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

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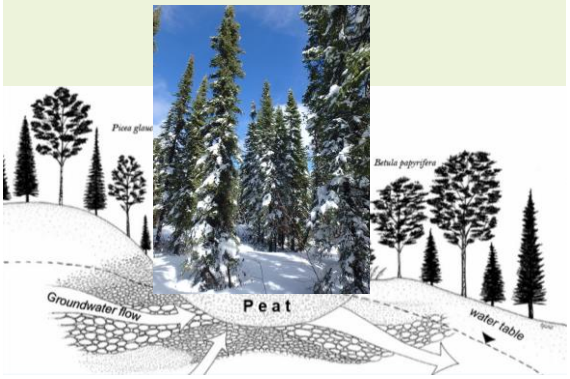
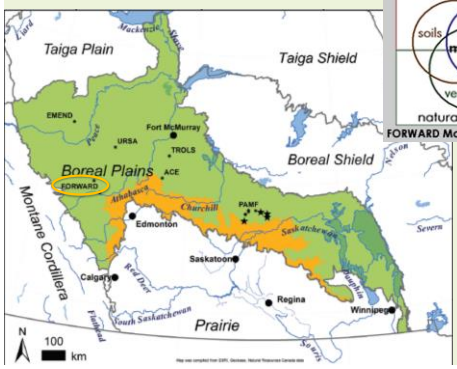
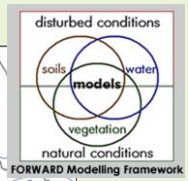
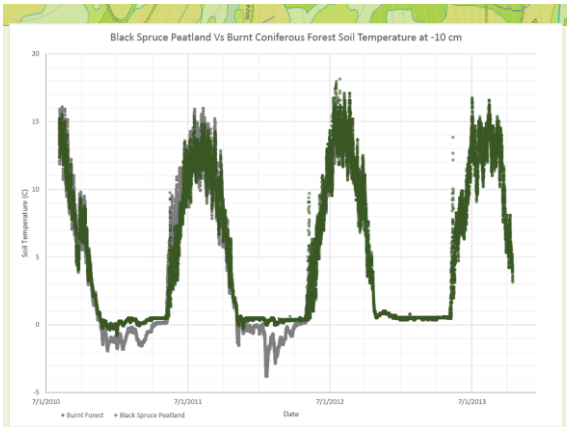
What is a Black Spruce (Picea mariana) Peatland?

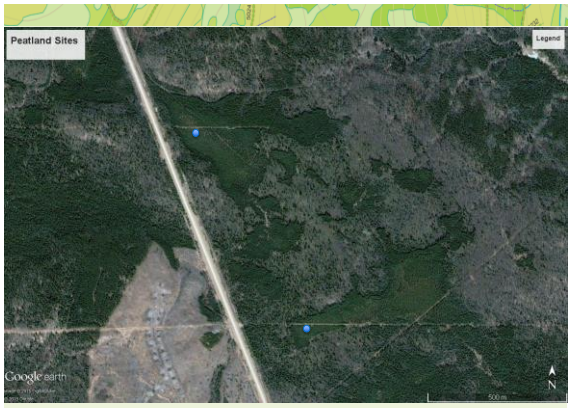


Where is the Boreal Plains?

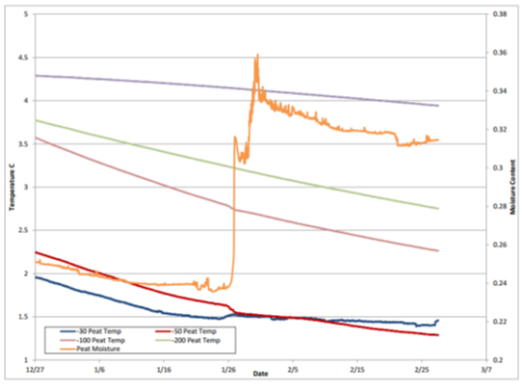


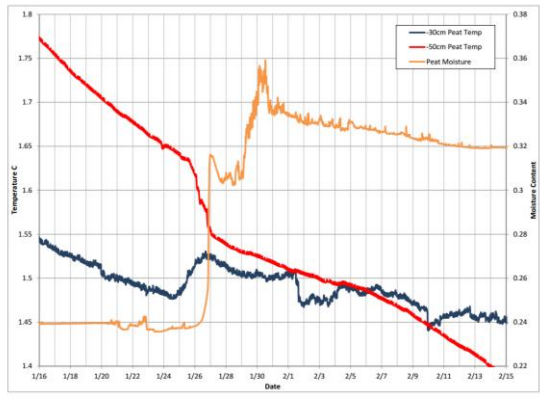






Winter in a Black Spruce Peatland





Black Spruce Tree Wells

Blowing in the Wind

Sunny Side Up

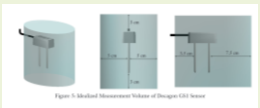
Where did all the Snow go?

Down the Rabbit Hole

Black Spruce Macropores

Black Spruce Macropores

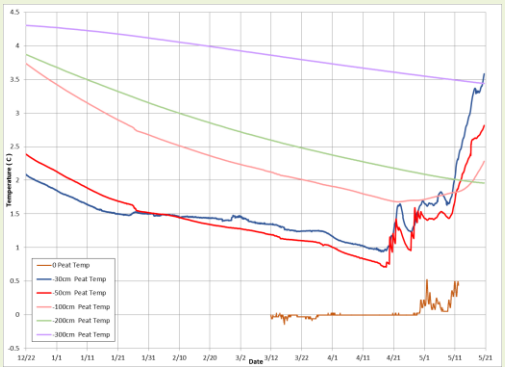
Additional Probes



Additional measurements Now include:

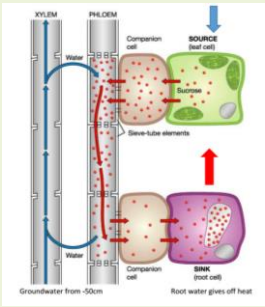
- Snow Pack
- Upper Peat
- Sphagnum Moss
- Macropore
- Tree Canopy
- Groundwater

Black Spruce Roots Warming the Peat

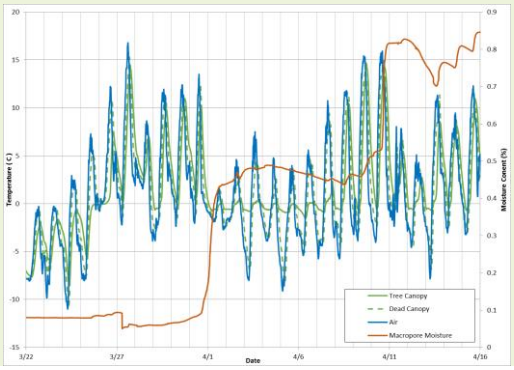


Bleeding Spruce

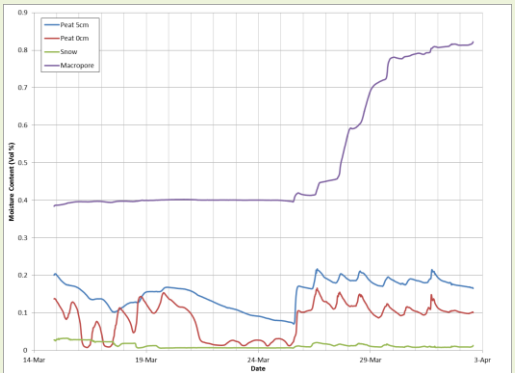
Mass Flow Hypothesis – Munch 1930



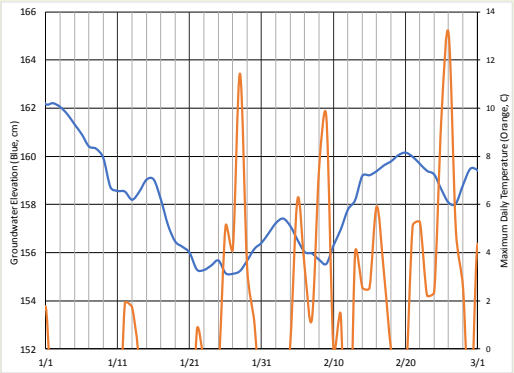
Living Verses the Dead



Marcopores Collect Canopy Drip



Macropores Recharge Groundwater Table



Late April Snow Rings

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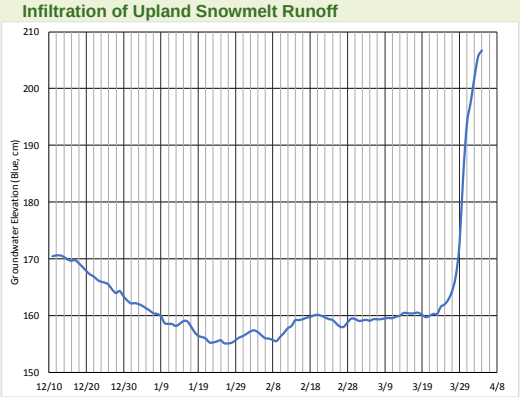
Infiltration of Upland Snowmelt Runoff



Without Black Spruce?

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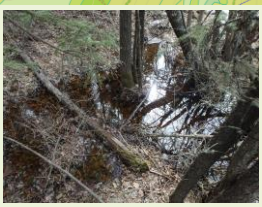


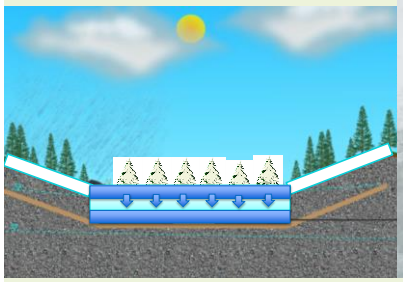
Without Black Spruce?

Sphagnum Moss in a Black Spruce Tree Well

Sphagnum Moss Without Black Spruce?

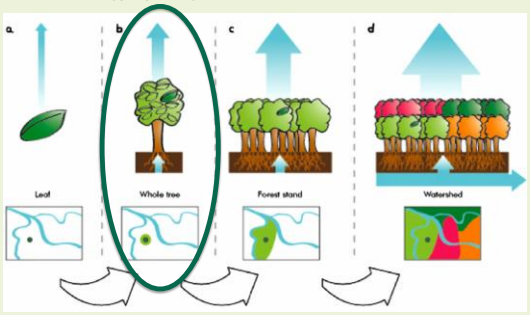
Reclaiming Peatlands

Must Include Black Spruce Tree



Scaling Ecohydrological Processes from Leaves to Watershed

USDA SHAW MODEL



(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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