



NRCS **Technology News**

June 2003

“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.

“NRCS *Technology News*” is in a format that is available to all NRCS field staff. The formatted MSWord version is attached.

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MESSAGE FROM THE DEPUTY CHIEFS

Lawrence E. Clark and Maurice J. Mausbach

NRCS relies on plants in many of our land conservation activities, and most of these plants require pollination—the transfer of pollen to seed-bearing structures—to produce seeds for the next generation. Many of our conservation plants, such as grasses, sedges, and coniferous trees, are wind pollinated, as are many of the flowering trees including poplars, birches, alders, and oaks. Relatively few of our plants are pollinated by birds or bats, though these animals are important pollinators in the tropics. In fact, our major pollinators are insects in a few advanced groups, namely the Lepidoptera (butterflies and moths), Diptera (flies), Coleoptera (beetles), and Hymenoptera (bees and wasps). A better understanding of these pollinators and their role in ecosystems will help us to be effective farmers and conservationists.

Farmers have known for millennia that certain crops need pollination help for maximum yields of healthy fruit. Ancient farmers domesticated the European honey bee (*Apis mellifera*) not only for honey, but to provide pollination to certain fruit trees, notably the prunes, plums, cherries, apricots, and almonds of the genus *Prunus*, as well as related members of the rose family, such as apples and pears. The importance of these supplemental pollinators—usually transported from orchard to orchard by truck—can be easily gauged. When bad weather limits their activities, fruit yields can decline so much that crops become economically unharvestable.

Lately, American orchardists have begun experimenting with some native bee species that forage in poor weather and are immune to the diseases, mites, and genetic pollution (Africanization) that plague the honey bee, which is still the workhorse of modern pollinator services. Small, solitary bees in the genus *Osmia* have been used for decades to pollinate fruit trees in Japan, and our beekeepers are now learning how to culture and transport them as they do honey bees.

Just as some pollinators are very specific to the plants they visit, some crops have always been dependent on certain native pollinators. For example, blueberries and cranberries are quasi-wild plants often grown within their native ranges that rely primarily on native bumblebees (*Bombus*) for pollination. These pollinators need native habitats in which to live and breed. Since so many of them nest in the soil and require different plants for nectar and pollen, row crops and other tilled landscapes are generally unsuitable. Preservation, restoration, and maintenance of appropriate wild habitats adjacent to farmlands provide colony sites and supplemental foraging areas that increase pollinator densities. Creating such native buffer areas can often pay economic and ecological dividends by improving crop yields and reducing soil loss and runoff.

Pollinators are keystone components of most natural systems, so it is disturbing that pollinator availability has declined significantly with widespread pesticide use and land clearing. There is a clear synergism between improving land stewardship and pollinator activities: better land management promotes pollinators and pollinators then further improve the health of the land by assisting plant reproduction.

Pollinators are fundamental. They maintain the natural cycle of life in our wildlands and in agricultural settings and they brighten urban and suburban landscapes. Some things that NRCS can do to promote pollinators are:

- Maintain broad buffers between fields where pollinators can live and breed
- Restrict pesticide and herbicide use as much as possible, especially in these buffer areas or when pollinators are most active
- Plant cover crops, such as clovers, alfalfa, sunflowers, and mints, to sustain wild pollinators, particularly between crop seasons
- Let plants bloom: when deciding to plow, mow, or graze, consider whether the timing lets plants in the area feed pollinators
- Use native plants that support native pollinators in conservation plantings
- Encourage pollinators in backyards and urban settings by providing nest sites and planting pollinator-friendly plants

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CONSERVATIONIST'S CORNER

Lincoln E. (Ed) Burton
State Conservationist, Wyoming

Wyoming finds the wealth of resources and assistance available through the professionals and scientists within the NRCS Science and Technology Consortium to be invaluable. The variety of expertise is a tool that helps the State meet increased customer expectations and demands for technical assistance to reach natural resource conservation goals.

The Ecological Sciences Division (ECS) helped NRCS Wyoming address National Environmental Protection Act (NEPA) issues under the Small Watershed Program (PL-566). It also provided consultation and guidance related to Section 7 of the Endangered Species Act (ESA). NRCS Wyoming works with employees and partners to ensure that landowners have the necessary information in the conservation planning process to make informed decisions concerning endangered species and critical habitat on private lands. Employees in the ECS Division have been Wyoming's "go-to" resource for both NEPA and ESA.

The on-site technical assistance from the landscape architects in the Conservation Engineering Division and the National Design, Construction, and Soil Mechanics Center helped us graphically demonstrate alternatives for a flood mitigation project that is in the active planning stages. The Center also receives soil samples from the State to determine soil properties to develop construction specifications for agricultural waste storage facilities. We look forward to continued assistance as options for maximum customer service are considered.

The Social Sciences Institute's products and training provide Wyoming employees with a variety of tools to help in the customer relations aspect of their jobs. The "People, Partnerships, and Communities" fact sheets offer guidance for working effectively with people and communities. "The Leader in You" satellite broadcasts provide employees with an opportunity for staff development initiatives.

The Watershed Science Institute (WSSI) assisted in the planning efforts for Wyoming's Popo Agie River Flood Mitigation Project near Lander. WSSI staff conducted a 2-day on-site investigation and provided follow-up review and recommendations for implementing the project. Products, publications, and information available through the Wildlife Habitat Management Institute are a valuable resource for both internal and external customers and are used on an ongoing basis by Wyoming staff.

The National Cartography and Geospatial Center (NCGC) has played an important role in the development of Wyoming's GIS program. The NRCS/NCGC relationship in the state began with NRCS Wyoming efforts to create seamless digital topo maps that could be used with GIS. NCGC expanded its assistance to produce county orthomosaics for every county, in addition to other datasets. As a result, field personnel can create professional-looking maps using GIS. NCGC also provides assistance on GIS software, hardware, analysis, and training. NRCS Wyoming has just completed a May 2003 ArcGIS class for State office, resource, soils, and engineering staffs. This expands our expertise and increases customer appreciation for NRCS services.

In fiscal year 2002, staff from the National Water Management Center (NWMC) conducted a 3-day NEPA and water resources planning training session for 20 NRCS Wyoming and partner employees involved in watershed planning. A technical review of Wyoming's draft Environmental Assessment (EA) on our Lingle-Fort Laramie Water Quality Project provided guidance and recommendations for the final EA. NWMC's groundwater specialist is helping with the Yoder Flood Management Preliminary Investigation Report. The project will include a detailed monitoring plan to determine the source of the groundwater. In addition, staff from the National Water and Climate Center assisted in a 3-day Hydraulics Training for Wyoming's NRCS engineers that included instruction in the use of the HEC-RAS software.

The NRCS Science and Technology Consortium offers knowledge and data that helps maintain our Agency's leadership role in natural resource conservation on private lands. Wyoming appreciates the opportunity to capitalize on the investment NRCS has made in

the Consortium in order to ensure that our customers continue to receive the highest quality service possible.

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NEW PRODUCTS AND SERVICES

#1 Norwalk River Case Study Highlights Collaborative Planning

“The Norwalk River Watershed Initiative: A Case Study of Collaboration in Partnerships” reviews the activities and achievements associated with the Norwalk River Watershed Planning initiative in Connecticut. This watershed has seen over 300 years of development that has resulted in a transition of the watershed from a Long Island Sound and harbor-based economy through an agricultural period to its current fragmented and suburban condition.

Of special interest is the community-based collaborative planning methodology used throughout the study, which may serve as a model for other locations. Community-based watershed planning provides a process for identifying natural resource concerns, developing consensus for action, and seeking solution through an open inclusive process that is driven by a sense of place and the people who live in those places. The results of the Norwalk River initiative are due as much to understanding social processes and human values as in understanding the technical aspects of watershed protection and natural resource management.

An electronic version of “The Norwalk River Watershed Initiative: A Case Study of Collaboration in Partnerships” is available at the Watershed Sciences Institute Web site, <http://www.wcc.nrcs.usda.gov/watershed/wssi-products.html>. Once on that page, select “Planning Tools” and choose the case study from the list of items available. An oral abstract of this paper is accepted for presentation at the 2003 annual conference of the Soil and Water Conservation Society in Spokane, Washington, July 26–30. The processes for community collaboration in natural resource planning, used in the Norwalk River initiative and based on the hands-on experiential lessons learned by NRCS Connecticut and IRT New England, have also been published as a set of 11 PowerPoint modules, “Collaboration in Community Based Partnerships.” The set may be obtained on the NRCS – Community Collaboration Network Web site at <http://www.wcc.nrcs.usda.gov/watershed/community-network.html>.

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#2 Social Sciences Institute Releases Four New Fact Sheets

“How to Improve Diversity on Your Team,” “Understanding Non-Profit Organizations,” “Exhibiting: A Tool to Achieve Technology Transfer,” and “Working with People of Different Cultures” are the new fact sheets released this month in the Social Sciences Institute’s (SSI) People, Partnerships, and Communities (PPC) series. They are available on the SSI’s Web site, www.ssi.nrcs.usda.gov/ssi.

A significant challenge for The Conservation Partnership is to continue to build and recruit a diverse workforce. “How to Improve Diversity on Your Team” defines diversity, highlights its benefits and importance, and provides strategies for increasing diversity in work and organizational settings. It also provides practical tips for recruiting people from diverse backgrounds and retaining them on your team.

For more information, contact:

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Seven out of every 10 Americans belong to an organization, and many of them support environmental and conservation initiatives. “Understanding Non-Profit Organizations” defines a non-profit organization and explains why non-profits are important, how they are structured, and suggests some things to consider in dealings with a non-profit organization.

A compelling exhibit can be an indispensable outreach or marketing tool for your watershed group, conservation district, or program. “Exhibiting: A Tool to Achieve Technology Transfer” gives tips to help you create a successful exhibit, including “do’s and don’ts.” This PPC focuses on the marketing objectives and the people aspects of

exhibiting. It can be used by anyone in The Conservation Partnership who wants to reach current or new customers at local, state, or national meetings.

For more information, contact:

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The NRCS has offices across the United States and in U.S. territories. Staff works with people from a variety of cultures. “Working with People of Different Cultures” explains culture, and how NRCS employees can successfully work together with people from many different backgrounds.

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#3 Electromagnetic Induction (EMI) Facilitates Soil Survey

The National Soil Survey Center (NSSC) is evaluating alternative tools to help document soil properties and aid in mapping soils. One such tool is the electromagnetic induction (EMI). EMI tools use electromagnetic energy to measure the apparent conductivity of earthen materials. NSSC has provided EMI training and technical assistance to more than half of the States.

NSSC has two employees assigned to operate these geophysical tools and provide field technical assistance and training as requested by the States. The staff provide EMI assistance to identify areas with high concentrations of sodium and salts (saline seeps), assist with depth to bedrock determinations, identify areas with higher concentrations of clay, locate ancient stream channels, aid in burial detection, locate septic fields, locate dissolution features in karst topography, discern between differing lithology in reclaimed mine spoil areas, detect plumes from waste storage facilities, and aid in archaeological investigations. EMI has been used to aid in quality control of project soil surveys and line placement of soil map unit boundaries.

The availability of computers, global positioning systems, geographical information systems, and geophysical tools is changing the way we look at and map soils. Because of the speed and ease of use, EMI technology has significant advantages over conventional

soil survey techniques. The efficiency of EMI fosters the collection of larger data sets than is possible with conventional soil survey techniques. Because of the larger number of observations, maps prepared from EMI data can provide higher levels of resolution than soil maps prepared with conventional methods. In many areas, spatial patterns of apparent conductivity correspond well with the soil patterns shown on soil survey maps.

EMI has proven to be a valuable non-invasive tool—along with ground penetrating radar, which allows multiple observations with a minimal amount of earth disturbance. Ground truthing is needed to confirm observable changes in apparent conductivity as it relates to soil properties.

EMI has gained wide acceptance over the past few years. Multiple applications of EMI within NRCS have proven to be beneficial in past and present use. EMI shows potential and has expanded applications when used in combination with the knowledge of soils and soil properties. The future of EMI within NRCS appears to be bright as more applications are discovered.

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TECHNOLOGY TRANSFER

#4 Plant Materials Center Researches Grasses for Bioenergy Development Possibilities

Four perennial warm-season grasses are being tested for bioenergy development possibilities by the NRCS Jamie L. Whitten Plant Materials Center (PMC) in Mississippi in cooperation with the U.S. Department of Energy (DOE).

The PMC and DOE are assessing Accession 9062680 eastern gamagrass (*Tripsacum dactyloides*), ‘Alamo’ switchgrass (*Panicum virgatum*), ‘Tifton 44’ bermudagrass (*Cynodon dactylon*), and Caucasian bluestem (*Bothriochloa bladhii*, formerly *Bothriochloa caucasicus*) for use as renewable energy crops. Alamo and accession 9062680, which is planned for release under the name ‘Highlander’ this year, are products of the Plant Materials Program. All four grasses produce high amounts of biomass and could be useful for producing ethanol or providing a combustible energy source.

One of the goals of the research was to develop clipping-management standards for optimum biomass production of the four grasses. In trials from 2000 to 2002, Alamo switchgrass averaged over 9.5 tons of biomass per acre when clipped once in mid-September and 7.7 tons per acre when clipped once at the boot stage and again in mid-September. Eastern gamagrass and Caucasian bluestem produced 6.2 and 6.7 tons per acre, respectively, when clipped twice annually. Bermudagrass produced 5.4 tons per acre when clipped twice and 5.5 tons per acre when cut three times.

The Jamie L. Whitten PMC is also working cooperatively with Mississippi State University in developing an Indiangrass (*Sorghastrum nutans*), big bluestem (*Andropogon gerardii*), and short-growing switchgrass cultivars to add to the palate of native grasses for bioenergy.

The PMC plans to continue the biomass research this summer. In addition, the Rose Lake Plant Materials Center in Michigan, and the PMC in Idaho are conducting biofuel research.

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TRAINING

#5 “Leading Through Influence,” Topic of “The Leader in You” Seminar

Tuesday, June 3, 2003, is approaching fast! "Leading Through Influence," the second seminar in “**The Leader in You**” spring series will be aired on June 3, from 1:00 to 3:00 p.m. e.t. Presenter Laree Kiely, Ph.D., will teach viewers how to change people's behaviors and attitudes through persuasion. Participants will also learn valuable skills, such as listening, creating a persuasive message, and enhancing credibility. Do not miss this opportunity to enhance your leadership skills.

“**The Leader in You**” videotape lending library continues to grow. Copies of "FISH! Sticks...Keeping the Vision Alive," the May 15, 2003, seminar will be available soon. To

request a copy of this tape or any tape in the lending library, contact Becky Noricks at (616) 942-1503 or ssinter2@po.nrcs.usda.gov.

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#6 Wildlife Habitat Institute Management Training Videos Receive Telly Awards

Two Telly awards for case study videos in the video-based ecology course “Understanding the Landscape” were received by the NRCS Wildlife Habitat Management Institute (WHMI). Telly has become the most recognized non-broadcast award for training, education, and marketing. The Telly’s Finalist (runner-up) award was given to the Upper Midwest case study in the training video category. The half-hour case study video on the Lower Mississippi Valley was awarded the bronze runner-up award for instructional videos. There were 11,114 entrants a year ago in more than 50 categories. First place silver trophies went to Sony, Pfizer, U.S. Navy, and National Geographic, among others.

The course, “Understanding the Landscape,” was developed by a 10-member team that included WHMI staff. Colorado State University and Oregon State University were involved in directing and producing the course. NRCS state and field offices in Arkansas, Colorado, Connecticut, Iowa, Louisiana, Minnesota, Mississippi, New Mexico, Oregon, and Vermont were also instrumental in video development.

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