Catamaran Brook Research and Climate Change Predictions

by
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Introduction

- Climate change studies
- Catamaran Brook
- Stakeholders & knowledge transfer

Climate Change Studies

Climate Change Studies

- Historical trends / relationships:
  - Temperature, streamflow, etc.
- Climate change predictions (GCM):
  - Air temperature, precipitation, etc.
- Study of processes & develop better models:
  - Making inferences about climate change

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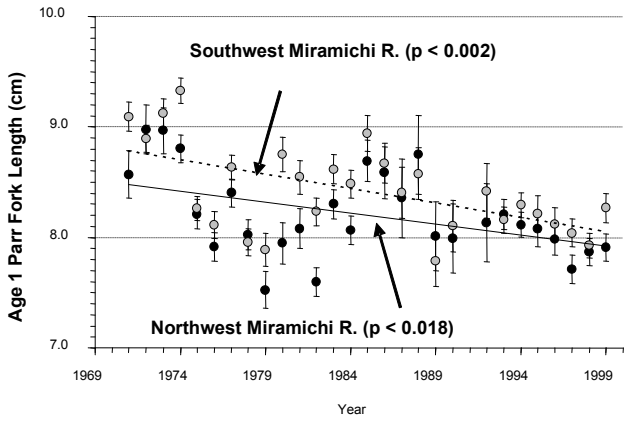
Historical Trends



Swansburg et al. 2004b

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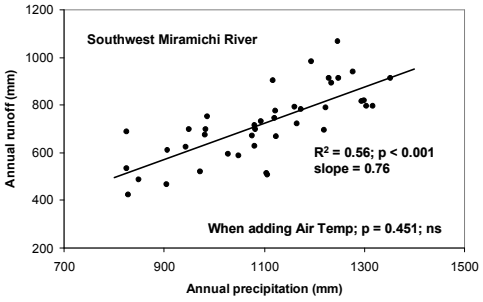
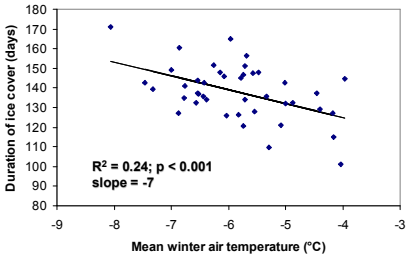
Historical Relationships





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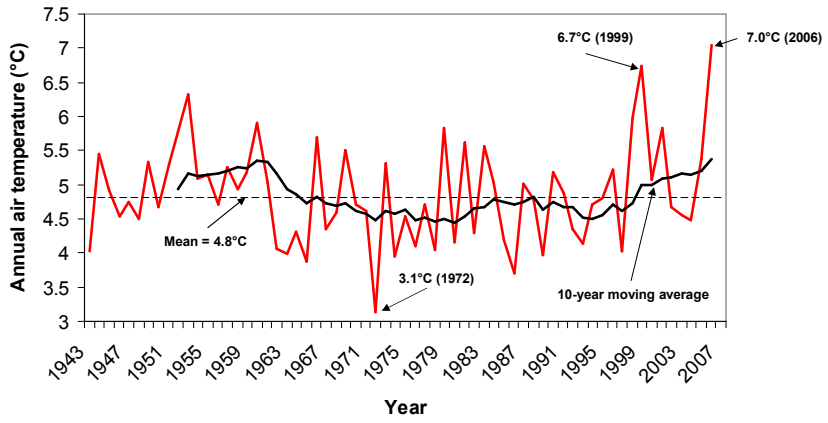
Annual Air Temperature (1943-2006)



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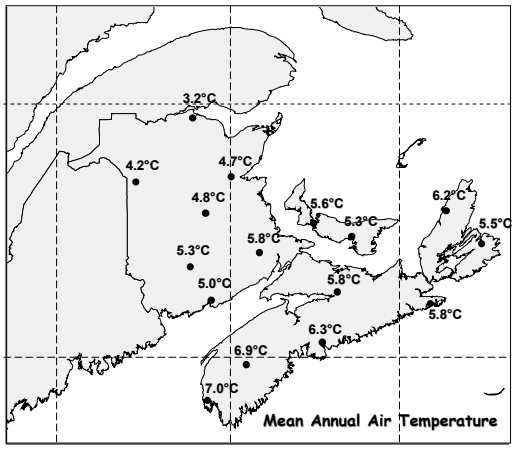
Current spatial variability (1)



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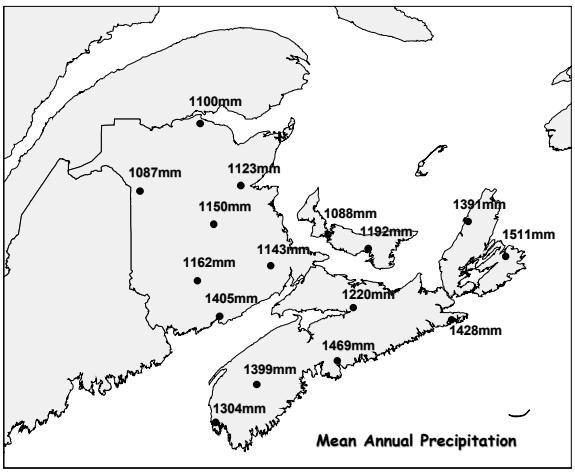
Current spatial variability (2)



R=P-ET

ET≈38%
R≈62%

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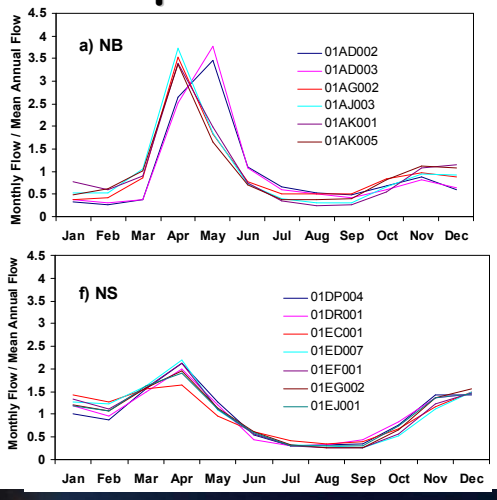
Current spatial variability (3)



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Climate Change Projections in NB

Statistical Downscaling (SDSM):

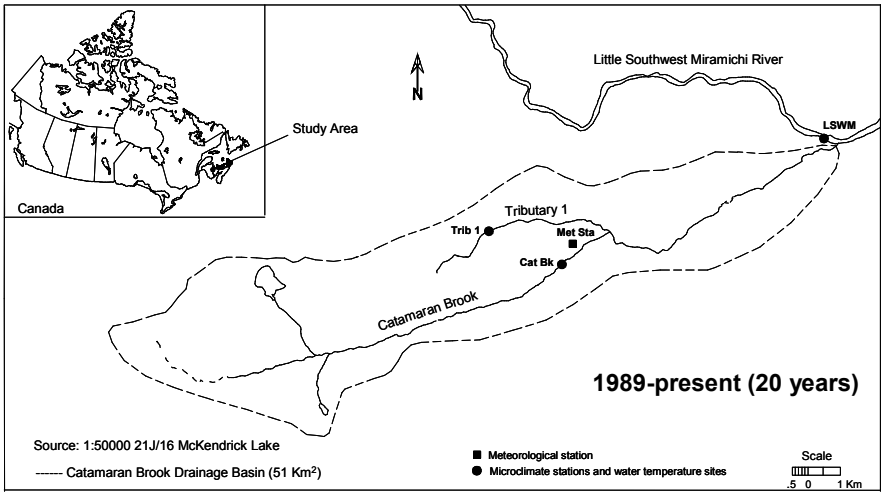
- Projected ↑ 4-5°C air temperature
  - (1999 = +1.9 °C; 2006 = +2.2 °C)
- Greatest ↑ in air temperatures (winter / spring)
- Increased precipitation (≈10%)
- Higher discharge in winter
- Changes in streamflow timing (e.g., earlier spring floods)

Swansburg et al. 2004a

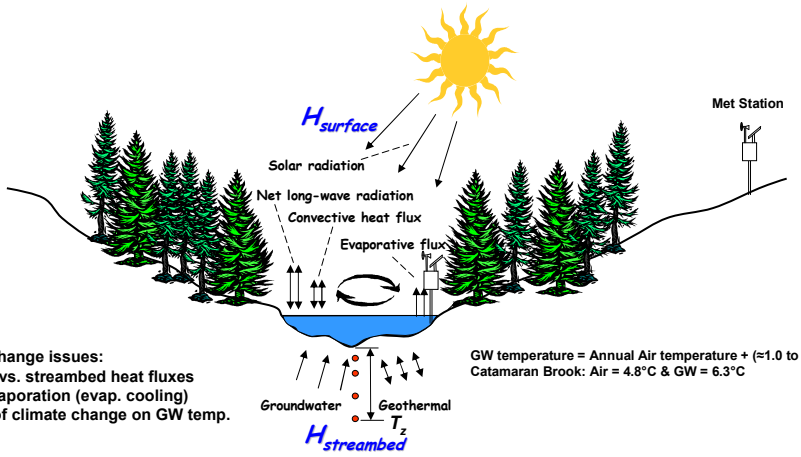
Catamaran Brook

Catamaran Brook Research

- Multidisciplinary research approach
- Understanding/studying processes
- Development of models
- Population dynamics / hydrology
- Potential climate change implications



Stream temperature modeling



Climate change issues:
- Surface vs. streambed heat fluxes
- River evaporation (evap. cooling)
- Impact of climate change on GW temp.

GW temperature = Annual Air temperature + (≈1.0 to 1.7°C)
Catamaran Brook: Air = 4.8°C & GW = 6.3°C

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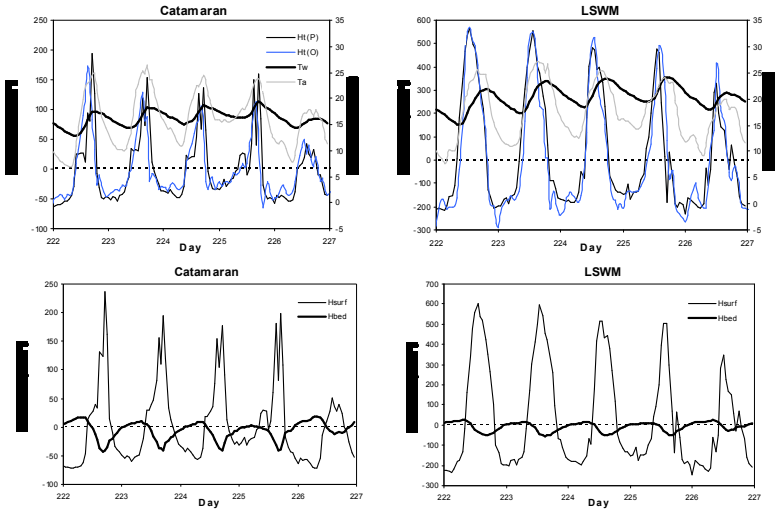
Data Collection



Monitoring Significant Events

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Number of days with water temperature exceeding 23°C in summer

Year	Little Southwest Miramichi
1992	8
1993	17
1994	30
1995	57 ←
1996	19
1997	14
1998	16
1999	62 ←
2000	19
2001	52 ←
2002	30
2003	34
2004	30
2005	31
2006	35

Maximum WT = 27-30°C

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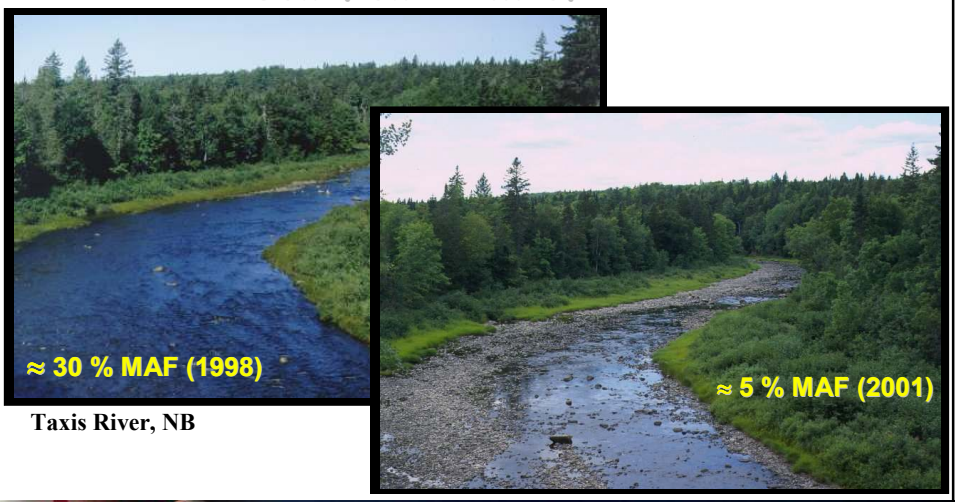
Low flow event of 2001



Taxis River, NB

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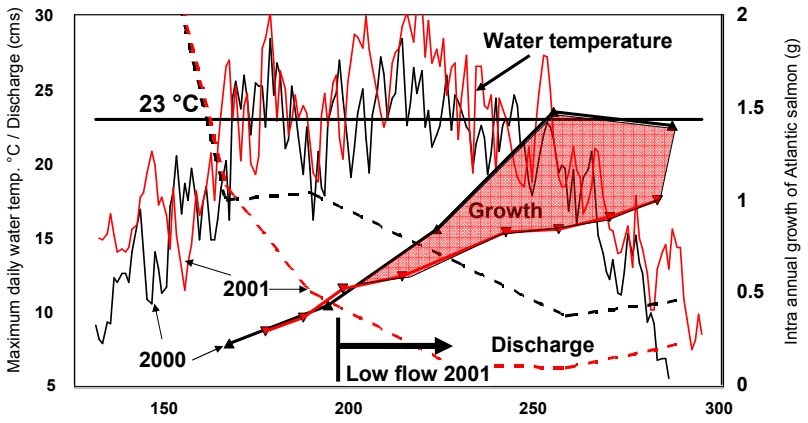
Intra Annual Fish Growth Miramichi River (2000, 2001)



Black = 2000; Red = 2001

Taxis River (Atlantic salmon fry)

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Stakeholders and Knowledge Transfer

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Stakeholders

- Mandate of DFO: the management and protection of fish habitat
- Angling community interest in fisheries resources (Atlantic salmon)
- Communities (native and non-native) are dependent on fisheries resources

Knowledge Transfer

- Benefit to graduate students
- Catamaran Brook as been key in getting researchers of different disciplines together
- Working with forest industry, watershed and angling communities

Thank you !

Questions !