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Comments:
From the SCS Chief

Conservation Reserve—A Shot in the Arm for Resource Conservation

The Conservation Reserve Program authorized by the Food Security Act of 1985 can be one of the best and most effective conservation programs this country has ever seen. It has the potential for removing from cultivation—for at least 10 years—as many as 40 to 45 million acres of highly erodible cropland.

The basic design for the Conservation Reserve Program—and much of the interest in its enactment—resulted from Soil Conservation Service data and staff work. I congratulate all those involved.

The Reserve was established as a voluntary program to help farmers prevent or control serious soil erosion now occurring on more than a third of America's cropland. Unchecked, this soil erosion would reduce the Nation's long-term capability to produce food and fiber, as well as increase sediment and other off-farm costs.

While reducing soil erosion, improving water quality, creating better habitat for fish and wildlife, and providing income support for farmers, the Reserve also will help adjust the production of some agricultural commodities currently in surplus. Thus, U.S. farm commodity programs and soil and water conservation efforts will harmonize with each other.

The "sodbuster," "swampbuster," and "conservation compliance" provisions of the Food Security Act disqualify farmers from receiving USDA farm program payments if they produce crops on certain lands and do not have a plan approved by the local conservation district. These are not attempts to dictate land use or interfere with private property rights. Rather, they are attempts to remove certain government incentives that lead to poor land use.

The Conservation Reserve and other conservation provisions will have a significant impact on the work of SCS and other U.S. Department of Agriculture agencies—the Agricultural Stabilization and Conservation Service (ASCS), Extension Service, Forest Service, and Farmers Home Administration—as well as State soil conservation and forestry agencies and local conservation districts.

SCS will determine eligible soils under the Act and help plan and apply conservation treatment called for in Conservation Reserve contracts. Establishing plant cover will be a big part of that conservation treatment.

The Food Security Act states that the conservation provisions will be administered through the use of conservation plans approved by local conservation districts in consultation with ASC county committees. This local involvement will help make the program a success.

As we move into these fast-paced times, it's important to keep in mind some of the basic principles that have made SCS a great agency over the last half century. One key has been our relationship with conservation districts.

Now, more than ever, it's vital that we work to maintain a capable and efficient field staff to help districts and their farmers and ranchers protect and improve natural resources.

I believe that SCS is taking the first steps into the most exciting and productive era of its history.

Cover: For 50 years, the Soil Conservation Service has directed a cooperative snow survey and water-supply forecasting program. See article beginning on page 3.

Wilson Scaling, Chief
Soil Conservation Service

All programs of the U.S. Department of Agriculture are available to everyone without regard to race, creed, color, sex, age, or national origin.

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Snow Survey Starts 51st Year

Many employees of the Soil Conservation Service enjoy skiing in the Western Mountains. For a few, however, crossing the winter landscape is more than recreation—it's a serious business. These employees are snow surveyors who travel the mountains by every means possible to inventory the snowpack that will provide next season's water.

"We have an important job to do and must respect the high country," said Jerry Beard, an SCS snow survey supervisor in Boise, Idaho. "The mountains are beautiful but unforgiving of mistakes, which is why all snow surveyors undergo special training in winter travel and safety."

About 75 percent of the streamflow in 11 Western States comes from mountain snowmelt. This water supply is so valuable—and variable—that SCS has directed a cooperative snow survey and water-supply forecasting program since 1935 to help water users and reservoir operators practice better water management.

Although greatly assisted by the new SNOTEL technology, snow surveyors still personally monitor the snowpack in 1,450 snow courses.

Snow surveyors such as Beard, personnel from other agencies, and volunteers take several readings of some 1,450 snow courses each winter. These readings, augmented by other data, are used to make monthly streamflow forecasts during the snowmelt season.

The surveys give a good snapshot of snow conditions at a single point in time, but they are not frequent enough to detect rapid changes that can alter the water supply. "Much can happen between readings," said Beard. "There may be an intense storm or an unexpected warming at low elevations that is missed by the monthly survey. Accurate forecasts require real-time information."

To fill this information gap, SCS in recent years has developed a snow telemetry system (SNOTEL) to provide daily data. This system uses meteor-burst radio telemetry to transmit data from remote mountain sensors.

The meteor-burst technology uses the electrons in meteor trails 50 to 75 miles above the Earth to reflect or reradiate radio signals. These ionized trails are left by the billions of meteors that daily enter the atmosphere. Most trails last only a fraction of a second, but this interval is long enough to send VHF (very high frequency) radio signals over vast distances.

About 550 solar-powered SNOTEL sites are operating in the Western Mountains to record and temporarily store data on temperature, precipitation, and snow water content. Early each morning, master stations at Boise, Idaho, and Ogden, Utah, bounce signals off the meteor trails to these remote SNOTEL sites and receive each site's response. The two master stations then forward the data received to a central computer at the SCS West National Technical Center in Portland, Oreg., for storage and use in forecast preparation. SCS operates a similar system in Alaska in cooperation with other agencies.

SNOTEL is the largest meteor-burst communications system in the world. Since being completed in 1980, it has made possible the elimination of many manual snow-course readings that involved hazardous, expensive travel. The data it makes available have allowed hydrologists to apply computer simulation models to improve the reliability and timeliness of forecasts.

A variety of cooperators use SNOTEL data. After major snowmelt flooding in 1983, special funds were appropriated for the installation of 37 new sites and upgrading 63 existing sites in the Colorado River Basin to improve forecast capability. With this new SNOTEL information, management agencies such as the U.S. Department of the Interior's Bureau of Reclamation and the U.S. Army Corps of Engineers will be able to make river management decisions with greater confidence.

Streamflow predictions issued to the public are generated in the Centralized Forecasting System (CFS). This system, which is operated by minicomputer, contains a number of interactive programs, data bases, and analysis routines that allow hydrologists to rapidly compute runoff predictions from massive amounts of near-real-time data. It also provides SCS field personnel at 300 offices in the West and many cooperators with automated dial-up computer access to runoff projections as well as current snowpack, reservoir, precipitation, and streamflow summaries. The programs allow users to obtain current and historic climatic data. Other specialized computer programs available within the CFS framework include software for irrigation planning and reservoir operations.

Good water management is essential for most agriculture in the West. It requires accurate advance knowledge of the amount of water to be received and, for 50 years, snow surveys and water-supply forecasting by SCS have helped to provide this information.

David E. Johnson,
manager, Snow Survey Program, West National Technical Center, SCS, Portland, Oreg.

Landscaping to Conserve Water

As communities grow, their demand for water grows too. This presents problems for State and local governments everywhere, but more so in arid and semi-arid parts of the country where officials must wrangle with how to stretch already meager supplies of water.

One way communities in dry areas can conserve water is through xeriscaping—a new way to design and maintain the areas around houses and buildings. Taken from the Greek "xeros" meaning "dry," xeriscaping reduces energy costs as well as conserves water. It means using native grasses, shrubs, and trees instead of popular water-demanding plants that are better suited to higher rainfall areas.

The xeriscape concept has been adopted in parts of Colorado, Texas, and California and could have wide-reaching application in the growing communities of semi-arid northern Nevada. A group of professionals in landscaping, engineering, and resource conservation and concerned lay people have formed a Great Basin xeriscaping group in Reno, Nev., to increase citizens' awareness of the technique and demonstrate its use.

The group includes representatives of the Northern Nevada Native Plant Society, the Reno Parks & Recreation Department, the Nevada State Division of Forestry, the University of Nevada Department of Plant Science, the Washoe County Cooperative Extension Service, the Washoe-Storey Conservation District (CD), and the Soil Conservation Service.

Right now, the group's major effort is developing a 1¼-acre demonstration garden at the Sierra Pacific Power Company's new Sierra Plaza, a five-story office complex. The xeriscape garden will include turfgrass trial plots, models of landscaping alternatives for residential lots, and a collection of drought-tolerant plants.

Leader of the Nevada xeriscaping group and a district supervisor of the Washoe-Storey CD, Thomas A. Stille of Stille & Associates Landscape Architects & Planners in Reno, said that the dry landscape method involves good design, soil improvement, mulch, minimal turf, zoned irrigation, drought-tolerant plants, and regular maintenance.

According to Stille, one of the principal xeriscape design criteria is reducing the need for water. Incorporating organic matter into the soil is one way to do it. The organic matter helps hold moisture in sandy soil and helps water to penetrate clayey soil. Using plants that perform better in poor, sandy soils or clayey soils also reduces the need for watering, said Stille.

Mulches reduce evaporation, control weeds, and provide a cool root zone for plants. Organic mulches such as wood chips or bark eventually break down, also adding organic matter to the soil.

Turf is not only a heavy water user, but it is also expensive to maintain, said Stille. Although shrubs and ground cover require substantial labor the first year or two, after they are established they require far less water and care than turf. For small areas of turf in a xeriscape design, Stille suggests that homeowners consider tall fescues, buffalograss, blue grama, streambank wheatgrass, and some of the fine leaf fescues instead of the popular, but water-demanding, Kentucky bluegrass.

Automatic irrigation systems should be zoned to irrigate different areas according to their water requirements, said Stille. A small turf area should be on a different valve than a shrub bed, and an area on the north side of a two-story building should receive less water than an exposed west or south side. Drip irrigation systems are more efficient than sprinklers because of water loss to wind and evaporation. On a hot, windy afternoon, sprinklers can lose up to 60 percent of their efficiency.

There are many trees, shrubs, vines, and perennial flowers that have very low or low water requirements. Low-water-requiring plants will grow with an additional 3 to 7 inches of water, or just three good soakings a year, said Stille. Many plants native to the Great Basin, once established, will grow and flower without any additional water.

Careful management of a garden is especially important in the first 2 years. Irrigation systems must be fine tuned, plants must be checked for vigorous growth, and dead plants must be replaced. Proper fertilization and pest control measures are also important.

Said Stille, "Xeriscapes have the same

goals as any landscape or garden. They include reducing soil erosion; providing sheltered micro-climates; creating a more enjoyable environment; and adding color, variety, and interest to urban areas. The difference is that xeriscapes do it all with less water."

Currently, Reno residents' water use is not metered. But, local officials see metering as inevitable. With an estimated one-half of residential water use going to water landscapes, residents will soon have more at stake in reducing their water use.

Stille said that in cooperation with the research and development department of the Sierra Pacific Power Company, University of Nevada scientists, and others, the xeriscape demonstration garden will incorporate an important research effort. The main goal of the effort is to collect weather and soil data and analyze it to determine how efficient xeriscaping is under local conditions.

A weather station will measure wind, temperature, humidity, solar radiation, precipitation, and pan evaporation. These measurements will be used in estimating the consumptive use of water by plants. Twelve water meters will record water use in various parts of the garden. The water in the soil profile will be measured to determine how much water is actually being used by plants. The data collected will be sent to the university for analysis.

Stille says current plans are to have the monitoring hardware in place by summer. The data collected will be used by the Great Basin xeriscaping group in its public education efforts.

Through creative landscaping, Sierra Plaza's xeriscape will serve as a demonstration and research garden and as a model for water conservation in northern Nevada. Visitors will be able to inspect plants with varying water requirements, learn about new turf plants developed for their drought tolerance, and see some xeriscape designs they can use in their own landscapes.

Nancy M. Garlitz,
associate editor, *Soil and Water Conservation News*, SCS, Washington, DC

Ranchers Harness Sun to Pump Water

Some ranches in Kansas have always had lots of sunshine but little water. By using the space-age technology of photovoltaics, however, several ranchers are now turning the sunshine into electricity and pumping water with it.

Over the past year, the Trego County Soil Conservation District has helped to install four solar-powered pumping stations. These stations are in remote areas of the county where the cost of installing conventional electric lines would be prohibitive.

The system being installed was developed by Eddie Bollig, a local conservation contractor, with assistance from Bill Crawford, district conservationist for the Soil Conservation Service. Bollig and Crawford began the project by obtaining information from the manufacturers of solar panels. They studied the various solar panels and pumps on the market and chose a combination that would work where the water table is relatively shallow, within about 12 feet of the soil surface. This makes the system suitable for about half of Trego County and a good deal of northwestern Kansas, which is on the edge of the Ogallala Aquifer. Springs in the aquifer are good sources of water for the system.

Two of the solar units have been installed and are functioning extremely well in the 1,200-acre Triple Creek area northeast of WaKeeney. This is an area of dry grassland where pit ponds have been used to water cattle. Years ago it was necessary to haul water to the cattle.

"This operation could replace pit ponds, or it could supplement them," said Crawford. "It could be used in the winter when the ponds are frozen over."

The solar panel is set up on a metal stand to keep it from being disturbed by cattle. It is capable of delivering a 12-volt, 2-ampere current. The pump, which is placed inside a casing below the solar panel, draws 1 ampere of current. It brings water up from the water table and pumps it through a pipe into a stockwater tank. When the tank is full, a float valve or float switch turns off the pump to conserve water. The same mechanism turns the pump back on when the water level in the tank gets low. A 12-volt battery can be added to store current for use on cloudy days.

According to its developers, this system is an improvement over the traditional windmill. "With a windmill, when the wind doesn't blow you are out of water," said Crawford. The solar panel and pump cost from $500 to $1,000, about one-third the cost of a new windmill and conventional well.

"Windmills provide more power than you really need," said Marvin Lynd, one of the ranchers who has installed the system. "You can't move a windmill. This operation is portable, and having it movable is a very practical point."

Another advantage of the solar operation is that water can be kept underground until needed. This helps to keep the water free of surface contamination and reduces evaporation. It also keeps the water supply from freezing in winter.

Similar solar systems have been established in Meade and Phillips Counties. The Kansas Fish and Game Commission has one in use and plans to install a larger one in the Garden City area.

"It started in Trego County but will apply to a big share of Kansas," Crawford said. "I think it will really catch on."

Although the system apparently requires little maintenance, Crawford acknowledged that its long-term reliability has yet to be established, especially under winter conditions. "There are still a few bugs to work out," he said. "But we think solar power will prove to be the simplest and most economical means of providing water in remote locations."

Laurie Evans,
staff writer, *Western Kansas World*, WaKeeney, Kans.

Flood-Control Structure Fits Community Needs

You don't build a flood-control dam in the middle of a village. Not in Deposit, N.Y., you don't. Your assignment, if you are an engineer for the Soil Conservation Service, is to protect the community from flooding without moving a single building.

SCS engineers accepted this assignment. In response to community concerns, they designed an innovative structure that not only protects the community from floodwaters but also fits into the surrounding neighborhood.

Deposit is located in New York's Southern Tier, a region of steep hills and narrow agricultural valleys. Flooding has been a problem here ever since the village began as a logging depot in the 1850's. In recent years, damages have risen to about $70,000 a year, affecting as many as 179 homes and 32 businesses. Damage has been particularly bad in a residential section along Elm Street, where Big Hollow Creek and Butler Brook converge and flow west to the Delaware River.

In 1983, the village asked SCS to help control the flooding. Stream flooding of this type is usually controlled by building a flood-control dam or widening the existing channel. Because the two streams came together in a heavily populated part of the village, however, neither of these solutions was feasible.

The engineers went to their drawing boards. They were presented with complex engineering considerations that required a special design. They also knew they had to design a structure that was not very expensive and involved little or no building relocation.

Local residents were especially concerned about the visual impact of the project on their neighborhood. "We had to worry about what we were going to have to live with," said Pete Hempstead, chairman of the Watershed Steering Committee.

Rerouting the stream to the river appeared to be the best solution. This could be done by digging a narrow outlet channel through the residential area where the homes are close together. A special transition structure would be needed, however, to funnel floodwater from the wide earthen channel into the narrow concrete outlet channel.

The transition structure would have to keep the surface of the floodwater as low as possible in the outlet channel. To accomplish this, the engineers designed a concrete, fan-shaped structure with curved sides that provides a smooth, uniform change in bottom width, side slope, and elevation.

Building the transition structure required 212 cubic yards of concrete and 20 tons of steel reinforcement. Because this structure is unique for the site conditions, the contractor had to develop new construction methods. The inside and outside sidewall forms were anchored to the floor of the structure. The surface was made smooth by forming the inside faces with plywood.

The finished transition structure is 60 feet long and carries water down a 5.5-foot change in elevation. Floodwater enters the transition structure from the 38-foot-wide trapezoidal earth channel at a speed of about 6 feet per second. It gradually accelerates and enters the 22-foot-wide rectangular concrete channel at about 20 feet per second.

Upstream from the transition structure, two dikes were built along Big Hollow Creek and Butler Brook to protect adjacent properties, including a high school and offices of a power company. The dikes guide floodwater to a holding area, which between flood times is a grassy, landscaped depression. From there, the floodwater flows through the transition structure and the outlet channel to the river.

A transition structure was built to smoothly funnel floodwater into the narrow concrete outlet channel.

Fencing and landscaping help integrate the outlet channel into the Deposit, N.Y., neighborhood.

Photos by Karen Rusinski, visual information specialist, SCS, Syracuse, N.Y.

A new highway bridge had to be constructed where the channel was dug across New York State Route 10. This was accomplished with the cooperation of the Village of Deposit, the New York State Department of Transportation, and SCS. Deposit lies in two counties, Broome and Delaware, and assistance was provided by the soil and water conservation district in both.

The channel and transition structure were fenced, and the entire area was landscaped. According to Hempstead, village residents are pleased with the project. "No buildings had to be moved," he said, " and it looks good. Esthetically, it's symmetrical, functional, and integrated into the neighborhood by the landscaping design. Most important, it works."

The entire project, which is designed to protect the community from the most severe storm expected in 100 years, was completed in May 1985 at a cost of $1.4 million. Its first crucial test came 4 months later when Hurricane Gloria dumped more than 5 inches of rain in the area. There was no flooding.

"It worked beautifully," said Sara Kelsey, who lives next door to the project.

SCS is now looking into using this type of structure for two other flood-control projects in New York.

Donald Lake,
State conservation engineer, SCS, Syracuse, N.Y.

Controlling the Water Table in Eastern North Carolina

Plagued by excessive soil wetness, the farmers of eastern North Carolina have traditionally relied on drainage to save their crops. But now that uncontrolled drainage is being blamed for a number of water-related problems, several hundred farmers are using water conservation practices to develop a more controlled approach to water table management.

Much of the new interest in controlled drainage began in 1983, when the Soil Conservation Service established seven projects in eastern North Carolina to demonstrate how water conservation practices can be applied in preexisting drainage systems to manage the water table. Other farmers in the area soon began adopting water conservation plans for crop fields where they previously practiced only drainage.

The switch from uncontrolled to controlled drainage in the area has required fundamental changes in the attitudes of the people involved. First, the land users, many of whom have spent their working lives trying to keep their drainage systems free and flowing, had to be shown that it can sometimes be in their interest to restrict drainage. Second, SCS personnel had to be trained in how to best apply water conservation practices to improve water quality, reduce the use of ground water for irrigation, reduce the influence of agricultural freshwater runoff on primary saline nursery areas, and achieve the goals of the land users.

The drainage of cropland and forestland has historically been one of the most important components of land management in eastern North Carolina. The need for drainage has been strongly reinforced by repeated crop and forest losses over the years as a result of excessive soil wetness. As a result, the land users have installed a vast system of drainage canals and ditches.

Onsite, the uncontrolled drainage provided by this system has lowered the natural water table and reduced the ability of many soils to produce field crops and forest. Saltwater intrusion into farmland and forestland adjacent to estuaries and sounds has also become a common problem. Offsite, agricultural and silvicultural runoff is being blamed for the degradation of water quality in rivers, sounds, and primary saline nursery areas.

Another problem concerns irrigation. The principal source of irrigation water in the area has always been ground water drawn from the lower, highly productive aquifers. Very little emphasis has been placed on the development of surficial aquifers or on the use of water-control structures in the network of drainage canals to conserve surface water runoff as a source of irrigation water. This has contributed to demands being placed on the ground water resources that, if allowed to continue, could result in direct competition between the agricultural and urban-industrial communities for these limited water resources.

Recent research has shown that many of these water-related problems can be addressed by water conservation practices. For example, conservation practices can reduce some of the freshwater runoff blamed for the degradation of primary saline nursery areas. Water-control structures in major ditches and canals can control the quality and quantity of water entering these areas during critical periods. They can also be used to increase the amount of fresh water available, and some research suggests they can be used to increase the rate of recharge to aquifers. Water historically drained from a watershed can be conserved and stored in a surficial aquifer for use as irrigation water.

In addition to the research validating the use of water conservation practices, a computer model has been developed at North Carolina State University for designing total water management systems for individual fields. The model, "DRAINMOD," enables the designer to observe the performance of the water table in the field in relation to the weather, soil properties, tile or ditch spacings, surface drainage, and other conditions.

The land users in eastern North Carolina were aware of the water-related problems for which they were being blamed. They were also aware of some of the research that was underway, but they were not familiar with the concept of total water management. To them it did not seem practical that all the land users in a watershed could control the level of the water table for their various crops throughout the year.

Most SCS personnel in the area were also aware of the water-related problems and the ongoing research, but they had no experience in designing and managing total water management systems. Neither was there a program for addressing water-related issues, providing training, and coordinating agricultural agencies, researchers, and private industry.

In response, the SCS State office obtained funds through the Soil and Water Resources Conservation Act of 1977 (RCA) to establish the seven pilot projects to demonstrate the effectiveness of total water management systems. In April 1983, plans were made for establishing two projects in

Camden County, three in Hyde County, and two in Pamlico County.

During their first year of operation, these projects provided information about such things as the proper installation of water-control structures, drop structures, tubing, land grading and leveling, tile systems, and other water conservation practices. Valuable insight was acquired regarding management techniques, the placement of observation wells, pumping requirements, and the management of systems on a watershed scale.

A strong interagency network was formed. Personnel from SCS, the Extension Service, USDA's Agricultural Research Service, and private industry participated in water management meetings. This emphasis generated a keen interest among landowners.

Recognizing the value of total water management systems for addressing many water-related problems, especially water quality and saltwater intrusion into primary saline nursery areas, the State Agricultural Stabilization and Conservation (ASC) committee endorsed the use of water-control structures. Local ASC programs were amended to encourage farmers to participate.

Public opinion is being swayed, and, in some cases, the most adamant critics are becoming the strongest supporters of water table management through the use of water conservation practices. Many land users are becoming aware of the position of the water table with respect to the root zone of their crops and are studying the potential for storage and use of surface water runoff.

The original pilot projects, and many of the subsequent applications, are still being monitored to gather as much information as possible. Efforts thus far have confirmed that total water management systems are feasible for eastern North Carolina. The focus now is on learning how to manage these systems for the various soil types, water sources, crops, and locations within individual watersheds.

Dwane Hinson,
soil conservationist and RCA project manager, SCS, Edenton, N.C.

SCS Releases Seven Conservation Plants

A wildflower named in honor of the 50th anniversary of the Soil Conservation Service heads a list of seven new plant varieties sent into action against soil erosion in 1985. Years of testing by SCS and cooperating agencies have proven these plants exceptionally effective in reducing erosion and achieving other conservation goals.

The yellow-to-orange blooms of **'Golden Jubilee' black-eyed susan** (*Rudbeckia hirta*) make it particularly well suited for roadsides, mine sites, embankments, landfills, and other areas where visual attractiveness is desired. 'Golden Jubilee' is a reseeding biannual forb that is native to the Northeast. It is suited to a wide range of drainage conditions and soil textures.

The other new conservation plants are:

- **'Arbrook' perennial peanut** (*Arachis glabrata*), a perennial warm-season legume from Paraguay. 'Arbrook' is well adapted to the well-drained, sandy soils of Florida where its tall height (12-18 inches) and rapid regrowth in spring provide a reliable hay crop before the rainy season. It produces some flowers, but only an occasional subterranean nut. Propagation is by rhizomes.
- **'Tropic Coral' tall erythrina** (*Erythrina variegata*), a leguminous tree developed primarily as a windbreak to protect vegetable crops and farmsteads in Hawaii. Propagation is by planting cuttings directly in the soil. 'Tropic Coral' grows to be about 25 feet tall within 3 years and ultimately attains a height of 50 to 60 feet.
- **'Eldorado' engelmanndaisy** (*Engelmannia pinnatifida*), a deep-rooted, early-season forb that is suited to much of its native Texas. 'Eldorado' provides a forage very high in protein and digestibility, but is so relished by livestock and big game animals that it must be managed to prevent overgrazing.
- **'Comanche' partridge pea** (*Cassia fasciculata*), a warm-season legume useful as a ground cover for surface-mined areas and as a wildlife food plant. This annual can reseed and cover bare areas that receive about 19 inches or more of rainfall each year in its native Texas and Oklahoma.
- **'Cedar' Palmer penstemon** (*Penstemon palmerii*), a perennial evergreen that provides all-season forage diversity in the Western Mountains. 'Cedar' is well adapted to infertile soils and provides good ground cover for stabilizing disturbed soils and burned-over areas.
- **'Hatch' winterfat** (*Eurotia lanata*), an erect, half-shrub that provides abundant winter forage in the Western Mountains, particularly in years of heavy snow accumulation. It has a rapid growth rate that makes it valuable for stabilizing windblown soils and extremely barren areas caused by wildfires.

'Golden Jubilee' black-eyed susan.

New Publications

Nitrogen in Crop Production

Edited by Roland D. Hauck

In May 1982, a symposium was held to provide a comprehensive summary of the current knowledge about nitrogen as it relates to crop production. Nearly 100 scientists and technologists contributed their presentations to the symposium. Those presentations as well as several additional closely related topics comprise the chapters of this book.

It covers such topics as how plants use nitrogen; sources and supply of plant-available nitrogen; and management of crops, fertilizer and fertilizer amendments, manures and other waste products, plant residues, and soils for maximum, economic crop production.

Farm managers, agronomists, crop and soil scientists, crop ecologists, and cooperative extension specialists should find *Nitrogen in Crop Production* to be a valuable reference tool.

Copies of this book are available for $48 from American Society of Agronomy, Crop Science Society of America, and Soil Science Society of America Headquarters Office, Attn: Book Order Department, 677 South Segoe Road, Madison, Wis. 53711.

Sodbusting: Land Use Change and Farm Programs

by the Economic Research Service

According to a study of recently converted land, the plowing up of land to grow erosive crops, or sodbusting, is not adding greatly to current soil losses but in the future may lead to increased erosion.

This report examines recent trends in conversion to cropland, the extent of soil erosion on newly converted land, and the likely impact of current farm programs and proposed sodbuster legislation on conversion. Under current sodbuster proposals an operator would become ineligible for price-support payments, farm storage facility loans, crop insurance, disaster payments, and insured or guaranteed loans for any crop year in which an annual crop was produced on a field which is predominantly highly erodible. This report investigates the implications of sodbuster legislation and analyzes the extent and location of recent conversion to cropland in total and on highly erodible land. Also, the economics of new conversion are examined and the likely effects of proposed sanctions are evaluated.

Single copies of this 29-page report are available from USDA/EMS, Room 208, 1301 New York Avenue, NW., Washington, DC 20005-4788.

Soil Micromorphology and Soil Classification

Edited by Lowell A. Douglas and Michael L. Thompson

In the fall of 1982, a symposium, sponsored by the Soil Science Society of America (SSSA), was held to narrow the gap between the micro-morphologist and the soil classifier so that the soil classifier could use the additional knowledge about soil micromorphology for classification purposes. The papers were presented by recognized authorities in the field.

Soil micromorphology should be useful in separating cause from effect and explain why different soils form horizons the way they do, and what the different variations within the horizons mean.

Copies of this SSSA Special Publication Number 15 are available for $19 from SSSA Headquarters Office, Attn: Book Order Department, 677 South Segoe Road, Madison, Wis. 53711.

Soil Taxonomy—Achievements and Challenges

Edited by Robert B. Grossman, Hari Eswaran, and Richard H. Rust

This publication is dedicated to the memory of Dr. Guy D. Smith, a soil scientist who pioneered the soil classification system today known as the U.S. system of soil taxonomy. It contains papers presented at a symposium of the Soil Science Society of America (SSSA) in the fall of 1982. Thoughts are given on the history of soil taxonomy and its future, the role of classification in research planning and technology transfer, and its impact on the national cooperative soil survey.

Soil Taxonomy (SSSA Special Publication Number 14) is available for $12 from SSSA Headquarters Office, Attn: Book Order Department, 677 South Segoe Road, Madison, Wis. 53711.

Western Water Flows to the Cities

by John A. Folk-Williams, Susan C. Fry, and Lucy Hilgendorf

This is the third and final volume in the *Water in the West* series, published by the Western Network, a nonprofit organization that provides information about natural resource conflicts in the Western States.

Urban growth in seven Western States has resulted in strong competition for control of water resources in the region. While urban residents are concerned about paying for water projects that affect rural areas, those with a stake in rural resources—including farmers, Indian tribes, and environmentalists—worry about the environmental and economic impacts. A concern of both urban and rural groups is their ability to affect the decision-making process concerning the use of water. In an effort to be heard, some of these interest groups have brought litigation against local and State governments; others have used negotiating methods for influencing decisions about water.

This book offers 56 real-life case studies of conflict over a water issue involving a municipality. It outlines the development of the conflict, describes the methods being used to make decisions, and highlights the needs of water users in both urban and rural areas.

Western Water Flows to the Cities is a useful tool for water managers, public officials, attorneys, and concerned citizens—both urban and rural—who must confront and understand the water issues and conflicts in the West.

The book includes maps, a bibliography, a table of cases cited in the study, and an index.

Copies of the book are available for $25 (plus $2.50 shipping and handling) from Island Press, Order Department, Box 7, Covelo, Calif. 95428.

The Woodland Steward

by James R. Fazio

For many Americans, owning a piece of woodland is a lifelong dream. It is not only a dream for some but a responsibility to nurture, care, and protect the land's resources. This responsibility is often referred to as stewardship.

The author presents in this book a readable, straight forward approach to planning and carrying out a good woodland program. He has interviewed woodland owners all across the United States, and tells how they are getting the most out of their forests while improving them for the future.

The chapters include information on safety and how-to tips for the do-it-yourself logger; planning goals and objectives for how you will use your land; planting and improving the woodlot; protecting the forest from fire, insects, and diseases; harvesting and selling your timber; harvesting and marketing Christmas trees; holly production; maple sugaring as a hobby; and planning for wildlife.

Throughout the guide are names and addresses of government agencies, private organizations, and others who can provide information on some of the details in planning a good management program for your woodland.

This 211-page guide is chockfull of useful drawings, tables, and graphs.

Copies of *The Woodland Steward* are available for $14.95 (plus $1.95 postage and handling) from The Woodland Press, Box 3524 University Station, Moscow, Idaho 83843.

Soil & Water Conservation News

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New Publications

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Targeting Erosion Control: Delivering Technical and Financial Assistance

by James Nielson

In 1981, the U.S. Department of Agriculture initiated a national program to target conservation efforts on critical resource problem areas. The key agencies in designing and implementing the program are the Soil Conservation Service (SCS) and the Agricultural Stabilization and Conservation Service (ASCS). While USDA targeted several areas of resource problems, this research project addresses only programs for controlling water erosion on cropland. It studies the targeting program in detail in one State in each of the four major water erosion areas designated by USDA.

Data in this report are based mainly on personal interviews with 709 farmers, telephone surveys of SCS district conservationists and ASCS county executive directors, and personal interviews with conservation professionals and others. The report describes what was done in carrying out targeting programs at the national level and in selected States and counties, gives reactions to targeting from those who implemented it and those affected by it, presents findings on various facets of the organization and operation of the delivery system, and offers suggestions for improving the system.

Single copies of this report are available, while supplies last, from EMS Information, U.S. Department of Agriculture, Room 208, 1301 New York Avenue, NW., Washington, DC 20005-4788.

Recent Soil Surveys Published

by the Soil Conservation Service

Alabama: St. Clair County.
Iowa: Dubuque County.
Michigan: Missaukee County.
Nebraska: Nemaha County.
New Mexico: Mora County.
Oklahoma: Grant County.
Pennsylvania: Wayne County.
South Dakota: Brule and Buffalo Counties, and Potter County.
Texas: Denton and Zavala Counties, and Webb County.
Virginia: Giles County, Middlesex County, and Virginia Beach.

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