



# Snow Eco-Hydrology Field Course Scotty Creek, NWT

*11-18 March, 2017*

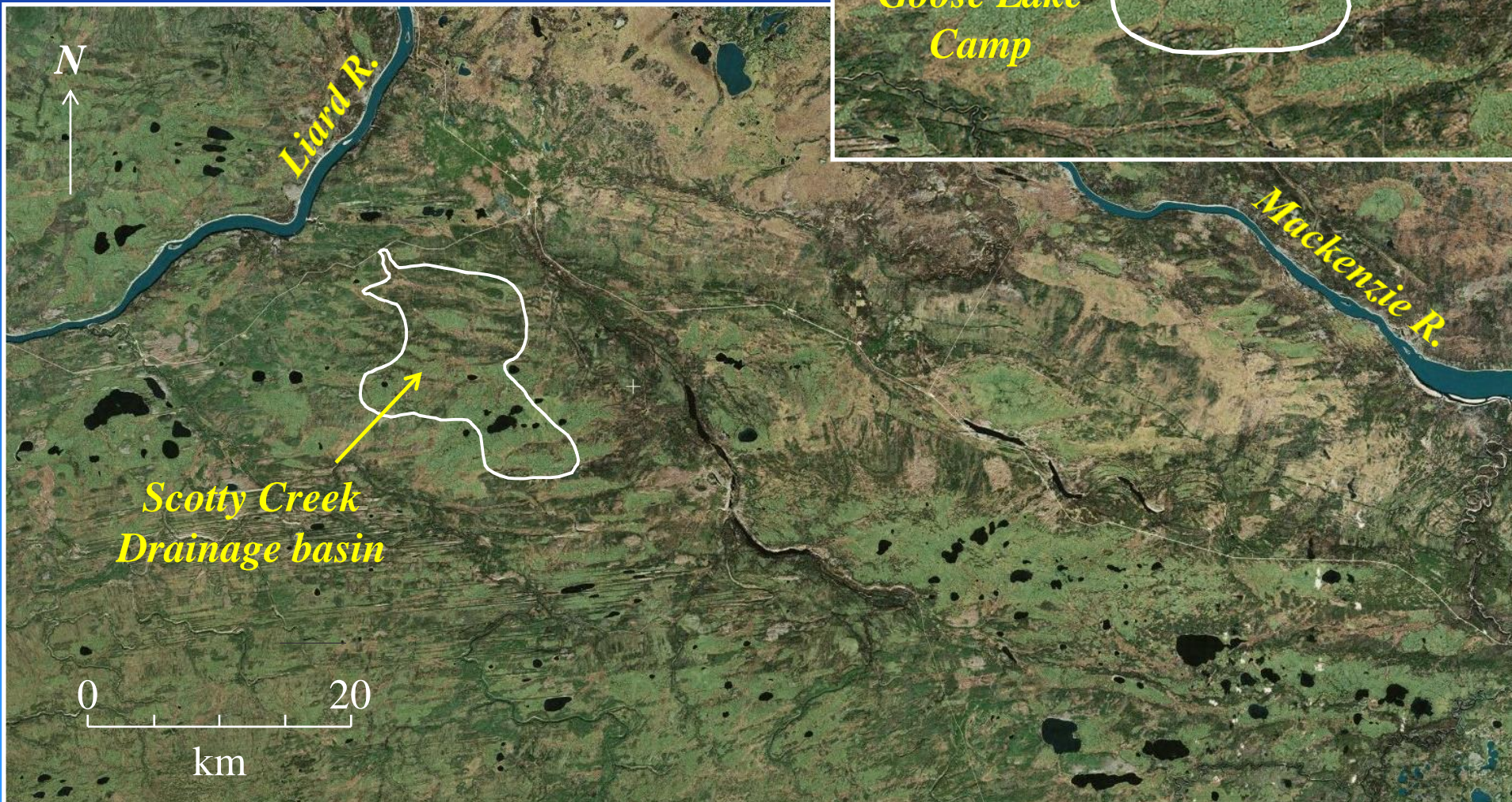
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Instructors: R. Connon, A. MacLean, W. Quinton



# *Scotty Creek, NWT*

*Where is it? 50 km south  
of Fort Simpson.*





# Learn more about Scotty Creek at: [www.scottycreek.com](http://www.scottycreek.com)

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## Scotty Creek Research Station

The Scotty Creek Research Station (SCRS) is 50 km south of Fort Simpson, in the Northwest Territories, Canada.

Bienvenue

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Quvianaqtusi qaigapsi

Máhsı hejɔ raxets'é ráwəðə

Márcı ja nuwe gha núhdəl

Welcome



Tawaw

Shòh hàh aanàii

Quana qaigaffi

Sınà, jɔ naxıghaèhda

Máhsı ejɔh nahxe tah anet'ı

# Field course: 11-18 March, 2017



	Saturday	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
	11 March	12 March	13 March	14 March	15 March	16 March	17 March	18 March
07:30			Breakfast	Breakfast	Breakfast	Breakfast	Breakfast	Breakfast
08:30		-Thomas Simpson students arrive CP at 9:30 AM -Travel to Scotty Creek -Set up camp	-Traditional Knowledge Activities led by D. Tsetso & H. Norwegian	-Traditional Knowledge Activities led by E. Cholo -map exercise	<i>How much snow is on the land?</i>  -Snow physical properties -Snow & water sampling	<i>How do trees interact with snow?</i>  -Visit burned forest -Set up forest plots -Tree corers	<i>Is permafrost thaw changing the water in the ground?</i>  -Near surface soil moisture -Auger drill through AL	-Travel to CP
12:00		Lunch	Lunch	Lunch	Lunch	Lunch	Lunch	
13:30		-Tour of the Station -Orientation / safety -Tour of the research sites / weather stations in the area.	-Traditional Knowledge Activities led by D. Tsetso & H. Norwegian	-Traditional Knowledge Activities led by E. Cholo	-Snow surveys for different land covers. Includes snow-mobile access to remote sites.	<i>How do we map snow on the land?</i>  -Drone flights for imaging -Orienteering, using GPS & compasses.	-Final thoughts and discussion of what we have learned over the last 5 days.	
18:00		Dinner	Dinner	Dinner	Dinner	Dinner	Dinner	
	-Deh Gáh students arrive at CP, sleep over.	-Activities	-Activities	-Chemical analysis of water and snow samples	-Visualising the snow survey data	-Drone image viewing / analysis	-Activities	



# Properties of snow



Snow density



Snow temperature



Snow layers & crystals



# How much snow is on the land?

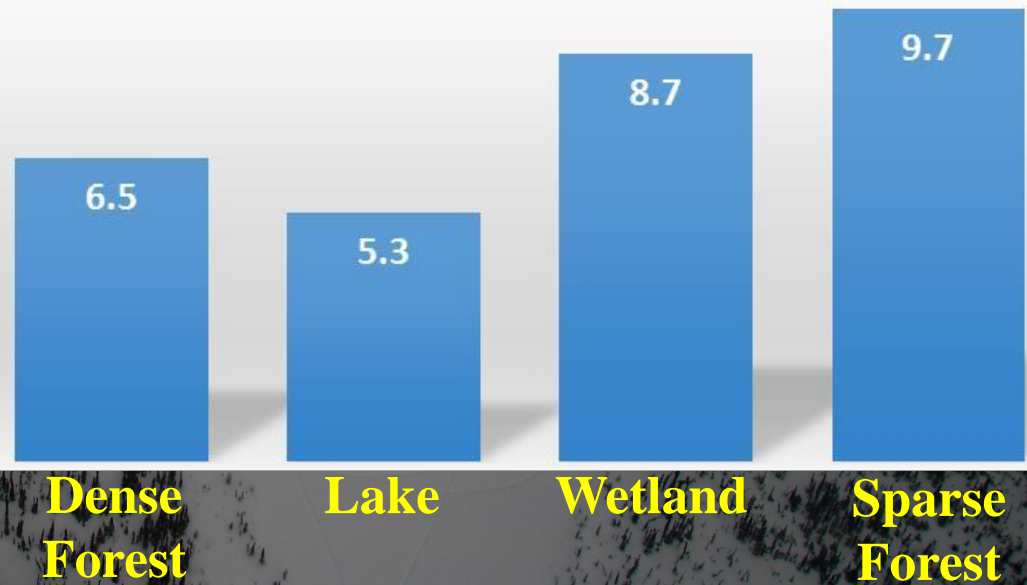
- ◆ Snow surveys for different land covers
- ◆ Snow sampling for chemical analysis (pH, EC, dissolved oxygen).



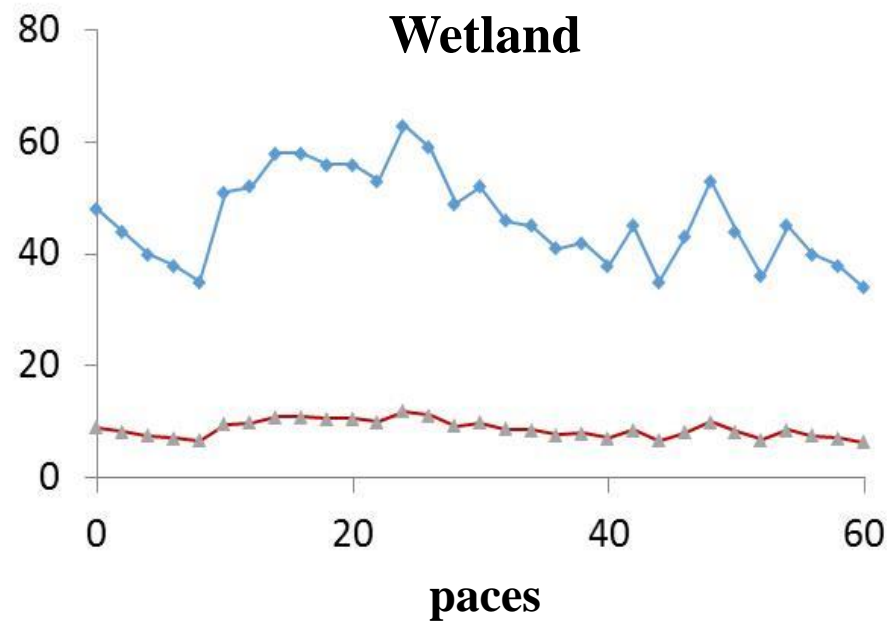
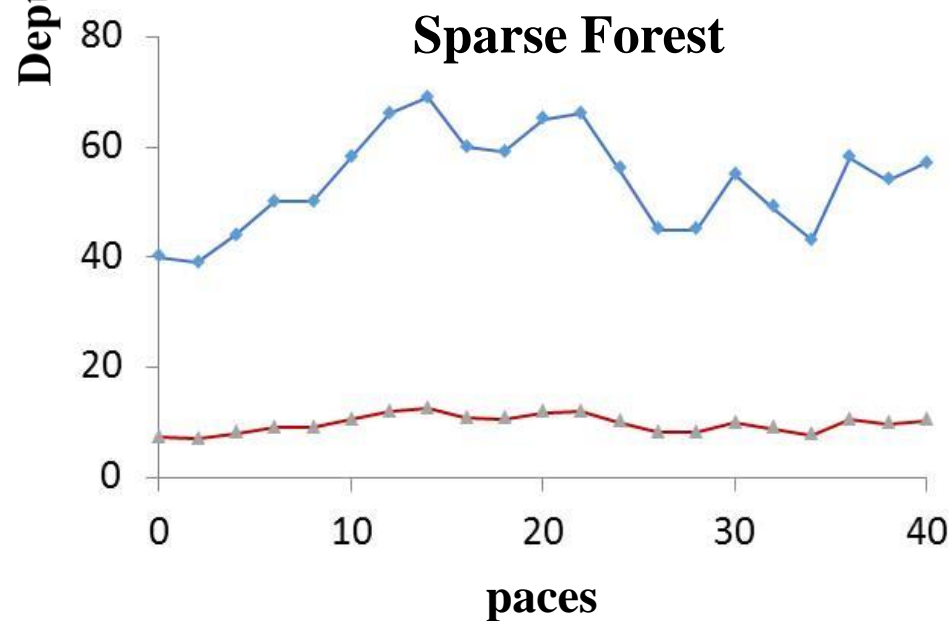
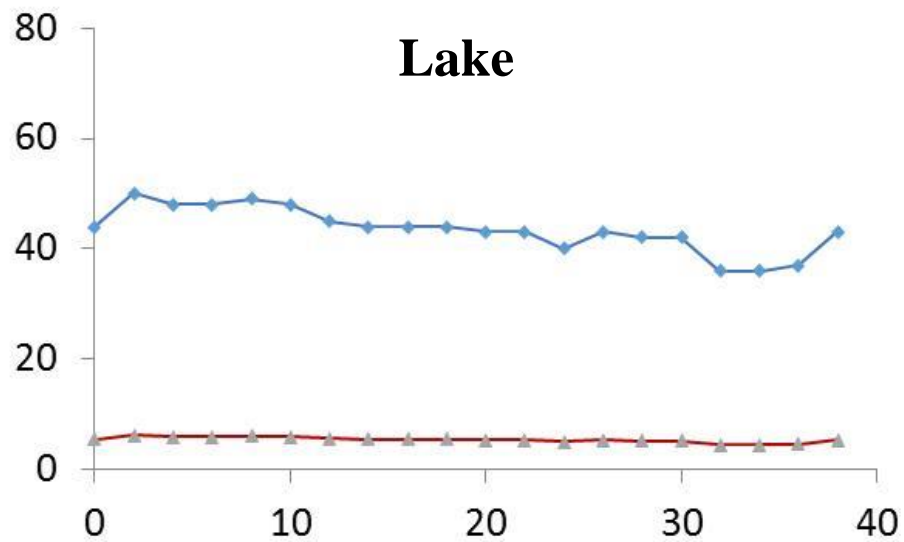
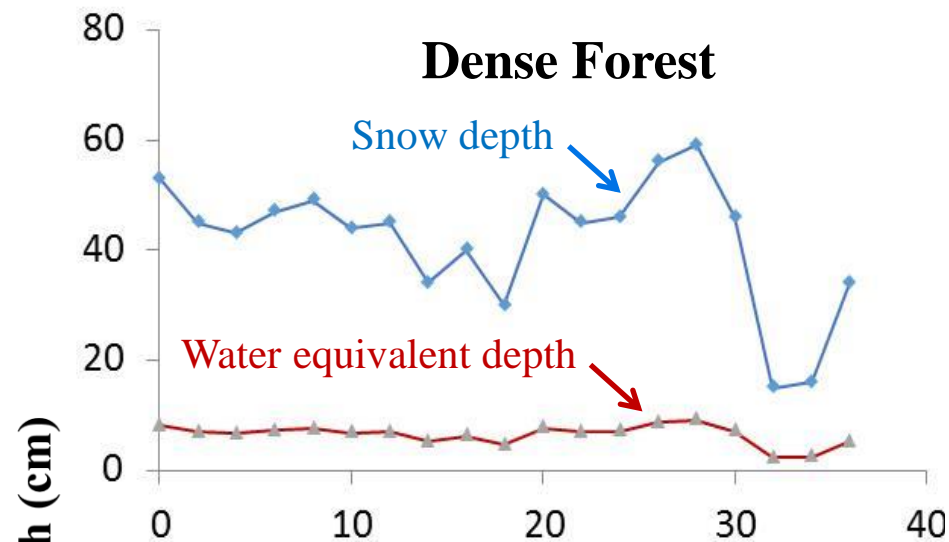




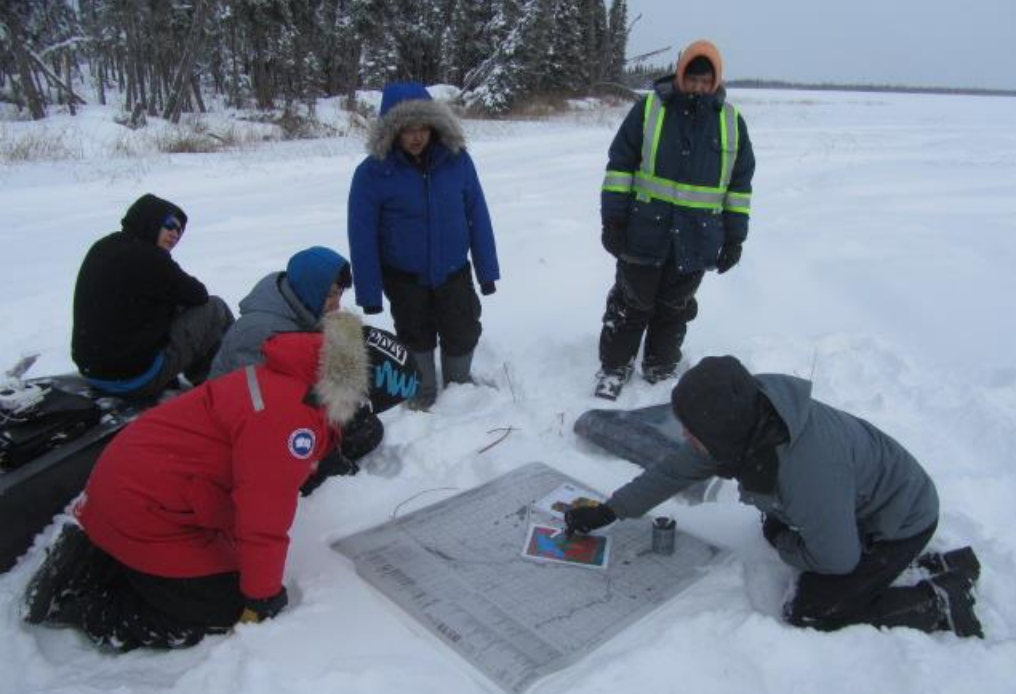
## Water equivalent depth of snow (cm)



# Snow surveys for major land covers







# Unmanned Aerial Vehicles for data collection





# *How do trees interact with snow?*

- ◆ Density of trees in forest
- ◆ Age of trees (tree cores)
- ◆ Measure tree heights (from clinometer)
- ◆ Tree diameters (DBH)
- ◆ Tree health (evidence of permafrost thaw?)
- ◆ Interception of snow by trees
- ◆ How forest fires affect snow and melt.

Circum. (cm)	DBH (cm)	Height (m)
8	2.547771	
20	6.369427	
6.5	2.070064	
22	7.006369	
19	6.050955	
11	3.503185	
26	8.280255	6.7
20	6.369427	
22	7.006369	
26	8.280255	
15	4.77707	
2	0.636943	
16	5.095541	
9.5	3.025478	
37	11.78344	8.6
20	6.369427	
20	6.369427	
14	4.458599	
24	7.643312	
15	4.77707	
Average	5.621019	
Min	0.636943	
Max	11.78344	





# *Is permafrost thaw changing the water in the ground?*

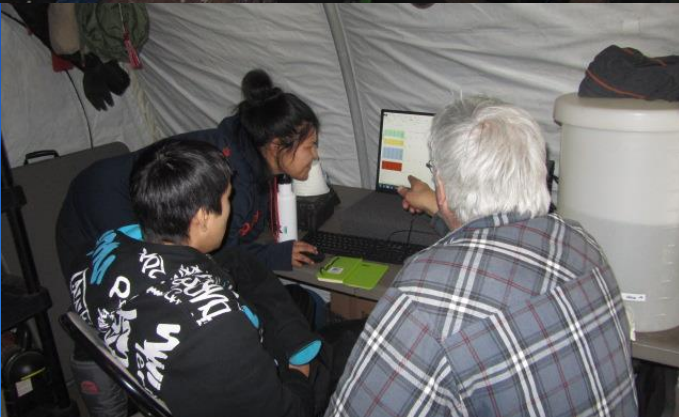
- ◆ If ground thaws deeper in summer than it can freeze in the winter, a “talik” layer develops.
- ◆ Taliks can drain water from one land cover to another.
- ◆ The chemistry of talik water is different than snowmelt water and the frozen water in the ground.



Drilling into  
the talik



# Analysis and discussion of data





# *Paddle Hockey:* A Scotty Tradition...





*Many people and organisations came together to make this course possible. We wish to thank them all:*

- ◆ *Dehcho First Nations* office (especially Dahti Tsetso and Grand Chief Herb Norwegian)
- ◆ *Jean Marie River* and *Liidlii Kue* First Nations offices (especially Liza McPherson, Gladys Norwegian, Dean Holman, Edward Cholo)
- ◆ Laurier - GNWT Partnership (especially Bruce Hanna)
- ◆ Our School Principals (Sherry Thompson, John Forbes, Lois Philipp)
- ◆ Our School Board Superintendent (Terry Jaffray)
- ◆ The Changing Cold Regions Network (CCRN)
- ◆ The Cold Regions Research Centre (Laurier)



# Aurora over Scotty:

