

Water Resources Center

MINNEgram

Impaired Waters Symposium garners research ideas

A two-day Impaired Waters Symposium on February 11–12, 2008 was held at the Continuing Education Center on the St. Paul Campus.

The two-day event was attended by over 160 participants and drew University professors, State agency staff, environmental consultants, advocacy groups and students alike to discuss the future of water resources. Research needs, in the area of impaired waters and, more

broadly, surface water protection and restoration were the focus of the gathering. The event was sponsored by the University of Minnesota's College of Food, Agricultural and Natural Resource Sciences, Water Resources Center and Department of Bioproducts and Biosystems Engineering, along with the Minnesota Department of Agriculture, Minnesota Board of Water and Soil Resources, Minnesota Department of Natural Resources, Min-



From left, Scott Lanyon, Director, Bell Museum; Faye Sleeper, Co-Director, Water Resources Center; Deborah Swackhamer, Interim Director, Institute on the Environment; Peter Nowak, Professor, Gaylord Nelson Institute for Environmental Studies; Bruce Wilson, Professor, Bioproducts and Biosystems Engineering; Jim Anderson, Co-Director, Water Resources Center.

nesota Environmental Quality Board, and Minnesota Pollution Control Agency.

Dr. Deborah Swackhamer, Interim Director of the Institute on the Environment and a member of the Minnesota Clean Water Council, delivered the keynote address on the first day of the sym-

posium. Her talk emphasized the state of our water resources today and the suggested steps required to achieve the goals set by Minnesota's Clean Water Legacy Act as described in the Twenty Needs Report published by the U.S. Environmental Protection Agency. She talked about the

Symposium continued on page 2

WRC awards four grants in 2008 competition

In this Issue

- 2 Director's Desk
- 3 Water Conference
- 5 Wetland Conference
- 6 Community News
- 7 Upcoming Events

The Water Resources Center (WRC) is pleased to announce the selection of four research projects for funding in the 2008 grant competition. Projects include: studies of raingarden bioretention cells in stormwater management, integrating biological data into TMDL assessments, bacteria that biodegrade haloacetic acids in drinking water, and appropriate metrics for sediment-related total maximum daily loads (TMDL). Funding for these projects is provided by the Water Resources Research Institute program of the U.S. Geological Survey, and the Minnesota Agricultural Experiment Station through the WRC.

Enhanced degradation of stormwater petrochemicals within the rhizosphere of raingarden bioretention cells

Associate Professor Paige Novak has seen that traditional approaches to stormwater management, such as curbs and gutters, can act as conduits for pollutants rather than provide infiltration or water quality improvement. Municipalities and developers are turning to Low Impact Development (LID), which promotes on-site infiltration methods as alternative stormwater management approaches. Raingardens (small on-site vegetated depressions to which runoff is directed) are

Grants continued on page 4

St. Anthony Falls Laboratory builds Onsite StreamLab

The National Center for Earth-Surface Dynamics (NCED) and St. Anthony Falls Laboratory (SAFL) Outdoor StreamLab (OSL) will be busy in 2008 with five projects planned for the OSL Riparian Basin: Project 1 uses current knowledge of river channel processes to predict the equilibrium topography of a sand-bed channel within a floodplain. Project 2 examines the dominant control of cross-stream super-elevation within meander bends. Project 3 seeks to determine appropriate metrics for sediment-related total maximum daily loads. More information on this project is highlighted in this issue. Project 4 involves establishment of ecological function in an engineered sand-bed channel, and project 5 concerns the prediction of water residence time and sedimentation within patches of aquatic vegetation.

This same OSL Riparian Basin took center stage last month during the SAFL/NCED Stream Research Workshop. Workshop participants, many from state and federal agencies, gained a thorough knowledge of SAFL, NCED, and the OSL, and viewed the Riparian Basin, the first of the OSL's research laboratory components. As a result of the workshop, the OSL gained local and national attention, and SAFL/NCED gained insight into the needs of (and potential projects for) the larger stream restoration community.

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Symposium continued from page 1

need for feedback loops, effectiveness in modeling, the role of scale and cost in restoration efforts, and the impacts of climate change. Dr. Swackhamer ended her talk by encouraging her audience to consider research strategy that contributes to long term success in achieving the goals of the Clean Water Legacy Act.

Professor Pete Nowak, of the Gaylord Nelson Institute for Environmental Studies at the University of Wisconsin – Madison, gave the second day's keynote address. He highlighted the importance of identifying the general public as a target audience for water resources management and encouraged involving citizens in identifying issues and implementing plans. Dr. Nowak detailed the process of

From the Director's Desk

Colleagues who know me well realize that one of the things I like to do least is write letters or articles like this. It just seems I can never quite articulate the most appropriate stories to make a point. This particular director's letter takes that to new heights (or depths, depending on your viewpoint) since this is my last letter as Co-director of the Water Resources Center. I would like to wax poetic about the past 33 years, but poetry was never a long suit either, so that would not be a "good plan." Instead, I will just highlight a couple of activities that hold a lot of promise for the future of the Center and, in my own way, lobby for their continued support and development.



In this newsletter, you will read about a feasibility study we are conducting to develop a Minnesota "Discovery Farm" as a new approach to research, education and outreach on water quality issues facing agriculture. Minnesota has some unique advantages and conditions where such a program would be very powerful for the state. Most advantageous are the well-funded impaired waters efforts underway at the state level. The University also has a long track record of integrating off-site on-farm research into our Extension and education programs, along with a large number of commodity groups and a great deal of agricultural support. I hope that if I were to step back here ten years from now, that I would find just such a strong program in place and to see the "fruits" of that effort in improved water quality.

Switching to an entirely different arena, we have also begun efforts to work with Wisconsin on the identification and location of a National Estuarine Research Reserve (NERR) site on Lake Superior. The opportunity for cooperative research efforts on the part of the University of Minnesota, University of Minnesota-Duluth, Natural Resources Research Institute, Sea Grant and the University of Wisconsin system, as well as other national and international universities and organizations is mind boggling. To see the results of those efforts ensuring that we keep Lake Superior the freshwater jewel it is down the road would be very satisfying.

As for myself, I would like to highlight for everyone that I am not retiring, just changing what I do. I look forward to my new challenges, and rest assured, I will keep an eye on how these efforts develop. So, take care and good luck.

*Jim Anderson Co-Director,
Water Resources Center*

assessing impairment issues and promoted watershed work on a smaller scale, citing the Wisconsin Buffer Initiative and showing that problems are more manageable and solvable at that level. He concluded by framing some research issues around the topic of existing protocol and designing watershed work that involves local land owners.

The core of the two-day symposium was gathered participants' ideas on the gaps and needs in research that would help Minnesotans better address water quality protection and impairments. This was accomplished through four sessions: Standards and Monitoring Assessment; Total Maximum Daily Load Studies; Implementation, Point Source; and Non-

point Source Pollution and Effectiveness measures. The sessions were kicked off with a presentation by Shannon Lotthammer of the MPCA, Gaylen Reetz of the MPCA, Steve Woods of BWSR, and Lucinda Johnson, University of Minnesota – Duluth Natural Resources Research Institute. A draft report compiling these ideas should be available for review and comments in late April 2008. The final report will be delivered to the Clean Water Council, the five sponsoring state agencies and the Environmental Quality Board for its legislative report on research needs from Minnesota's waters.

Call for abstracts: 2008 Water Resources Conference

The 2008 Minnesota Water Resources Conference will be held October 28–29 in a new location: the RiverCentre in St. Paul, Minnesota. This conference presents innovative and practical water resource management techniques and highlights research about Minnesota's water resources. If you would like to present your work at this conference, please note that the due date for abstracts is March 28, 2008. Full instructions and a link to the submission page are available on the Water Resources Center Web site at: <http://wrc.umn.edu/waterconf>.

The conference will provide an opportunity to address: 1) best practices discovered in the design and application of water resource management techniques, 2) implications of water policy decisions, and 3) research into current and emerging issues. The conference also facilitates interaction among water resources professionals including resource manag-

ers, researchers, local, state and federal agency staff, consultants, practicing engineers, as well as students in the field. The range of presentations comprises all areas of water resources.

Topics of interest include, but are not limited to:

- Agricultural Policy – Impacts on Water
- Agriculture Water Quality and Quantity Management
- Applied Hydraulic Design
- Climate Change and Impacts on Water
- Education and Citizen Involvement in Water Resources
- Hydrologic Extremes – Floods and Droughts
- Innovative Designs
- Lakes, Lake Management, and Lake Restoration
- National/International Projects and Issues
- Policy and Regulatory Changes/Issues
- Preventing and Managing Emerging Contaminants of Concern
- Shore Land Management and Zoning
- Stream or River Ecology and Restoration, Geomorphology and Bank Stabilization

Nominations requested for Dave Ford Water Resources Award

Nominations for the Dave Ford Water Resources Award, which will be presented at the Minnesota Water Resources Conference, are requested at this time. Dave Ford served as a hydrologist with the Minnesota DNR. This award honors individuals like Dave, who in their careers have made significant contributions to water resources in the State of Minnesota.

Nominations should be submitted by email to cceconf5@umn.edu by March 28, 2008. Include a biographical sketch of the nominee and a justification for why he or she should receive the award.

Call continued on page 7

Discovery Farm researcher joins Water Resources Center

The Water Resources Center welcomes Research Fellow Ann Lewandowski. Ann is working with Les Everett and various agriculture professionals on the topics of crop nutrients in the environment. Before joining the WRC, she earned a M.A. in Geography from the University of Minnesota and spent seven

years as a technical writer and editor for the Soil Quality Institute of the United States Department of Agriculture Natural Resources Conservation Service. Currently, Ann is working with Les Everett on a study of the feasibility for a statewide network of on-farm water quality monitoring sites funded by the Minnesota Department of Agriculture.

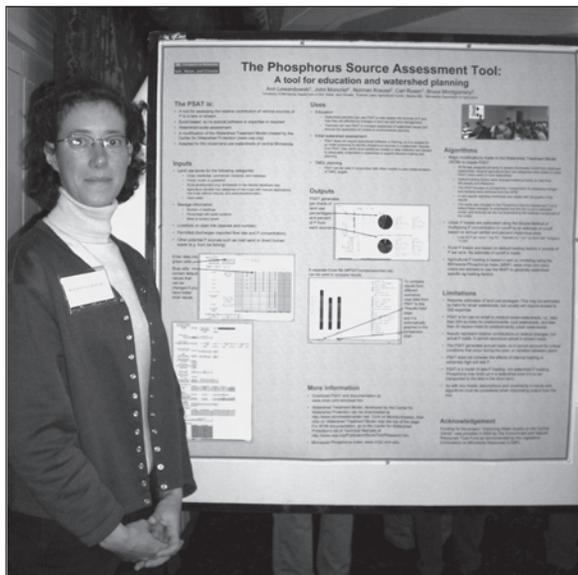
The study was inspired by the Wisconsin Discovery Farm program, a network of water quality monitoring sites on commercial farms. The farms were selected by a team of people from the University of Wisconsin, state and federal agencies, and private sector partners including farmers, producer groups, and environmental organizations. Currently, there are eight core Discovery Farms strategically located in different geographic areas. Each farm is managed by its owner who works with researchers and outreach specialists on integrated research and education projects to

collect data about the impacts of different farming and production practices on soil, air, and water quality. They are monitoring runoff water quality from small watersheds on commercial farms and generating information about farm system-level pollutant loads. The Discovery Farm program has been tremendously successful in outreach to land owners; farmers and producer organizations are key funders and participants in the program's steering committee. The MDA feasibility study asks if this is a program we should replicate in Minnesota, and if so, what form it should take.

During the initial phase at each farm, baseline data is collected about soil nutrients, runoff water, manure, odor emissions, and other variables. After the baseline is recorded, studies are designed to address specific questions identified by local committees. Specialists track changes in environmental and financial factors resulting from adoption of best management practices and changes in environmental regulations.

A critical component of the Discovery Farm's initiative is outreach. Research-

Discovery continued on page 8



Ann presented her research on Phosphorus Source Assessment Tools at the 2007 Water Resources Conference.

Grants continued from page 1

a popular and promoted Best Management Practice (BMP) for urban stormwater quality. However, there is concern that contaminants present in runoff may accumulate in raingardens and cause pollution of soil or groundwater. Little research has been done to examine the fate of hydrocarbons in alternative stormwater systems or to understand raingardens as a pollution control device. In order to be

truly effective as a pollution control BMP, a raingarden must not only trap and detain, but degrade petrochemicals routed to them. Because most raingardens are vegetated, it is also vital to understand the role of plants in pollution control applications. Dr. Novak proposes creation of simulated raingarden systems in columns to analyze the fate of benzene and toluene (gasoline components) and determine what

effects varying vegetation have upon the degradation capacity of these hydrocarbons. The hypothesis is that legumes, which possess an enhanced microbial community in the rhizosphere of their roots, will facilitate an environment leading to greater biodegradation of these compounds.

The cultivation, characterization, and detection of bacteria that biodegrade haloacetic acids in drinking water distribution systems

Professors Raymond Hozalski and Timothy LaPara acknowledge that the disinfection of drinking water and wastewater is needed for the protection of public health. Typically chlorine is used to disinfect drinking water and wastewater because of its effectiveness and low cost, but chlorination also leads to the formation of disinfection by-products (DBPs), the most common of which are trihalomethanes (THMs) and haloacetic acids (HAAs). Many of these compounds

are known or suspected carcinogens and some have even suggested other deleterious effects such as increased risk of spontaneous abortion. Numerous full-scale monitoring campaigns have demonstrated that THM levels generally increase with residence time in water distribution systems. Conversely, HAA have been observed to decrease along the distribution systems in some cases. Thus, research is needed to understand the fate



Artist's interpretation of the newly constructed Onsite StreamLab at St. Anthony Falls Laboratory, created by Teddy Huck and Damon Sidel.

of HAAs in distribution systems and the role of bacteria in determining their fate. Relatively little information is available on the aerobic biodegradation of HAAs. During their preliminary research, Dr.'s Hozalski and LaPara determined that the HAA-degrading bacteria in drinking water distribution systems are substantially different than those previously isolated, thus complicating the cultivation-independent analysis of these important bacteria. The aim of the proposed project, then, is to isolate and to characterize HAA-degrading bacteria within drinking water distribution systems.

Integrating biological data into TMDL assessments: Refining a model to determine biologically meaningful target levels for dissolved oxygen

Professor Leonard Charles Ferrington, Jr., has observed that reduced levels of dissolved Oxygen (DO) can have severe and unacceptable consequences for productivity and biological diversity in

surface waters. The Minnesota Pollution Control Agency has identified 64 stream and river segments with unacceptable DO conditions in their 2008 draft list of TMDLs. Dr. Ferrington's proposal is designed to continue developing models for integrating and interpreting data derived from a newly tested rapid bioassessment technique developed for Chironomidae, using the insects as surrogates to measure biological conditions in streams that are

on the TMDL list because of reduced DO conditions. The species thermal preference will be developed and related to thermal patterns in stream segments that are controlled by groundwater-surfacewater interactions. In this project, twenty stream segments from the MPCA 2008 draft list (all warm-water segments) that are listed for reduced DO and

have TMDL start dates of 2006, 2007 or 2008 will be modeled. All of these streams occur in the upper Mississippi, Minnesota River, Saint Croix River or Lake Superior drainage units. The models will serve to inform decisions about target levels for DO developed in the TMDL program, and are constructed to allow predictions of the percentage of species that will be protected. This approach relies on relationships of daily mean temperature to equilibrium saturation of DO concentrations. Once the patterns of thermal preference are quantified, it will be possible to identify taxa that are extirpated, but should be present based on thermal regime, and develop predictive statements about species that should re-colonize a given stream if the TMDL results in improved DO conditions. This project will enable these species to be identified in order to be considered as indicators of improving DO conditions,

Grants continued on page 5

First annual wetland conference held on St. Paul Campus

Over 200 wetland professionals convened at the University of Minnesota's Continuing Education Building on the St. Paul campus for the first annual Minnesota Wetland Conference on January 31, 2008. The conference, hosted by the Minnesota Wetland Delineator Certification Program and the Minnesota Wetland Professionals Association (WPA), was entitled Hydrology: Issues and Answers.

The Wetland Professionals Association stemmed from the Wetland Delineators Association, founded in 1995 by a group of wetland scientists seeking to raise awareness of wetland issues and create cohesion in the field of wetland delineation. The WPA currently comprises 184 professionals and works closely with the Wetland Delineator Certification Program, which is housed in the Department of Soil and Water Resources at the University of Minnesota, supported by the Water Resources Center and sponsored by the Board of Water and Soil Resources.

Wetland Professionals Association president, Allyz Kramer, opened the conference with a welcome speech and presented Rachel Rozina, former program coordinator for the University of Minnesota's Wetland Delineator Program, an award for her outstanding

service to the association, granting her honorary membership to the association.

Five speakers were lined up for conference: University of Minnesota faculty Professor Ken Brooks presented his work with fellow faculty member, Professor John Nieber on a wetland hydrology model. United States Geological Survey (USGS) research scientist Dr. Glen

Gutenspergen gave a talk on climate change affects on North Central U.S. wetlands. Michael Whited, soil scientist with the National Resources Conservation Service gave a presentation on hydric soils and wetland hydrology. Ralph Tiner, Regional Wetland Coordinator for the Northeast Region of the Fish and Wildlife Service discussed his work on enhancing the National Wetlands Inventory data for



Conference speakers, from left: Dr. Glen Gutenspergen, Research Scientist, U. S. Geological Survey; Michael Whited, Soil Scientist, United States Department of Agriculture, Natural Resources Conservation Service; Ralph Tiner, Regional Wetland Coordinator, Northeast Region of the U.S. Fish and Wildlife Service; Ken Brooks, Professor, University of Minnesota Department of Forest Resources; Jim Stark, Supervisory Hydrologist, U.S. Geological Survey.

as an excellent platform from which professionals in the field could network and disseminate current research. Andrea Moffett, Vice-President of the WPA, said she was very pleased with the turnout, and looks forward to hosting another conference next year, perhaps expanding the time and opportunities for attendees. Details have not been finalized, but more information will be available at: <http://www.mnwetlandprofessionals.org/index.htm>.

Grants continued from page 4

and will enable an independent measure of improvement in biological conditions.

Determination of appropriate metric(s) for sediment-related total maximum daily loads (TMDLs)

Research Associate Anne Lightbody finds the most common cause of impaired rivers and streams in the United States is sediment pollution. High levels of fine suspended sediment reduce aquatic health in numerous ways, including a reduction in light transmission, interference with aquatic organisms, and reduction in benthic habitat quality following deposition on the bed. There are many ways of measuring suspended sediment levels including both direct measurements of suspended solids and inferred measurements of turbidity. Direct measurements of total suspended solids concentrations are obtained from water samples, which are then filtered and processed in a laboratory. Turbidity, on the other hand,

is an expression of the optical property of a water sample in which the amount of light scattered is compared with that scattered by a standard sample.

It is possible to develop robust relationships between turbidity and suspended sediment concentrations in a river reach or system where the sediment distribution and its range are spatially and temporally constant. However, when the optical properties of the water and sediment mixture differ, which occurs as a result of changes in watershed slope, soil type, geology, precipitation, and other factors, then turbidity readings will also change, even if the overall sediment concentration remains the same. In many systems, particle size characteristics change rapidly both temporally and spatially, so turbidity does not always correlate well with suspended sediment concentrations.

Dr. Lightbody plans to test the null hypothesis that turbidity is the most important factor by experimentally manipu-

landscape-level functional assessment. USGS Supervisory Hydrologist, Jim Stark, gave the final presentation on wetland hydrology, climate and geology in the prairie pothole and northern lakes regions.

Overall, this conference served

lating turbidity levels within an outdoor stream ecosystem and observing impacts of turbidity on this system. She will introduce water with different compositions of suspended solids but the same turbidity level into the Outdoor Stream Lab facility at St. Anthony Falls Laboratory (SAFL) and compare the ecosystem responses. Trials will be performed under high flow conditions, which often accompany high turbidity levels and typically exert substantial stress on aquatic ecosystems. The results will indicate whether turbidity most closely correlates with benthic habitat quality or if another metric or combination of metrics (e.g., suspended sediment concentration, transparency, net sedimentation, or embeddedness) provides a better understanding of the effect on benthic habitat. These results are needed by Federal and State agencies to modify their TMDL program and better protect the water quality of America's rivers and streams.

U of M Water Community News

Water Resources Center Co-Director Faye Sleeper, Research Fellow Stephanie Grayzeck, and Graduate Assistant Shannon Wing are working on a project to develop a framework of measuring, tracking and reporting the effectiveness of Clean Water Legacy Act (CWLA) efforts. They recently began working with Minnesota state agencies (Pollution Control Agency, Department of Agriculture, Board of Water and Soil Resources, and Department of Natural Resources) responsible for implementing the CWLA. The framework developed from the project will allow key stakeholders, such as citizens, the Clean Water Council, and the legislature, to more fully understand the results of CWLA funding.

This tracking and reporting strategy incorporates physical measurements of water quality, quantitative project measures such as number and funding of point source projects, nonpoint source Best Management Practices, administrative accomplishments, and human activity measures such as community involvement, education, and delivery of services to local governments.

The ultimate goal of this effort is to assist the Clean Water Council in making recommendations about funding allocation and setting priorities to address impaired waters.

James Anderson (Soil, Water and Climate, WRS Faculty), Co-Director of the Water Resources Center and **Karlynn Eckman** (Forest Resources), were recently awarded a grant from the Minnesota Pollution Control Agency for continuing work on developing social indicators for nonpoint source pollution evaluation in Minnesota.

Efi Foufoula-Georgiou, McKnight Distinguished Professor (Civil Engineering, WRS Faculty), will become Director of the National Center for Earth-Surface Dynamics (NCED) August 1, 2008. In addition to her

recent appointment as NCED director, Dr. Foufoula-Georgiou also holds the new Joseph T. and Rose S. Ling Chair in Environmental Engineering. This endowed chair provides \$2 million to support environmental engineering research and education.

Sara Christopherson of the Water Resources Center Onsite Sewage Treatment Program was recently awarded a grant from the Colorado School of Mines for her work on onsite wastewater residential source monitoring.

Randall Hicks (Biology, WRS Faculty), along with collaborators from the Northeast-Midwest Institute, Cornell and the Old Dominion University, and the Great Lakes Commission recently received a one-million dollar grant from the Great Lakes Protection fund to investigate ship-mediated harmful microbes.

Ray Newman (Fisheries, Wildlife and Conservation Biology), Director of Graduate Studies for the Water Resources Science program, has joined the editorial board of the journal, *Freshwater Biology*.

Katsumi Matsumoto, (Geology and Geophysics, WRS Faculty), was awarded a 2008 McKnight Land-Grant Professorship by the Office of the Provost and the Graduate School.

Janet Keough, (Integrated Biosciences Graduate Program, WRS Faculty) of the US EPA's Midcontinent Ecology Division, was recently appointed to the Technical Advisory Committee for the emerging Upper Great Lakes water level study sponsored by the International Joint Commission. The study will examine the effects of water level fluctuations in the upper Great Lakes region in Lakes Michigan, Huron, and Superior.

Faye E. Sleeper, Co-Director of the Water Resources Center, was recently awarded several grants from five state agencies (see article on cover) for her work on the Impaired Waters Symposium.

WRS receives gift for student travel

The Water Resources Science program gratefully acknowledges the generous donation of \$500 toward the Travel Grant Fund by Mr. Brett Emmons of Emmons and Olivier Resources, Inc. The recipients of this grant will use the funds to present the results of their research at major, regional, national or international meetings. Their work will be reflective of the donor's interest, and they will also make a presentation to the company directly.

University of Minnesota Water Resources Science Program Degree Recipients

Helga Madrigal-Solis received her M.S. in December 2007. Her thesis was titled, "Identification and quantification of source waters to streamflow using hydrograph separation and End Member Mixing Analysis, in a paired watershed setting, Southeastern Minnesota." She was co-advised by John Nieber and Jacques Finlay.

Jeffrey Strom received his M.S. in December 2007. His thesis was titled, "Seasonal Evolution of Dissolved Gas Concentrations in Western Lake Superior: Implications for Respiration, Primary Production and Carbon Cycling." He was advised by Erik Brown.

Jeri Huggins received her M.S. in January 2008. Her plan B thesis was titled, "Spatial and short-term temporal variation of campus groundwater quantity and quality." She was advised by Jim Perry.

Della Schall received her M.S. in January 2008. Her plan B thesis was titled, "SWAT: A management tool for understanding phosphorus transport in the spring lake watershed." She was advised by Jim Perry.

Chris Lenhart received his Ph.D. in January 2008. His thesis was titled, "The influence of watershed hydrology and stream geomorphology on turbidity, sediment and nutrients in tributaries of the Blue Earth River. He was advised by Ken Brooks.

Upcoming Events

March 27–28, 2008. **The Shallow Lakes Forum V: Managing Shallow Lake Habitat.** Bigwood Event Center in Fergus Falls, MN. The Shallow Lakes Forum is a collaboration of public and private interest groups concerned about the current status and management of shallow waters in Minnesota. A dinner buffet will be available on the night of March 27. Early registration for this event is \$40 and ends March 20, 2008, after which the price is \$65. For more information, contact Shannon Fischer at (507) 389-5492 or shannon.fisher@mnsu.edu/.

April 15, 2007. **The 9th Annual “Protecting the St. Croix” Conference.** University Center, UW–River Falls. Sponsored by the St. Croix Basin Water Resources Planning Team, this year’s conference will be held in the new “Green Building” University Center. It will showcase the diverse efforts of government and non-government organizations to achieve the 20% phosphorus reduction goal set by the 2006 Minnesota-Wisconsin Nutrient Agreement. A panel will discuss how the St. Croix Basin Team is using the agreement as a springboard for water quality improvement in the basin. Advance registration deadline is April 7, 2008. For more information, contact John Haack, UW-Extension St. Croix Basin Educator at 715-635-7406, or john.haack@ces.uwex.edu, or visit: <http://basineducation.uwex.edu/stcroix/>.

April 29–May 2, 2008. **The 21st Annual National Conference on Enhancing the States’ Lake Management Programs: Building Partnerships for Improved Fisheries and Lake Water Quality.** Holiday Inn Chicago Mart Plaza, Chicago, Illinois. Registration for the conference is due by April 4, 2008. It is co-sponsored by the Chicago Botanic Garden, Environmental Protection Agency, and the North American Lake Management Society. For more information, contact Bob Kirschner at bkirschn@chicagobotanic.org.

July 14–18, 2008. **Fluvial Geomorphology and Stream Classification Workshop.** Fergus Falls, MN. This course is sponsored by the Minnesota Department of Natural Resources and offers an opportunity for professionals to obtain 23–30 Continuing Education Credits through the American Fisheries Society. Please note that this course is prerequisite to the following course on Stream Assessment and Monitoring. For more information, visit <http://www.dnr.state.mn.us/eco/streamhab/index.html>.

August 11–15, 2008. **Stream Assessment and Monitoring workshop.** Whitewater State Park, MN. This course is sponsored by the Minnesota Department of Natural Resources and offers an opportunity for professionals to obtain 23–30 Continuing Education Credits through the American Fisheries Society. Please note that the preceding course

on Fluvial Geomorphology and Stream Classification is a prerequisite. For more information, visit: <http://www.dnr.state.mn.us/eco/streamhab/>.

October 27–28, 2008. **Water Resources Conference.** RiverCentre, St. Paul, MN. The Water Resources Conference is an opportunity for researchers and professionals in the field to present their work and collaborate on current issues. The conference is sponsored by the University of Minnesota’s Water Resources Center and the College of Continuing Education. More information may be found at: <http://wrc.umn.edu/waterconf/>.

Call continued from page 3

- Storm Water Management — BMPs, Runoff, Reuse and Reduction, Non-Degradation
- Surface- and Ground Water Supplies and Adequacy, Threats
- Total Maximum Daily Loads (TMDLs)
- Water Demands, Availability, Scarcity, and Reuse
- Water Resources Construction, Operation and Maintenance
- Wetlands — Regulations, Issues, Approaches, and Lessons Learned.

Abstracts may also be submitted electronically to: www.cce.umn.edu/waterresources/submit/. For more information, see the WRC Web site: <http://wrc.umn.edu/waterconf/> or contact Sara Van Essendelft at the College of Continuing Education. Phone: 612-624-3708; e-mail: cceconf5@umn.edu.

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Editors: Samantha Hensley, Chris Hansen

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.umn.edu>, phone: 612-624-9282.

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Publications and Resources

Journal of Great Lakes Research (Volume 33, Special Issue 3, 2007) on Coastal Indicators. Guest editors of the issue were Gerald J. Niemi and John R. Kelly. Niemi is Director of the Center for Water and the Environment, NRRRI and Professor in the Department of Biology, University of Minnesota - Duluth. He also contributed to eight articles within this publication. (WRS - Duluth) Lucinda Johnson contributed to five articles, and (WRS - Duluth) faculty Euan Reavie, three, one of which was co-authored by Richard Axler (WRS - Twin Cities.)

Discovery continued from page 3

based information is disseminated to farmers, consultants, agribusinesses, and regulators through publications, media outlets, field day events and demonstrations, and meetings of producer organizations. Over 15,000 producers were reached directly in meetings and workshops in 2004 alone. More information about this project may be found at: wrc.umn.edu/outreach/onfarmresearch.

Ann is also working on a training

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Healthy Rivers: A Water Course. A dynamic CD-ROM program that explores the ecology and management of river systems. Produced by the Minnesota DNR Division of Ecological Resources. Product information is available on the DNR web site: www.mndnr.gov/healthyivers/. To order a copy, contact Amy Childers, MnDNR Division of Ecological Resources at 218-739-7576 x 233 or amy.childers@dnr.state.mn.us.

initiative for agriculture and conservation professionals, also funded by the MDA. The Conservation Training Initiative hopes to build a larger cadre of Technical Service Providers (TSPs) – private sector professionals who can be paid through the Farm Bill to help implement conservation programs. This initiative also aims to improve coordination among various state and federal agencies that provide both public and private training

Water Year Data Summary: 2005 and 2006. Available on the DNR Waters Web site (http://mndnr.gov/publications/waters/water_year_2005-2006.html). This publication provides a review and summary of basic hydrologic data gathered through the Minnesota DNR Waters programs. A hard copy or compact disk version of the publication is available upon request. Contact Judy Boudreau, Editor at: judy.boudreau@dnr.state.mn.us, or call 651-259-5659.

in conservation topics including Nutrient Management Planning, Comprehensive Nutrient Management Planning e.g., manure management, invasive species management, erosion prediction, pest management.) More information can be found at tsp.umn.edu.

The WRC is looking forward to working with Ann on these exciting new projects.

March 2008