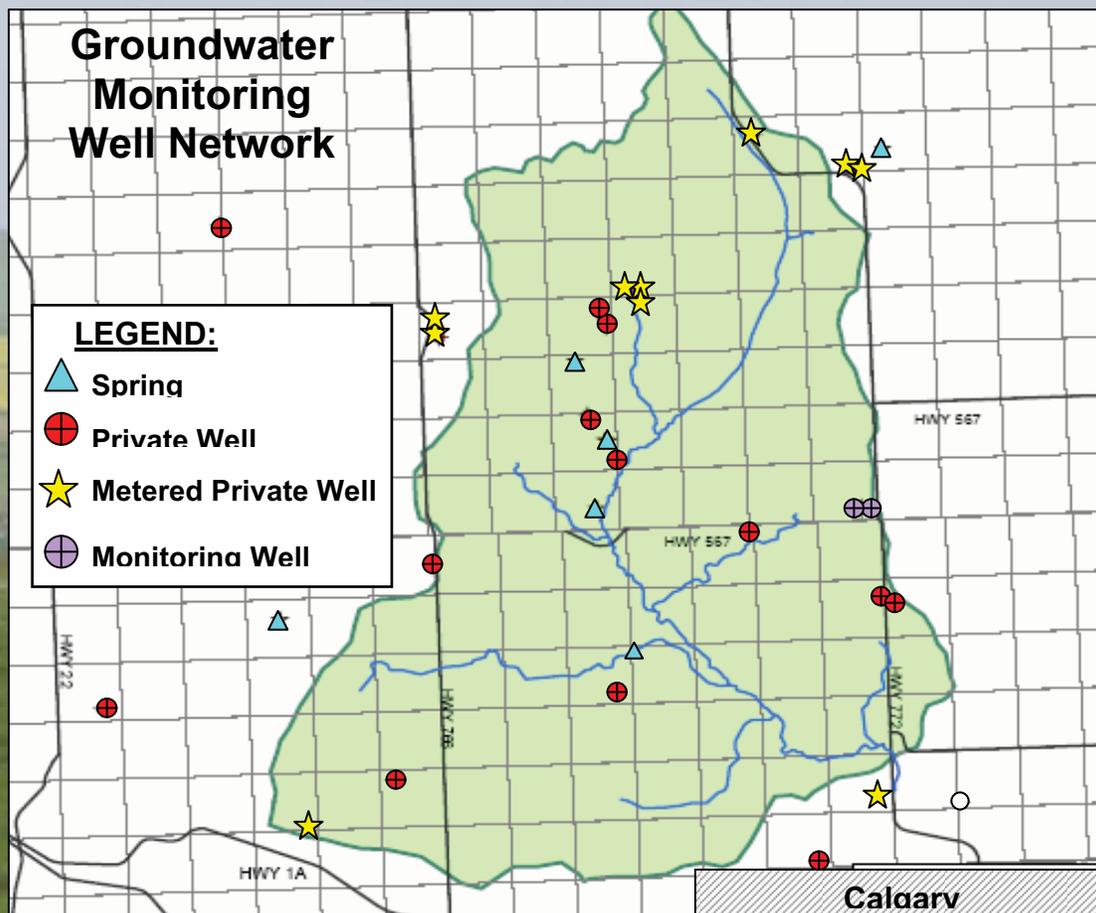


## ***“You can’t manage it without measuring it”***

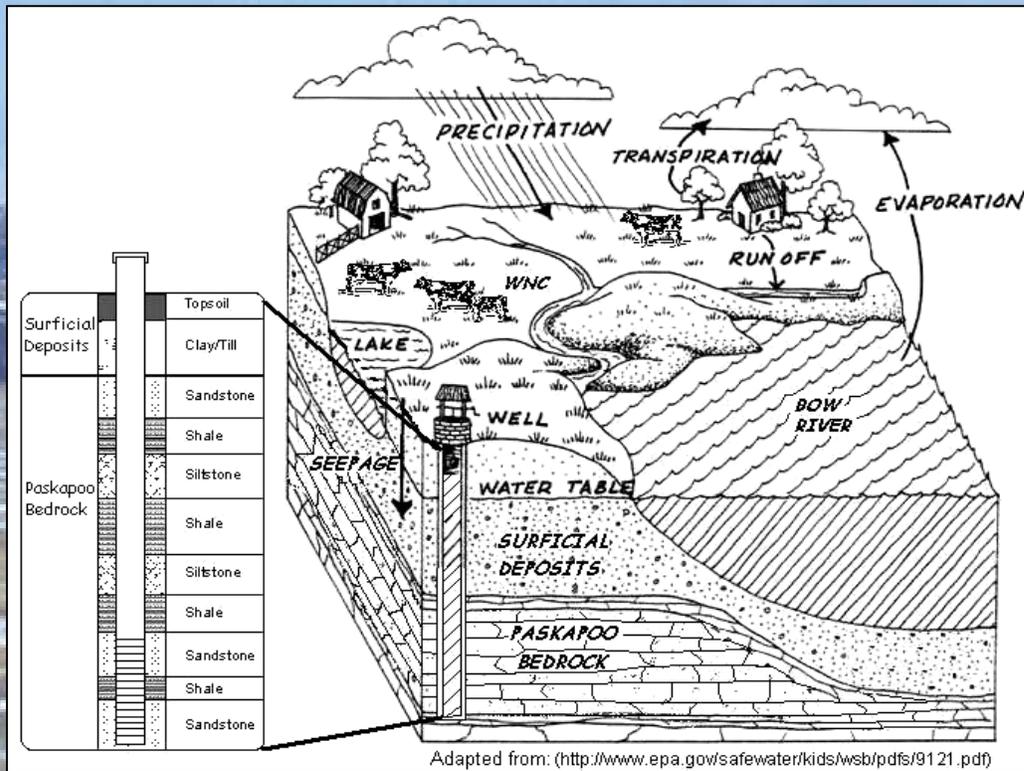
Sustainable water resource management becomes increasingly important as our population grows. The community members of the West Nose Creek watershed rely on groundwater and surface water for their daily needs. As participants of this study, you are helping to measure and monitor aspects of the watershed with the goal of answering questions like:

- *How much water is there and where is it stored?*
- *How much of it can we access?*
- *How does water travel below ground?*
- *How is the water replenished and how often?*
- *How do water levels respond to pumping, or changes in weather or climate?*



This monitoring well network has been established over the past year; it is being used to collect water level, water chemistry, and water use information. This watershed is characteristic of rural areas in Alberta that are dependant on groundwater from the Paskapoo bedrock formation. Its proximity to Calgary and the resulting population increase and demand on water resources emphasizes the need for improved understanding and responsible management of water. The ultimate goal of this watershed study is to set an example for water resource modeling and management in Alberta and beyond.

# THE WATER CYCLE



**Evaporation:** water returning to the atmosphere

**Precipitation:** rain and snow

**Runoff:** precipitation that runs along the ground surface

**Seepage:** water that moves slowly through pores in rock or sediment

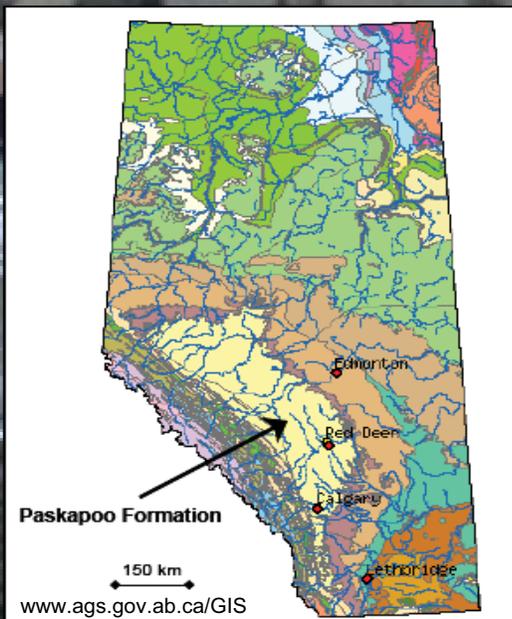
**Sustainable Use:** use of natural resources such that they will be available in the future

**Transpiration:** water used by plants and released into the air

**Water Table:** level below ground where sediments are saturated with water

**WNC:** West Nose Creek

Water in the air, on land, and underground are all interconnected. A water budget can be calculated for the watershed by measuring the inputs and outputs of water. Precipitation is an input; while evaporation, transpiration, pumping and creek outflow are some outputs of water from the watershed.



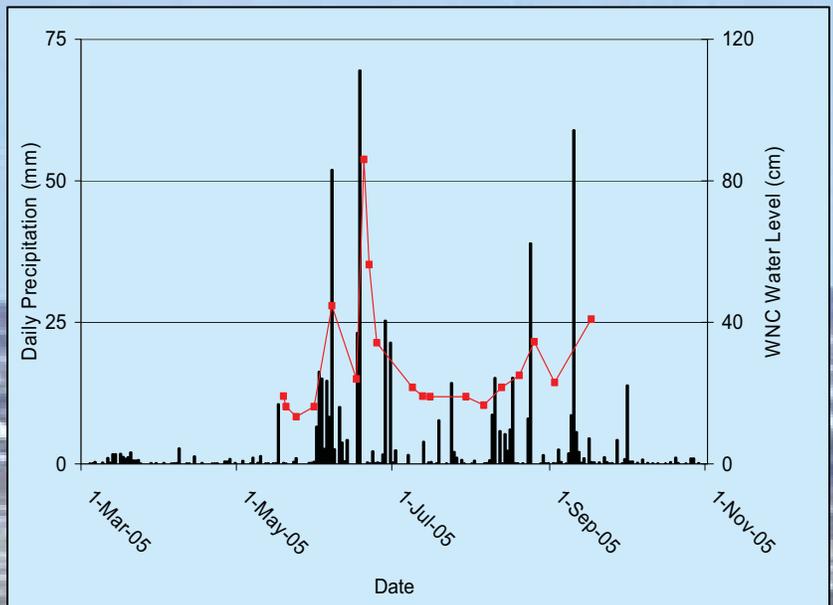
## PASKAPOO

The Paskapoo bedrock formation consists of interbedded shale, siltstone, and sandstone that form an aquifer system. This unit covers over 10 000 km<sup>2</sup> and is a major source of water for rural Albertans. It was deposited in an ancient river system that left sand channels within extensive mud and silt. The sandstone and fractured bedrock store water in open spaces. Many of the rural wells are installed across a series of sandstone lenses.

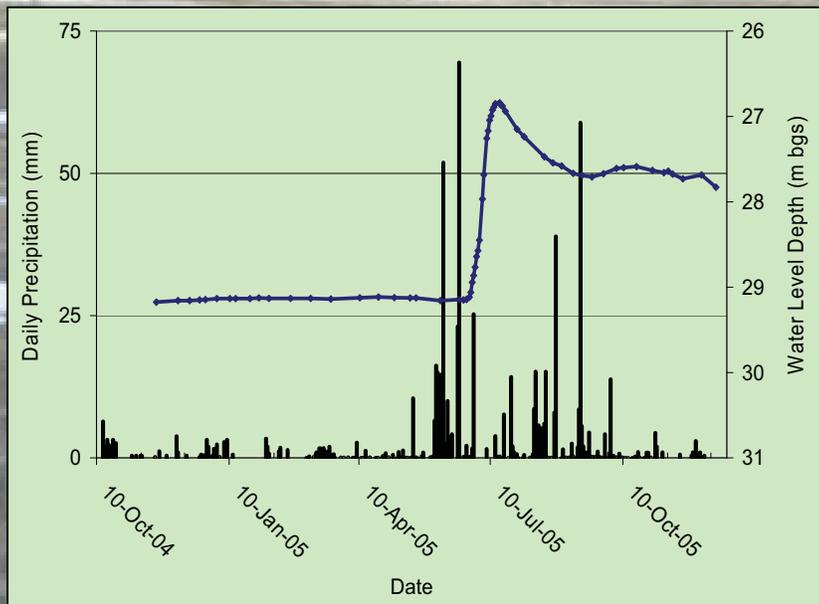
## Seasonal Fluctuations – Surface Water

We have been recording the rise and fall of the creek water level at the outlet of the watershed. The graph to the right shows creek level and precipitation over time. The levels are related to precipitation.

The creek bed lies within Paskapoo bedrock; however at this point, it is still unclear how creek water is connected to groundwater in the watershed.



# SEASONAL FLUCTUATIONS



## Seasonal Fluctuations - Groundwater

Both surface and groundwater levels respond to seasonal changes in precipitation. The graph to the left shows water levels at one well and precipitation over time. There was a marked rise in water levels at all the wells after the storm events in June 2005. The amount of fluctuation in levels ranged from about 0.1 to 6.0 meters.

The pictures below show the dramatic change in creek level in West Nose Creek from May to June.

# WEST NOSE CREEK



May 19, 2005



June 19, 2005

# WATER METERING

Ten water meters were installed on wells at seven farms in the WNC watershed this fall. Meters are read regularly. The table below shows the range in water use per day for household and stock wells since the time of installation.

Well	Water use per day (m <sup>3</sup> /day)	
	min	max
Household	0.34	1.5
Livestock	0.16	28.2



Try out this fun water cycle word search!

<p>Z B H K R C L F N B B T Z A A          A I N B Q N W N C C V I G P Q          M B O Y D O D O I U E V F R L          K L I N S I N I G G E V A E P          U U T O N T V T O R W I D C F          K K A I O A O A L O N Q N I X          L N R T W R O S O U A I I P X          T A T A W I O N R N N O F I E          K R L R A P B E D D P K Z T E          W G I O T S F D Y W L U F A C          L A F P E N C N H A W C F T E          C Z N A R A K O M T D B O I H          P P I V G R S C E E R D N O U          Y M F E D T P Z F R A T U N D          W G L R A S X J H A V Y R J N</p>	<p>The Hydrologic Cycle</p> <p>CONDENSATION          EVAPORATION          GROUNDWATER          HYDROLOGIC          INFILTRATION          PRECIPITATION          RAIN          RUNOFF          SNOW          TRANSPIRATION          WATER</p> <p>(NASA 2005)</p>
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**Interesting Links:**

- University of Calgary Hydrogeology: [www.geo.ucalgary.ca/hydro/](http://www.geo.ucalgary.ca/hydro/)
- Alberta Agriculture: [www.agric.gov.ab.ca](http://www.agric.gov.ab.ca)
- Prairie Farm Rehabilitation Association: [www.agr.gc.ca/pfra/main\\_e.htm](http://www.agr.gc.ca/pfra/main_e.htm)
- Alberta Environment Groundwater Info: [www3.gov.ab.ca/env/water/groundwater/index.html](http://www3.gov.ab.ca/env/water/groundwater/index.html)
- Watersheds of Alberta: [www.albertawatersheds.org/](http://www.albertawatersheds.org/)
- United States Water Resources Information: [water.usgs.gov/technical\\_info.html](http://water.usgs.gov/technical_info.html)

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