

In support of the Drought Research Initiative

Addressing current modelling challenges

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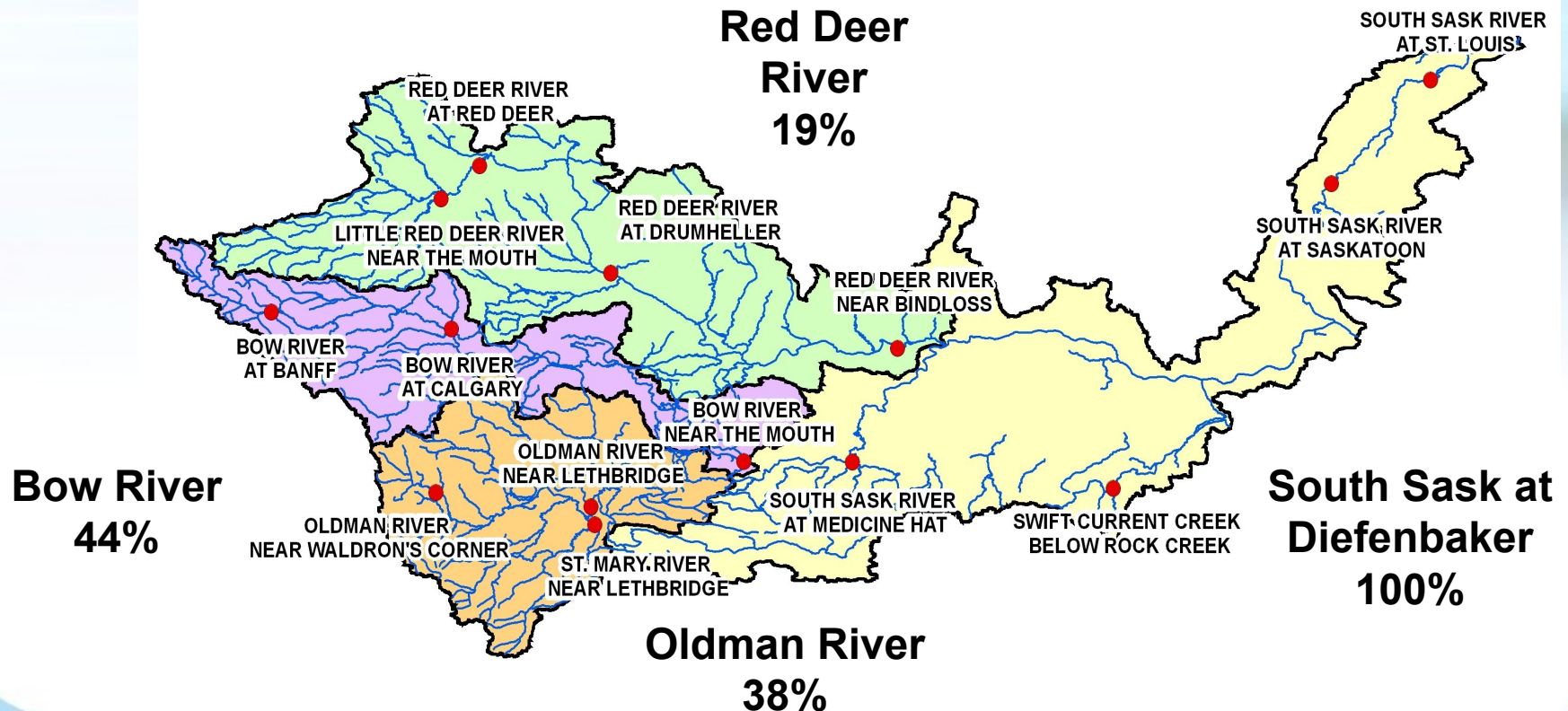
Centre for Hydrology, University of Saskatchewan

**Hydrometeorology and Arctic Lab,
Environment Canada**

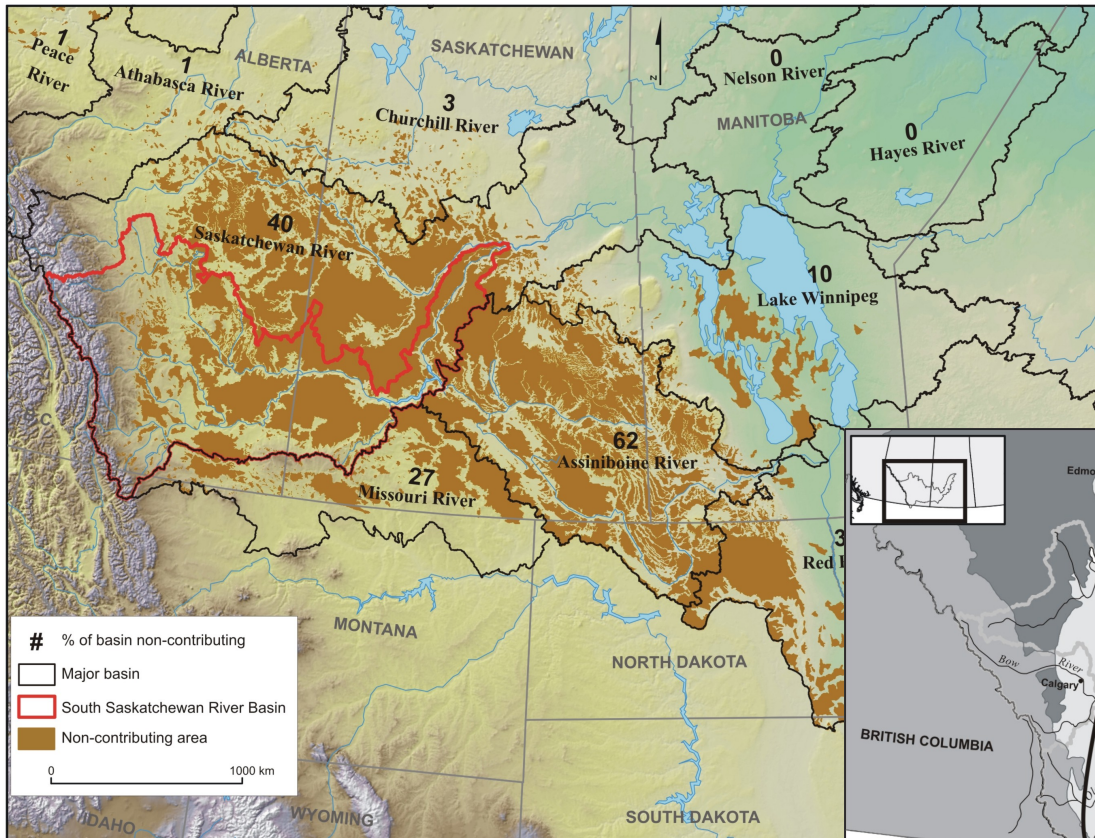
**January 18, 2008
DRI Workshop III
Calgary Alberta**

Modelling challenges

Modelling is difficult in an environment where the land surface is disconnected from flow.



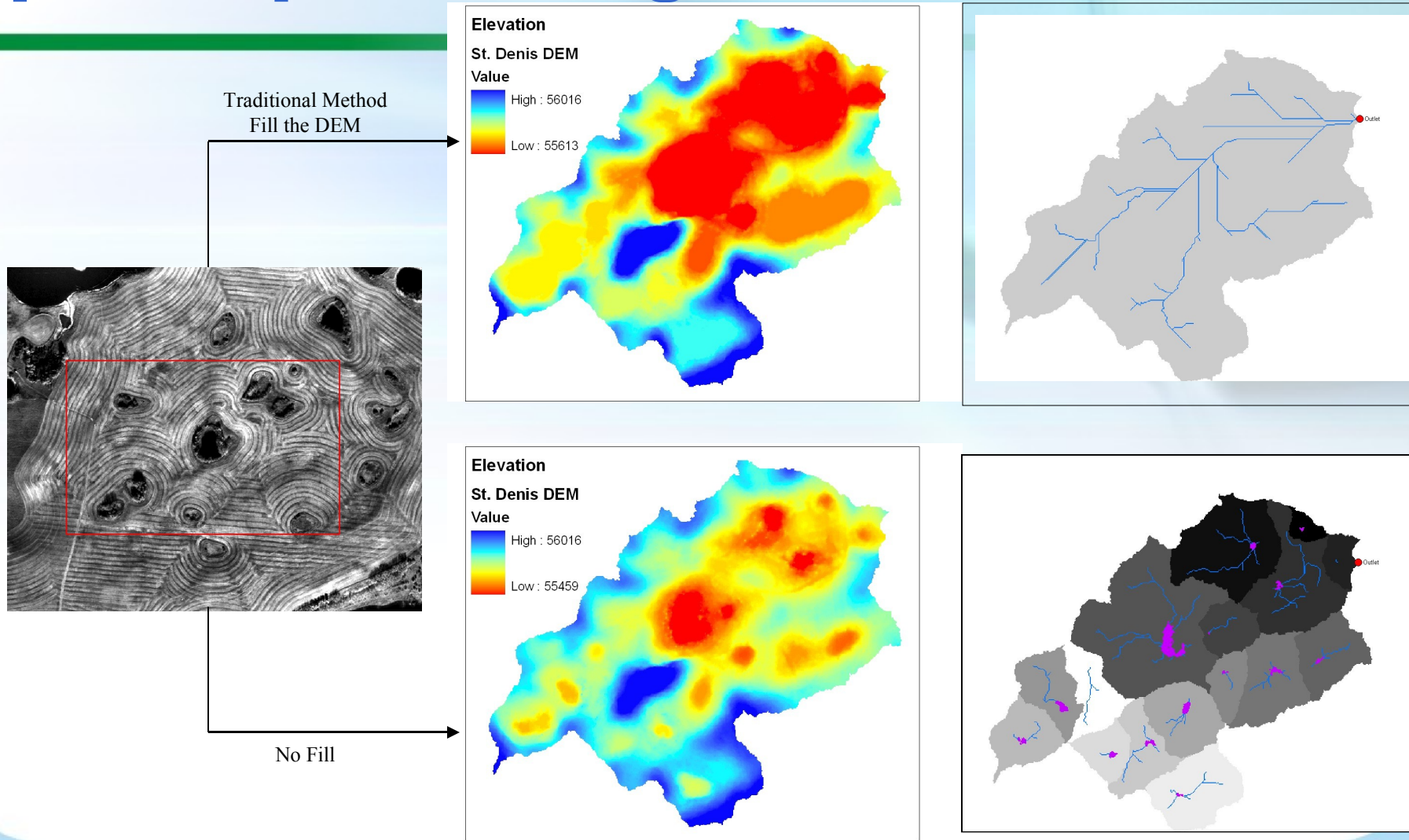
Non-contributing area



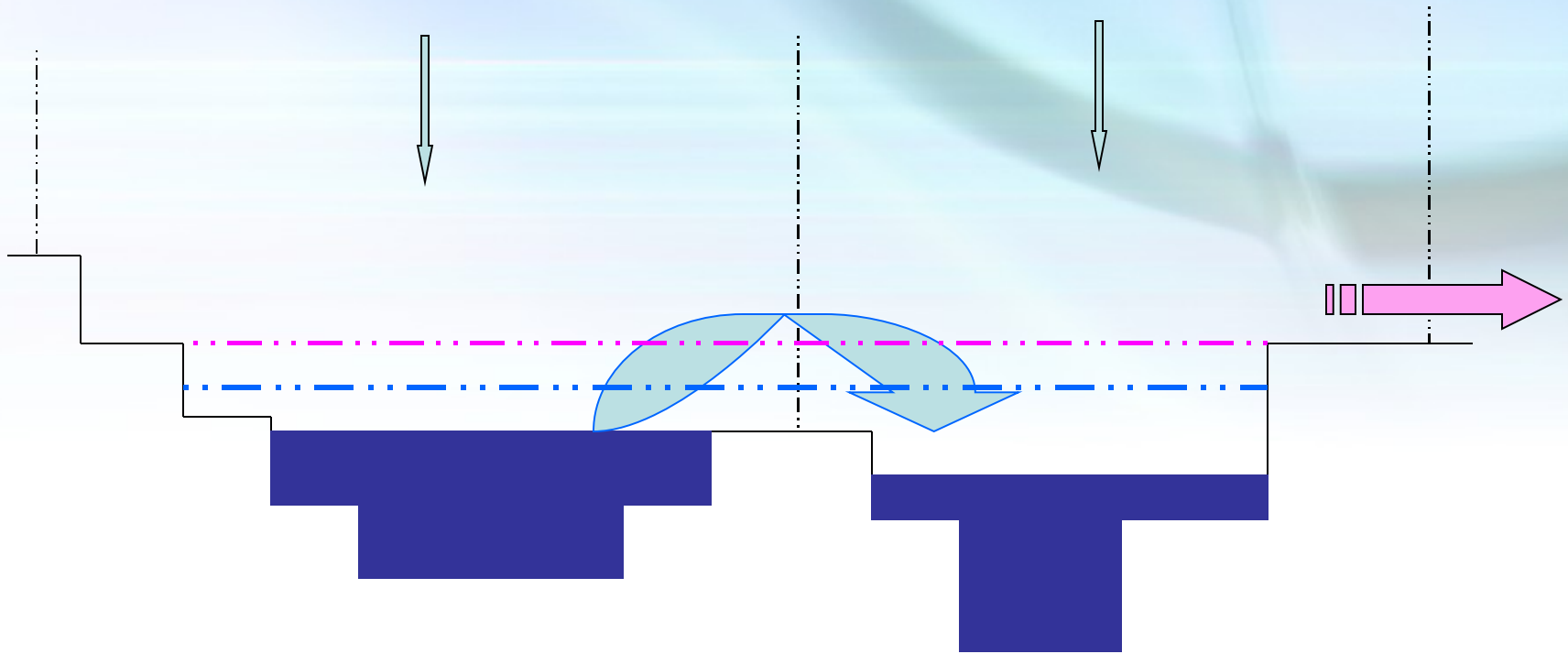
Map data source: EcoAtlas, Geogratis - Natural Resources Canada, Government of Canada
 Map projection: Lambert Conformal Conic; Central meridian - 110° W



Modelling contributing area in the prairie pothole region

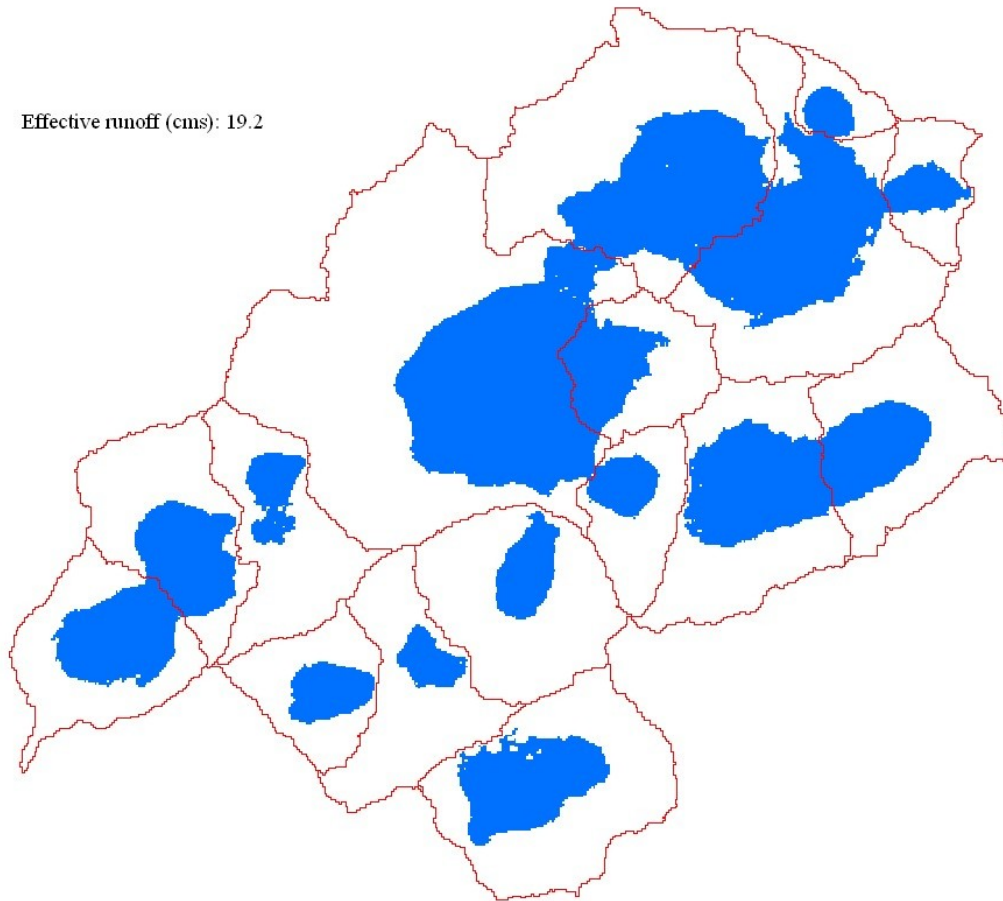


Effective runoff and filling

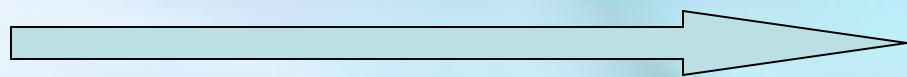


The increase in pond size with increasing effective runoff

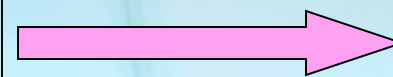
Effective runoff (cms): 19.2



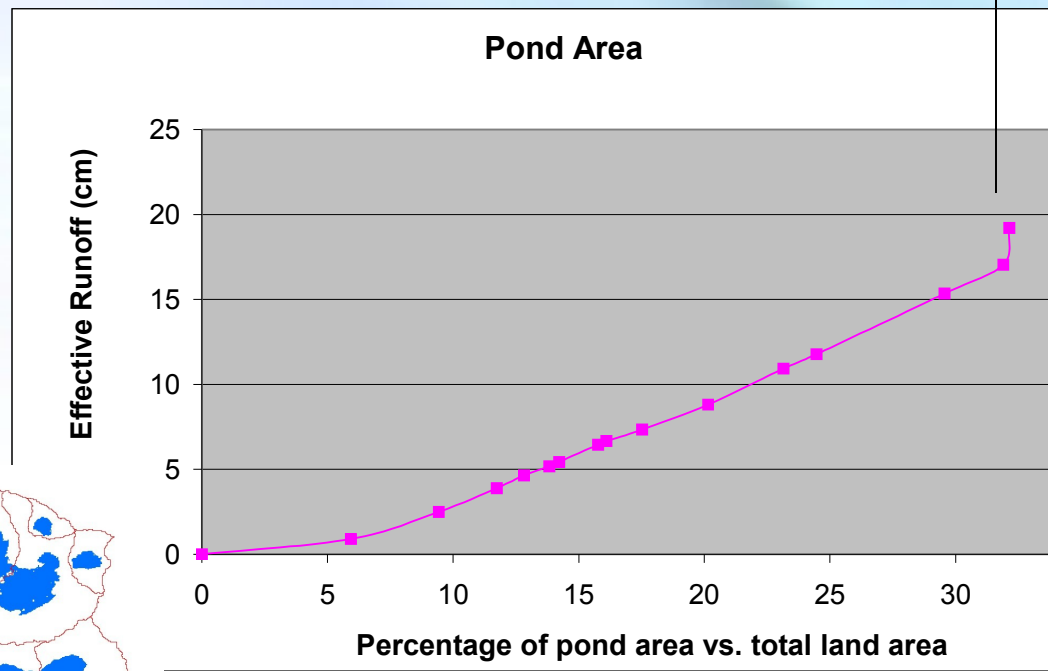
Percentage of pond area vs. total land area with increasing runoff



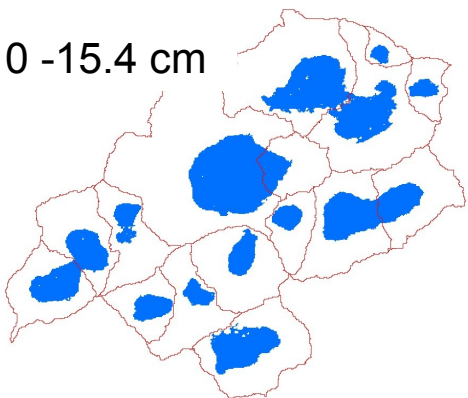
Fill and spill



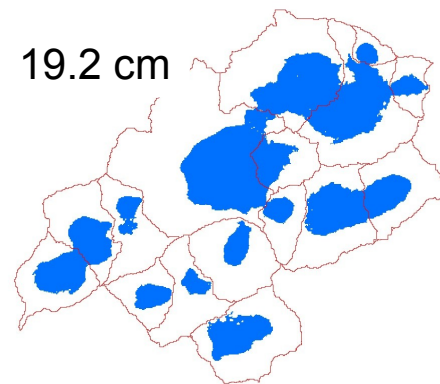
Traditional topo analysis



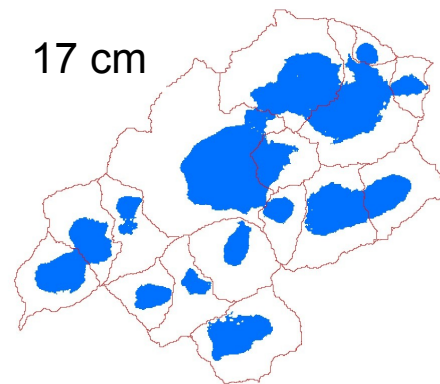
0 -15.4 cm



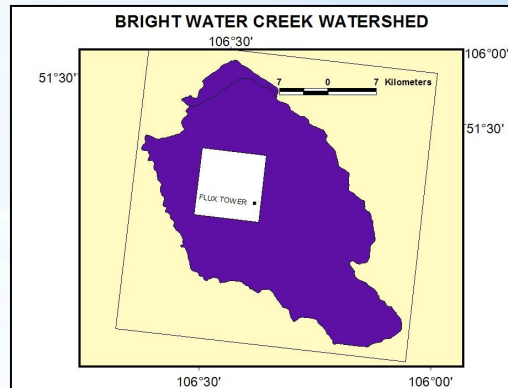
19.2 cm



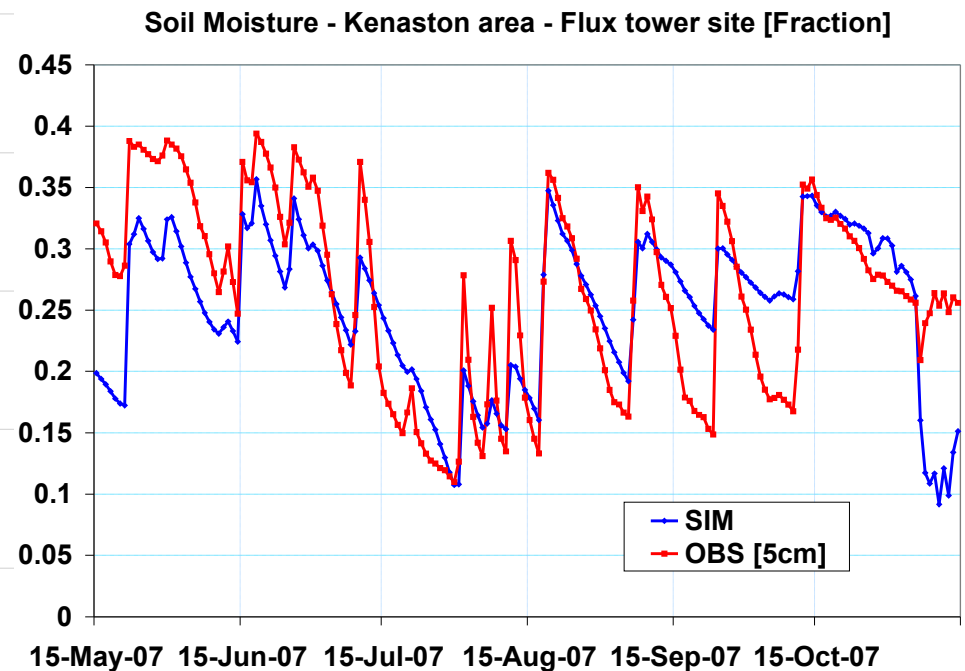
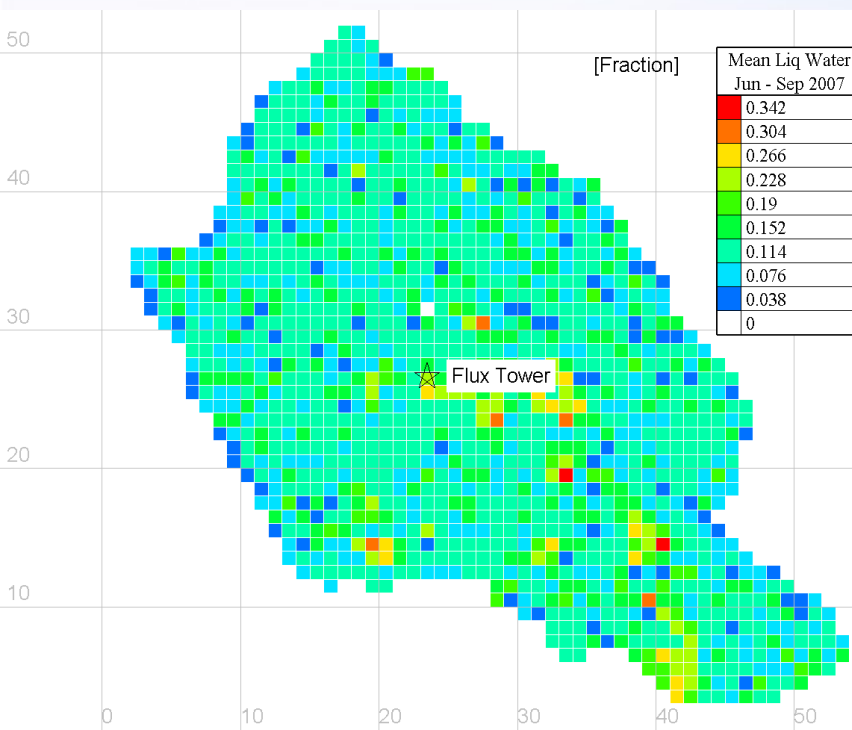
17 cm



Stand alone MESH



- **Small prairie headwater basin**
 - WSC outlet
 - typical prairie landscape including non-contributing area
- **Currently running stand-alone MESH**
 - (CLASS 3.2 with Watroute)
 - 800 m resolution for summer 2007



Summary and future considerations for DRI (2007 and 2008)

- 2006/07
 - PhD work on fill and spill conceptualized, coded, runoff/area relationship developed for St. Denis
 - Modelling framework with CLASS 3.2 model physics running over Brightwater currently running with standard parameterization
- 2007/08
 - Fill and spill to be tested in additional watersheds
 - Multi-objective parameterization of stand alone MESH
 - Code changes to MESH to incorporate fill and spill and results for Brightwater compare to distributed field data and streamflow measurements

Acknowledgements

- DRI support for Dr. Saul Marin and PhD candidate Dean Shaw
- AAFC support of the water availability study sub-theme under NAESI

THANK YOU



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