

Green Farms and Blue Lakes: EQIP education helps preserve both

by Les Everett

The 1996 Farm Bill isn't just "Freedom to Farm;" it established the Environmental Quality Incentives Program (EQIP), which pays agricultural producers for environmentally friendly production practices. When the USDA Natural Resources Conservation Service (NRCS) in Minnesota needed to show farmers how to put EQIP-compliant practices on the ground, they sought the help of University of Minnesota faculty who had



Regional workshops teach farmers how to apply manure using environmentally friendly production practices.

researched and recommended many of the practices. Since 1997, NRCS and UM Extension have been cooperating to educate producers and agricultural professionals on crop nutrient, manure, grazing and tillage management. The Board of Soil and Water Resources (BWSR) and the Minnesota Department of Agriculture (MDA) have also joined the partnership, ensuring that farmers and professionals hear a unified message about recommended practices.

Many accomplishments involving

education on crop nutrient and manure management, intensively managed grazing, and grants for locally designed education programs have resulted from the partnership managed by the UM Water Resources Center. Regional workshops have delivered crop nutrient and manure management planning education to 430 producers, agricultural professionals, and agency staff. An educational guide and slide-set for workshop presenters is being distributed to Extension educators, NRCS field staff, and Soil and Water Conservation District staff. This teaching tool will allow many more workshops to be held. The release of this education guide comes just in time to assist producers in meeting the requirements of new state feedlot rules for land application of manure.

Intensively managed grazing is an emerging practice supported by EQIP-incentive payments. An educational guide for in-the-field workshops that assist milk and livestock producers in their transition to intensive managed grazing is nearing completion.

Locally designed education programs addressing a wide range of locally appropriate practices are being supported by a series of education grants throughout the state. Since early 1998, sixty-two local projects, totaling over \$420,000, have been funded. Workshops, field demonstrations, newsletters, and other education methods have addressed stream buffers, manure management, reduced

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Minnesota Water 2000

On April 25-26, 2000, the Water Resources Center will host the 8th biennial Minnesota Water conference at the Minneapolis Convention Center in Minneapolis. This year's conference, entitled *A Watershed Year: Looking back, planning ahead*, will emphasize the integration of science, policy and management of Minnesota's water resources. Plenary sessions will feature a historical overview and a review of the current status of Minnesota's water resources and water policies. Concurrent sessions will focus on the role science, policy, and management have in decision-making. Time also will be scheduled for participants to view and discuss posters. For the call for papers, see page 3. For more information concerning the Minnesota Water 2000 Conference, visit <http://wrc.coafes.umn.edu/water2000>.

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Around the state

WATER RESOURCES UPDATES

Sewage treatment satellite conference

On October 28, a live satellite conference on the future of septic systems was televised in forty-five locations in Minnesota and thirty-five other sites around the country. The program, entitled "The Next Generation of Sewage Treatment: Flushing in the New Millenium," involved home and cabin owners, local agency staff, educators, elected officials, onsite industry professionals and researchers. The conference included a discussion by a panel of experts and

interviews of people who have implemented alternative septic systems. The two-hour conference also provided an opportunity for viewers to phone or fax in questions and receive a live response from the panel. For more information concerning alternative septic systems, or for handouts and videotapes of the session, please contact the University of Minnesota Extension Service at (800) 719-2825.

Excerpt from MN Waterline Newsletter

MPCA study details toxic chemicals in Duluth-Superior Harbor

The Minnesota Pollution Control Agency (MPCA) has released a report of the Lake Superior/Duluth-Superior Harbor toxic loading study, which estimated the harbor's contribution of toxic chemicals to the overall toxic loads in Lake Superior. The harbor and the St. Louis and Nemadji Rivers contained several toxic compounds at levels above designated limits. The report notes that while the concentrations of these toxic compounds are important in terms of water-quality impacts in and near the harbor, the harbor's contribution accounts for only a very small percentage of the overall load of toxic compounds to Lake Superior. The majority of that load comes from atmospheric deposition from within the U. S. and other countries. While the study is not intended to provide a complete picture of the water quality in the Duluth/Superior Harbor and its tributaries, it is useful as an indicator of general trends and as a guide for future monitoring and assessment activities.

Copies are available by contacting Patricia King at the MPCA, (651) 296-8723 or toll-free (800) 657-3864.

Excerpt from MPCA News Release

Citizen comments sought for water plan

As part of the Water Management Unification Initiative, the Environmental Quality Board's (EQB) Water Resources Committee is seeking the comments and suggestions of citizens for the Minnesota Water Plan 2000. This 10-year plan focuses on monitoring 29 indicators in major river basins as a means of measuring progress towards the plan's goals to improve water quality, conserve water supplies, restore ecosystems, and strengthen recreational opportunities. Citizens are encouraged to review the discussion document, *Preparing for Minnesota Water Plan 2000*, and respond either by e-mailing their comments to their local basin team or by attending meetings scheduled for each of the state's major water basins. For more information, please visit the EQB's web site at <http://www.mnplan.state.mn.us>.

Coordinating volunteer stream monitoring

A strategic plan to guide volunteer stream monitoring in the seven-county metropolitan area has been developed through efforts of a broad partnership of educators, agencies, and non-profits. The plan includes goals and recommendations for engaging volunteers and involving agencies, and for quality assurance and data management.

The plan was funded by a grant from the Met Council to the Rivers Council of Minnesota and was developed and supported by the WaterShed Partners, an informal collaboration of 45 organizations in the Twin Cities working on watershed education. For copies of the strategic plan, please contact the WRC at (612) 624-9282.

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Annual call for UCOWR dissertation award

The University Council on Water Resources (UCOWR) has announced its annual call for Ph.D. dissertation awards. Each year, the UCOWR recognizes two outstanding Ph.D. dissertations on water issues in 1) water policy and socio-economics and 2) natural science and engineering. The award consists of a certificate and a \$750 cash award, reimbursement up to \$1,000 for travel expenses to the UCOWR annual meeting, and a registration waiver to attend the annual UCOWR meeting. To be eligible for the awards, candidates must have completed their Ph.D. dissertations within the last two years or anticipate meeting all graduation requirements by June 20, 2000. Each university that is a member of UCOWR may submit only one application in each of the above two categories.

Applications are due January 14, 2000 and winners will be announced on April 30. For further information or an application packet, contact Jim Anderson, a University of Minnesota delegate, at (612) 625-8209.

Minnesota Rivers

Minnesota Rivers, a publication designed to serve as a basic reference to Minnesota's river systems, will be released this month by the Water Resources Center. The primer describes how rivers function and provides more detailed information on such topics as how Minnesota rivers are managed; how policy, planning, and management activities affect the rivers; and how the rivers are monitored. Booklets providing detailed profiles of the State's four great rivers (the Red, Mississippi, St. Croix, and Minnesota Rivers) are planned for future publication. For more information or to obtain a copy of *Minnesota Rivers*, please contact the Water Resources Center at (612) 624-9282.

Call for Oral and Poster Papers

Minnesota Water 2000

A Watershed Year: Looking back, planning ahead

Dates: April 25-26, 2000

Location: Minneapolis Convention Center, Minneapolis

DEADLINE for receipt of abstracts: Friday, January 14, 2000

Plenary sessions will focus on assessing the status of Minnesota's water resources as we enter the next century, reviewing what we've learned over the past 100 years, and integrating science, policy, management, education, and economics to explore the future of our water resources. Concurrent sessions will focus on specific water resources issues. Presenters will be asked to consider how policy, management, and science are integral to the subject or case study presented.

Topics for papers include:

- ecological indicators
- drainage, flooding, or water supply issues
- cumulative impacts of development on water resources
- changing patterns of use and resulting change in water quality
- case studies on Minnesota rivers, lakes, watersheds, or ground water aquifers

Abstract requirements:

- brief description of presentation (100-150 words)
- title, author(s) name, affiliation, and e-mail in the abstract
- separate address, phone, and fax for one contact person, and preference for oral or poster presentation
- Word or WordPerfect attachment, single-spaced in 11-12 Times Roman or similar font

Submit abstracts electronically to thoma032@tc.umn.edu. Those unable to submit electronically may submit a hard copy to MN Water 2000, Water Resources Center, 146 Classroom Office Building, 1994 Buford Avenue, St. Paul, MN 55108. For questions, call (612) 624-9282 or visit <http://wrc.coafes.umn.edu/water2000>.

Center focuses on ecological risk assessment

by Stefanie Miklovic

Ecological risk assessment (ERA) is the science of identifying stressors and predicting the severity of their effects on ecosystems. Today, environmental agencies are turning increasingly to ERA as a useful tool in making decisions about pollution regulation and ecosystem management. Using ERA requires vast amounts of information about the stressor and the environment as well as coordination among the parties involved in the ERA. To aid in the exchange of information and coordination of research and outreach on ecological risk assessment in the Midwest, a cross-disciplinary group of faculty created the Midwest Ecological Risk Assessment Center (MERAC) with the help of an interdisciplinary center grant from the University of Minnesota Graduate School.

"MERAC was designed to serve as an information center. Its mission is to facilitate interactions [among those involved in ERAs] and provide educational opportunities, rather than to conduct research," said Deborah Swackhamer, director of MERAC. MERAC holds colloquia centered on ERA theories, case studies, and application; and has developed a course, *Ecological Risk Assessment*, open to students and working professionals. Members of MERAC come from a variety of departments and academic units within the University as well as from many state and federal agencies.

Since its inception in 1998, MERAC has held three colloquia, bringing professionals together to discuss methods, projects, and problems associated with ERAs. Topics have included ERAs of the St. Croix and Minnesota Rivers, economic valuation and its use in risk management decisions, and the role of ERA in assessing damage from exotic species and determining how to control them (see inset). A colloquium

Colloquium discusses environmental risk assessment of exotic species

The Midwest Environmental Risk Assessment Center (MERAC) hosted a colloquium on November 4 at the Minnesota Valley National Wildlife Refuge at which three presenters described how environmental risk assessment (ERA) is used to assess the risk of exotic species. Rob Venette, Department of Entomology, began the discussion with an explanation of the theory of stages of invasion and the use of ERA to assess the risk of exotic species at each stage. Ray Newman, Department of Fisheries and Wildlife, presented a discussion of using ERA prospectively to assess the risks and benefits of introducing an exotic species for the biological control of an invasive species. Jay Rendall, Minnesota Department of Natural Resources, followed with a description of how ERAs are used to regulate and manage exotic species. The colloquium ended with an open discussion among the attendees (state agency affiliates, University of Minnesota faculty and students) and presenters about the problems and benefits associated with conducting ERA of exotic species. For more information about this colloquium or future colloquia, contact Barbara Murdock at (612) 626-0149.

on natural resource damage assessment resulting from contamination at Superfund sites is planned for February 2000.

In *Ecological Risk Assessment*, offered Spring Semester 2000, students will be introduced to the theories and practices of ERAs through a review of several case studies and by working on risk assessment projects in their areas of expertise. Robert Venette (Department of Entomology) will teach the course in collaboration with Steve Simmons (Department of Agronomy and Plant Genetics), Deborah Swackhamer (Division of Environmental and Occupational Health), Patrick Brezonik (Department of Civil Engineering), Jim Perry (Department of Forest Resources), and Edward Nater (Department of Soil, Water, and Climate). A CD-ROM module and bibliography are currently being developed for use in the class or for independent study. The CD-ROM module, expected to be complete in 2001, will contain quantitative exercises, examples, and case studies. The bibliography details what ERA resource materials are held in MERAC's library (located in the Water Resources Center), and other libraries on campus. It will be accessible on the MERAC homepage in January 2000.

For more information, visit the MERAC web site at <http://www.merac.umn.edu>.

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tillage, grazing management, nitrogen management for wellhead protection, conservation awareness for women landowners, and other topics.

Programs are designed and organized by staff from Soil and Water Conservation Districts, watershed districts, and county water planners, and are delivered by local, regional, and state staff of Extension and other agencies.

Coordination of local educational activities, development of educational materials, and liaison with other Extension programs is carried out by four regional Extension EQIP Education Coordinators, funded by NRCS, BWSR, and Extension, and assisted by specialists from these organizations. With the added participation of MDA and the Pollution Control Agency in crop nutrient and manure management, EQIP education is an excellent model for teamwork in service to agriculture and the environment. For more information about EQIP education programs, contact Les Everett at (612) 625-6751.

Water Resources student wins Lindbergh grant

by Marcey Westrick

Can a soil scientist and an environmental artist create a new kind of sod that could “interrupt the predominant visual and ecological idiom of the American lawn?” Kathy Draeger, a Water Resources Science doctoral candidate and owner of the consulting firm, Environmental Grounds, and Christine Baeumler, a local artist, have won one of ten Charles A. and Anne Morrow Lindbergh Foundation grants. The grants are awarded to those people attempting to balance technology and nature.

Together, Draeger and Baeumler will attempt to sow native prairie plant seeds into mats made of fibrous waste from paper mills and recycled bio-solids from sewage treatment facilities. The duo envisions people using their mats to create a swath of prairie along a fence or a geometric island of landscaped prairie in their front yard.

Lawns incorporating native vegetation may be more aesthetically appealing and more attractive to wildlife. One of the main benefits of the new sod would be to increase wildlife habitat in people’s yards. Traditional green, monocultured lawns have replaced nesting habitats for many birds, food sources for butterflies, and refugia for small animals.

Traditional sod also requires large amounts of water, fertilizer, and pesticides to maintain its manicured appearance. The new mats proposed by Baeumler and Draeger do not need as much watering, fertilizer or pesticides and will help minimize contaminated runoff. In addition, the mats could be used to prevent erosion around construction sites, along roadsides and in mine reclamation areas. The grant will allow the two to use test plots to study the shape, color, texture, and growth times to see which plants work the best with various waste materials.

MinnAqua: A Year in Review

by Roland Sigurdson

Fiscal year 1999 has been a year of change for the MinnAqua aquatic education program. In November of 1998 Linda Erickson-Eastwood (Aquatic Resource Education Coordinator) was promoted to Program Manager of the DNR Section of Fisheries. In January of 1999 Bob Gibson was hired to fill the vacated Coordinator position. In March of 1999 the Metro Aquatic Education Specialist moved from the Center for 4-H Youth Development to the Water Resources Center on the St Paul Campus of the University of Minnesota.

Amidst these changes, however, MinnAqua continued to meet the increasing demand for aquatic education and fishing programs throughout Minnesota. In April of 1999, nine program interns completed instructor training to facilitate regional programs. This year’s collaborative intern positions were housed with Crow Wing County Extension, Lake Superior Center/Great Lakes Aquarium, Hennepin Parks, and the JD Rivers Outdoor Discovery Center. Others were housed with DNR Fisheries staff in regional or area offices.

A number of projects were completed this year including a self-guided interpretive trail along Duschee Creek near Lanesboro and an informational trail at the French River Hatchery site north of Duluth. A joint MinnAqua/4-H Fishing Sports training took place in May at the Cloquet Forestry Station. Adult and Junior leaders were given training, curricula and resource materials available from 4-H and DNR to assist them in developing a Fishing Sports Club in their own counties or clusters. The training received high marks from attendees.

Budget cuts to the program as a result of legislative action will cause MinnAqua to provide fewer large-scale public events this year. However, planning continues with DNR Non-Game Wildlife and the Water Resources Center to provide training for lake shore property owners and lake associations regarding aquatic plant management/restoration and shoreland development issues. Additionally, program interns will be hired again for all regions and continue to function as they have in the past. We are looking forward to a tremendous year in aquatic education!

House passes the Conservation and Reinvestment Act

The U. S. House of Representatives recently passed a bill that may guarantee the annual allocation of \$900 million to the Land and Water Conservation Fund, which provides funding for both state and federal conservation and preservation programs. The bill, entitled the Conservation and Reinvestment Act of 1999 (H.R. 701), would also secure funding for Outer Continental Shelf Impact Assistance, Conservation Easements & Species Recovery, Wildlife Conservation and Restoration, Urban Park and Recreation Recovery, Historic Preservation, and Federal and Indian

Lands Restoration programs. Money for these allocations would come from revenues collected from oil companies drilling in U. S. waters. The majority of this money (typically about \$4.5 billion each year) is currently dedicated to a variety of other programs. If signed, the bill is projected to provide a total of \$40 million to various Minnesota programs, with approximately \$16 million directed toward land and water conservation projects. For more information, please visit <http://www.house.gov/resources/ocs/>.



Minnesota Water Community News

Kim Shulz (Ecology, Evolution, and Behavior), a research associate and graduate student of Bob Sterner, has accepted a position at the State University of New York–Syracuse as an assistant professor beginning January 1.

Ed Nater (Soil, Water, and Climate), **Pat Brezonik** (Director, Water Resources Center; Civil Engineering), and **Jim Cotner** (Ecology, Evolution, and Behavior) are co-investigators on a EPA-funded study of mercury transport from wetlands to lakes in forested watersheds located in Marcell, MN. They are collaborating with scientists from the MPCA and the Science Museum of Minnesota on the three year project.

Cotner has also received a \$28,000 grant from the University of MN Grant-in-Aid program for his project, “Organic Matter Degradation in Lake Superior: Mediation by UV Radiation and Bacteria.”

Bob Sterner (Ecology, Evolution, and Behavior), together with **Cotner**, has received a \$601,000 grant from the National Science Foundation for a study entitled, “Biological Stoichiometry: From Genes to Ecosystems.” **Sterner** also recently attended two NSF workshops, one in South Carolina on zooplankton nutrition and the other in Washington, D.C., entitled, “New Frontiers in Ecology.”

Jeff Gunderson and **Doug Jensen** (Minnesota Sea Grant) have received \$358,000 in funding from the National Sea Grant College Program to begin two aquatic nuisance species (ANS) projects. The first project will look at reducing the risk of spreading ANS when baitfish are harvested in infested waters. The second project involves conducting a multi-state survey to evaluate the effectiveness of ANS boater education programs.

Ira Adelman (Head, Fisheries and Wildlife), **Terry Allendorf** (Fisheries and Wildlife), **Jim Perry** (Forest Resources), **Andrew Simons** (Fisheries and Wildlife), **J.L. David Smith** (Conservation Biology), **Deborah Swackhamer** (Environmental and Occupational Health), and **Bruce Vondracek** (Fisheries and Wildlife) will travel to Nepal in January at the request of the Nepalese Ministry of Forests. The group of University faculty will conduct a survey of the Narayani River basin and begin to work with Nepalese counterparts to develop a proposal to maintain the health and integrity of the Narayani River ecosystem.

Swackhamer was recently appointed to the National Research Council’s WSTB/BEST Committee on Drinking Water Contaminants. The committee is in the process of prioritizing all types of potential drinking water contaminants for the EPA.

Lucinda Johnson and **Catherine Johnson** (Natural Resources Research Institute) have received a three-year grant from the EPA’s Science to Achieve Results (STAR) program to study the effects of forest fragmentation on wetland-dependent amphibians.

Robert Tippin, **Tony Runkel**, and **Barbara Palen** (Minnesota Geological Survey) have recently received a grant from the Southeast Minnesota Water Resources Board to investigate bedrock aquifer characteristics in southeastern Minnesota.

John Kingston has joined the Center for Water and the Environment as a research associate. He will be initiating Natural Resources Research Institute (NRRI) research at the Ely Field Station.

Kingston comes to the NRRI from the U.S. Geological Survey in Arvada, CO.

Carol Johnston (Natural Resources Research Institute) was elected Chair-Elect of the Wetland Soils Division of the Soil Science Society of America.

Johnston was also re-appointed to the U.S. Environmental Protection Agency Science Advisory Board by Carol M. Browner.

Gerald Niemi (Director, Center for Water and the Environment) has been named a U.S. representative to the Lake Superior Bi-national Forum. The forum advises U.S. and Canadian governments about critical issues relating to Lake Superior.

Ray Newman (Fisheries and Wildlife) presented “The importance of prior experience and population source in the determination of host range” at the International Symposium of the Global International Organization for Biological Control in October. The symposium was held in Montpellier, France.

Pat Brezonik co-organized a session of cumulative impacts of development of lakes with **Dick Osgood** (Ecosystem Strategies) for the annual meeting of the North American Lake Management Society in Reno, NV. **Erin Day** (WRS graduate student) presented a paper on remote sensing.



Upcoming Events

February 19-20. **LiMNology Science 2001: New Technologies.** Siren, WI. This conference aims to bring together faculty and students from the University of Minnesota to share ideas on how technological innovation advances limnological science. For more information, contact Sue Julson at (612) 624-4238 or visit <http://www.limnology.umn.edu>.

February 24-26. **State of the Rivers Annual Conference.** Hamline University, St. Paul, MN. For further information, contact Molly MacGregor (218) 547-3583.

April 9-12. **Gulf of Mexico Symposium 2000.** Mobile, AL. This symposium will bring together scientists, citizens, educators, government representatives and students to share and discuss critical issues and challenges concerning the Gulf of Mexico. For more information, contact Lisa Adams at (334) 621-1541 or E-mail: acf@the.gulf.net.

April 12. **Carbon Cycling in the Ocean.** University of Minnesota. Rob Benner from the University of South Carolina will give a seminar on the above topic. For more information, contact Jim Cotner at (612) 625-1706.

April 13-14. **Third Annual Conference on Great Lakes' Law, Science & Policy.** Toledo, OH. A look at contaminated sediments from both legal and scientific perspectives. This program will have experts from both the United States and Canada discuss the causes, prevention and remediation of contaminated sediments from technical and legal frameworks. For more information, contact Gary L. Overmier at (419) 530-4179 or E-mail: govermi@pop3.utoledo.edu.

April 16-19. **3rd International Conference on Modeling Groundwater Flow.** East Gull Lake, MN. The Department of Civil Engineering is organizing this international conference on Analytic Element Groundwater Modeling. Events will include a tutorial on the method, and presentations and panel discussions on topics such as 3D analytic modeling, multi-phase flow, regional modeling, and transient flow. For more information, contact Josh Curlee at (612) 625-5522 or visit the conference website at <http://www.ce.umn.edu/AEMGroundwater/>.

April 25-26. **Minnesota Water 2000—A Watershed Year: Looking Back; Planning Ahead.** Minneapolis, MN. This conference will focus on the status of Minnesota's ground and surface waters as we begin the millenium. For further information, contact Tracy Thomas at (612) 625-2282 or E-mail: thoma032@tc.umn.edu.

May 3-5. **Bridging the River.** St. Paul, MN. This conference will focus on bridging communication between communities along the Upper Mississippi. For more information, contact George Orning at (612) 625-0081 or E-mail: ornin002@tc.umn.edu.

We're moving...again!!

The Water Resources Center will be moving in March to 179 McNeal Hall, 1985 Buford Avenue, on the St. Paul campus. Our telephone and fax numbers will remain the same. Please make the change in your address books!

Got a water question?



Call

Minnesota Water Line

1-800-455-4526



New Publications

Public Perceptions of the impacts, use, and future of Minnesota Lakes: Results of the 1998 Minnesota Lakes Survey. K.A. Anderson, T. Kelly, R.M. Sushak, C.A. Hagley, D.A. Jensen, G.M. Kreag. Read about the results of the 1998 public perception survey designed by the University of Minnesota Sea Grant and the Minnesota Department of Natural Resources. Available from Sea Grant at <http://www.d.umn.edu/seagr/areas/water/survey.html>.

Well Owner Handbook. Do you own a well in Minnesota? Are you interested in understanding your well system? If so, the Minnesota Department of Health has a new handbook for you. The 30-page owner's manual is free of charge to residents of Minnesota. Available from the Minnesota Department of Health at (651) 215-0811 or (800) 383-9808.

Strategic Directions for the U.S. Geological Survey Ground-Water Resources Program: A report to Congress. November 30, 1998. The

report describes the importance of groundwater to the Nation, outlines evolving groundwater issues, and describes the current USGS activities and future directions of the Ground Water Resources Program. Available from the USGS: call (612) 783-3100 or visit <http://water.usgs.gov/ogw/gwrp/stratdir/>.

The quality of our nation's waters: nutrients and pesticides. 1999. This report is the first in a series of non-technical publications designed to describe major findings of the National Water-Quality Assessment Program regarding water quality issues of regional and national concern. Available from the USGS at (612) 783-3100 or visit <http://water.usgs.gov/pubs/circ/circ1225/>.

Hydrologic Science Priorities for the U.S. Global Change Research Program: An Initial Assessment. August 24, 1999. This report contains preliminary assessment of the hydrologic science content of the U.S. Global Change

Research Program and focuses attention towards the most critical missing hydrologic science elements. Available from the National Academy Press: call (202) 334-3313 or visit <http://www.nap.edu>.

Compilation of National Recommended Water Quality Criteria. The EPA has published a compilation of water quality criteria for the protection of aquatic life and human health for approximately 150 pollutants. Available from the EPA at (202) 260-2787 or visit <http://www.epa.gov/OST/>.

Regional hydrogeologic assessment: Quaternary geology-Upper Minnesota River Basin, Minnesota, 1999. C.J. Patterson. Available from the Minnesota Geological Survey at (612) 627-4780.

The Great Mississippi, 1999. Thomas Jabusch. A brochure describing the benefits of the Mississippi River. Available from the Water Resources Center at (612) 625-9798.

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