NRCS Technology News

March 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.

Features in this issue include:

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MESSAGE FROM THE DEPUTY CHIEFS

Coral Reefs and Land-Based Activities

Lawrence E. Clark and Maurice J. Mausbach

Coral reefs are spectacular, diverse, and highly complex ecosystems that provide benefits to millions of island people. Unfortunately, many mainlanders have never seen coral reefs in their splendor in the wild. They comprise less than 0.2 percent of the total ocean, and are found off the coasts of more than 100 countries. Coral reefs are the foundation of the natural resource base for many of the island populations. Their benefits include recreational opportunities, habitat for commercially valuable fish species, protection against storm surges, and opportunities for the development of new medicines to fight cancer and other diseases.

Coral reef photo courtesy of the Florida Keys National Marine Sanctuary. Photo by Commander William Harrigan, NOAA Corps.

Coral reefs are massive structures built largely by colonial invertebrate animals that secrete skeletons of calcium carbonate. The skeleton remains after the animals die, forming a foundation for the next generation. These calcium carbonate foundations, sometimes hundreds of meters thick, can survive for millions of years. However, the living and growing part of the reef that sits atop this massive structure is quite fragile. It can be easily damaged by natural or human disturbance. Because healthy reef ecosystems provide so many valuable services, there are both environmental and economic consequences to degrading or dying coral reef ecosystems.

Unfortunately, activities such as overfishing, overharvesting of corals, higher ocean water temperatures, and land use modification causing accelerated runoff of nutrients, sediment, and other pollutants onto reef ecosystems are causing reef systems to deteriorate at an alarming rate (Status of Coral Reefs of the World: 2000).

The dire condition of coral reefs has been recognized worldwide over the past several years. To reverse this condition, a number of international, national, regional, and local agencies have been conducting conservation activities that have yielded local success stories for coral reefs. The Natural Resources Conservation Service (NRCS) has been developing new technologies to further reduce sediment and nutrient loss from watersheds in tropical climes that benefit coral reefs. Furthermore, the Agency maintains its important role as a member of the United States Coral Reef Task Force (USCRTF).

The NRCS Tropical Technology Consortium (TTC)[1] is leading the effort to develop new technologies. The TTC includes NRCS professionals and university researchers. The Consortium's guiding principles are to "disseminate scientific information that fosters the practice and policy of managing tropical land resources in a sustainable manner and to collaborate with national and international partners."

TTC research activities in the Caribbean, Hawaii, and the Pacific Basin that benefit water quality and coral reef ecosystems include:

- evaluating the performance of riparian fencing
- developing decision-aids to help planners and growers identify potential sources of phosphorus and nitrogen-based pollution
- evaluating sediment and runoff control using "media luna" (perennial trees on terraces with cover crops)
- working with local partners to install and maintain demonstration conservation management systems
- developing a database of native plants for use in riparian restoration projects
- evaluating the use of burned logs placed on the contour after a fire to reduce soil erosion

Watershed in Hawaii. Photo courtesy of USDA NRCS.

A recent NRCS role within the USCRTF has been to partner with the Environmental Protection Agency in an effort to develop Local Action Strategies (LAS)[2] to address land-based sources of pollution adversely impacting coral reef ecosystems. As a result, one highly successful workshop has been completed in the Pacific Basin and one is being planned in the Caribbean Area. These workshops provide assistance in completing the development of LAS and identify resources to implement strategy activities.

Future generations have a right to benefit from all that coral reefs have to offer in their natural environment. So, the next time you see an aquarium with saltwater fish and pieces of coral, you may wish to consider contacting an organization about how you can help protect this delicate natural resource.

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[1] For additional information on the Tropical Technology Consortium, visit http://www.ttc.nrcs.usda.gov/.
[2] For more information on developing Local Action Strategies, visit http://www.coralreef.gov/resolution1.cfm.

CONSERVATIONIST'S CORNER

Livia Marqués, State Conservationist--Nevada

Nevada agriculture is predominantly based on forage crop and livestock production. As such, a major workload for Nevada NRCS field offices is to provide technical assistance to livestock producers. With less than 15 percent of the land area in Nevada in private ownership, livestock operators need to ensure the sustained production of high quality forage resources from their private grazing lands to maintain the management independence and flexibility required for successful livestock production.

Ranch scene courtesy of the Nevada Department of Conservation and Natural Resources. Photo by John Walker.

The Nutritional Balance Analyzer (NUTBAL) decision support software, distributed to NRCS through the Grazing Lands Technology Institute, has proven to be a useful tool. It helps Nevada ranchers (and NRCS technicians) become more aware of the varying nutritional requirements of their livestock and the ability of their available forage resources to meet nutritional needs. Use of the NUTBAL program and the consumed forage nutritional analyses provide ranchers with the information to either confirm the adequacy of their present grazing system in meeting livestock nutritional requirements or to make needed adjustments to their grazing management. The NUTBAL program has also been useful in helping ranchers justify (economically) and plan for the development of new or additional/alternative forage resources.

The training and technical support from the Grazing Lands Technology Institute (GLTI) have been critical to the successful deployment and use of the NUTBAL system. Without the GLTI support, this important tool would not be in use in Nevada today.

Another major workload in Nevada is soil surveys. We worked cooperatively with the Soil Survey Division to expedite the publication of soil survey manuscripts in Nevada and in Major Land Resource Area Office Soil Survey Region 3 (MO3), eliminating the backlog in Nevada and significantly reducing it in Major Land Resource Area Offices (MO) region wide. We have recently partnered with the Soil Survey Division in a capacity building effort to get nontraditional cooperators involved with soil survey, and we have gained the partnership of the University of Nevada Las Vegas. The state office and MO staffs work routinely with the national leaders of technical services, investigations, soil classification and standards, and interpretations to assure field needs are met and products are consistent between states and MO regions.

The presence of heavy metals in soils is an increasing resource concern in Nevada. The Soil Survey Laboratory has run samples of benchmark soils to help determine background levels of some of these metals in the soil. Nevada has many soils with a high content of volcanic ash and glass. The weathering of this glassy material is significantly less in an arid climate than in more humid parts of

the country. The behavior of these soils is quite different from soils not formed in this material. Across the landscape we have soils with nearly 100 percent volcanic glass to those with no evidence of ash or glass. The analyses run by the Soil Survey Laboratory assist in recognizing and grouping these soils for their interpretive capabilities.

Nevada is the host to one of the six map finishing sites. The National Cartography and Geospatial Center provides the research and development and the technical support needed to have digitally map finished products available for soil survey publications.

NRCS's Centers and Institutes offer knowledge and data that help maintain our Agency's leadership role in private land natural resource conservation. We appreciate their support to ensure our customers receive the highest quality service possible.

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NEW PRODUCTS AND SERVICES

#1 Stream Design Handbook: A Progress Update

The development of a new stream design handbook is presently underway. It will be distributed as National Engineering Handbook, Part 654. Over 100 authors and reviewers have volunteered their time to produce the source materials for this design guide. While some of these authors represent other Federal, State, and local agencies, universities, and private engineering firms, the majority of the contributors are NRCS employees. This pool of active volunteers represents all parts of the country, and their contributions will provide a collection of regionally specific design tools. The individual source documents will be synthesized into a comprehensive design handbook. A first draft of this document is scheduled for completion early in 2005.

The goal of this design guide is to consolidate new and existing tools, techniques, and resources to support the design process associated with stream restoration and rehabilitation. The proposed guide is an "open-ended" document so additional methodologies can be added as they become available. Modifications will also be made to existing tools as experience in restoration brings new knowledge and insight. Formal training, preparation, and updating of supporting directives related to stream design are also anticipated.

The NRCS is actively involved in designing and implementing stream restoration projects all over the country, typically to improve habitat and stabilize the bed and banks. The proposed stream design handbook should be of interest to the numerous disciplines charged with putting those projects on the ground. The handbook will cover the full range of treatments from natural to structural.

For more information, or to be added to the reviewer list for the handbook, contact:

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#2 "Protecting Urban Soil Quality: Examples for Landscape Codes and Specifications" in Review

"Protecting Urban Soil Quality: Examples for Landscape Codes and Specifications" is a new document available on the NRCS Soil Quality Web site at: http://soils.usda.gov/sqi/soil_quality/land_management/index.html.

Part I of the document explains major threats to soil quality during construction and landscaping projects, as well as principles for protecting the soil. Part II provides sample language for contracts or codes. (These are not official standards, but a framework that local entities can use to develop standards for contractors, landscapers, and developers.)

Common construction practices cause compaction and erosion and leave inadequate amounts of topsoil depth and organic matter. These practices have long-term impacts on plant growth and hydrology (e.g., stormwater management). Following the guidelines in "Protecting Urban Soil Quality: Examples for Landscape Codes and Specifications" during construction can generate significant financial and resource protection benefits.

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TECHNOLOGICAL ADVANCES

#3 Achieving Data Quality at the Soil Survey Laboratory

The Soil Survey Laboratory (SSL) is continually looking for ways to improve data quality and cut costs by implementing new ideas and applying new technology. A revision of the extractable acidity method is one way the SSL is providing quality service to clients.

Extractable acidity is the acidity released by soil to a barium chloride-triethanolamine extraction solution buffered at pH 8.2. Calcareous soils have little or no acidity to extract by a pH 8.2 solution and are not routinely analyzed for extractable acidity. Noncalcareous soils are commonly acidic, and extractable acidity is a measurement of the lime requirement of such soils.

The SSL has adopted a revised approach to measuring pH 8.2 extractable acidity. The new protocol uses a centrifuge tube as the mixing chamber. When soils are separated from the extraction solution

by a centrifuge, no filtration is necessary. In contrast, the prior method utilized a prepulped filter tube to achieve separation.

The new protocol resulted from a critical examination of organic and volcanic soils with high extractable acidities. Optimizing sample size and equilibration time increased recoveries. Also, a centrifuge tube was adopted as the mixing chamber because it costs 75 percent less than a prepulped filter tube.

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TECHNOLOGY TRANSFER

#4 *NRCS Technology News* Available for Subscription

The NRCS News Lists page now provides list-serves for subscription to several NRCS publications. People outside the Agency can visit http://news-source.nrcs.usda.gov/ to subscribe to *NRCS Technology News*. An appropriate link will soon be placed in www.nrcs.usda.gov as well. At this time, NRCS employees will continue to receive *NRCS Technology News* by e-mail from the deputy chiefs.

NRCS Technology News is an electronic newsletter provided by Science and Technology 10 times a year. It is designed to deliver 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. The January-February issue is also published as a special edition print copy. Back issues of *NRCS Technology News* are available at the Science and Technology Consortium Web page at http://www.nrcs.usda.gov/technical/SandT/index.html. Select *NRCS Technology News* from the menu at the top of the page.

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WEB-BASED TECHNOLOGY

#5 National Plant Data Center Announces Updates to PLANTS

Tulip Pricklypear. Photo courtesy of USDA NRCS PLANTS database.

Updates have been made to the National Plant Data Center's PLANTS Web site. The potent search engine, Advanced Query, has been improved. Some new fields were added, including PLANTS Invasive status, State T/E (threatened and endangered) status, and ITIS TSN (Integrated Taxonomic Information System taxonomic serial number). The images have been divided into line drawings and photographs so that each may be searched separately. Visitors can now enter multiple symbols in the symbol field to display an idiosyncratic list that has no search commonality. For example, visitors can search for the ten worst exotic plants in any area, or five favorite tree species. Minor problems with the field order and errors in the search engine programming have been corrected, particularly those associated with searches employing scientific name ranks and author ranks.

The recent upsurge in awareness about the invasive species crisis in the United States has resulted in many more jurisdictions passing laws regulating noxious weeds. In response, PLANTS staff have carefully canvassed available information on state-designated noxious weeds and completely overhauled the data. PLANTS now has the most accurate information about U.S. regulated noxious weeds available.

The lists are being modified so quickly that it is difficult to stay abreast of changes. If you notice that some of this information is out of date, please contact us. Visit the PLANTS Web site at http://plants.usda.gov.

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TRAINING

#6 Laree Kiely Returns in *The Leader in You* Satellite Broadcast

Laree Kiely returns to *The Leader in You* this spring with a satellite seminar entitled "Leaders at All Levels." This program will air on Friday, April 2, 2004 from 12:00 – 2:00 p.m. e.t. The differentiating factor between a thriving enterprise and one that constantly struggles is readiness. Leaders are people at all levels of an organization who have the ability to anticipate and respond to challenges. It is a leader's readiness that determines how nimbly and effectively he or she can respond in difficult situations. Join Ms. Kiely as she discusses what organizational readiness is, how to become a "ready" leader, and the effect readiness has on efficiency and effectiveness.

Satellite coordinates for this seminar will be posted on the my.NRCS employee Web site and e-mailed to partner contacts as soon as they are available. For information on local viewing sites, contact your NRCS state training coordinator, Becky Noricks at the Social Sciences Institute at ssinter2@po.nrcs.usda.gov, or Sue Brooks at the National Employee Development Center at sbrooks@ftw.nrcs.usda.gov.

Later this spring, best-selling author Marcus Buckingham will present "Now, Discover Your Strengths" on May 18, 2004 from 11:00 a.m. – 12:30 p.m. e.t. Additional details about this seminar will be in the April issue of *NRCS Technology News* and posted on the my.NRCS Employee Intranet Web site.

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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HONORS

#7 NRCS Employees Honored at ARS Awards Ceremony

Charles H. Lander (left), NRCS national agronomist, and Jerry Lemunyon (right), NRCS conservation agronomist, were recently presented with a technology transfer award by the Agricultural Research Service (ARS) in New Orleans. Lander and Lemunyon were part of a team of 19 NRCS agronomists, Agricultural Research Service (ARS) researchers, and land grant university scientists honored at the conference for their accomplishments.

The team developed the template for the Phosphorus Index (PI). The PI is a risk assessment tool that determines the relative risk of phosphorus transport from agricultural fields to adjoining land areas or waterbodies. The PI has been implemented in 48 states. It is used by NRCS field staffs, conservation district employees, and technical service providers who develop nutrient management plans.

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MEETINGS

#8 Clark Speaks at Society for Range Management Meeting

Nearly 2,000 ecologists, range scientists, public and private land managers, policy makers, students, and others interested in rangelands attended the 57th Annual Meeting of the Society for Range Management. The theme of the conference was "Rangelands in Transition." Lawrence Clark, Deputy Chief of NRCS Science and Technology, was a featured speaker, addressing issues related to changes on the Nation's rangelands. Other speakers included Olene S. Walker, Governor of Utah, Mark Rey, the USDA's Under Secretary for Natural Resources and the Environment, and Kathleen Clarke, Director of the Bureau of Land Management. The meeting took place in Salt Lake City on January 25-30, 2004.

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NRCS TECHNOLOGY NEWS

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