

Water Resources Center

MINNEgram

Minnesota Water Resources Conference fills new venue

The 2008 Minnesota Water Resources Conference convened on the banks of the Mississippi in St. Paul at the RiverCentre October 27 and 28 with over 600 water resources managers, educators, students and professionals in attendance. Guest speakers headlined two plenary sessions and two luncheon presentations. Participants attended four concurrent sessions comprising 78 water-related topics and viewed 54 posters, which featured many contributions from University of Minnesota faculty and students.

The conference was sponsored by the Water Resources Center and the College of Continuing Education, and co-sponsored by the Department of Civil Engineering, the Minnesota Section of the American Society of Civil Engineers, Minnesota Sea Grant, and the Natural

Resources Research Institute.

The first day of the conference included the presentation of the Dave Ford Water Resources Award to Steven A. Heiskary of the Minnesota Pollution Control Agency in recognition of his 30 years of work to improve Minnesota's water resources. Heiskary authored some of the first acid rain research and conducted 25 years of lake research that were translated into nation-leading lake and reservoir criteria and standards.

Jack Bacon, futurist and author of *My Grandfather's Clock*, gave the first plenary presentation, "Killer Aps for the Green Global Village." He touched on engineering and computer science, agricul-

tural production and water issues. Bacon also cited Rwanda as a test locale for energy technologies and small-scale water technologies such as the Hydro-Ram. He concluded that most innovations in the fields of communication, energy and technological development are occurring internationally and are driven by the **Conference continued on page 3**



Mark Seeley with Water Resources Conference Committee co-chairs Andrea Hendrickson (Mn/DOT) and Faye Sleeper (WRC).

WRC-led process creates innovative clean water reporting framework

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Since the Clean Water Legacy Act (CWLA) came into effect in 2006, state agencies with CWLA responsibilities have reported program results to the legislature, each using its own system on its own schedule. The need for a shared tracking and reporting strategy prompted the Minnesota Pollution Control Agency (MPCA) to allot funds to the Water Resources Center to develop a comprehensive reporting mechanism for state agencies to communicate the progress and track the effectiveness of programs with water quality improvement goals. The Clean Water Legacy Effectiveness Tracking Framework will allow the Clean Water Council to compile a report to the legislature every two years describing the

progress of all the projects from all the agencies. "Transparency is the issue," said Faye Sleeper, co-director of the WRC. "In the last twenty years there has not been this level of water and environmental legislation in the state, so it is incumbent on us to spend it wisely and to communicate that clearly to the legislature."

To develop the concept of a transparent framework, the WRC convened meetings of representatives from the four participating agencies, the MPCA, the Board of Water and Soil Resources, the MN Department of Agriculture, and the MN Department of Natural Resources, and cooperating partners from the U.S. Environmental Protection Agency **Framework continued on page 2**

Around the State

Clean Water, Land, and Legacy Amendment passes

Citizens of Minnesota passed a constitutional amendment to provide funding to clean Minnesota's waterways, protect wildlife habitat, and promote the arts in November's general election. The amendment to the state constitution increases the state sales tax by three-eighths of one percent beginning July 2009, and will raise an estimated \$300 million per year. Money raised by the sales tax will be distributed as follows:

- 33% to a new Outdoor Heritage Fund to restore, protect, and enhance wetlands, prairies, forests, and habitat for game, fish and wildlife;
- 33% to a new Clean Water Fund to protect, enhance, and restore water quality in lakes, rivers, streams and groundwater;
- 14.25% to a new Parks and Trails Fund to support parks and trails of regional or statewide significance; and
- 19.75% to a new Arts and Cultural Heritage Fund for arts education and arts access, and to preserve Minnesota's history and cultural heritage.

The Outdoor Heritage portion of the amendment will be overseen by the Lessard Outdoors Heritage Council, which is composed of eight citizens and four lawmakers. Two citizen members will be selected by the Senate, two will be selected by the Speaker of the House, and four will be chosen by the governor. State law forbids any citizen member to be a registered lobbyist. By law, the panel met before December 1, 2008. Funding proposals will be considered on a competitive basis; the Department of Natural Resources, other state agencies and conservation groups will be eligible for grants. The Lessard Council will not make recommendations on the Clean Water Fund. The Legislature has yet to determine who will oversee the disbursement of the monies collected in the Clean Water Fund.

From the Director's Desk



Amid the news of economic turndowns and budget deficits, Minnesota has something to celebrate. On November 4, 2008, voters passed an amendment to the State Constitution by a wide margin. This Clean Water, Land, and Legacy Amendment will fund restoration and protection of water resources, support parks and trails, restore and protect fish and wildlife habitat, support the arts, and preserve Minnesota's cultural heritage. The amendment is monumental in its scope and potential impact: the funds that will be devoted to clean water are estimated to be approximately \$100M per year for 25 years. This is almost exactly the amount required to clean up the state's long list of impaired waters, as estimated some years ago by the G16 (architects of the 2006 Clean Water Legacy Act). This funding also coincides with the release of the final version of the Statewide Conservation and Preservation Plan prepared by the University of Minnesota, Bonestroo, and CR Planning. This plan calls for a comprehensive and integrated approach to protecting, restoring, and conserving the state's natural resources (air, water, land, wildlife, fish, outdoor recreation), which is completely aligned with the aims of the amendment. Thus the state has a roadmap and funds to follow the roadmap – we hope that this becomes a model for the nation.

Water resources are clearly a topic of national attention, with three excellent reports recently released. The USGS NAWQA program has results of a national consultation. Peter Gleick of the Pacific Institute issued a report "Water: Threats and Opportunities. Recommendations for the Next President", and Gerry Galloway and others have just published the findings of the Fourth National Water Policy Dialogue sponsored by AWWA, ASCE, and the National Wildlife Federation. (See Publications and Resources on page seven for report web links). President-Elect Obama also indicates that water issues are a priority for the country.

From all of us at the WRC, we wish you a healthy, happy New Year, and may it come with peace, a stabilized economy, and renewed hope for sustaining our rich water resources.

A handwritten signature in cursive script, appearing to read "Deb".

Deborah Swackhamer, WRC
Co-Director

Framework continued from page 1

(USEPA), the USDA Natural Resources Conservation Service, University of Minnesota faculty, the Clean Water Council, a private consulting firm, and a local unit of government. In addition, WRC Co-Director Faye Sleeper, Research Associate Stephanie Grayzeck, and Graduate student Shannon Wing researched environmental reporting frameworks, interviewed state agency staff and stakeholder groups, and more fully developed the draft framework.

The CWLA tracking framework created as a result of this process is a matrix that reports on projects in four categories: *Partnerships/Leveraging*—coordinating with local, state and federal partners, *Environmental Indicators*—physical results of the effort (water quality improvement, land-use changes, etc.),

Social Indicators—changes in behavior and attitudes related to water quality and improvement activities, and *Organizational Performance*—managing a program or project. "We believe this framework is unique in the U.S.," said Sleeper. "No other system coordinates the reports of four state agencies, and no other system measures both physical results and behavioral changes."

The group developed a list of proposed measures, and the state agency representatives worked with their staffs to modify the framework. The next phase will include development of an implementation plan with local partner involvement, a potential pilot through the USEPA, and a communication plan. The final report is available at <http://wrc.umn.edu/outreach/cwlatracking/>.

UM Extension–WRC workshops promote economic and environmental benefits of manure

by Les Everett, WRC

Farmers face rising costs in every facet of their operations, including commercial fertilizer for crops. A new series of WRC-managed workshops aims to help farmers reduce fertilizer expenses while at the same time reducing nutrients in runoff from farm fields.

“The Economic Value of Manure” workshops will launch across the state in the winter of 2009 with participating farmers and agricultural professionals recruited by local UM Extension staff, county feedlot officers, producer organizations, and staff of Soil and Water Conservation Districts. Participants in the workshops receive instruction in using an electronic spreadsheet that calculates the value of manure as a replacement for commercial fertilizers under a range of application rates and methods, crop nutrient needs, application costs, and fertilizer prices. Paper worksheets will be available for those who do not use computers. When doing these calculations, farmers often find that it is more profitable to apply manure according to crop needs, and usually this results in covering more acres at lower rates than they currently use. They also find that application

Conference continued from page 1

private sector.

Monday’s luncheon speaker, Janet Attarian, is Project Director of the Streetscape and Urban Design Program, Chicago Department of Transportation. Using the Chicago Green Alley Project as an example, she focused on the need for the world’s cities to adapt to changes driven by climate change and urban migration, and described Chicago’s new approach to “green” infrastructure and stormwater management.

Mark Seeley, UM climatologist and meteorologist, opened Tuesday’s plenary session with “The Southeast Minnesota Floods of August 2007: In Historical and Future Context.” Seeley focused on documentary evidence from these events, and linked that evidence to the mid-continent and local drivers of climate change in Minnesota.

Edward Thomas, an attorney at



Farmers observe a field demonstration of manure application methods to conserve nutrients for crops.

timing and method influence how much nitrogen and phosphorus is conserved for the crop or lost to air or water.

Workshop participants will be polled in the months following the workshops to determine if they have altered their manure management in response to the workshops. Program organizers anticipate that livestock producers will readjust manure application rates and methods, saving at least ten dollars per acre in fertilizer replacement costs.

Michael Baker Corporation, presented “Total Water Resources Management: Bringing Together Wetland, Storm Water, Floodplain, and Water Quality Management,” at Tuesday’s luncheon session. Thomas gave a practical overview of the legal context affecting local watershed management, especially where property damages occur as a result of policy and watershed decisions.

According to Thomas, property owners and government bodies find that measures taken to protect humans from flood disasters can

The “What’s Manure Worth?” spreadsheet authored by Bill Lazarus and Bob Koehler of UM Extension can be downloaded at: http://www.apec.umn.edu/faculty/wlazarus/interests_manureworth.html. Contact Les Everett at evere003@umn.edu or 612-625-6751 for more information about this series of workshops. The project is funded by EPA 319 funds awarded through the Minnesota Pollution Control Agency.

also protect wetlands and preserve and restore water quality.

Concurrent sessions included presentations by UM researchers such as “How Do Water Quality Projects Evaluate Impacts and Outcomes?” The Minnesota NPS Project Survey, by Karlyn Eckman, Rachel Walker, and Lilao Bouapao.

Posters included, “Reducing Un-

certainty and Bounding Variability of Stream Ecosystem Indicators” by Christine Dolph. For a full listing of sessions and posters, see the Book of Abstracts at <http://wrc.umn.edu>.



Conference participants listen to a concurrent session

New Extension educator to work on manure management

The Water Resources Center welcomes José Hernandez to his new position as Extension Educator in Nutrient Management for UM Extension. José will be the principal educator and researcher on the new grant project, "Maximizing the economic benefits of manure to reduce nutrient loading." The project combines small-group education on calculating the value of manure for individual operation with on-farm trials on corn response to the timing of manure applications.

José spent most of his childhood on a Costa Rican banana farm, the son of an agronomist who worked for the Del Monte Corporation. José followed in his father's footsteps, obtaining a B.Sc. in Agricultural Sciences and Natural Resources from EARTH University in



José Hernandez at work in the field.

Costa Rica in 1996. José came to the UM in 2001 to pursue his Ph.D. in Soil Science with David Mulla and Pierre Robert. Since 2005, José has been a lecturer and researcher in the Department of Soil, Water, and Climate on the topics of precision agriculture, nutrient management and water quality.

Paperless Minnogram coming in March 2009

Thank you to the over 100 Minnogram readers who sent in paperless Minnogram subscriptions. We are pleased to announce that the March 2009 issue will be sent to our online subscribers as an electronic link. In the March issue we will also unveil a full-color format and our new wordmark, which reflects the University of Minnesota's award-winning Driven to Discover campaign. We continue to poll our readers on page eight, and hope that many more of you will use the simple online form to sign up for the electronic Minnogram.

Bridge symposium explores relationship between river and city

The new I-35W bridge opened quietly at 5:00 a.m. September 18, 2008, and traffic streamed across it, into and out of Minneapolis. While the story of building the bridge has ended, "It's not like you can just walk away from what happened there and the issues related to the river," said Pat Nunnally, instructor of urban studies and co-organizer of the October 10, 2008, symposium, "The City, the River, the Bridge." The symposium, held at Herbert M. Hanson Jr. Hall at the University of Minnesota, examined topics relating to the Mississippi River and transportation infrastructure in light of the collapse of the I-35W bridge. Symposium organizers created a forum for University faculty, students, non-profit employees, city staff, and park service employees to exchange ideas about the relationship of Minneapolis to the Mississippi River.

Among the questions asked were: What lessons have been learned from the disaster and the response? What policy and planning changes have occurred or are likely to occur? What will be the long-term consequences for the City of Minneapolis and its relationship to the Mississippi? In ten years, what will be seen as opportunities taken or missed? Tom Fisher, dean of the UM College of Design, believes the new bridge is well built, unlike the old one, saying, "The way the bridge is designed now, it is like four

connected bridges, so if one were to fall, it wouldn't bring down the others." UM Geography professor Roger Miller said that a year of living without the bridge highlighted the problem areas of the transportation system. "If we continue to address transportation issues by putting in more roadways, we may be missing the point," he said.

Deb Swackhamer, WRC co-director, described the importance of the Mississippi River and current pollution issues. The I-35W bridge and the river are important routes of transportation, and the river is also a vital ecosystem. Human-generated pollution, including the building of locks and dams and the discharge of wastewater, is destroying the river, she said. "We are the beginning point of the river, so in many ways, we are its parents," said Swackhamer. "Let us use this tragedy to reacquaint ourselves with the value of the river."

The symposium closed with remarks from President Robert Bruininks, who said it is important that the University demonstrate its drive to discover to real-world solutions, highlighting the St. Anthony Falls Laboratory. The lab, located on an island in the river, conducts research for developing engineering solutions to major environmental, water and energy-

related problems.

Following the symposium, Nunnally pronounced it a success, with the broad participation that he had envisioned. He believes that participants recognize the bridge and its rebuilt site as an historic site. He added that the success of the symposium lies in the issues raised and conversations begun among planners, scholars, and students about the future relationships between the city, the river, and the bridge that connects them.

Nunnally is editing a book about the bridge and the river while his urban studies workshop students are writing their own river stories, highlighting aspects of the river's history and design that they find significant.

Video of the presentations can be viewed at: <http://www.ias.umn.edu/media/CityRiverBridge.php>.



The new I-35W bridge opened September 18, 2008.

Wireless and sensor technologies applied to urban water quality management

by Michael Henjum, research assistant, UM Civil Engineering

A research team from the Water Resources Science Graduate Program monitored two Twin Cities streams using a wireless network equipped with water quality sensors. The trace organic pollutant detection was conducted throughout the spring, summer and fall of 2008. The goal was to measure anthropogenic pollutants that have been detected in urban water systems. These human-generated pollutants include insecticides, herbicides, pharmaceuticals and estrogens. Data were collected in near real-time at five locations in the two urban streams. At the same time, one-liter grab samples were collected by two ISCO samplers at two-hour intervals over 24 hours during three dry periods and six rain events. Grab samples were analyzed for pollutants that could not be detected with the sensors: fecal coliform, atrazine, prometon and caffeine. Fecal coliform provides a measure of pathogen levels, atrazine is an agricultural herbicide, prometon is an herbicide used in urban areas, and caffeine is an indicator of wastewater inputs. This allowed the investigation of stormwater treatment, as well as exploration of the dynamics of urban watersheds and correlations that may exist between fundamental water quality parameters and the chemical contaminants mentioned above.

Urbanization typically causes dramatic degradation of water quality in lakes, rivers and streams. The hydrologic changes (i.e., increased flows and erosion) and chemical inputs result in poor ecological health. The dynamics of urban pollution and removal in stormwater

treatment systems (such as ponds) are not well understood. Monitoring for pollutants is labor intensive and expensive as it cannot be done with *in situ* sensor systems but requires grab sampling and analyses in a laboratory. Thus, surrogate measurements that can be monitored on a continuous or semi-continuous basis using *in situ* sensor systems are desirable.

Researchers observe that the concentrations of prometon and fecal coliform, which are likely to be washed from urban land uses, generally increase with rainfall soon after the storm event. Furthermore, these contaminants appear to correlate with turbidity. Atrazine, caffeine and nitrate decrease with rainfall in the short-term, which is consistent with distant non-runoff-associated sources. Stormwater ponds do decrease most of the pollutants, but appear to be a source for some

contaminants that may run off the area surrounding the ponds. Data analysis will continue throughout the winter months and the network will be deployed again in the spring. Researchers hope that eventually these results will enable mechanistically-based scaling and forecasting of water quality in urban streams and rivers. Future planning and management of storm water best management practices can be enhanced accordingly.

Principal Investigators on the project were: W. A. Arnold, associate professor; M. Hondzo, professor; R. M. Hozalski, associate professor; and P. J. Novak, associate professor, UM Department of Civil Engineering, along with research assistants Jeremiah Jadzewski, Michael Henjum, Department of Civil Engineering; and Christine Wennen, Graduate Program in Water Resources Science.



Photo by Roy Hozalski

WRS research assistant Christine Wennen places a remote sensor.

WRC faculty present at Extension Program Conference

The University of Minnesota Extension Program Conference, held October 20–22, 2008, brought together 350 Extension Educators and Specialists for professional development and organizational connections with a focus on technology. Jon Gordon's keynote speech, "Latest Trends in Digital Technology and Social Networking," gave many their first glimpse of Twitter and other innovations for educational programming. Technical sessions offered new teaching and communication techniques and tours focused on clean energy, international commerce, storm water management, alternative agriculture, forestry, and youth interac-

tions with nature and neighborhoods.

WRC Co-Director Deb Swackhamer presented a keynote, "Minnesota Waters: Local Treasures, National Issues," and Extension professor Barb Liukkonen presented a technical session, "Animate your Powerpoint." Co-Director Faye Sleeper and WRC agronomist Les Everett also attended the conference. The MN Association of Extension Educators held their annual meeting in conjunction with the conference at which Liukkonen was elected president for 2008–2009.

U of M Water Community News

Roger E.A. Arndt (Civil Engineering, SAFL) attended the 24th International Association of Hydraulic Research Symposium on Hydraulic Machinery in Fox do Iguassu, Brazil, in October 2008. He presented a keynote lecture: "Some Perspectives on Cavitation Research," and two papers. Professor Arndt was given a plaque recognizing his nearly 50 years dedicated to hydro machinery.

Brenda Asmus (WRS) co-authored a manuscript recently accepted for publication by Environmental Monitoring and Assessment (EMAS) titled, "Physical integrity: the missing link in biological monitoring and TMDLs," co-authors were: Joe Magner, Bruce Vondracek, and Jim Perry.

Steve Bortone, Director, Minnesota Sea Grant, was appointed to the Research and Monitoring Advisory Committee of the St. Louis River/Estuary National Estuarine Research Reserve.

Karlyn Eckman (WRC) received a Native Shoreland Buffer Incentives (NSBI) project grant funded by the DNR for \$40,000. Eckman also presented at the Minnesota Water Conference, "How do Water Quality Projects in Minnesota Evaluate Impacts and Outcomes?" based on the 2008 Minnesota NPS Project Evaluation Survey conducted by Eckman, Rachel Walker (WRC), Lilao Bouapao (WRC), and Kimberly Nuckles (MPCA).

Karlyn Eckman (WRC) and **Rachel Walker** (WRC) participated in a Lakeside Stormwater Reduction Project (LSRP) workshop on September 11, 2008, as part of the EPA-funded social indicators project.

James A. Johnson (WRS) received an Emmons & Olivier Resources, Inc. Travel Grant to the North American Lake Management Society 2008 Symposium in Banff, Canada November 11–14, 2008. He presented, "Assessment of Whole-Lake Herbicide Treatment as a Management Strategy for Controlling Curlyleaf Pondweed (*Potamogeton crispus*) in Minnesota Lakes." His advisor is Ray Newman.

Barb Liukkonen (WRC, Sea Grant)

presented "Preventing the Spread of AIS from Water Gardening" at the Minnesota Invasive Species Conference, Duluth, MN, October 26–29, 2008. She moderated three concurrent sessions at the Minnesota Water Resources Conference, St. Paul, MN, October 27–28, 2008, and presented at the the post-conference workshop October 29, 2008, "Surface Water Monitoring Projects."

Derrick Passe (WRS) is working with Engineers Without Borders as the project manager for the Minnesota Chapter's Guatemalan project. In summer 2008, he conducted water supply research in rural Guatemala. He hopes to return to Guatemala to implement an improved water distribution network in summer 2009.

Erika Rivers (DNR) and **Karlyn Eckman** (WRC) organized a workshop for local government units at the Initiative Foundation on October 17, 2008, "Working with Your Target Audience."

Brandon Stephens (WRS-UMD) participated in the East Asian and Pacific Summer Institutes (EAPSI) program June–August 2008. His research in Taiwan focused on his project, "Solid-phase microextraction as used to determine polycyclic aromatic hydrocarbon sorption to organic matter in the aqueous phase." Stephens plans to defend his thesis "DOM characteristics along the continuum from river to reservoir; a comparison of freshwater and saline transects," in December 2008.

Rachel Durkee Walker (WRC) co-authored an article with **Jill Doerfler** (UMD) "Wild Rice: The Minnesota Legislature, a Distinctive Crop, GMOs and Ojibwe Perspectives," which will be published in the Hamline University Law Review in 2009.

Robert Megard (Professor Emeritus, Ecology, Evolution and Behavior), Elise Ralph (former WRS faculty) and Michelle Marko (WRS alumna) co-authored "Effects of Wind and Temperature on Lake Superior



BWSR chairman Randy Kramer congratulates Jim Anderson.

Jim Anderson, former Water Resources Center co-director, received a Certificate of Recognition from Governor Pawlenty on October 22, 2008, which read, "This certificate is presented to Dr. Jim Anderson in recognition of thirteen years of excellent service to the State of Minnesota and the Minnesota Board of Water and Soil Resources. Therefore, with appreciation and respect of the people of Minnesota, this certificate is presented."

Copepods," published in conjunction with the International Limnological Society Conference, Montreal, Canada, August 11–18, 2007. The paper is published as: Effects of wind and temperature on Lake Superior copepods. 2008. Verh. Internat. Verein. Limnol.30(5):801-808/.

University of Minnesota Water Resources Science Program Degree Recipients

Stephanie V. Johnson received her M.S. in October 2008. Her thesis was titled: Assessing the Barriers to and Potential for Wetland Restoration in Agricultural Watersheds. Johnson also received her Law School Juris Doctor (J.D.) in May 2008 as part of the UMN Joint Degree Program in Law, Health and the Life Sciences. Johnson was advised by Gary Sands, Bioproducts Biosystems Engineering.

Upcoming Events

June 1–4, 2009. **International Symposium on Genetic Biocontrol of Invasive Fish.** Doubletree Hotel, Minneapolis, Minnesota. This symposium is designed for international scientists specializing in fish genetics, biotechnology, risk assessment science and ecology and professionals who work to manage invasive fish. Visit: www.seagrant.umn.edu/ais/biocontrol for more information.

July 11–15, 2009. **The Soil and Water Conservations Society's 2009 Annual Conference.** Dearborn, Michigan.

The conference includes workshops, concurrent sessions, symposia, posters, plenary sessions, and technical tours designed to raise awareness of conference participants to recent developments in the science and art of natural resource conservation and environmental management on working land—the largely privately-owned land comprising working farms, ranches, forests, and rural urban communities. Visit http://www.swcs.org/en/conferences/2009_annual_conference/call_for_papers/.

February 10–12, 2009. **Minnesota Air, Water, and Waste Environmental Conference.** RiverCentre, St. Paul, Minnesota. This conference offers opportunities for environmental professionals to network, build relationships and explore new ideas. To register, visit: <http://www.pca.state.mn.us/news/training/mawweconference/index.html#registration>.

Publications and Resources

“Application of ecological indicators” by Dr. Gerald J. Niemi (UM-Duluth), originally published in the 2004 “Annual Review of Ecology Evolution and Systematics” has generated a Fast Moving Fronts feature article in Thomson Reuters Science Watch November 2008 issue. Dr. Niemi’s article has been recently identified by Essential Science Indicators as being among the highest cited papers in the field of Plant and Animal Science. Dr. Niemi’s comments about his report can be found at <http://sciencewatch.com/dr/fmf/2008/08novfmf/08novfmfNiemiET/>.

“Field Techniques for Estimating Water Fluxes Between Surface Water and Ground Water,” USGS, edited by Donald O. Rosenberry and James W. LaBaugh.

This report focuses on measuring the flow of water across the interface between surface water and ground water, rather than the hydrogeological or geochemical processes that occur at or near this interface. The authors designed the report to make the reader aware of the breadth of approaches available for the study of the exchange between surface and ground water. The publication is available on the USGS website at: <http://pubs.usgs.gov/tm/04d02/>.

“Water: Threats and Opportunities. Recommendations for the Next President.” Peter Gleick, Pacific Institute. http://www.pacinst.org/publications/essays_and_opinion/presidential_recommendations/index.html.

Fourth National Water Policy Dialogue sponsored by AWWA, ASCE, and the National Wildlife Federation, Gerry Galloway, Richard Engberg, Brian Parsons and David Conrad. Dialogue findings available at: <http://www.awra.org/pdf/fnwpd.pdf>.

USGS NAWQA Program national consultation results: http://water.usgs.gov/nawqa/headlines/liaison_committee/.

Statewide Conservation and Preservation Plan, University of Minnesota, Bonestroo, and CR Planning. <http://www.lccmr.leg.mn/statewideconservationplan/StatewidePlan.htm>.

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Submissions: Minnegram welcomes articles, letters to the editor, news stories, photos, and other materials for publications. Please address correspondence to: Minnegram Editor, Water Resources Center, 173 McNeal Hall, 1985 Buford Ave., St. Paul, MN 55108. E-mail: mng-ed@umn.edu, Web site: <http://wrc.umn.edu>, phone: 612-624-9282.

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