Harrison, Nebraska residents realized that they had a real problem after the blizzard of March, 1988. They now have a living snowfence planted around the north and west sides of town to help control fierce Great Plains snow storms.

Finding solutions to problems at the agriculture/community interface builds working relationships among grassroots, state, and federal representatives.

Every community has problems and issues to deal with. But, in March of 1988, the town of Harrison, Nebraska realized it had a problem of disastrous proportions.

Nebraska’s northwesternmost community, surrounded by open rangeland, seemed to be the target of every Great Plains blizzard, shutting down Harrison’s primary artery, US-20, and isolating the 291 residents often for days at a time. This spring snowstorm had finally gotten the best of the town, blowing the highway shut for almost a week and covering homes with 30-foot drifts, making conventional snowblowers worthless.

The community finally decided that a solution must be found for their recurring problem. The residents of Harrison spearheaded a project to plant a living snowfence around the town’s northwest corner, with cooperation from local agencies, organizations and individuals and...
Conservation Buffers For Communities

The theme of this issue of *IA* is applications of agroforestry technologies in the agriculture/community interface -- where agriculture and urban land uses meet, and often conflict. Over the past few years, the Center and its partners have provided information and helped to support demonstrations of “Working Trees for Communities” to show how tree-based buffer practices, like windbreaks and riparian buffer strips, can be applied in and near communities.

“Conservation buffers for Communities” is a bit broader, but the same concept. In the future, the Center will be working with partners to demonstrate how tree-based buffers can be combined with other buffer practices (like grass-based buffers, bioengineering practices, and constructed wetlands) to attain landscape-level buffer systems that provide multiple benefits. The focus will be on small communities in agriculture-dominated landscapes, and mitigating the environmental impacts that agriculture can have on small communities, and vice-versa. However, the concept applies to communities of all sizes.

Small communities in agriculture-dominated landscapes are especially vulnerable to the impacts of wind, dust, noise, odors, snow-drifting, sedimentation, runoff and flooding, and water contamination from agricultural sources. Conservation buffers is the strategic placement of permanent vegetation to moderate those problems, and at the same time enhance landscape diversity and wildlife. Examples in the interface are community windbreaks, riparian buffer strips to intercept sediments and pollutants and retard flooding, and establishment of “cottage industries” that are protected by trees and maintain access to critical facilities (hospitals, fire stations, schools). Communities are also part of watersheds, and need to be responsible environmental stewards within organized watershed-based programs. Examples are land disposal of municipal sewage sludge and wastewater on tree plantations, and stabilization of landfills with tree cover. Tree-based buffers (agroforestry technologies) are some of the most effective “tools” in the “conservation toolbox” that we have available to help harmonize land uses.

We feel that a focus on “Conservation Buffers for Communities” is an excellent opportunity to foster partnerships and cooperation between rural- and community-based organizations to address shared problems, and at the same time enhance awareness of the need for sustainable land use. Everyone lives in a watershed, and should be aware of, and responsive to, the need for land stewardship. That is what collaborative stewardship is all about.

(See Solutions on page 6)
“The wind blasted though here like it was straight out of Siberia. With the wind came snow that piled up completely over the tops of our cars.”

“The blowing snow was so bad we couldn’t even get out of our houses. If we’d had to get to a hospital or needed a fire truck, there was no way we could get out, or they could get in.”

Comments like these were common in communities in North and South Dakota and Minnesota last winter. These folks needed protection from wind and blowing snow that wasn’t there, but could be!

“We’re tired of dust on our cars and muddy creeks caused by nearby farming.”

“Don’t those city folks understand that we can’t avoid making some dust when we farm?”

“I hate to think that those chemicals that farmers use are blowing or washing into our community.”

“You know what? The water that comes out of towns contains more insecticides and fertilizers than we farmers put in the water!”

This is a conversation one might hear from community dwellers and their farming neighbors. It involves problems that arise in the agriculture/community interface — where farming “meets” town and conflicting interests are common. Actually, there are no rights or wrongs in this scenario. Both the town and the farms are essential. Whether the problems are real or perceived does not matter. The conflict is real. What is needed is a mutually acceptable solution. One solution might involve strategically placed agroforestry practices around and near the communities to buffer the concern.

The National Agroforestry Center has a project called “Working Trees for Communities” (WTC) that uses agroforestry practices targeted to benefit rural communities and farms in the agriculture/community interface. These practices can solve local natural resource problems like those mentioned in the above scenarios. WTC applies rural agroforestry practices near rural communities. The WTC project is patterned after the successful Working Trees for Agriculture (WTA) project that is designed to assist the sustainable agriculture movement. The only difference between the projects is that WTC practices are altered to meet the special needs of rural towns to make the

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“Working trees will work for only room and board. In fact, most working trees pay their own way. They just require a little space, some light maintenance, and a little water and nutrients.”

—Jerry Bratton

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Working trees have soil to protect, wildlife to house, water and air to cool and clean, snow to control, wind to moderate, and energy to conserve.

practices more “community friendly.” Working trees are more than “just another pretty face.” Although they do add beauty, working trees have a job to do. There are many opportunities for putting trees to work. They have soil to protect, wildlife to shelter, water and air to cool and clean, snow to control, wind to moderate, and energy to conserve.

Working trees will work for only room and board. In fact, most working trees pay their own way. They just require a little space, some light maintenance, and a little water and nutrients. Properly designed and located, working tree practices will give many years of faithful service.

Working trees can heal natural resource disorders associated with community environments. They can be a front line defense, cushioning problems between communities and associated agricultural enterprises. And, they can be the last line of defense, keeping pollutants from entering streams and rivers. Properly designed and located, working tree practices can:

- Manage blowing snow. Living snowfences (LSF) can be designed to protect entrances and exits to communities. They can be located at the fringes of small towns to protect entire communities. Of major importance, LSF’s can provide protection to roads leading to and from emergency services such as hospitals, fire houses, and police stations.

- Filter water. Riparian buffer strips should be located along waterways so that the tree root systems can help filter pollutants from water before they reach the stream or lake. They can also be placed near well heads to protect both surface and ground water.

- Moderate both hot summer or cold winter winds. Community windbreaks can be designed to protect entire communities or individual activity areas (ball fields, golf courses, shopping centers, etc.) from adverse winds.

- Control dust and noise. Tree buffers can be used to control dust along roads or near farm fields. They also provide protection from excess noise. Up to a ten-decibel decrease in noise levels can be realized from properly designed noise buffers.

- Heal eroding streambanks. Streambank bioengineering practices can be applied to stabilize eroding streambanks.
Applying Buffers at the Agriculture/Community Interface

Trees located in between a community and adjacent agricultural lands, the agriculture/community interface, play an increasingly important role as rural farmlands and ranches are encroached upon by expanding urban populations for housing, business, and industrial construction. These strategically located “working trees” serve as a “living buffer,” the front-line defense for both rural and urban residents against contaminated water and air, blowing snow and dust, noise, and wind. They also help to reduce flood damage, decrease nonpoint source pollution, and reduce problems associated with municipal landfills.

The goal is to protect natural resources and at the same time make communities productive, profitable, stable, and sustainable for future generations. Working tree technologies appropriate for the agricultural/community interface include windbreaks, plantations for municipal wastewater disposal, living snowfences for snow management, windbreaks for schools and recreational areas, and riparian buffers/soil bioengineering to stabilize streambanks and reduce flood damage. Other practices include sound barriers, landfill cover, visual screening, and wildlife habitat.

As funding grows ever more competitive, shade and beauty alone are not enough to justify the planting and care of community trees. Trees and shrubs must be put to work and pay their way -- by providing economic, conservation, environmental, and social services to create more sustainable communities. As we do this, it could mean a whole new cadre of support for community forestry. Each of the technologies previously mentioned is discussed more thoroughly in the following examples.

Community Windbreaks

Rows of trees improve community environments for both work and play. Windspeed can be reduced by more than 50 percent, making being outdoors more comfortable. Windbreaks can buffer both cold winter winds and hot summer winds. They can modify environments around hospitals, schools, homes, recreation areas, parking lots, and industrial parks, creating more pleasant living and working areas.

Take for example, Woodward State Hospital and School in Woodward, Iowa. Over 362 full-time mentally and physically handicapped residents and about 800 full-time local employees have benefitted from the renovation and expansion of a declining two-row windbreak around their facility.

The hospital is located on 80+ acres of ground and is the largest employer in the area. It contains local industry, classrooms, and living quarters for employees and patients. In 1993, a struggling two-row honeysuckle windbreak was expanded. Two rows of eastern red cedar and one row of a norway spruce/white pine combination were added.

One of the things that John Walkowiak, Urban Forester with the Iowa Department of Natural Resources, really likes about the project is its large size. He says that the grounds are like a community within a community and in order to expand the windbreak, the facility gave up approximately 11 acres of high-quality farmland. The break now stretches 2 1/2 miles around the entire facility and added much needed density and height to the existing windbreak.

The windbreak provides wind and snow protection, beautifies the landscape, and increases wildlife habitat for the hospital. It aids in reducing utility bills, conserving energy, and lowering snow removal costs. The maintenance is primarily supplied by the normal grounds crew but involves some of the residents that are physically capable of volunteering.

Municipal Wastewater Disposal

Strategically located blocks of trees near wastewater treatment facilities can replace traditional, costly treatment plants. The trees, usually hybrid poplar, are treated with sprinkler-irrigated wastewater. Poplars are used because of their fast uptake ability. The soil is monitored for moisture level to make sure that the trees take up all of the moisture and that no leaching into ground water occurs. The cost of establishing the tree system...
Schools and Recreational Areas

Working trees planted around recreation areas like parks, picnic areas, ball fields, and golf courses, block the wind and provide shade, helping to create a more pleasant atmosphere. This naturally improves wildlife habitat and adds recreational opportunities such as birdwatching, hiking, biking, and nature walks. Working trees in this setting also provide perfect environmental education sites!

Conrad, Montana grade school students have a windbreak planted around their school that doubles as an outdoor laboratory. In the spring of 1993 students were involved with the development, budget, choosing tree species, landscape design, and planting. They continue to maintain the windbreak. When mature, the windbreak will not only protect the schoolgrounds and foster environmental education but will lower fuel costs and serve as a home for wildlife.

Ruth Carlstrom, Coordinator of Programs for the Gifted and Talented at the Conrad School District said that “the kids contin-

Snow Management

Rows of trees and/or shrubs near access roads and emergency routes reduce dangerous crosswinds, trap blowing snow, lower snow removal costs, and increase driving safety. Living snowfences can also be designed to provide and enhance recreational opportunities. For example, hiking and biking trails can be incorporated in between rows of trees, and berry-producing shrubs added to the design will improve songbird and wildlife habitat.

The winter of 1996-97 will be remembered for a long time in North Dakota. Some of the statistics include: seven deaths attributed to winter conditions; $4.7 million federal dollars were spent on snow removal on state roads; $1.2 million was spent by the National Guard opening county roads; parts of the interstate system was blocked on seven occasions for a total of 2-3 weeks. According to Ed Ryen, Assistant Maintenance Engineer for the North Dakota department of Transportation, just east of Bismarck are two interchanges that remained open all winter “only normal snow plowing was needed to get a clear road surface.” In each of these instances, just northwest of the interchange was a quarter section of cropland that was protected with a series of single-row field windbreaks oriented in a north-south direction. Any drifts created by the trees were held in the fields where they caused no problems for the roads. In the eastern part of the state there are many miles of mature multiple row windbreaks. According to Ryen, these windbreaks provided “an oasis of clear road in the midst of blinding ground blizzards. It was obvious when one drove out from behind the windbreak; it was impossible to see the road.”

Fields on the windward side of roads, like this example, help keep roadways clear from drifting snow.

Windbreaks around schools and recreational areas like this high school in Merna, Nebraska, block cold wind in the winter and provide shade in the summer. They naturally provide wildlife habitat and add recreational and educational opportunities.
Nelson says that basically these windbreaks, usually on the north and west sides of town, protect the community in much the same way a field windbreak protects a crop or pasture or a farmstead windbreak protects a homestead. This example illustrates a real need for buffers in the agriculture/community interface.

Natural resources professionals from state and national levels are working just as hard to deal with the interface problems too.

Greg Sundstrom, a state staff forester in Colorado agrees that issues of the interface are best addressed locally, but that assistance and cooperation through all levels is necessary to support grassroots efforts.

“There are instances where public health and safety or other impacts are huge enough that those directly involved do not have the resources to deal with the need, issue, or problem,” Sundstrom said, noting that convincing landowners that there is a solution is often times difficult to do.

“Regulations involving pesticides and trash dumping are examples of outside involvement. Cost-share programs are often necessary to implement practices which are for the common good.

“There are also some communities so large that the agricultural sector has a very small voice within them,” Sundstrom said. “Higher level groups representing agricultural interests are often needed to speak for agriculture in more urban settings.”

Debra Bogar, the northeastern representative of the National Association of Conservation Districts (NACD) agrees that her work is most effective when the landowners and communities get involved.

“There are all types of issues in the urban-agricultural interface and just as many ways to address them,” Bogar said. “That’s why we believe they are best addressed locally with public and private assistance.”

It is apparent that realizing problems at the agriculture/community interface is mostly in the hands of local residents. Ultimately, cooperation between these local residents and agencies at all levels is the key to finding solutions.

banks. The erosion from communities is often intensified by excessive runoff from acres of paved roads, parking lots, and roof tops. Bioengineering works well in combination with riparian buffer strips.

Buffer agriculture/community interface. All of the buffers listed above can be located between communities and nearby agricultural activities to cushion noise, dust, chemical use, etc. problems between conflicting land uses. They can be designed to protect both the community and/or agricultural land use.

By the year 2,000, it’s projected that more than 80 percent of Americans will live in urban environments. Because land in these communities will be in great demand, these environments will probably place a higher value on land economics than on natural resource management. The result in these urbanized areas is that: 1) natural systems will have difficulty maintaining ecological functions that are essential to society; 2) there will be a greater need to carefully plan natural resource management activities than ever before; 3) it will be important to consider the impact of adjacent land use on communities and conversely, community land uses on adjacent lands; and 4) communities will need to look beyond their immediate borders and consider watershed or landscape-level management opportunities, thereby becoming involved with rural land management counterparts.

The main idea behind WTC is to provide cost-effective, environmentally-friendly, aesthetically-pleasing, working tree practices that promote natural resource conservation, encourage sustainable communities, enhance natural and human environments, and catalyze cooperation. The WTC concept is even more applicable when one looks at opportunities from the watershed or landscape level. WTC practices fit well into watershed-level land management systems that promote natural resource conservation.

For agencies, groups, or individuals looking for an answer to healing natural resource wounds, preventing future problems, and creating goodwill between community and rural land managers, developing a WTC project may just be the answer.

Midwest Agroforestry Workshop

Visioning, information, sharing, communication, understanding, challenging, dreaming are all terms that describe the Midwest Agroforestry Workshop. Nearly 80 people from Illinois, Indiana, Iowa, Michigan, Minnesota, Missouri, Ohio, and Wisconsin gathered June 11-13 at Purdue University in West Lafayette, Indiana. The participant’s goals were to increase their level of understanding of the economic and environmental benefits of agroforestry, and to begin networking to facilitate agroforestry technology development and transfer in the Midwest.

The workshop presentations focused on five areas: definition, why we are interested, history, current examples, and future directions.

Dr. Gene Garrett, University of Missouri, covered the principles of agroforestry: that it is intentional, intensive, integrated, and interactive. As practiced in the US today, agroforestry can be categorized into five types of practices: windbreaks, alley cropping, silvopasture, riparian buffer strips, and forest farming.

Garrett also said that in 1975 no one listened to agroforestry concepts. It was like playing the “stupid song” trying to sell agroforestry to farmers. By 1997 we’ve progressed light years.

As we produce more research, we need to engage in technology transfer. Sandra Hodge, University of Missouri, encouraged participants to form partnerships. Agroforestry development doesn’t stop with knowing the practices, she said. We need technology transfer to get people to use them.

Agroforestry has the potential to revolutionize American agriculture. The Midwest Agroforestry Workshop was a step forward into a future that will change agriculture economically,
ue to be proud to be a part of improving their school grounds and
the environment as a whole.” Besides the fact that the school is
located near a farming community and the windbreak is almost a
necessity because of fierce Montana winds, she is excited about
the hands-on experience that the outdoor lab gives the children.

**Landfill Stabilization**

The goal of landfill stabilization practices is to grow a renew-
able crop, such as poplar fiber for paper production or fuel, while
at the same time sustain an ecosystem that stabilizes soil, pro-
vides wildlife habitat, uptakes nitrates and phosphorus, reduces
wind velocities, and contributes to local aesthetics.

The Lakeside Reclamation Landfill, near Beaverton, Oregon,
binders the Tualatin River. The landfill has been receiving atten-
tion lately due to conflicting requirements among agriculture,
industry, potable water, and wildlife interests. The landfill occu-
pies approximately 60 acres and is designated as a limited use
landfill. Wastes buried at this site are not putrescible nor are they
listed on the EPA hazardous substances list.

A concept called the Ecolotree Buffer Strip was selected as a
management technique for the landfill. Approximately 7,000
five-foot cuttings from selected poplar hybrids were planted in
three-foot deep trenches. The tree planting area is covered with a
thick mulch of recycled shredded yard debris. Moisture percolat-
ing through the landfill will be minimized by the high water
uptake rate of the deep-rooted trees. Soil moisture that might
leave the site will have to pass through the high-density root
mass and receive biofiltration of nutrients and organic com-
ounds. Meters were installed to collect water samples and mea-
sure water content in the soils.

The Ecolotree buffer strip has elicited many favorable reac-
tions from the owner, regulators, and the consultant. The Oregon
Department of Environmental Quality will be monitoring data
collected from the cover cap prototype area to determine whether
it is environmentally sound to have a living treatment system on
a closed landfill. Howard Grabhorn, Lakeside’s owner says
“growing renewable resources with agriculture on a landfill cap
is better for the environment than permanently removing this 60
acres from production by covering it with a synthetic membrane.
The membrane leaches but requires considerable nonrenewable
resources to manufacture and is nonbiodegradable. A tree farm
of high-density, deep-rooted, fast-growing poplars also mini-
mizes keachate but produces fuel, fiber, and oxygen on a sustain-
able basis.”

**Riparian Zone Management and Soil Bioengineering**

Natural or re-established streamside forests comprised of
trees, shrubs, and grasses filter surface and shallow subsurface
water pollutants before they enter streams and rivers. Riparian
zones also help control bank erosion, protect and enhance aquat-
ic envirionments, provide wildlife habitat and recreational sites,
and increase biodiversity.

When a streambank is caving in, soil bioengineering tech-
niques may be used to repair it. Bioengineering creates a stable
streambank covered with tree/shrub/grass plantings, and is an
effective alternative to structures. It is often used in combination
with riparian buffer strips alongside the streambank to provide an
effective and attractive streamside buffer zone.

A streambank stabilization demonstration project was
installed along Sny Magill Creek in Northeast Iowa in the spring
of 1995. Sny Magill is managed as a trout stream by the Iowa
Department of Natural Resources and soil bioengineering was an
appropriate alternative to stabilize the banks, reducing the sedi-
ment load in the stream, and provide shade and wildlife habitat.
Even though the site was hit by a grasshopper infestation and
some beaver activity, it is still functioning as designed.

After installing a soil bioengineering streambank protection
demonstration project on Sny Magill Creek, many landowners
and agency personnel have become aware and interested in
implementing this environmentally sensitive alternative.

Jeff Tisl, Sny Magill HUA Project Coordinator in Elkader,
Iowa, says “there is a lot of excitement from landowners about
soil bioengineering stabilization. They look at it as something
they can do themselves to help solve problems. They don’t need
big budgets or help from the government.” However, Jeff cau-
tions that maintenance is the key. If the landowner isn’t willing
to maintain the plantings after establishment they shouldn’t

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**When a streambank is severely eroded, soil bioengineering tech-
niques can be used to repair it. Here a six-month old
bruslayer/geogrid planting is established. Bioengineering is often
used in combination with riparian buffer strips which provides an
effective and attractive streamside buffer zone.**
September 13-14, 1997  

September 17-20  

November 2-5, 1997  
National Urban Conservation Conference, Columbus, Ohio, contact: Karl Otte, 703-440-8611.

January 26-28, 1998  

The National Arbor Day Foundation has asked for our help in nominating outstanding landowners who do an exceptional job of carrying out the practices we recommend, from windbreaks to forest farming. These folks will be considered for NADF’s Stewardship Award, to be presented next April. Please contact us for a copy of the NADF Awards brochure containing information for the submission of nominations. Thanks!

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Mission
The National Agroforestry Center (NAC) is a partnership of the USDA Forest Service 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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