

Minnegram On-line

March 1997

Twin Cities Host North American Lake Management Society's Annual International Symposium

The 16th Annual NALMS Symposia was held at the Radisson South, in Bloomington on Nov. 13-16, 1996. This was the first time the NALMS conference was held in the Twin Cities since 1978. The 1996 Symposia drew over 800 people making it the best attended NALMS event ever (pretty good considering the weather). Attendees came from across the U.S., Canada, and Mexico, as well as several other countries including Russia, Japan, South Korea, South Africa, Peru, Sweden, and Germany.

The conference theme was "People, Lakes, and Land: Puzzling Relationships." This theme acknowledged and reinforced the significance of interpersonal relationships in the management of water resources. The several papers addressed this topic and provided a valuable addition to the many papers dealing with more technical aspects of lake and watershed management.

The opening plenary sessions included welcomes from St. Paul Mayor Norm Coleman and Minneapolis Park Board President, Patricia Baker. They commented on lake projects in their respective areas. The plenary also featured presentations by Dr. Stanley Ponce, Director of Research for the Bureau of Reclamation, and limnologist Dr. Joseph Shapiro. Dr. Shapiro chose to take a more spiritual approach to lake management with his talk "The Zen and Now of Limnology and Lake Management."

In addition to informative sessions, the conference provided training opportunities for a wide range of lake managers including lake association members, teachers, water planners, watershed district managers, as well as professional scientists.

Pre-conference training workshops featured "Phosphorus Inactivation and Interception" by Dennis Cooke and Gene Welch, University of Washington, and "Water Quality Modeling" by Dr. Stephen Chapra, University of Colorado. Other workshops focused on zooplankton identification, algae identification, and P8 stormwater modeling.

Prior to the conference, the St. Paul Water Utility and the Minnehaha Creek Watershed District sponsored a poster contest for grade and middle schools. Over 40 papers were submitted. After judging, Mayor Colman and Pat Baker presented awards for the best posters. Many participants also attended tours of projects in the St. Paul water utility watershed and Minnehaha Creek watershed as part of the conference.

Overall, the conference was a great success. The State of Minnesota was well represented, except, perhaps, by the weather. Staff from the Minnesota Pollution Control Agency (MPCA),

Minnesota Department of Natural Resources (MNDR), and Met Council were instrumental in organizing this event. The Board of Water and Soil Resources (BWSR), Minnesota Extension Service, Minnesota Sea Grant, and the Natural Resources Research Institute (NRRI) of the University of Minnesota also played prominent roles in helping to organize the conference in addition to providing numerous speakers. From the first announcement to the last speaker, those attending the meeting left with a great impression.

Copies of the final program brochure (including abstracts) are available for a small fee from NALMS, Madison, WI (608) 233-2836.

Minnesota River Project Takes Interdisciplinary Approach

An interdisciplinary team of researchers from the University of Minnesota's Graduate Program in Water Resources Science has been awarded a three-year grant of \$813,000 from the U.S. Environmental Protection Agency and the National Science Foundation. The team, led by U of MN professors Pat Brezonik (Civil Engineering), Jim Perry (Forest Resources), Dave Mulla (Soil, Water, and Climate), and Bill Easter (Applied Economics), is interested in improving watershed management in agriculturally impacted watersheds. Their research will investigate the complex relationships between water quality degradation, land and river characteristics, and management strategies.

Specifically, the team will investigate the discrepancy between the scale at which aquatic and terrestrial processes occur, and the scale at which management efforts are conducted. By looking at variance in water quality, watersheds, and stream conditions at several spatial scales, the team hopes to provide biophysical data that will allow water quality managers to target their efforts more efficiently.

The team will work within the large and complex Minnesota River Basin. The basin has been the subject of intense interest within Minnesota for the past decade because of poor water quality in the Minnesota River and its tributaries, and because of potential impacts of pollutant loadings on the downstream Mississippi River. Efforts to understand and document the source of the Minnesota's water quality problems have been the focus of a local, state, and federal multi-agency effort, and plans to restore the water quality and pollutant runoff from the surrounding landscape are underway.

The EPA / NSF project is comprised of three interconnected components. One component is studying how variations in land characteristics influence the transport of nutrients and sediment into streams. This work is being conducted at three spatial scales: major watershed, minor watershed, and agroecoregion. The objective of this component is to understand at what scale distinctions between regions based on water quality impacts need to be made for effective management. To accomplish this, the team is testing the correlation between various landscape characteristics and processes contributing to water quality degradation such as phosphorus runoff and sediment transport. The team hypothesizes that, due to differences in slope, soil type, land

use, and other characteristics, different agroecoregions within watersheds have varying potential to cause water quality problems.

A second component is addressing in-stream processes such as macroinvertebrate production and nutrient retention within and among various watershed divisions (e.g. agroecoregions). As with the first component, this work is being conducted at three spatial scales. Results from the aquatic and terrestrial phases will be integrated to provide insight into at what scale landscapes and streams are most closely linked.

The third component is focusing on socio-economic processes that affect water quality management for the Minnesota River. This aspect of the project will use surveys to assess what various stakeholders in the watershed value, and what incentives might be most effective in reducing water quality degradation within the basin. Biophysical data provided by the first two components, along with analyses of management activities from the third component will be used to make recommendations for improving management of the basin.

Natural Rivers Inspire Rivers Council of Minnesota

The Rivers Council of Minnesota is a new nonprofit dedicated to helping Minnesotans protect their streams and rivers. The Council was organized -- bylaws adopted, board appointed, and activities discussed -- at a meeting at Hamline University last October.

Participants at the October meeting agreed that river protection should begin with the community. The mission of the Rivers Council of Minnesota affirms that commitment to community and focuses on the protection, maintenance, and restoration of Minnesota's 92,000 miles of rivers. The council will be guided by the principle of achieving the highest riverine ecological integrity possible within the context of the natural conditions of and cultural uses sustained by each of the state's rivers.

A steering committee met for a year to establish a framework for the nonprofit and draft a mission statement. During the year it received support from state agencies and other organizations including a \$215,000 grant from the Northwest Area Foundation.

Board members represent all areas of the state and include local elected officials, private citizens and directors of grassroots organizations. A technical advisory committee that includes local units of government, researchers, state agency representatives, attorneys, activists, and educators has been established. For more information call (612) 690-0690.

Minnesota's New Water Center Full Speed Ahead

After a period of moving furniture, reconfiguring networks, and hiring additional personnel, the new Minnesota Water Resources Center (WRC) is moving on to more water related activities.

The new center is an expansion of the former Water Resources Research Center of Minnesota (WRRC).

The WRC represents a partnership among three water-related programs in separate collegiate units on the University of Minnesota's St. Paul Campus: the College of Agriculture, Food and Environmental Science's Center for Agricultural Impacts on Water Quality (CAIWQ), the Minnesota Extension Service's Water Quality Program (MES), and the College of Natural Resource's Water Resources Research Institute (WRRI). Additionally, the St. Paul office of the Minnesota Sea Grant Program is housed in the WRC office suite. The primary goal of the new center is to enhance the production and delivery of University-based water resources research to decision makers throughout Minnesota.

A strength of the new center is that it brings together programs with shared goals, but differing areas of expertise. The CAIWQ specializes in promoting research on agriculturally driven impacts to waterways, while the MES water quality program focuses on implementing outreach and community centered educational projects. The WRRI, which is part of a national network of 54 water centers, concentrates on funding water resources research, sponsoring professional outreach programs, and serving the university's broader water community through providing opportunities for graduate education in water resources.

The three programs which now comprise the WRC have been active at the University of Minnesota as individual units for years. The new arrangement allows the individual programs to retain distinct identities while enhancing the effectiveness of each unit by improving communication, reducing duplication of effort, lowering overhead, and fostering an environment of idea sharing and cooperation. Joint projects such as this newsletter and an expanded program of conferences and workshops will help create cohesion among the sub-units.

In addition to the WRRI, MES, and CAIWQ, the WRC is administrative home to the University of Minnesota Graduate Program in Water Resources Science (WRS). The center will enhance educational opportunities for graduate students by exposing students to a variety of research and professional activities.

Community Water Education For Youth Video Conference

"Community Water Education for Youth," a national live video conference for youth leaders and educators, will be broadcast from Wisconsin on May 1, 1997 12:30-3:00 CDT. A downlink, sponsored by the Water Resources Center and MES, will be available free of charge in Minnesota.

Metro participants will gather at the St. Paul Student Center, Minnesota Commons from 12:00 - 3:30. The satellite conference will offer a chance to see the WaterShed, a new interactive display on urban watersheds, and will provide information for reserving the display for upcoming events.

If you are interested in participating at the Metro site or in downlinking this video conference in your area, please contact Tracy Thomas at the Water Resources Center (612) 625-2282 or E-mail: tthomas@mes.umn.edu.

Weevil Shows Potential to Control Milfoil

University of Minnesota Sea Grant researchers think a tiny freshwater weevil (*Euhrychiopsis lecontei*) shows promise as a possible control for Eurasian watermilfoil. Eurasian watermilfoil is an exotic plant that has infested North American waters since the late 1940s. It can form dense mats of vegetation that crowd out native aquatic plants, clog boat propellers, and make water recreation difficult. In Minnesota, the spread of watermilfoil, usually due to accidental transport by boaters, is an increasing problem.

Susan Solarz and Ray Newman (University of Minnesota, Dept. of Fisheries and Wildlife) conducted experiments with a native weevil that normally eats northern watermilfoil, a usually benign native relative of the Eurasian type. Solarz and Newman found that weevils introduced to Eurasian watermilfoil in a lab setting prefer to lay eggs on the Eurasian variety over native varieties. The weevil lays its eggs on the tips of the milfoil plant. Once they hatch, the young burrow down the stem, eating their way through the plant, slowing growth. Under the right environmental conditions, this could provide a chemical-free control method.

"Their results show that the weevils are definitely worth looking into as a control method and that additional research is necessary," said Chip Welling, coordinator of the Minnesota Department of Natural Resources Eurasian watermilfoil program.

"Finding a natural way to inhibit Eurasian watermilfoil is important," said Newman. "Although it is unlikely the weevils will eradicate Eurasian watermilfoil infestations, under certain conditions which we are still investigating, they can reduce the amount of the plant that spreads across the water's surface. This can provide major benefits, especially for boaters."

According to Newman, the prospect of a natural control has distinct advantages. "First, these weevils are already here; there isn't the danger of adding a new exotic pest," said Newman, "The weevil specifically targets Eurasian watermilfoil, reducing the risk that native plants will be harmed in the process. Second, effective biological controls may result in long-term declines at a relatively low cost. This reduces the need for repeated treatments usually required with chemical and mechanical controls."

Solarz and Newman also discovered that once weevils are reared on the exotic plant in the lab, they spend more time looking for it if the Eurasian variety is removed, instead of simply switching to the native species. They eventually can switch, but the weevils have long coexisted with the native variety.

Solarz and Newman's results were recently published in *Oecologia*. A reprint of this journal article, "Oviposition Specificity and Behavior of the Watermilfoil Specialist, *Euhrychiopsis lecontei*," is available from Sea Grant by calling (218) 726-6191

Sea Grant Premier's New Exotic Species Web Site

Anyone requiring science-based information on zebra mussels and other nonindigenous species can now obtain it at the touch of their fingertips thanks to the Great Lakes Sea Grant Network. The Sea Grant Zebra Mussel and Nonindigenous Species World Wide Web site (SGNIS) contains a comprehensive collection of research publications and education materials produced by Sea Grant programs across the country.

The site, which contains more than 150 research reports and 60 educational items, can be accessed through the World Wide Web, Telnet, or directly through a modem. The address is: **<http://www.ansc.purdue.edu/sgnis/>**.

Although currently focused on zebra mussels, the site also contains Sea Grant information on four other invaders, the Eurasian ruffe, round goby, sea lamprey and spiny waterflea.

This site is useful for industrial and municipal water users, shoreland property owners, boaters, resource management agencies, students, teachers, outreach professionals, and researchers. "We hope the site will give people the information they need to help prevent or slow the spread and improve the control of invading species," said Al Miller, project coordinator from the Wisconsin Sea Grant Institute.

All entries, with the exception of conference proceedings and newsletters, have been peer-reviewed to ensure they are of the highest quality science. The searchable site allows entry via "Products" available, "Users" of the materials, "Key Words" or through a site search engine.

The search engine allows browsers to search for documents by title, author(s), the organization of the author, date of publication, users, products and keywords.

The site provides numerous links to other internet sites dealing with nonindigenous species. In coming months, the site will expand to include more comprehensive coverage of nonindigenous species in the Great Lakes Region.

Story courtesy of MN Sea Grant

Zebra Mussels Found On St. Croix Substrate

Officials of the St. Croix National Scenic Riverway have been fearing the introduction of the prolific zebra mussel into St. Croix waters for years. In mid-August, these fears were realized.

Despite strict boater restrictions to prevent the introduction of the mussel, two adult zebra mussels were found attached to bottom substrate in the St. Croix River near Stillwater, MN. This was the first discovery of a zebra mussel in the St. Croix living somewhere other than on the hull of a boat.

The find is discouraging given the efforts of the National Park Service, the U.S. Fish and Wildlife Service and the Minnesota and Wisconsin Departments of Natural Resources in recent years to stall the spread of the zebra mussel into the St. Croix. In addition to rigorous boat inspections, several recent educational efforts have promoted awareness of the rich native mussel fauna in the river. The invasion of zebra mussels in the St. Croix may mean the demise of many native mussel species, including two federally endangered species.

Despite the fact that the two zebra mussels were found living in the St. Croix, there is little evidence to suggest there is a reproducing zebra mussel population. This is good news for agencies who hope that management of boating activity may yet win the battle against the zebra mussel in the St. Croix.

Efforts to slow the spread of the zebra mussel into the St. Croix were intensified this past summer. For the first time, random boat inspections were conducted by divers on the St. Croix. To support this effort, both Minnesota and Wisconsin adopted laws which give state inspectors authority to fine boat owners if zebra mussels are found on their boats.

Student Competition

The Hydrolab Corporation of Austin, Texas, the University Council on Water Resources and the American Water Resources Association (AWRA) have teamed up in an effort to reward outstanding water resources students across the nation.

This year's AWRA Annual Conference in Long Beach, CA will feature three student-only awards. The first, sponsored by the Hydrolab Corporation, will award \$300 and a one year membership in AWRA for the best student paper presentation. The second and third awards will be for best graduate and best undergraduate paper and will be sponsored by UCOWR and AWRA. Winners of both awards will receive \$250 and a one year membership in AWRA. The papers will be judged on three categories: technical content, structure and organization, and creativity and originality.

For more information contact: Earl Spangenberg at (715) 346-2372 or E-mail: espangen@uwsp.edu

Minnesota Water Community News

Biosystems and Agricultural Engineering

John Nieber, along with **Satish Gupta**, **Carl Rosen** and **Craig Shaeffer**, has received funding from the MPCA to conduct a study involving the modeling of water flow and solute transport in soils and groundwater at a site where food processing wastewater is applied to the land.

Abdel Karim Abulaban has hired as a new research associate. He will work on projects involving modeling soil hydrology, groundwater flow, and solute transport.

Fisheries and Wildlife

Anne Kapuscinski, professor, was part of a USDA scientific exchange team which traveled to China in October in an effort to learn about aquatic biotechnology activities and to stimulate collaboration.

Geology and Geophysics

Mark Person began the 36 date Birdsall-Dreiss Hydrogeology lecture tour on January 22. The tour, which started in California, will wind up in the Twin Cities sometime in April. Person will give two talks "Scientific visualization in hydrogeology" and "Basin scale hydrological modeling: problems, solutions, and applications."

Natural Resources Research Institute

Randall Hicks (Biology Associate Professor, UMD) attended the North Central Branch Meeting of the American Society of Microbiology in Milwaukee, WI, October 11-12, 1996. He presented an invited paper in the aquatic microbiology session entitled "Different Genetic Characters of Communities Across Thermal Barriers in the Great Lakes Spoil the Myth of Structurally Uniform Bacterial Plankton."

Soil, Water, and Climate

David Mulla traveled to the Netherlands from January 18-25 to present a paper "Geostatistics, remote sensing, and precision farming" at a CIBA workshop.

Ken Davis has been appointed as an assistant professor of Climatology.

Water Resources Center

Barbara Liukkonen has been named the new education coordinator for the new Water Resources Center. Previous to her new appointment Barbara held a joint educational position with the Board of Water and Soil Resources and the Minnesota Extension Service. There she developed and provided water resources education for over 40 counties in Northern Minnesota. Liukkonen holds a B.A. in biology and an M.S. in geology. As education coordinator she will be responsible for connecting Minnesotans with University researchers and research so they can make informed decisions and take action to protect Minnesota's water resources.

Other

Patrick Brezonik (Civil Engineering /WRC), **Eville Gorham** (Ecology), and **John Pastor** (NRRI), have been appointed to a new National Research Council study committee on environmental indicators and indices. The two year study is funded by the U.S. EPA and is a joint initiative of the NRC's Water Sciences and Technology Board and the Board on Environmental Sciences and Toxicology.

Water Calendar

Meetings and Events

March 25-26. **Annual Mississippi Water Resources Conference.** Ramada Inn Southwest, Jackson, MS. Co-hosts are the Office of Land and Water and the USGS, Mississippi District. A proceedings will be published. Call the Institute (601) 325-7356 for more information.

March 25-27. **1997 International Clean Water Conference "Today's Science for Tomorrow's Policies."** Renaissance Harbor-Place Hotel. Baltimore, MD. Conference will provide a forum for exchange on and discussion of research, applications, and policy issues affecting availability, use, and quality of water and by electric utilities and other industries. Contact: Christine C. Lillie at (415) 855-2041 or E-mail: clillie@epri.net.

April 6-10. **7th Annual Meeting of the Society of Toxicology and Chemistry.** RAI International Congress Center, The Netherlands; Eurocongress Conference Management. Contact: Jan van Goyenkade at 3120-697-3410 or E-mail: eurocongres@pi.net.

April 14-15. **Soil and Water Conservation Society's: "Interactions: Investigating Ecosystem Dynamics at the Watershed Level."** Athens, GA. Contact: at (515) 289-2331 or E-mail swcs@swcs.org.

May 5-9. **Water Resources Systems - Short Course "Hierarchical-Multiobjective Approach in Water Resources Planning and Management."** Peabody Hall, Univ. of Virginia, Charlottesville, VA. Intended for engineers and public officials interested in water resources

systems. The theme of this year's short course will be "Risk Assessment and Management"
Contact: Dr. Haimes at (804) 924-0960.

May 7-9. **An American Wetlands Month Celebration - Communities Working for Wetlands.** Radisson Plaza Hotel, Alexandria, VA. Gathering of individuals interested in community - based wetlands conservation. For more information call (800) 726-4853 or E-mail: terrene@gnn.com.

May 18-21. **National Watershed Coalition's Fifth National Watershed Conference.** Nugget Hotel, Reno, NV. Contact: John Peterson at (703) 455-4377.

May 20-22. **Management of Landscapes Disturbed by Channel Incision: Stabilization, Rehabilitation, and Restoration.** Oxford, MS. Contact: MLDCI Secretary at E-mail: wang@hydra.cche.olemiss.edu.

May 28-31. **International Association for Impact Assessment's 1997 Meeting "Relations on Water: Learning From History and Assessing the Future."** New Orleans, LA. Contact: IAIA, NDSU-IBID, Hastings Hall, PO Box 5256, Fargo, ND 58015-5256.

June 21-25. **BIOGEOMON - 3rd International Symposium on Ecosystem Behavior.** Villanova Univ., Villanova, PA. Focuses on biogeochemical research at the watershed, landscape, ecosystem, and global scales. Contact: R. Kelman Wieder (610) 519-4856, or E-mail: biogeomo@ucis.vill.edu.

June 29-July 3. **AWRA/UCOWR Annual Symposium "Water Resources Education, Training and Practice: Opportunities for the Next Century."** Keystone, CO. Contact: John Stednick, General Chairperson, AWRA at (970-491-7248), or E-mail: jds@cnr.colstate.edu; Robert Ward, General Chairperson, UCOWR at (970) 491-6308, or E-mail: rward@vines.colstate.edu

June 25-27, July 15-17, and July 22-24. **HACH Presents: Science Educator's Workshops.** Loveland, CO. Some workshops are free. Contact: (800) 227-4224, jthomas@hach.com.

August 3-8. **Gordon Conference on Hydrobiogeochemistry of Forested Watersheds.** Colby-Sawyer College, New London, NH. Conference will address three major themes: "Linking Population and Community Dynamics to Watershed Fluxes and Processes," "Learning from Spatial Heterogeneity: Opportunities and Pitfalls in Watersheds," and "Predicting the Unpredictable? Watershed Response to the Changing Environment" Contact: Dr. Myron J. Mitchell at (315) 470-6765 or E-mail: mitchell@mailbox.syr.edu.

August 3-7. **ASCE International Water Resources Engineering Groundwater Management Symposium.** Peabody Hotel, Memphis, TN. Contact: Robert Baily at (901) 729-5500.

August 10-13. **"With Rivers to the Sea: Interaction of Land Activities, Fresh Water, and Enclosed Coastal Seas" 7th Stockholm Water Symposium.** Contact: Stockholm Joint Conference Secretariat at 46-87-362021 or E-mail: sympos@sthwat.se.

August 10-13. **American Water Works Association's "Water Resources Management: Preparing for the Next Century."** Downtown Sheraton Hotel, Seattle, WA. Contact: Susan Blount at (303) 347-6181 or E-mail: sblount@awwa.org

September 1-6. **International Water Resources Association: Ninth World Water Congress.** Montreal, Canada. The world congress is a triennial event featuring technical meetings, special workshops, sessions, and posters, exhibits, study tours, and social cultural events. Contact: Aly M. Shady (819) 994-4098 or E-mail: aly_shady@ACDI-CIDA.GC.CA.

Calls for Papers

First Annual Federal Interagency Hydrologic Modeling Conference "Bridging the Gap Between Technology and Implementation of Surface Water Quantity and Quality Models in the Next Century." April 19-23, 1998. Tropicana Hotel, Las Vegas, NV. Call for papers and computer demonstrations. *Abstracts must be submitted by April, 15 1997.* Contact: Don Frevert at (303) 236-0123 or Don Woodward at (202) 720-0722. Internet info: <http://h2o.usgs.gov/public/wicp>.

7th International Conference on Lakes and Management. October 27-31, 1997. San Martin de Andes, Argentina. Contact: Secretariat, Comision Organizadora Lacar 97' at 54-1-348-8368 or E-mail: lacar97@sernah.gov.ar.

Requests for Proposals

Preliminary proposals are requested for Drinking Water Revolving Loan Funds. \$41 million are available to eligible public drinking water supplies for the purpose of planning, design and construction or improvement of facilities to ensure safe drinking water. Selected communities will receive low interest loans of up to 20 years. For more information contact: Richard D. Clark, Public Water Supply Unit at (612) 215-0770.

Publications

Wetlands in Minnesota. 1996. MN Board of Water and Soil Resources. Poster / brochure providing basic non-technical information on Minnesota wetlands including wetland classification types, benefits, and history. Available from BWSR office at (612) 296-3767.

An Inquiry into the Relationship of Wetland Regulations and Property Values in Minnesota. 1996. C. Holtman, S. J. Taff, A. Meyer, and Leitch. U of MN Dept. of Appl. Economics, Staff Paper P96-16. Available from the U of MN Dept. of Appl. Economics (612) 625-2729

Anoka Sand Plain Water Quality Demonstration Project: Minnesota - Annual Progress Report for Fiscal Year 1996. D. Cooper - Coordinator. U.S. Dept. of Agriculture in conjunction with MN Extension Service, Nat. Resources Conserv. Serv., Farm Service Agency, and Anoka Sand Plain Soil and Water Conservation Districts. Provides an extensive summary of project activities

in 1996. Contact: David Cooper, MN Extension Service at (612) 625-2713 or E-mail: dcooper@mes.umn.edu.

Crosscurrents - Managing Water Resources. 1996. D. Pile and R. Kava. MN Planning Agency. Focuses on ways in which Minnesota's water management system can be adjusted to fit the state legislature's goals and outcomes. Included are specific examples of recent improvements made by agencies and other groups. Available from MN Planning Agency at (612) 296-3985 or contact the MN Planning Agency web site: <http://www.mnplan.state.mn.us>.

The Great Lakes - St. Lawrence: Our Fragile Ecosystem. 1996. International Joint Commission (IJC) - United States and Canada. This poster provides an overview of the Great Lakes - St. Lawrence River Ecosystem. In addition to providing a summary of current and past impacts to the ecosystem, information on the areas geography, geology, and biology is also presented. Available from the IJC at (313) 226-2170 [U.S.]. Or (519) 256-7821 [Canada].

Septic Systems Revealed: A guide to operation, care, and maintenance. A 23 minute video demonstrates how a septic system works and details proper pumping methods. VHS video. \$13.00. Available from: MN Extension Service Distrib. Ctr., University of MN, 1420 Eckles Avenue, St. Paul, MN 55108-6069. For phone orders call (612)-624-4900 or (800) 876-8636. *Septic System Owner's Guide.* A 24-page, fully illustrated book is a complete guide to the operation and maintenance of individual treatment systems. \$4.00. Available from: MN Extension Service Distrib. Ctr., University of MN, 1420 Eckles Avenue, St. Paul, MN 55108-6069. For phone orders call (612)-624-4900 or (800) 876-8636.

The following three reports can be ordered through the National Academy Press, 2101 Constitution Avenue, N.W., Lock Box 285, Washington, D.C. 20055. To order by phone using VISA/MasterCard/American Express, call (800)-624-6242.

Wetlands: Characteristics and Boundaries. This report looks at present wetlands regulations and proposes changes to bolster objectivity and scientific validity. \$37.95.

Review of EPA's Environmental Monitoring and Assessment Program: Overall Evaluation. Evaluates whether EMA's goals of assessing the status and trends in the nation's ecosystems are realistic and achievable. \$35.00

Restoration of Aquatic Ecosystems: Science, Technology, and Public Policy. Outlines a national strategy for restoring the nation's streams, lakes and wetlands. Features numerous case studies of current restoration projects. \$39.95

Ecological Criteria for Important Habitat - Public Review Draft. 1996. Lake Superior Binational Program. This preliminary report details a system for identifying and prioritizing important habitat in the Lake Superior Ecosystem. Describes specific objectives and applications of the habitat evaluation system. Available from: Lake Superior Binational Program.

Nitrogen and Phosphorus in Streams in Part of the Upper Mississippi River Basin, Minnesota and Wisconsin, 1984-1993. A compilation of existing nitrogen and phosphorus data (primarily

1984-1993) for a portion of the Upper Mississippi Watershed including the Minnesota, Mississippi, Cannon, Straight, St. Croix and Namekagon Rivers. For more information call the National Water Quality Assessment Program (NAQWA) at (612) 783-3100.

Water-Quality Assessment of Part of the Upper Mississippi River Basin, Minnesota and Wisconsin - Review of Selected Literature. W. J. Andrews, J. D. Fallon, S. E. Kroening, K. E. Lee, and J. R. Stark. 1996. USGS Investigations Report 96-4149. This report provides a summary of literature pertaining to surface- and ground-water hydrology, water quality, and aquatic biology and ecology of the National Water Quality Assessment Program, Upper Mississippi Study Area. Copies may be purchased from: USGS, Branch of Information Serv., Open-File Reports Section, Box 25286, Denver, CO 80225-0286.

Relation of Physical and Chemical Characteristics of Streams to Fish Communities in the Red River of the North Basin, Minnesota and North Dakota, 1993-95. 1996. R. M. Golstein, J. C. Stauffer, P. R. Larson, and D. L. Lorenz. USGS Water-Resources Investigations Report 96-4227. Reports on a study done for the National Water Quality Assessment Program (NAQWA) to investigate the influence of in-stream habitat and terrestrial land-use on fish community composition in the Red River of the North Basin. Copies may be purchased from: USGS, Branch of Information Serv., Open-File Reports Section, Box 25286, Denver, CO 80225-0286.

Nutrients in the Nation's Waters--Too Much of a Good Thing? 1996. D.K. Mueller. USGS Circular 1136. Non-technical summary of what is known about nutrients in the nation's waters. Available free of charge from the USGS, Branch of Information Services, Open-File Reports Section, Box 25286, Denver, CO 80225-0286 or view it on the internet: <http://wwwvares.er.usgs.gov/naqwa/CIRC-1136.html>.

Nitrate in Ground Waters of the United States--Assessing the Risk. Provides a summary and national map of groundwater nitrate distribution. Copies available from the USGS National Information Center (800) 426-9000 or view it on the internet: <http://wwwvares.er.usgs.gov/naqwa/FS-092-96.html>

Riparian Area Management-A Citizen's Guide. 1996. Lake County, IL Stormwater Management Commission. Offers tips, definitions, and diagrams to educate riparian landowners about proper streamside management. Includes information on stream bank stabilization, and native landscaping. For copies call Jennifer or Ginger (317) 494-9555 or E-mail kyw@ctic.purdue.edu. Cost is \$2.00.