

Research News

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Lake doctor makes regular housecalls

BY SEAN MOORE
Research Promotion

If Manitoba's biggest lakes were medical patients, Lake Winnipeg would be hospitalized and in need of immediate attention, and Lake Manitoba would be advised to have regular check-ups.

That's how Delta Marsh Field Station director Gordon Goldsborough, biological sciences, views the current ecological situation facing two of the world's largest lakes. The aquatic ecologist has paid particular attention to Lake Manitoba, which has not – yet – experienced the regular, devastating algal blooms that currently afflict Lake Winnipeg.

"There's not nearly enough attention paid to Lake Manitoba," he said.

Indeed, if it weren't for Goldsborough's lab, which, since 1991, has been collecting monthly samples from Lake Manitoba's south basin (when it's not frozen), on behalf of Provincial laboratories, only feeble 1960s data would exist.

"If we learned anything from Lake Winnipeg, it would be that it should have been studied long ago so we could have a baseline to see how much it has changed," Goldsborough said.

Lake Manitoba, with its maximum depth of about seven meters, is the world's shallowest large lake, so it lacks the toxin-diluting ability of its deeper



Gordon Goldsborough monitors the health of Lake Manitoba's aquatic ecosystem.

brethren. What's more, it faces the same threats Lake Winnipeg contends with – cottage and farm developments around it and nutrient-laden rivers flowing into it.

But these threats are unfolding on a smaller, slower scale for Lake Manitoba, and that's why it hasn't shown drastic changes. However, Goldsborough notes, "that doesn't mean it won't. It will inevitably; it's just a few years in coming."

Three years ago, Goldsborough's lab began collecting samples from 16

sites on and around the lake, as well as measurements of temperature and turbidity. The preliminary results show levels of phosphorous – a driver of algal growth – and nitrogen have increased, but, surprisingly, salinity has decreased.

Technically, Lake Manitoba is not a freshwater lake. Don't think of it as a salty sea either, though. Pure water does not conduct electricity. But the saltier the water, the better it conducts. Conductivity is measured in microSiemens per centimeter

($\mu\text{S}/\text{cm}$) and freshwater begins at 500 $\mu\text{S}/\text{cm}$ and gets fresher as the number decreases. In the early 1990s Goldsborough measured 1800 $\mu\text{S}/\text{cm}$ in Lake Manitoba. In the early 2000s, it was 1400 $\mu\text{S}/\text{cm}$.

When it drops to 1000 $\mu\text{S}/\text{cm}$ it's suitable for irrigation, and there's the rub. The Portage Diversion, which diverts snowmelt from the Assiniboine River into the lake, will further lower salinity levels and consequently, Goldsborough reckons, provide an impetus to keep the water flowing so farmers can use it. But upstream, phosphorus and nitrogen compounds have leached off farmland into the river and will be carried to the lake, posing major problems for the ecosystem.

Obviously, preventing nutrients from getting into the river would be the ideal solution, and Goldsborough is working with soil scientists on this.

But even if nutrient leaching ceased today, the contaminants would linger for years. Goldsborough notes that residence time for a single water molecule in the north basin is believed to be 2 years, and in the slower churning south basin it's 20 years.

"So there is no magic bullet that you can fire and the problem is gone. It's going to require long-term changes in the way people do things. I guess the question comes down to, 'how much do you value water?'"

Showcasing undergraduate research

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Research on mosquito RNA was up against a study investigating the hemoglobin of the Mammoth at the second annual Student Poster Competition.

Over the summer months 54 undergraduate students conducted research in one of three scientific fields – applied, biological and physical – to discover facts about nature and perhaps even their passion for research, to learn about the research process, and to get a chance to win some money.

"They can really feel what it's like to be a scientist," judge and biological sciences professor David Bird said. "This helps gets students more excited about becoming a scientist because they feel a sense of accomplishment, and they get excited when people compliment them on their experimental designs."

On October 5, the research posters were reviewed by 15 judges drawn from the university community, industry and the Natural Sciences and Engineering Research Council of Canada (NSERC) Prairies Regional Office in Winnipeg. Prizes of \$500, \$300, and \$200 were awarded to the top three posters in each category.

This year's first prize winner in the applied sciences category was engineering student Martin Noel for his project, "High Strength Concrete in Prestressed Prisms: A New Concept for Reinforced Concrete."

Science student Jason Roberts took top honours in the biological sciences category for his project, "Resurrecting Functional Mammoth Hemoglobin Using Ancient DNA."

In the physical sciences category, science student Veena Agrawal won first prize for her project, "Disease Brain Tissue by Synchrotron FTIR Spectromicroscopy."

The competition, sponsored by The Office of the Vice-President (Research) and NSERC, provides opportunities for undergraduates to get exposure to, and gain an appreciation of, research.

"We host the competition to raise awareness about research in the undergraduate community and to enhance the students' learning by getting them involved," said event organizer Digvir Jayas, associate vice-president (research) at the University of Manitoba. "Holding this competition gets this message out that there is another side to being a student – you can learn in the classroom but you can

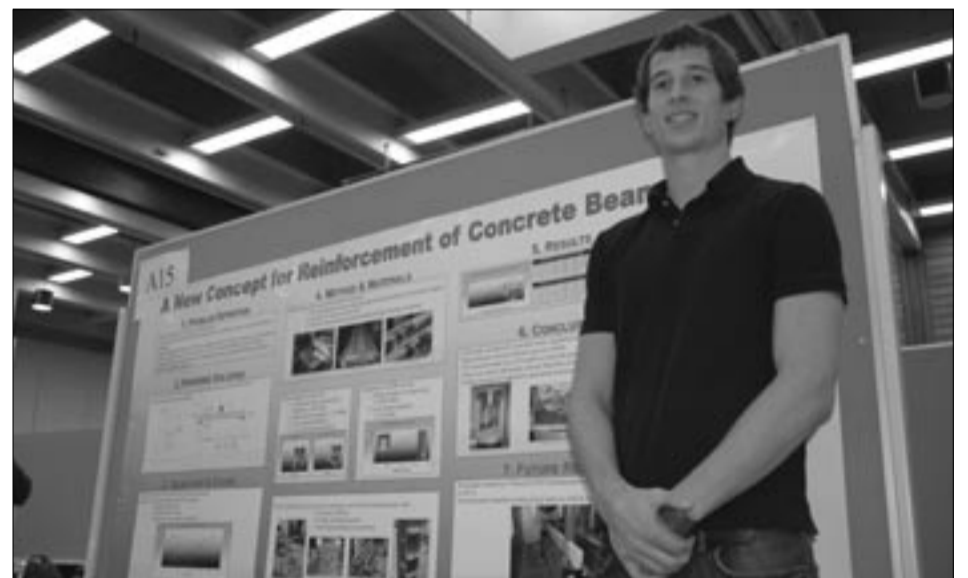


Photo by Sean Moore

Engineering student Martin Noel won first place in the Applied Science category at the second annual Undergraduate Poster Competition.

also learn by doing research."

Indeed, Noel said he enjoyed applying the theories he learned into a tangible and practical application.

"I definitely recommend research to anyone who is interested," he said. "I'm planning to keep doing it. Doing research as an undergrad is probably the best way to figure out if it's something you want to pursue after you graduate."

This was the second time University of Manitoba undergraduate research assistants were invited to present their NSERC-funded projects. The annual event provides an opportunity for members of the university community, industry and the general public to see the relevance, value and outstanding caliber of research being conducted by our undergraduates.

Bringing Research To Life

Research News is Published
by the Office of the Vice-President (Research)
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