

## University commission recommends building on environmental strengths

To ensure that the University of Minnesota is prepared to address environmental issues of the 21st century such as energy shortages, shrinking freshwater supplies, and a loss of natural genetic diversity, University Provost, now Interim President, Robert Bruininks created the Commission on Environmental Science and Policy, a 32-member panel of faculty and collegiate deans. The goal of the Commission was to enhance, foster, and make more visible the University's efforts in research, education, and outreach in the broadly defined environmental arena. To meet this goal, the Commission conducted an evaluation of the University's environmental strengths and opportunities. Published in June 2002, the Commission's final report, entitled "Building on our strengths: Our opportunity in environmental science and policy," details 27 recommendations that serve as a starting point for discussions to strengthen the U of M's environmental initiatives.

Commenting on the report's findings, Al Sullivan, outgoing dean of the College of Natural Resources and newly appointed vice provost for academic programs and facilities, said, "The University can be justifiably proud of its efforts in environmental science and policy, but it is missing opportunities and falling short of its potential. More important, it is falling short of society's need for environmental awareness, understanding, and action guided by science."

Despite the breadth of environmental research at the University, critical gaps remain. Additional expertise is needed in areas in which the public would benefit such as environmental law, atmospheric

science, watershed management, agroecosystems, ecosystem management, and wetland ecology. In addition, structural barriers within the University make it difficult for faculty, departments, and colleges to come together under an environmental banner. "Conducting research, education, and outreach among colleges and across disciplinary boundaries is definitely a challenge," said James Anderson, co-director of the Water Resources Center and a member of the Commission, "but the benefits of having a centralized structure to bring people together across the entire arena of environmental sciences would greatly out-weigh the effort required."

To address these challenges, the Commission's recommendations focus on communication, coordination, and capacity. The recommendations include techniques to improve the University's communication of environmentally-related endeavors to the public, redirection of existing resources and requests for new funding, and the creation of a coordinating structure to nurture multidisciplinary relationships—the Environmental Science and Policy Council.

According to Sullivan, capitalizing on the strengths of the University's many environmental initiatives would place the University in the "vanguard of the U.S.'s leading universities that are already reorganizing to address these issues in a coordinated fashion." Sullivan cited UC-Davis, Harvard University, and the University of Arizona. "In short, the U of M has an immediate opportunity for

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## New CNR dean set to meet environmental challenges

The University of Minnesota has named Susan G. Stafford dean of the College of Natural Resources, effective October 1.



*Susan Stafford*

Prior to accepting this position, Stafford was head of the Forest Sciences Department at Colorado State University. Her background also includes nearly 20 years as a professor in the Department of Forest Science at Oregon State University, specializing in the interface of statistics, ecology, and research information management. Stafford also has worked as a consultant with colleagues from multiple disciplines in natural resources.

Stafford is a former division director at the National Science Foundation (NSF).

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# Around the State



## WATER RESOURCES UPDATES

### Eurasian watermilfoil found in five more Minnesota lakes

The Minnesota Department of Natural Resources (DNR) has confirmed the discovery of Eurasian watermilfoil in five additional lakes, bringing total new infestations to seven in 2002. The latest discoveries are in Little Elk Lake (Sherburne County), German and East Jefferson lakes (Le Seuer County), Fish (Wright County) and Ripley (Meeker County). DNR officials say recent warm weather caused the plants to grow and become more obvious. Based on patterns observed in recent years, more infestations are likely to be found before freeze-up because as the plants grow, boaters and DNR staff are better able to see and report them.

Despite the annual spread to more lakes, the DNR encourages boaters not to become apathetic about precautions they should take. There are still many thousands of waters in the state without Eurasian watermilfoil. To help remind boaters, exotic species alert signs will be posted at public water accesses on lakes with newly-discovered infestations.

DNR biologists will inspect each newly infested lake to determine the extent of the infestation and the potential for control. "Control is now aimed at reducing plant-caused nuisances for lake users and at reducing the potential for spread to other lakes. Eradication is not a realistic goal," said Chip Welling, DNR Eurasian Watermilfoil Program Coordinator. In recent years, the DNR has authorized and shared the cost of many small-scale removal efforts managed by property owners, lake associations and local governments. "Experience has shown that even the most aggressive control efforts undertaken in past years

## From the Director's Desk

### Autumn Changes



In the so-called "real world," autumn evokes thoughts of turning leaves, the end of the growing season, and nature preparing for the dormancy of winter. The situation is just the opposite in the academic world. Autumn is the start of a new year, with all the hopes and aspirations for personal growth and enrichment that can bring.

As we look forward to the coming academic year, it is timely to reflect on the changes that have occurred over the past year. On global and national scales, changes have been profound—and not only because of the terrorist attacks of last September 11. The dramatic decline in the stock market and loss in public confidence in the economy as a result of fraud and mismanagement within the business community also have affected us. The impacts of these developments are felt not just in our lives outside the university but also within it, and they are likely to have major, long-term effects in both arenas. For example, the economic downturn not only pared many people's net wealth but greatly diminished tax receipts, returning federal and state budgets to deficits after a few giddy years of surpluses. Already we saw the effects of this "budget crunch" in the form of a less-than-hoped-for increase in state support for the U, and this led to an unfortunate double-digit increase in tuition rates this fall. State budget difficulties are likely to be even greater in the 2003 legislative session, and more difficult financial times for the U and its students likely lie ahead. Of course, we are not alone in this situation; colleagues around the country have told me of even worse financial crises.

The U's popular and effective president, Mark Yudof, left this past summer to head the University of Texas system, and numerous other changes in the top leadership positions at the U either have occurred or are in process. The U has a new interim president, executive vice president and provost, vice president for research, and Graduate School dean. Most important for us in the WRC, Al Sullivan, dean of the College of Natural Resources is stepping down at the end of this month. During his ten years as dean, CNR saw major growth in its programs and national stature. We are especially appreciative of Al's support as the WRC blossomed from a tiny operation in the college in the early 1990s to the multi-faceted and multi-college program it is today. We are pleased that Al is not leaving the U but will move to a position as vice provost for academic programs and facilities, from which he will oversee academic planning and budgeting and facilities coordination for the University. We wish Al well in his new responsibilities. One of Al's last major activities as dean was to chair the U's Commission on Environmental Science and Policy, which published a report with recommendations for improving the U's programs related to the environment. We hope that his new position will provide opportunities to implement the Commission's recommendations. At the same time, we are pleased to welcome Susan Stafford, who will become dean of CNR on October 1 (see article p.1).

*Pat*

Fall 2002 thus represents a time of transition for the University of Minnesota. Let us hope that we have the wisdom to see the opportunities among the obstacles that doubtless lie ahead.

Patrick Brezonik, WRC co-director

have failed to eliminate milfoil or even limit its spread within a lake," Welling said. "There is one key lesson from this fact: prevention efforts by boaters and

others are critical." Milfoil now infests 140 Minnesota lakes, wetlands and rivers. It was first discovered in Minnesota in Lake Minnetonka in 1987.

*excerpted from MLA Lake Bulletin*

# U of M researchers investigate potential water quality benefits of perennial bioenergy crops on agricultural landscapes

by Kenneth Brooks, Department of Forest Resources

Since 1996, my graduate students (Ryan Miller, Steve Stockhaus, Tony Kaster, Jeff Christopherson, and Michelle Rorer, WRS; Ahmed Fall, Hobie Perry, and Brett Shank, Forest Resources) and I have been conducting field and modeling studies to determine hydrologic and water quality benefits that can be attributed to short-rotation hybrid poplar plantations and switchgrass plantings on agricultural land. These crops have been planted as bioenergy crops, although hybrid poplar can also be considered as an alternative source of fiber for Minnesota's forest industries. Comparisons have been made between these perennial crops and wheat crops managed under typical fertilizer and pesticide regimes, fallow farmland, and naturally occurring forest stands. Field sites are located on farmland in northwestern Minnesota and in riparian areas of the Minnesota River Basin.

The basic research question we have asked is whether replacing annual crops with perennial bioenergy crops such as hybrid poplar and switchgrass can capture the hydrologic and water quality benefits that are associated with natural systems.

Forested watersheds have long been considered to be exceptionally stable hydrologic systems. In contrast to other vegetative-cover conditions, forested watersheds discharge the highest quality water, have lower stormflow peaks and volumes for a given input of rainfall, experience less variation in streamflow between high and low flows during a year, and provide the greatest soil stability and the lowest levels of soil erosion and sediment export. Likewise, perennial grasses exhibit greater hydrologic stability and better water quality conditions than annual row crops.

Replacement of annual agricultural

crops with perennial woody and herbaceous vegetation implies less chemical use on watersheds and thereby reduced non-point agricultural pollution. Furthermore, fast-growing trees in uplands and riparian areas can consume large amounts of soil water, potentially reducing runoff to streams and enhancing stream channel stability. Our studies have concentrated on quantifying



A student installs water quality samplers.

differences in hydrologic processes, including nutrient export, among the different vegetation types. As the field study is completed in 2002, the results will be used to model flow response from watersheds that undergo vegetative changes. To date this study indicates that:

- Consumptive use, water yield, and nutrient export from 8–9-year-old hybrid poplar stands were similar to those of 22- to 34-year-old natural mixed aspen stands in northwestern Minnesota.

- Interception losses of 12-year-old hybrid poplar accounted for 23% of the summer rainfall of 317 mm, which compares with 26% interception by a natural aspen stand (reported by Verry 1976).

- Hybrid poplar planted on previously cropped land did not exhibit the high infiltration rates associated with natural forests. Hybrid poplar rates, however, were higher than those of fallow fields and switchgrass.

- Soil frost conditions, snow accumulation, and snow melt all were altered by the presence of hybrid poplar plantations and by switchgrass. Snow accumulation was lower in open fields than in hybrid poplar plantations, switchgrass fields, or

natural forest stands. Soil frost penetrated an average of 29 cm deeper and remained 10 days longer in open fields than in hybrid poplar stands. Natural forest and switchgrass had the shallowest soil frost, and “concrete type” frost was common in open fields and switchgrass but not in the tree crops or natural forests. These results suggest that a more diversified agricultural landscape, with more perennial crops, may improve snowmelt runoff conditions in watersheds.

- Nitrogen exports from a newly established hybrid poplar stand were higher than those from either switchgrass or wheat in 1998; however, the lowest nitrogen exports were from 10-year-old hybrid poplar and mature natural forest stands.

Using results of the field experiments, we will apply a modeling approach to study water flow and nutrient export over the entire cycle of establishment, growth, and harvesting of mature hybrid poplar stands. Comparisons will be made with

annual crops, switchgrass and natural forest conditions for upland sites. The field study has shifted in 2002 to riparian areas in the Minnesota River basin, where a sap velocity method is being used to determine transpiration rates of native and hybrid trees in floodplain areas and along stream channels. Comparisons with switchgrass sites will be made and results used to simulate the



Hybrid poplar stand with rain gauge

hydrologic and water quality effects of perennial vegetation crops in riparian zones.

This research was supported by the U.S. Department of Energy (DOE) through the Oak Ridge National Laboratory, the U.S. Forest Service North Central Experiment Station, Minnesota Pollution Control Agency, and University of Minnesota Agricultural Experiment Station.

# Monitoring projects investigate sources of Minnesota River pollution



## Citizen water volunteers and water resource professionals connect to protect Minnesota's Chippewa River Watershed

by Jordan Kimball

Throughout the 2,080-square-mile watershed of the Chippewa River, a major tributary of the Minnesota River, an active citizen monitoring effort is underway to protect the waterways.

Equipped with clipboards, sampling buckets, transparency tubes, and plastic sampling containers, Paul Wymar (M.S., Forest Resources, 2000), water scientist with the Chippewa River Watershed Project (CRWP) and 30 citizens conduct water monitoring to generate data and improve management practices.



*Paul Wymar records data from a Chippewa River measuring gauge.*

The Chippewa River flows into the Minnesota River at Montevideo, located in southwestern Minnesota. Approximately 41,000 people live in the watershed, where agriculture is the primary land use. The watershed's tributary network is over 2,000 miles long and runs through portions of eight counties. There is high tributary diversity in riparian vegetation cover, sedimentation levels, erosion factors, agricultural practices, stream velocities and depths, dredging and channelization, and recreation pressures.

The watershed contributes 50,000 to 312,000 acre-feet of water to the Minnesota River every year, depending upon snowmelt, runoff, and precipitation levels. Because of this volume, the Chippewa has a significant effect on the water quality of the Minnesota River.

Summer means that the sampling season is in full swing for Wymar and the citizen monitors, who begin biweekly sampling soon after ice-out in April and conclude sampling in November. Monitors take transparency tube readings and stage measurements, monitor visual conditions, record rainfall, and collect macro-invertebrate samples. Water samples are analyzed at the EPA lab in Duluth for total nitrogen, nitrate, phosphorus, turbidity, and total suspended solids. The wastewater treatment plant in Benson performs analyses on samples for fecal coliform bacteria. Wymar analyzes and interprets the results during winter.

A need for more water quality data led to the development of the CRWP's Citizen Monitoring Network. As a result of the

data generated by the citizen volunteers, Wymar and his colleagues are able to generate computerized models to evaluate the Chippewa's water quality and quantity characteristics. The lessons learned from the data analysis serve to prioritize project funding and design. In 2001, the CRWP used data collected by volunteers in its successful application for federal funds through the Minnesota Pollution Control Agency.

The CRWP had its beginnings in an interdisciplinary group formed at the University of Minnesota Morris to study water and land use issues related to agriculture. The monitoring network was formed in 1998 with three goals: 1) to document water quality of the Chippewa River and its tributaries, 2) to use the data to design and direct projects that will improve the water quality, and 3) to develop an understanding and awareness of water issues among watershed residents.



*Citizen Monitor Nancy Messner measures variations in water quality.*

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The CRWP continues to work with the University by providing local resources and background data for students researching topics compatible with the goals of the project. The CRWP has supported a student researcher with a grant from the University's Community Assistance Program for the last two years.

Results of a CRWP diagnostic study conducted from 1998 to 2001 show that the principal pollutant problems are high levels of nitrate, total suspended solids, total phosphorus, and fecal coliform bacteria. According to Wymar, these elevated levels of pollutants are primarily from non-point sources, such as septic systems, agricultural runoff, livestock, and municipal runoff.

Watershed resident Paul Lines, who

grew up fishing, boating, and swimming throughout the watershed, said that the Chippewa River is visibly cleaner today than it was 20 years ago. Only ten years ago, it was common to see extensive foamy residues, livestock carcasses, and a lack of riparian buffers, said Lines. He also recalls seeing the river on fire as a result of chemical pollutants.

Wymar predicted last spring that because of the low snow runoff and relatively dry season, this would be a good year for water quality because there would be less rain-induced erosion. By mid-July, however, Wymar was wondering why the water was "so filthy this year." He explained that turbidity and total phosphorus levels were high, which, coupled with warm weather, may increase algal growth rates.

In mid-August, frequent heavy rains resulted in higher levels of nutrients than

are normally seen. One late-August storm dumped 4.5 to 6.5 inches on the watershed in just a few hours. Intense rainfall events underscore the need to control sediments flowing into the watershed. For Wymar, land stewardship directly impacts sediment flow and water quality: "If we had more buffers, water storage, and residue on the land, we would not be so vulnerable to the whims of nature."

Wymar and the citizen monitors interact closely with the watershed. Their efforts are establishing a scientific foundation on which to build an understanding of the diverse hydrological and landscape features of the Chippewa River watershed. The combination of more data generation with local familiarity of the watershed's behavior throughout the year is creating the most accurate descriptions of Chippewa River watershed conditions ever recorded.

## The Minnesota River's mercury, PCBs, and other non-point sources monitored in long term study

by Heather Offerman

In 1997, the Minnesota Legislature funded the Interagency Water Monitoring Initiative (IWMI) for expansion of water quality monitoring efforts in the state. As part of that initiative, the Metropolitan Council Environmental Services (MCES) and the Minnesota Department of Agriculture (MDA) established a surface water quality monitoring field office in Mankato in 1999. The office serves as a central location to operate and maintain six long-term monitoring stations on the main stem of the Minnesota River, near the mouths of the Blue Earth and Le Sueur Rivers, and on several smaller tributaries in the Le Sueur River Watershed.

As an MCES environmental scientist, I operate and maintain these Mankato sites in cooperation with Bill VanRyswyk, MDA Hydrologist. The MCES monitoring initiative is known as the "Mercury and PCB Inputs to the Minnesota River Program" and the Mankato office focuses on collecting hydraulic, mercury, PCB, sediment, and nutrient data. The objective of the MCES initiative is to investigate sources and measure loads of mercury, PCB, and other nonpoint source pollutants in the Minnesota River Basin. Inputs of mercury and PCB are contributing to fish consumption advisories in the Minnesota River, and inputs of sediment, nutrients, and bacteria are contributing to a general degradation of Minnesota River water quality. The primary goal of MDA's

Surface Water Monitoring Program administered by VanRyswyk is to quantify the long-term water quality trends associated with normal pesticide usage in the Minnesota River Basin.

I plan to incorporate data gathered from these sites into my master's thesis project which examines the effects of precipitation, wetlands, best management practices, impervious layers, and other factors on trends in river flow and water quality. Since the establishment of the monitoring sites in late 1999, data have been logged continuously for water stage and flow, temperature, conductivity and precipitation. Flow-composited samples have been collected automatically during runoff events, and grab sampling routines have been established at all sites.

Recent publications related to the Minnesota River monitoring include: "Episodes of Elevated Methylmercury Concentrations in Prairie Streams" (Balogh, S.J.; Huang, Y.; et al., 2002. *Environ. Sci. Technol.* 36: 1665-1670) and the "State of the Minnesota River Report, Summary of Surface Water Quality Monitoring in 2000," available at <http://mrbdc.mankato.msus.edu/>.

Heather Offerman, a first-year Water Resources Science graduate student, is advised by Satish Gupta (*Soil, Water, and Climate*).



*Le Sueur River Station: flow composite samples ready for splitting between MCES and MDA after a May 2002 rain.*

# New phosphorus legislation generates education and research needs

by Ron Struss, WRC and U of M Extension Service

Toward the goal of protecting Minnesota's lakes, rivers, and wetlands from phosphorus runoff, Governor Ventura signed the Lawn Phosphorus Fertilizer Bill into law. Beginning January 1, 2004, lawn fertilizers used in the Twin Cities seven-county metropolitan area will be required to contain 0% phosphate, and lawn fertilizers used outside of this area no more than 3% phosphate. Local units of government will enforce the law; violations will be petty misdemeanors.



*New law dictates that Twin Cities lawn fertilizers contain 0% phosphate.*

Often incorrectly referred to as a “ban,” the law allows the use of fertilizer with greater concentrations of phosphate when a soil test shows a need for phosphorus or a new lawn is established. It does not regulate the use of phosphorus fertilizer on agricultural crops, sod farms,

and gardens. Golf courses also are exempt when staff who apply fertilizer are trained through a program approved by the Minnesota Department of Agriculture. In addition to exempting these uses from restrictions, the law removes the future ability of local units of government to regulate the sale, handling, or use of phosphorus agricultural fertilizers—that ability resides now only with the state.

The law is a restriction on the use, not sale, of phosphorus-containing lawn fertilizers. Merchants may sell and consumers may buy fertilizer of any phosphorus content. A handful of Minnesota cities are allowed to “grandfather” in ordinances that regulate the sale of phosphorus lawn fertilizer.

Some of the law's provisions are already in effect. Starting August 1, 2002,

it is illegal to spread or spill fertilizer of any type on hard surfaces such as streets, sidewalks, and driveways.

University and state agency staffs are responding to education and research needs generated by the law. The Minnesota Department of Agriculture, the Minnesota Office of Environmental Assistance, and the University of Minnesota Extension Service produced a two-page publication on the law in time for the Minnesota State Fair. The Office of Environmental Assistance provided funding and is distributing the publication through their Education Clearinghouse (1-800-877-6300). A second in-depth publication targeted at lawn care professionals, lawn and garden store staff, Master Gardeners, and lake associations will be available in January 2003, in time for winter training workshops. A PowerPoint presentation, *Lawns, Lakes, and Laws*, is available from Ron Struss, WRC and U of M Extension (651-215-1950).

## WRS graduate receives national Knauss Fellowship

WRS Graduate Barbara Peichel received a Knauss Fellowship sponsored by the National Oceanic and Atmospheric Administration's (NOAA) National Sea Grant College Program. Peichel, who graduated in August, is the third WRS graduate to receive the fellowship since the inception of the WRS program in 1995. Past recipients are Jonathan Pundsack and Erik Heinen (see Minnegram, March 2000 and September 2001).

Peichel's water resources experience made her a strong candidate for the fellowship. As an undergraduate, she gained research experience in stream water quality indicators at the University of Minnesota's Natural Resources Research Institute. In addition to her two degrees (she holds a B.S. in Biology and a M.S. in Water Resources Science), Peichel holds a post-baccalaure-

ate certificate in Environmental Education.

The Dean John A. Knauss Marine Policy Fellowship program provides educational experiences for highly qualified graduate students with an interest in policy decisions affecting ocean, coastal, and Great Lakes resources. Peichel will interview with potential “host” agencies in the legislative branch or executive branches of the United States government in November, which will determine her specific assignment. The one-year, paid fellowship will begin February 2003 in Washington, D.C.

Former Knauss fellowship recipients have worked with executive hosts such as the National Marine Fisheries Habitat Protection Division and the EPA's Office



*Barbara Peichel*

of Wetlands, Oceans, and Watersheds, and legislative hosts such as the House Subcommittee on Fisheries, Wildlife and Oceans and the Senate Subcommittee on Oceans, Atmosphere and Fisheries.

“Learning how the national branches function and how policy works on the federal level will better prepare me for future interactions with federal agencies and legislators,” said Peichel. The fellowship also will help Peichel guide colleagues and citizens interested in water resources policy actions through the federal decision-making process. Peichel believes that federal policy plays an intricate role in any water resources career.

# Water Resources Science student group works with community water monitoring effort

by Michelle Marko and Heather Hendrixson

The U of M Water Resources Sciences student group, Water Resources Students In Action (WRSIA), traveled to Mora and Ogilvie, Minnesota, last spring to help teach middle school and high school students about water quality.

Heather Hendrixson and Michelle



*WRS graduate student and WRSIA member Stanley Asah investigates Groundhouse River invertebrate diversity with middle and high school students from Mora and Ogilvie, Minnesota.*

Marko spoke to the Mora and Ogilvie students about stream restoration, pollution and monitoring. They explained to the students how pollution in the Groundhouse River nearby can affect the health of the Snake River, the Mississippi River, and ultimately the Gulf of Mexico. The students examined invertebrates and received information needed to begin monitoring the stream.

The following Monday, WRSIA members joined land owners Tim and Dorene Fischer, Steve Haar of the Soil and Water Conservation District (SWCD), Kelly Osterdyke of the Natural Resources Conservation Service, the Kanabec County Commissioners, Mora teacher Tom Demarais, and Ogilvie teacher Alan Ambrose and his high school class to teach over 140 eighth

grade students from Mora how to evaluate stream quality and collect and identify invertebrates.

WRSIA, the teachers, and the high school students guided the eighth-graders through the process of the River Watch Network Benthic Invertebrate Sampling sheet. The high school students compiled the data and submitted it to the SWCD.

When WRSIA members began helping with the Groundhouse River monitoring project three years ago, the river already had been recovering from degradation for several years. The Fischers, the SWCD, NRCS, and Ambrose and his students, had fenced off the river and planted trees along its banks. Ambrose and his students have been monitoring the river twice each year for five years and have seen remarkable improvements in the stream's water quality. When they began monitoring, the stream contained few invertebrates, and those it did contain were tolerant to pollution. Approximately 52% of the invertebrates sampled in May 2002 were intolerant to pollution.

WRSIA will continue to work with the Groundhouse River monitoring project, providing WRS students opportunities to serve the community and Mora and Ogilvie students opportunities to learn about and interact with their water resources.

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national and international leadership in this area," said Sullivan.

The Commission's report states that the University is positioned to make significant advances in four essential areas of environmental need: 1) educating students in the dimensions of environmental issues through its array of colleges and departments; 2) applying its diverse array of expertise to multi-disciplinary environmental issues through research, teaching, and outreach; 3) bridging communication gaps that impede decision-making efforts by policymakers, business and industry, consumers, and community-based environmental groups; and 4) providing society with an example of how to integrate land and building management techniques that minimize the consumption of natural resources while ensuring living communities, strong economies, and ecological viability.

In addition to its recommendations, the Commission suggests the University take immediate action on several items to maintain the momentum created by the Commission's efforts; foster discussions across the University; and include community partners. To achieve these objectives, the Commission suggests that the University provide central funding for an information-gathering and Web portal project, institute the Environmental Science and Policy Council, and provide central funds for a service to assist in environmental grant writing. The report notes that "the University has just begun to scratch the surface of these new (environmental) funding opportunities."

The final report of the Commission on Environmental Science and Policy is available online at [www1.umn.edu/enviro/](http://www1.umn.edu/enviro/).

## WRS welcomes incoming graduate students

The Water Resources Science graduate program welcomed 25 students at its orientation August 28, 2002, the largest new class since the program's establishment in 1995. Total enrollment in Water Resources Science now stands at 83 students (33 Ph.D. and 50 M.S.). The diverse group of WRS students come from as far away as Malawi and are advised by faculty in about twelve departments on the Twin Cities campus and at University of Minnesota-Duluth.



## U of M Water Community News

**Al Sullivan** has been appointed the new vice provost for academic programs and facilities. His appointment is effective October 1, upon the conclusion of his current role as dean of the College of Natural Resources.

**Tom Johnson**, Director of the Large Lakes Observatory (LLO), hosted a NSF-sponsored workshop on basic research in large lakes, July 14–16, in Duluth. Twenty scientists from the U.S. and Canada gathered to develop a science and implementation plan for NSF.

**Elise Ralph** (LLO) accepted a temporary appointment at the NSF as program manager in physical oceanography. She will return to LLO after either 1 or 2 years.

**Erik Brown** (LLO) returned from a year's sabbatical in Aix-en-Provence, France, where he was a Fulbright Research Fellow at the University of Aix-Marseille.

Graduate student **Julie Zimmerman** (Fisheries, Wildlife, and Conservation Biology [FWCB]) won the "Sea Grant Student Award for Excellence in Fisheries Science" for her paper, "Effects of agricultural practices on fish communities in two Minnesota watersheds." Julie works with **Bruce Vondracek** (FWCB).

**Roger Arndt** (St. Anthony Falls Laboratory) led a seminar in May on cavitation research at SAFL. He also traveled to Germany in June to discuss on-going research with the Institute for Hydraulic Engineering Research in Obernach, and the Technical University of Munich, and then visited Sweden to serve on a Ph.D. dissertation exam committee at Chalmers University, Gothenburg. Roger's "Cavitation in vortical flows" was published as a book chapter in the Annual Review of Fluid Mechanics.

**Valerie Brady** (Center for Water and the Environment, Natural Resources Research Institute) received a three-year grant from EPA's Science to Achieve Results program to coordinate its Estuarine and Great Lakes (EaGLe) Coastal Initiative.

In August, **John Kingston** (Natural Resources Research Institute) presented "Periodic occurrence of abnormal *Stephanodiscus niagarae* from a eutrophic lake in northern Minnesota" at the 17th International Diatom Symposium in Ottawa, Ontario, Canada. John is also Co-convenor at IDS2002 with **Luc Ector** (Luxembourg) of a workshop entitled "Freshwater diatoms and their role as ecological indicators in rivers and lakes."

**Lawrence Baker** (Water Resources Center) and **Mary Renwick** (WRC) were awarded a grant by the USDA Forest Service-North Central Research Station for their study "Hotspots of landscape change: Identifying key linkages."

The International Water Management Institute awarded **Mary Renwick** (WRC) a grant for her study "Impact assessment of irrigation development in Uda Walawe River" in Sri Lanka. Mary recently received a promotion to Senior Fellow in water policy and economics.

**Bill Arnold** (Civil Engineering) and **Ed Cussler** (Chemical Engineering & Materials Science) were awarded a three-year grant from the Department of Energy's Environmental Management Science Program for their project "Reactive membrane barriers for containment of subsurface contamination."

### Summer 2002 University of Minnesota Water Resources Science Program Degree Recipients

**Erik Heinen**, advised by **Jim McManus** (Large Lakes Observatory), received an M.S. in July 2002. His thesis was titled, "Carbon and Nutrient Cycling in Lake Superior."

**Stefanie Miklovic** received her M.S. under **Susan Galatowitsch** (Horticultural/Landscape Architecture) in July 2002. Her paper was titled, "Effects of Road Salt on Glacial Marshes."

**Benjamin Bertsch** received his M.S. in July 2002. Bertsch was advised by **Howard Mooers** (Geology, Duluth). His thesis was titled, "Groundwater Flow Modeling and the Delineation of Well-head Protection Areas, Cass County, Minnesota."

**Barbara Peichel** received her M.S. in August 2002. Her paper was titled, "A Protocol for Prioritizing Wetland Habitat Restoration in the St. Louis River Watershed." Peichel was advised by **Susan Galatowitsch** (Horticultural/Landscape Architecture).

**Tara Carson**, advised by **Paul Bloom** (Soil, Water, and Climate), received her M.S. in September 2002. Her thesis was titled, "The effect of sediment nutrient variation, water depth and emergent aquatic perennials on wild rice (*Zizania palustris*) production at the Rice Lake National Wildlife Refuge."

**Anne Jefferson** received her M.S. in September 2002. Jefferson was advised by **Patrick Brezonik** (Water Resources Center and Civil Engineering). Her paper was titled, "Early Tertiary and modern hydrological environments of the Stenkul Fiord Area, Ellesmere Island, Canada."





## Upcoming Events

October 7–9, 2002. **Wetlands 2002: Restoring Wetlands and Other Impaired Waters.** Indianapolis, Ind. The goal of this national symposium will be to assess the successes and failures of science and policy related to restoration of wetlands and related waters and to point to methods for improving future success. Contact Tammy Taylor for more information. Tel: (765) 494-1814, or e-mail: [taylor@ctic.purdue.edu](mailto:taylor@ctic.purdue.edu).

October 21–22, 2002. **Bringing It Home: Lessons from the Field for Making Watershed Management Work.** Mt. Sterling, Ohio. This workshop will cover such topics as financial planning and fundraising, TMDL implementation, land use planning, working with local governments, integrating watershed management within a regulatory framework, and tools for watershed planning. Contact Sarah Whitney for more information. Tel: (734) 665-9135, or e-mail: [swhitney@glc.org](mailto:swhitney@glc.org).

October 30, 2002. **Great Lakes Recreational Water Quality Association Annual Meeting.** Chicago, Ill. This meeting will focus on policy, management, and scientific developments regarding recreational water quality monitoring of Great Lakes beaches. Contact Sheridan Haaack for more information at [skhaack@usgs.gov](mailto:skhaack@usgs.gov).

November 14, 2002. **River Summit.** The Second Annual River Summit will be held at the Minneapolis Convention Center.

Minneapolis Mayor R. T. Rybak will be the keynote speaker for this event. Up to 300 volunteers, teachers, professionals, and decision-makers will be in attendance to share information, connect with policy-makers and professionals, and to celebrate Minnesota's rivers. Contact Kevin Proescholdt for more information at [kevinp@umn.edu](mailto:kevinp@umn.edu).

December 3–5, 2002. **Midwest Fisheries Conference.** Bettendorf, Iowa. Because the 2002 Midwest Fish and Wildlife Conference was cancelled, the North Central Division of the American Fisheries Society is sponsoring a Midwest Fisheries Conference in December. Contact Chris Guy for more information. Tel: (785) 532-6634, or e-mail: [chrisgy@ksu.edu](mailto:chrisgy@ksu.edu).

March 25–27, 2003. **Urban Drainage and Highway Runoff in Cold Climates.** Riksgården, Sweden. This conference aims to increase the exchange of information and to encourage international cooperation in the field of urban drainage in cold climates. Participants will include research fellows, engineers, practitioners and management personnel, academics from universities and research institutes, and government representatives. Topics include cold climate trends, hydrological cycle, snow and snowmelt, runoff processes, and urban water quality control issues. Contact Karin Reinodsdotter for more information: e-mail: [karin.reinodsdotter@sb.luth.se](mailto:karin.reinodsdotter@sb.luth.se), or Tel: 46-920-492426.

**CNR dean** continued from page 1

She has also worked as an associate scientist with the H.J. Andrews Experimental Forest and the Shortgrass Steppe Long-Term Ecological Research (LTER) sites. Methods and protocols for research information management developed under her direction are used nationally across the 24-site LTER network. Stafford earned a doctorate in applied statistics and a master's degree in quantitative ecology from the State University of New York (SUNY) College of Environmental Science and Forestry. She has a bachelor's degree in biology from Syracuse University.

"The College of Natural Resources is regarded as one of the top five colleges of its kind in the country, and so I am deeply honored to accept this position," Stafford said. "Our society faces a number of critical environmental challenges, and this college's faculty, staff and students—as part of a land grant university and research institution—have the mission, the message, and the connections to assist people in meeting the challenges associated with sustainable natural resources development."

Stafford's selection is the result of an intensive national search. She replaces Al Sullivan, who has been named Vice Provost for Academic Programs and Facilities.

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# Publications and Resources



*Small Community Wastewater Solutions—A Guide to Making Treatment, Management and Financing Decisions.* 2002. University of MN Extension Service. This 124-page guide for communities making wastewater treatment decisions includes information on using community process to solve problems; collecting and interpreting data; treatment systems; selecting an organizational structure; funding the project; hiring professionals; and implementing the project. Visit: <http://www.bae.umn.edu/~septic/PublicationInfoForm.html>

*A Quick Guide to Small Community Wastewater Treatment Decisions.* 2002. University of MN Extension Service. This four-page guide highlights key components of the decision-making process facing small communities in their effort to select and implement suitable wastewater treatment programs. Visit <http://septic.coafes.umn.edu/>, or Tel: (800) 657-3516.

*Wetlands Fact Sheets.* 2002. Environmental Protection Agency. Twelve fact sheets dealing with wetland topics such as functions and values, monitoring, assessment, restoration, and funding sources. Visit: <http://www.epa.gov/owow/wetlands/factsheets/>. A variety of illustrations are included.

*Great Lakes Directory.* 2002. Great Lakes Aquatic Habitat Network and Fund. This new website provides hundreds of articles related to the Great Lakes, free environmental software, events calendars, grant information, and a search engine that allows visitors to find local and regional grassroots organizations focused on environmental issues. To access the website, visit: <http://www.greatlakesdirectory.org>.

*Protecting and Restoring America's Watersheds.* 2001. U.S. EPA. This report brings together the ideas of local stakeholders, government employees, and academic evaluators on the current state

of watershed management and includes recommendations for improvement in areas such as awareness, monitoring and research, funding, and technical assistance. For a copy of the report, visit: <http://www.epa.gov/owow/protecting/>.

*The Watershed Project Management Guide.* 2002. Lewis Publishers/CRC Press. This 312-page book outlines a new four-step process for developing a watershed-specific management plan. This process can be used to implement a management strategy to meet the load allocations required by an approved Total Maximum Daily Load (TMDL), the goals of a Source Water Protection Plan, USDA programs such as EQIP, or a Section 319 Project. Thomas E. Davenport, an Environmental Scientist for U. S. EPA Region 5, is the author of this book. For more information, visit: <http://www.epa.gov/owow/watershed/publications.html>.