



# Welcome

From Howard Wheeler

GIWS marked its third anniversary this past World Water Day on March 22. We are making progress on many fronts – our first research report, released in January, and our two-day workshop in February, showed the wide range of exciting research that’s ongoing. Most recently, we had another impressive showing at the May Canadian Geophysical Union meeting in Banff, Alberta. It’s very pleasing to see our students being recognized by numerous scholarships, and many congratulations to Phil Marsh for the well-deserved award of the CGU J. Tuzo Wilson Medal.

I would also like to say how pleased I am that Karsten Liber has been awarded a University of Saskatchewan Distinguished Professorship. Apart from his many significant research contributions, Karsten played a key role in the conception and launch of the Canada Excellence Research Chair in Water Security program.

As GIWS matures, we have been able to expand the scope of our work and research themes. Due to U of S strength and capacity in the health sciences, toxicology and public health, a new theme of Water and Health has been added. This theme explores drinking water quality and sanitation issues critical to society, particularly for rural and First Nations communities. We are also developing a Water and Wastewater Treatment Technologies theme.

Our final new theme includes turning our attention from surface water issues to look more deeply into the subsurface. This March we released a report titled *Groundwater, Hydrogeology and Sustainability in Saskatchewan*, written by Denis Peach, retired Chief Scientist of the British Geological Survey, and based on extensive consultations with government, industry and academic sectors in Saskatchewan.



*Masters student Noel Galuschik surveys bank erosion from a culvert in Manitoba. This field work is part of our Tobacco Creek research project profiled on page 2. Photo by Raea Gooding.*

Specific recommendations of the groundwater report included auditing and coordinating the currently fragmented groundwater science base, developing new research and assessment guidelines to ensure sustainable development practices, and creating training opportunities to meet the growing need for expertise in groundwater management. An advisory panel has been struck and members will be meeting this June to determine next steps.

As always, it’s a pleasure to welcome many new faces to our institute. Over the summer there will be a number of overseas visiting students and scholars working with us. We look forward to a summer of learning, networking and new discoveries.



Regards,  
Howard Wheeler  
*Canada Excellence Research Chair in Water Security  
Director, Global Institute for Water Security*



# Research spotlight on Tobacco Creek

The Tobacco Creek Model Watershed is located in south-central Manitoba and is an important site for GIWS researchers studying the effects of agricultural Beneficial Management Practices (BMPs) on hydrology and biogeochemical cycles. BMPs are used to reduce nutrient loads to sensitive aquatic ecosystems and mitigate the effects of flood and drought. But, despite widespread application, there remains little information on their effectiveness.

“Tobacco Creek is one of the most data-rich watersheds in Canada, where more than 20 years of research has been targeted to understanding the effectiveness of several BMPs,” explains Helen Baulch, research lead. “This long history has been incredibly valuable for our research into understanding the nutrients and hydrology of the watershed and is helping us develop potential solutions to eutrophication problems in Lake Winnipeg and beyond.”

Postdoctoral fellow Taufique Mahmood and masters student Jennifer Roste are modelling the hydrology of the creek and developing new tools to understand nutrient export and its controls. So far, Mahmood’s work suggests that field stubble height is an important determinant of snowpack and spring streamflow. He’s also shown that although the small dams that farmers construct throughout the watershed do reduce peak flows, the impact is fairly small in flood years.



*Taufique Mahmood and Jennifer Roste collect samples at Tobacco Creek. Photo taken by Helen Baulch.*



*Masters student Raea Gooding measures water quality parameters of a reservoir in Manitoba. Photo taken by Noel Galuschik.*

Also part of the research team are masters students Raea Gooding and Noel Galuschik. They completed an extensive field program to understand nutrient dynamics within Tobacco Creek’s tributaries and ask the question: ‘Do sediments alter stream nutrient concentrations and will this interaction yield a net benefit to water quality?’.

Final results aren’t expected until later this year, but Gooding’s work suggests that streams and dams are important sites of permanent nitrogen removal, with dams in particular having a high capacity to retain nitrogen, which will help improve water quality. Unfortunately, both dams and streams are susceptible to nitrogen saturation. Galuschik’s work shows that stream and dam sediments often have the capacity to absorb phosphorus from the water column. She is looking into identifying important sites for phosphorus retention and why these may change over a season.

This research is funded by the Canadian Water Network with GIWS members and students working in collaboration with Tobacco Creek Model Watershed and Environment Canada researchers. Local community members, farmers, government officials and other stakeholders are kept informed of research findings and offered the opportunity to voice their opinions, suggestions or concerns.



# New faces to GIWS



## **Jaivime Evaristo, PhD student**

Jaivime completed his MSc in applied geosciences with a major in hydrogeology from the University of Pennsylvania. He is working with supervisor Jeff McDonnell on stable isotope ecohydrology and plant-water interactions. He is pleased with the opportunities GIWS provides for trans-disciplinary and collaborative international work.



## **Alyssa Scott, research assistant**

Alyssa recently graduated with a BA & Sc in environment and society from the U of S. She has been working with the socio-hydrology research team since October 2013 on the project *Facilitated Empathy for Water Security in the Saskatchewan River Basin*. She chose to be part of GIWS to enhance her understanding of water issues.



## **Patricia Pernica, PDF**

Patricia holds a PhD in physics from the University of Toronto and a MSc in mechanical engineering from the University of Alberta. Under the supervision of Howard Wheater and Murray MacKay for the Changing Cold Regions Network, she is developing a physical lake model for use within a regional climate model. For her, GIWS offers the opportunity to collaborate with experts from various fields and integrate limnological research within a larger regional context.



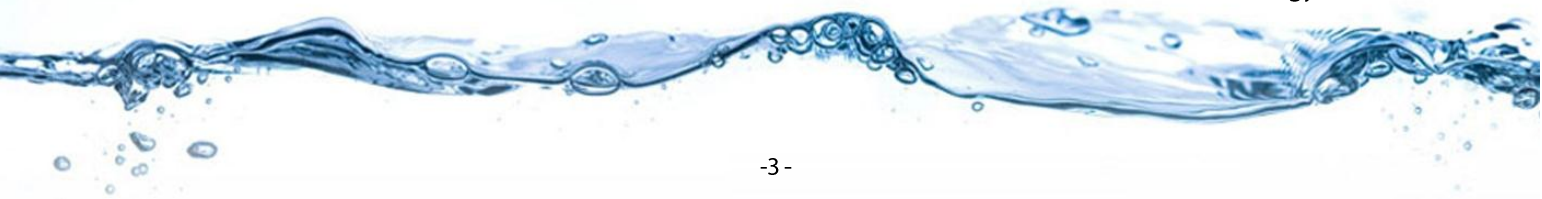
## **Jay Bauer, lab technician**

Jay joined the GIWS team as the lab technician for Helen Baulch in April. He received his BSc in environmental earth science from the U of S and is looking forward to working as a field technician with graduate students in his new role.



## **Lucia Fuenzalida Scaff, PhD student**

Lucia joined GIWS in April from Chile where she was working in engineering consulting. She holds a degree in civil engineering and a masters in meteorology and climatology. She is working on her PhD in environment and sustainability with Yanping Li and is pleased to have found a place to conduct research that joins her two interest areas: water resources and meteorology.



# Downstream drama



Downstream actors: Jesse Fulcher Gagnon, Kelly McTaggart, Andrea Folster and Lauren Younghusband. Photo by Meagan Hinther.

It doesn't get any more interdisciplinary than this: a collaboration between GIWS and the U of S Department of Drama is demonstrating how fine arts can be used to communicate water research results in an engaging and interactive way.

As part of the socio-hydrology research theme, GIWS toured a play throughout Saskatchewan and Alberta February 17 – 24. The production, titled *Downstream*, was developed with the Department of Drama and the School of Environment and Sustainability (SENS). The piece built on a series of workshops held in 2012 that used multiple social science methods to gather views on water security from those working in or with an interest in water stewardship.

"*Downstream* is an innovative way to convey research knowledge and get people to consider how they might use that knowledge," said Graham Strickert, a research associate with GIWS and the Changing Cold Regions Network, and project lead. "The play used a style called forum theatre that invited audience members to make decisions as the story progressed. For example, should authorities breach a levee and flood land to save a community downstream? Who bears the consequences of decisions made upstream?"

The play was written by U of S playwright-in-residence, Kenneth T. Williams and directed by Natasha Martina, associate professor (Drama). Major funding was provided by the Social Sciences and Humanities Research Council (SSHRC) Connection Grant.

*Downstream* took a slightly satirical look at how water management plans are created using statements, feedback and observations gathered from workshop participants. Following the performance, audience members were invited to give feedback about research results and also the drama production as a communications format. The cast was comprised entirely of student actors from the Department of Drama.

The research team is analysing the audience flood mitigation choices and focus group results and preparing their final report. Strickert says next steps involve looking for interested partners and funding sources to develop a 'blueprint' that could be used to mobilize research knowledge through the performing arts for a variety of disciplines.

"*Downstream* is a really novel collaboration, and the whole production would not have been possible without the hard work and dedication of the Department of Drama, which met some seemingly impossible timelines to make this a reality," said Strickert.

"The fine arts present a huge opportunity to mobilize research results. We're finding that the play was a really effective way to prime our focus groups and get people talking about the core issues of water governance."

## Downstream Project Team:

Principle Investigator: Graham Strickert

Co-Applicant: Natasha Martina, Department of Drama,  
Director of *Downstream*

Collaborator: Douglas Clark, SENS

Partner (in-kind donations): Gregory Marion,  
Department of Drama (Greystone Theater)

Project Coordinator: Lori Bradford, SENS

Assistant Director: Christopher Donlevy

Sound Design: Kody Manson

Stage Manager: Jillian Borrowman

Actors: Kashtin Moen, Jenna Berenbaum, Lauren Younghusband, Kelly McTaggart, Phil Munson, Jesse Fulcher Gagnon, Andrea Folster

Design, set and costume team: Carla Orosz, Iain Rose,  
Beverley Kobelsky



# Member Awards and Accolades

## SK Innovation and Opportunity Scholarships

- Elmira Hassanzadeh
- Kathryn Dompierre
- Chris Marsh
- Amir Sadeghian
- Elvis Zilefac
- Edward Bam
- Hamideh Safa
- Jaivime Evaristo
- Badrul Masud

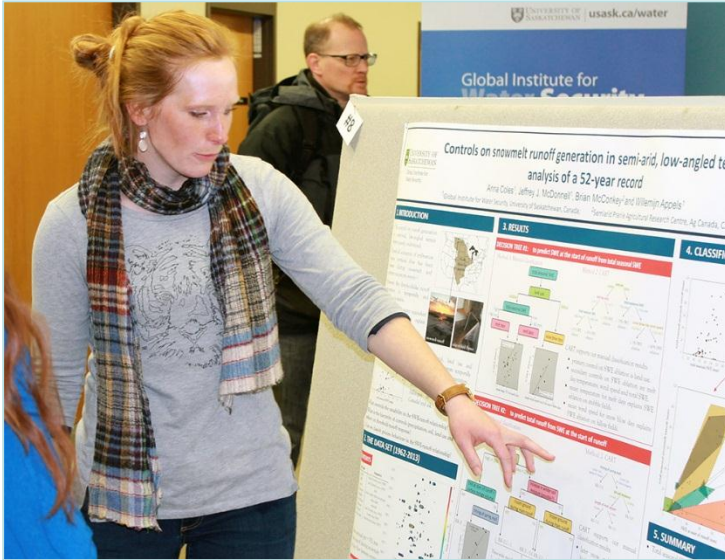
## NSERC Alexander Graham Bell Scholarships

- Dan Karren
- Chris Marsh
- Kabir Rasouli

**Karsten Liber was awarded a U of S Distinguished Professorship, effective July 1<sup>st</sup>.**

## Awards from the Canadian Geophysical Union/Canadian Society for Soil Science Joint Meeting, May 4-7

- Xiaoyue Wang won the 1<sup>st</sup> prize President's Award in the CSSS student poster competition
- Chris Marsh received the CGU Stan Paterson Scholarship in Glaciology
- Phil Marsh won the CGU J. Tuzo Wilson Medal



Anna Coles, PhD candidate presents her winning poster at the GIWS-CWRA World Water Day event, March 21.

## World Water Day 2014

On March 21, GIWS and the Canadian Water Resources Association celebrated World Water Day with an event showcasing student, postdoctoral and young professional research. The afternoon began with the *Water Leaders of Tomorrow Lecture Series* and concluded with a student and postdoctoral fellow poster competition. Congratulations to the winners:

- **Top postdoctoral fellow poster:** Willemijn Appels, School of Environment and Sustainability (SENS), *Ask me about spatial patterns of groundwater recharge*
- **1st place, student poster:** Anna Coles, SENS, *Controls on snowmelt runoff generation in semi-arid, low-angled terrain: analysis of a 52 year record.*
- **2nd place, student poster:** Stephanie Schiffer, Toxicology Centre, *Acute and chronic toxicity of aqueous vanadium to model and field-collected planktonic and benthic invertebrates.*
- **3rd place, student poster:** Iain Phillips, Department of Biology, *Development of aquatic ecosystem health stewardship tools for the Northern Great Plains based on empirical models of benthic macroinvertebrate community structure.*

## Mark your calendars Wednesdays, September 10 – November 19, 2014

The GIWS *Breakthroughs in Water Security Research: Distinguished Lecture Series* is back for a second year. This dynamic series begins on September 10 with a seminar by Jim Kirchner from ETH Zurich. The series features a different world-renowned researcher each week for the fall term and is part of a class taught by GIWS associate director, Jeffrey McDonnell. Please refer to our website for the complete list of presenters, dates, locations and times. Lectures are free and open to the public.



Henry Mackay (left) and Karl-Erich Lindenschmidt (right) conduct an ice survey along the Slave River. Photo supplied by Jay Sagin.

## Community engagement at Fort Resolution, NWT

Contributed by Karl-Erich Lindenschmidt, GIWS member and associate professor, School of Environment and Sustainability

“As part of the Slave Watershed Environmental Effects Program (SWEEP), Lorne Doig, Jay Sagin and I visited Fort Resolution from January 31 to February 4, 2014. Guided by Henry MacKay from the hamlet’s Métis Council, Jay and I carried out ice surveys along the main stem of the Slave river within the delta. The data will be used to show ice types along the river’s ice cover and verify RADARSAT-2 satellite imagery.

After the ice survey work was completed, I taught a class on river ice processes to the high school students at Fort Resolution’s school. Lorne engaged the students in aquatic ecotoxicology. He brought equipment allowing the students to classify aquatic invertebrates sampled from the Slave river and providing a basis for them to make an assessment of the river’s water quality. Studying the hydrological/ice regime (led by myself), aquatic ecotoxicology (led by Lorne), wildlife (led by Tim Jardine) and fish toxicology (led by Paul Jones) in the context of both Traditional Knowledge and Western Science (mediated by Lalita Bharadwaj) is part of SWEEP’s mandate to develop a long-term community-based monitoring program along the Slave River.”



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Do you have a story, news item or event you’d like to see profiled in an upcoming issue? If so, please send your contribution to Meagan Hinthier, Communications Specialist: [meagan.hinthier@usask.ca](mailto:meagan.hinthier@usask.ca).



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