

# Minnegram On-line

December 1995

## WRRC Research Grant Alert

In the past the WRRC would have announced its request for proposals for water resources research under the federal Water Resources Research Grant Program by now. However, the USGS has not yet received an appropriation for fiscal year 1996 and is operating under a short-term continuing resolution. It probably will continue to operate in this way at least to mid-December. Until it receives an appropriation or a long-term continuing resolution, it will not be able to distribute institute grants.

Even when this issue is resolved, obstacles remain to research project funding. The conference report of the appropriation committees changed the way FY 1996 funds will be allocated among the institutes. Each institute will receive a base grant of only \$20,000, down from approximately \$80,000 last year. The remainder of the \$4.55 million likely to be appropriated for FY 1996 will be allocated by five regional competitions. The precise application and reporting procedures for the \$20,000 base grant and the procedures for competitively allocating the funds among the institutes have not yet been developed, but each region is likely to establish its own research priorities. In the Midwest-North Central region, watershed-based studies are likely to be one of the priorities. An Ad Hoc Committee of the National Institutes of Water Resources (NIWR) is working on a document intended to assist the USGS in developing procedures, and the USGS expects to have the new procedures in place by the end of calendar 1995.

The Minnesota WRRC will request proposals for water resources research involving Water Resources Research Institute program funds only after procedures are published by the USGS. When that happens, however, the time available for preparing proposals will likely be very short. The WRRC will try to make the proposal process as easy as possible within the USGS guidelines, but applicants are warned to be ready to respond quickly.

## Minnesota Water Line Answers Water Questions

The Minnesota Water Line, **1-800-455-4526** is a toll-free phone service established earlier this year in northeastern Minnesota and expanded recently to provide all citizens of Minnesota with water information. People with water-related questions can call from 9:00 a.m. to noon, Monday through Friday to talk with the Water Line Coordinator. At other times, a message recorder is available and calls are returned promptly. The Coordinator uses non-technical language to answer questions about household water, wells, septic systems, resource issues, and other water-related concerns. Some questions may be answered directly by the Coordinator, while others will be answered by sending information, or by referral to appropriate volunteer professionals or state

and local agency staff. The Water Line is operated as a partnership of the American Ground Water Trust and the Minnesota Extension Service of the U and is housed in the Minnesota Sea Grant Offices in Duluth.

## **Fellowships in Water Sciences Offered**

Both the Univ of Minnesota and Michigan State Univ have announced the availability of 1996 Graduate Fellowships in water sciences. Each institution was awarded a grant for two Ph.D. fellowships through the U.S. Department of Agriculture (USDA).

The stipend is \$17,000 per year plus non-resident tuition, if applicable. Applications are due December 31, 1995 for fellowships effective August 26, 1996 to August 31, 1999. Candidates must have an M.S. degree in a water science-related academic discipline with strong academic records, not already be enrolled in a water science graduate program at the issuing university, and be a citizen or permanent resident of the U.S. Women and minorities are encouraged to apply.

The UM fellowships are National Needs Fellowships in Water Quality and are offered in the Departments of Biosystems and Agricultural Engineering; Civil Engineering; or Soil, Water, and Climate. Contact Dr. John Nieber, 1390 Eckles Ave., Univ of Minnesota, St. Paul, MN 55108-6005, phone: (612) 625-6724; or Dr. Satish Gupta, phone: (612) 625-1241.

At MSU, the fellowships are offered by the College of Agriculture and Natural Resources and are identified as Water Science Graduate Fellowships. Contact Dr. Frank M. D'Itri, Co-Director, Institute of Water Research, MSU, 115 Manly Miles Bldg., East Lansing, MI 48823-5243, phone: (517) 353-3744, fax: (517) 353-1812, e-mail: 17872DIT@msu.edu or Dr. Boyd G. Ellis, Co-Director, Dept. of Crop & Soil Sciences, 286 Plant & Soil Science Bldg., East Lansing, MI 48824, phone: (517) 355-0217 fax: (517) 353-5174, e-mail: ELLIS%Faculty%CSSDEPT@BANYAN.msu.edu.

The Water Resources Center of the Desert Research Institute in Las Vegas, Nevada, is offering the Sulo and Aileen Maki Fellowship to incoming Ph.D. students in the University and Community College System of Nevada who are pursuing a degree in the hydrologic sciences. The fellowship provides a stipend of \$15,000 per year for three years. Selection will be based on academic record; letters of recommendation; and the student's statement of interests, goals, and expectations. The deadline for application is February 1, 1996. Contact Dr. John W. Hess, Executive Director, Water Resources Center, Desert Research Institute, P.O. Box 19040, Las Vegas, NV 89132-004, phone: (702) 895-0451, e-mail: jack@snsd.dri.edu.

## WRS Program Welcomes First Class

The first group of 16 students entered the WRS Interdisciplinary Graduate Program in the fall semester. Four women and 12 men are in the entering group; 12 are seeking M.S. degrees. Several of these students intend to pursue Ph.D.s and 4 others were admitted directly to the Ph.D. degree program on the basis of their previous education and experience. Five students are based at UMD and eleven on the TC campus.

Many students are from the north-central states (three are graduates of Gustavus Adolphus College), but the program also attracted students from abroad (Madagascar and China) and other areas of the U.S. The students range in age from 23 to 42; about one-third of the students are "non-traditional" students who are over 35 and returning to school to continue studies within their professional fields or changing careers.

The average undergraduate GPA is 3.2 out of 4.0. Many students also had completed coursework on the graduate level, and the average graduate GPA is 3.66 for these students. Most of the students, even the younger "traditional" students, have had at least one year of relevant work experience in the field or laboratory, and quite a few have participated in professional research and written and presented papers on water resources-related topics.

The educational backgrounds of this class are almost evenly divided between physical sciences (e.g., geology, soils) and life sciences (e.g., biology, ecology, fisheries and wildlife). If there is a theme that encompasses these students, it is their commitment to advancing understanding of environmental processes to support informed resource management decisions.

## New Courses Offered Winter Quarter

The Department of Civil Engineering is offering a special course Winter Quarter 1996, CE 5098, **Risk and Uncertainty in Environmental Decision-making and Management**. The course will cover concepts of risk assessment and risk management and incorporation of uncertainty analysis into risk-based environmental decision-making. Lectures by distinguished visiting professors will be combined with assigned reading and class discussion. Visiting professors will be sponsored by the Institute of Technology's J.S. Braun/Braun Intertec visiting professor chair. Class meets Tues & Thurs 4:40-6:35 in CE 212. For information contact: Patrick Brezonik by phone at (612) 625-0866 or 624-9282 or brezo001@maroon.tc.umn.edu.

A two-credit course, **Pollution Impacts on Aquatic Systems** (FW5460), will be taught by **Carl Herbrandson** on Tues & Thurs afternoons during Jan-Feb 1996. It will be transmitted to the Duluth Campus via interactive TV. The course will cover pollution assessment approaches, biological effects, fate and flow of contaminants in aquatic systems, and major types of pollutants. The course format will include lectures, reading, class discussions, and student presentations. For information contact **Ira Adelman**, (612) 624-4228 or ira@finsandfur.fw.umn.edu.

Anyone interested in crustal scale fluids is invited to register for a current topics seminar, **Geofluids Seminar** (Geo 8098), offered by the Department of Geology and Geo-physics in the winter and spring quarters, 1996. The seminar will be led by Calvin Alexander and will meet for one hour, one day per week, TBA. A participant-driven seminar, students will discuss current readings within the broad field of geofluids and present their individual research interests and plans. For information, contact **E. Calvin Alexander** (612) 624-3517 or alexa001@maroon.tc.umn.edu.

**Quaternary Paleoecology and Paleoclimate** (GEO 8262) will be offered in the spring quarter; it will cover terrestrial and aquatic criteria for reconstructing regional environmental dynamics from proxy records. The course will be run as a forum in which post-doctoral researchers will gain experience by preparing and teaching some weekly themes. The text will be R. Bradley, *Quaternary Paleoclimatology*, Allen and Unwin, 1985. Students will prepare and present 10-minute talks with 2-page summaries on themes. The 4-credit course will meet twice weekly at a time TBA

Kerry Kelts and Emi Ito will be organizing a 1-credit working seminar, (GEO 8098) with the goal of producing a short course textbook with comprehensive information and syntheses of case studies of environmental isotopes as applied to lacustrine problems. The course is aimed at graduate students, post docs, and faculty and will meet once a week (day and time TBA). Participants will define content, layout chapters, select illustrations, and summarize themes. Chapters may be individually or group authored. Registration not required, but prior notification of intent to participate is needed.

Notify kkelts@maroon.tc.umn.edu by Dec. 1 if you are considering either of these courses.

## **Mississippi River National Heritage Corridor - Yes/No?**

In its draft study report, released in August 1995, the Mississippi River Corridor Commission recommended creation of a Mississippi River National Heritage Corridor covering the 120 counties or parishes on both sides of the river through which the Great River Road passes between Minnesota and Louisiana. The report summarizes a multi-year feasibility assessment of the concept. Citing "dire economic needs," the Commission's report emphasized the advantages of such a designation in fostering public and private partnerships to promote recreation and tourism-related economic development, resource preservation, and interjurisdictional cooperation.

Although the Commission explicitly rejected new land use controls and public acquisition of land or easements, some people are concerned that a National Heritage Corridor would involve new federal controls on, and possible taking of private property. After receiving a petition with 12,000 signatures of corridor opponents, Rep. Gil Gutknecht (R-MN) sponsored a proposal to eliminate the Commission's funding; subsequently the House eliminated the funding in its version of the Interior budget bill. Gutknecht is quoted saying, "we should do everything we can to make sure that the Father of Waters does not become the Mother of all Federal land grabs."

(*the River Register* , Sept/Oct 1995) The funds were intended to be used for a series of ten public hearing on the draft report, one in each Mississippi River state. Public hearings have not been scheduled pending resolution of the funding issue.

## **Hydrogeology Summer Field Camp Taught**

Field Hydrology (Geo 5112), a new summer field camp offered through the Summer Session, was taught August 6 through 16, 1995. Its logistics base was at the University's Itasca Forestry and Biology Station, but much of the work was done at a new field site southeast of Akley, MN, between Williams and Crystal Lakes. The Geology and Geophysics Department acquired a long-term lease to 20 acres of tax-forfeited land in Hubbard County, where an array of one pumping well and three monitoring wells were installed. At the Field Camp, faculty and students installed a fourth monitoring well as part of the curriculum.

The field site is within the study area of the long-term USGS IRI research project on lake-groundwater inter-actions at Williams and Shingobee Lakes. The field camp was fortunate in being able to make use of many of the USGS's facilities and personnel.

The camp was intense. The resident faculty, visiting faculty and graduate assistant typically worked 18-hour days. The students worked just as hard. Students were divided into teams for a series of modules covering subjects from surveying and geophysical techniques to aquifer tests and water sampling to collecting vadose zone, stream gauge and weather data. The course also included a three-day pumping test that required around-the-clock monitoring by student-faculty teams.

The camp was taught by three resident faculty, Mark Person, Olaf Pfannkuch, and Calvin Alexander, plus a graduate student assistant, Steffan Fay, and about a dozen visiting faculty who came in to teach one- or two-day modules. This was the first time the faculty had taught such a field camp. According to Alexander, there were no disasters, only a few *snafus*, and many successes. In general, faculty and students were pleased with the camp. Student evaluations and faculty discussions resulted in many suggestions for next year aimed at improving a solid initial effort.

Twenty-one students completed the course. The students were a mix of advanced undergraduate and graduate students, adult special students, and included several UMD students and students from other universities. The adult special students included faculty from Bemidji State and Ashland, Wisconsin. The student from the most distant point was an undergraduate from the Univ. of Nevada. Next summer's field camp will be advertised more extensively to attract more students (24 is the optimum enrollment); but judging from the 1995 class, the advertising is reaching the intended audience. It is hoped that future student groups will be as diverse and dedicated as this first one was.

The camp will be taught next summer from August 1–22. Additional information may be obtained from Calvin Alexander at (612) 624-3517 or alexa001 @maroon.tc.umn.edu.

## Water on the Web: Universities

We have been doing a little Web surfing along with everyone else who can buy, beg, borrow or steal access. The explosion of information and entertainment it makes available is stupefying.

Water-related information is readily available through many sources. A good place to start is the Universities Water Information Network (UWIN) maintained by the Universities Council on Water Resources (UCOWR) at the Univ of Illinois-Urbana. It can be accessed at <http://www.uwin.siu.edu>. UWIN is still available via Gopher; it has been up-dated for the WWW environment, but contains essentially the same services as previously described (Sept 1994, Minnegram).

From UWIN you can link to NIWR, the National Institutes for Water Resources, a site maintained by the South Carolina WRRI at Clemson Univ. (To go directly to NIWR use <http://wrri.eng.clemson.edu/>) NIWR is the national organization of water institutes and the web site provides information about each of the 54 water institutes. Information on many of the institutes is basic: staff names, address and contact numbers; but some institutes also provide program descriptions and publications lists. A few have links to the individual institute's home page.

All of these home pages can be reached directly, and some institutes have home pages that are not yet linked (or were not the last time we looked) to NIWR. Water Resources Research Institutes with web pages and their web addresses (URLs) are listed below. All take the form <http://> followed by the specific page name. For example, the URL for the water center at Univ of Arizona is <http://ag.arizona.edu/AZWATER/>.

- Arizona: [ag.arizona.edu/AZWATER/](http://ag.arizona.edu/AZWATER/)
- Colorado: [www.colostate.edu/Depts/CWRRI](http://www.colostate.edu/Depts/CWRRI)
- Indiana: [ce.ecn.purdue.edu/wrrc.html](http://ce.ecn.purdue.edu/wrrc.html)
- Nebraska: [ianrwww.unl.edu/ianr/waterctr/wchome.html](http://ianrwww.unl.edu/ianr/waterctr/wchome.html)
- New Mexico: [wrri.nmsu.edu](http://wrri.nmsu.edu)
- New York: [www.cfe.cornell.edu](http://www.cfe.cornell.edu)
- North Carolina: [www2.ncsu.edu/ncsu/CIL/WRRI](http://www2.ncsu.edu/ncsu/CIL/WRRI)
- Oklahoma: [www.seic.okstate.edu/envinst/ucwr.html](http://www.seic.okstate.edu/envinst/ucwr.html)
- South Carolina: [wrri.eng.clemson.edu/sc.html](http://wrri.eng.clemson.edu/sc.html)
- Texas: [twri.tamu.edu](http://twri.tamu.edu)
- Wyoming: [www\\_wwrc.uwyo.edu](http://www_wwrc.uwyo.edu)

Some of these, like the centers at Oklahoma State and Nebraska, are part of larger environmental or natural resources institutes with larger pools of useful resources. New institutes' pages are appearing rapidly; Minnesota's should be up early in 1996 (see related story).

We visited all these institutes' pages using both a user-friendly graphics capable browser (Netscape) and a more cumbersome, text-only vehicle (Lynx). We can report that the sites functioned well in both formats, although most pages showed that less effort had gone into design for text-only browsers. The graphics sometimes slowed the process and more than once

brought it to a halt, but not all readers will experience this problem. Several pages are under construction, but most of the sites provide information on the institutes, research projects, publications, state water expertise, and up-coming events. Some also provide the full text of institute produced documents.

## **WRS Program and WRRC to Initiate WWW Home Pages**

The graduate degree program in Water Resources Science will have its own web page beginning this December (URL=<http://www.soils.agri.umn.edu/academics/gradstudies/wrs>). Visitors will be able to find out about program requirements, faculty and curriculum. The page will also provide a calendar of current events, listings of research and employment opportunities and links to other useful and interesting sites, including UWIN and NIWR (see related article).

The audience is expected to be made up of enrolled and prospective students, faculty, and student advisors. One of the advantages of the WWW is its flexibility. Because of this flexibility the page will begin modestly but is expected to expand as the program grows. Ideally, enrolled students and faculty will use the site to stay up-to-date on program-related activities within the U community, and potential students and their advisors will find answers to all their questions. The page will feature the program's multidisciplinary nature and will provide links to a variety of useful resources.

Concurrently, the WRRC will be expanding the information on its programs available through the NIWR home page and designing its own home page. As early as February, interested WWW users should be able to scan the WRRC publications list, find a summary of the current research program, and look up the names and addresses of water resources experts at Minnesota's Colleges and Universities. Eventually, the Minnogram, news releases, conference and seminar notices, and the full text of popular WRRC publications also will be made available.

## **Minnesota Water Community News**

### ***Fisheries and Wildlife***

**Anne R. Kapuscinski** has been appointed Associate Director of the MacArthur Interdisciplinary Program on Peace and International Cooperation. She is leading a new MacArthur initiative on sustainable societies.

**Kapuscinski** traveled to China, Oct. 6-19, 1995, as part of a four-member team in a scientific exchange program sponsored by the USDA. The team studied China's research and biosafety in aquatic biotechnology and distributed information on U.S. voluntary guidelines for fostering environmentally safe research involving genetically modified fish and shellfish.

**Peter Sorenson** received a \$481,659- grant on "Reproduction in the Eurasian ruffe (*Gymnocephalus cernuus*)" for 1995-98 from Sea Grant. Co-Pi's are **Drs. P. Schoff, J. Holy** , and **P. Thomas**.

**Sorenson** presented a seminar, "Hormonal Sex Pheromones in Fish" at Institute of Marine Science, at the University of Texas, Port Aransas, TX. He also gave special Lectures, "Bile acids as migratory pheromones in the sea lamprey" at the annual meeting of the Commissions of the Great Lakes Fisheries Commission, in Toronto.

### ***Forest Resources***

**James Perry** lectured on the topic "The Future of Applied Limnology" at the University of Vienna, Faculties of Ecology, Limnology, Botany, Microbiology and Zoology and to the faculties of Comenius University and Akademia Istropolitana in Slovakia.

### ***Environmental & Occupational Health***

**Deb Swackhamer** and students, **Roger Pearson, Annette Trowbridge, Carl Herbranson, Jeannie Pfaff** , and **Pat McCann** attended the 2nd Society of Environmental Toxicology and Chemistry (SETAC) Global Congress in Vancouver, B.C., Nov 5-9, 1995. **Trowbridge** received the SETAC Pre-doctoral Fellowship Award of \$15,000, sponsored by Proctor & Gamble. She was selected from an international pool of students based on her scholastic record and dissertation proposal, which addresses the bioaccumulation of PCBs in the lower pelagic foodweb of Lake Michigan.

### ***Geology UMD***

**Howard Mooers** and WRS graduate student **Ben Bertsch** have received a grant from Cass County Environmental Services to develop a county-wide wellhead protection strategy. The primary goals are to develop a three-dimensional model of the hydrostratigraphic setting of four selected areas within Cass County and delineate groundwater recharge areas for surficial and buried drift aquifers and the capture zones for wells. Using this information, wellhead protection zones will be established in consultation with local planning officials. The four areas include the communities of Walker, Cass Lake, Longville, and Pine River. Each study area lies within a distinct geomorphological and hydrogeo-logical setting. The results from these detailed investigations will be applied to the rest of the County to develop a preliminary wellhead protection sensitivity model for outlying areas.

### ***Geology and Geophysics***

**Mark Person** is on sabbatical leave at New Mexico Tech in Socorro, and **Olaf Pfannkuch** is on sabbatical leave in Morocco. **Kerry Keen** of Summit Envirosolutions is a visiting adjunct professor in their absence.

**Calvin Alexander** presented a paper, "The Impact of Intensive Agriculture on the Geochemistry of Groundwater Recharge to Regional Karst Aquifers" to the International Association of



Geomorphologists SouthEast Asia Conference in Singapore, June 18-23, 1995. **Alexander's** research determined human activities are adding a CaMgClNO<sub>3</sub> component of up to 6 meq/kg to the regional groundwater recharge of southeastern Minnesota. This component effectively doubles the hardness of the recharge waters. (*Programme with Abstracts*, p.28.)

### ***Large Lakes Observatory***

**Tom Johnson**, working in conjunction with **Kerry Kelts** (LRC) and cooperators from universities in Europe, East Africa, and the U.S., completed the first paleolimnological cruise of Lake Victoria and preliminary analysis of cruise data. Seismic reflection profiles, core samples, and conductivity/temperature/depth casts were obtained and analyzed. One significant result of the cruise was evidence that the lake dried out completely during the last ice age.

### ***Limnological Research Center***

North American members of the Inter-national Decade for the East African Lakes (IDEAL) Steering Committee met at the Limnological Research Center in July 1995 to address the program's focus, development of East African lakes drilling proposals, and a new initiative designed to train up to eight Africans and eight American or European undergraduates in Uganda or Tanzania.

### ***Natural Resources Research Institute***

#### **Center for Water and the Environment**

**Carl Richards** and **Richard Axler** received a \$221,000-grant for a two-year study of sediments in the Duluth-Superior Harbor and St. Louis River. Samples are being collected for chemical analyses and identification of invertebrate animals. **Richards** and **John Bonde**, manager of the Natural Resources GIS Lab, have received \$240,000 from the MDNR and U.S. N.B.S. to use electronic sonar to map the near-shore bottom along Minnesota's Lake Superior coast to aid management of lake trout fisheries.

**Tatiana Nawrocki** and **Patrick Schoff** were appointed to research associate positions.

**Nawrocki** and **Carol Johnston** traveled to Russia this fall on a grant, "GIS an integrating tool for multi-disciplinary environmental efforts in the headwaters of nations' rivers; the Mississippi and the Volga," funded by the International Research and Exchange Board (IREX). In Russia, they conveyed to concerned agencies and organizations the experience of GIS applications in integrated studies and management of watersheds. Russian scientists will visit NRRI next spring

**Johnston** gave a talk, "Watershed Delineation: Ecology Meets Regulation," at the International Association of Landscape Ecology conference in Toulouse, France, August 9-Sept 1, 1995.

Under the direction of **Chris Owen**, the CWE Central Analytical Laboratory has been re-certified by the State Department of Health for a variety of water quality parameters relating to federal Clean Water Act and Safe Drinking Water regulatory standards.

**Shane Yokom**, a biology graduate student at CWE, was awarded the Outstanding Student Talk for his presentation "Recovery of a Mine Pit Lake Following Removal of Aqua-cultural Loading" at the 29th Lake Superior Biological Conference, held at UMD Sept 25-26, 1995.

**Owen** and **Yokom** attended the North American Lake Management Society's 15th International Symposium on Lake, Reservoir and Watershed Management in Toronto on Nov 6-11, where Owen presented a poster, "Screening for PAHs by Fluorescence Spectroscopy: A comparison of calibrations," and **Yokom** presented both a talk and a poster on "A Recovery Assessment of a Mine Pit Lake from Phosphorus Loading."

**Carl Richards** presented a poster entitled "Effects of Inorganic Sediment on the MERS Stream Ecosystems" at the Society for Environmental Toxicology and Chemistry conference in Vancouver, Nov 5-9, 1995.

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### ***Soil, Water and Climate***

**H.H. Cheng** was installed as President of Soil Physics, of the Soil Science Society of America (SSSA). **David Mulla**, the William E. Larson Endowed Chair, was elected chair of division S-1, of SSSA.

**Egbert Spaans**, a post doc in Soil, Water, and Climate, was presented the Emil Truog Award by the SSSA. The award is given to a Ph.D. recipient who makes an outstanding contribution to soil science as evidenced by his or her Ph.D. thesis. **Spaans'** research focused on theoretical and experimental aspects of *in situ* measurements of soil freezing characteristics and their similarity to soil moisture characteristics.

**William Larson** received a Distinguished Service Award from SSSA.

### ***St. Anthony Falls Laboratory and Civil Engineering***

**John Gulliver** has received a grant from the U.S. Army Corps of Engineers to develop predictive techniques for dissolved gas supersaturation on the Columbia and Snake Rivers, for input into a larger salmon survival study. **Gulliver** also received a grant from the U.S. EPA to model instream flow impacts upon water temperature in the Platte River, ND.

**Gulliver** traveled to Heidelberg, Germany in July 1995 to attend the 3rd International Symposium on Air-Water Gas Transfer. (The 2nd International Symposium was held at the U in 1990). He presented two papers, chaired two sessions, and served on the Program Committee for the Symposium. **Gulliver** and **Michael Semmens** traveled to London, in September 1995 on an NSF travel grant to interact with membrane researchers on mutual interests.

**Efi Foufoula-Georgiou** will begin a sabbatical in winter quarter 1996. She will spend part of her time at the National Technical University in Athens, Greece.

## Exotic Goby Found in Lake Superior

# Calendar of Events

### *Meetings*

January 4-8, 1996. **Conserv96: Responsible Water Stewardship, A Forum on Water Conservation Technology, Strategies, and Solutions.** Orlando, FL. Jointly sponsored by American Society of Civil Engineers, American Water Resources Assoc., and American Water Works Assoc. Technical presentations, workshops, panel discussions, and displays. Contact: ASCE, 345 E. 47th St., New York, NY 10017. Phone (800)548-2723, (212)705-7286; fax (212)705-7300.

February 25-28. **Water Reuse 96.** Sheraton San Diego Hotel and Marina, San Diego. Sponsored by American Water Works Association and Water Environment Federation. Seminars, tours and poster sessions augment 2-1/2 days of technical sessions covering all aspects of water reuse, including irrigation, dual systems, storage, treatment, potential health effects, and funding. Contact: AWWA/WEF Water Reuse 96 Symposium, 6666 W. Quincy Ave., Denver, Co 80235. Phone (303)347-6160; fax (303)794-3951.

February 26-27. **Urban Conserva-tion 2000, A Virtual Reality: A Working Conference to Evaluate Urban Erosion Control & Water Management Innovations.** Seattle. Sponsored by the Urban Conserva-tion Conference Task Force of the Soil and Water Conservation Society (SWCS). Contact: Nancy Herselius, SWCS Meeting Coord., or Timothy Kautza, Dir. of Edu. & Prof. Devel., SECS, 7515 N.E. Ankeny Rd., Ankeny, IA 50021-9764. Phone (800)843-7645, ext. 18 or ext. 12; fax (515)289-1227; E-mail: SWCS@netins.net.

March 4-6, 1996. **5th Water Resources Operations Management Workshop: Water Resources Planning & Management Division, ASCE.** Arlington, Va. Contact: Dr. Paul Kershen, River Systems Association, 11 Arlington St., Boston, MA 02116-3411. Phone (617)266-5400. Or Prof. A. Georgakako, School of Civil & Environmental Engineering, Georgia Institute of Technology, Atlants, GA 30332-0355. Phone (404)894-2240.

March 5-7, 1996. **6th International Zebra Mussel Conference.** Dearborn, Mi. Contact: Zebra Mussel Conference, 567 Roy St. Bembroke, Ontario, Canada K8A 6R6. Phone (800)8688776, fax (613)732-3386.

April 21-26, 1996. **Hydrology & Hydrogeology of Urban & Urbanizing Areas, AIH 1996 Annual Meeting.** Boston, MA. Contact: J.H. Guswa, GeoTrans, Inc. 6 Lancaster County Rd., Harvard, MA 01451. Phone (508)772-7557; fax (508)772-6183; e-mailL geotrans@world.std.com.

May 12-15, 1996. **Ecological Risk Assessment.** Portland, OR. Contact: Water Environment Foundation, 601 Wythe St., Alexandria, VA 22314-1994. Phone (703)684-2400.

June 8-12, 1996. **Watershed '96: Moving Ahead Together.** Baltimore Convention Center, Baltimore, Maryland. A national interactive forum on the progress and future of watershed management in the U.S. Contact: Tim Williams, Water Environment Federation. Phone (703)684-2437.

June 16-19, 1996. **Urban Wet Weather Pollution from the Stream's Perspective.** Quebec City, Quebec. Contact: Water Environment Federation, 601 Wythe St., Alexandria, VA 22314-1994. Phone (703)684-2400.

June 22-28 1996. **North American Water and Environment Congress '96, American Society of Civil Engineers (ASCE).** A forum for discussion and exchange on a broad spectrum on topics including water engineering, quality, resources, planning and management. Special emphasis on international issues associated with the North American Free Trade Agreement (NAFTA), Canada, and Mexico. Cosponsored with National Water Research Institute. Contact: ASCE Headquarters, Attn: Ms. Andrea Simon, Conf. and Conven. Dept., 345 E. 47th St., New York, NY 10017.

July 14-17, 1996. **AWRA Annual Summer Symposium "Watershed Restoration Management: Physical, Chemical & Biological Considerations."** Syracuse, NY. Focused on restoration and maintenance of natural and disturbed hydrologic and/or water resource quality functions of watersheds, streams, and wetlands (not remediation) to meet a regulatory, legal or aesthetic standard. Contact: Dr. Peter E. Black, General Chairperson, SUNY College of Environmental Science & Forestry, 1 Forestry Dr., Syracuse, NY 13210. Phone (315)470-6671. - or- AWRA, 950 Herndon Pkwy., Ste. 300, Herndon, VA 22070-5528. Phone (703)904-1225; fax (703)904-1228.

August 4-8, 1996. **5th National Volunteer Monitoring Conference.** Madison, Wisconsin. A gathering of citizens, government officials, non-profit groups and others involved in volunteer monitoring. Contact: Alice Mayo, US Environmental Protection Agency. Phone (202)260-7018.

### ***Calls for Papers***

**Pacific Northwest/Oceania Conference 1996: Water Resources Management in the Pacific Rim.** March 25-27, 1996. Pacific Star Hotel, Tumon Beach, Guam. Papers sought on water resources planning, management, and education and meteorological influences on water resources management in the Pacific Basin. Abstracts due December 15, 1995. Contact: Shahram Khosrowpanah, Dir., Water and Energy Research Inst. Of the Western Pacific, Univ of Guam, Mangilao. Guam 96923. Phone (671)735-2685; fax (671)734-8890; e-mail: khosrow@uog.edu.

**51st Industrial Waste Conference,** May 6-8, 1996. Stewart Center, Purdue University, West Lafayette, Indiana. Co-sponsored by School of Civil Engineering and Indiana Pollution Prevention & Safe Materials Inst., Purdue Univ. Suggested topics include case histories, pollution prevention, legal aspects, new products and processes, site remediation, and wastewater treatment. Abstracts due December 15, 1995. Contact: Dr. Ronald F. Wukasz, Conf. Chair, Industrial Waste Conf., School of Civil Eng., Purdue Univ., 1284 CE Bldg., West Lafayette, IN 47907-1284.

**International Symposium on Physics, Chemistry, and Ecology of Seasonally Frozen Soils.** June 10-12, 1997. Fairbanks, Alaska. Scientists, engineers and conservationists are invited to present papers related to the occurrence, measurement, and prediction of physical and biological processes in frozen soils. Abstracts due April 1, 1996. Contact: Dr. Pieter Groenevelt, Prog. Chair, Dept. of Land Resource Science, Univ. of Guelph, Guelph, Ontario N1G 2W1, Canada.

**51st Annual Conference of the Soil and Water Society; Rocky Mountain Rendezvous: Renew Yourself in the High Country.** July 7-10, 1996. Keystone Resort, Colorado. Conference themes are conservation and ecosystem science, ecological decision-making and management, the spirit of conservation and sustaining ecosystems, and human dimensions. Abstracts for posters and computer exposition due Jan 3, 1996. Contact Jim Caplan, Chair, Prog. Com., SWCS, 7515 NE Ankeny Rd., Ankeny, IA 50021-9784. Fax (615)289-1227.

**UCOWR -'96: Integrated Management of Surface and Ground Water. July 30-August 2, 1996.** Papers are welcome that address legal and institutional impediments to integrated management, incorporating groundwater into watershed management, risk assessment, water marketing, preservation of biological diversity, artificial recharge, water quality impacts, and conflict resolution. Where possible papers should also address the roles of universities and their faculties in these issues. Abstracts due February 1, 1996. Contact: Lloyd Urban, Tech. Prog. Chair, Water Resources Ctr., Texas Tech Univ, Box 41022, Lubbock TX 79409-1022. Phone (806)742-3597; fax (806)742-3449; e-mail: lurban@coe2.coe.ttu.edu.

### ***National Water Resources Links***

The Hydrology Web provides numerous resources for the hydrologist including computer modelling information, data resources, bibliographic databases, publications, and other relevant links.