People and water: a dynamic relationship

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The boat braided a froth wake as it coursed through the intertwining channels of the Saskatchewan River delta. One of the largest freshwater deltas in North America, it sits at the exit point of the Saskatchewan River, straddling Saskatchewan and Manitoba.

Our local guide and delta champion, Gary Carrière, offered running commentary—a blend of history, ecology, politics, hydrology and memory. Here, he pointed, is a good fishing spot, where the lake and the river bleed into each other. There is Steamboat Channel. Hudson Bay Company steamboats used to chug up and down the Saskatchewan River between Edmonton and The Pas.

Not even a canoe can get through that channel now. Change is a constant in the delta—some natural, some as a result of human decisions. Carrière, and the delta, know both.

The passion, energy, and knowledge of locals like Carrière drives a new research direction at the University of Saskatchewan's Global Institute for Water Security (GIWS)—socio-hydrology. While water research can, and often has, focused on the more traditional water sciences of climate, hydrology, toxicology and ecology, something is missing.

Graham Strickert, research associate at GIWS, explained, "It's really about trying to incorporate humans as a part of how water flows through systems.

"More than ever, humans have significant control." We use water for municipal, agricultural and industrial purposes, and manipulate environmental flow. "We have to understand the different drivers, to see what influences how and why we manage water the way we do.

"If we can understand that, we can understand better how the physical hydrology works." Connecting science with society is how Strickert and the U of S water team define socio-hydrology.

"If we only look at the physical hydrology, we only understand part of the system."

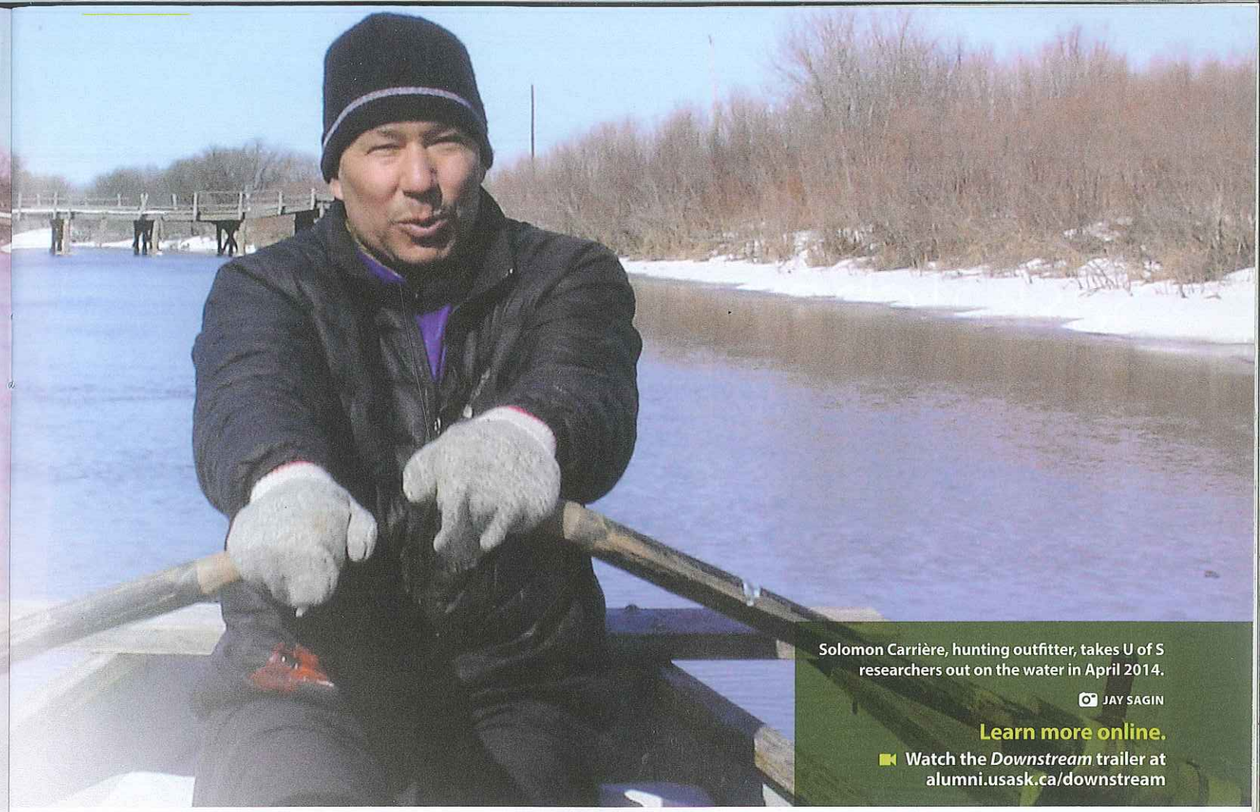
While water science remains central, socio-hydrology aims to find the values and attitudes that underpin different decisions. How do people use water? What are the values and hard lines that people draw around water? When does the science feed into policy and politics—and what else needs to be considered? Who is making the decisions, and what are decision-makers considering? When do people upstream think about the people downstream—or do they? Where do water security, sustainability and the economy intersect?

Lori Bradford, a socio-hydrology research associate with the university's School of Public Health, expands the research in a new direction: time.

"The values and attitudes of one generation help to feed into the next generation, and teach them the drivers, of how they're going to use water in the system," she said. Socio-hydrology is intergenerational.

Yet, sequencing water values through generations does not mean they are the same. "We're already seeing that the next generation is different." The next generation's values around water security and prioritizing water use points to future change, something that socio-hydrology aims to track.

Bradford also identified a major challenge around water security: communication. "Because we all have different values and attitudes, it's often hard to come to a bargaining table and make decisions about water, and to be able to put yourself in somebody else's shoes.



Solomon Carrière, hunting outfitter, takes U of S researchers out on the water in April 2014.

JAY SAGIN

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"If we, as socio-hydrologists, can come up with different ways to help with that communication, then that should help us make better decisions."

One socio-hydrology project was the live drama *Downstream*, which toured Western Canada in the spring of 2014. Using responses from a variety of people living along the Saskatchewan River basin regarding water security (collected in 2012), the socio-hydrology team partnered with the U of S Department of Drama to create a play with a bit of a satirical edge.

Interactive and deliberately stereotypical, and driven by audience participation and decision-making, Bradford said the play "tested how we can communicate better, to bring those values and attitudes to a wide audience."

The socio-hydrology team is continuing work on strengthening communication, finding common ground, and helping groups upstream and downstream really think about the others' needs.

To get there, there needs to be accurate hydrological data and a clear understanding of—and empathy with—the complex (and sometimes opposing) needs of different people and places within a water system.

Socio-hydrology was not part of the original function of the global institute, but its role and importance have been increasing, highlighted by Strickert receiving the U of S Award for Distinction in Outreach and Public Service this fall. Strickert said, "They quickly realized, at the very beginning, that we need to incorporate the human dimensions." Focusing on community-based research, the team works with people in the communities to come to a broader understanding and more workable solutions.

Strickert said that the holy grail of their research program is to help all those who make decisions about water to "make decisions that share the risk, without regret, in real time."

An ambitious goal, but, as Strickert and Bradford point out, the practical application is huge.

Students aiming for environmental management positions, as well as scientific researchers, respect and appreciate the importance of balancing science with society.

The institute, coupled with the university's School of Environment and Sustainability, is a training ground for both present and future environmental and water resources managers. "We've got really difficult trade-offs around water.

"It's more than just having the right amount of water in the right place at the right time," Strickert said. "There is a cultural shift going on in water management now to address the fact that systems have become really complex and really connected.

"What is it that will enable all these people to work across sectors? If we can figure that out, then we're on our way."

Bradford goes even further. "I feel a real satisfaction, a real duty to prepare the next generation of socio-hydrologists, I call them blended scientists, to think more broadly about water problems. We need to think beyond the technical fix."

Carrière—long used to listening to the Saskatchewan River delta tell its stories through water, through fish and birds, animals and plants, through culture, and through memory—might agree. We too need to listen, to the whole story, to both science and society, if we are to make good decisions for both present and future generations. ■