



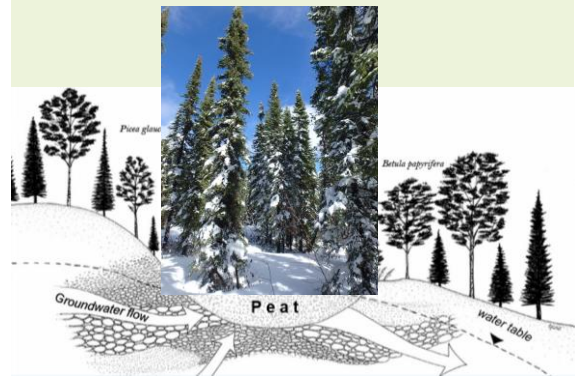
Wintertime Infiltration and Snowmelt Processes of Black Spruce Peatlands in the Boreal Plain

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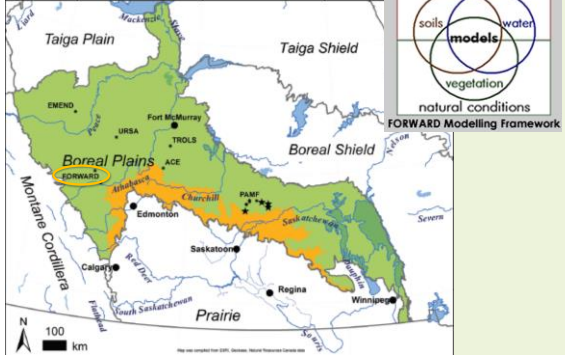
S.S. Papadopoulos & Associates, Inc.

What is a Black Spruce (*Picea mariana*) Peatland?



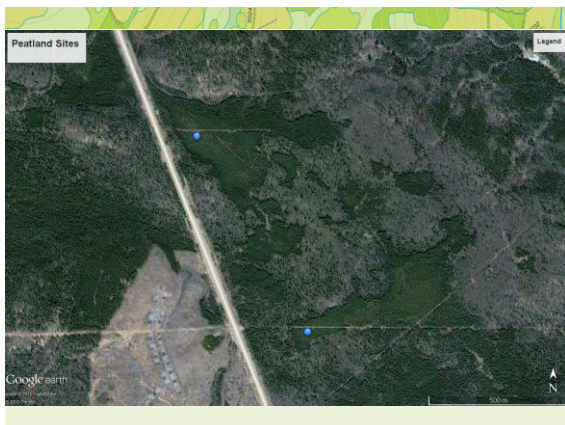
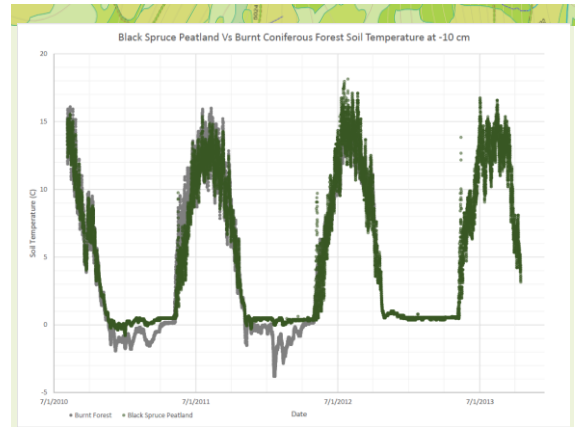
The diagram illustrates a cross-section of a peatland. It shows a layer of peat above a groundwater table. Arrows indicate groundwater flow from left to right. Labels include *Picea glauca*, *Betula papyrifera*, and Peat.

Where is the Boreal Plains?



The map shows the Boreal Plains region across Canada and Alaska, including areas like the Taiga Plain, Boreal Shield, and Prairie. Major cities like Edmonton, Calgary, and Winnipeg are marked. A legend indicates 'disturbed conditions' (soils, models, water, vegetation) and 'natural conditions'.

FORWARD Modelling Framework





Black Spruce Tree Wells



Blowing in the Wind



Sunny Side Up



Where did all the Snow go?



Down the Rabbit Hole

Black Spruce Macropores

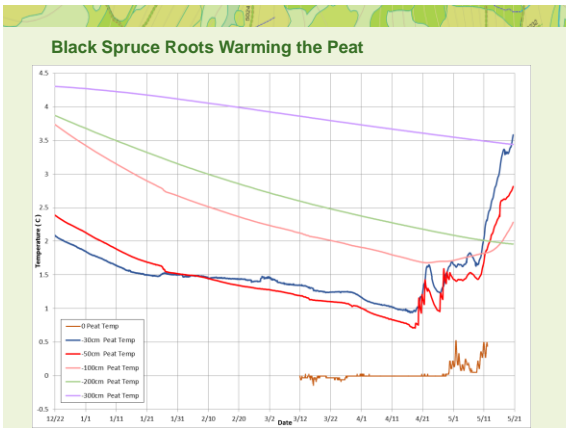
Black Spruce Macropores

Additional Probes

Figure 1: Schematic Diagrams of Design-033 Probes

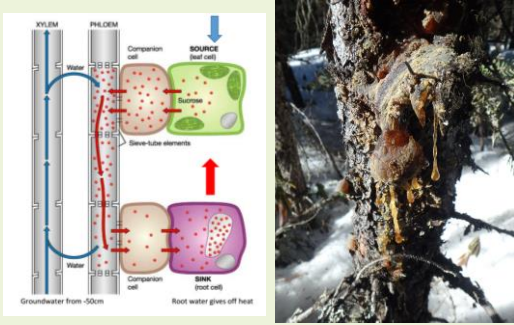
Additional measurements Now include:

- Snow Pack
- Upper Peat
- Sphagnum Moss
- Macropore
- Tree Canopy
- Groundwater

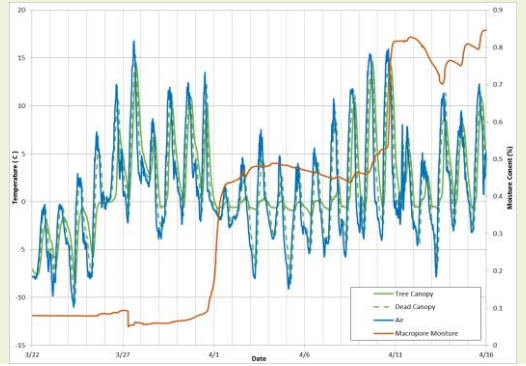


Bleeding Spruce

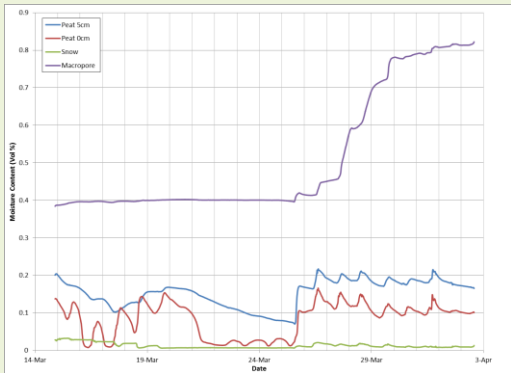
Mass Flow Hypothesis – Munch 1930



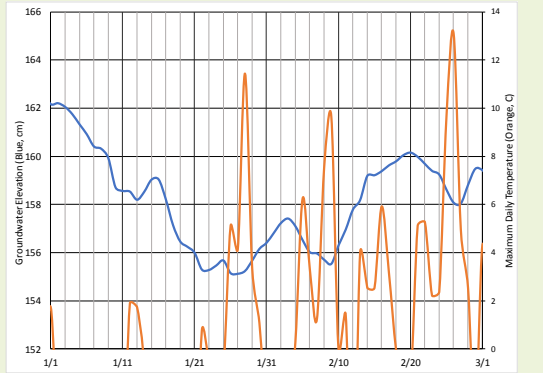
Living Verses the Dead



Macropores Collect Canopy Drip



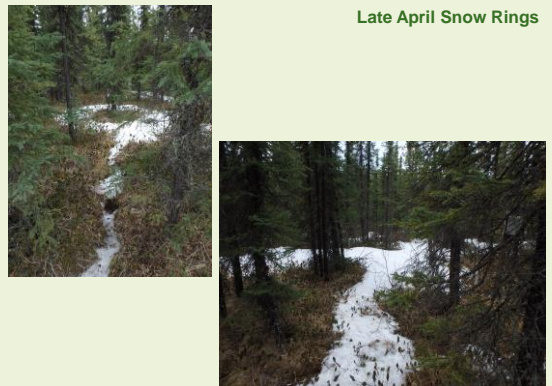
Macropores Recharge Groundwater Table

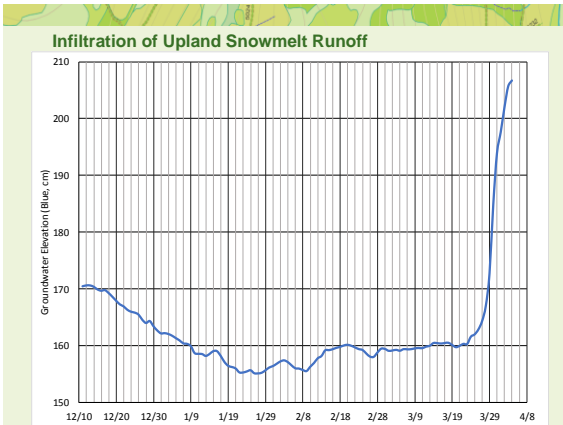


Late April Snow Rings



Late April Snow Rings



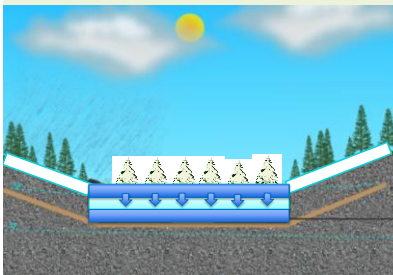


Sphagnum Moss in a Black Spruce Tree Well

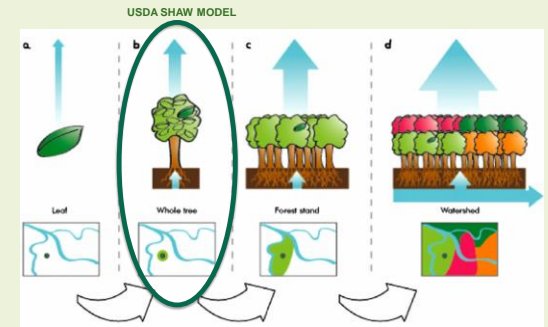


Sphagnum Moss Without Black Spruce?

**Reclaiming Peatlands
Must Include Black Spruce Tree**



Scaling Ecohydrological Processes from Leaves to Watershed



(Asbjornsen et al. 2011)

Conclusions for Wintertime Black Spruce Peatlands

- Roots warm the subsurface
- Canopy melt infiltrates through macropores
- Wintertime groundwater recharge occurs
- Allows for interception of upland snowmelt runoff
- Biological processes important for surface/groundwater interactions
- Modification of the USDA SHAW Model required



**"If there is Magic on this Planet,
It is contained in Water"** Loren Eiseley



Acknowledgements

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