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# Groundwater Connections



DECEMBER 2012 EDITION

## Groundwater Connections - Online in 2013

Over the past six months, we have been working on the development of an informative web site – Groundwater Connections. Now that the Rocky View Well Watch site is up and running and the final improvements have been made, we have shifted our energy to developing the complimentary web site. This new web site will provide information about the research, community outreach and educational material that make our project unique. It is anticipated that this web site will be launched in January 2013.

The research section of the website will provide scientific information related to the Groundwater Connections project. On this page users will be able to find information on the climate and geology of Rocky View County. The basic hydrogeological processes are described on the website, with the option to download Fact Sheets that provide further information. The research tab explores the science behind the watershed-based approach used in the community-based groundwater monitoring project. Although this section of the website is based on the scientific research, we have worked hard to make it easy to understand for anyone wanting to learn more about groundwater in Rocky View County. One of the highlights is the photo galleries that will allow people to see the research team in action around Rocky View County!

The Community Connections section is about how the volunteer-based groundwater monitoring network was developed. This provides community members and other municipalities with the background of the predecessor project located in West Nose Creek and information about the current County wide project. It is here that we highlight the importance of having community members willing to participate and volunteer their water wells and their time. This section of the website provides maps of West Nose Creek and Rocky View County, archived newsletters from 2005 to 2012 and videos showing how to complete water level measurements. In addition, there are links to the watershed groups located within the County borders. In the near future this section will also contain an implementation manual for other municipalities wishing to adopt the methodology of a community-based groundwater monitoring network.

The final section is the educational component of our project, which will include information for both teachers and students. This section provides resources for teachers to bring local groundwater research into their classrooms. On the Education Connections page there are four activities, which are related to the adapted research article located on the Research Connections page. These activities were developed earlier this year during interactive workshops with Dr. Hayashi, his graduate student Chris Farrow and four Calgary teachers. The activities developed include a field trip, a hands-on lab, demonstration lab and computer lab. These resources will be available online for local Grade 8 science teachers to use. The local focus of the research and the diversity of activities will assist Grade 8 students in understanding the groundwater-surface water interactions in southern Alberta. We invite you to explore the educational side of the web site, we are all learners and this is where the fun stuff is located. In fact you can check out a sample of a word search on page 4.

## Winter Work - Snow Survey

As the winter weather moves in, our research team is gearing up for snow surveys in the Spy Hill area. It may seem a bit odd that a groundwater research team would be monitoring snow; however, snowmelt is an important source of groundwater recharge. The work being completed by Chris Farrow, a graduate student studying under Dr. Hayashi, has found a relationship between the amount of snow on the ground prior to the spring snowmelt (in mid-March to early April) and the amount of groundwater recharge observed. Snowmelt in southern Alberta is unique compared to other prairie landscapes because of Chinook events. Although we get snow throughout the winter, some of it is lost to the atmosphere as the warm Chinook winds blow in throughout the season. This phenomenon is called sublimation, and it typically results in less of an overall snowpack when the spring melt occurs. The research findings suggest that it is not necessarily the total amount of snow that falls over the course of winter, but the amount of snow on the ground prior to this last melt that impacts groundwater recharge. The snow survey data help us understand how the snow accumulates and sublimates during the winter season and how much is available for the spring melt.

*“Examining the relationship between the amount of snow on the ground prior to the spring snowmelt and the amount of groundwater recharge observed”*



**Figure 1.** A) Photo of the research team taking a snow depth measurement along the transect B) Photo of the research team taking a snow sample using a snow tube.

Throughout the winter season, we conduct snow surveys along two 200-m long transects – one located in an alfalfa field and the other in a grassland pasture, where snow depth is measured every meter and several snow samples are collected to determine the density of snowpack (heavy snowpack contains more water than light, fluffy snowpack). From these data, we determine the amount of snow and how it is distributed in different parts of the landscape. The information collected during these snow surveys are then used in the groundwater model being developed to calibrate it for predicting snow melt and its relation to groundwater recharge.

## Feedback

Thank you to everyone who completed the feedback survey sent out this summer. The information we received was valuable in understanding what is working and where there could be improvements. This information was used to provide feedback to the Geomatics team who developed the Rocky View Well Watch web portal and the County. The majority of respondents used the web portal, which was great feedback for the Geomatics team. There were a few comments about the rough start to using the site, but it appears the improvements made have worked and a number of people are becoming comfortable with entering and viewing their data. However, one downside mentioned about the web portal was that it isn't very interactive. It is our hope that the development of our informative website and blog will provide an avenue for this desired interaction.

*"We are currently working on determining how we can continue this project and working with all our volunteers and the County as this pilot project comes to an end. ."*

The most common improvement request for the project was more open communication between the research group and participants. This request for more information and contact is one of the reasons we choose to write a winter newsletter to update participants about what we have been working on. We are hoping that the Groundwater Connection website and blog will assist in providing this communication about the project.

Finally, it appears a number of participants want to continue monitoring their wells beyond the end of this initial project. We are currently working on determining how we can continue this project and working with all our volunteers and the County as this pilot project comes to an end.

## Buzzing at the Cyber Summit

The development and implementation of the Rocky View Well Watch web portal has been receiving a lot of attention. The use of the technology in a practical and interactive project has been thrilling for everyone involved. Our team was invited to present the web portal on October 2<sup>nd</sup> at the Cybera Cyber Summit in Banff. The presentation focused on how the technology was developed as a tool for the Rocky View project and highlighted the struggles and successes of creating and implementing an online database. Our presentation was a chance to show how technology can be used in a practical application within Earth Science research and it was well received. The people at the conference were interested in what is happening in Rocky View County and the prospect of developing a similar project elsewhere. The thought of other municipalities implementing a groundwater monitoring project using our methodology is remarkable. The lessons we have learned from this project and the feedback provided from the participants, has allowed us to develop and refine the monitoring network procedure. It was exciting for people to see how technology is being used in a practical manner and it created quite the "buzz" around our project!

## Hydrology Terms Groundwater Connections

Y E N O I T A M I L B U S B W O D R P  
 G G C T L D W R E T Y L G B E I E L U  
 O R T R K T O K S P G R Y Q S F S K M  
 L A W W E I V Y K C O R D C I I H Q P  
 O H A P A E I S S G L C H U R G C I I  
 E C A P A S K A P O O A Q I E A S R N  
 G E L F I N F I L T R A T I O N S N G  
 W R H T I O A T O G D E H S R E T A W  
 A C U A U W S I E L Y L E I T L L M W  
 Q O W E L L W A T C H H L H R E R T E

Aquifer  
 Creek  
 Discharge  
 Geology  
 Hydrology  
 Infiltration  
 Paskapoo  
 Pumping  
 Recharge  
 Rocky View  
 Snow  
 Sublimation  
 Watershed  
 Well Watch



### Welcome Liz Munroe to the team!

Liz Munroe is a new graduate student who will be participating in the Rocky View County Project. She recently moved to Calgary from Vancouver where she was working for the past 5 years as a Project Engineer on industrial water treatment processes. Liz obtained an undergraduate degree in Civil Engineering from McGill and is currently working on her Masters of Science in Hydrogeology under Dr. Masaki Hayashi's supervision. Liz is very excited about the community focus of the project, which is ultimately why she chose a new career path in hydrogeology. Her main interest lies in the sustainable development of groundwater development as it pertains to communities and local ecosystems.

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