By Lance Nixon
South Dakota State University

BROOKINGS, S.D. – Area residents have until Oct. 1 to get the discount rate to register for the upcoming Eastern South Dakota Water Conference. The conference is set for Nov. 1-2 at the Swiftel Center in Brookings.

Non-students can register for $60 through Oct. 13, or $75 after that date. Students can register for $15 through Oct. 13, or $20 after that.

Register or find more information online at http://wri.sdstate.edu/esdwc.

SDSU Extension Environmental Quality Engineer Russell Persyn says South Dakota State University would like the Eastern South Dakota Water Conference to be an annual event. Water is an important piece of the economic future of South Dakota, and this conference is intended to serve as a mechanism to educate participants on this resource, he said.

The event gets under way with noon registration on Wednesday, Nov. 1. At 1 p.m. a panel discussion kicks off the conference. Panelists include Secretary John Cooper of the South Dakota Department of Game Fish and Parks; Secretary Larry Gabriel of the South Dakota Department of Agriculture; Kevin Smith of the Sioux Falls Department of Public Works; and Dave Templeton of the South Dakota Department of Environment and Natural Resources.

Concurrent sessions throughout the conference will offer information important to wide array of stakeholders including engineers, industry, public officials, agricultural producers, and conservation groups. On Nov. 1 the sessions focus on watershed management/non-point source pollution, and land use and remote sensing.

Rep. Stephanie Herseth will give the keynote address during dinner that evening from 6 to 7 p.m.

Concurrent sessions from 8 a.m. to 10 a.m., Nov. 2, deal with water use/management, and surface water quality. Concurrent sessions from 10:15 a.m. to 12:15 p.m. focus on sustainable infrastructure, and watershed assessment.

Mark Anderson, director of the U.S. Geological Survey in South Dakota, will be the speaker during lunch on Nov. 2 as the conference wraps up.

Sponsors are the South Dakota Water Resource Institute in SDSU’s College of Agriculture and Biological Sciences, the Water and Environmental Engineering Research Center in SDSU’s College of Engineering, the East Dakota Water Development District in Brookings, and the U.S. Geological Survey.
This announcement is a Request for Proposals for the State Water Resources Research Institute Program. This program, authorized by section 104 of the Water Resources Research Act of 1984, is a Federal-State partnership which:

- Plans, facilitates, and conducts research to aid in the resolution of State and regional water problems
- Promotes technology transfer and the dissemination and application of research results
- Provides for the training of scientists and engineers through their participation in research
- Provides for competitive grants to be awarded under the Water Resources Research Act

The state water resources research institutes authorized by the Act are organized as the National Institutes for Water Resources (NIWR). NIWR cooperates with the United States Geological Survey (USGS) in establishing total programmatic direction, reporting on the activities of the Institutes, coordinating and facilitating regional research and information and technology transfer, and in operating the NIWR-USGS Student Internship Program.

The South Dakota State University Water Resources Institute (SD WRI) is making plans for FY2007 regarding the State Water Resources Institute Program (SWRIP). The Department of Interior has not yet done the official "apportionment" of the funds; therefore, there has not yet been a final determination of the amount to be awarded to each institute under its base grant. We will be proceeding with the assumption that funding will remain at the same level as last year. Last year, the SDSU Water Resources Institute funded five research projects at SDSU totaling approximately $67,000. We will proceed at this time with the assumption that we will again fund research for an approximate total of $67,000 for 3-5 projects. That dollar amount is subject to change, depending on what happens at the Congressional level. Faculty employed at all state-owned universities and colleges are eligible to apply for these grant funds.

The deadline for pre-proposal submission to SD WRI is November 3, 2006. Pre-proposals will be reviewed and those selected for submission to USGS for funding will be notified no later than December 1, 2006 although if no Congressional action has been taken, this date will be pushed back. Full proposals will be due to Jennifer at SD WRI no later than December 29, 2006. We are anticipating a start date for these one-year research projects of 3-1-07.

Keep in mind that the 104 Grant program requires a two-to-one match (two non-federal dollars per federal dollar awarded). Indirect costs are not allowed on the federal side, but may be used as match. Notify SDWRI if you would like to receive the file containing the criteria by which pre-proposals will be reviewed and the required formats for pre-proposals and budgets. Please use these formats when submitting your pre-proposal.

Please keep your pre-proposals to a two page maximum, not including budget sheet and budget justification. You may e-mail your pre-proposals to Jennifer in a Word or WordPerfect format.

Feel free to send this announcement to anyone who may be interested in applying for these grant funds who may not have received a copy of this notification.

- Pre-proposal submission due to SDWRI: November 3, 2006
- Notification to submit full proposal: December 1, 2006
- Full proposals due: December 29, 2006
In 2002, the South Dakota Department of Environment and Natural Resources (DENR) was in the process of developing rules controlling the application of manure at permitted feedlots in South Dakota based on the phosphorus content of the soil. There was some debate about whether there was adequate scientific data available to develop rules on phosphorus (P) applications.

A literature search revealed that the research data available was from southern states on soils very different from those found in the upper Midwest. The “P-Project” was initiated to determine the relationship between the amount of P stored in the soil and the amount of P in runoff from several South Dakota soils.

We wanted to collect solid data that would help policy makers balance the need to develop the livestock industry in South Dakota and protect water quality in lakes and streams.

The project was also structured to help educate livestock producers on the findings of the project so they could be better stewards of water resources in their own operation.

The first phase of the P-Project determined the soil P versus runoff P relationship for five soils in eastern South Dakota, along the Big Sioux River. A rainfall simulator was used on 2-meter by 2-meter plots on cropland to study runoff characteristics. The study revealed that as soil test P increased, the amount of P in the runoff also increased as shown in Figure 1.

### Watershed P

One of the concerns about using the results of small field plots to study P runoff has to do with scale. The question is, “Do the field plots represent what occurs during natural rainfall at the watershed scale?”

To determine if data from field plots can be used to predict P runoff from a cropland watershed, three experimental watersheds have been instrumented on South Dakota State University land near Brookings.

Minor modifications were made in the topography at a 15-acre corn field to accentuate existing watershed boundaries and allow runoff to be collected from three watersheds at one location. Each watershed is five acres in size, adjacent to each other, and planted to corn. The outlet of each watershed was outfitted with a flume to measure water flow in the fall of...
Runoff from a small snowmelt and three small rainfall events were collected manually in the spring of 2006 before automatic gauging and sampling equipment was installed in June 2006. Rainfall simulations were also conducted on one plot in each watershed in June. The plots represented average soil P concentrations for that watershed. The results of this simulations will be compared to the four runoff events that occurred in the spring. During this first simulation the field plots were in seed-bed conditions (no crop).

An automated data collection and water sampling system was installed in June 2006. The system includes ISCO automatic water samplers and Stevens stage recorders attached to each flume to record water depth. Each stage recorded was outfitted with a Thalimedes recorder to electronically record water depth and transfer the data to a NexSens data logger. An ISCO tipping bucket rain gage also relays data to the NexSens data logger. The data logger is in contact with a computer through a modem so that data is automatically transferred to the SDSU campus. The system is set up to send a text message and e-mail to researchers when rainfall is recorded and a second alert when flow begins.

It was very dry during June and July 2006 and no runoff occurred as the corn developed but on August 13th—2.74 inches of rain fell—and on September 1-2 thunderstorms caused 6.14 inches of rain to fall. The automated system worked well in these events (and two more in September) alerting investigators of both rain and runoff. A second rainfall simulation was conducted on each watershed between the large events to represent runoff conditions with a mature corn crop.

Phosphorus data from the eight runoff events and two rain simulations on small plots within each watershed will be analyzed to determine how well runoff data from small plots predicts runoff P at the watershed scale. Additional runoff sampling and plot studies will be conducted in spring of 2007 to obtain data from a wider range of rainfall amounts, intensities and with different stages of crop cover.
By Dr. Dennis Todey

After a relatively wet and cool fall over nearly the whole state, drought conditions have eased according to the US Drought Monitor. Nearly the whole state has seen reduction in drought status based on short term moisture conditions. Longer term dryness will still continue to impact much of the western part of the state where some pasture and range conditions have been slow to respond, several reservoirs are still well below average and surface water for cattle continues to be short.

Current Conditions

The most recent US Drought Monitor (Fig. 1) has removed drought impacts from most of the east river locations as soil begins to rewet from the recent rainfalls. While locations in the western part of the state have been wetter than average, also, they continue to have longer term moisture problems that will continue for the time being.

September precipitation was much greater than average in all but the southwestern part of the state (Fig. 2). Most of the state was 150-200% of average for the month. This additional rainfall will help recharge the very dry soil moisture profile across the state. While not resolving drought issues completely, the rainfall has reduced some concern for next year in the row crop areas. It has also allowed green-up over much of the pasture and range land and has brought some needed moisture for winter wheat seeding.

Drought Impacts

Because of the cooler temperatures and more rainfall, fewer fires have occurred in the last month.

(Continued on page 6)
There is still potential for them in fall and should be monitored. Most crop production is completed and not affected in development by moisture conditions. Wetness has been beneficial for the winter wheat crop being planted.

Reservoirs in the western part of the state continue to lag far behind average showing the longer term conditions of the drought. See reservoir levels contained below:
- Angostura 50%
- Belle Fourche 52%
- Pactola 70%
- Shadehill 84%

Water conditions for cattle have improved in association with the additional rainfall and cooler temperatures.

**Outlook**

For the month of September precipitation has a slight chance of being above average in the southeastern part of the state. No indications for below or above average are included in the outlooks from the Climate Prediction Center. Most rainfall in the fall is assumed to go back in to soil moisture recharge for the following year.

The El Nino discussed over the last month continues on track. The best indications are that we will have a moderate El Nino during the winter. The strongest connection in the next three months is expected to be warmer than average temperatures because of the El Nino. This situation will likely continue throughout the winter as moderate to strong El Nino’s are typically associated with warmer than average temperatures overall.

Forecasts can be found at: [http://www.weather.gov](http://www.weather.gov)

Links to current outlooks can be found at: [http://www.cpc.ncep.noaa.gov/](http://www.cpc.ncep.noaa.gov/)

---

Fig. 2  Percent of average precipitation in September. Only southwestern counties failed to receive above average precipitation during the month.
By Jennifer Pickard
SD Water Resources Institute

The Annual Aberdeen Water Festival was held September 21, 2006 at the Barnett Center on the Northern State University campus.

David German, SD Water Resources Institute, collected numerous caddisflies, water beetles, leeches, crayfish, damsel and dragon flies, along with several types of algae.

As the 4th graders looked through the microscopes, many of them had the usual responses. “Yuck!” and “Cool” were common. One young girl took a look under the microscope, jumped back, and said, “Oh! I didn’t need to see that!”

German explained to the kids that what they were viewing was the aquatic food chain. He told the kids that if they had ever been swimming in a lake in South Dakota, they had probably had a few zooplankton in their mouths before.

The kids at the Pierre water festival had a special treat. German collected a very rare fishfly from Enemy Swim Lake. He said that very few adult fishflies have been collected. Fishflies are found only in very clean water. The kids learned that certain organisms like bloodworms can live in polluted as well as clean lakes.

After his presentation, German quizzed the kids about the organisms in a lake and how they help determine if the lake is clean or polluted.

---

A potential scientist learns how plants produce oxygen at the Pierre water festival.
By Ross Vander Vorste  
SD Water Resources Institute

In May, I began an undergraduate research project on three lakes in northeastern South Dakota. This is a bioassessment project in which I am studying the macroinvertebrate communities of Enemy Swim Lake, Clear Lake and Lake Minnewasta. I also studied the water chemistry of these lakes, with the help of Dave German and Dennis Skadsen. I spent the summer collecting invertebrates using sweep nets, Eckman dredges, and Hester-Dendy samplers, not to mention many hours in the laboratory picking invertebrates out of the mud. I wouldn’t say that I wanted my field season to come to an end, but I am afraid it has. Now I get to spend my time identifying, counting and analyzing the data I collected. By the end of the project I hope to have a better understanding of limnology.

I collected the majority of the invertebrates using a D-frame sweep net. The sweep net is like an underwater butterfly net that I swept along the shoreline collecting both active and sessile invertebrates disturbed by my feet. These were large samples that usually contained lots of macrophytes (aquatic plants) making them difficult to sort through. Corixids (water boatman) and amphipods (scuds) comprised the majority of sweep net samples with numbers reaching into the thousands per sample. The sweep net was by far the most productive sampling method in terms of the total amount of invertebrates collected.

The Eckman dredge was another sampling gear that I used to collect benthic (bottom) invertebrates this summer. The Eckman dredge simply gathers sediment from the bottom of the lake. It encloses the sediment allowing it to be transferred to the surface and emptied into a wash bucket. I could then rinse the sample and get rid of any excess sediment while keeping all the invertebrates in the bucket. This sampling method was good for collecting chironomids and other bottom-dwelling aquatic invertebrates.

I also used Hester-Dendy samplers to collect invertebrates. These are a series of stacked plates that are anchored just off the shoreline. I allowed invertebrates to colonize the samplers for over a month before I collected and sorted them. Results from the Hester-Dendy samplers were variable and factors like wave action and the amount of algae growth on the plates determined how many invertebrates I found. I collected a variety of invertebrates, ranging from amphipods to chironomids, using Hester-Dendy samplers.

Water quality analysis was done by collecting (Continued on page 9)
water samples from the surface and bottom of the lakes. Samples were then sent to the water quality laboratory at SDSU for further analysis. I also used Secchi disks to measure transparency and a DO meter to measure the dissolved oxygen and temperature profile in each lake.

This past summer I learned what it takes to be a limnologist. A limnologist has to be willing to get wet and muddy. They have to sample in all types of weather, no matter how large the waves are on Clear Lake. I found and identified many different genera of freshwater invertebrates and I am now making comparisons of the three lakes. I am learning more about the complexity of lake ecosystems and the various factors influencing them. I feel as though I have only grazed the surface of what really goes on in a lake and it has triggered my interests in limnology.

(Continued from page 8)

ATTENTION LAKE LOVERS!

Due to the success of the Lake Water Quality Workshop held in June, David German (SDWRI) and Dennis Skadsen (Day Conservation District) will be conducting another Basic Limnology Workshop for improved lake water quality education at NeSoDak Camp on Enemy Swim Lake October 21-22, 2006.

The workshop is designed so that afterwards attendees will be able to share what they have learned with their neighbors and friends. Participants will be taught limnology and ecosystem concepts, the use of lake sampling equipment and will learn fun games and other techniques to help demonstrate learned concepts. The priority topic that will be covered through this workshop will be lake water quality and how watershed processes and humans affect lake water quality. The workshop will be held in an informal atmosphere and is designed to be fun as well as informative.

Kirk Hansen, a Clear Lake resident in Marshall County, was one of the June workshop participants who has already shared his new-found knowledge. Hansen made a presentation about the principles he learned at the workshop during the Clear Lake Association’s Annual Meeting.

There is no charge for the workshop or for food and lodging but travel is the participant’s responsibility.

Pre-registration is required. For more information or to register by October 13th, please call Jennifer at (605) 688-4910 or e-mail Jennifer.Pickard@sdstate.edu.

Ross took Secchi disk readings on Lake Minnewasta, north of Waubay, SD.

Kirk Hansen shares about Clear Lake’s water quality.
When it rains, it rains
When it doesn’t, it doesn’t

Hal Werner, 1947