



January-February 2004

“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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SPECIAL MESSAGE FROM THE CHIEF

Becoming an Enabler of Conservation Through Improved Technology

Bruce Knight, Chief, NRCS



Bruce Knight, Chief, NRCS

One major trend in the Natural Resources Conservation Service (NRCS) is that we are rapidly becoming more of a catalyst or enabler of conservation. Technology will have an important role in this process. The more partners there are and the greater their role in conservation, the more important it becomes that we all have access to the current technical standards and latest and best technical information.

We will continue to improve our technological tools and to make them available on the Internet. These tools include the Electronic Field Office Technical Guide, the Customer Service Toolkit, Comprehensive Nutrient Management Planning, the PLANTS data base, WIN-PST, the Soil Climate Analysis Network, digitized soil inventories, and others.

Our new technologies also include such administrative tools as Protracts, which allows landowners to report the progress they make in implementing their contracts and TechReg, which provides a variety of services related to Technical Service Providers – including registering providers who are certified by NRCS, allowing producers to locate appropriate providers, and allowing providers to document completion of their work.

One other aspect of technology we are working on is to do a better job of measuring the environmental benefits of conservation programs. The effort is called the Conservation Effects Assessment Project, and it is a joint effort by NRCS, Farm Service Agency, and the National Agricultural Statistics Service.

The fact is that with an increased investment in conservation comes increased accountability. We need to be able to demonstrate with greater precision just what it is that we accomplish. Beyond listing the number of acres treated, the number of plans written, or other output measures, we also need to quantify the actual benefits with outcome measures.

As we continue to find ways to enlist more partners in conservation, find new sources of investment in conservation, and apply new technologies, we gradually see a new kind of conservation on America's private lands.

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MESSAGE FROM THE DEPUTY CHIEFS

Environmental Credit Trading--A Tool to Increase Agricultural Conservation Implementation

Lawrence E. Clark and Maurice J. Mausbach



Environmental credit trading is a market-based mechanism for efficiently allocating pollution reductions among sources with different marginal control costs. Market-based approaches have been shown to result in more cost-effective achievement of natural resource conservation and environmental goals compared to traditional command and control approaches. Greenhouse gas (GHG) emission reduction (including carbon sequestration), wetland mitigation banking, and water quality credit trading (including nutrient trading), are all types of environmental credit trading markets that have the potential to produce win-win situations for the environment, agricultural producers, and other stakeholders. Environmental credit trading offers NRCS unique opportunities to proactively increase environmental outputs while reducing implementation costs.

Several successful environmental credit trading projects across the country demonstrate that agricultural production and environmental goals can be met cost-effectively through market-based approaches. These projects can also increase the amount and sources of funding for natural resource conservation beyond the typical conservation programs provided by USDA and State conservation agencies. Two such projects are the Carbon Sequestration Marketing between Entergy Corporation and Pacific Northwest Direct Seeding Association (PNDSA) and Iowa's Agricultural Wetland Mitigation Banking.

Entergy Corporation, the fifth largest power generation and distribution company in the U.S., wanted to voluntarily offset its carbon increases associated with increased power generation from 1995 to 2000, avoiding contribution to GHG emissions. Entergy Corporation contracted with PNDSA, an organization comprised of farmers who use conservation tillage techniques, to sequester 30,000 tons of carbon over 10 years. Seventy-seven PNDSA farmers are under contract to sequester carbon by managing crop residues with conservation tillage techniques, receiving an estimated \$2 per ton of carbon sequestered. NRCS verifies the carbon sequestration measures, as outlined in the contract.

The Iowa Agricultural Wetland Mitigation Bank project is a market-based trading program for farmers who desire to alter a jurisdictional farmed wetland. Farmers can purchase a credit at the wetland bank to satisfy mitigation requirements allowing them to perform the project legally and retain USDA benefits. The Iowa Farm Bureau Federation administers the bank, working in partnership with the Iowa Department of Natural Resources and NRCS. As a result of this innovative partnership, each credit costs farmers on average \$1,850 per acre, which is much less than the \$10,000 per acre credit costs typical of commercial wetland mitigation banks in Iowa. NRCS developed and uses a wetland functional assessment methodology to evaluate compensation requirements associated with wetland bank use.

Environmental credit trading practitioners are interested in using NRCS technical expertise and conservation programs to support establishment and operation of trading markets. Developments from our technical experts can provide a variety of benefits. For example, they can develop practical tools to provide improved certainty of traded credits and quantify environmental benefits resulting from conservation practices and systems. In addition, we as an Agency can promote the development

of voluntary registries or processes that can bring buyers and sellers together more efficiently, as well as help market managers determine the value of environmental credits. Maintaining the most current technology will enable our field staff to provide farmer participants with the best conservation planning, practice standards, and implementation assistance. Other developments could support conservation practice maintenance and performance verification.

Market-based environmental stewardship is a new tool to achieve environmental goals. Such an approach can lead to implementation of more conservation practices and systems by providing added financial incentives. This is a win for agriculture and the environment, but it will only be successful if science and technology tools are used in establishing and operating the market.

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CONSERVATIONIST'S CORNER

Technology Training Work Group Update

Charles Whitmore, Regional Conservationist--Midwest



NRCS is recognized as a “can do” agency because of the relationships we develop with producers and our technically skilled people, and our ability to provide sound technical assistance utilizing current technology. As stated in our strategic plan, “NRCS’ success depends upon the technical expertise of its employees and volunteers and upon their ability to work effectively with a diverse customer base.”

NRCS is committed to investing in development and delivery of science-based technology to support private lands conservation. This includes ensuring that field staffs are provided with the needed technology, tools, training, and expert technical support to deliver conservation on the ground.

It has always been a challenge to identify, develop, and deliver the technologies needed by our field staffs to efficiently and effectively provide technical assistance. Beginning in 1999, a national Technology Training Work Group (TTWG) was established to ensure that field technical training needs were identified and sufficiently supported nationally. The task of the TTWG was to deliver priority technical training needs to the National Employee Development Board for development and delivery through the National Employment Development Center (NEDC). For fiscal year 2000, the TTWG identified eight priorities to NEDC. Several of these priorities have been delivered, such as web-based conservation planning modules.

The responsibilities of the TTWG were expanded in fiscal year 2001. Currently, the TTWG identifies technical training, technology development, and technical tool needs to the Deputy Chiefs for Science and Technology and Soils and Resource Assessment. Many of the needs identified are based on field assessments conducted by the regional technology specialists (RTSs) that identify technology needs of the field staffs. As a result, technology transfer has increased and the development and delivery of tools and training have improved. Examples include RUSLE II, SmarTech and eFOTG, enhanced Customer Service Toolkit, engineering tools update, data warehouse development, and conservation planning training.

In fiscal year 2002, an ad-hoc advisory board comprised of state-level representatives was established to provide review and input on proposed Science and Technology investments. As chair of that advisory board, I would like to assure you that there is a tremendous amount of work done each year to develop and deliver high priority technology needs and training to our partners and the public. Under the direction of deputy chiefs Larry Clark and Maury Mausbach; technical leaders in National Headquarters, the Centers and Institutes, and the RTSs have worked very hard to develop and deliver technology, tools, and training needed to provide cutting-edge conservation assistance.

For NRCS to remain viable as an agency, we must expand our investment in the development and acquisition of high priority natural resource conservation technologies. To ensure we make the right investments, we will continue to ask field staffs for ideas and assistance to identify those high priority technology needs. Contact your NRCS state technical leaders, regional technology specialists, or national technical leaders for more information on how national science and technology investments can help to address the needs in your state.

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NEW PRODUCTS AND SERVICES

#1 Ninth Edition of *Keys to Soil Taxonomy* Released

The National Soil Survey Center Staff and the National Cooperative Soil Survey Regional Soil Taxonomy Committees reviewed over 50 proposals for revising Soil Taxonomy. These proposals, submitted since the *Keys to Soil Taxonomy* was last published in 1998, originated predominately from field soil scientists around the country. Many of the proposals were approved, and these changes are included in the new *Keys to Soil Taxonomy, 9th edition*. Four new suborders, 11 great groups, and 87 subgroups have been added.

The complete document is available in PDF format at: http://soils.usda.gov/technical/classification/tax_keys/. It is suitable for download and printing locally. In the near future, a CD-ROM containing the document, as well as a supply of bound copies of *Keys to Soil Taxonomy, 9th edition*, will be distributed to each state.

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#2 “Managing Soil Organic Matter: The Key to Air and Water Quality” Available

“Managing Soil Organic Matter: The Key to Air and Water Quality” is a new technical note explaining why organic matter is the key to environmental quality and describing how this idea impacts conservation planning. To improve land productivity while preserving air and water quality, soil conservation must not only control erosion, but must also enhance soil functions. Soil organic matter management improves soil functions, including soil stability, infiltration, water holding, and nutrient cycling. Organic matter management is important when addressing resource concerns including dust, allergens, and pathogens in the air; drought and disease resistance in crops; and sediment, nutrients, and pollutants in surface water.



No-till planting of corn into cover crop of barley.
Washington County, Virginia
Photo courtesy of USDA NRCS.

This technical note is intended for use by conservation planners and is suitable for distribution to land managers. It can be ordered from the Landcare office by phone (toll-free) at 1-888-LANDCARE or by e-mail at landcare@swcs.org. It is also available online at <http://soils.usda.gov/sqi>.

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#3 Henry’s Fork Case Study Completed

Techniques used in “*Conservation Corridor Planning at the Landscape Level*” have been validated in a case study completed by the Watershed Science Institute and the Wildlife Habitat Management Institute. A draft report on the Henry’s Fork Case Study, conducted with Utah State University, is now available. The study area was a 40-mile stretch of the Henry’s Fork of the Snake River in southeastern Idaho. This portion of the river flows through privately-owned ranches and productive wheat, barley, and potato farms. Known for its scenic quality and world-renowned fishery, this area provides habitat for trumpeter swans, bald eagles, waterfowl, mule deer, whitetail deer, moose, and a diversity of other wildlife. The Henry’s Fork Case Study was directed at assisting conservationists involved in watershed-scale wildlife corridor planning projects in agriculturally dominated landscapes like the Henry’s Fork.



This case study demonstrates how the principles and methodologies presented in the NRCS technical handbook “Conservation Corridor Planning at the Landscape Level: Managing for Wildlife Habitat” can be used at the watershed scale for planning purposes. For this reason, the case study should be valuable to state and field office personnel preparing a watershed or landscape plan using the corridor manual.

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Example of a stream corridor

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#4 New Fish and Wildlife Article Series Soon Available to Field Offices

Another opportunity for NRCS field offices to provide helpful information to community residents and raise NRCS visibility will soon be available. A series of 26 articles dealing with wildlife habitat on private lands, each complete with a “did you know” fact and photo, was prepared by the NRCS Wildlife Habitat Management Institute (WHMI) staff. These articles will be available for download from the WHMI ftp site at <ftp://ftp-fc.sc.egov.usda.gov/WHMI/> by clicking on “Wildlife Habitat Articles.” Designed for field office adaptation and use in local newspapers and newsletters, the articles may also be used as an introduction to basic wildlife habitat principles. The recently completed articles will be available in both Word and Acrobat files, with JPEG photos. They will receive technical review prior to release. A second set of 26 articles is being developed.

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#5 Fish and Wildlife Habitat Leaflets in Review

“Managing Forests for Fish and Wildlife” and “Managing Rangelands for Fish and Wildlife” will be the nineteenth and twentieth fish and wildlife habitat leaflets available online. They are in the technical review stage.

Pertinent information and habitat considerations for quail, turkey, butterflies, pheasants, bats, bluebirds, elk, trout, and other species are summarized online at <http://www.whmi.nrcs.usda.gov/technical/leaflet.htm>.

The leaflets, produced cooperatively by the NRCS Wildlife Habitat Management Institute and the Wildlife Habitat Council, provide technical information for field office personnel as well as their customers. At least a dozen more are in development.

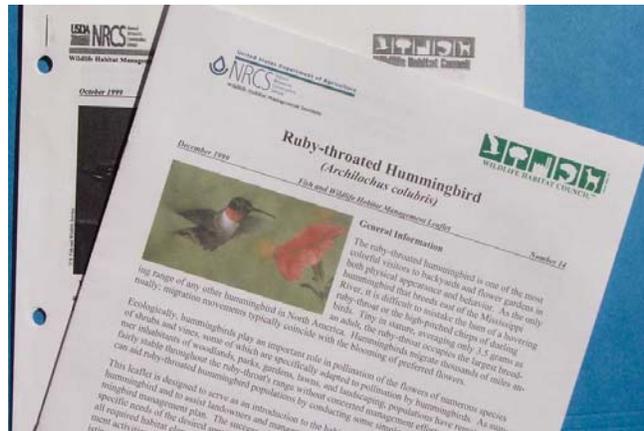
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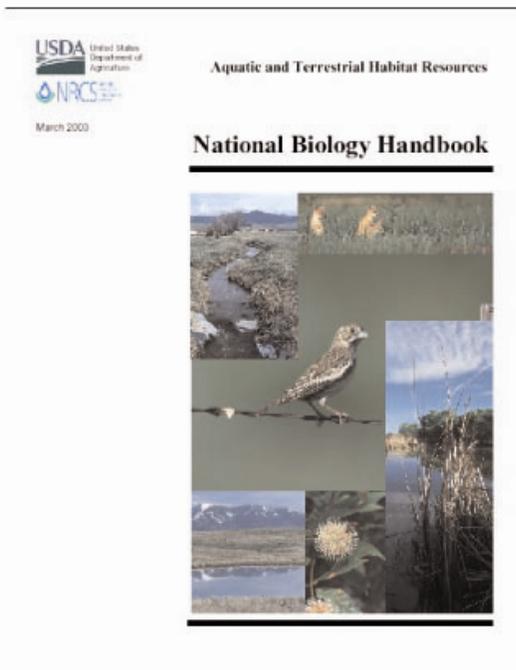
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Fish and wildlife habitat leaflets

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#6 National Biology Handbook in Final Review



The revised NRCS *National Biology Handbook* will soon be distributed to all NRCS field offices. The handbook will provide the latest techniques and comprehensive information on the management and conservation of fish and wildlife habitats on working lands. The Wildlife Habitat Management Institute led the revision of the handbook, which will help implement the policy outlined in the National Biology Manual.

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TECHNOLOGICAL ADVANCES

#7 “Highlander” Eastern Gamagrass Released

Fifteen years ago, the Jamie L. Whitten Plant Materials Center (PMC) in Coffeerville, Mississippi, began developing a cultivar of eastern gamagrass adapted for forage and erosion control in the Southeast. Field office and PMC personnel made 73 collections from sites in Oklahoma, Arkansas, Mississippi, Alabama, Tennessee, South Carolina, North Carolina, Texas, and Georgia. Plants were assembled and evaluated at Coffeerville. Initial evaluation of these collections showed that one, from Montgomery County, Tennessee, Accession 9062680, had superior vigor, growth form and pest resistance.



“Highlander” Grass
(ruler is in feet)

This accession underwent further testing to confirm its forage yields and quality at several sites in the Southeast. Results showed that it is best used as a hay crop; however, it can be grazed if given appropriate management (i.e., rotational grazing). It is capable of producing annual yields of more than 6 tons per acre when harvested on a 45-day cutting regime; this typically represents three harvests per growing season in the lower South. Production and harvest are greatly influenced by rainfall and length of growing season. Our research shows that it has potential as a perennial silage crop and as biomass for bioenergy production. We have also conducted studies to examine its seed production, establishment requirements, and its nutrient uptake capability. Those studies indicated that it can be a useful component in many types of conservation plantings, such as buffers and vegetative barriers.

This cultivar is named Highlander because its site of origin lies within the Highland Rim Region. It was released in cooperation with the Mississippi Agricultural and Forestry Experiment Station and the Jimmy Carter PMC in Americus, Georgia. Plant variety protection will be sought for this cultivar to maintain the identity of the release and ensure quality of seed produced. Large-scale seed production began at the PMC in 2000, and seed will be available for commercial producers in 2004.

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TECHNOLOGY TRANSFER

#8 NRCS Assists Ghana in Agriculture and Rural Development

Larry Clark, Deputy Chief of Science and Technology, William Effland, Dewayne Mays, and Denise Tennessee recently traveled to Ghana to continue developing a framework for agricultural development in the Afram Plains. Clark is the U.S. co-convenor of The Consultative Committee on Agriculture and Rural Development (CCARD), Natural Resources Management Working Group (NRMWG). Dr. Bertha Gana is the Ghanaian coordinator. One of the group's top priorities is to focus on natural resources sustainability and growth, with an emphasis on soil resource utilization and development in the Afram Plains.

The first objective of the group is to develop a plan to deliver the Soils – Geographical Information Systems (GIS) Training for Ghanaian management and technical staffs working within the Ministry of Food and Agriculture, the Soil Research Institute, and at other public and private institutions. The Soils – GIS Training will be scheduled for this year.

The second objective is to conduct a detailed soils resource inventory and characterization of the Afram Plains. After meeting with private and public partners, a framework was developed to conduct the inventory and characterization of a section of the Afram Plains. The U.S. will provide technical support to the Ghanaians at various stages.

Developing a proposal to improve the capacity of Ghanaian soil scientists to conduct soil surveys is the third objective. A 1-month training program for two Ghanaian soil scientists to work with USDA-NRCS soils personnel in various U.S. locations in 2004 is planned. The training will focus on using modern techniques for soil survey, soil data interpretations, and land use.

The future outcome of the NRMWG is to create a GIS-based natural resources management decision support system (to include a detailed digital soils layer, approximately 1:10,000 scale) as the foundation for agricultural and non-agricultural development of the Afram Plains. This system would improve soil fertility recommendations to increase yields and optimize nutrient inputs, improve the Land Suitability Assessments for a variety of land uses, provide useful information to the private sector interested in investment within the Afram Plains, and assist public officials and private investors in making better decisions concerning agriculture, environmental, and land use planning. The NRMWG recommends that the NRCS provide technical assistance in 2004 and 2005 to implement these objectives.

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#9 Soil Quality Institute Cited in *Science* Magazine

The Soil Quality Institute (SQI) was cited in a recent issue of *Science*. In the article, “Tropical Soils and Food Security: The Next 50 Years,” M.A. Stocking argued that declining crop yield is exponentially related to loss of soil quality, and the changing quality of the natural resource base is a key determinant of the increasing vulnerability of poor people to food insecurity. To explain soil quality concepts, the author cited the SQI Web site and articles by several NRCS employees.

The article is in *Science*, vol. 302, 21 November 2003, p.1356-1359.

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TRAINING

#10 *The Leader in You* Spring Series Announced

Innovation, leadership, and enhancing your job performance will be the three topics of “*The Leader in You*” spring 2004 satellite seminars. This season’s schedule will feature the return of speakers Stephen Lundin and Laree Kiely and also introduce author Marcus Buckingham.



On February 18, 2004, Stephen Lundin, Ph.D. will present a seminar entitled “CATS: The Nine Lives of Innovation.” This presentation will discuss the nine essential ingredients of any highly innovative organization. Participants will learn new ways to develop critical thinking skills and how to generate new ideas. This program will air from 1:00 to 2:30 p.m. e.t.

Leaders are people at all levels of an organization who have the ability to anticipate and respond to new challenges. “Leaders at All Levels” will be presented by Laree Kiely on April 2, 2004. The seminar is designed for any employee who is ready to begin influencing positive environmental change in the workplace. As a result of this session, leaders will understand what organizational readiness is, learn how to become a “ready” leader, and examine the effect readiness has on efficiency and effectiveness. This program will air from 12:00 to 2:00 p.m. e.t.





Best-selling author Marcus Buckingham will present “Now, Discover Your Strengths” on May 18, 2004, from 11:00 a.m. to 12:30 p.m. e.t. Utilizing over 150,000 interviews collected over the last 25 years by the Gallup Organization, Mr. Buckingham asserts that there is no standard model for success. He will discuss how individuals, by discovering their specific strengths, can become better managers and employees. Additionally, he will provide specific techniques for better on-the-job performance by partnering specific employee strengths with the “right fit” for each individual.

“*The Leader in You*” program, sponsored by the NRCS Social Sciences Institute and the NRCS National Employee Development Center, is designed to support the locally led conservation aspects of the Farm Bill and the President’s Management Agenda. The National Association of Conservation Districts, National Association of State Conservation Agencies, National Conservation District Employees Association, and the Federal Training Network are cooperating sponsors of the program.

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#11 Training Completed on Compatible Use

Training on compatible use decisions on Wetlands Reserve Program (WRP) land has been completed. The training sessions used new guidelines developed to assist State Office and Field Office staff to make WRP compatible use decisions concerning timber harvest or grazing, when requested by the landowner. The Wildlife Habitat Management Institute led national teams that developed the guidelines.

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