Water Resources Center

University of Minnesota

MINNEGRAM

June 2006

Public stormwater meeting outlines the vision of a campus of the environment

Residents of the St. Paul Campus and surrounding community gathered on May 8 for the University's stormwater management public meeting. As part of its permitting process, the EPA mandates that the University, just like any municipality that needs a stormwater permit, hold a yearly public meeting. The agenda on May 8, however, encompassed much more than a discussion of short-term plans.

In her opening remarks, Vice President for University Services Kathleen O'Brien described the future of the St. Paul Campus as a model system of stormwater management and sustainability, informed by faculty research and providing a classroom for students. "Academic mission and operations should reinforce each other," Vice President O'Brien said. "Faculty and students will learn from operations and operations will learn from faculty and students—a sustainable campus is something all our work will contribute to."

Research and groundwork for such a vision has begun in several University organizations. Andy Phelan of Environmental Heath Sciences and Scott Alexander of Geology and Geophysics described the University's Stormwater Pollution Prevention Plan (SWPPP), designed to move the University from a traditional stormwater management system that treats stormwater by disposing of it, to a modern system that uses rain gardens, green roofs and other practices to capture sediment, take up nutrients, and moderate temperatures. The goal is to put 80% of the stormwater to use, reducing the load on the pipe system and on the Sarita Wetland, which currently receives most of the stormwater from the campus.

This rain garden was installed on Gortner Avenue in St. Paul to help manage stormwater while improving campus sustainability.

Although this year's meeting focused on St. Paul, University plans also include the Minneapolis Campus. As a first step, stormwater drains on both campuses have been mapped, and illicit discharges have been located and corrected. Phelan and Alexander described several additional improvements that have been made in the last few years, including the construction of a forebay to the Sarita Wetland and the

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Water Follies author to speak at Minnesota Water 2006 and Annual Water Resources Conference

Potatoes grow perfectly well without irrigation, but we irrigate them in the Streaight River Watershed in Minnesota. According to Dr. Robert Glennon, author of *Water Follies: Groundwater Pumping and the Fate of America's Fresh Water* (Island Press 2002), we do it to please McDonalds. McDonalds will buy only from farmers who irrigate, Dr. Glennon says, because an irrigated potato field grows "industrial potatoes" of a uniform length, which can be made into fries that peek out appetizingly from super-sized, flat-bottomed fry boxes. Meanwhile, the primary farmer in Minnesota supplying potatoes to McDonalds has had to move his processing plant and change his well-water drawing practices to avoid destroying the Straight River. Similar situations have arisen in Wisconsin, Maine, and Georgia, and in the western United States. The Santa Cruz River has disappeared entirely due to groundwater pumping.

Dr. Glennon, the Morris K. Udall Professor of Law and Public Policy at the

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In This Issue

Policy and a Pint event highlights environmental choices

On April 20, Larry Baker (Water Resources Center) and Kristin Nelson (Forest Resources and Fisheries, Wildlife, and Conservation Biology) joined John Curry, Campaign Director for the Minnesota Campaign for Conservation, at the Varsity Theater in Minneapolis to discuss the future of the Minnesota environment. The event was sponsored by the Citizens League and Minnesota Public Radio, and was the latest installment of the Citizen League's "Policy and a Pint" lecture series. DJ Steve Seel of 89.3 The Current moderated the discussion.

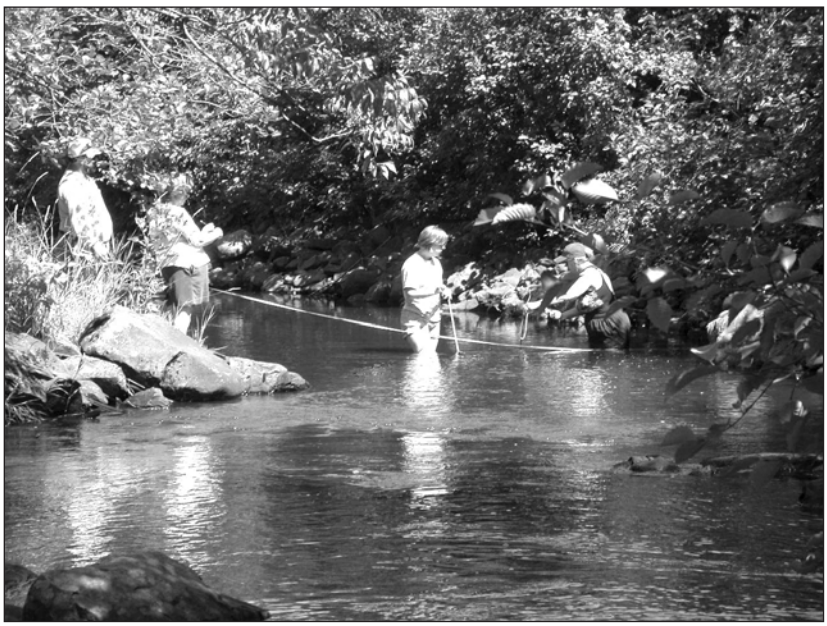
Over 130 people attended the discussion and quaffed a pint of beer at the lecture, which focused on the choices we make—as individuals, in collaboratives, and as a state—to control and enrich our environment. Baker and Nelson used members of the audience as guinea pigs to demonstrate how the decisions we make as individuals influence the amount of carbon that goes into and leaves our respective households. The pair also highlighted their on-going research on how choices affect household pollutant fluxes. Other participants in this research include Paul Hartzheim (Water Resources Science), Sarah Hobbie (Ecology, Evolution, and Behavior), and Jennifer King (Soil, Water, and Climate; and Ecology, Evolution, and Behavior).

Panelists left to right: Kristin Nelson, Larry Baker, John Curry, and moderator, Steve Seel.

An audio recording of the event is available on the Minnesota Public Radio Web site, at http://minnesota.publicradio.org/display/web/2006/04/20/policy_pint/. The Citizens League was born in 1952, and seeks to identify, frame, and propose solutions to public policy problems. For more information on the Citizens League, visit their Web site at www.citizensleague.net/.

U offers new stream restoration certification

Rivers are receiving more and more attention these days from citizens, agencies, and nonprofit groups seeking to restore functional habitat, improve water quality, and manage riparian corridors. According to a recent survey published in *Science* (v.308, 636-637, 2005), upwards of $15 billion has been spent since 1990 on efforts to restore and rehabilitate streams in the United States, and the amount continues to grow. Stream restoration efforts require a complex blend of hydrology, ecology, geomorphology, and engineering, yet many practitioners lack integrated training in these fields, and few university-level programs exist to educate current and future practitioners. The National Center for Earth-surface Dynamics (NCED) at the University of Minnesota seeks to fill that gap by offering a new graduate-level certificate program in stream restoration science and engineering.



Students in the restoration program will visit restoration field sites to gain practical experience.

The one-year program will teach graduate students to blend engineering and physical, biological, and social sciences to prioritize, design, implement, and evaluate stream restoration projects. After completing an introductory course in stream restoration, students will select four additional courses from four theme areas—River and Floodplain Science and Engineering, River and Floodplain Ecology, Water Quality, and Water Policy and Management. To give students a hands-on experience, a one-week short course will be held in the summer. Students will visit recently completed and on-going stream restoration field sites to see how the stream restoration science and engineering learned in the classroom is applied to real-world restoration problems. The certificate can be a stand-alone qualification or part of a M.S. or Ph.D. program. For more information regarding the Stream Restoration Xertificate Program, visit the program Web site at www.nced.umn.edu/sr_certificate_uofm/.

MinnAqua can help you enjoy Minnesota's aquatic resources

by Roland Sigurdson, MinnAqua and WRC

MinnAqua's Aquatic and Angling Education Program is the outreach and education program of the Minnesota Department of Natural Resources Division of Fish and Wildlife. By combining aquatic education and sport fishing, the MinnAqua program fosters a better understanding of natural resource management and develops aquatic resource stewards.

So who can participate? In a word, anyone!

In our fifteen-year history, the MinAqua program has worked with a vast array of organizations. From school classrooms, 4-H, and Boy/Girl Scouts to park and recreation centers, churches, nature centers, new immigrant organizations, cities, and counties, the MinnAqua program provides consistent quality programs tailored to meet the needs of the participants.

MinnAqua provides adult fishing education, too. We work with the Becoming An Outdoor Woman (BOW) program to deliver parent/child angling and fly-fishing classes. In a collaboration with senior citizen programs, we invite seniors to take a stroll down memory lane, remembering fishing adventures of their childhoods and those times spent with their own children fishing Minnesota's great aquatic resources.

How can you get involved? The MinnAqua program has four aquatic education specialists stationed across the state to assist you in developing a program that is right for your organization. Visit the MinnAqua Web site at www.dnr.state.mn.us/minnaqua/ to find the specialist in your area.

MinnAqua loves volunteers, too. Each year, angling-savvy Minnesotans donate their time and talent to helping others learn fishing skills that enable them to enjoy our aquatic resources. In fact, we couldn't do many of the large public events without our volunteers. Take A Kid Fishing weekend is always the second weekend in June, and Minnesota residents can fish for free on these days if they are fishing with youngsters up to age 16. Many cities, counties and sporting groups put on events that weekend to encourage their neighbors to take advantage of this age old tradition by introducing their kids to fishing. MinnAqua works with many of these organizations to help them get started and support their efforts.

So if you're looking for a new, engaging activity for you, your family or organization, consider a sport that will serve you for a lifetime and help you to appreciate our aquatic resources. Fishing—it's for the young and young-at-heart, too.

From the Director's Desk

A Green Spring

Spring came early to Minnesota this year, and with it a breath of fresh air from several directions. The Legislature and Governor have passed the Clean Water Legacy Act and new stricter rules on mercury emissions. The University has begun designing the framework for its new Institute on the Environment, and has rolled out the St Paul Campus Ecology Master Plan. "Green" is the color of spring, it seems.

The Clean Water Legacy Act has been three years in the making, and its passage is as much due to its legislative proponents as to the success of the inclusive stakeholder approach that designed it (the "G16" consortium). Although the funding is for only one year and a fraction of what is needed, the state has made a commitment to clean water, and the framework for meeting this commitment has been launched. This represents a comprehensive plan for identifying and addressing our impaired waters through the TMDL process. The new Clean Water Council will guide the process, and we are pleased to see that there will be a higher education representative (either UMN or MNSCU) on this advisory body. To help reduce contamination of our waters (and fish) by mercury (fish consumption advisories due to mercury account for 2/3 of our impaired waters), the state has passed emission controls more aggressive than the federal rules. Emissions at coal-fired power plants must be reduced 90% by 2015.

The Institute on the Environment is one of the key components of the University's Strategic Positioning Initiative, and a committee of 11 varied and accomplished environmental researchers has been selected to advise the Provost on a "blueprint" for its mission and its strategic opportunities as well the nuts and bolts of how it will function. I am honored to serve as the committee co-chair along with Steve Polasky, professor in Applied Economics and Ecology, Evolution and Behavior. We are thrilled to be part of the effort to provide an enervating focus to the vastly talented but fragmented faculty in the environment.

The rollout of the St. Paul Ecology Master Plan heralds a new campus-wide master planning initiative. The Ecology plan calls for managing future growth, space and stormwater flow of the St. Paul campus from a green perspective. The goal is to make the campus more esthetically pleasing, add back some ecological services, and most of all, capture and use storm water on campus rather than having it run off through the drainpipe system which is currently overtaxed and wasteful. The principles of this plan can be found in the accompanying story (see page 1).

May the seeds that have been sown this spring flourish in the coming months and reach their full potential.

Deb

Deb Swackhamer, WRC Co-Director

Undergrad spurs native revegetation effort at Sarita

Over 25 people gathered on April 20 at the Sarita Wetland on the St. Paul Campus to plant native trees, as part of the University of Minnesota's Beautiful U Day. The architect of the event was Fisheries, Wildlife, and Conservation Biology (FWCB) Club President, Tim Barberg, a FWCB undergraduate. Barberg said he had grown impatient with the planning process and wanted to do some physical work, so he took it upon himself to get the ball rolling.

Scott Alexander (Geology and Geophysics) plants native trees at the Beautiful U Day planting event at the Sarita Wetland organized by FWCB student Tim Barburg.

He sought the help of professor emeritus Peter Jordan (Fisheries, Wildlife, and Conservation Biology), who was instrumental, Barberg said, in getting the planting event approved by the countless committees and boards of the University. Barberg also credits FWCB Club members Bryan Pynn and Christine Yaeger, and Scott Alexander of the Department of Geology and Geophysics for their help organizing the event and getting their hands dirty planting trees. Facilities Management-Landcare Grounds Superintendent Les Potts orchestrated the clearing of many undesirable trees, which made room for the native tree species to be planted.

In all, over 100 trees were ordered, delivered, and planted, including American basswood, ironwood, sugar maple, red-osier dogwood, three species of oak, and two species of cherry. Barberg assumed that the trees would arrive as small and manageable saplings, and was surprised when some of them turned out to be 12 to 15 feet tall.

The Sarita Wetland receives much of the stormwater runoff from the St. Paul Campus and the fairgrounds, but it is also extremely valuable as an outdoor classroom. Barberg worked with Rebecca Montgomery (Forest Resources) to create a design that Montgomery could incorporate into her forestry classes. In the future, Barberg hopes to organize herbaceous plantings at the Sarita Wetland to accompany the native trees.

The funding for the trees came from a Beautiful U Day grant awarded to the FWCB Club. Additional funding came from a grant from the First Minnesota Conference on Sustainable Tourism. This grant was awarded to the FWCB Club to offset carbon emissions produced by the conference attendee's travels.

Planting event participants, left to right: Bryan Pynn, Christine Yaeger, Tim Barberg, Chad Allen, and Peter Jordan.

Conference continued from page 1

University of Arizona, will deliver the keynote address and sign copies of his book at the Minnesota Water 2006 and Annual Water Resources Joint Conference in October. He has more than 30 years of professional experience and specializes in constitutional law, American legal history, and water law. *Water Follies*, the first book published focusing on the environmental impact of groundwater pumping, received accolades from *Scientific American*, *The Washington Post*, and *The New York Review of Books*, among others. Dr. Glennon lectures widely and has given over 25 keynote addresses in the last three years. He holds a J.D. from Boston College Law School and an M.A. and Ph.D. in American History from Brandeis University. He is also a member of the bars of Arizona and Massachusetts.

Also featured at the water conference will be a panel discussion with MPCA Commissioner Sheryl Corrigan, water attorney Louis Smith of Smith Partners PLLP, and Virginia Kibler of the US EPA, who will take a local, state and national look at the effects of impaired waters.

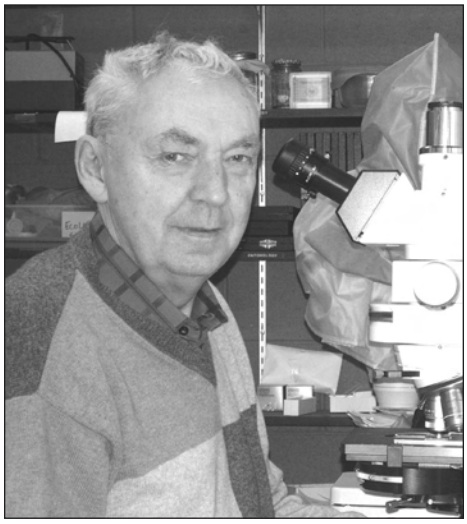
The water conference will be held October 24–25, 2006, at the Earle Brown Heritage Center in Brooklyn Center. The conference draws over 500 water professionals, practitioners, researchers, and students from around the region for an exploration of innovative water management techniques and cutting-edge research. For more information about the conference, visit the WRC Web site: http://wrc.coafes.umn.edu/.

International entomologist visits water resources faculty

Professor Ole A. Saether of the University of Bergen Biodiversity Studies Institute in Norway spent most of this past winter semester on a sabbatical leave working with the Chironomidae Research Group in the lab of Leonard Ferrington (Entomology). Professor Saether has a long record of research focusing on ecology and taxonomy of Chironomidae, and has been working on a taxonomic revision of Chironomidae with Ferrington. For more information on this taxonomic revision, visit www.entomology.umn.edu/midge/Pseudosmittia.htm.

In addition to describing or re-describing more than 400 species of Chironomidae during 40 years of research, Professor Saether pioneered a Lake Trophic State Model that relates Chironomidae to epilimnetic phosphorus concentrations in high latitude, deep lakes. His model has been calibrated and widely applied in Scandinavia. Professor Saether was also the first Chironomidae researcher to draw attention to morphological abnormalities in Chironomidae living in contaminated lake sediments. His landmark papers in this area have served as the basis for more detailed understanding of bilateral asymmetry analyses and developmental abnormalities of aquatic insects exposed to heavy metal pollution and pesticide residues.

Widespread use of Chironomidae to biomonitor water quality is often hindered by incomplete knowledge of local or regional faunas in areas of the world that have been poorly studied. Taxonomic studies often lead to discovery of large percentages of undescribed species of Chironomidae even in well-studied areas such as Michigan, Wisconsin, and Minnesota. Taxonomic revisions and species descriptions provide the fundamental building blocks for more accurate water quality assessments, especially when the aquatic larval and pupal stages are discovered and described.



Professor Ole Saether, visiting scholar from Norway, worked with Dr. Len Ferrington (Entomology) to describe two new genera of Chironomidae.

During the visit, Saether and Ferrington completed descriptions of two new Chironomidae genera and compiled text, descriptions, and illustrations (greater than 600) for three additional genera and 121 species. Ms. Moriya Rufer assisted with illustrations and computer editing of drawings while supported part-time on a National Science Foundation (NSF) grant from the Biotic Surveys and Inventories Program to Ferrington (Principal Investigator) and two colleagues. The grant is to perform biodiversity studies of Chironomidae and other aquatic insects at Long Term Ecological Research (LTER) sites across the upper mid-west. In addition to the research completed by Saether and Ferrington, the field studies at LTER sites have yielded records of more than 250 species of Chironomidae, approximately 25 percent of which are undescribed species or species in need of re-description. For additional information on this NSF grant, visit www.entomology.umn.edu/midge/NSFGrant.htm. Results of the collaborative research project presented at the 2005 meeting of the North American Benthological Society are available online at www.entomology.umn.edu/midge/bergposter.htm.

Strip Tillage Expos

Manufacturers will gather to demonstrate equipment for strip tillage and associated operations, such as auto-guidance systems, fertilizer injectors, and minimum tillage planters at the "Strip Tillage Expo: Tillage for Today and Tomorrow." The event will be presented by the University of Minnesota at the Southwest Research and Outreach Center in Lamberton on July 25, and again at the Southern Research and Outreach Center in Waseca on July 27. Speaker topics will include management of equipment, soil fertility in high-residue systems, economics of reduced tillage systems, and yield results from two years of on-farm trials comparing tillage systems across Minnesota.

The Expo will begin at 9:00 a.m. with tillage demonstrations until 11:00 a.m., followed by presentations, review of information booths, and lunch until 2:00 pm. Field demonstrations will repeat from 2:00 to 4:00 p.m. There is no cost for attendance. Expo information is periodically updated at http://wrc.coafes.umn.edu/.

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installation of rain gardens on Gortner Avenue. They also outlined strategies for making parking structures "greener" and for diverting drainage from experimental farm fields on campus into the sheep pasture. Sending the agricultural drainage to a separate location will not only lessen the impact of stormwater on the wetland, it will allow researchers and students to study stormwater management practices by land-use.

To document the vision of a "Campus of the Environment" in St. Paul as a campus that increases its commitment to environmental sustainability as it grows, the University hired The Kestrel Design Group. Doug VanValkenberg and Peter McDonnaugh, both from Kestrel, presented the St. Paul Campus Ecology Master Plan, which represents the result of their collaboration with the University's Stormwater Linkage Committee and other stakeholder groups. Much of what was presented coincided with plans already underway, but the Kestrel plan went further, proposing more extensive structural changes, coordinated green "classrooms" representing different ecosystems, and cooperative projects with the State Fair and regional parks. The St. Paul Ecology Master Plan will be considered by University planners as they revise the University's Twin Cities Campus Master Plan over the next two years.

U of M Water Community News

The Water Resources Center (WRC) would like to wish **Eric Otto** farewell as he moves on to work as a Water Resources Engineer at Conservation Design Forum, Inc., in Elmhurst, Illinois. He served as the WRC's Student Editor for the past two years while earning a M.S. in Water Resources Science. The Minnegram was Eric's primary responsibility at the WRC (this was his last issue); however, he also produced the WRC's 2002–2004 Biennial Report and was involved in several other publications. We know that he's excited to begin the next phase of his life. Good luck, Eric—the office won't be the same without you!

University of Minnesota Water Resources Science Program Degree Recipients

Luke Stuewe received his M.S. in February 2006. His thesis was titled "Agricultural Nitrogen and Phosphorus Mass-Balances in South-Central Minnesota." Stuewe was advised by **Dave Mulla** (Soil, Water, and Climate).

Michelle Marko received her Ph.D. in February 2006. The title of her thesis was "The Chemical Ecology of Watermilfoil-Weevil Interaction." Marko was advised by **Ray Newman** (Fisheries, Wildlife, and Conservation Biology) and **Florence Gleason** (Plant Biology).

Driss Ennaanay received his Ph.D. in March 2006. His thesis was titled "Modeling the Effects of Perennial Vegetation and Wetland Restoration on the Hydrological Regime in Watersheds of the Minnesota River Basin." Ennaanay was advised by **Ken Brooks** (Forest Resources).

Heather Offerman received her M.S. in April 2006. The title of her thesis was "Assessing River Water Quality Trends in the Minnesota River Basin." Offerman was advised by **Satish Gupta** (Soil, Water, and Climate).

Megan Brown-Smith received her Ph.D. in May 2006. The title of her thesis was "The Distribution and Emergence of *Bythotrephes logimanus* Resting Eggs: Defining the Role of Cumulative Environmental Stressors in Dormancy." Brown-Smith was advised by **Donn Branstrator** (Biology).

Yi-Wen Chiu received her M.S. in May 2006. Her Plan B Paper was titled "Establishing Standardized Procedure for Ecological Engineering Projects in Taiwan." Chiu was advised by **John Nieber** (Biosystems and Agricultural Engineering).

Nathaniel Hemstad received his Ph.D. in May 2006. His thesis was titled "Evaluation of Local and Landscape Effects of Forest Harvest on Instream Habitat and Fish Communities." Hemstad was advised by **Ray Newman** (Fisheries, Wildlife, and Conservation Biology).

Melinda Huff received her M.S. in May 2006. Her thesis was titled "Trophic State and Food Web Evaluation of Two Urban, Connected Lakes in Northeastern Minnesota." Huff was advised by **Donn Branstrator** (Biology).

Eric Otto received his M.S. in May 2006. His Plan B Paper was titled "Two Methods to Evaluate the Potential Negative Impact of Stormwater BMPs on Roadway Infrastructure." Otto was advised by **John Nieber (**Biosystems and Agricultural Engineering).

Deborah Hinterleitner Anderson received her Ph.D. in May 2006. The title of her thesis was "Cranberry Marsh Nutrient and Pesticide Effects on Receiving Lake and Groundwater." Anderson was advised by **Howard Mooers** (Geology) and **Carl Richards** (Biology).

Larry Baker (Water Resources Center) and **Kristen Nelson** (Forest Resources, and Fisheries, Wildlife, and Conservation Biology) participated in an environmental conversation hosted by the Citizens League on April 20 (see article on page 2). Baker also served as a panelist for a plenary discussion on sustainable tourism at the First Conference on Minnesota Sustainable Tourism, held at the University of Minnesota April 19–20. On July 12, Baker will make an invited presentation on urban biogeochemistry at a National Science Foundation-sponsored workshop at the Wingspread Center in Racine, Wisconsin, July 12–14.

Ken Brooks (Forest Resources) was selected to serve on a National Academies Committee on Hydrologic Impacts of Forest Management. This committee will report to the Water Science and Technology Board of the National Academies and National Research Council. The report will address the state of knowledge and reflect on "research needs that would advance understanding of connections among hydrology, science, and land management and policy in forested landscapes."

Jacques Finlay (Ecology, Evolution, and Behavior) received a grant from the National Science Foundation for his project titled "Coupling consumer-resource interaction and nutrient spiraling in a stream network." Collaborators from St. Olaf College, The College of St. Catherine, The University of Nebraska, and The University of California-Berkeley join Finlay on this project.

Barbara Liukkonen (Water Resources Center and Sea Grant) made two presentations, "Preventing the Spread of AIS from Water Gardening," and "Does Arsenic in Drinking Water Affect Dairy Products," at the Association of Natural Resource Extension Professionals conference, May 14–17, in Park City, Utah.

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Upcoming Events

October 24–25, 2006. **Minnesota Water 2006 and Annual Water Resources Joint Conference**. Earle Brown Heritage Center, Brooklyn Center, Minnesota. This conference combines practical techniques with the most innovative research, drawing water researchers and professionals from around the region. Refer to page 1 for additional information. Conference plans and registration information will be featured on the WRC Web site at http://wrc.coafes.umn.edu/ as they become available.

July 17–21, 2006. **Fluvial Geomorphology and Stream Classification**. Fergus Falls, Minnesota. This workshop is the first installment of the Minnesota Department of Natural Resources' Stream Health Protection and Restoration Program for 2006. For more information, refer to the Program's Web site at www.dnr.state.mn.us/ecological_services/streamhab/.

August 21–25, 2006. **Stream Assessment and Monitoring**. Whitewater State Park, Altura, Minnesota. This workshop is designed to teach natural resource professionals to effectively determine a stream's health, or condition, and to monitor it over time. Students completing this course will be able to quantitatively describe a river's condition in terms that other professionals can understandand to monitor a river's condition over time in an objective manner. For more information, refer to the Program's Web site at www.dnr.state.mn.us/ecological_services/streamhab/.

September 22–23, 2006. **Christianity and the Environment: Christian Perspectives on the Interfaces of the Human, Natural, and Engineered Worlds**. University of Minnesota, St. Paul Campus. This conference on Christianity and the environment will explore what it means to demonstrate a Christian perspective at the interfaces of the human, natural and engineered worlds. The conference is sponsored by The MacLaurin Institute (www.maclaurin.org), a Christian study center. For more information, visit the Web site at www.christianenvironmentconference.net/.

November 6–9, 2006. **American Water Resources Association Annual Water Resources Conference**. Sheraton Inner Harbor Hotel, Baltimore, Maryland. The conference presents a unique opportunity for water resource practitioners from diverse disciplines to gather and interact together. For more information, visit the Conference Web site at www.awra.org/meetings/Baltimore2006/.

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Barbara Liukkonen received a gold award from the Association of Natural Resources Education Professionals (ANREP) for a suite of educational materials titled, "Preventing the Spread of AIS from Water Gardening," which includes materials posters, tip cards, plant sticks, and nursery tags. Liukkonen also won the gold team award as part of the Citizens Monitoring Bacteria Team for their work assessing *E. coli* test kits and developing a comprehensive curriculum. ANREP awards only one gold in each category per biennial conference.

Elizabeth Minor (Chemistry-UMD, Biochemistry-UMD, and Large Lakes Observatory) gave an oral presentation titled "DOM photodegradation in a temperate estuary" at the 13th Ocean Sciences Meeting in Honolulu, Hawaii, in February. Minor was co-author of two other presentations at the same meeting.

Michael Sadowsky (Soil, Water, and Climate) was highlighted in TIME magazine (Vol. 167, No. 12) for his research on distinguishing human versus non-human sources of *E. coli* bacteria. His research was funded by the Water Resources Center.

The **2006 Water Resources: Individuals and Institutions** class, instructed by **Larry Baker**, have spent the semester analyzing water policies in Chisago County, Minnesota. The class has been invited by the Chisago County Water Policy Committee to present their findings at the Committee's June 12 meeting.

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Publications and Resources

National Summary of Flood Reports. U.S. Geological Survey. 2006. Floods are the most frequent of all catastrophic natural hazards, costing an average of $6 billion in losses annually and threatening lives and property in every state. The U.S. Geological Survey has made the National Flood Summary information from 1970 to 1998, including maps and data, available on the Web at http://ks.water.usgs.gov/Kansas/floodsummary/. The Web site provides a tool to compare current or possible flood conditions with historical flood information by state and year, as to magnitude, cause, loss of life, damage, and cost for this 28-year time period.

Pesticides in the Nation's Streams and Ground Water, 1992–2001. U.S. Geological Survey. 2006. This release marks the completion of National Water Quality Assessment Program's decadal assessment on pesticide occurrence and concentrations in streams and ground water based on results from 51 studies across the nation. The U.S. Geological Survey (USGS) assessment provides the most comprehensive national-scale analysis to date of pesticide occurrence, distribution and sources, and potential for effects on humans, aquatic life, and wildlife. The assessment also begins to examine two important topics with implications for the future—prediction of pesticides in unmonitored areas and long-term trends. This publication is available for download from the USGS Web site at http://pubs.usgs.gov/circ/2005/1291/.

Known and Potential Environmental Impacts of Oil and Gas Drilling Activity in the Great Lakes. U.S. Army Corps of Engineers. 2006. This study reviews existing information and characterizes the environmental effects of oil and gas drilling under the Great Lakes, including the effects on the shorelines and water of the Great Lakes. The final report serves informational purposes only and does not address any particular Federal action. The following subjects are described in the report: technologies currently used for oil and gas drilling exploration and extraction; environmental effects associated with oil and gas drilling both in the Great Lakes and elsewhere; regulatory background affecting oil and gas exploration in the Great Lakes as well as other environmental regulations and policies that could apply if exploration and development were to occur; environmental setting of the Great Lakes Basin including the distribution and status of oil and gas resources, other natural resources, and human activities within the region; and types of effects and the resources that could be affected if the oil and gas resources beneath the Great Lakes were to be developed. The Corps of Engineers coordinated this study with other Federal agencies through the Great Lakes Interagency Task Force. The full report is currently available on the project Web site at www.lrc.usace.army.mil/GrtLakes/OilGas/index-oilgas.html/.

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