



Welcome

FROM HOWARD WHEATER

Spring has been a busy time for the Global Institute for Water Security (GIWS). Our research programs are moving forward, and we continue to welcome new people to the institute almost every week.

World Water Day, March 22, marked the one year anniversary of the launch of GIWS and was a time to pause and reflect on our accomplishments over the past year. Highlights of our research and events are presented in this edition of *Water News*, as well as profiles of students recently brought on board by member faculty.

We have expanded our research program into Tobacco Creek, Manitoba and recently took over the management of a world-class Boreal Forest monitoring program – a key resource providing near real-time data on land – atmosphere interactions for climate scientists around the world. We also held a series of workshops throughout Saskatchewan and Alberta, talking with people about their water management concerns and ideas.

Water security is a diverse field which builds on many disciplines and offers many opportunities for collaboration. I invite those interested in water security to visit our website to learn more about the institute's work, and to get in touch with us. We are always keen to expand our network and discuss how your research expertise and interests may compliment the work that we do.



Regards,

Howard Wheeler

Canada Excellence Research Chair in Water Security

*Director,
Global Institute for Water Security*



Clockwise from left to right: Howard Wheeler, Karl-Erich Lindenschmidt, graduate student Chance Prestie, visiting researcher Steve Chapra and Jeff Hudson explore Lake Diefenbaker, May 3, 2012. See story on page four. Photo courtesy of graduate student Jess Johansson.

GIWS membership

To continue building the GIWS community, the institute launched its membership program this past February. Founding memberships were extended to those contributing to research groups over the past year and a half. All have been instrumental to building GIWS and advancing our work throughout the Saskatchewan River Basin.

To date, over 70 faculty, scientists, post-doctoral fellows and students have joined the institute. Membership brings with it the benefit of enhanced national and international visibility, potential for collaboration locally, nationally and internationally, and invitations to participate in a range of specialist and general interest activities hosted by the institute. Membership also grants access to communications initiatives related to ongoing events, activities and opportunities associated with GIWS.

To find out more about our membership offerings and the application process, visit www.usask.ca/water.

Science in Society: Starting the water conversation

People and water are deeply connected. Water is needed for drinking, for maintaining good hygiene and health, for energy and food production, and industrial development. People crave being near water and often build summer vacation plans around a stay at a lake. Water is essential to every aspect of life – whether one is conscious of it or not.

Recognizing this link, an interdisciplinary team of GIWS members were successful in securing a University of Saskatchewan (U of S) *Science in Society* award to host a series of workshops examining how those engaged in the management of water across the prairies define water security in the Saskatchewan River Basin. The workshops are the first step in developing the socio-hydrology research theme at GIWS and connecting people to water science.

The workshops took place in Canmore and Medicine Hat, Alberta, and in Saskatoon throughout March. One more workshop is scheduled later this year for Cumberland House in the Saskatchewan River Delta.

“The Saskatchewan River Basin has a population of over 3 million people and is a complex human-environmental system,” says Graham Strickert, socio-hydrology post-doctoral fellow with the School of Environment and Sustainability, “Often water resources are the most stressed by social factors. These workshops are a way to begin cultivating an understanding about people’s perceptions of those stresses, and how they define water security in the basin.”



Workshop locations Canmore (left), Saskatoon (middle) and Medicine Hat. Top right: Graham Strickert debriefs workshop participants in Canmore. Opposite: Medicine Hat participants map out their depictions of water security in the river basin.



Each workshop followed the same format and took participants through several exercises to gather information about their thoughts and experiences regarding governance, resource stresses, policy and other perceived opportunities for, and threats to, current and future water security in the Saskatchewan River Basin.

“We used a variety of social science research methodologies throughout the workshop, like focus groups, mind-maps and statement sorting exercises. This helped keep participants engaged throughout the day and also provided us with very rich data to analyze,” explains Strickert.

“We were also interested in hearing which natural science and social science questions people want explored for the river basin. The data gathered from these conversations will help feed into the types of scientific questions GIWS researchers should be examining, and help us understand water security on the Prairies.”

Science in Society awards are granted by the U of S Office of the Vice-President Research for projects that investigate the roots of societal perceptions and understandings of science.



Building a talented team

As GIWS research projects continue to develop, the institute is in need of student and post-doctoral expertise to train with our member faculty and conduct interdisciplinary research. The institute spent the winter recruiting summer students, graduate students and post-doctoral fellows to fill a number of field research and modelling posts and studentships. We now have 56 graduate students, undergraduate summer students and post-doctoral fellows funded through the institute.

Below are the profiles of a few of the students we welcomed recently. Each newsletter will feature student profiles and research.



Rosa Brannen **Graduate student**

Rosa joined the institute on May 1 to conduct research at the St. Denis National Wildlife Area under the co-supervision of Andrew Ireson and Chris Spence, Environment Canada. She is examining the relative roles of surface and subsurface storage in controlling streamflow response at catchment scales and working towards her Master of Environment and Sustainability. Rosa recently completed her Bachelor of Science in geography at the U of S.

Diana Payton **Graduate student**

Diana joined the institute on January 17 under the supervision of Patricia Gober. She is working towards her Master of Public Policy at the Johnson-Shoyama Graduate School of Public Policy. Her research is part of the socio-hydrology theme and Science in Society project and focuses on the commoditization of water in the Saskatchewan River Basin. Diana obtained her Bachelor of Arts in Early Modern Studies and Classics from King's College and Dalhousie University in Halifax.



Raea Gooding **Research assistant and** **graduate student**

Raea joined the institute this winter to assist with Swift Current Creek and Tobacco Creek research. Starting in the fall, she will begin her Master of Environment and Sustainability with Helen Baulch. Her graduate research will focus on water quality indicators in Tobacco Creek, Manitoba where local farmers are using beneficial management practices to see if this is having an effect on the nutrients entering the watershed. Raea holds a Bachelor of Science in Agriculture from the U of S.



Jennifer Roste, P.Eng **Graduate student**

Jennifer joined the institute on May 1 as a masters student working with John Pomeroy and Howard Wheeler. Jennifer holds a Bachelor of Engineering from the U of S and has worked in consulting and government in the field of water and wastewater treatment. Her thesis will focus on hydrological modelling and agricultural land management in prairie landscapes.

"I am honoured to be part of an esteemed group that is focusing its efforts on work of such importance as water quality and water security."

-Raea Gooding, School of Environment and Sustainability graduate student under assistant professor Helen Baulch, beginning Fall 2012



Water quality modelling expert visits GIWS



Steve Chapra, professor and Berger Chair in Civil & Environmental Engineering at Tufts University, visited GIWS May 3 & 4 to tour Lake Diefenbaker, host a seminar and discuss potential research collaborations. Chapra is a highly sought-after expert on applied numerical methods and water

quality modelling. His research has been used in a number of decision-making contexts, including the 1978 Great Lakes Water Quality Agreement, which led to reduced phosphorus loads and marked water quality improvements in the Great Lakes.

Chapra's seminar, titled *Rubbish, Stink and Death* provided an engaging account of the history and evolution of water quality management and modelling – from the first sewer systems installed in plague-ridden London in the mid-19th century to the complex integration of epidemiology, hydrology and mathematics to create modelling tools used today.

“The words rubbish, stink and death are used to illustrate why we care about water quality – we don't want our water polluted by garbage, or for it to smell poorly, or for it to cause us illness,” says Chapra. “There was an evolution in sanitary engineering over time - first due to aesthetic reasons, then due to a recognition that poor ecosystem health was related to odour, followed by a realisation of the direct connection between water-borne diseases and poor public health.”

Now, models are a key tool used by engineers to protect water quality. Chapra explains that models are a powerful management tool when they give the big picture of an ecosystem – for example, the biology, chemistry and physics of a system are brought together and scenarios explored through the mathematical model.

“Long term data sets are critically important when developing and testing models,” cautions Chapra. “Without them, creating accurate and useful models becomes even more challenging.”

Chapra will be working with Howard Wheeler and Karl-Erich Lindenschmidt on water quality modelling for Lake Diefenbaker – a key GIWS research program and a treasured Prairie ecosystem.



Student and post-doc team beats the heat

On March 2, a multidisciplinary team of students and post-doctoral fellows from the School of Environment and Sustainability (SENS) and GIWS beat out teams from universities across the prairies to take home top prize at the Agriculture and Agri-Food Canada (AAFC) Invitational Drought Tournament held in Saskatoon.

Teams from the U of S, University of Alberta, University of Manitoba and University of Regina were invited by AAFC to test out a new planning tool designed to help prepare the Canadian prairies for future extreme climate events like drought. Teams were given a budget and guided through a three year drought scenario recreated from a 17th century drought. The goal of the game was to maximize economic potential during the drought, minimize social stress and improve environmental conditions.

The U of S drought team members were Jania Chilima, PhD student, SENS; Alana Debusschere, masters student, College of Agriculture and Bioresources; and post-doctoral fellows Merle Massie, Uri Nachson and Sun Chun, SENS, and Ali Nazemi, College of Engineering. Andrew Ireson, assistant professor, SENS, was there as team coach.

The team's winning strategies included hosting a rain dance to increase community engagement; creating a drought-stress telephone line; installing solar power to stimulate the economy and mitigate energy shortages due to reduced hydro capacity, and recycling waste water for agriculture use.

Upcoming events and important dates

The National Hydrology Research Centre Seminar Series, presented in partnership with Environment Canada, is taking a break for the summer and will resume in September.

June 5 - 8, Canadian Geophysical Union/Canadian Water Resources Association National Conference, Banff, Alberta. GIWS presenters include:

- Howard Wheeler, Jeff McDonnell, Uri Nachson, Sun Chun, Muluneh Mckonnen

July 15 – 19, Pacific Northwest Economic Region Annual Summit, Saskatoon. A portion of this year's PNWER summit will focus on water policy.

For up-to-date event listings and more information, we encourage you to visit www.usask.ca/water regularly. Event listings are updated on a weekly basis.

New faces at GIWS

- **Kristen Bruce**, graduate student, Master of Public Policy
- **Meghan Carr**, graduate student, Master of Environment and Sustainability
- **Ryan Davies**, summer student, Imperial College London
- **Alex Horton**, summer student, Imperial College London
- **Pablo Jaramillo Restrepo**, summer student, U of S
- **Taufique Mahmood**, post-doctoral fellow, Tobacco Creek research program
- **Amber Peterson**, research assistant, Brightwater Creek research program
- **Lindsay Todman**, summer student, Imperial College London
- **Iлона Vashchyshyn**, summer student, U of S

Winter Water News Update: *Laxmi Sushama, profiled in the Winter newsletter, remained in her faculty position at the Université de Québec à Montréal. GIWS is currently searching for a faculty member to fill a post in Hydrometeorology and Climate Science. Visit our website for application criteria and details.*



Aerial photos of the Saskatchewan River Delta show a veined landscape intersected by river channels, lakes and wetlands.

Understanding a vital North American ecosystem

A team of GIWS members and associate members are examining the link between water, animals and people in the Saskatchewan River Delta to provide a tool that will show the social and economic impacts of changing water flows in the region. The research is largely funded by GIWS.

“This interdisciplinary approach to water science and management will produce information needed to understand upstream effects on a remote downstream community and the ecosystem that serves it,” says research lead and GIWS member, Tim Jardine.

The Saskatchewan River Delta spans the Manitoba and Saskatchewan border and is one of the most biologically diverse habitats in Canada with an abundance of fish, waterfowl and game. Over 15,000 people live in the region – the majority in First Nations communities – and many rely on hunting, trapping and fishing for their livelihoods.

The region represents the culmination of water diverted and used in the Saskatchewan River Basin. Annual flows have decreased by around 30% since the turn of the last century, partly due to dams such as Gardiner and E.B. Campbell holding back water.

“Our research will help communities in the delta understand how climate change and water resource development may affect the local habitat and plan for ways to ease the impact to their livelihoods,” says Jardine.

The first steps in establishing the research program began recently during a visit to Cumberland House by members of the research team.

