



# NRCS **Technology News**



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**June 2005**

“NRCS *Technology News*,” provided by Science and Technology, delivers pertinent information to our customers about new technology, products, and services available from the Soil Survey and Resource Assessment and the Science and Technology deputy areas.

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## MESSAGE FROM DEPUTY CHIEF LAWRENCE E. CLARK

### Wind Erosion Model Transferred from ARS to NRCS

A computer model, the latest cutting-edge tool for predicting wind erosion, was formally transferred from U.S. Department of Agriculture's (USDA) Agricultural Research Service (ARS) to USDA's Natural Resources Conservation Service (NRCS) during a handoff ceremony.

The transfer of the Wind Erosion Prediction System (WEPS) model from USDA's ARS to USDA's NRCS brings the technology a step closer to reaching NRCS field offices, producers and landowners in wind-prone regions of the country.

“Farmers and conservationists in Great Plains states have long sought more effective ways to estimate erosion and apply management to cope with the region's erratic winds and recurrent droughts, which together can strip vital topsoil and carry it hundreds of miles,” said ARS Administrator Edward B. Knipling.

In addition, wind-driven dust storms are capable of generating massive, rolling black clouds that can cause hazardous driving conditions and motorist fatalities.

For the past 40 years, landowners have made erosion-related decisions based on a simple equation that didn't take into account new advances in erosion science and computer technology. WEPS, the new model, simulates weather, soil and crop conditions, and wind erosion on a daily basis. It can also project the emission of the tiny dust particles referred to as PM-10.

NRCS and Extension Service personnel, as well as individual farmers, will be able to use WEPS to formulate specific wind erosion control practices. The decision support system can guide growers to the right approach, whether it's establishing a soil-stabilizing crop cover, setting up windbreaks and barriers, or reducing the soil's erodibility with soil ridges and clods.

As with any newly-developed model, NRCS will proceed to test the model, as well as prepare the databases needed for use at the field office level. Testing began in early April in a region of Colorado and will continue to end of May. Further testing is planned for North Dakota, New Mexico, and Oklahoma, in 2006. The field testing will assure that the model will provide reasonable estimates for the Great Plains states. Other areas will be identified for testing in early 2006.

We urge you to get involved in testing and adopting this new technical tool when it becomes available in your part of the country.

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## CONSERVATIONIST'S CORNER

Allen Green, State Conservationist--Colorado

### COLORADO SNOTEL SITES & HYDROPROBES

As one of only 11 states to have the Snow Survey and Water Forecasting program, we in Colorado realize the significance and impact of the products and services we supply. We know that our snow survey program is vital because water management is complex. Our efforts impact millions of urban and rural landowners; supply, demand and cost of water are subject to the climate and to numerous economic and social influences, domestic and international.

Our experts collect snowpack and climatological data through our 99 SNOWpack TELEmetry (SNOTEL) sites to generate daily precipitation and snowpack measurements used to forecast seasonal runoff, estimate annual water availability, and provide data used in agricultural production, recreation, power generation, fish and wildlife management, municipal and industrial water supply, flood control, and urban development decision making.

“Our snow program is one of the most visible in Colorado,” says Allen Green, State Conservationist, Colorado. “Every major media outlet clings to any and all reports distributed from that division; as a result, it is our continued effort to provide the most up-to-date, accurate information possible.”

In order to ensure the accuracy and timeliness of our forecasting information, SNOTEL sites must be maintained and updated on a regular basis. Colorado places a high priority on the precision of its equipment and as a result the sites are upgraded regularly.

“We are currently in the process of upgrading all 99 Colorado sites,” says Mike Gillespie, Snow Survey Supervisor, Colorado. “This should take our six staff members about four summer field seasons and will allow for more efficient data collection.”

In addition to upgrading the electronics at each site in Colorado, some sites will receive new sensors called hydroprobes. “This technology is exciting and really hits home with the foundation of our organization, soils,” Gillespie goes on to say.

Hydroprobes provide the ability to determine the water content of specific soils within a watershed. They provide the kind of information that helps determine the amount of water likely lost because of soil recharge.

“For the first time, we will have a direct measurement of soil moisture within a basin. Our stream-flow forecasters can then accurately estimate the quantity of snow water required to recharge the soil profile,” Green further states. “This data gives us our best estimate of runoff efficiency the basin might have as we enter the critical snow melt period.”

In many cases, local water users and cooperators are helping to fund these additional sensors. The Colorado snow survey staff is also utilizing assistance from the National Water and Climate Center, along with the National Soil Survey Lab in Lincoln, Nebraska, to assess the soil characteristics at each SNOTEL site equipped with these sensors.

It is estimated that Colorado's SNOTEL sites will be completely upgraded in 2006, upon which time the State's water uses will have significantly improved data and more accurate forecasts to base their water supply decisions.

## NEW PRODUCTS AND SERVICES

### #1 A Tool to Communicate Planning Alternatives Visually

Could you use a tool that helps visualize the future? The USDA National Agroforestry Center (NAC) has developed a Visual Simulation Kit that provides guidance and software for editing pictures to illustrate proposed planning scenarios. Photo-realistic simulations provide a powerful planning tool to communicate ideas visually, leading to better decision-making and adoption of conservation measures.

The two CD Kit contains a Visual Simulation Guide and CanVis image editing software.

- The Visual Simulation Guide provides information on how to use image editing software to create simulations for conservation planning. The Guide runs on an internet browser and provides directions on how to plan a simulation project, acquire images, edit an image, and accurately locate and size imported objects to create realistic looking simulations. Ten natural resource planning projects are provided as working examples. Videos are used extensively to showcase how these projects were created.
- CanVis is an entry-level image editing software that can be used to edit scanned photographs or images from digital cameras. Simulations are created by duplicating elements from within the image and by adding elements from other images or from CanVis' object library. A collection of over 500 plants and other elements typically used in conservation projects are included in CanVis' object libraries. The CanVis software has been CCE certified and comes with video tutorials.

A free copy of the Visual Simulation Kit can be ordered from NAC by faxing Nancy Hammond at 402-437-5712 .

For more information contact Gary Wells, National Agroforestry Center, 402-437-5178 ext 41, or email at [gary.wells@ne.usda.gov](mailto:gary.wells@ne.usda.gov).

The USDA National Agroforestry Center is a collaborative partnership of NRCS and the Forest Service.



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## TECHNOLOGICAL ADVANCES

### #2 New Release has Bio-Energy Potential

The Booneville, Arkansas, Plant Materials Center (PMC) recently released a new eastern gamagrass to be called “Bumpers” in honor of Senator Dale Bumpers of Arkansas, a 24-year veteran of the U. S. Senate and a long-time agricultural advocate and supporter.



*Former Senator Bumpers announces release of new gamagrass variety.*

Although the new grass is primarily a forage crop, Bumpers has significant potential benefits as a production-biomass crop for bio-energy or biofuel. Experts predict that energy produced from fossil fuels will peak by 2020, presenting a challenge to find alternative energy resources. Agriculture stands to benefit by becoming a major producer of alternative fuels such as bio-fuels from crops like Bumpers to supply small power plants and crops that can be utilized in the production of synthetic fuels such as methane and ethanol.

A variety of biomass-producing plant materials, such as Bumpers, other selected perennial grasses, and fast-growing trees, are rapidly emerging in the agricultural marketplace. PMCs, including Booneville, are addressing the development of plant materials that will accommodate energy needs while considering water conservation and other objectives.

For more information, contact Lance M. Tharel at the Booneville PMC, at 479-675-5182 or by email at lance.tharel@ar.usda.gov.



*Eastern Gamagrass*

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## TECHNOLOGY TRANSFER

### #3 Risk Assessment and Exposure Analysis on the Agricultural Landscape

In 2002, the University of Nebraska at Lincoln entered into an agreement with the National Soil Survey Center (NSSC) to develop the soils part of the “Risk Assessment and Exposure Analysis on the Agricultural Landscape,” a project sponsored by USDA-Risk Management Agency (RMA). Working with the UNL Department of Computer Science and Engineering, scientists at the NSSC developed criteria for a computer program that would generate soil productivity indices for dryland commodity crops, such as corn, wheat, soybeans, and cotton. RMA will evaluate the results for use as a risk assessment tool in its crop insurance program.

Productivity indices rate soils according to their inherent capacity to produce seed, fiber, and biomass. Inherent productivity is nearly invariant over long periods of time. Temporary fluctuations in productivity resulting from above average or below average management do not affect productivity indices. On the other hand, long-term changes in soil properties that cause significant changes in productivity do affect the indices. Erosion, land leveling, and salinization are examples of long-term changes that cause such changes.

The inherent capacity of the soil to produce cultivated crops is only one factor that determines the overall productivity. Crop varieties and management practices also cause yields to vary from place to place and partially mask the inherent quality of the soil. Except in extreme circumstances, such as prolonged drought, inherent soil capacity varies little throughout the geographic extent of a given soil identified in the Soil Survey Program.

The National Geospatial Development Center in Morgantown, West Virginia, created soil productivity index maps for a limited number of Nebraska counties using digitized soil survey data acquired from the Soil Data Mart (<http://soildatamart.nrcs.usda.gov>). The maps show the geographic distribution of soils that range from nonarable (index <30) to very highly productive (index >70). These maps are useful not only for testing productivity indices, but also for displaying the distribution of agriculturally important soils.

Scientists at the NSSC developed soil productivity indices to avoid inequities that are possible when soils are arrayed by use of traditional yield data alone. These indices use soil data that are accessible in every county where commodity crops are grown. Although the immediate focus was on commodity crops in selected counties in Nebraska, productivity indices can be made available for commodity crops in other areas of the United States.

For additional information, please contact:

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## **#4 NRSC Plant Materials Program Highlighted in Discovery Science Channel Documentary**

The Discovery Science Channel will be highlighting the dedicated work of the NRCS Plant Materials Program in its ongoing battle to restore the eroding Louisiana Delta. Every year an area bigger than the island of Manhattan disappears under the waters of the Gulf of Mexico. At this erosion rate, the entire delta, one of the largest wetlands on earth, will be gone resulting in disastrous economic and environmental consequences for the nation.

In the documentary to be aired nationally on the Discovery Science Channel, Plant Materials Specialist Gary Fine of the Golden Meadows Plant Materials Center, located in the heart of the Louisiana delta, will talk about what types of plants work best in halting this catastrophic erosion.



What: Discovery Science Channel

Who: NRCS Plant Materials Program's Gary Fine

When: June 11, 2005 at 8 pm on all Discovery Science Channels nationwide

Why: The Louisiana Delta erosion crisis

Where: Gary Fine was interviewed for this documentary on site in the Louisiana delta region

For more information about the NRCS Plant Materials Program please visit:

<http://plant-materials.nrcs.usda.gov>

## WEB-BASED TECHNOLOGY

### #5 Plant Distribution Update Module: An APHIS and NRCS Partnership

For the past several years, the NRCS National Plant Data Center and the USDA Animal and Plant Health Inspection Service (APHIS) Center for Plant Health Science Technology (CPHST) Plant Epidemiology and Risk Analysis Laboratory (PERAL) have collaborated in order to improve the distributional data on the PLANTS Database, <http://plants.usda.gov>, and make it of greater use for risk analysis. One of the major projects in this effort is the development of an online module, the Distribution Update (DU), for the submission of new state and county plant distribution data.

One of the particular goals of this module is to speed the input and subsequent dissemination of distributional information about weeds, especially those that are spreading rapidly and/or are poorly known. For example, the DU could shorten the time between the submission reporting time for occurrences of species like *Sylvinia molesta*, giant salvinia, a serious weed spreading across the U.S. The PLANTS Database is considered another resource for federal and state agencies to learn of new plants to the U.S. or a particular state or track records/reports over time. PLANTS fits into the Early Detection, Rapid Response system proposed by the Federal Interagency Committee for the Management of Noxious and Exotic Weeds, <http://ficmnew.fws.gov/>.

Module submissions require documentation to be considered for inclusion in PLANTS. Submissions may be documented by a voucher collection deposited at a recognized herbarium, published literature, or observation. Default PLANTS distribution will continue to be based upon specimens that can be verified to assure reliability. To access the Distribution Update Module, go to the PLANTS Web site at <http://plants.usda.gov>, and select Distribution Update.

For more information, contact:

Rebecca Noricks  
National Plant Data Center  
225-775-6280 x 10  
[rebecca.noricks@la.usda.gov](mailto:rebecca.noricks@la.usda.gov)



*Sylvinia molesta*

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## PERSONNEL

### #6 Lawrence New Director for Resource Economics & Social Sciences Division

Prior to being named Director for Resource Economics & Social Sciences Division, Douglas Lawrence has held several positions in the NRCS National Headquarters Programs Deputy area including Branch Chief in the Easement Programs Division; Acting Director of the Watershed and Wetlands Division; and Staff Leader of the Farmland Protection and Community Planning staff. In addition, he was detailed to the Environmental Protection Agency's Agricultural Counselor to the Administrator and the USDA Deputy Secretary's office.

During his 30-year NRCS career he has served as a Senior Economist and Deputy Division Director in Washington, DC; an Economist at the National Technical Centers in the Northeast and the South; and a State Office Economist in Wisconsin, Maryland, Delaware, and the New England states. In addition to working on the economics of flood damage reduction, drainage improvement, recreation, and water quality enhancement, he has worked extensively with national conservation policy analysis. In 1997, he was detailed to the House Agricultural Appropriations Committee to work on developing the 1998 appropriations act for the U.S. Department of Agriculture.

Dr. Lawrence, a North Dakota native, holds a Ph.D. in economics from the University of New Hampshire; a Masters degree in agricultural and resource economics from the University of Maryland; and a Bachelors degree in economics from the University of Wisconsin.

### #7 Technology Personnel Realignment

Scientists and engineers working on technology development in the areas of water quality, hydrology, and water management at the National Water and Climate Center have been realigned to the Water Quality and Quantity Technology Development Team within the West National Technology Support Center (WNTSC). Functional responsibilities and duty stations are unchanged.

Please welcome the following staff to the WNTSC:

Joe Bagdon .....	Conservation Agronomist
Alfreda Brown.....	Office Assistant
Chris Gross.....	Conservation Agronomist
Eric Hesketh .....	Soil Scientist
Rosalinda Maesner .....	Office Assistant
Bill Merkel .....	Hydraulic Engineer
Helen Moody.....	Hydraulic Engineer
Dan Moore.....	Hydraulic Engineer
Ken Pfeiffer .....	Conservation Agronomist
Clare Prestwich .....	Agricultural Engineer
Quan Quan.....	Hydraulic Engineer
Fred Theurer .....	Agricultural Engineer
Pat Willey .....	Agricultural Engineer

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## SCIENCE & TECHNOLOGY-RELATED MEETINGS

### #8 International Salinity Forum Attracts Worldwide Audience

Over 350 producers, scientists, water-resource managers, and policy-makers attended the recent International Salinity Forum in Riverside, CA. Attendees represented 17 countries and five continents, to learn more about soil salinity issues. Salinity, the measure of total salt in the soil or water, is robbing nations of the natural resources that sustain life.

Dr. Daniel Hillel of Columbia University, previously with Ben-Gurion University in Israel, noted that salinity problems started with early agricultural practices in southern Mesopotamia. Diverting river water to productive farmlands led to two problems, sedimentation and an increase in salt loads. These ancient civilizations rose and declined as the population centers shifted northward, seeking soil not impacted by salt. Today, the remnants of the once-great cities of southern Mesopotamia are surrounded by great expanses of salt-encrusted marshlands or sterile deserts. He warned that we must start work now to avoid the same fate.

Dr. Julian Martinez-Beltran with the United Nations Food and Agriculture Organization (FAO) said salinity limits crop production and negatively impacts food security worldwide. In 2002, the FAO estimated that 50 – 75 million acres of irrigated land, worldwide, were seriously damaged by the build-up of salts, and that 1 million acres are lost from production every year as a result of salinity.

Dr. Rob Fitzpatrick of the Commonwealth Science & Industry Research Organization estimates Australia is losing the equivalent of one football field to salinity every three minutes. Two-thirds of the Australian continent is affected by salinity issues, degrading some rivers to little more than toxic waste sites due to the leaching of salts and metals into the rivers.



*Central National Technology Support Center Staff attend Salinity Forum. L to R - Russ Pringle, Ron Williams, Emil Horvath, Dennis Neffendorf, and Jerry Walker.*

The sponsors of the International Salinity Forum are hopeful that the meeting will improve the sharing of ideas and research, and develop networking opportunities that will foster greater regional, national and international collaboration on solving this international problem.

For additional information, contact Dennis Neffendorf at 817-509-3225

### #9 National Environmental Policy Meeting and Fish and Wildlife Workshop

National Headquarters Ecological Sciences Division will hold a joint National Environmental Policy Meeting and Fish and Wildlife Workshop in Sacramento, California, June 14–16, 2005. Please contact the Conservation Economist, Ecological Sciences Division, by telephone at (202) 720-8578 or by facsimile at (202) 720-2646, should you have any questions.

## #10 American Forage and Grassland Council

The American Forage and Grassland Council is the professional organization that represents nearly 3,000 forage, grassland management, and natural resource professionals. The AFGC Annual Meeting will be June 11–15, 2005, at the Radisson Hotel and Conference Center, Bloomington, Illinois. Detailed information regarding the AFGC Annual Meeting is available at <http://www.afgc.org/>. Additionally, NRCS is sponsoring a special symposium on Wednesday, June 15, 2005, to provide staff and others with information on emerging technology and programs. Please contact Dennis Thompson, National Grazing Lands Ecologist, at (202) 720-5010, should you have any questions.

## #11 NRCS National Economists' Meeting

NRCS economists play an important role in assuring that practice and program costs and effects are provided in a timely and accurate manner. The NRCS 2005 National Economists' meeting held in Portland, Oregon, June 13-June 17, 2005, provides a forum for both new and experienced economists to develop or improve their economic knowledge and skills. Contact the Resource Economics and Social Science Division at 202-720-2307 for additional information.

## #12 North American AgroForestry Conference

The theme for this conference, "Moving Agroforestry into the Mainstream," is intended to attract those people interested in the production and environmental benefits of agroforestry. The conference consists of two days of concurrent sessions and one day of field tours. The concurrent sessions will address various topics relevant to agroforestry, a poster session that includes many of these themes on both national and international levels, panel discussions that focus on policy issues, successes and promising directions for agroforestry. The third day of the conference will include several field trips to visit agroforestry in practice as well as ongoing research on agroforestry options to address research as well as the implementation of agroforestry options.

## #13 International Grassland Congress

The International Grassland Congress (IGC) is the premier world event for grassland research and development and attracts around 1000 delegates from about 100 countries. Since its beginning in 1927 in Leipzig, Germany, the IGC has been held about every four years in different locations around the world. In 2005, we welcome you to Dublin, Ireland, for the XX Congress. The main Congress is followed by five concurrent satellite workshops each of 3 - 4 days in various locations in the UK and Ireland.

For more information, visit the website at [http://www.igc2005.com/grass\\_congress.htm](http://www.igc2005.com/grass_congress.htm).



## #14 Soil & Water Conservation Society

The Soil and Water Conservation Society (SWCS) has a multidisciplinary membership of more than 7,000 individuals and business leaders throughout the world. The SWCS annual conference brings together researchers, practitioners, and policymakers at all levels of government, along with a broad cross-section of other interest groups, to explore current issues in natural resource management and planning.

The annual conference, held in Rochester, New York, July 30-August 4, will focus on four key topics of concern for professionals working to conserve natural resources locally and globally –

- Managing Landscapes for Environmental Quality
- Assessing and Communicating the Effectiveness of Conservation and Environmental Programs
- The Growing Debate Around Water Use
- Consumer Demand and Policy Effects on Agricultural Resources



For more information, visit the SWCS website at [www.swcs.org](http://www.swcs.org).

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### NRCS TECHNOLOGY NEWS

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William E. Puckett, Deputy Chief for Soil Survey and Resource Assessment

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