

MINNE GRAM

December 2005

Conference showcases research and management issues

Over 500 people convened at the Earle Brown Heritage Center in Brooklyn Center on October 25 and 26 for the Minnesota Water 2005 and Annual Water Resources Joint Conference. This first-time joint conference brought together the 38th annual Water Resources Conference and the 11th biennial Minnesota Water conference, and featured 60 concurrent-session presentations and 25 posters. The Conference was sponsored by the Water Resources Center and the College of Continuing Education, with co-sponsorship by the Department of Civil Engineering, the Minnesota Section of the American Society of Civil Engineers, the Minnesota Sea Grant Program, and the Natural Resources Research Institute.

The conference began with the presentation of the 2005 Dave Ford Water Resources Award to Marcel Jouseau, manager of the Water Resource Assessment Section of the Metropolitan Council in St. Paul. This award is given by the Minnesota Water Resources Conference Committee to an individual who has made an outstanding contribution to the field of water resource management in Minnesota. Jouseau urged attendees to “put a great deal of passion into what you are doing to protect water resources.”

John J. Magnuson, Professor Emeritus at the University of Wisconsin Limnological Research Center, delivered the first day’s plenary address, “Changing Strategies in a Changing Climate.” Appealing to most Minnesotans’ strong sense of place, Magnuson pointed to lakes as a place for Minnesotans to perceive climate change, particularly through earlier ice-out dates and the total number of days per year with ice cover. He also noted that “over the past 50 years, the variation in the Earth’s surface temperature



Conference Chairs and TMDL Panel Members (l to r): WRC Co-Director and Minnesota Water Planning Committee Chair, Deb Swackhamer; TMDL Panel Moderator, Faye Sleeper; Panel Members, Walt Poole, Representative Dennis Ozment, and Michael Robertson; and Water Resources Planning Committee Chair, Ron Leaf.

has moved outside the envelope of the past 1000 years.” This climate change impacts water resources; in particular, Magnuson identified a dramatic statistical increase in streamflows measured at gauging stations

Conference continued on page 4

WRC receives contribution from Xcel Energy Foundation



Cheryl Miller (Continuing Education) (l) and Jim Anderson (WRC Co-Director and professor in Soil, Water, and Climate) (r) accept a \$10,000 check from the Xcel Energy Foundation from Karen Utt, a senior environmental analyst with Xcel Energy. The Foundation, encouraged by the recent WRC-sponsored forum discussing terrestrial carbon sequestration in Minnesota, made this contribution to support two upcoming carbon sequestration forums that will explore research and opportunities in greater depth. For more information on the upcoming forums, refer to pages five and seven.

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WRS boosts funding for graduate students

The Water Resources Science Graduate Program, with the assistance of College of Natural Resources (CNR) Development Officer, Jan Sickbert, has begun to develop external funding to enhance student support.

Bernice Jessen has generously committed to establish and fund the Butler & Jessen Water Resources Science Fellowship for WRS students. The gift honors Jessen's son Donald Butler, a CNR alumnus, and his wife Nancy Butler and underscores the value that the family, including her late husband Don, place on education. This fellowship, the first dedicated to WRS students, should be fully endowed by 2010 and will be matched by the University's 21st Century Graduate Fellowship Endowment.

The WRS Program has also established the WRS Travel Grant Fund to supplement graduate school support for travel grants. Consulting firms, WRS alumni, and WRS faculty are being solicited for contributions. Our first corporate contributor is Emmons and Olivier Resources, Inc., of Oakdale, Minnesota, who contributed \$500 for the Emmons and Olivier Travel Grant. Their support is greatly appreciated. WRS Ph.D. candidate Mark Green is the first recipient of this grant, which will assist his attendance at the American Geophysical Union fall meeting this December in San Francisco, California, to present a paper on the sensitivity of simulated stream water nitrogen (N) and phosphorus (P) concentrations and N:P ratios to precipitation regimes in a central Minnesota watershed. In addition Green will give a presentation on his work to Emmons and Olivier Resources staff, which includes three WRS alumnae, Marcey Westrick, Shannon Skally, and Jennifer Olson, and also Andrea Plevan, who received a minor in WRS.

To kick off faculty and alumni contributions, WRS Director of Graduate Studies, Ray Newman, pledged \$2500 to the fund, and WRS alumni and faculty have been solicited for contributions. An appeal was also sent in the mail to all alumni in early November. The aim is to establish

From the Director's Desk

"Change is the law of life. And those who look only to the past or present are certain to miss the future." - John F. Kennedy

I have had the privilege of serving as one of three Co-chairs of the Task Force that is making recommendations for the design of the new college that combines the College of Natural Resources (the WRC's home), the College of Agricultural, Food, and Environmental Sciences, and the Department of Food Science and Nutrition. We have worked intensely for the last ten weeks to develop our recommendations, and our draft report is now available for review (http://www1.umn.edu/system-wide/strategic_positioning/). We encourage your reactions and responses during the comment period which ends January 27, 2006, and our final report will be issued in early February.



We were asked to be bold, and one of our most transforming recommendations is to create an Institute of the Environment at the University of Minnesota. Our talent and activities in environmental research, education, and outreach are very rich and diverse, but have not been coordinated across the University to full advantage. Protecting and restoring our natural resources have always been a priority for the citizens of the state. We have the people, the expertise, the support, and the energy it takes to be excellent in this arena, and such an Institute would allow them to flourish and achieve this excellence.

We recommend that this Institute be System-wide, and include member faculty from each of the colleges on the Twin Cities campus as well as appropriate faculty from our other campuses. We envision that there will be a set of "core" faculty with joint appointments to the Institute, as well as flexibility for other faculty to participate occasionally as opportunities arise. We recommend that this Institute have physical space for offices and labs, so that it may serve as a gathering place for these faculty to interact and develop interdisciplinary teams. We see many positive opportunities for the WRC to work with or be part of such an Institute.

Let's hope the University reaches for the gold ring, and endorses the Institute of the Environment. The time is right to be bold.

Deb Swackhamer, WRC Co-Director

ongoing contributions and an endowment to provide five or six travel grants of up to \$500 annually that will enable students to attend and present papers at regional, national, and international professional meetings. These funds will supplement funding from the Graduate School which currently can support a similar number of students.

We encourage alumni, faculty, and friends of WRS to consider contributing to this fund. Contributions to the Water

Resources Science Travel Grant Fund should be made to the University of Minnesota Foundation. Information on how to contribute can be found on the Web at www.giving.umn.edu/giving_opps/. Be sure to specify Water Resources Science Travel Grant Fund, #7767. Sponsors who wish to develop a named travel grant should contact CNR Development Officer Jan Sickbert either by e-mail at sickb001@umn.edu, or by phone at (612) 624-3283.

Researchers in Mongolia paddle uncharted territory

by James Almendinger, St. Croix Watershed Research Station, Science Museum of Minnesota

In the 1200s, at the time of Genghis Khan, western Mongolia was a cold, stony land sparsely populated with nomadic herders. Water resources were so scarce

gists collected three groups of aquatic taxa during the 2004–05 field trips. Diatoms, a type of algae, are being surveyed by Edlund, aided by Geology graduate student

more than 60 lakes, in addition to nearly as many spring and river sites.

A typical day entailed cramming our crew of 18, all packed with their camping and research gear, into four Russian jeeps and driving an hour or so to a new lake. Even though a map may show many roads crisscrossing the study area, each “road” was simply a track across the steppe where someone else had driven before. When a track becomes too rutted to safely pass, the drivers just move over a few feet and start a new one.

Upon arrival, the “lake crew” would pump up two inflatable canoes and paddle out onto the lake to collect water, sediment, and plankton samples. Meanwhile, the “shore crew” waded the lake margin to collect their target organisms. If all went well, the team could be back on the road in about two hours and heading for a second site for that day. Spare moments and evenings were spent sorting, organizing, labeling, filtering, preserving, and packaging samples.

Examination of the collected specimens has only just begun but has already yielded a few “thrills” (likely new species) for the biologists. Water chemistry analyses have confirmed the wide range



Charles Umbanhowar (l) and Avery Shinneman (r), part of the “lake crew,” collect water and invertebrate samples from one of the expedition’s inflatable canoes.

and revered by these ancient Mongolians that the term “water” was used as a metaphor for loyalty and power. Fouling the water in any way was forbidden, and all travel hinged upon finding fresh water for the herds.

800 years later, in the summers of 2004 and 2005, an international research team traveled over 2000 miles by jeep through western Mongolia— which remains a land of nomadic herders with scarce water resources. Our National Science Foundation-funded team is assessing the region’s aquatic biodiversity and water quality and is headed up by Mark Edlund (St. Croix Watershed Research Station, Science Museum of Minnesota) and me, James Almendinger. Major participants include Len Ferrington, Jr. (Entomology), Emi Ito (Geology and Geophysics), Charles Umbanhowar (St. Olaf College), and collaborators from the Royal Belgian Institute of Natural Sciences, the National University of Mongolia, and the Mongolian Academy of Science.

The thrill of discovery—being the first to see and describe a new species—is one of the most exciting things that a biologist can experience. Our thrill-seeking biolo-

Avery Shinneman. Chironomids, the non-biting midge insects, are being assessed by Ferrington, with the help of WRS graduate student Giana Gelsey. Ostracodes, millimeter-sized crustaceans, are being studied by Ito and the Belgian crew. Ito and I are measuring the water chemistry to characterize the habitats of these organisms. Given that the water chemistries of sampled sites range from rain-water fresh to several times saltier than the ocean, and that these taxa have never been systematically collected from the region, the team expects to find a high biodiversity and a significant number of new species. Due to the tiny size of these taxa, they are generally unknown even to the local natives, so we really can be the first humans to lay eyes on the new organisms.

The core of the study area is the Valley of the Great Lakes, a large basin of internal drainage bounded on the west by the Altai Mountains and on the east by the Khangai Mountains. The team sampled



Emi Ito (l) and researchers from the Royal Belgian Institute of Natural Sciences (r) gather Ostracodes from the near-shore environment.

of habitats. And, we hope that the statistical relations between these organisms and their habitats will form the basis of practical tools to assess the health both of present ecosystems and of past environments in this far-away corner of the world.

Workshops help decrease farmers' fertilizer costs

by Les Everett, WRC

Minnesota Soil and Water Conservation Districts and County Feedlot Officers, University Extension Educators, and livestock organizations have hosted 68 Nutrient Management Workshops since 2003 in which 710 livestock and crop farmers have prepared nutrient management plans for two fields on their own farms. The farmers learn and apply the basics of nutrient management, using their own soil and manure tests, field maps, and cropping systems to develop their plans. They review the roles of spreader calibration and other best management practices, and calculate fertilizer cost savings from implementing their plans. These potential cost savings have been instrumental in motivating producers to implement their plans.

A series of pre-session, post-session, and following-year surveys indicate that the workshops have significantly

increased the number of nutrient management plans and the implementation of nutrient and manure recommended practices on the 513,000 acres managed by these producers. The pre-session survey indicated that about 60 percent of participants already were following recommended rates, calibrating manure spreaders, and keeping records, while 44 percent were taking full nutrient credit for manure. A year later, 70 percent of respondents (a 47-percent survey return rate) had completed their plans for the whole farm, either by themselves or with a consultant. Adoption of the above-listed practices had increased by about 20 percent, with a stated intention to adopt within two years by another 14 percent. Clearly, the combination of feedlot rules and "hands on" education has made a difference in nutrient management.

This will be the final winter for small-group nutrient management planning

workshops for crop and livestock producers. The project was extended into 2006 to accommodate livestock producers who are required to complete a nutrient management plan by January 2006 (operations over 300 animal units) and other farmers who wish to participate.

Local organizations and agencies that would like to host one or more workshops should contact University Extension Educator Kevin Blanchet by phone at (651) 480-7739 or email at blanc013@umn.edu soon to begin arrangements. The project provides funds to the local organizer to recruit producers and prepare them for the workshop. Kevin Blanchet, Jodi DeJong-Hughes, or another University Extension nutrient management specialists guide participants through preparation of the nutrient management plan.

Conference continued from page 1

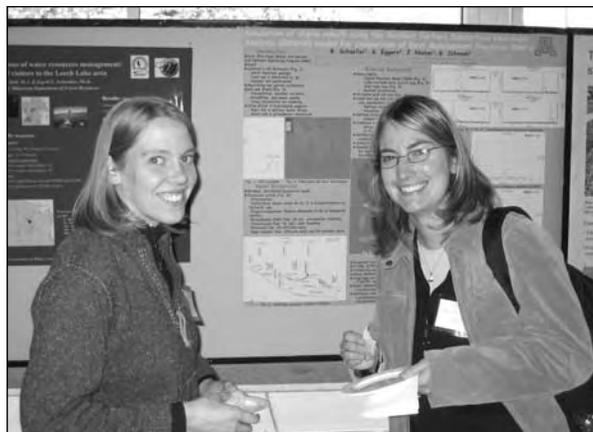
after 1970. It was suggested that perhaps climate change and land-use impacts work in tandem and are not two singular causes for change in water resources. "It is time to include climate change in water management," said Magnuson.

The morning of the second day began with a panel presentation and discussion titled "TMDLs: Impaired Waters, Impaired Process? Three Perspectives on Improving the Process." The panel consisted of Walt Poole, TMDL Project Circuit Rider at America's Clean Water Foundation, Michael Robertson, Environmental Policy Coordinator at the Minnesota Chamber of Commerce, and Representative Dennis Ozment from the Minnesota House of Representatives, and was moderated by Faye Sleeper of the Minnesota Pollution Control Agency. Each panel member enlightened the audience with his viewpoint of the TMDL process, with a common thread being the necessary involvement of local stakeholders and the money required develop TMDLs. Both Robertson and Ozment gave a close-to-home perspective on the economic issue, with Robertson detailing

the proposal for a tiered wastewater fee for Minnesota homeowners and businesses, and Ozment reassuring the audience that Minnesota is ahead of other states in directing money to local groups for TMDL

tory of the U.S. Environmental Protection Agency, titled "Everglades Restoration: A Remarkable Convergence of Science, Policy, Advocacy, and Law." He described the massive undertaking of restoring the Florida Everglades, that were hydrologically altered to turn the wetlands into farmable land, and the design of large-scale pilot restorations that will guide the entire restoration of this unique ecosystem.

Overarching the two-day event were 20 concurrent sessions, which included individual presentations ranging from "Estimating the Non-point Source Pollution Contribution of the Twin Cities Metro Area" and "Measuring the Sustainability of Water Management in the U.S." to "Impacts of Perennial Vegetation on the Hydrologic Stability and the Economic Viability in Watersheds of the Minnesota River Basin" and "Modeling Long-Term Nitrate Losses in Response to Changes in Fertilizer Application Rate and Timing." The WRC is in the process of reviewing suggestions submitted by attendees, but it appears that the joint conference format was well received.



WRS students Holly Dolliver (l) and Heather Offerman (r) peruse the posters during a break from the concurrent sessions.

development. Poole said that "TMDLs are a hopeful process and a guide for what we need to do for the future."

Conference goers were treated to a luncheon presentation the second afternoon by Thomas Fontaine, Director of the Western Ecology Division of the National Health and Environmental Effects Labora-

University student groups get dirty at Sarita clean-up

On October 7, twelve members of the Water Resources Students in Action (WRSIA) and Environmental Studies Club (ESC) joined forces to clean up the Sarita wetland on the St. Paul campus of the University. Armed with garbage bags and outfitted with boots, gloves, and even waders, the students combed the wetland for garbage, finding a car tire, a wooden pallet, and numerous balls among the commonplace bottles and cans, cigarette butts, and candy wrappers. The students even rescued a kitten from a tree. The kitten was taken to the veterinarian for a check-up and adopted by a member of the ESC.

The clean-up effort came one month after the end of the Minnesota State Fair, which takes place next-door and contributes stormwater runoff to the wetland. This stormwater runoff can carry with it many seen and unseen pollutants. The students found more than one beverage cup bearing the State Fair logo. In addition to a portion of the State Fair grounds, the entire St. Paul campus drains to the wetland.

For more information on ESC and WRSIA activities, visit the groups' Web sites at <http://groups.yahoo.com/group/ESCers/> and <http://wrs.coafes.umn.edu/WRSIA/>, respectively.

WRSIA co-leaders, Erica Schram (l) and Paul Hartzheim (r), joined other members of their group and the ESC to remove trash from the Sarita wetland. Each student removed at least one full bag of garbage.



WRC staff receives Extension Faculty award

We at the Water Resources Center are extremely proud to announce that Barbara Liukkonen has received the 2005 Dean and Director's Distinguished Extension Faculty Award. Barb's appointment is divided equally between the Water Resources Center and the Minnesota Sea Grant Program. This award is the highest honor available to Extension faculty, awarded annually to one Extension campus-based faculty member and one field-based Extension educator. Selections are made by a committee from nominations by Extension colleagues. Barb's nomination was crowded with accolades describing her excellent work and her extraordinary devotion to quality Extension programming. In his letter of support, Jim Anderson wrote, "Barb is one of the most deserving people I know for this award. She thinks, eats, sleeps, and breathes extension work. If I were to select the attributes of an ideal Extension Educator, Barb would be the model." Our warmest congratulations to Barb.

WRC forums on resources, Minnesota and beyond

During the fall season, the WRC sponsored two important forums: The Mekong-Mississippi Partnership Forum, A Meeting of Two Rivers; and Minnesota's Landscape and the Emerging Carbon Market, Terrestrial Carbon Sequestration Forum. Both forums took place at the Cargill Building on the St. Paul Campus, and were well attended.

On October 17, Dr. Jeffrey Jacobs (Senior Program Officer, Water Science and Technology Board, National Research Council) and Timothy Sullivan (President and CEO, Mississippi River Institute for Global Cooperation) spoke at the Mekong-Mississippi Partnership Forum. Jacobs talk compared and contrasted the management approaches of many of the large rivers systems of the U.S., including the Colorado, Columbia, Missouri, and Upper Mississippi Rivers. Later, Sullivan detailed similarities between the Mekong and Mississippi Rivers. He went on to explain the collaborative partnership between the WRC, Mississippi River Basin Alliance, Mississippi River Institute for Global

Cooperation, and Mekong River Commission, and how lessons learned from Mississippi River management can aid in development of the Lower Mekong River Basin.

On November 14, the first of three forums on Terrestrial Carbon Sequestration opened the door for carbon sequestration in Minnesota by discussing its economic, biophysical, and institutional aspects. This forum featured many speakers, including Aldyen Donnelly, President of Greenhouse Emissions Management Consortium, a not-for-profit Canadian corporation committed to the development of a viable market in greenhouse gas emission reduction credits. She discussed the Canadian carbon market and the many ways that Minnesota can learn from and improve upon it. Donnelly believes that Minnesota is in the position to be a leader in a U.S. carbon market. The next two carbon sequestration forums will be held on March 9 and April 20, 2006, and will focus on biophysical, and economic and institutional aspects, respectively.



U of M Water Community News

Water quality is great topic of Conversation

On February 28, 2006, WRC Co-director, Deb Swackhamer will be joined by Dr. David Schindler, Professor of Ecology at the University of Alberta, for the first installment of the 2006 Great Conversations series. The pair of water quality experts will discuss the obstacles and benefits of preserving the world's water resources in "Protecting Water Quality of Future Generations." The entire Great Conversation series will be held at the Ted Mann Concert Hall on the West Bank campus of the University of Minnesota. For more information, visit the Great Conversations Web site at www.cce.umn.edu/conversations/.

Jim Anderson (WRC and Soil, Water, and Climate) was awarded a grant from the Board of Water and Soil Resources for a study on public drainage ditch buffer strips. The study includes a literature review on the use, maintenance, and benefits of buffer strips.

E. Calvin Alexander, Jr. (Geology and Geophysics) presented at the Tenth Multidisciplinary Conference on Sinkholes and the Engineering and Environmental Impacts of Karst in San Antonio on September 26. He also chaired two sessions and was co-editor of an ASCE publication. He was co-convenor of two sessions at the Geological Society of America Annual Meeting and Exposition in Salt Lake City on October 18.

Larry Baker (WRC) and **Johanna Schussler** (WRS alumna) presented at the North American Lake Management Society. The conference was held in Madison, Wisconsin, November 9–11.

Jim Cotner, **Claudia Neuhauser** (Ecology, Evolution, and Behavior), and **Tim LaPara** (Civil Engineering) received a National Science Foundation grant to examine microbial diversity and nutrient cycling in lakes. Cotner also received two Initiative for Renewable Energy and the Environment grants.

Melinda Erickson (WRS alumna) and **Randal Barnes** (Civil Engineering) had an article accepted by Applied Geochemistry. Erickson also presented at the Minnesota Ground Water Association's 2005 Fall Conference, held in St. Paul on November 17.

Barbara Liukkonen presented a poster at the National NPS and Stormwater Education Conference in Chicago, October 17–20 titled "Building the Capacity of Volunteer Monitoring for *E. coli* in the Upper Midwest."

Kris McNeill (Chemistry) and **Jim Cotner** (Ecology, Evolution, and Behavior) were awarded a grant from the National Science Foundation for their singlet-oxygen project.

Hans-Olaf Pfannkuch (Geology and Geophysics) was the guest of honor at the Geological Society of America Annual Meeting and Exposition. During the Hydrogeology Section luncheon, Pfannkuch gave the citation address for the O.E. Meinzer award to his Ph.D. advisee, Don Siegel.

Brennon Schaefer (WRS) delivered a presentation at the 13th National Nonpoint Source Monitoring workshop held September 18–22 in Raleigh, North Carolina. He also presented a poster at the Minnesota Water 2005 and Annual Water Resources Joint Conference.

Matt Simcik (Environmental Health Sciences) had a paper published in Environmental Science and Technology. The research that led to the paper was partially funded by the WRC.

Congratulations to the **Minnesota Sea Grant Program** on their 30th anniversary.

Deb Swackhamer (WRC and Environmental Health Sciences) was named the Regional Director of the Great Lakes-Upper Mississippi River Region of the National Water Research Institutes.

University of Minnesota Water Resources Science Program Degree Recipients

Adam Birr received his Ph.D. in October 2005. His thesis was titled "Paired Watershed Studies for Nutrient Reductions in the Minnesota River Basin." Birr was advised by **David Mulla** (Soil, Water, and Climate).

Vinay Nangia received his Ph.D. in October 2005. The title of his thesis was "Field- and Watershed-Scale Evaluation of Water Quality Trends Due to Changes in Landscape and Management Practices." Nangia was advised by **David Mulla** (Soil, Water, and Climate).

Kari Rolf received her M.S. in October 2005. Her thesis was titled "Evaluation of Alternative Versus Conventional Farming Systems Impacts on Subsurface Drainage Flow and Water Quality." Rolf was co-advised by **Jeffrey Stroock** and **David Mulla** (Soil, Water, and Climate).

She was an invited speaker and participant in a workshop sponsored by the European Union on persistent organic pollutants held in Stresa, Italy, October 17–20. She also has a paper in press in Environmental Science and Technology with co-authors **Matt Hudson** (WRS alumnus) and **Jim Cotner** (Ecology, Evolution, and Behavior).

The **Volunteer Stream Monitoring Project** 2005 River Summit was a great success. On November 17, at the Science Museum of Minnesota, over 200 high school students, educators, and natural resource professionals listened to a keynote from Daniel Huff (Friends of the Mississippi River) and attended breakout sessions in which all students presented results of their stream monitoring work and participated in a group activity to determine how to invest funds in protecting or restoring local streams.



Upcoming Events

March 8–9, 2006. **Environmental Credits Generated Through Land-Use Changes: Challenges and Approaches.** Baltimore, Maryland. The workshop will be used to study and discuss the challenges that arise when market-based mechanisms are used to encourage changes in practices on the land in order to achieve environmental goals. The primary focus will be on carbon sequestration and nutrient run-off reductions. A main goal of the workshop is to bring together those facing such issues in both greenhouse gas/carbon sequestration and water quality settings to learn from each other about approaches that might be taken to overcome these challenges. Additional information is available at www.envtn.org/LBcreditsworkshop/.

March 9, 2006. **Minnesota Terrestrial Carbon Sequestration Forum.** University of Minnesota, St. Paul, Minnesota. This second of three forums will examine in depth the biophysical aspects of terrestrial carbon sequestration in Minnesota. For more information, visit the WRC Web site at <http://wrc.coafes.umn.edu/>.

April 20, 2006. **Minnesota Terrestrial Carbon Sequestration Forum.** Room 105, Cargill Building (tent.), University of Minnesota, St. Paul, Minnesota. This third forum in the series will examine the economic and institutional aspects of terrestrial carbon sequestration and

carbon markets as they are currently operating and explore the implications for carbon trading in Minnesota. For more information, visit the WRC Web site at <http://wrc.coafes.umn.edu/>.

May 22–26, 2006. **49th Annual Conference on Great Lakes Research.** University of Windsor, Windsor, Ontario. The International Association for Great Lakes Research is pleased to announce this conference. The conference theme is “Great Lakes in a Changing Environment.” It will address the many aspects of change occurring within the Great Lakes. More than 400 talks, featuring scientific sessions and plenary speakers, are anticipated. For more information, visit the conference Web site at www.iaglr.org/conference/2006/.

June 25–28, 2006. **International Conference on Rivers and Civilization: Multidisciplinary Perspectives on Major River Basins.** La Crosse, Wisconsin. This conference is hosted and presented by the University of Wisconsin-La Crosse and the National Mississippi River Museum & Aquarium. This is the third in a series of international conferences on large river basins. This conference, which has been endorsed by the Smithsonian Institution, is targeted for a multidisciplinary audience from the sciences, arts, and humanities, as well as other groups who manage and use riverine resources. Headlining the conference will be Jared Diamond,

winner of a Pulitzer Prize. Several other internationally renowned scholars will also be featured. For additional information, visit the conference Web site at www.rivers2006.org/.

June 25–29, 2006. **Tenth International Paleolimnology Symposium.** Harbor Side Convention Center, Duluth, Minnesota. The meeting theme is “Past Ecosystem Processes and Human-Environment Interactions.” Because the vast majority of our global ecosystems have a significant history of human impact, viable strategies for their preservation, conservation, or sustainable management require an understanding of long-term responses to climate and human activities. More information is available at <http://www.geo.umn.edu/paleolim10/>.

July 25 & 27, 2006. **Conservation Tillage Field Days.** July 25, University of Minnesota Southwest Research and Outreach Center, Lamberton, Minnesota; July 27, University of Minnesota Southern Research and Outreach Center, Waseca, Minnesota. These events will consist of field demonstrations of strip-tillage equipment by ten equipment manufacturers. There will also be an education symposium on management of reduced tillage systems. Exhibitors are welcome. For more information, contact Les Everett at evere003@umn.edu or Jodi De Jong-Hughes at dejong003@umn.edu.

Minnegram is published quarterly by The University of Minnesota Water Resources Center

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Article Submissions: *Minnegram* welcomes articles, letters to the editor, news stories, photos, and other materials for publications. Please address correspondence to: *Minnegram* Editor, Water Resources Center, 173 McNeal Hall, 1985 Buford Ave., St. Paul, MN 55108, E-mail: mng-ed@umn.edu, Web site: <http://wrc.coafes.umn.edu>, phone: (612) 624-9282.

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Publications and Resources



Evolution of the Great Lakes Water Quality Agreement. Lee Botts and Paul Muldoon. 2005. Citizens who care deeply about the Great Lakes and want to understand the importance of the Agreement in the history of Great Lakes cleanup should arm themselves with this excellent volume. For information on the book, or to preorder, please go to the Michigan State University Press Web site at www.msupress.msu.edu/bookTemplate.php?bookID=2821/.

Minnesota Lake Water Quality Assessment Report: Developing Lake Nutrient Criteria. Minnesota Pollution Control Agency (MPCA). 2005. This report serves as the technical basis for Minnesota's draft of proposed lake nutrient criteria. MPCA's previous Lake Water Quality Assessment (LWQA) reports were developed as a requirement for participation in Clean Lakes Program. The first two editions described regional patterns in lake water quality in Minnesota and served as a basis for developing ecoregion-based phosphorus criteria. This edition builds

on the previous reports and provides a detailed description of MPCA's approach for setting lake nutrient criteria. Draft criteria are presented and examples of how the criteria may be used to further lake management are included in this edition. If you would like a copy of the report, please contact Steven Heiskary, Environmental Analysis and Outcomes Division, by phone at (651) 296-7217 or (800) 657-3864 or by e-mail at steven.heiskary@pca.state.mn.us. Copies are also available on-line at www.pca.state.mn.us/water/lakequality.html#reports/.

Watershed Assessment of River Stability and Sediment Supply. U.S. Environmental Protection Agency, Office of Water. 2005. The Office of Water recently finalized a new technical methods Web site designed to help watershed managers assess and restore waters with suspended or bedded sediment problems. The centerpiece of the WARSSS (Watershed Assessment of River Stability and Sediment Supply) website is a methodology developed by Dr. David L. Rosgen for detecting sediment problems

and source areas, estimating excessive sediment loads, and planning to restore normal sediment dynamics in streams and rivers. Visit the WARSSS Web site at www.epa.gov/warsss/ and if you have any questions, please contact Doug Norton at norton.douglas@epa.gov.

Erickson, M. and Barnes, R. In press. Arsenic Concentration Variability in Public Water System Wells in Minnesota, USA. *Applied Geochemistry*.

Hudson, M.J., Swackhamer, D.L., and Cotner, J.B. 2005. Effect of Microbes on Contaminant Transfer in the Lake Superior Food Web. *Environ. Sci. Technol.*, 39(24), 9500–9508.

Simcik, M.F. and Dorweiler, K.J. 2005. Ratio of Perfluorochemical Concentrations as a Tracer of Atmospheric Deposition to Surface Waters. *Environ. Sci. Technol.*, 39(22), 8678–8683.

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