

Inside Agroforestry



GETTING BUFFERS ON THE GROUND: A GROUP EFFORT

by Rich Straight

Forest Service Lead Agroforester, NAC, Lincoln, Nebraska

“Tree planting in the Great Plains is a team effort,” says Joe Cervantes, Resource Conservationist with the USDA Natural Resources Conservation Service (NRCS) in Alliance, Nebraska. It takes an interested landowner, resource professionals with technical and program expertise, and professional tree planters.

Jim Jelinek, a farmer from western Nebraska, is one of those interested landowners. He says, “When the dirt blows, it’s disgusting.. The trees planted in the 1930’s and 1940’s are dying and there just aren’t the trees out there that there used to be.” While talking about planting trees through the Continuous Conservation Reserve Program (CCRP) Jim said, “It was easy, Joe sat down and explained

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Alley Cropping System Buffers Water Table

Kimberly Stuhr
Technology Transfer Specialist,
NAC, Lincoln, Nebraska

Deep in the Mesilla Valley near Las Cruces, New Mexico you’ll find over 25,000 acres of pecan trees. At first glance this just looks like a lot of pecan trees, but after closer inspection and a visit with NRCS Soil Conservationist Rudy Garcia of the Las Cruces Field Office, you’ll find that some of the plantings are an interesting and productive

alley cropping / buffer system of pecan trees, orchard grass (like Bermuda grass), and dairy waste nutrient management.

According to Garcia, “This alley cropping system buffers excess nitrate leaching into the water table. Here in the desert we have a shallow water table that is only about seven to nine feet below the surface.”

The Mesilla Valley is home to 22 large dairy operations that produce manure in need

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Center pivot irrigation corners planted with trees, shrubs, and grass help protect soil and crops, while enhancing wildlife habitat. Pictured are Dave and Dean Buskirk in their five-year-old pivot corner planting in the western Nebraska Panhandle.

Photo courtesy of Doak Nickerson, Nebraska Forest Service.

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CAN HARDLY
BELIEVE IT!



NAC Director's Corner

A commentary : by Center Director, Dr. Greg Ruark

Buffers: More Relevant Today Than Ever!

Agroforestry buffers utilize trees and/or shrubs to protect things that are important. They protect waterways from non-point source pollution, prevent soil from eroding, and moderate dust and odors. Fields, homes, communities, and roadways can be sheltered from the adverse affects of harsh climates and strong winds. Buffers can also provide social benefits, like wildlife habitat, visual beauty, recreation opportunities, and carbon storage. The economic profitability of a farm or ranch can often be improved when agroforestry buffers are properly planned and installed.

Former Secretary of Agriculture, Dan Glickman, once said, *"When combined with conservation tillage and nutrient and pest management, buffers can all but eliminate serious water pollution and related environmental problems from farms."*

This issue of *Inside Agroforestry* focuses on several types of agroforestry buffers. Local stories are used to illustrate how alley cropping, riparian forest buffers, field windbreaks, living snowfences, and planted pivot corners are being used throughout the country. Unfortunately, many existing buffers have reached the end of their service life and are in dire need of renovation or replacement. This is especially true for field windbreaks that were planted in the Great Plains to combat the "dust bowl" of the 1930's.

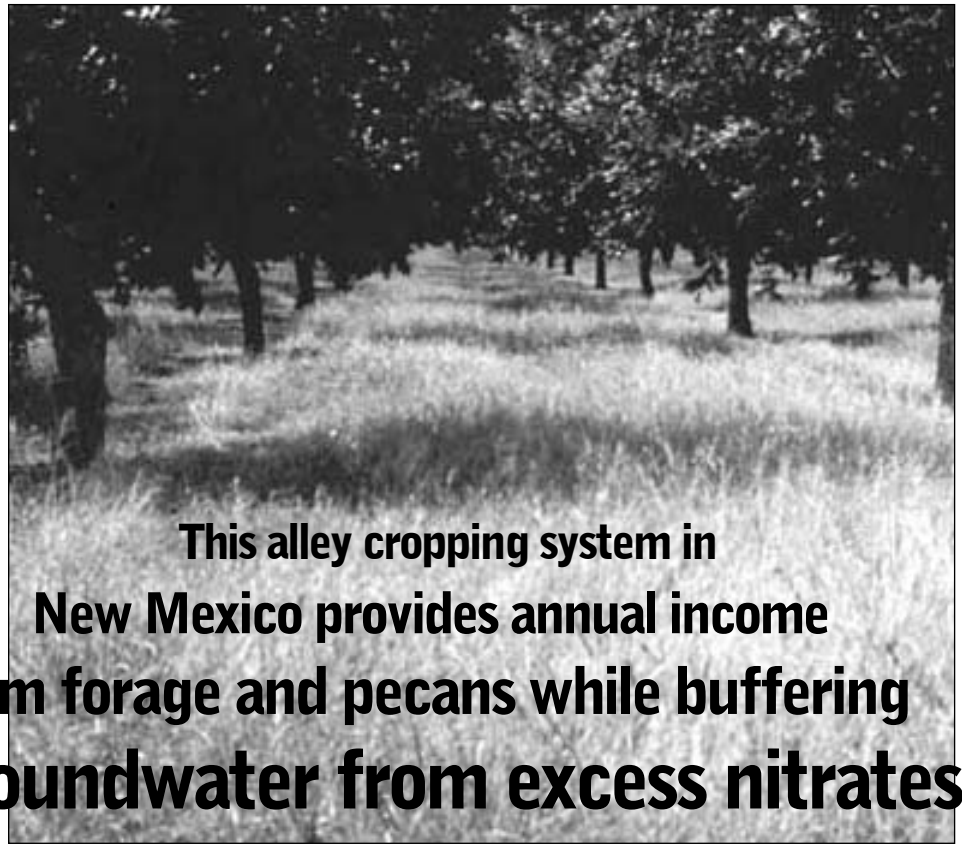
Don't underestimate the benefits of agroforestry buffers. These strategically placed "linear forests" can work for you, they can work for your neighbors, and they can work for watersheds and the entire nation.



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of disposal, or more appropriately, "utilization." Typically 10 to 15 tons of dairy manure is applied per acre every three to four years on a pecan orchard. By applying "waste" to the grass and trees, nutrients are readily available that improve forage and pecan production. Obviously, what used to be considered waste can alternatively be seen as a valuable component of a productive agroforestry alley cropping system and efficient disposal means of a sure supply of manure.

The grass is planted between pecan trees, which are planted at a 40-foot by 40-foot spacing. It is harvested about two times per year and often sold to local farmers for feed or bedding. Many landowners consider the grass an excellent soil conditioner (i.e., the grass is mowed between rotations) that improves soil quality properties, which beneficially influence yield and quality. When sold, the Bermuda grass provides an annual income for the landowner throughout the summer growing season. Then, in late autumn the pecans are harvested for another source of income. Garcia says, "Several landowners who have recently converted to this system really like it. They maxi-

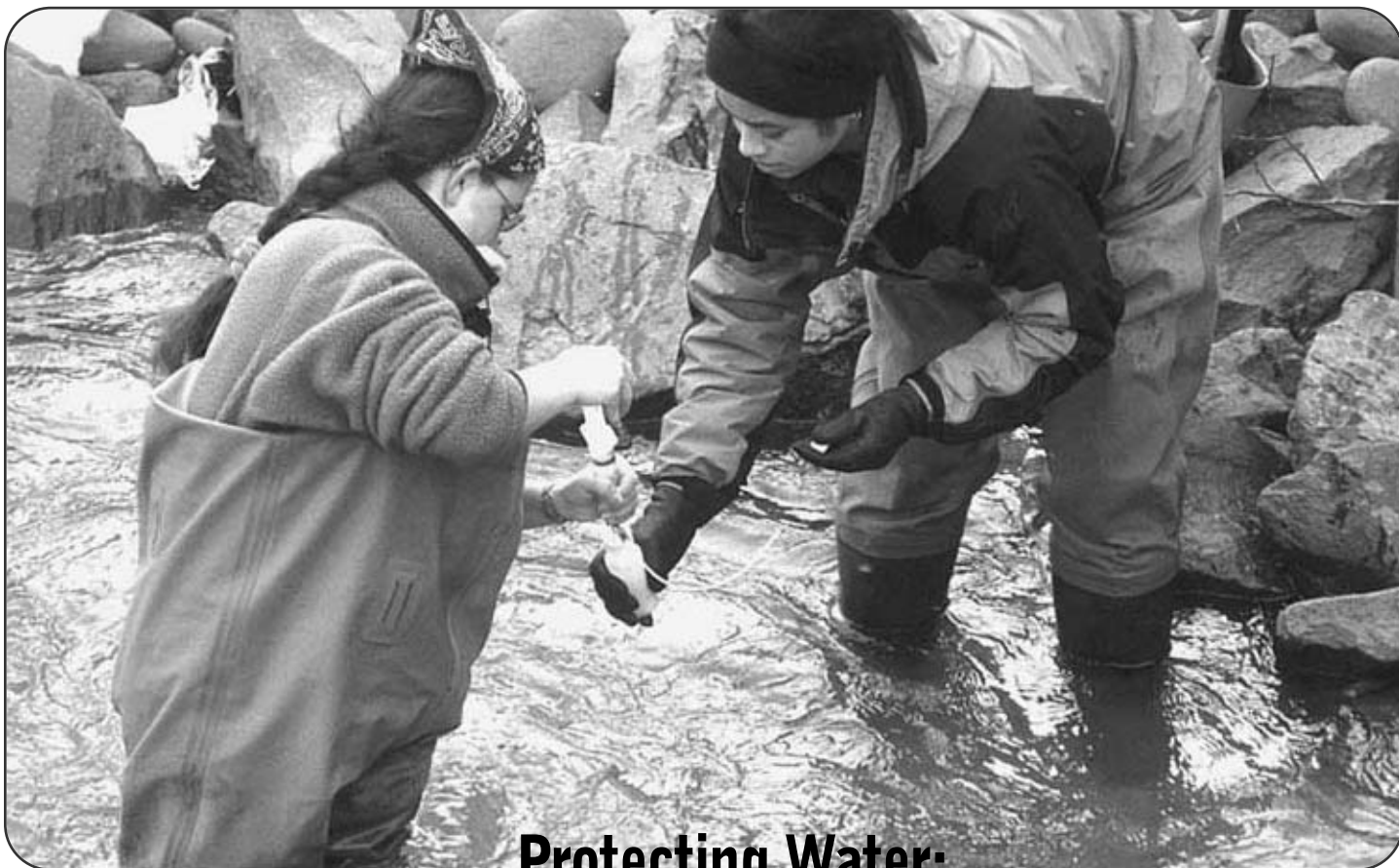


This alley cropping system in New Mexico provides annual income from forage and pecans while buffering the groundwater from excess nitrates.

mize the use of their fields and are generating greater income through increased yield and quality of both the pecans and the grass crop."



For more information about this unique alley cropping / buffer system, contact Rudy Garcia by phone: 505-522-8775 or e-mail him at: Rudy.Garcia@nm.usda.gov



Stroud Center employees Jessie Mathisen (left) and Arlene Casas sample icy waters of the Esopus Creek in the New York Catskills this past winter.

Protecting Water: Every Drop Counts

Bern Sweeney, Director,
Claire Birney, Development Director,
Stroud Water Research Center,
Avondale, Pennsylvania

New York City dwellers use an average of 1.2 billion gallons of water daily. Fifty-six upstate cities, towns, villages, and other water districts draw another 123 million gallons. New York City's water, considered among the cleanest and best tasting of any city in North America, is internationally envied. What's more, the water is unfiltered. And most interested parties want to keep it that way.

The problem that New York faces is that federal regulations now insist on filtration for communities that use surface water sources. But a water authority can avoid filtration if it demonstrates to the EPA that it can "maintain a watershed control program which minimizes the potential for contamination by *Giardia* (microorganisms that cause painful intestinal sickness) and viruses in the source water.

New York City draws its water from a network of rivers, streams, and reservoirs in the watersheds of the Hudson and Delaware rivers. Hundreds of streams feed the systems 18 collecting reservoirs and three lakes that hold about 548 billion gallons. The system watersheds cover 1,969 square miles, with the outer edges lying 125 miles from Manhattan.

A filtration plant could cost as much \$6 billion. Not surprisingly, New York City has decided it would rather spend \$1.5 billion over 10 years to implement a watershed management strategy.

One part of the system is already beyond filtration avoidance. The once rural East-of-Hudson Croton watershed is fast turning into a sprawling suburbia, and the Environmental Protection Agency (EPA) has ordered New York to filter water from this section, which provides only 10 percent of the city's water. The Croton filtration plant will cost \$687

million – relatively cheap next to the estimated \$6 billion cost (plus \$300 million a year to run) of filtration for the Catskill-Delaware system, which provides 90 percent of the city's water. Not surprisingly, the city has decided it would rather spend \$1.5 billion over 10 years to implement a watershed management strategy than to face the high costs of filtration.

"Every Drop [of water] Counts..." is the Stroud Water Research Center's (SWRC) motto. The Stroud Center, located about 40 miles southwest of Philadelphia, Pennsylvania, is a scientific and educational institution dedicated to understanding, preserving, and restoring streams, rivers, and their watersheds throughout the world. They have been contracted by New York State at \$1.2 million a year to help find, measure, and design controls for the sources of pollution in the myriad of streams and rivers that provide New York City's drinking water. Stroud scientists hope to pinpoint the problem areas and come up with a prescription that is cheaper, less dependent on chemicals, and more sensitive to both water quality and

see **STROUD CENTER** on page 4



A circular saw mounted on the Bobcat results in a highly maneuverable and efficient tool for removing selected trees in the windbreak renovation project.

Saving Our Aging Windbreak Buffers



Bruce Wight
NRCS Lead Agroforester,
NAC, Lincoln, Nebraska

Much like the “baby boomer” generation, most of the windbreaks in the Great Plains began life in the 1940’s, 50’s and 60’s and are now reaching maturity. According to Craig Stange, NRCS Forester in North Dakota, an estimated 70 to 80 percent of these windbreaks need some type of renovation ranging from reducing competition between trees and encroaching grass to complete tree removal and replacement. Similar renovation needs exist in the other states in the Northern Great Plains.

With \$50 per 100 feet as the going rate for tree and stump removal, the potential cost of rotating to second generation windbreaks is staggering. This cost can be reduced to \$20 per 100 feet if trees are

removed with a hydraulic shear or saw and the stump is left in the ground. Stange and other resource professionals in North Dakota are exploring alternatives like the tree shear to find cost-effective renovation approaches for landowners.

According to the 1992 National Resource Inventory, there are over 150,000 miles of windbreaks nationwide with about 90 percent occurring in 15 states making up the Northern Great Plains and Midwest. Estimates ranging from 50 to 60 percent of these windbreaks need some form of renovation.

Craig Stange is experimenting with new renovation ideas and sharing the lessons learned through an educational grant from the Environmental Quality Incentives Program (EQIP). One goal of the project is to find a way to reduce renovation costs to 30 percent of the present costs. Stange says,

“We all know that cost sharing will never be sufficient enough to meet the need; therefore, we must show a less expensive way that is attractive to landowners.” With money from the grant, North Dakota held four windbreak renovation workshops across the state with over 200 people attending. As a result, several conservation districts have purchased some of the innovative equipment demonstrated for use by local landowners.

Part of the EQIP educational grant is supporting development of a windbreak renovation video. The video project is a cooperative effort among the USDA Natural Resources Conservation Service, North Dakota State University Cooperative Extension Service, North Dakota Forest Service, several soil conservation districts, and several dedicated landowners. The video will document a variety of windbreak renovation techniques and is slated to be completed later this year. For more information on the video, contact: Marcus Jackson at mjackson@ndsuext.nodak.edu or phone him at: 701-231-8478.

People living on the plains and prairies of North America have long appreciated the buffering capability of windbreaks and their many benefits. Now is the time to develop effective windbreak renovation techniques. This job will require help from conservation partners in both the private and public sector.

Stroud Center continued from page 3

the natural environment. According to Stroud Director Bern Sweeney, “This project fits well with our mission because it applies basic research science to a real world problem.”

The overall aim of the three-year project is to establish a system to monitor the amount of contaminants in the water and the sources of contamination in the watersheds.

The system must also be able to measure and predict future changes in water quality as land uses change. Most importantly, for the long run, the information provided by the Stroud Center must lead to land and water management practices that will prevent further contamination.

For more information about the Stroud Center, the New York City project, and other water quality projects visit their website at: www.stroudcenter.org or call Claire Birney, Development Director, at 610-268-2153 ext. 230.



A GOOD THING is doing **GOOD THINGS**

by Kimberly Stuhr
Technology Transfer Specialist,
NAC, Lincoln, Nebraska

Talk about word-of-mouth advertising! Word about windbreaks is spreading fast in Idaho. According to Dennis Hadley, District Conservationist, for the USDA Natural Resources Conservation Service (NRCS) in eastern Idaho, “Word is getting out. When you’ve got a good buffer practice and a good program to support it, you can talk about good things to people.”

With the great incentives that the Continuous Conservation Reserve Program (CCRP) offers and a first-rate buffer practice like windbreaks, it’s no wonder that the High Country RC&D and the East and West Side Soil Conservation Districts (SCDs) are installing increasing numbers of new windbreaks per year. According to Hadley, landowners are extremely pleased with their windbreaks and CCRP’s incentives. The cost share plus the sign-up bonus for buffer practices is fantastic. After you add in the annual rental payments, CCRP is the

best conservation tree planting program that’s been available in a long time. Cooperators won’t find a better opportunity to apply a conservation planting to their land.

Hadley continues, “In fact, landowners can hardly believe it. Sometimes I almost need to pinch them!”

Windbreak buffers of all types are important in this part of the country. A lot of the cropland is irrigated and is very erodible due to high winds. Furthermore, many parts of Idaho experience blowing and drifting snow each win-

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These seedlings installed by the Idaho Department of Transportation will eventually protect the adjacent highway from drifting snow and blowing soil. The land was purchased from willing landowners.



Buffers

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the program and how I could use it. My family has about 10 CCRP windbreak contracts between my place, my Dad's place, and my Grandad's estate." Jelinek adds, "We've planted windbreaks around most of our pivot-irrigated fields and around the pivot corners. Otherwise, planting crops in the corners with 50- to 60-foot equipment is difficult. Millet is about the only thing I can grow because it is inexpensive to plant." Jim has become a tree-planting-promoter, he says, "Now my landlords are following my lead and planting field windbreaks."

Jim is quick to point out that staff at the USDA Farm Services Agency (FSA) were invaluable when it came to filling out forms. Deena Collins, Program Technician, and landowner, worked with me to complete the paperwork. She not only knew how to fill out the forms, but she understands how programs can work on my farm.

Deena says, "Conservation is important to me. We live on an old 1889 Tree Claim and still have the deed that was signed by Ulysess S. Grant. Shelterbelts help save natural resources for our kids." She continues, "Buffer practices like field windbreaks only need a small number of acres, they [producers] are not giving up as much as they are getting in return. The wildlife aspects, like protected areas for pheasant and sharptail grouse, along with saving resources for our kids, and better crops, all from windbreaks. I love it. CCRP makes it easy to talk to landowners about windbreak possibilities."

Other key players on this successful conservation team are brothers Dave and Dean Buskirk. The Buskirks, landowners themselves with over 20,000 trees planted on their own farms for windbreaks and wildlife habitat, started their tree planting company, *Trees Are Us*, about six years ago. The first year we planted one job. Now we're up to three tree planting crews with seven people on each crew. Each crew plants trees and installs fabric mulch, *Trees Are Us* contracts with the local Upper Niobrara White Natural Resources District (NRD) to provide tree planting and mulch installation services for producers in the area.

The Buskirks' not only plant trees but they also install fabric water conservation mulch on windbreaks. "The advent of fabric mulch made it possible to increase survival and growth of seedlings," says brother Dean. "It took a few years to develop a fabric mulch installation machine that also worked in no-till situations." Farmers and ranchers don't like breaking the sod on the sandy soils because of the increased risk of wind erosion here on the edge of the Nebraska Sandhills.

This conservation team works because each person does their part with personal commitment. Joe and Deena provide USDA technical and program expertise to assist landowners like Jim develop effective conservation plans. Conservation Districts and landowners then work with local businesses, like *Trees Are Us*, to get the job done.

Working together to conserve our natural resources makes sense. And Conservation Buffers, like field windbreaks and living snowfences, are common sense conservation.



Living snowfences help save lives and money, and are aesthetically pleasing year-round.

Living Snowfences

Dan Gullickson

Forester, Minnesota Department of Transportation, Office of Environmental Services, St. Paul, Minnesota

Living snowfences are plantings of trees, shrubs, native grasses and sometimes standing rows of corn that trap blowing and drifting snow. These barriers help keep roadways clear and prevent big drifts that lead to stranded motorists.

Living snow fences save lives.

According to the Federal Emergency Management Administration the number one natural disaster that claims the most lives in Minnesota is winter weather. Between 1990 and 2000, in the Mankato-Windom area alone, there were 1,411 vehi-

cle crashes due to snow, 917 crashes due to blowing snow, and 86 crashes resulting from cross winds. With living snowfences, driver visibility is improved and these vehicle accidents are reduced.

Living snow fences save money.

According to Standard and Poor's financial information services, economic disruption of having to shut down the highways for one day in Minnesota would cost \$66 million in lost wages and \$27 million in lost sales. Living snow fences help keep roads open and reduce shipping delays for goods and services. They also help us make better use of the public's money because the need for plowing snow is reduced.

Living snow fences look good.

These barriers are natural, live materials

that are aesthetically pleasing year round. They provide visual cues, or land marks, to help drivers find their way. Living snow fences are an environmentally sound solution to improve snow management. Less salt, fewer plow and truck trips, and less fuel are required to keep the roadways clear.

As a result, the Minnesota Department of Transportation (MnDOT) has acquired a \$2.5 million grant from FEMA and participation of landowners and local governments in the Living Snowfence program. We are in the middle of planting 100 living snowfences that will be completed by June, 2001.

For more information, contact me by phone: 651-284-3763, or e-mail: Daniel.gullickson@dot.state.mn.us



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ter. This adversely affects winter travel, commuter safety, and snow removal budgets. Windbreaks take up very little space compared to the area they protect, whether they are planted to protect people, livestock, soil, or crops from harsh winters and extreme spring winds or to provide a visual screen from conflicting land uses like rural housing developments, dairies, or landfills. For example, a two-row, one-half mile long windbreak takes up less than two total acres.

Additionally, windbreaks add aesthetic variety to the landscape, provide wildlife habitat, and improve working and living environments.

Windbreaks provide benefits not only to individual landowners but also to communities as a whole. The Bone Road, located in rural Bonneville County, Idaho

is the only maintained winter access connecting Bone, Idaho to the greater Idaho Falls area. Snow removal costs on this road are usually quite high. The East Side SCD and High Country RC&D cooperated with Bonneville County Roads and landowner Steve Rhodes to design a special type of windbreak buffer, known as a living snowfence. In 1993 over 9,000 feet of Siberian Peashrub and Rocky Mountain Juniper were planted and are well on their way to maintaining winter access between the two communities.

Prior to 1992, windbreaks were installed sporadically throughout Idaho. The windbreak program dramatically increased when NRCS made a commitment to increase windbreak technology within the

state. Technologies were advanced through training, technology improvements, and coordination with outside agencies and programs. A NRCS forester was hired specifically to facilitate and coordinate the windbreak program.

Gary Kuhn, current NRCS Agroforester for NAC, located in Spokane, Washington was previously the NRCS State Staff Forester in Boise, Idaho. According to Kuhn, the windbreak program in Idaho has really taken off. Kuhn says, "During my time as Idaho NRCS forester, it was a pleasure to see the commitment to advance a



specific conservation technology, in this case, windbreak technology. After conducting two intensive windbreak technology training courses, the confidence and cooperation of resource professionals led to the expansion of windbreak plantings in Idaho. What's special is the windbreak activities continue to remain strong. I look forward to the years ahead to seeing the fruits of our effort."

The CCRP encourages buffer practices that occupy small amounts of space but provide big benefits. Hadley receives requests from landowners wanting windbreaks ranging from field and farmstead windbreaks to feedlot windbreaks. Landowner windbreak plans vary in size from two to 16 rows, and many of them include a wildlife habitat

component. Additionally, both acreage landowners and traditional farmers are getting involved in the program.

When asked about how he markets and outreaches to landowners in his area, Hadley said simply, "Word-of-mouth." He then added that he occasionally speaks to farm and watershed groups and reaches prospective clients there. The USDA Farm Service Agency (FSA) also includes information in their District's newsletter. And then, of course, there are conservation partners who participate in the plantings and promotion of conservation. Some of the groups include:

Here, fabric mulch is laid for the living snowfence. The three-row windbreak consists Siberian Peashrub on the windward side, hybrid poplar in the middle, and blue spruce on closes to the highway.

the Idaho State Transportation Department, East Side Soil & Water Conservation District, High Country RC&D of Bonneville County, Idaho Fish & Game, Farm Service Agency (FSA), West Side Soil & Water Conservation District, and Idaho Department of Lands.

"For the past nine years the program has been growing and now it seems like every day we get calls." Hadley sums up. "We've got about 12 windbreaks to install this spring. Twelve more are in the works for next year and by the end of summer, we'll have even more inquiries, probably 30 to 40." In a couple more years we will have installed several hundred windbreaks! Now, that's a good program doing good things for people, wildlife, water, and the land!

Idaho windbreak planting statistics graphically demonstrate the increased interest in windbreaks in east central Idaho. In 1999, East Side and West Side SCD's assisted with over 11,000 feet of windbreaks (about 16 percent of the windbreaks reported in Idaho). In 2000, they assisted with windbreak installation of about 36,000 feet (about one-fourth of the windbreaks reported in Idaho).

So, there you have it, when you've got a time-honored, well-proven buffer practice like windbreaks, field demonstrations that prove the benefits, and a Government program like CCRP good things are bound to happen to you, and the land.



Designing Silvopasture Systems: Managing for Trees and Livestock

Soil and Water Conservation Society, Myrtle Beach, South Carolina,
Sunday, August 5 — 1:00 to 5:00

A half-day technical workshop on how to plan and design silvopasture systems for the Southeastern United States will be offered during the annual meeting of the Soil and Water Conservation Society. The target audience are resource planners that provide information on how to incorporate long-term timber production into pasture and livestock management operations that provide both an annual income and a long-term cash flow.

Upcoming Events

July 10-11, 2001

Breaking New Ground: The Benefits of Ecological Enhancements in Brownfield Development & Superfund/RCRA Remediation Projects. Wildlife Habitat Council. Renaissance Washington, D.C. Hotel. WHC Phone: 301-588-8994 or RCRA@wildlifehc.org

August 4-8, 2001

2001 SWCS Annual Conference.

Myrtle Beach, South Carolina.
FAX: 515-289-1227.

August 16-18, 2001

Seventh Conference on Agroforestry in North America. Regina, Sask., Canada. Contact John Kort, phone: 306-695-2284, kortj@em.agr.ca, www.agr.ca/pfra/aftappfa.htm

September 14-17, 2001

Society of American Foresters Annual Meeting. Agroforestry technical

sessions and tour, Denver, Colorado
www.safnet.org

October 2-4, 2001

Agroforestry/Carbon Conference. Binghamton, New York. Contact: Mark Grennan, Hudson Mohawk RC&D. Phone: 518-828-4385, ext. 105.

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Phone: 402-437-5178; Fax: 402-437-5712.

Greg Ruark, Center Director	ext. 27
Michele Schoeneberger, FS Research Leader	ext. 21
Rich Straight, FS Lead Agroforester	ext. 24
Bruce Wight, NRCS Lead Agroforester	ext. 36
Kimberly Stuhr, TT Specialist/IA Editor	ext. 13
Ryan Dee, TT Assistant	ext. 14
Mike Majeski, FS Agroforester St. Paul, MN	phone: 651-649-5240
Jim Robinson, NRCS Agroforester Fort Worth, TX	phone: 817-509-3215
Gary Kuhn, NRCS Agroforester Spokane, WA	phone: 509-358-7946

www.unl.edu/nac

Mission

The National Agroforestry Center (NAC) is a partnership of the USDA Forest Service, Research & Development (Rocky Mountain Research Station) and State & Private Forestry and the USDA Natural Resources Conservation Service. The Center's purpose is to accelerate the development and application of agroforestry technologies to attain more economically, environmentally, and socially sustainable land-use systems. To accomplish its mission, the Center interacts with a national network of partners and cooperators to conduct research, develop technologies and tools, establish demonstrations, and provide useful information to natural resource professionals.

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