Proposals were reviewed by the following agencies: SD Department of Environment and Natural Resources, SD Department of Agriculture, SD USGS, SD NRCS, and South Dakota State University.

“Microbial indices of soils and water associated with vegetated treatment areas (VTAs) from five animal feeding operations (AFOs) in South Dakota”

$15,000 Principal Investigators: Bruce Bleakley, Professor; Biology/Microbiology & Plant Science Department, and Todd Trooien, Professor of Agricultural and Biological Engineering, both from South Dakota State University.

“Leaching Tests for Encapsulation of Waste after Arsenic Removal from Drinking Water”

$11,873 Principal Investigators: Arden Davis Chairman, Department of Geology and Geological Engineering, David Dixon, Professor of Chemical Engineering; and Professor of Civil Engineering, all from South Dakota School of Mines & Technology.

“Permeable Reactive Bio-Barriers for Uranium Removal: Role of Iron Minerals on Uranium Fate and Transport”

$14,855 Principal Investigators: Rajesh Sani, Assistant Professor, Chemical and Biological Engineering; Sookie Bang, Professor, Chemical and Biological Engineering, and David Dixon, Professor of Chemical Engineering; and Professor of Civil Engineering, all from South Dakota School of Mines & Technology.

“Alternative Irrigation Water Management Strategies to Conserve Water”

$17,365 Principal Investigators: Hal Werner, Professor, Agricultural and Biosystems Engineering, Todd Trooien, Professor, Agricultural and Biosystems Engineering, and Russell Persyn, Assistant Professor, Agricultural and Biosystems Engineering, all from South Dakota State University.

“Evaluation of manure application risk on frozen soils”

$14,018 Principal Investigators: Russell Persyn, Assistant Professor, Agricultural and Biosystems Engineering and Dennis Todey, State Climatologist/Assistant Professor, Agricultural and Biosystems Engineering, both from South Dakota State University.
Abstracts for the joint 52nd Annual Midwest Ground Water Conference and 2007 Eastern South Dakota Water Conference are being solicited. Abstracts for oral and poster presentations are limited to a maximum of 300 words. Abstracts will be accepted through Friday, June 29, 2007. (By submitting an abstract, the author grants the conference organizers the right to publish the accepted abstract.)

Biographical sketches must be in paragraph form and are limited to 100 words.

Authors will be notified of acceptance by July 13, 2007. (Accepted speakers are subject to conference registration fees.)

Program format: Oral presentations will be limited to 30 minutes, including introduction and questions; Microsoft® PowerPoint format required for oral and poster presentations. (Accepted presentations will be posted on the conference website, unless otherwise instructed.)

Topics for which abstracts will be considered include, but are not limited to:

**Water Supply**
- Reclaimed water
- Conservation/demand management
- Security
- Water rights/allocation
- Policy planning

**Water Quality**
- Non-point source pollution
- Urban best management practices
- Standards
- Emerging contaminants
- Ag best management practices
- Volunteer monitoring

**Surface Water**
- Missouri River Basin
- River management
- Lake/reservoir management
- Wetlands
- Monitoring
- Streambank stabilization

**Ground Water**
- Remediation
- Aquifer delineation
- Monitoring networks
- Trends
- In-situ leach mining
- Karst hydrology
- Contaminant fate and transport
- Geophysics

**Water Information Management**
- Data collection techniques
- Data dissemination
- Data security
- Data standards

**Environmental Issues**
- Hypoxia
- Carbon sequestration
- Climate change
- Drought
By Dr. Dennis Todey  
South Dakota State University

Synopsis  
The current drought status has slightly improved again over the western part of the state with a reduction of coverage of each of the drought categories. But precipitation amounts during April have been below average over much of the western third of the state limiting any more improvement.

Current Conditions  
The current drought monitor for South Dakota (Fig. 1) indicates continued drought conditions west of the Missouri River with the worst conditions still confined to the southwest corner of the state.

The recent drier conditions have actually been a welcome respite over the wetter eastern part of the state where lowland flooding has continued. This dry period slowed the improvement in drought conditions in the west. While improvement in soil moisture conditions occurred during a relatively wet March, the drier April slowed the improvement.

(Continued on page 4)

Dr. Dennis Todey is South Dakota’s State Climatologist.  
http://climate.sdstate.edu/climate_site/climate.htm

Fig. 1  US Drought Monitor for South Dakota.  For a regional or whole US map see...

http://drought.unl.edu/dm
Drought Impacts

Soil moisture conditions continue to be drier than average in the western third of the state, although improved over last year overall. Soil moisture is higher than average in the eastern part of the state as a result of recent snows and rains.

The issues from the Missouri River west continue to be low water levels. The Missouri River and lake system have seen little improvement. While drought monitor category has the Missouri River without a specific impact, this does not ignore the continuing issue of low water levels on the river. Oahe is still near record low levels at about 30’ below average. This will continue to be an issue for the near future as projected run-off for the year is about 81% of average.

Irrigation on the major irrigation projects of Belle Fourche and Angostura will be greatly limited this year. Angostura is projected to receive only 15% of it average allotment. All water bodies west of the river are showing the effects of extended dry conditions.

Outlook

The most recent drought monitor outlook indicates chances for improvement over areas west of the river. Some of the soil moisture affects are reduced because of the March precipitation. Some additional precipitation is likely in May as the outlooks from the Climate Prediction Center have indicated above average chances for precipitation over the whole northern Plains area.

The concern still exists for turning drier than average later in the summer. La Nina conditions are likely to occur in the middle of the summer. This often leads to drier and warmer than average conditions in the state. This will have to be watched closely for further developments.

Current forecasts can be found at:
- [http://www.weather.gov](http://www.weather.gov)

Links to current longer range outlooks can be found at:
South Dakota Diversity of Temperature: Pictures from Statistical Analysis

ABSTRACT

Human activities and sustainability of ecological systems depend at first from the dynamics of climate events: daily, seasonal and annual sequences of weather. The most used and representative characteristic of climate dynamics is air temperature. We analyzed the regional diversity of monthly temperature based on long-term data obtained from the High Plains Regional Climate Center for South Dakota. Multidimensional statistical methods were used, and the principal results presented as a sequence of 2- and 3-dimensional scatterplot pictures depicting the quantitative results.

The sets of initial matrices were compiled for territory of SD. The first set of initial matrices of time series \( \{X_{t*n}\} \), where \( t = \) number of years and \( n = \) number of meteorological stations, contains three matrices: \( X^1_{(91*19)} \), \( X^2_{(67*29)} \), and \( X^3_{(33*94)} \). The second set - \( \{X_{n*m}\} \), where \( n = \) number of meteorological stations and \( m = \) number of months in a year, contains two matrixes: \( X^4_{(29*12)} \) and \( X^5_{(94*12)} \). The third set - \( \{X_{t*m}\} \), where \( t = \) number of years and \( m = \) number of months in a year: \( X^6_{(113*12)} \), \( X^7_{(110*12)} \), and \( X^8_{(102*12)} \).

Statistical analysis allowed us to differentiate weather stations by temporal trends and spatial distribution for the time intervals 1915-2005 and 1932-1998. The most variable stations (Brookings, Camp Crook, and Highmore) were determined; their seasonality was described (the most variable months and correlation among months during year) and their seasonal regime determined. The average annual and monthly temperature distributions were presented for South Dakota based on 29 and 94 stations for the time intervals 1932-1998 and 1963-1995.

Shmagin, B.A.*, C.A. Johnston, and D.P. Todey, Department of Agricultural & Biosystems Engineering and Department of Biology & Microbiology, South Dakota State University, Brookings, SD 57007.

Researcher Dr. Boris Shmagin (SDWRI) made a poster presentation at the South Dakota Academy of Science 92nd Annual Meeting at South Dakota State University in Brookings, SD.
Development of an Optimal Macroinvertebrate Bioassessment Index for Prairie Lakes in Northeastern South Dakota

ABSTRACT

Biological monitoring is a necessary tool used for assessing the quality of fresh water ecosystems. Accurate biological assessments allow for determining the exposure of aquatic communities to different classes of stressors (e.g., domestic waste, agricultural runoff and sedimentation, pesticides, habitat alteration). Biomonitoring can guide managers toward the proper preventative or restorative actions for impaired ecosystems. Despite the widespread use of multimetrics for bioassessment in streams, little work has been published on multimetric indices for lakes.

This study examined the macroinvertebrate communities and water quality of Enemy Swim Lake, Clear Lake and Lake Minnewasta in northeastern South Dakota. The macroinvertebrate communities were collected using sweep-nets, Hester-Dendy subsamplers, and Eckman dredges and individuals were identified to genus. Taxa richness and composition, feeding habits and habitat use were used to develop metrics. Metric scores were compared to the water quality status of the lake. Trophic status of the lakes correlated with metric scores. These lakes ranged in trophic status (TSI) from mesotrophic (moderate levels of nutrients) to hypereutrophic (high levels of nutrients) during the sampling period. Enemy Swim was found to have the highest water quality based on TSI and received high scores in metrics related to taxa diversity and pollution intolerance. Clear Lake had intermediate water quality and metric scores. Lake Minnewasta had the lowest water quality based on TSI scores and also the lowest metric scores out of the three lakes in the study.

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"Water—the most refreshing drink on the planet."
—Steve Pohl