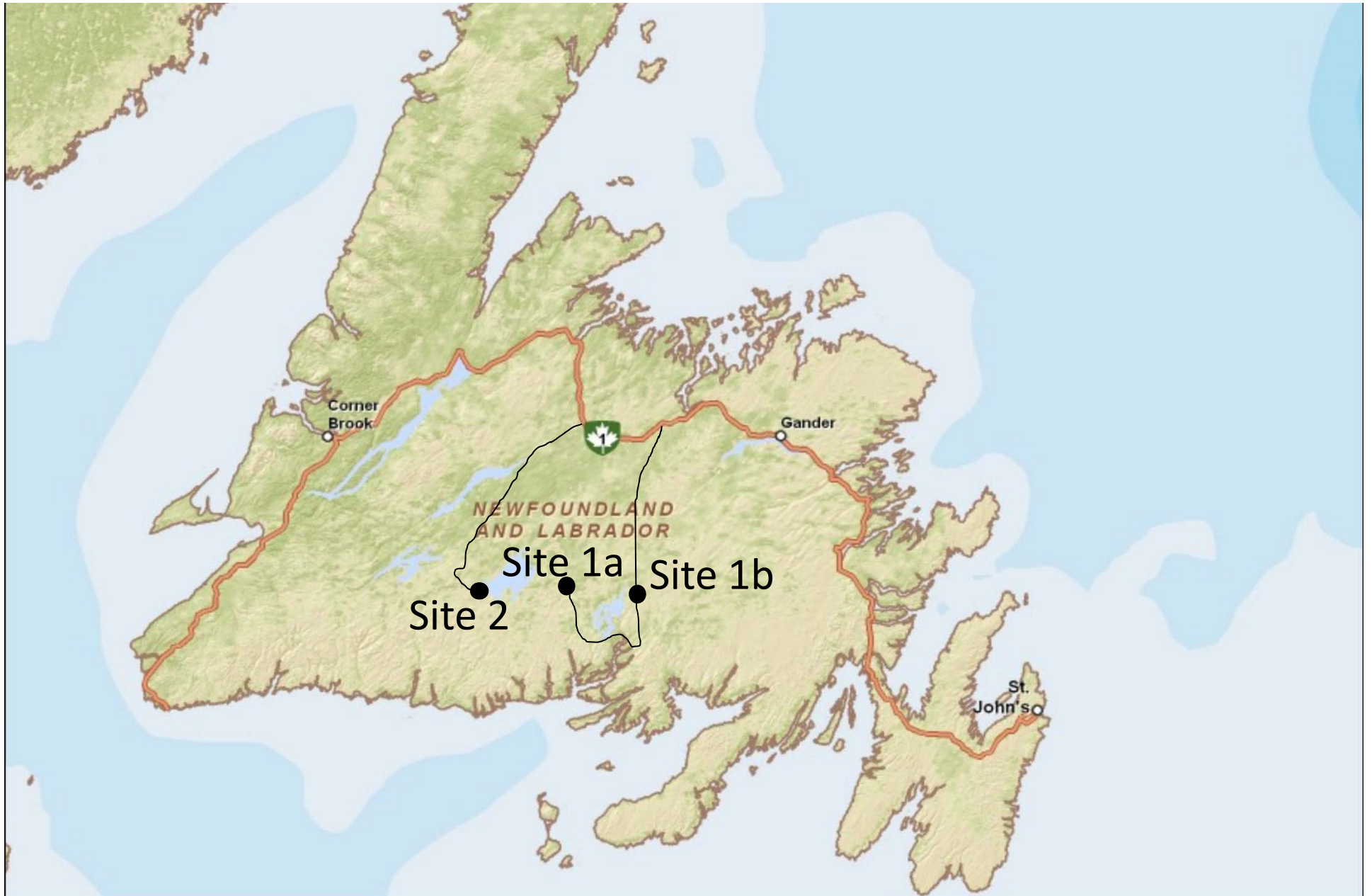
Objectives

- To broadly characterize and quantify the winter regime of rivers:
 - to identify those environmental stressors that directly influence fish habitats and productive capacity, and
 - To distinguish how those stressors may vary in regulated versus unregulated systems

River Ice Field Program – Nfld.

- 2010/11 Objectives:
 - ✓ Select suitable streams – 2 regulated, 2 natural – in collaboration with Rick Cunjak's team
 - ✓ Install time lapse cameras to observe winter ice processes at these sites *(16 cameras installed in Oct 2010)*
 - Broadly characterize and quantify the winter regime of these streams at these sites

Location - Newfoundland



Primary Observations – Remote Cameras



(Curtis Penell, DFO)

Site 1a – West Salmon River *(regulated)*

- 2 reaches
- 2 cameras at each reach
 - one looking upstream
 - one looking downstream



Time Lapse Camera M2 installed 26-Oct-10



View from Camera M2 (looking downstream)

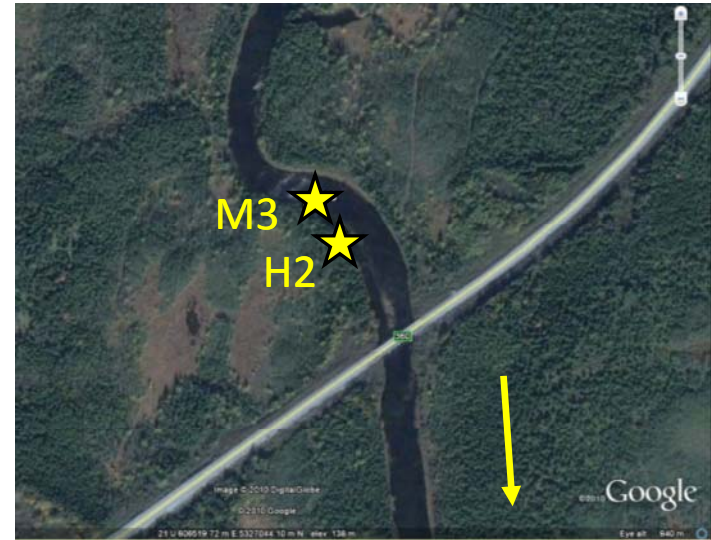
Site 1b – Twillick Brook *(unregulated)*



Time Lapse Camera M7 installed 27-Oct-10



View from Camera M7 (looking upstream)



Twillick Brook Upstream Site



Twillick Brook Downstream Site

Site 2a – Compensation Creek (*regulated*)



Time Lapse Camera M4 installed 28-Oct-10



View from Camera H6 (looking upstream)

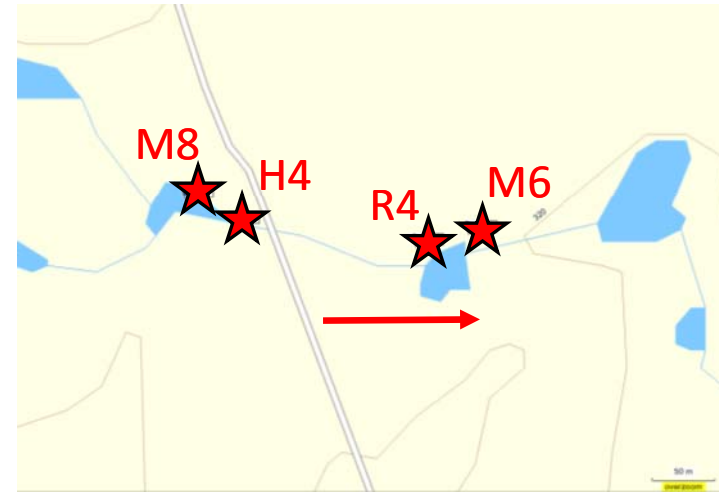
Note:

Camera stands were constructed for the Compensation Creek stations since there are no trees suitable for mounting cameras here.

Site 2b – No Name Creek (*unregulated*)



Time Lapse Camera H4 installed 29-Oct-10

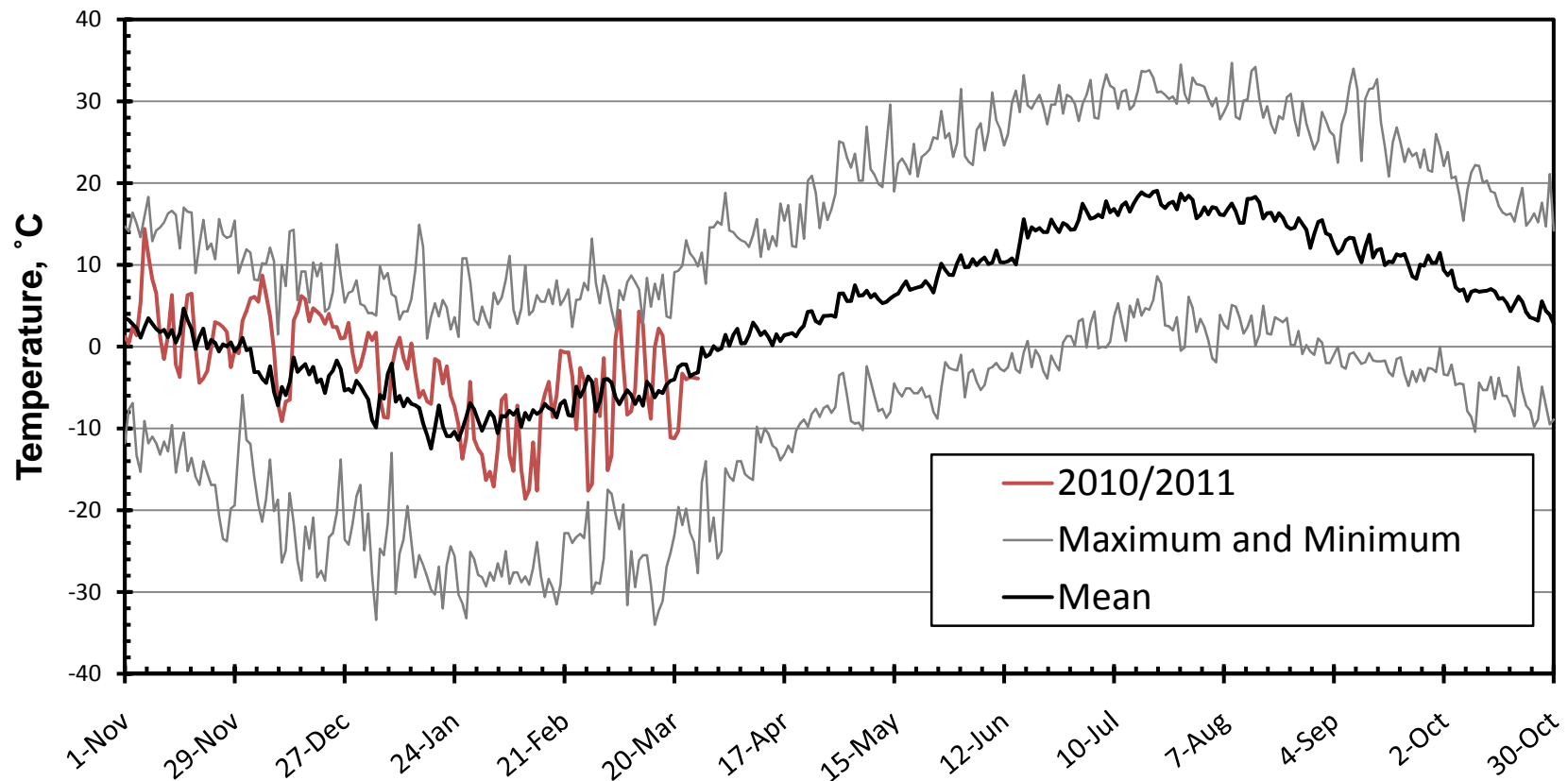


View from Camera H4 (looking upstream)

Notes on these camera installations:

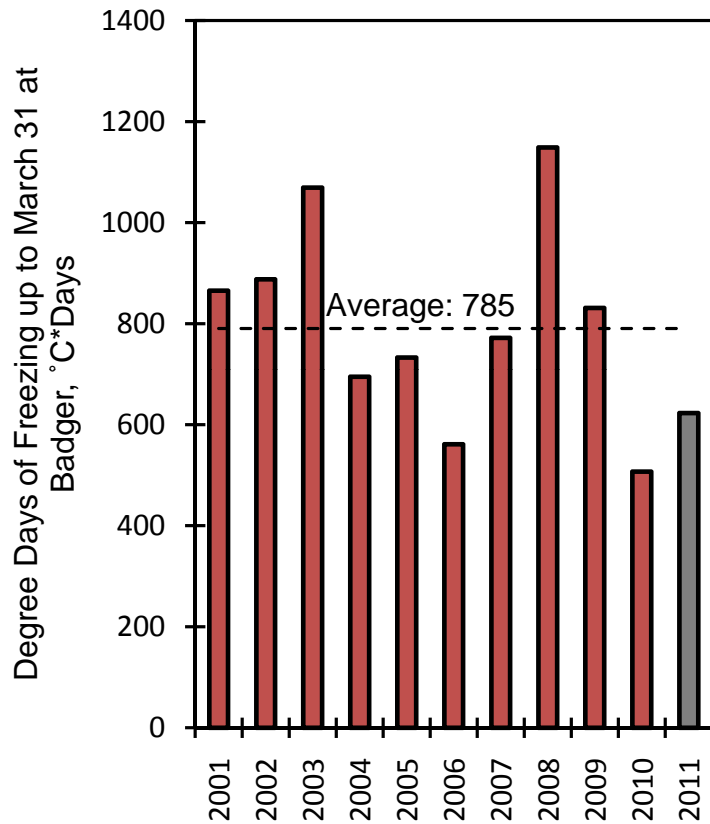
- *All cameras are set to take hourly photos*
- *All record air temperature with each photo*
- *Different makes, models and battery types were used at each site – to test and compare their reliability and effectiveness*
- *All models have been used before in winter*

Winter 2010-11 – Air Temperature

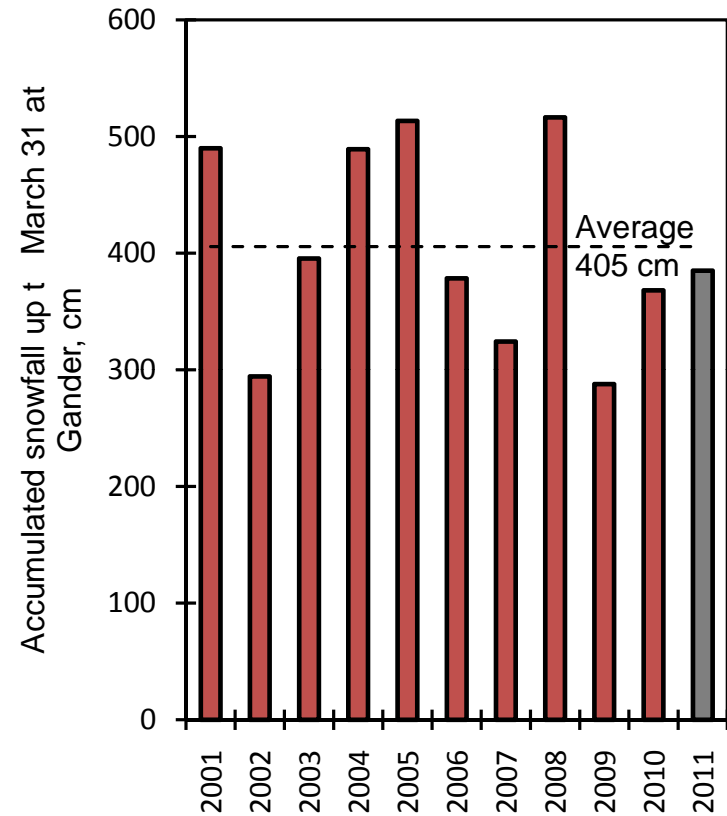


Mean, Maximum and Minimum Temperatures compared to Winter 2010-11 Temperatures at Badger, NFL

Winter 2010-11 – Degree Days & Snow



Historical Record of accumulated Degree Days of Freezing up to March 31 over the past 10 years at Badger

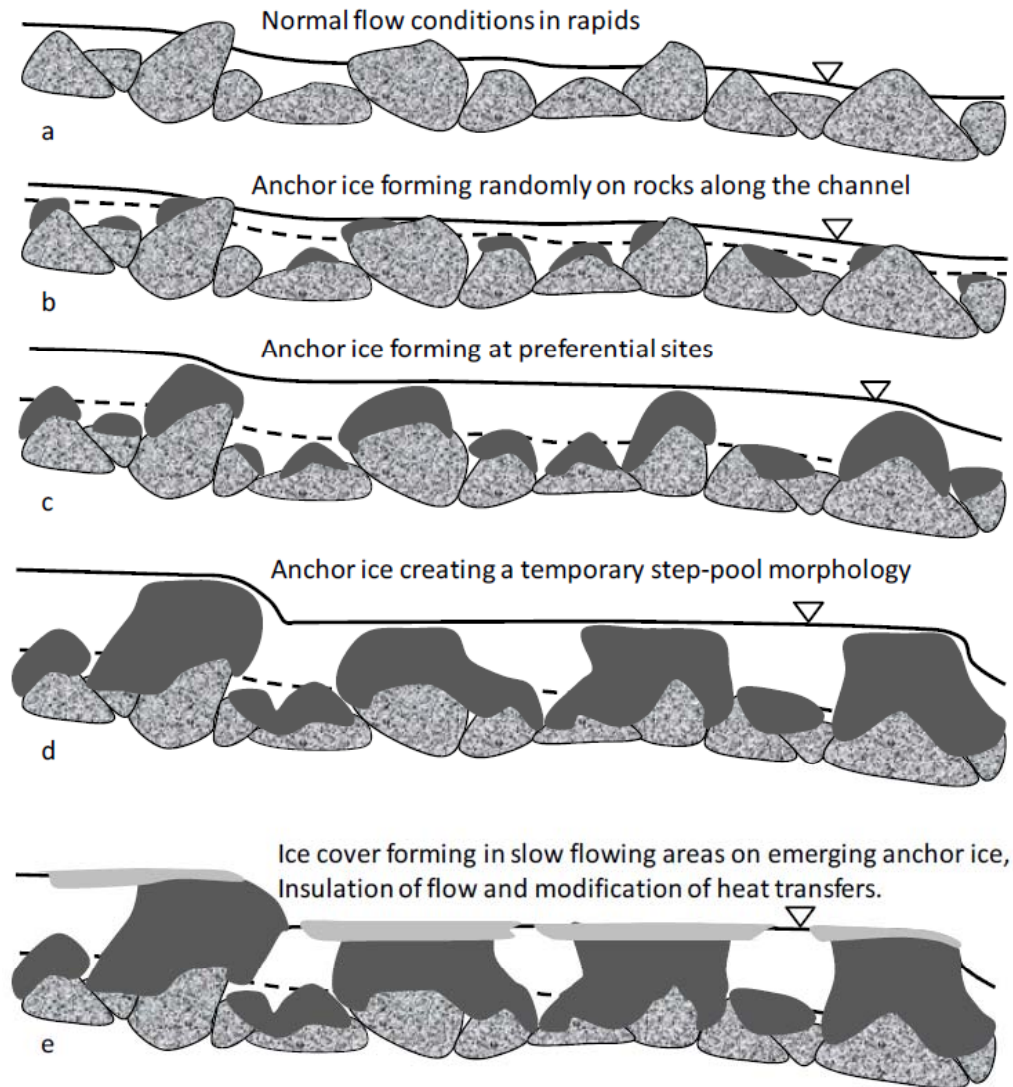


Historical Record of the accumulated snowfall up to March 31 over the past 10 years at Gander Airport

What type of ice processes do we expect?



Other Small Steep Reaches



- Non-typical Ice Cover
 - Anchor ice
 - Step-Pool Morphology



(Turcotte & Morse, in press)

Plans for Next Year

- Will depend upon what we find on the cameras...
 - Definitely set up cameras next season
 - Water temperature and water level monitoring
 - Possible bathymetry surveys
 - Possible winter fieldwork

Monitoring Water Levels and Water Temperature

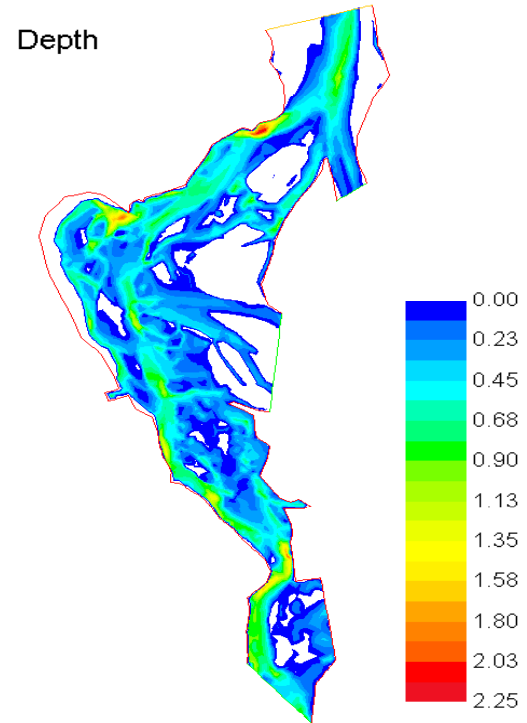
- Data Divers
 - Measure water temperature and pressure



Possible Bathymetry Surveys?



Bathymetric surveys – Fall 2011



*Example:
2-D ice process modeling
Summer 2012
Source: P. Steffler*

Possible Winter Field Work?



Summary

- For the winter of 2010/2011 we set up 16 time lapse cameras at 4 rivers
 - 2 regulated, 2 unregulated
- Our future plans are very dependent on the type of ice observed at each location
- We will know more in May 2011

Thank you

