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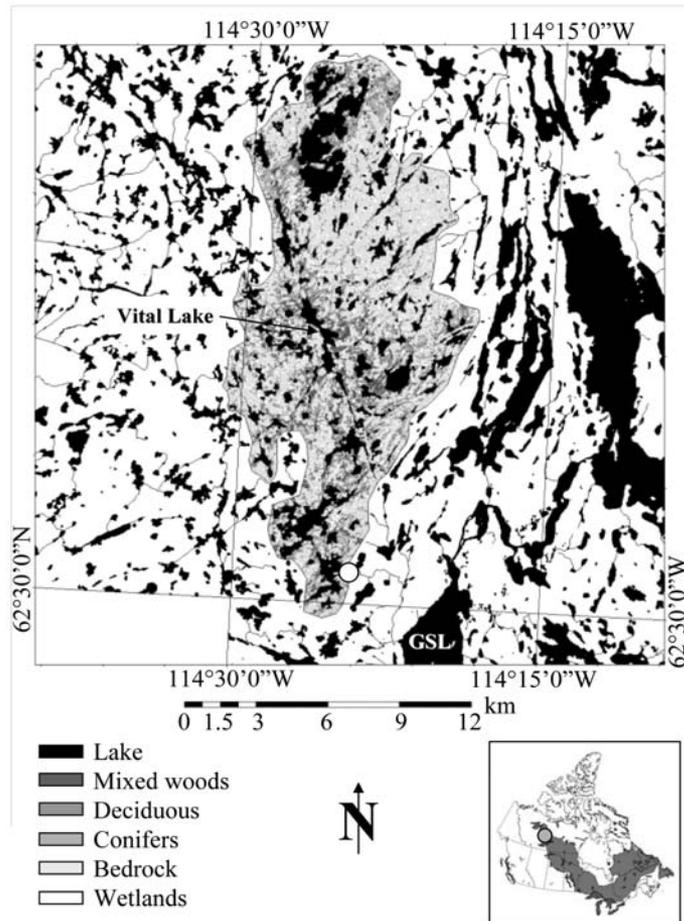
IP3 ACTIVITIES AT BAKER CREEK

**IP3 Annual Workshop
Waterloo, ON
Christopher Spence
November 8, 2007**



Improved Processes & Parameterisation
for Prediction in Cold Regions

Baker Creek



Theme 1 - Processes

- Contributing area dynamics are being investigated using three methodologies:
 - 1) Hydrometric
 - 2) Remote sensing
 - 3) Hydrochemistry



Hydrometric

- May Guan – M.Sc. candidate at U of S

Objectives:

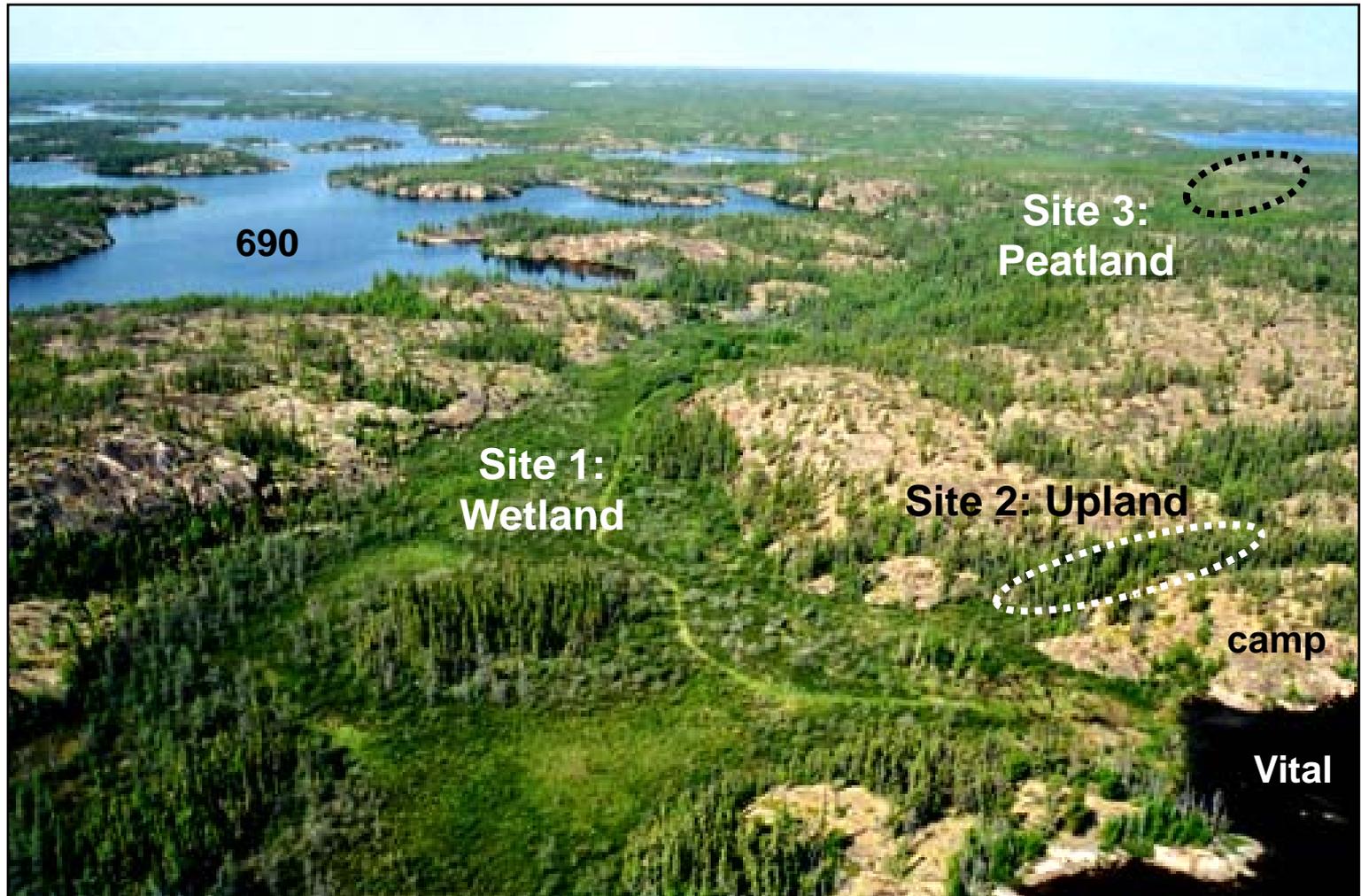
1. Investigate the spatial and temporal changes of soil moisture in relation with ground thaw
2. Upscale observed patterns to determine the influence of soil-filled areas on catchment scale streamflow regulation mechanisms

Methodology:

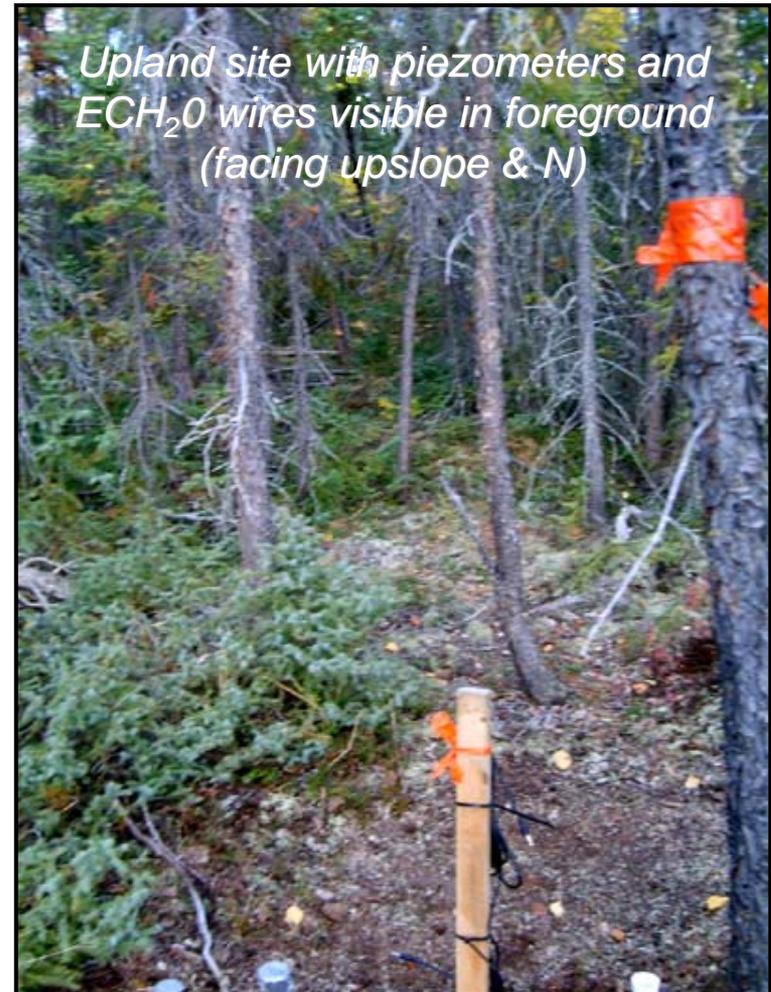
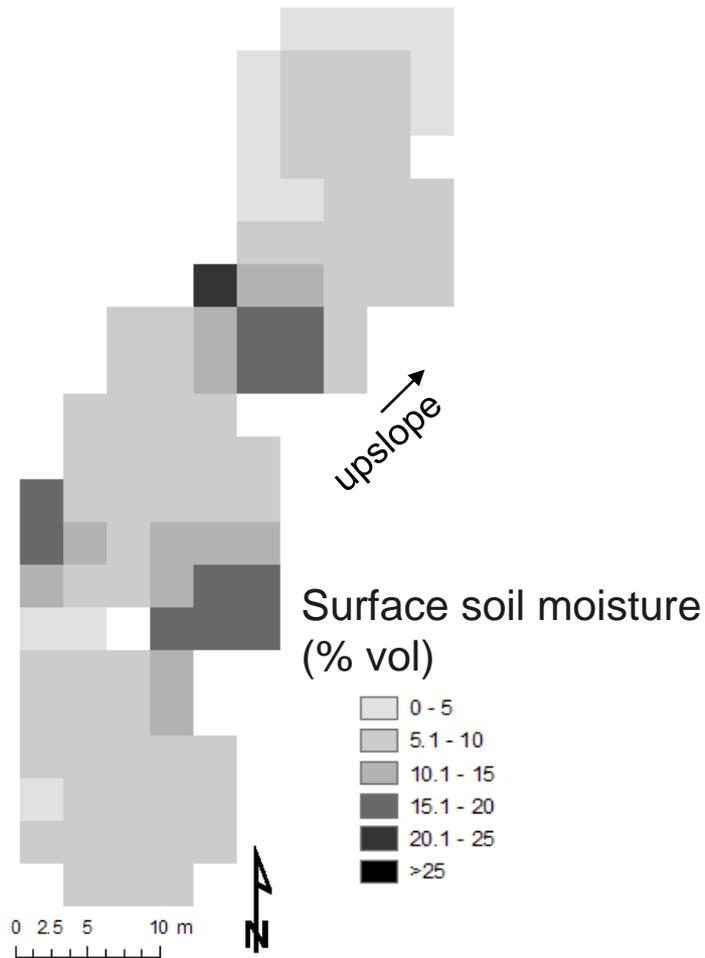
1. High resolution soil moisture surveys
2. Water budget investigation at each site to explain the measured soil moisture patterns
3. Compare and contrast the findings from the three sites



Hydrometric

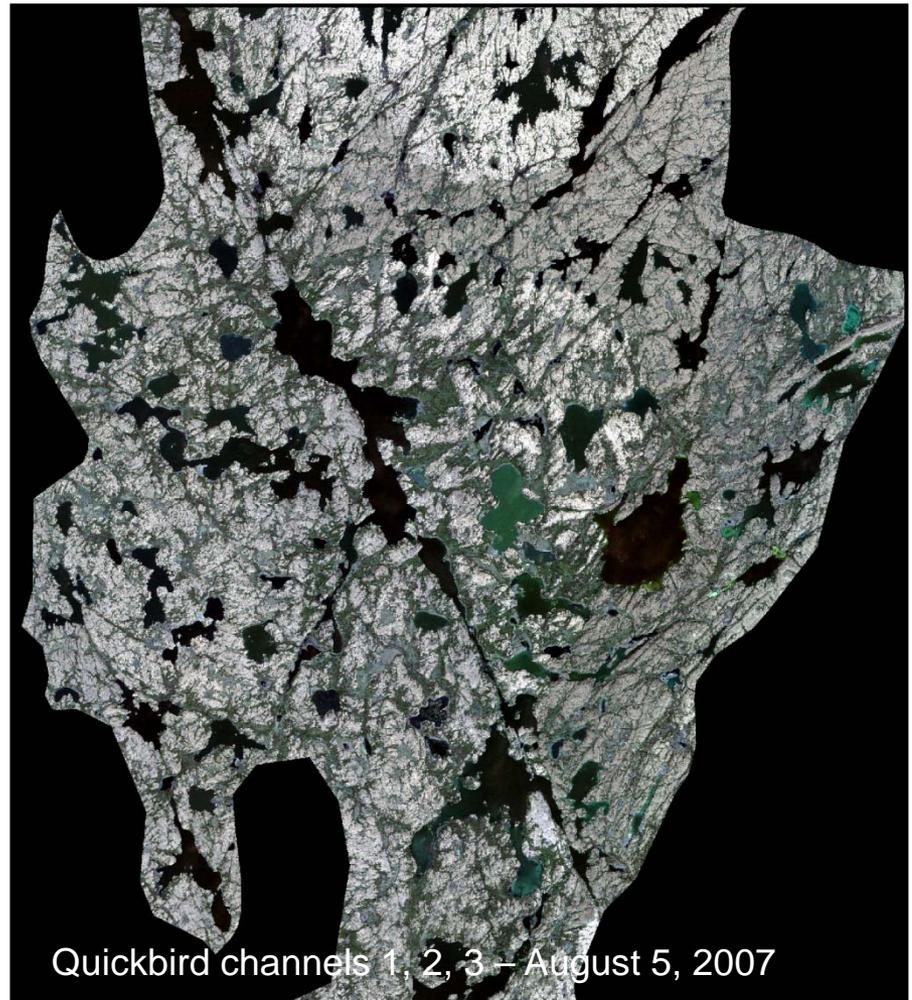


Hydrometric



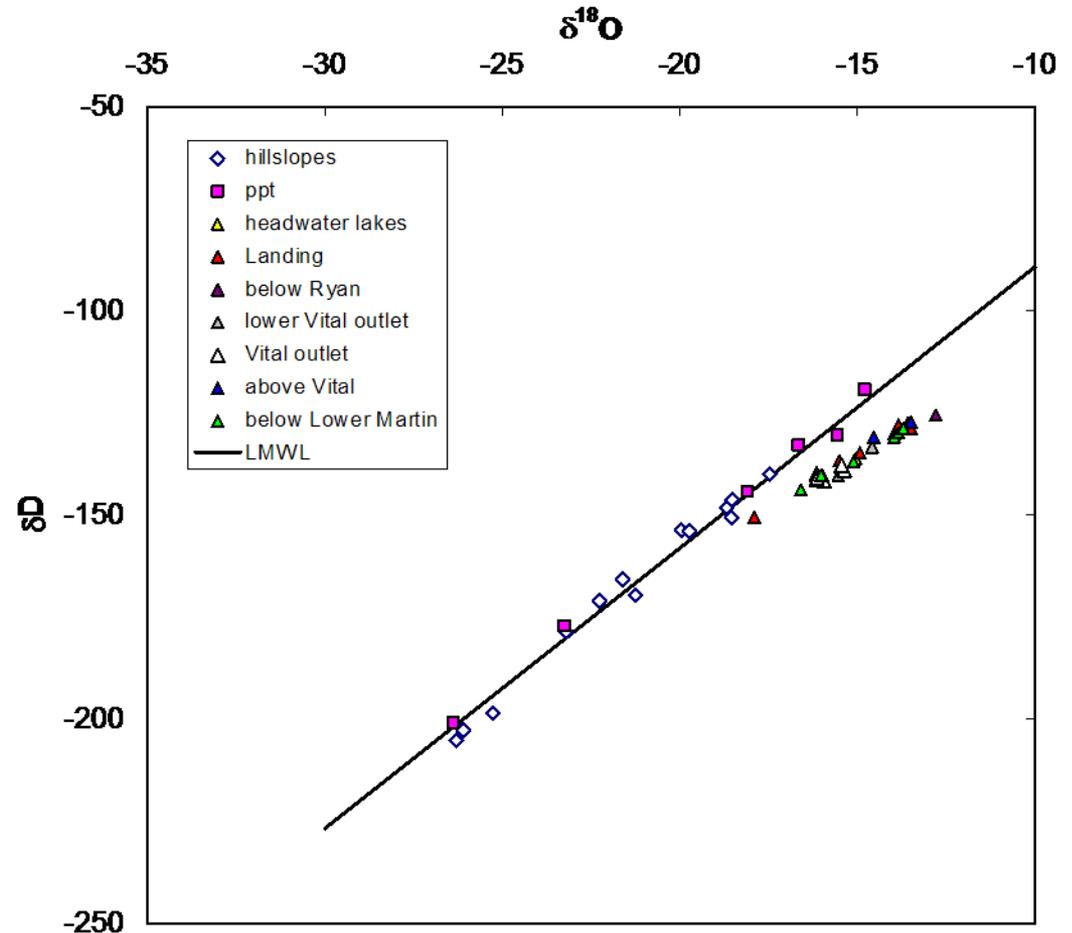
Remote sensing

- A 2007 open water season sequence of Radarsat and high resolution Quickbird imagery will be used in an attempt to map areas contributing to runoff.
- The lidar data from August may also be of use.



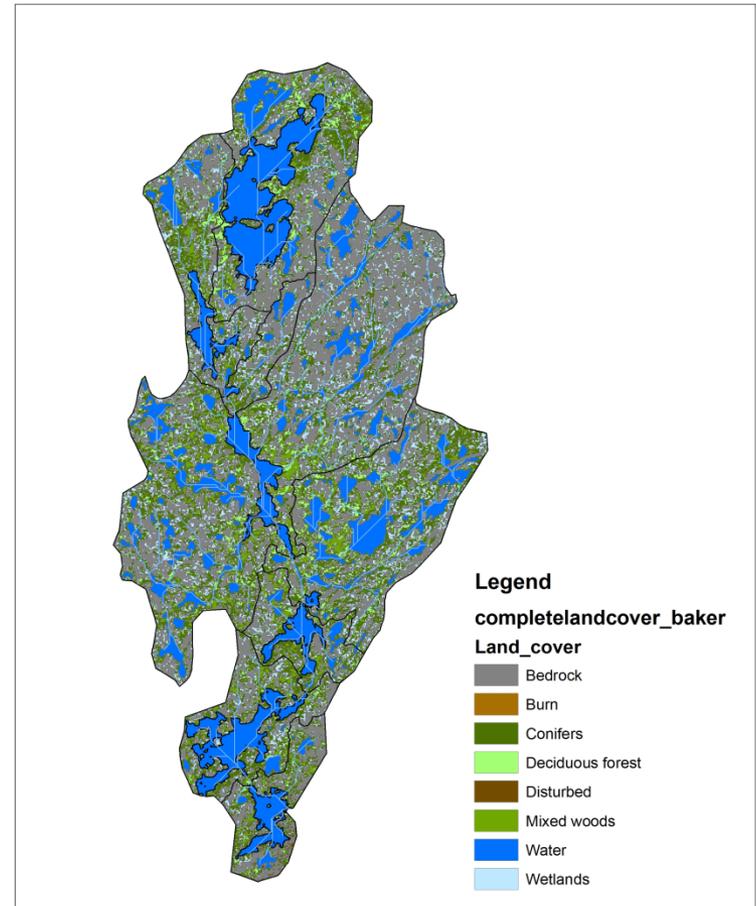
Hydrochemistry

- Sampling of ions and stable isotopes continues in an effort to discern runoff source areas with water chemistry.

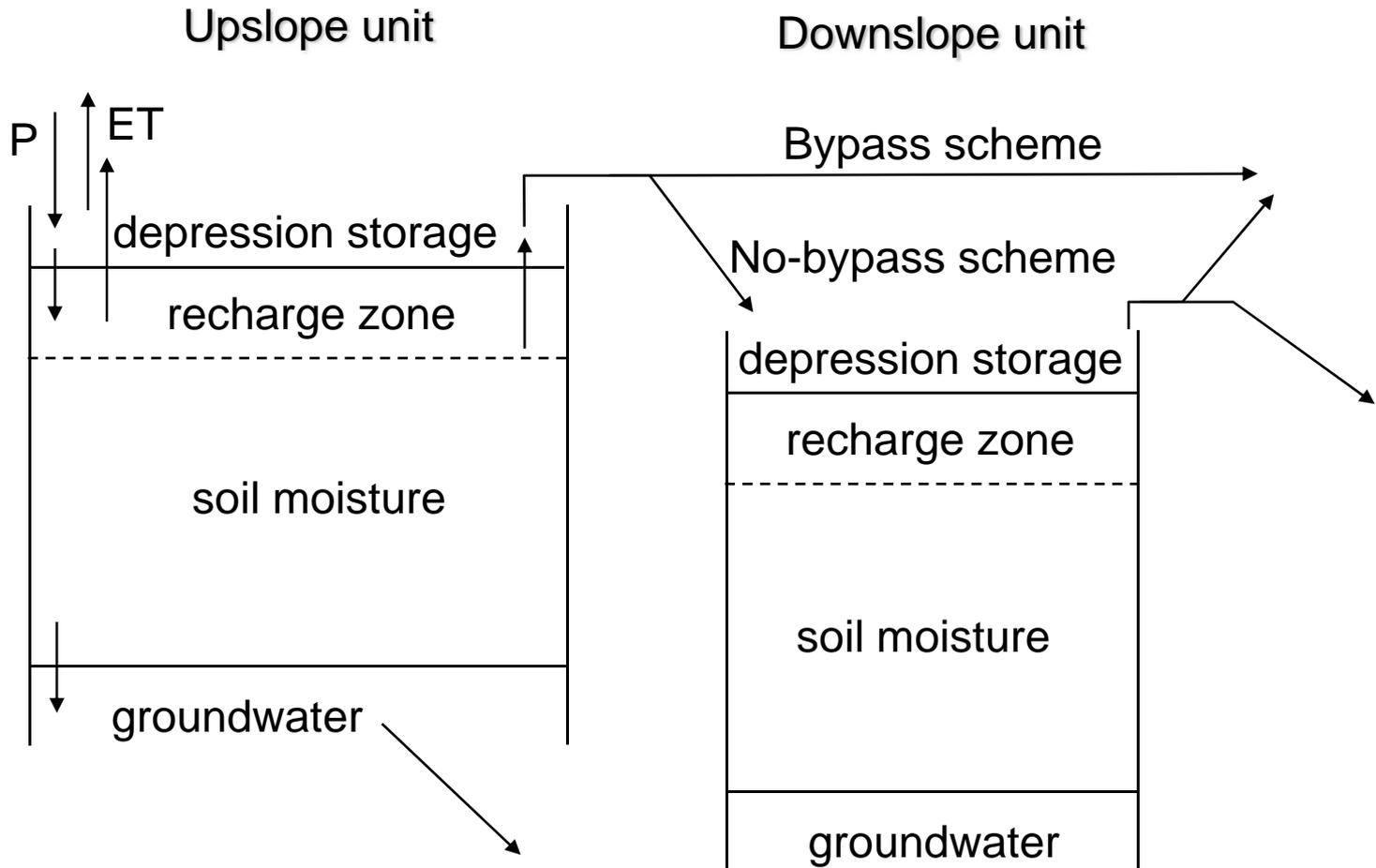


Theme 2 - Parameterization

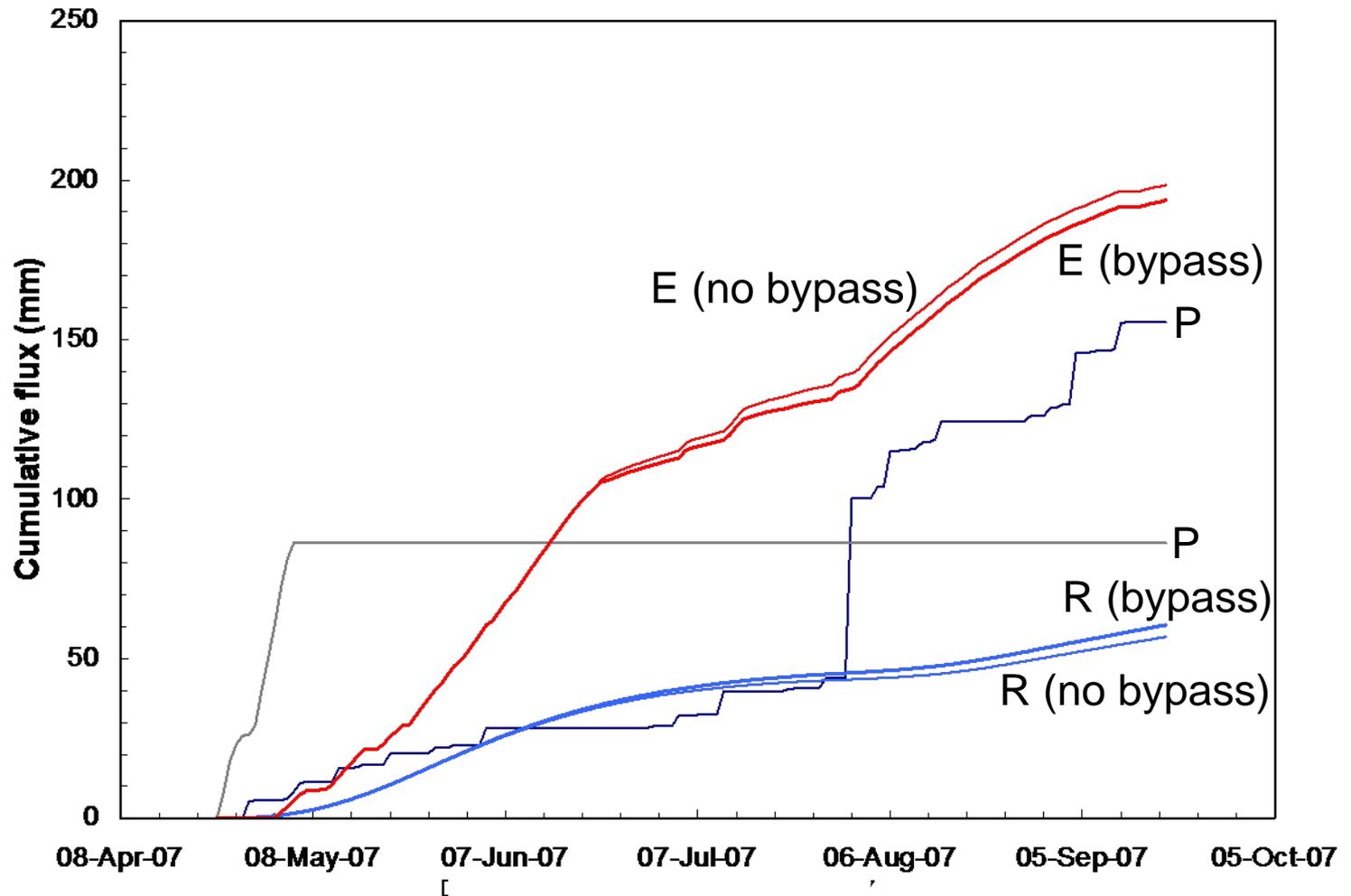
- Dynamics of contributing areas are being modelled with the Cold Regions Hydrological Model (CRHM)
- Parameterized CRHM with 16 HRU's - 8 trunk lakes and their contributing areas
- The storage interaction between HRU's was manipulated within the model to evaluate effect on water budget.



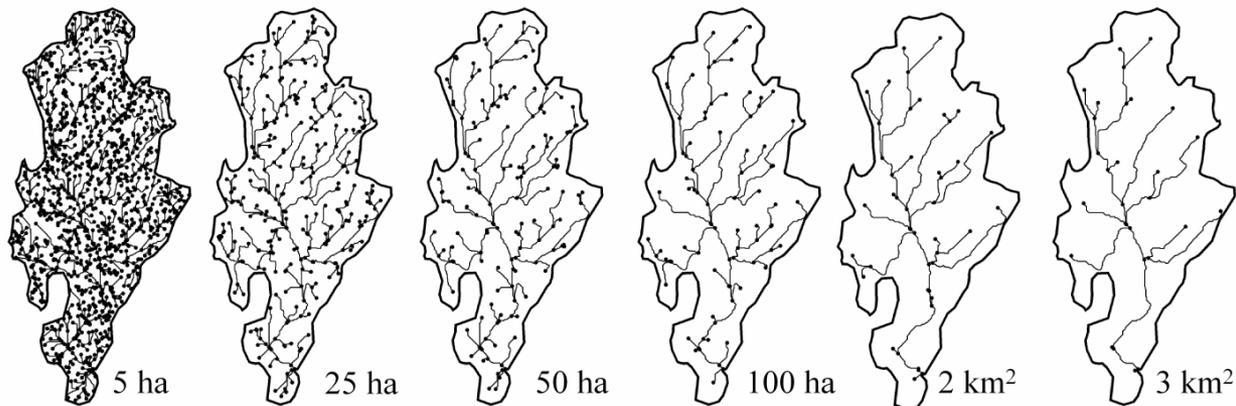
Storage parameterization



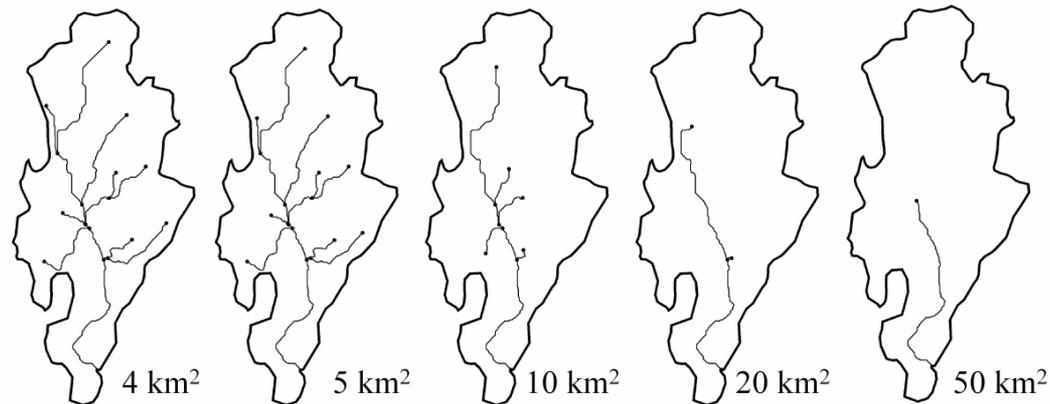
Bypass vs. No bypass schemes



Scaling effects



$$R_T = \left(\frac{A_i}{A_{i-1}}\right) \cdot F_{i,i-1} < 1$$



The upcoming year

- May's field season
- Start 2nd M.Sc. student
- Continue scaling experiments with CRHM
- Classify Quickbird and Radarsat images
- Finalize chemistry sampling program
- Support MESH modelling



