

Brezonik to step down after 18 years with WRC

When Patrick Brezonik steps down from his positions with the Water Resources Center (WRC) this fall, the WRC will say goodbye to one of its founders, its co-director, and its Director of Graduate Studies (DGS), as well as a major visionary of the Center, who has provided 18 years of leadership, service, guidance, and activism.

When he was appointed director of the Water Resources Research Center (the Research Center) in 1985, Pat saw “the potential to build something multidisciplinary, to bring the University’s dispersed water faculty together.” At that time, The Research Center’s office housed only its director and a secretary, and its main activities were those of the Water Resources Research Institute Federal Grant Program. Pat founded the *Minnegram* newsletter in 1987, and organized the first biennial water conference, Minnesota Water, in 1988.

Pat was instrumental in starting the graduate studies program, Water Resources Science (WRS). “We were doing a great job here at the University training ecologists, hydrologists, and limnologists, but we weren’t training people in the big picture of water resources,” he said. WRS began as a graduate minor in 1989 and became an interdisciplinary major in 1995. Today, the program enrolls nearly 80 students and includes faculty from over 25 departments in both the Twin Cities and



Patrick Brezonik

Photo courtesy of Steve Schneider

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Patrick Brezonik appointed to CURA Chair

Patrick Brezonik (WRC and Civil Engineering) has been appointed to the Fesler-Lampert Chair in Urban and Regional Affairs for 2003-2004. The one-year appointment receives approximately \$50,000 for research, salary, and support. Professor Brezonik plans to use the appointment to continue work on two projects: the application of satellite-based technology to monitor and assess water quality in Minnesota lakes, and the development of models describing human impacts on biogeochemical cycling in urban ecosystems. He also plans to develop a graduate seminar on regional and global biogeochemical cycles. The Fesler-Lampert Chair in Urban and Regional Affairs is made possible through a contribution by David and Elizabeth Fesler to the University of Minnesota. Brezonik is the fourth person to hold the chair and the first from the physical sciences disciplines.

Deb Swackhamer appointed WRC co-director



Deb Swackhamer

Deb Swackhamer will join Jim Anderson as the new co-director of the Water Resources Center (WRC). “Dr. Swackhamer brings an energetic vision for the future

direction of the WRC,” said Dean Susan Stafford (College of Natural Resources). “I am pleased to further the collaborative nature of the WRC and that’s why I was so pleased that Deb, who holds her tenure in

the School of Public Health, was willing and eager to come over and lead the research and education mission of the WRC.”

Deb, an environmental chemist in the Division of Environmental and Occupational Health, received her M.S. in Water Chemistry in 1981 and her Ph.D. in Oceanography and Limnology in 1985 from the University of Wisconsin, Madison. She began her career at the University of Minnesota as an Assistant Professor in 1986. Swackhamer currently is working on research involving the

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Around the State



WATER RESOURCES UPDATES

Water News from the 2003 Minnesota State Legislature

by Kevin Proescholdt, Volunteer Stream
Monitoring Partnership and WRC

Despite the overwhelming focus on eliminating the state's \$4.2 billion budget deficit, and the need for a special session once the regular session ended, the Minnesota State Legislature took action on a number of issues dealing with water resources and water quality during the 2003 session. Here are some of the highlights:

Septic Systems

The Legislature passed three actions dealing with septic systems: a pilot program for three counties (to be selected later by MPCA) to inventory and clean up failing and illegal septic systems, technical assistance for counties to deal with new septic technology, and a process to develop a proposal to take the septic clean-up statewide. Included in this package was a \$25 fee on new septic tanks that will provide about \$500,000 per year to fund these initiatives.

Phosphorus in Dishwashing Detergents

The bill to eliminate phosphorus in dishwashing detergents passed the Senate, but narrowly failed on the House floor under heavy pressure from House Republican leadership. The Legislature instead funded a study of human-caused phosphorus in wastewater treatment systems, which will include recommendations on how and when to reduce "excess" phosphorus.

Local Water Planning

The Legislature approved \$3 million in base funding for counties' local water planning over two years, plus an additional \$500,000 in grants for the program.

Minnegram

From the Director's Desk

Not goodbye, but ... see ya later!!!



As indicated elsewhere in this issue, I'll be stepping down from my posts as Co-Director of the WRC and Director of Graduate Studies for the WRS program at the end of summer. Jim Anderson, who normally would be writing this column agreed to switch places with me so that I could make a few "closing remarks." First, it's been an honor and a pleasure to help chart the course for the Water Resources Center and its predecessor unit, the Water Resources Research Center, for almost 18 years. Time flies when you're having fun! Second, I want to thank the current staff of the WRC for building it into the strong and much more visible unit that it has become in recent years. They are a highly dedicated, competent, and productive group, and a joy to work with. I especially want to thank Maria Juergens, our associate administrator, who has worked with me since 1992, and Tracy Thomas, our editor and "person Friday," for their commitment and helpfulness. Third, I would like to thank the leadership of the College of Natural Resources, first Dean Dick Skok, then Dean Al Sullivan, and now Dean Susan Stafford, for their strong support of the Center during the past dozen years or so that the WRC (and WRRC) have been associated with the college.

The world, the University, and the Center were very different places when I started *Minnegram* near the beginning of my tenure as director in 1987. Email and the Web had not yet made their appearance; today we wonder what life was like without them. The simple format of early *Minnegram* issues reflected the crudeness of desktop publishing as it existed then. As an aside, I coined the name as a play on words from the Dakota word for water (or lake), *minne*, and the Greek word for letter, *gram*, (a la Minneapolis – literally, city of lakes).

I leave the Center mostly with feelings of pride and satisfaction, but also with a tinge of sadness; its staff and activities have been a major part of my professional life for a long time, and I will miss them all. However, to paraphrase the once popular song (and Biblical passage), to everything under heaven there is a season and a purpose. It clearly is the season for me to move on and for new leadership to come forward. I am especially pleased to leave the WRC in very capable hands under the new leadership of Deb Swackhamer and the continuing leadership of Jim Anderson. Similarly, the WRS graduate program has a great new leader in Ray Newman. I wish them the best in their responsibilities and am confident that they will lead the Center and graduate program to greater prominence and new heights of excellence. As for me, the title of this soliloquy says it all; I'll still be around, but in a different role. I'm looking forward to a sabbatical year to rejuvenate the academic juices and then to the quiet (???) life of a professor in what has become one of the best departments of Civil Engineering in the country.

Patrick Brezonik, WRC co-director

Legislative Commission on Minnesota Resources (LCMR) Grant

The Legislature approved \$740,000 for Citizen Water Quality Monitoring, combining three separate proposals from the Minnesota Pollution Control Agency,

the Minnesota Environmental Partnership, and the Minnesota Lakes Association.

Ray Newman elected WRS director of graduate studies

In September, Ray Newman (Fisheries, Wildlife, and Conservation Biology) will be joining the Water Resources Center as the Director of Graduate Studies (DGS) in the Water Resources Science graduate program.

Ray received both his M.S. and Ph.D. in Fisheries from the University of Minnesota. He has been a professor in the Department of Fisheries, Wildlife, and Conservation Biology since 1989, and has been a faculty member in Water Resources Science (WRS) since it became a major in 1995. He has served as chair of the WRS curriculum and admissions committees, as a member of the executive committee, and as acting DGS of the program for a half-year term in 1996.

Newman sees WRS as “growing and healthy.” In the short term, he hopes to get acquainted with WRS students and faculty and to request their input through meetings on each campus in the fall. His long-term goals are to “continue to grow the program, increase faculty participation, continue to attract quality students, improve student recruitment, and find more funding sources for students.”

Ray’s professional interests and research are in ecology of stream and littoral systems. His research has included work on aquatic plant-herbivore interactions, impacts and control of invasive species such as Eurasian watermilfoil, and effects of land-use practices on stream habitat and biota. He has served on the executive, information, and meeting committees of the North American Benthological Society and as associate editor of the *Journal of the North American Benthological Society*. He is currently a member of the editorial board for *Ecology of Freshwater Fish*, Copenhagen, and a fellow of the American Institute of Fishery Research Biologists.

John Nieber, Chair of the WRS executive committee, said of Newman’s appointment, “We certainly do expect that the WRS program will continue to flourish and progress with Ray as the DGS.”



Ray Newman

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Duluth. John Nieber, chair of the WRS Executive Committee sees Brezonik’s contributions to WRS as essential. “You might say that Pat not only served as a ‘watchdog’ to make sure that things were going well, but also as a visionary for the development of new initiatives,” Nieber said.

In 1996, the Water Resources Research Center, the WRS graduate program, the Extension Water Quality Program, and the Center for Agricultural Impacts on Water Quality came together in one location as the Water Resources Center. The new co-directors, Pat and Jim Anderson, saw the WRC as a place to further the goal of cooperation among water programs at the University. Today Brezonik says that the WRC has become “more than just a co-location of programs, but a true collaboration.” Anderson says, “Without Pat’s persistence and efforts at developing interdisciplinary programs, neither the WRC nor the WRS programs would be a reality.”

Pat has been well recognized for his leadership of the WRC. He was Chair of the National Organization of Water Institute Directors from 1988–1990, and president of the University’s Council of Water Resources from 1991–1992.

Of his successors, Deb Swackhamer (WRC co-director) and Ray Newman (WRS director of graduate studies), Pat says that he is “very pleased that both of them have agreed to do their respective jobs. I’ve worked with both Deb and Ray for a long time, and have a great deal of respect for their abilities as scholars and leaders.” John Nieber says that, “while Pat is stepping down from his position of DGS, we know that he will continue to be

a major contributor from the standpoint of a WRS faculty member.”

Under Patrick Brezonik’s leadership, the Water Resources Center has seen much growth and many changes. The appointment of new leadership allows for continued progress and is truly in keeping with Brezonik’s original vision of the WRC as a center for multi-disciplinary collaboration and training in the field of water resources.

Dear Pat,

On behalf of (but without the knowledge of) the WRS faculty, I would like to thank you for your contributions to our community over the last 22 years. You have been (and remain):

Rigorous in your approach to science and to graduate advising

Energetic in your approaches to WRS and its leadership

Substantive in the many ways you have guided water-related research

Professional in your interactions with administration, colleagues, and students who are sometimes trying and always demanding

Entrepreneurial in fundraising for WRS

Creative in drawing together current water issues and the interests and goals of the WRS faculty, staff and students

Thoughtful in the ways you involve a breadth of people in leadership issues and then develop consensus

Ethical in the ways you develop and lead WRS ethics seminars

Dedicated to the high quality performance and leadership of this, the number-one water resources graduate program in the country

Thank you,

Jim Perry (Fisheries, Wildlife, and Conservation Biology)

University partnership with Kyrgyzstan offers opportunities for collaboration

In January 2003, Professor Jim Perry (Fisheries, Wildlife, and Conservation Biology) visited the Arbaev Kyrgyz State Pedagogical University (KSPU) in Bishkek, Kyrgyzstan.

Jim's visit was at the invitation of the Rector of KSPU for the purpose of laying the groundwork for future collaboration on water, environment, and natural resource issues between KSPU faculty and the University of Minnesota.

Perry is particularly interested in the opportunities for interdisciplinary research offered by Kyrgyzstan's geography. Kyrgyzstan is home to Lake Issyk Kul, the world's fifth

deepest lake (668 m) and, at 1607 m above sea level, one of the largest high-altitude lakes in the world. As the elevation increases from the lakeshore into the surrounding mountain ranges, separate and distinct lateral zones are formed. The zones vary not only ecologically, but also culturally. For example, in low areas near the lake, fishing is the primary vocation of the inhabitants. At higher elevations, the people's main livelihood is raising sheep. These laterally distinct zones offer interesting opportunities for natural scientists and social scientists to work together to understand how humans' cultural values influence their interactions with their environment and what kind of broad environmental implications those interactions may have.

Kyrgyzstan offers other unique research opportunities in natural resources fields. The high mountain ranges of Kyrgyzstan provide glacial melt that feeds the Syr-Darya, a major river flowing to the increasingly desiccated Aral Sea. As a republic in the Aral Sea's watershed as well as a source of headwaters flow, Kyrgyzstan is in an important position

with regard to the rehabilitation of the Aral Sea and its watershed "This is especially interesting," Jim says, "as a range of former Soviet republics develop policies and practices that move them toward democratic, market-based societies. Some of these changes require transboundary policies and agreements. There are many opportunities for collaborative work with Minnesota faculty to advance the abilities of countries like Kyrgyzstan, Kazakhstan and Uzbekistan to exchange resources."



Kyrgyzstan's geography offers many opportunities for collaborative research.

The University of Minnesota has a history of collaboration with the Kyrgyz Republic (KR). From 1995–1997, Myrza Karimov, the former Vice Rector of KSPU, was a master's student in the University's Educational Policy and Administration program. During his course of study, Karimov became acquainted with faculty such as Gary McLean (Dept. of Work, Community, and Family Education) who have since begun projects in the KR. McLean is currently working in collaboration with KSPU to improve administration in the K-12 school system in Kyrgyzstan. Karimov became acquainted with Dr. Perry on a visit to Minnesota for McLean's project in the fall of 2002. It was this visit that prompted discussion on expanding the KR's collaboration with the University to include research in water, environment, and natural resources.

Perry is enthusiastic about the opportunities afforded by a collaborative relationship with KSPU and the KR. Such collaboration would offer the University of Minnesota a way to become directly involved in issues such as transboundary water quality and quantity issues, which were some of the main topics at the recent World Water Forum. Continued

collaboration with Kyrgyzstan also allows the University to continue its commitment to international research opportunities and to use its resources to serve the global community.

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behavior and environmental inputs of two varieties of toxic organic chemicals: persistent pollutants (PCBs, or "legacy chemicals") and endocrine disrupters, chemicals that mimic estrogen.

Since 1999, Deb has run the Great Lakes Fish Monitoring Program for the U.S. EPA. This program tracks trends of 35 chemicals in lake trout in all five Great Lakes. She and Gerry Niemi (Natural Resources Research Institute) are the principal investigators for the Great Lakes Environmental Indicators (GLEI) Project, a multi-disciplinary, multi-university study that develops indicators of ecological integrity for near-shore regions of the Great Lakes. She also serves on the Science Advisory Board of the International Joint Commission and is active in the International Association for Great Lakes Research, the American Chemical Society Environmental Division, and the Society for Environmental Toxicology and Chemistry.

One of the goals that Deb has for the WRC is to expand projects beyond Minnesota state boundaries. "When resources are tight," she says, "people want to get together, to be more cost-effective." She would also like to see the WRC more involved in international projects. While her own international research experience has been focused mostly in Canada and northern Europe, Deb mentions that "a lot of the challenges in terms of water policy and water use are taking place in less developed countries." She acknowledges the international expertise of faculty within the WRC, and says, "If there's a role for the WRC to play in terms of international research or outreach, I'd like to pursue that."

World Water Forum highlights global water issues

In March 2003, Mary Renwick (Water Resources Center Senior Fellow in Economics and Water Policy) attended the Third World Water Forum in Kyoto, Japan. The Forum highlighted some of the world's most pressing water resource issues, and provided an opportunity for participants to share their experiences and to advocate for sustainable water resource management. "I was honored to participate in the Forum," Renwick said. "It was a great opportunity to learn and network with others working on water issues from around the globe." Her trip was part of an effort by the Water Resources Center, in partnership with other University departments and programs, to explore opportunities for building an international water initiative to further international water-related work and collaboration.

The year 2003 was declared by the UN as the International Year of Freshwater, making it an appropriate year for the Forum, which was the largest-ever international gathering on water-related issues. Twenty-four thousand participants from over 180 countries attended the eight-day event, three times more

than originally expected. The Forum sessions provided discussion and debate on over twenty themes covering such topics as Gender and Water, and Dams and Sustainable Development.

One of the more hotly debated topics at the Forum was the privatization of water services. According to UNESCO (United Nations Educational, Scientific and Cultural Organization), 1.1 billion of the world's human inhabitants lack access to an adequate supply of water, and 2.4 billion people lack adequate sanitation. In 2002, the UN declared that access to water is a basic human right. But providing access to water for those currently without it will require major infrastructure investments. Proponents of privatization claim that requiring private corporations to compete for water delivery and sanitation clients will ensure adequate service for everyone. Others argue that water is a social good that should be provided by public agencies to ensure equitable access at reasonable prices. Renwick points out that poor people in many countries may be paying more for their water on a per-unit basis than wealthier people because they rely on informal water vendors.

Another theme addressed at the Forum was the potential for transboundary water conflicts or "water wars." Two hundred sixty-one of the world's river basins are shared by two or more states. Many nations, particularly in the Middle East and North Africa, also share nonrenewable transboundary groundwater resources. Some argue that increasing water scarcity will trigger increasing—and potentially violent—conflict. Greater demands on freshwater resources combined with reductions in supply due to pollution and groundwater depletion contribute to increased pressure on available water resources at the local, regional, and international levels. The potential for conflict arises as multiple users strive to secure these limited resources for themselves. Others argue that, historically, water has acted as a catalyst for peace, cooperation and improved relationships. In response to issues raised at the Forum, a consortium of international organizations asked world leaders at the June 2003 G8 Summit in Evian, France, to recognize the management of

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MGS publishes report on Southeastern Minnesota aquifer

by Anthony Runkel, Minnesota Geological Survey

The Minnesota Geological Survey (MGS) announces the publication of Report of Investigations 61, "Hydrogeology of the Paleozoic Bedrock in Southeastern Minnesota." The authors are Anthony Runkel, Robert Tipping, and John Mossler of the Minnesota Geological Survey; E. Calvin Alexander Jr. and Scott Alexander of the University of Minnesota; and Jeff Green of the Minnesota Department of Natural Resources. In this report, the authors characterize the hydrogeologic attributes of the most heavily used aquifer system in Minnesota by compiling and interpreting a large volume of hydrostratigraphic and hydraulic data.

Hydrostratigraphic analysis is based on plug tests of rock samples, outcrop

and core observations of secondary pores, and borehole geophysical techniques that provide a depiction of the spatial distribution of matrix (intergranular) and secondary (fractures and dissolution cavities) porosity in a spectrum of geologic settings. Hydraulic analyses provide information on the manner in which groundwater travels through the pores, and is evaluated using a number of methods including a recently developed borehole geophysical tool called an electromagnetic flowmeter. A major advancement in our understanding of the groundwater system is the recognition that large volumes of water travel through secondary pore conduits regardless of rock type. Conduit networks in both

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Typical example of large, interconnected, dissolution cavities arranged parallel to beds of dolostone in southeastern Minnesota. These cavities (arrows) are connected to the surface by a vertical fracture exposed along the quarry wall on the left side of the photo. Using a number of recently developed borehole geophysical techniques, recognition and predictability of these kinds of important groundwater conduits in deep, saturated subsurface conditions is now greatly enhanced.



U of M Water Community News

Erik Brown (UMD Geology) was presented the Chancellor's Award for Distinguished Research in April. Brown presented a seminar titled "How fast do mountains move? Views of Himalayan tectonics and links to past climate."

John Gulliver (Civil Engineering) and students **Jason Giovannettone** and **Alicia Urban** will travel to the 30th Congress of the International Association for Hydraulics Research in Thessaloniki, Greece, where Alicia and Jason will present in the J.F. Kennedy student paper competition.

John Gulliver has been selected by the American Society of Civil Engineers as the recipient of the 2003 Rickey Medal, given in recognition of educating new hydroelectric engineers and advancing the basic and applied knowledge of hydroelectric engineering.

Emi Ito (Geology and Geophysics) has been elected as Member-At-Large of the Geology and Geography section of the American Association for the Advancement of Science, and to the Board of Directors of DOSECC (Drilling, Observation and Sampling of the Earth's Continental Crust), both for 3-year terms.

Barbara Liukkonen (WRC) and Douglas Jensen (Aquatic Invasive Species Information Center) received a grant from the National Sea Grant College Program for work on preventing the spread of aquatic invasive species.

Kevin Proescholdt (WRC) presented a paper on the Volunteer Stream Monitoring Partnership at the 2003 Water Management Association of Ohio spring meeting in Columbus, Ohio.

Doug Schnurrenberger (Geology and Geophysics) completed fieldwork in Uganda in May. He will travel to Iceland in July to drill periglacial lakes, and to Mexico in October to obtain a record of

subtropical climate from lakes on the Pacific and Gulf sides of the country.

Matt Simcik (School of Public Health) traveled to Hamburg, Germany, for a workshop on the analysis of perfluorooctanoic acid (PFOA) sponsored by the Association for Plastic Manufacturers Europe.

The **Core Laboratory** at the **Limnological Research Center** received a \$249,519 grant from the National Science Foundation. This grant will support the Core Laboratory and recognizes its joint role with the LacCore (National Lacustrine Core Curation Center) as a resource to the lake-sediment community.

The **Volunteer Stream Monitoring Partnership** received preliminary notification of the award of a grant from the Mississippi Watershed Management Organization's Stewardship Fund to support its citizen monitoring publications and the 2003 River Summit.

Spring 2002 University of Minnesota Water Resources Science Program Degree Recipients

Martin du Saire received a M.S. in April 2003. His thesis was titled "Using 2D resistivity surveys to describe variability of soil depth and corn yield." **John Baker** (Soil, Water, and Climate) was du Saire's advisor.

David Thoma received a Ph.D. in February 2003. The title of his dissertation was "Assessment of management impacts, and measurements of residue cover and bank erosion in the Minnesota River Basin." Thoma was advised by **Satish Gupta** (Soil, Water, and Climate).

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transboundary rivers, lakes and aquifers as a priority, and to allocate \$1 billion over the next ten years to finance interstate cooperation over this strategic issue.

Other important Forum topics included the role of dams in the context of economic development, poverty alleviation, environmental sustainability, and political sustainability. Much of the discussion on this topic stemmed from the recent World Commission on Dams report, which has elicited strong reactions from both sides of the issue (see <http://www.dams.org/> for more information). Also discussed was the need to understand how global climate changes combined with changing land-use patterns will affect future water resources planning.

Water resource issues are clearly becoming increasingly important worldwide. Regarding the potential for an international water initiative at the University, Renwick says, "The scope of global water resource problems is immense, particularly in developing countries. The University of Minnesota has over 180 faculty and staff working on water issues and I think there is a tremendous opportunity for the University to make a contribution in addressing some of these critical issues."

Renwick's trip was financed by the WRC, the Interdisciplinary Center for the Study of Global Change, the Center for International Food and Agricultural Policy, and University of Minnesota Central Administration (Robert Jones, Vice President and Executive Vice Provost for Faculty and Academic Programs, and Victor Bloomfield, Interim Dean of the Graduate School and Vice Provost for Research).

More information on the Third World Water Forum can be found at <http://www.world.water-forum3.com/>.



Upcoming Events

June 28–July 2, 2003. **17th Annual Society for Conservation Biology Conference.** Duluth Entertainment Convention Center, Duluth, MN. The conference is sponsored by the University of Minnesota Duluth's Natural Resources Research Institute (NRRRI) and Continuing Education Program, and the University of Minnesota's Sea Grant Program and Conservation Biology Graduate Program. Fifteen symposia will focus on conservation issues including coastal wetlands, climate change, land-use planning, and marine reserves. For more information, visit <http://www.conservationbiology.org/2003> or contact Kris Lund at (218) 726-7810.

July 22–23, 2003. **National Forum on Water Quality Trading.** Holiday Inn Chicago City Center, Chicago, IL. This event is sponsored by the Environmental Protection Agency Office of Water, USDA Natural Resources Conservation Service, Association of State and Interstate Water Pollution Control Administrators, and the Water Environment Federation. Focus will be on market innovations to restore watersheds, water quality trading's potential benefits, implementation challenges and solutions, and what's next for this innovative approach. For further information contact Lynda Wynn at wynn.lynda@epa.gov.

August 12–14, 2003. **15th International Symposium on Chironomidae.** University of Minnesota, Minneapolis, MN. The symposium is sponsored by the University of Minnesota Department of Ento-

mology. For more information, contact Len Ferrington at (612) 624-3265 or by email at ferri016@tc.umn.edu. A symposium web page is available at <http://www.entomology.umn.edu/chironomidae/>.

August 10–13, 2003. **Frontiers in Assessment Methods for the Environment (FAME).** Coffman Memorial Union, University of Minnesota, Minneapolis, MN. This symposium will bring together scientists and engineers from many disciplines responsible for the groundbreaking technological advances being made in environmental measurement systems and assessment methods. Symposium participants will have an opportunity to learn about several proposed NSF funding initiatives for highly instrumented and networked environmental field research facilities that build on and are a natural outgrowth of these technological advances. For more information, see <http://wrc.coafes.umn.edu/FAME/>.

August 19–20, 2003. **Implementing TMDLs: Working Together at the Local and State Levels.** Concordia College, St. Paul, MN. This conference is hosted by the Council of State Governments (CSG) and the Minnesota Pollution Control Agency, with planning committee members from Minnesota, Wisconsin, and Iowa. Principal participants will be watershed and county-level staff who will be working with education, incentive, and regulatory programs related to TMDLs. Staff of state agencies and education institutions are also encouraged to attend.

Agenda and registration information is available on the CSG web site (www.csg.org) or contact Sandra Vesenda, at senda@csg.org or call (859) 244-8163.

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aquifers and confining units are commonly characterized by recharge through vertical fractures and lateral transport through interconnected systems of bedding-plane-parallel secondary pores. Demonstrated stratigraphic control of such networks means that these important conduit systems have a degree of predictability never before recognized.

The results have important ramifications that change commonly accepted concepts and practices for groundwater investigations in Minnesota. For example, aquifer productivity, flow paths, and travel times can be more accurately predicted. Additionally, the interaction between shallow groundwater and surface water can now be better understood. Wellhead protection plans and other environmental management strategies will be improved with this information.

Report of Investigations 61 is accessible from the home page of MGS as a PDF file readable with Acrobat Reader 4.0, at <http://www.geo.umn.edu/mgs/newrelease.html>.

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Publications and Resources



Backyard composting CD-ROM version 1.03. The University of Minnesota, Department of Soil, Water, and Climate, Extension Unit. 2003. This interactive CD-ROM includes photographs, movies, and animated diagrams to explain the key concepts of backyard composting. Two levels of text addresses the needs of beginners as well experienced composters. Topics covered include the history of composting and tips on producing better compost in less time. The CD is narrated by Mark Seeley, Extension's State Climatologist and weather commentator on Minnesota Public Radio's Morning Edition. For more information or to order, visit <http://www.compost.umn.edu/>.

Getting in Step: Engaging and Involving Stakeholders in Your Watershed. TetraTech and U.S. EPA. 2003. This new guide builds on an earlier version called Guide to Effective Outreach in Your Watershed. Topics include identifying

driving forces, building a stakeholder group, managing conflict, and using consensus to make decisions. Both versions are available at <http://www.epa.gov/owow/watershed/outreach/documents/>.

STORET Version 2.0. U.S. EPA. This new version of EPA's main repository for water monitoring data will better enable State, local, Tribal and Federal partners to document their ambient water quality and biological monitoring activities and manage their environmental data. STORET is a cornerstone of the water monitoring program because of its uniform approach to the storage of quality assurance metadata, its adherence to EPA data standards, and its ability to store disparate kinds of data. The newly released Version 2.0 is fully compatible with current Windows platforms for personal computers; improves the batch upload capability for water data; allows users to store data describing probability-

based monitoring designs; can store documents, graphics, and digital pictures; and allows users to store information on over 320,000 different biological species. If you have questions about STORET, please call the STORET User Assistance at 1-800-424-9067 or email to STORET@epa.gov.

Water and the Environment. American Geological Institute. 2002. This is the fifth booklet in AGI's Environmental Awareness Series, intended to provide information on water resources and supply. This publication serves as an outreach tool appropriate for the general public, educators, and policymakers. Topics covered in the publication include the water cycle, environmental concerns, groundwater use, water quality, and water regulations. An illustrated poster is included. Copies can be purchased from <http://www.agiweb.org/publications.html>.