

Effects of Wet-Dry Cycles on Groundwater Sustainability in the Prairies

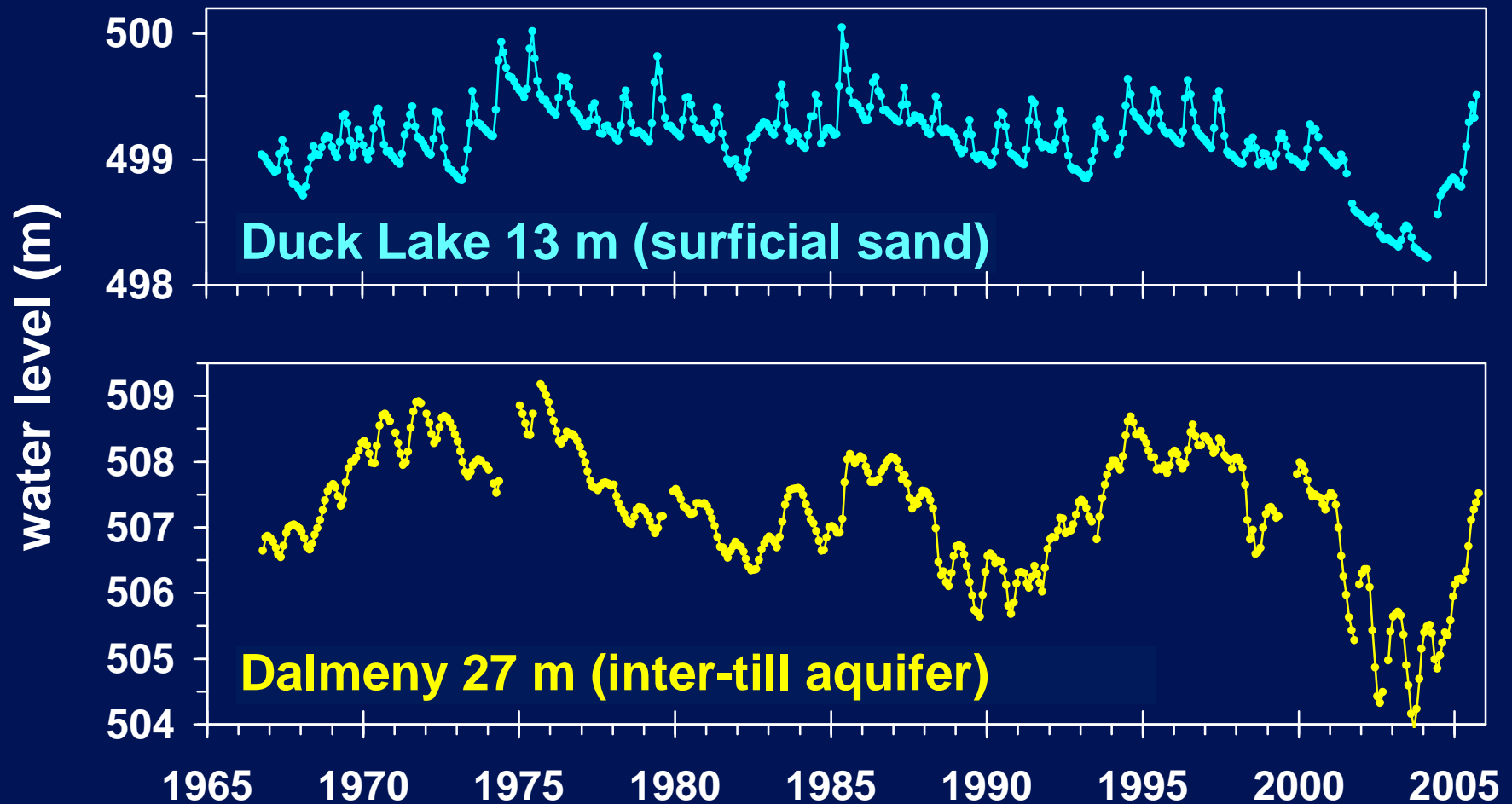
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Water Level in 'Undisturbed' Prairie Aquifers

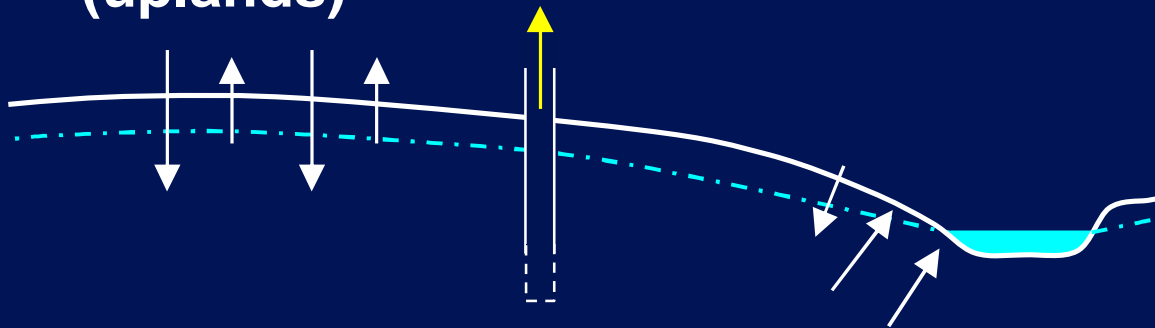
Data from Sask. Obs. Well Network



Water Balance: Basis of Sustainability

$$\text{Recharge} - \text{Discharge} - \text{Pumping} = \text{Storage change} \\ (\text{water level} - \bar{})$$

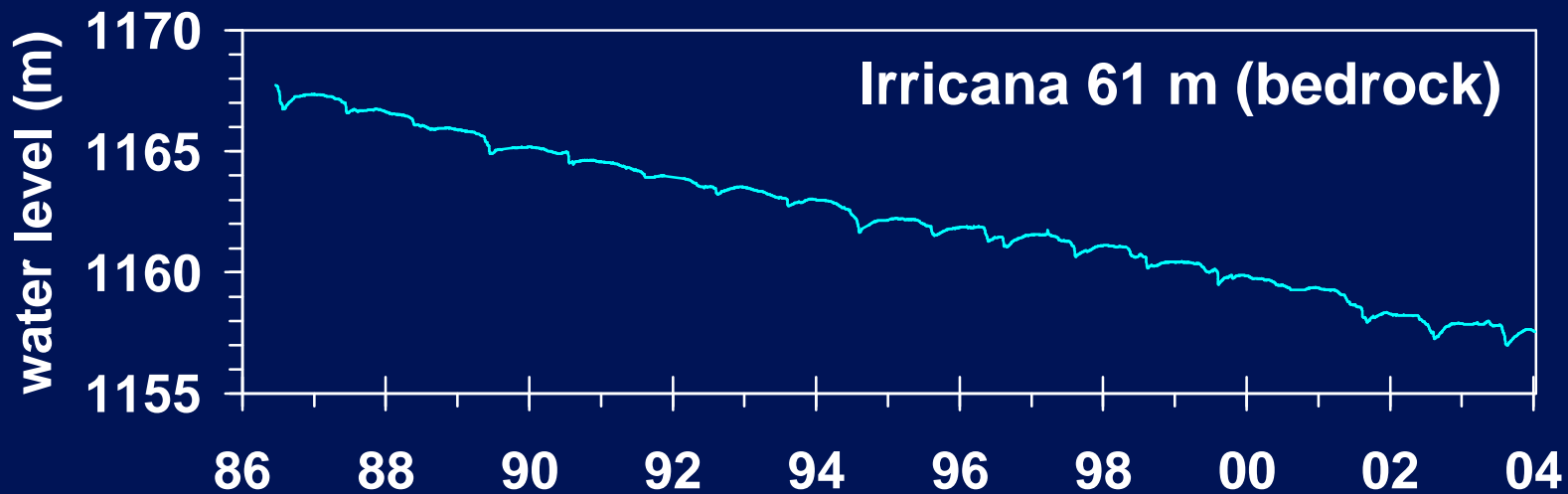
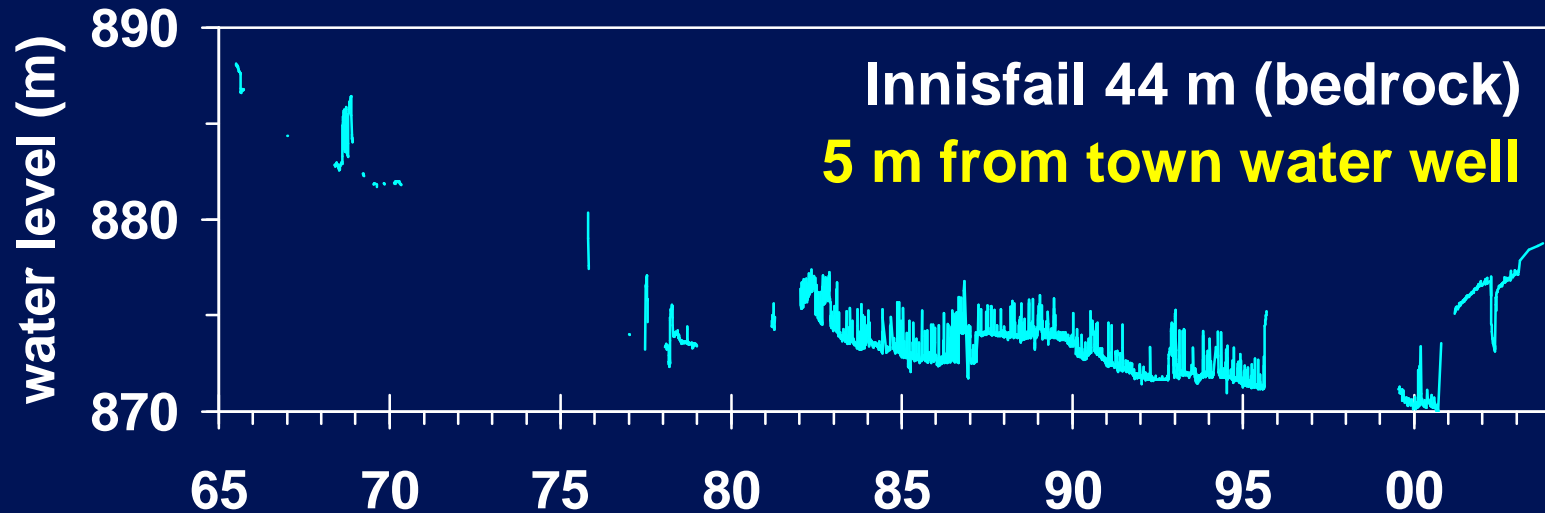
recharge dominant
(uplands)



discharge dominant
(low lands)

Water Level in Heavily Pumped Aquifers

Data by Carole Holt Oduro (Alberta Environment)



Groundwater Model Coupled with Soil-Vegetation-Atmosphere Transfer Scheme

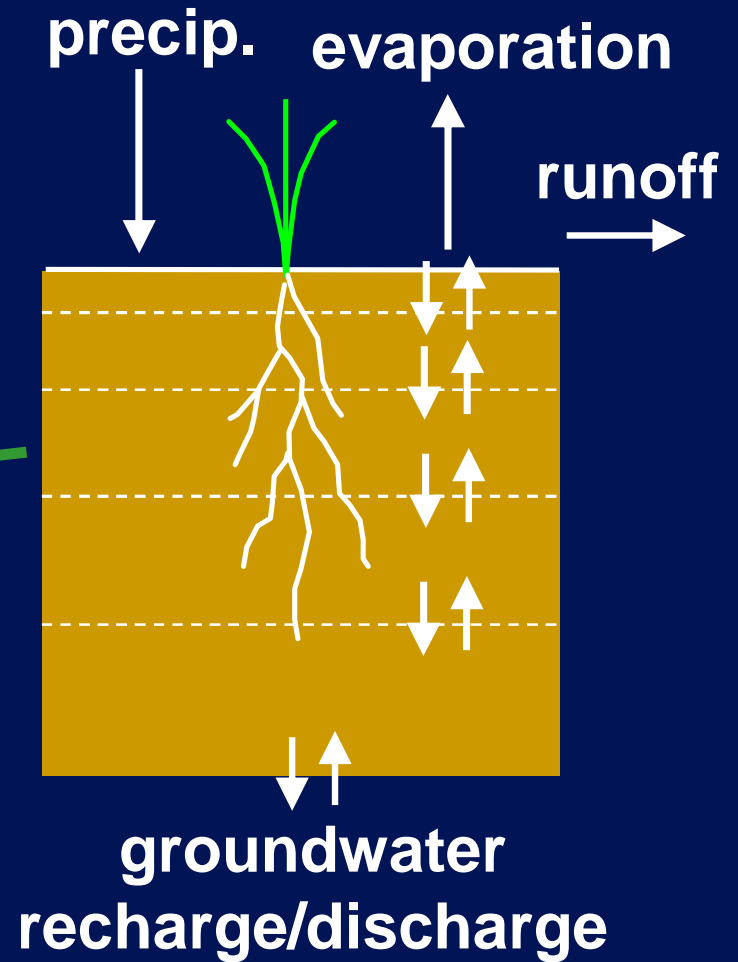
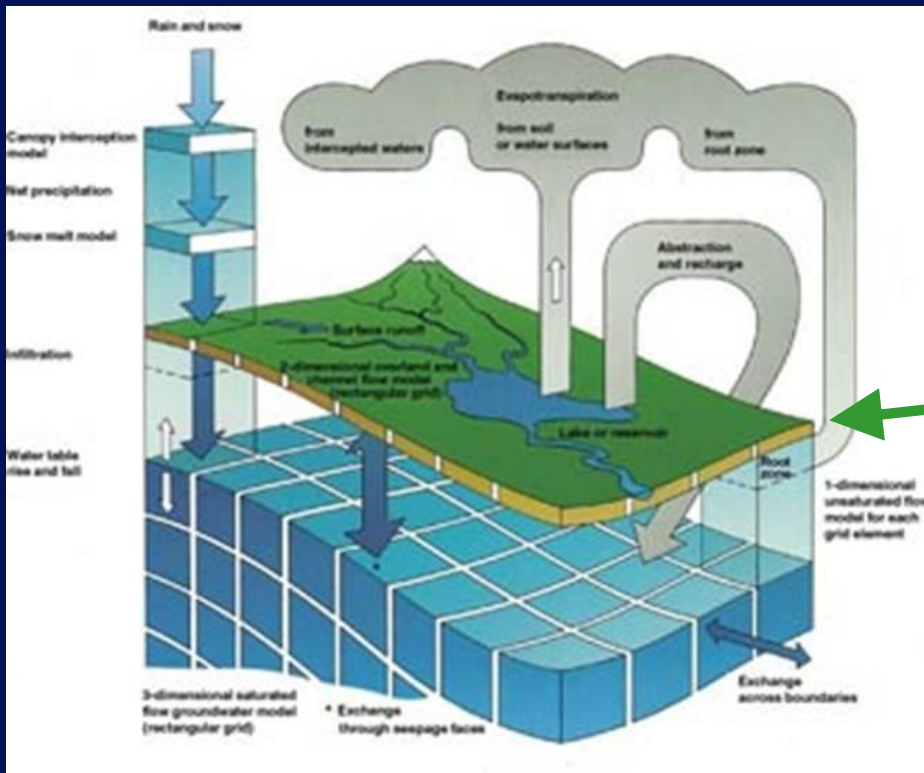
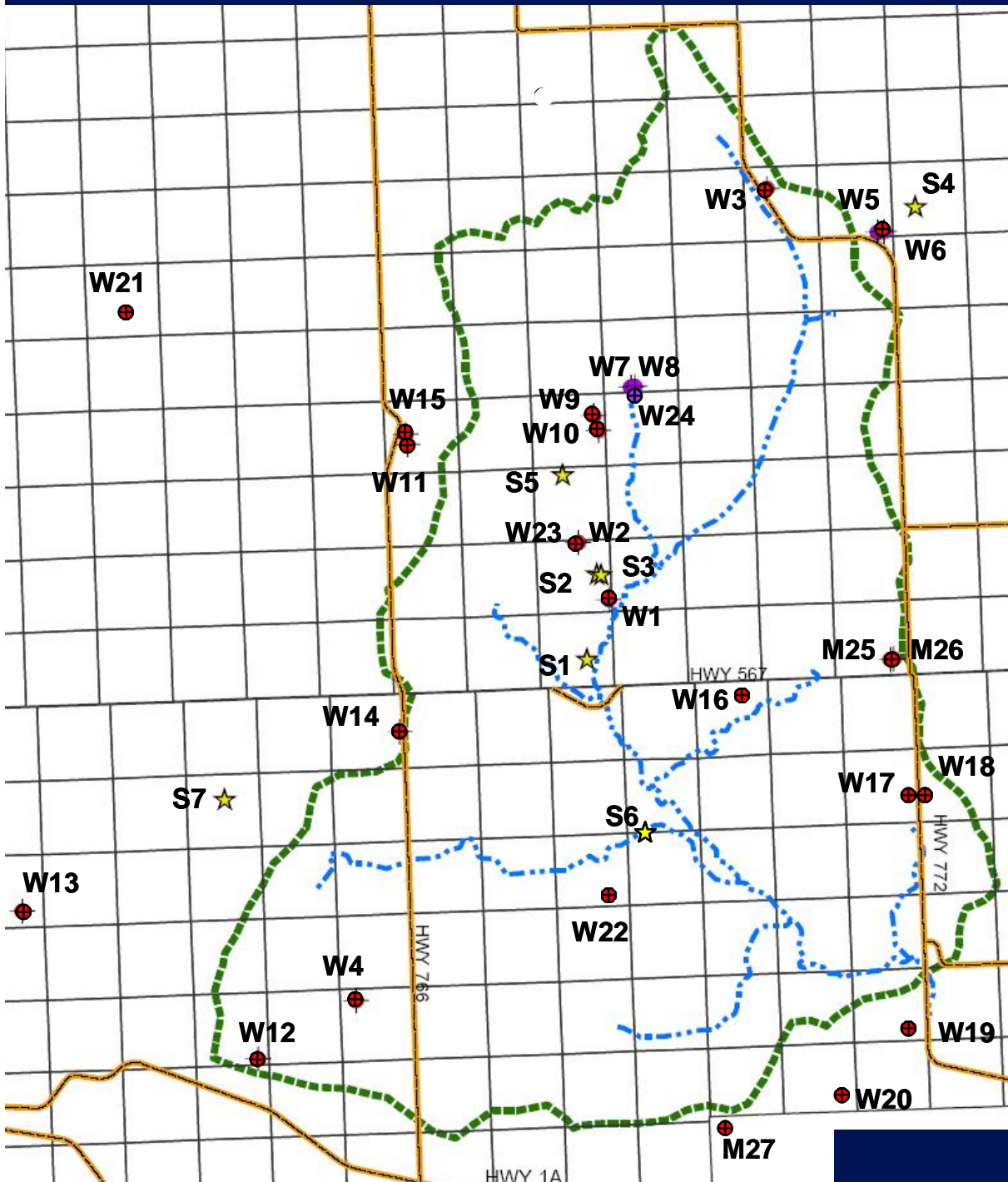


Figure from: www.dhisoftware.com

West Nose Creek Watershed Groundwater Monitoring Network



Legend

- Roads
- Drainage
- Sections
- Watershed
- Springs
- Wells (monitored)
- Wells (sampled only)

Water metering – selected wells



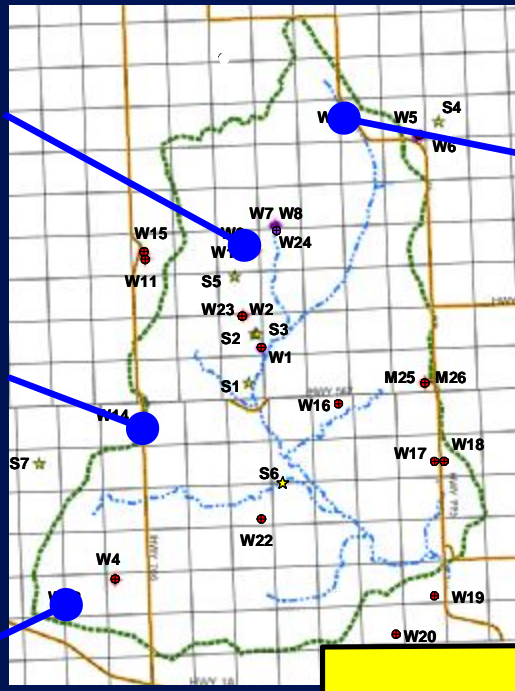
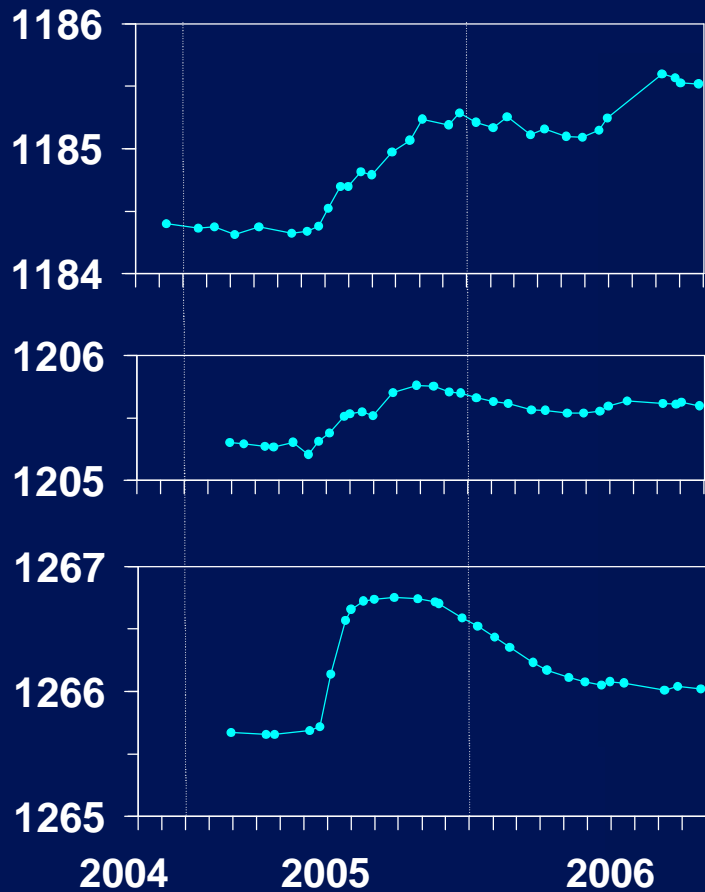
Bi-weekly water level



Water Level in Selected Monitoring Wells

Nov. 2004 – Oct. 2006.

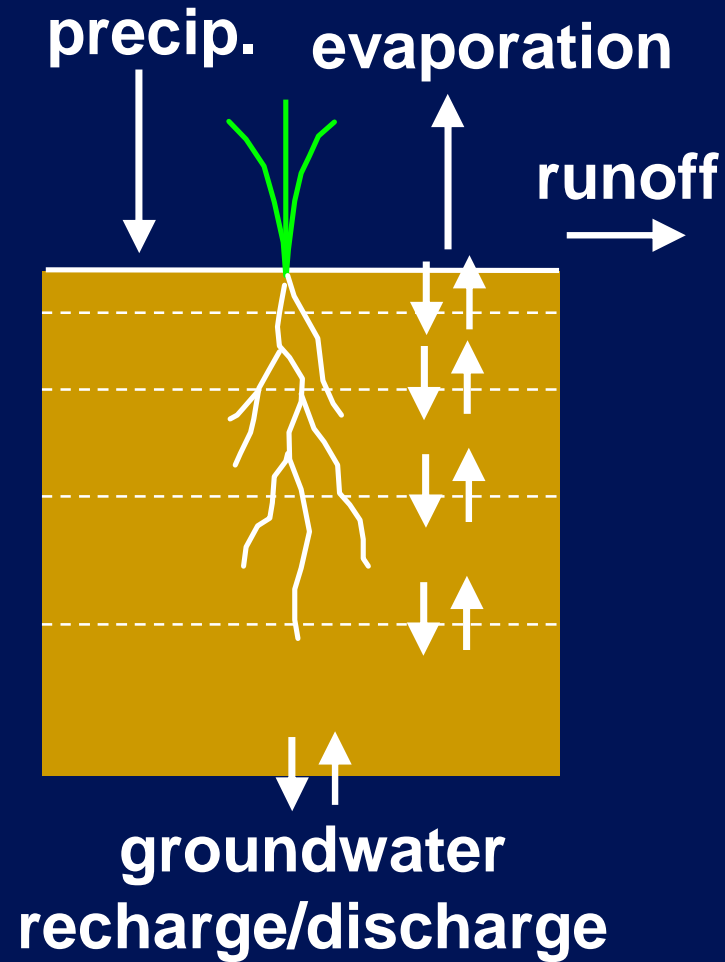
Elevation (m) above mean sea level



Calgary

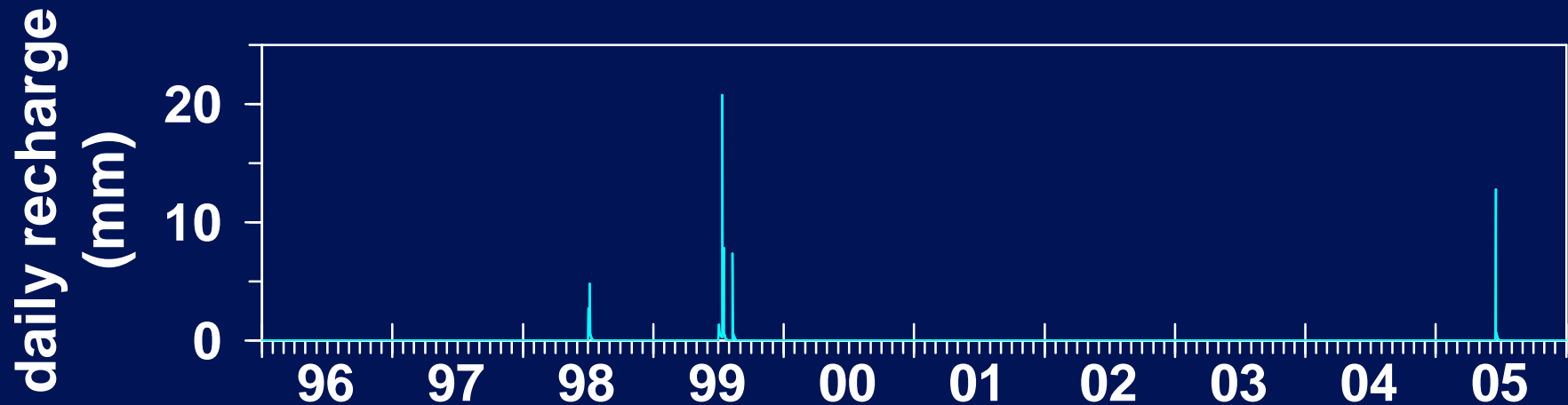


Soil Water Balance Model for Groundwater Recharge Estimation



Versatile Soil Moisture Budget Model

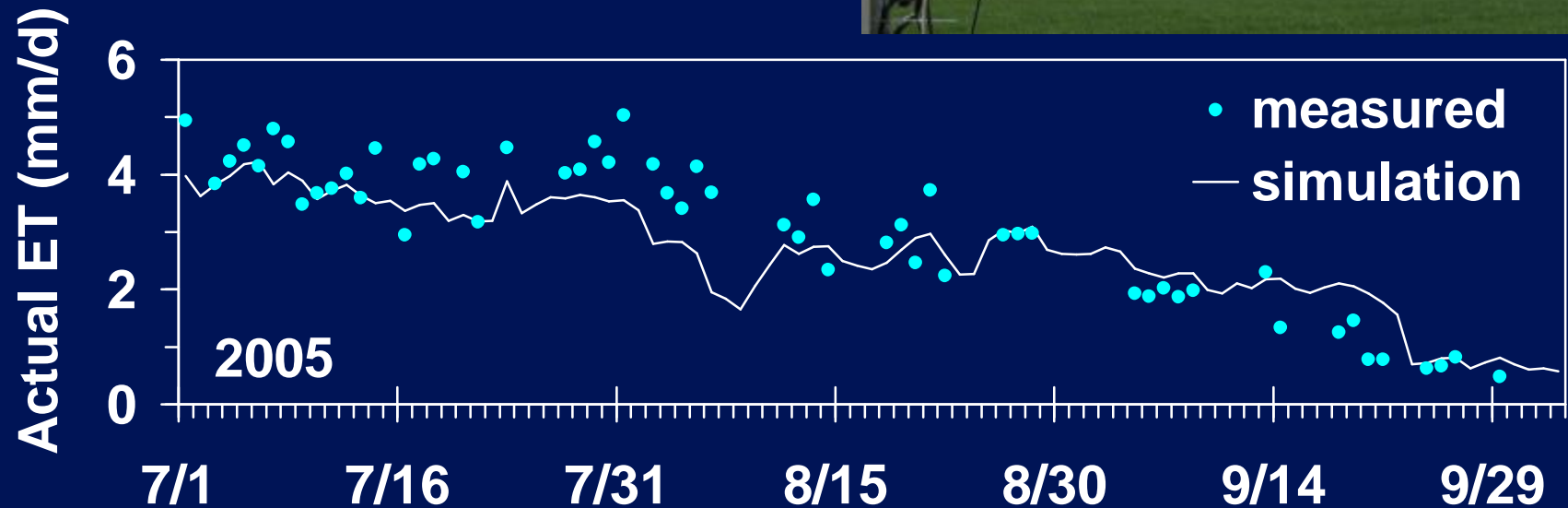
- Canadian model for agricultural purposes
- Modified by Alberta Agriculture Food Rural Development
- Used by AAFRD for **every township**



Preliminary simulation by Ralph Wright (AAFRD)

Model Testing for Actual Evapotranspiration

Eddy Flux Measurement
Barley Field in 2005



Current and Future Studies

- 1. Testing VSMB in grassland/pasture.
Poster by Jackson et al.**
- 2. Improvement of snowmelt algorithm
Chinook study – winter 2007**
- 3. Collaboration with U of M group (Al Woodbury)
Data sharing and model testing**
- 4. Treatment of depression focused recharge
Postdoc fellow starting on January 19.**

Acknowledgement

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