

A Geography of Hope



United States
Department of
Agriculture

Natural
Resources
Conservation
Service

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Tim McCabe, ARS, NRCS
Jack Dykinga, ARS
Ron Nichols, NRCS
Mike Anderson, NRCS

America's Private Land

A Geography of Hope



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A Conservation Legacy

Our Nation faces a challenge that will become increasingly important in the next millennium: How will we maintain the health of privately owned land, the “working land” on which our country’s economic and environmental well-being depends?

In my view, our next great environmental goal is conserving our private land. To achieve this goal, we must accept stewardship on private land as a shared responsibility between public and private interests. The public funds we spend for private land conservation is one of our government’s wisest investments, achieving multiple conservation benefits from modest expenditures on research, technical and financial assistance, and targeted land retirement.

Conservation is not just the purview of landowners or of Federal, state, or local government. In reality, we will meet our goals for conservation on private land only if there is a national commitment to building effective public and private partnerships.

I congratulate farmers, ranchers, and other landowners for their conservation accomplishments in recent years. But we have not solved all conservation problems on private land.

Soil erosion exceeds the level at which agricultural production can be sustained on some soils, and urban and suburban growth continues to exacerbate the competition for water in many parts of the country. Elsewhere, the protection of biological diversity requires attention. Drinking water quality problems persist at certain locations as well. But there is every reason for hope, as this publication so graphically points out.

Fifty years from now, few will remember the arcane details of the farm programs that have been traditionally the mainstay of this Department. People will, however, remember whether we had a commitment to preserve our natural resources to ensure the sustainability of our food supply. That’s the commitment we have undertaken, that is laid out in the pages that follow, and the heart of the legacy for which I want to be remembered.



Dan Glickman

Secretary of Agriculture

We know now that we can produce abundant food and fiber without ruining the Earth. In fact, environmentally sound farming can help preserve the system that connects us all with everything else.



Richard Rominger
Deputy Secretary of Agriculture

A Geography of Hope

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FOREWORD

Author and historian Wallace Stegner once wrote that the preservation of our Nation's last tracts of wildlands represented a "geography of hope." Stegner was right, and thanks to him and others who pressed for passage of the Wilderness Act of 1964, we can enjoy a national system of wildlands. Yet today we understand that narrowly circumscribed areas of natural beauty and protected land alone cannot provide the quality of environment that people need and want. We must also recognize the needs of America's private land and private landowners for us to truly have a geography of *hope*...

...*hope* that we can build economically and environmentally sustainable communities for ourselves and for our children,

...*hope* that we and our children and their children will retain the opportunity to renew ourselves and our spirits among that which remains wild and free, and

...*hope* for so much of the life with which we share this Earth.

As we approach the next millennium, we must rededicate our efforts to conserve the land. We still live in a beautiful,

largely natural world, but that world is increasingly characterized by accelerated change. World population growth and our urge to live richly are exerting unprecedented pressures on our soil, air, water, and other natural resources. Without intending to do so, we continue to push nonhuman life into ever-smaller places. Today, we run the risk of those places eventually becoming mere islands on a domesticated landscape.

If Stegner were with us today, he likely would agree: A land comprised of wilderness islands at one extreme and urban islands at the other, with vast food and fiber factories in between, does not constitute a geography of hope. But private land need not be devoted to a single-purpose enterprise. With a broader understanding of land and our place within the landscape, our Nation's farms, ranches, and private forest land can and do serve the multiple functions that we and all other life depend upon.

The farm on which my wife, my children, and I have lived and worked for the past 23 years is one example of how private land can function. We are but one of the 2 million farms and ranches that comprise much of the private land in America.



Larry Lefever / Grant Heilman Photography

We produce traditional commodities for the marketplace: corn, soybeans, oats, hay, milk, beef, mutton and wool, Christmas trees, and hardwood sawlogs. Elsewhere across the country, the crops vary, but the concept does not. Commodities for the marketplace are what our Nation's farms, ranches, and other private enterprises are about.

But private land is about much more than this. The foundation of our farm's productivity is our soil, a complex, living system that, although largely unrecognized as important in our national environmental policies, is in fact the basis of all life. If we farm our soil well, its productivity will be sustained by recycling what was once living into new life.

Soil on our farm harbors a host of microorganisms that perform an array of functions that sustain life. Soil also buffers the multitude of foreign substances our industrial society releases into our environment. If we farm well, healthy soil will help to process those wastes, although agricultural land alone cannot possibly offset the need for less-polluting urban and industrial activities.

Most water that we use falls first on our Nation's farms and ranches, where it is partitioned by soil into surface water, groundwater, and vapor that reenters the atmosphere through plants. If we manage our soil well, water will be used efficiently. By the time it leaves our farm, heading downstream to support our urban neighbors and other life, it will be clean.

Soil on our farm is also a critical component of the carbon cycle. In this era of accelerated fossil fuel use, our soil, if farmed well, can sequester carbon, thus helping to stabilize global climate.

Our farm, like all private land, is not only our home place but the home place of many plants and animals that inhabit this Earth with us. They are a part of creation and thus deserve our

respect. If we farm well, we can continue to coexist with this rich array of life. Wilderness sanctuaries need not be the only home place for "noneconomic" species. Every farm and ranch and private woodlot in our Nation can and should be home to abundant wild life.

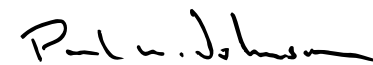
Our farm, our neighbors' farms, and all other private land comprise a majority of the American landscape. As we use our land, we paint our individual and community portraits on the land. Done well, those portraits can be a source of pride.

The story that follows is our attempt to present to you the state of America's private, nonurban land, but it is intended to be more than a national report card. We hope it prompts you to think about land in a different way.

Private land in America produces abundant food and fiber. It does much more, however. Private land represents many rich, diverse places, full of life. Those places, when healthy, function in ways essential to the sustenance of all creatures on this Earth, including humankind.

It should become obvious in reading this story that healthy, productive land does not simply happen. A good deal of thought, work, and conservation assistance—both technical and financial—are often requisite to success.

America's farmers, ranchers, and woodlot owners work hard to produce multiple benefits from the land. If our Nation and those landowners are willing to partner together, we in the Natural Resources Conservation Service believe that America's private land, along with public land, can become our Nation's real geography of hope.



Paul W. Johnson, Chief

Introduction

Grant Heilman Photography



Larry Lefever / Grant Heilman Photography

America's *Private Land, A Geography of Hope* is a call to action—a call to renew our national commitment to America's private land and private landowners. In 1935, this Nation made an historic commitment to the stewardship of private land in the Soil Conservation Act. That Act, passed in the depths of the Dust Bowl, recognized that the long-term welfare of all Americans rested in the hands of farmers and ranchers struggling to keep their land from eroding away.

At that time, many of us were tied to the land, as farmers, ranchers, or in the local businesses and industries that supported those working the land. Most citizens understood and identified with life on the land and in rural America. Their stake in the welfare of the land and those who worked the land was clear.

As we approach the end of this century, our relationship to the land has changed. Few people now live or work on farms and ranches. Far more live in cities and suburbs. Many of us have lost what author Wallace Stegner called our “sense of place”—that intangible bond between ourselves and the natural world around us.

What happens on the land, however, remains crucial to our economic and environmental well-being, even if we never set foot on a farm or ranch. Our connection to the land is there every time we buy a loaf of bread, or turn on the tap for a cool drink of water, or admire a flock of geese heading south in the fall. Many of us may have lost our sense of place, but none of us has lost our dependence on place.

What the Land Produces

We may have become an urban nation, but we remain an agricultural land. Nearly 70 percent of the United States, exclusive of Alaska, is held in private ownership by millions of individuals. Fifty percent of the United States, 907 million acres, is cropland, pastureland, and rangeland owned and managed by farmers and ranchers and their families. The responsibility for stewardship of this land lies in the hands of about 4.7 million individuals. This means that the care of 50 percent of the United States is in the hands of less than 2 percent of our citizens.

We rely on these fellow citizens and neighbors to produce the food and fiber we need. And they are exceedingly good at doing so. Today, each acre of cropland produces nearly 3 times what was produced on the same acre in 1935. This dramatic productivity increase has made food prices lower for Americans than they are for citizens of any other industrial country. Exports of agricultural commodities reached \$56 billion in 1995, 7 percent of our export total that year.

Through their care and stewardship of the land, farmers and ranchers produce safe drinking water, clear-flowing streams, lakes full of fish, skies full of ducks and geese, and scenic landscapes.



But farmers and ranchers produce much more than food and fiber. Through their care and stewardship of the land, farmers and ranchers produce safe drinking water, clear-flowing streams, lakes full of fish, skies full of ducks and geese, and scenic landscapes. We do not buy these commodities in our supermarkets, and their prices are not listed on the Chicago Board of Trade, but we value them just the same.



Grant Helman Photography

From a national perspective, then, our land will be healthy not because of broad public policies and programs but because each landowner will make his or her own individual place healthy.

It is hard to overestimate the importance of farms and ranches in producing these nonmarket environmental goods and services. Nesting success for North American waterfowl has increased by at least a third since 1985, due in large part to farmer and rancher participation in the Conservation Reserve Program. Nearly 88 percent of the water that falls on the United States as rain and snow each year falls on private land before it reaches our lakes and streams and groundwater aquifers. Public awareness of the importance of these environmental amenities is increasing. Today, most Americans support policies and programs to help private landowners conserve natural resources and produce traditional as well as nontraditional products of the land.

The National Commitment To Conservation on Private Land

Early in this century, at the urging of President Theodore Roosevelt and conservationists John Muir and Gifford Pinchot, we had the foresight to set aside America's special places—national parks and forests and, later, wildlife refuges, grasslands, seashores, and wilderness areas. America's public land became a showcase for some of the most dramatic and beautiful landscapes on the North American continent.

But there were others who recognized the importance of America's private land to the health of our Nation. Hugh Hammond Bennett argued that the health of private land required a national commitment to sharing the cost of caring for that land. It took the devastation of the Dust Bowl for his mes-

sage to be accepted. The Soil Conservation Service, predecessor to the Natural Resources Conservation Service, was created in 1935 to help farmers and ranchers care for the land. The Soil Conservation Act of 1935 charged SCS to deliver conservation assistance to farmers, ranchers, and other private landowners.

The national commitment to private land stewardship was then and remains very different than the commitment to the care of public land. Unlike the health of public land, which is the responsibility of a handful of Federal agencies, the health of

private land rests in the hands of millions of individuals, most of whom are inclined to do the right thing. The knowledge, creativity, skill, and commitment to conservation of each landowner thus determines whether most of America's land is healthy. From a national perspective, then, our land will be healthy not because of broad public policies and programs but because each landowner will make his or her own individual place healthy.

A Conservation Success Story: The Driftless Area of the Upper Midwest

The first public forum for the Soil Erosion Service (which became the Soil Conservation Service, then the Natural Resources Conservation Service) was a demonstration project in Coon Valley, Wisconsin. Established in 1933, the project helped local farmers plan conservation measures for their land. SES offered each farmer assistance to install a reorganized system of land use that would conserve soil and thus agriculture, but these systems would also integrate forestry, game, fish, fur, flood-control, scenery, songbirds, and any other pertinent interest.

A 1992 study by SCS concluded that soil erosion on cropland in the area known as the Driftless Area of the upper Mississippi Valley, including Coon Valley, had been nearly 15 tons per acre annually before the demonstration project was established. By 1992, the average annual erosion rate had declined to just over 6 tons per acre. This occurred even though the acreage in row crops—that land expected to have high erosion rates—had nearly doubled, and

the acreage in small grains—normally having lower erosion rates—had declined more than 80 percent. Today, Coon Valley remains a productive agricultural area as a result of the conservation effort initiated more than 60 years ago.

The reasons? Installation of traditional conservation practices, such as stripcropping, contouring, and terracing; a recent surge in the use of no-till and other crop residue management technologies; and enrollment of more than 400,000 acres in the Conservation Reserve Program. Equally important was establishment, by the early 1940s, of local soil conservation districts in the Driftless Area to bring a permanent, local voice to natural resource decisions.

From the perspective of 60 years, we can see how natural resource conservation has helped this area thrive through changing times. The experience in the Driftless Area reinforces the idea that conservation is a continuing responsibility that produces continuing rewards, particularly when multiple interests can act jointly.



Stripcropping, terraces, and management of small woodlots were among the conservation practices applied by the late 1940s throughout much of the Coon Valley demonstration project area.

Time for Renewal

The conservation pioneers of the 1930s did much more than create a Federal agency. They also put in place a remarkable Federal, state, and local governmental partnership for delivering conservation assistance to farmers and ranchers. The Federal Government, Hugh

Bennett and others concluded, could best deliver technical and financial assistance for conservation, while state governments and local conservation districts could more effectively connect with individual landowners and set local priorities for action. That partnership remains a model for intergovernmental cooperation today.

Conservation Districts: The Local Conscience of Conservation

From the outset of Federal involvement in soil and water conservation, national leaders recognized that something was missing: more—and more formal—local involvement and support. The 1935 law that created the Soil Conservation Service foresaw this need and authorized the new agency “to cooperate and enter into agreements with, or to furnish financial or other aid to, any agency, governmental or otherwise....”

Using this authority, U.S. Department of Agriculture officials drafted a Standard State Soil Conservation Districts law, which President Franklin D. Roosevelt sent to state

governors in February 1937. Roosevelt urged the states to pass laws based on this model, stating that “to supplement the Federal programs, and safeguard their results, state legislation is needed.” In this new twist on federalism, USDA could sign a memorandum of understanding directly with the local conservation districts thus created.

Later that same year, the North Carolina State Conservation Commission was formed, as was the Nation’s first conservation district in Anson County, Hugh Hammond Bennett’s home county. The conservation district movement spread rapidly. Within a few years, more than half of the Nation had been organized into districts, and today, districts—variously known as soil conservation districts, soil and water conservation districts, natural resource conservation districts, and land conservation committees—are organized through local elections throughout the United States; they now cover nearly all of the Nation’s privately owned land.

From the beginning conservation districts adopted a cooperative approach, drawing on many sources for technical knowledge, financial assistance, and broad-based edu-

cational programs for natural resources conservation and management. Districts serve as a bridge between Federal, state, and local resource management agencies and local land managers, performing a variety of functions and activities in coordinating and implementing state and national programs. Many districts also use their own technical and other capabilities in assisting land managers with natural resource management problems.

Over the past 60 years, conservation districts, state conservation agencies, and NRCS have forged what is widely recognized as a unique and effective partnership. Both by legislation and by agreement between USDA and states, NRCS provides technical services to land users through conservation districts. Each conservation district in the Nation has signed a memorandum of understanding with the Secretary of Agriculture, but also a supplemental agreement with NRCS that sets forth the basis for working together cooperatively.



Now, six decades later, that conservation partnership faces new and more complex challenges. Despite significant gains by America's farmers and ranchers, particularly over the past decade, soil erosion continues to threaten the productive capacity on nearly 1 of every 3 cropland acres. But new problems are becoming apparent as well, as is the interrelated nature of these problems. Water quality and supply problems confront many communities, and we have grown more concerned about the loss of wildlife habitat and the conservation of biodiversity. The Nation needs to make a firm commitment to share the burden of caring for private land, even more so now than in the 1930s.

But the public financial commitment to conservation assistance has diminished measurably since the 1930s. In 1937, Congress appropriated \$440 million in financial assistance through a new Agricultural Conservation Program and \$23 million in technical assistance through SCS for conservation. Federal financial assistance was based on the premise that the broader public interest was served by sharing the cost of caring for private land. Technical

assistance—helping landowners understand their land and the tools available to manage their land—was just as important as financial assistance to ensure that conservation practices were effective and workable for the landowner.

Today, the public financial commitment for conservation on private land is well below the 1937 level. We would spend \$4.8 billion (in 1996 dollars) to share the cost of conservation today if we were to match the 1937 spending level. Instead, projected spending for conservation assistance on private land each year over the 7 years covered by the 1996 farm bill amounts to

NRCS conservationists help landowners plan and apply effective, profitable conservation measures, including conservation tillage, which reduces soil erosion and increases soil moisture.



about \$2.2 billion, less than half the annual commitment made 60 years ago. Funding for technical assistance has grown since 1937, but even that has declined over the past two decades.

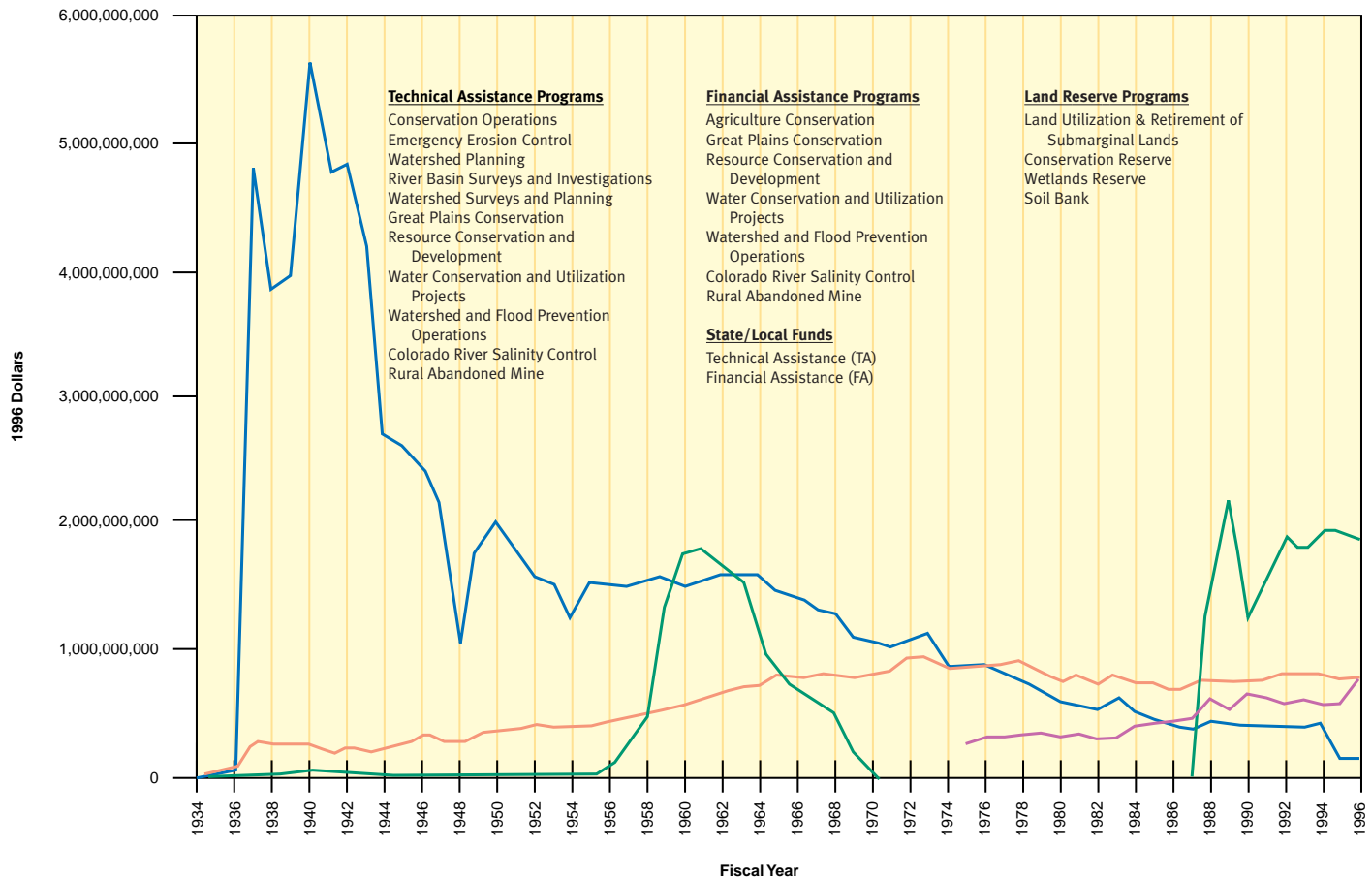
Private land constitutes the single largest portion of our country's landscape. A majority of the Federal commitment to

conservation on private land today is accomplished through the U.S. Department of Agriculture, with annual appropriations of less than \$2 per acre. In contrast, the commitment to protecting and managing public land is the responsibility of a number of agencies, and annual appropriations approach \$10 per acre.

MAJOR U.S. DEPARTMENT OF AGRICULTURE, STATE, AND LOCAL CONSERVATION PROGRAMS, 1934-1996
APPROPRIATIONS FOR TECHNICAL ASSISTANCE, FINANCIAL ASSISTANCE, AND LAND RESERVE
 1996 Constant Dollars

LEGEND

- Technical assistance
- Financial assistance
- Land reserve
- State and local FA & TA



State and local governments, including conservation districts, have added financial and staff resources to the conservation effort on private land in the last 20 years, but even with those contributions, the total falls well short of the need.

That shortfall is frustrating to conservationists—farmers, ranchers, the professionals who serve them, and the public that supports them—who see land abused where it need not be; who see water polluted and watersheds damaged in ways that cost less to prevent than to rectify; who see landscapes that people prize lost—some permanently—for lack of simple care.

Compounding that frustration is the fact that we have tools and technologies today that the conservation pioneers could only have dreamed of in 1937. Conservation tools that keep the soil covered even after tillage and new tools that dramatically increase the efficiency with which fertilizers, pesticides, and irrigation water are applied are making conservation pay off for landowners and the public. Innovative approaches to using plants as engineering tools—working with the land through installation of grassed waterways, riparian buffers, and restoration of stream channels—open up a world of new possibilities to fit conservation onto the landscape and into the bottomlines of farmers and ranchers.

A Call to Action

Our 60-year-old Federal, state, and local conservation partnership remains strong, and the opportunities to work with new partners grows every day. Already there are hundreds of communities trying to work together in one way or another to protect their natural resources. Moreover, public support for conservation and the environment is growing.

...it is time to regain our sense of place and renew our commitment to private land and private landowners.

A 1995 Gallup poll revealed that a majority of citizens supported Federal incentive and assistance programs to conserve natural resources, and a majority of those citizens believed that funding for these activities should remain stable or increase. An NRCS survey of public attitudes toward agriculture and the environment revealed similar opinions. About half of those surveyed believed that society should, at a minimum, share conservation costs equally with landowners. Roughly one-third believed that society should be responsible for the greater share of conservation costs. The survey also showed a substantial preference for increased flexibility and authority for conservation districts and NRCS field staff in developing and implementing conservation solutions based on local conditions.

Clearly, it is time to regain our sense of place and renew our national commitment to private land and private landowners. As we contemplate our challenges in caring for the land, we cannot afford to tell landowners that stewardship is their concern alone. Just as in the Dust Bowl days, we are all in this together, and each of us must respond. The task is enormous and complex. It challenges millions of landowners, thousands of scientifically trained public employees, hundreds of public agencies, and a host of legislators and other public leaders. The task is not impossible, however, if we share a common vision and answer the call to action with a commitment to the future. America's private land will then become a truly integral part of our Nation's geography of hope.

Thinking About Land and People



PhotoDisc

*In a very real sense the land does not lie;
it bears a record of what men write on it.
In a larger sense a nation writes its record on the land.*

— W.C. Lowdermilk
Assistant Chief
Soil Conservation Service, 1953



PhotoDisc

PhotoDisc



Every day, people write their record on the land and read the record left by others. We shape the land, and the land shapes us.

Aldo Leopold talked about this relationship in terms of “reading” the land. “Once you learn to read the land,” Leopold wrote, “I have no fear of what you will do to it, or with it. And I know many pleasant things it will do to you.”

Reading the land accurately is no simple task. Land—soil, water, air, plants, and animals—is a marvelously complex and dynamic system that often changes in ways too subtle to perceive. Through the ages, people solved this challenge by observing land over long periods of time. Generation after generation lived on the same land, applied similar technologies to it, and constructed a history to guide each new generation.

In spending a long time in one place, people developed an intimate understanding of that place. They adapted to its needs and demands while working to shape the land in a way that would sustain them in the future.

Today, we have greatly enlarged the scale of the landscape with which we interact. Agricultural producers manage larger units, which often adds to the variety and complexity of their task. People travel greater distances more frequently. Even when they stay at home, they experience and affect a larger share of the world through electronic communications and economic activities.

The pace of change in our society has accelerated as well. New technologies continuously come on line. Now, instead of spending generations focused on one place and using it in essentially one way, we find ourselves moving from place to place, needing to use new and different tools. Many of those places are unfamiliar, as are the tools.

“Back home” to many Americans is a place they left behind, not where they spend their working days. Obtaining adequate food, water, and shelter for themselves and their families is no longer the challenge of understanding and relating to the land around them. It is instead the challenge of achieving economic success in a world of walls, windows, and the World Wide Web.

With life so greatly changed and daily activities so far removed from any intimate contact with the land, many people



Larry Lefever / Grant Heilman Photography

Land—soil, water, air, plants, and animals—is a marvelously complex and dynamic system that often changes in ways too subtle to perceive.

today still seek assurance that the bond between themselves and the land that supports them remains intact. A sustainable society requires a sustainable environment. One depends upon the other. We are thus challenged to think about the land in new ways and to communicate what we see to people whose

connections to the land are less direct but just as essential. In a world awash in data, statistics, and sound bites, we seek new insight and meaning.

On behalf of the American people, some of whom work the land but most of whom spend their time far removed from the land, NRCS undertakes the challenge of reading the land and reporting on its status, condition, and trends. The agency takes advantage of a wide array of modern, sophisticated tools. The beautiful views of the Earth captured by astronauts from space are replicated millions of times by earth-orbiting satellites, and science allows us to learn more and more from those and other electronic images.

Back on Earth, NRCS scientists sample soils and evaluate soil quality, work with watershed information and water quality reports, and record changes in land use patterns. Studies by public and private institutions alike are brought together to help

paint a picture of the American land. We thus meet the challenge of understanding the world around us in the face of mobile societies, large landscapes, exploding technological change, and growing population pressures by working cooperatively, harnessing science and technology, and expanding our awareness and knowledge together.

An Ecological View of the Land

Today, we have available many indicators of land health. One of the most basic and perhaps least understood is soil quality. Soil supports plant growth and represents the living reservoir that buffers the flows of water, nutrients, and energy through an ecosystem. Most water that people see and use falls first on the land. It then either percolates to the groundwater, runs over the land surface to a stream or lake, or moves laterally through the soil to a surface water body. Whichever the route, the quality of

Watersheds: Areas for Conservation

When water falls on land, during a rain-storm, for example, it flows downhill into drains, ditches, streams, rivers, and other surface water bodies or percolates through the soil to aquifers or other underground waters. All of the land from which water flows into a particular water body is known as that waterway's watershed. Complex natural landscapes and their environmental functions are often best understood when thought of in terms of watersheds.

Watersheds tend to be composed of multiple ecosystems (forests, grassland, wetlands, etc.) and ecotones (transition zones,

such as riparian areas) that are linked by the movement of energy, nutrients, and water through various pathways (groundwater recharge zones, rivers, streams, soil infiltration, etc.). How these pathways function is critical to the health of all the linked systems. Because of these relationships, the watershed becomes a useful area for conservation activities. But in defining an area of conservation interest to be a watershed, one must still recognize that the dynamics of a single watershed are at least in part conditioned by activities surrounding it.

The United States is divided into 18 major drainage areas, 160 principal river basins, and some 2,200 small watersheds, which average 900,000 acres in size. Drainage basins can be quite large (for example, the Chesapeake Bay drainage basin extends from central New York to central Virginia), which makes them inappropriate for local conservation planning and management purposes. But drainage basins can be an appropriate scale for the application of national or regional natural resource management goals that might complement or coordinate local action.

the soil largely determines the water's chemical and biological characteristics and flow dynamics.

Soil quality refers to the capacity of a soil to perform these beneficial functions. A soil's quality is determined by its texture, structure, water-holding capacity, porosity, organic matter content, and depth, among other properties. Because soils naturally vary in their capacity to perform these functions, we must tie our understanding of soil quality to landscapes and land use. A soil with sufficient capacity to support one ecosystem—rangeland, for example—may not be capable of supporting a corn field.

If we are to read the land accurately, we must understand soil quality for two important reasons. First, we must match our use and management of land to soil capability. Improper use of a soil can lead to disappointment and failure, as well as damage to the soil and ecosystem. Second, we must establish baseline

If soil and water are healthy, the ecosystem has an opportunity to remain healthy. If soil and water are unhealthy or deteriorating in quality, the system is probably unsustainable.

understanding about soil quality so we can recognize ongoing trends. If soil quality is stable or improving, we have a good indicator that the ecosystem is sustainable. If soil quality is deteriorating, the larger ecosystem will almost certainly decline with it.

The Know Your Watershed campaign is a national partnership of 50 corporations, conservation groups, commodity growers associations, and Federal agencies, coordinated by the Conservation Technology Information Center. The campaign was formed to encourage formation of 500 locally initiated watershed partnerships by the year 2000. Among its educational products is a video explaining what a watershed is and what the benefits of local partnerships are in achieving community environmental goals within watersheds.

WATERSHED CAMPAIGN MAP



The Know Your Watershed campaign has identified and profiled nearly 700 existing watershed partnerships across the United States. This map shows the distribution of about two-thirds of these partnerships.

Source:
Conservation Technology
Information Center, Know
Your Watershed Campaign,
1996

We must also understand watersheds, which provide a scale that often proves useful in identifying important landscape relationships. Water is the lifeblood of natural systems, and the quantity and quality of water, both surface water and groundwater, provide useful measures of how well those systems are func-

tioning. Where streams and rivers flow clear and clean, the soils, plant and animal communities, and human elements of the system are likely healthy as well.

To read the land accurately, therefore, requires an assessment of soil quality and watershed health. If soil and water are

Sustainability and Agricultural Research

Sustainability simply means that resources should be used to provide for the needs of the present generation without compromising the ability of future generations to meet their own needs. The National Agricultural Research, Extension, and Teaching Policy Act of 1977 identified sustainability in agriculture as a goal of the U.S. agricultural research system. The research system was directed to invest in research that would:

- Satisfy human food and fiber needs.
- **Enhance environmental quality and the natural resource base upon which the agriculture economy depends.**
- **Make the most efficient use of non-renewable natural biological cycles and controls.**
- Sustain the economic viability of farm operations.
- Enhance the quality of life for farmers and society as a whole.

Subsequent agricultural acts elaborated on the goals set out in 1977. The Food Security Act of 1985 contained several significant conservation measures, and more such measures were added in the Food, Agriculture, Conservation, and Trade Act of 1990. The 1990 act stated six specific challenges for the agricultural research system

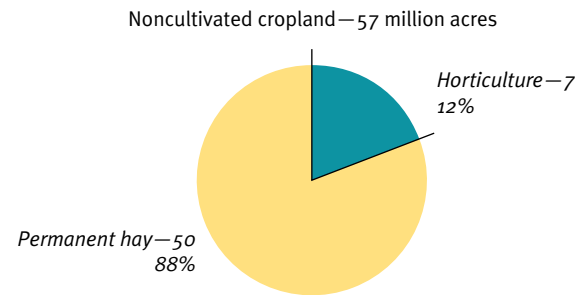
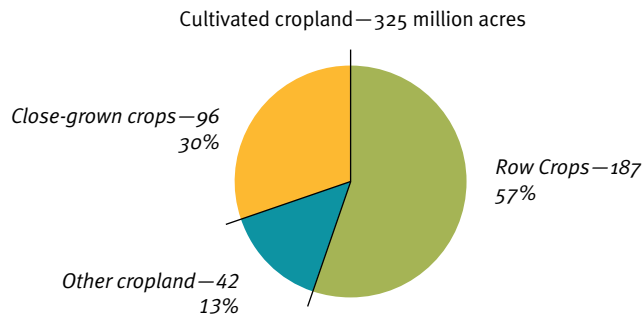
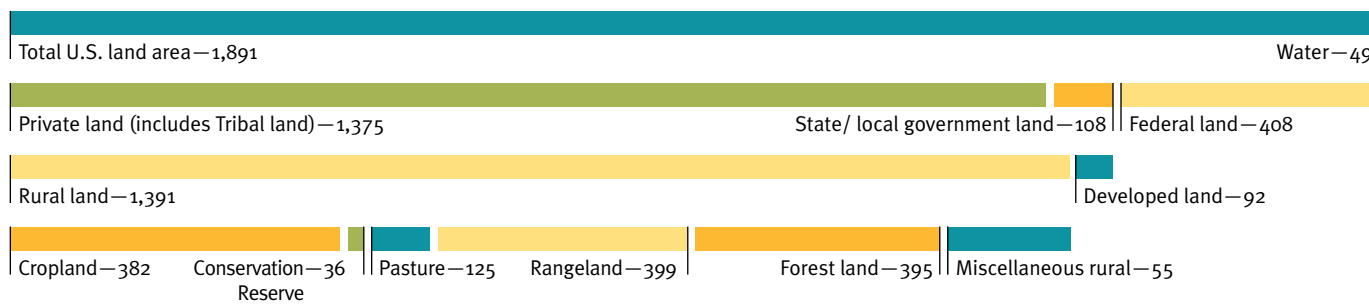
that reflected a blend of the traditional production focus and the concerns about agriculture's connection with environmental and human health and the well-being of rural populations. The newest farm bill (Federal Agriculture Improvement and Reform Act of 1996) expands on these earlier themes, challenging the research system to:

- Increase the long-term productivity of the U.S. agriculture and food industry while maintaining and enhancing the natural resource base on which rural America and the U.S. agricultural economy depend.

- Support agricultural research and extension to promote economic opportunity in rural communities and to meet the increasing demand for information and technology transfer throughout the U.S. agricultural industry.
- Improve the safe production and processing of, and adding of value to, U.S. food and fiber resources using methods that maintain the balance between yield and environmental soundness.



AMERICA'S LAND BASE IN 1992



Millions of acres in the 48 contiguous states, Hawaii, Puerto Rico, and the U.S. Virgin Islands.

Source:
USDA/NRCS National Resources Inventory, 1992

healthy, the ecosystem has an opportunity to remain healthy. If soil and water are unhealthy or deteriorating in quality, the system is probably unsustainable unless these trends are reversed

Agriculture's Impact on the Land

The extent and importance of agriculture in the United States means that we cannot accurately assess the health of our land—read the land—without a special focus on agriculture. Across our expansive and diverse landscape, Americans produce at least two hundred different crops. Amid this diversity, however, four crops—hay, wheat, corn, and soybeans—account for about 80 percent of the acreage planted each year, and livestock production—beef and dairy cattle, poultry, and hogs—accounts for slightly more than half of the total value of all farm sales. Major

fiber products include timber, cotton, wool, and hides. Private, nonindustrial forests—those not owned by companies that also have wood-processing facilities—produce about half the Nation's timber supply.

While some of agriculture's environmental impact can be assessed within an individual field or farm ownership, there is some that cannot. Few farms are large enough to encompass an entire landscape or watershed, and even those farms that are exceptionally large are ecologically linked to neighboring land, including nonagricultural land. Everybody is somebody's neighbor.

The continued dominance of agricultural land use, combined with the growth and dispersal of people into suburban and rural areas, means that the quality of the Nation's environment and the sustained productivity of the land depends more

Everybody is Somebody's Neighbor

Development in formerly rural, agricultural areas is placing increased pressures on watersheds. The growth in developed land and specifically urban and suburban land has natural resource implications far beyond loss of productive agricultural land. With development comes paved surfaces, automobile traffic, and residential chemical use, among others.



WHEN THE SKY FALLS

Even though a watershed may be free of smokestacks, winds may still bring acidic substances from surrounding cities and industries as well as nitrogen from automobile exhaust and phosphorous from windblown soil.

SEPTIC SEEP

Like a full sponge, aging septic drain fields that treat sewage by slow filtration, and overloaded sludge-holding tanks can leak bacteria, nitrate, and liquid poisons into groundwater. Homeowners with septic systems can reduce this risk by pumping tanks regularly and avoid introducing solvents or other potential pollutants into the septic system.



URBAN OOZE

As fields are paved for roads and parking lots, rainfall moves faster off the land. This torrent picks up debris and pollutants and can cause flooding, scour riverbanks, and prevent the slow filtration of water needed to recharge groundwater.

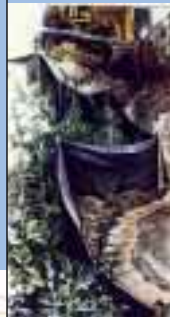


NATURAL FILTERS

Key to a healthy watershed, low-lying wetlands trap runoff and filter its sediments through natural vegetation. Protecting and restoring wetlands offer opportunities to increase the extent of these natural filtration systems.

CONSTRUCTION

Soil erosion from development can be controlled with filter fences and water diversions, or trapped in sediment basins. Protective buffers can be planted or existing waterside vegetation maintained to further reduce sediment loss to nearby streams and rivers.



FORESTS

Logging can cause serious sediment problems for streams. Soil erosion from clear cut slopes and access roads can contribute large amounts of sediment to nearby streams and rivers. Greenways along streams and cutting practices that leave tree roots in the soil can help to trap sediment.

SEDIMENT TRAPS

Large development sites can install sediment traps that catch stormwater and control runoff. Ponds may be two-tiered: one with an impervious lining to settle out sediment and potential pollutants and another that promotes slow infiltration of rainwater into the aquifer. Sediment ponds may also provide habitat for certain waterfowl species.



ON THE FARM

As suburban sprawl intensifies, farm numbers are dwindling in many formerly rural watersheds. Remaining farms can help to protect the watershed by improving pesticide and nutrient management, fencing livestock away from streams, and making use of natural predators in pest control to reduce pesticide use.

LEAFY BUFFERS

Lacking a cushion of wetlands, streams can still be partly shielded from runoff and sediments. Setbacks from lakes and creeks and planting of waterside shrubs and other vegetation can help to trap sediment, slow flow, and provide shade and wildlife habitat.

Art by C. Bruce Morser

Source: Adapted from National Geographic, February 1996.



than ever on how people relate to the land. How America's farmers and ranchers use and manage their land is, therefore, key to producing the nontraditional agricultural commodities that people value and to maintaining healthy, stable landscapes and watersheds. Moreover, the continuing dispersal of urban and suburban residents into rural areas virtually guarantees heightened interest among the newcomers in agriculture's environmental performance.

Some of our society's deepest social and cultural values are tied to land ownership and to the rights and responsibilities associated with private property. Defining and establishing property boundaries have great legal and economic meaning; however, they are seldom ecologically meaningful. Straight lines laid out by surveyors establish rectangular spaces on a complex landscape where most natural boundaries are curved or better defined as transition zones. As such, these established boundaries often divide naturally functioning systems.

Understanding the degree to which agriculture in a region meets the public's needs and expectations for a healthy envi-

ronment, therefore, requires a view that encompasses many ownerships. Each owner's actions are important, not just because they affect that particular piece of land, but also because they affect neighboring land and the health of the larger ecosystems and watersheds in which they occur.

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Larry Lefever / Grant Heilman Photography

Letting Farmland Stay Farmland

Conversion of farmland to nonfarm uses may change land use irreversibly and alter the character of an area. It also may weaken the local agricultural economy. In heavily developed areas, loss of even a few acres of remaining farmland suggests for many the end of a way of life and separation of people from their roots.

Fifteen states, mostly in the Northeast, have enacted laws and appropriated funds to pay farmers willing to keep their land in an agricultural use. Easements stay with the land even after its sale, guaranteeing that farmland stays farmland.

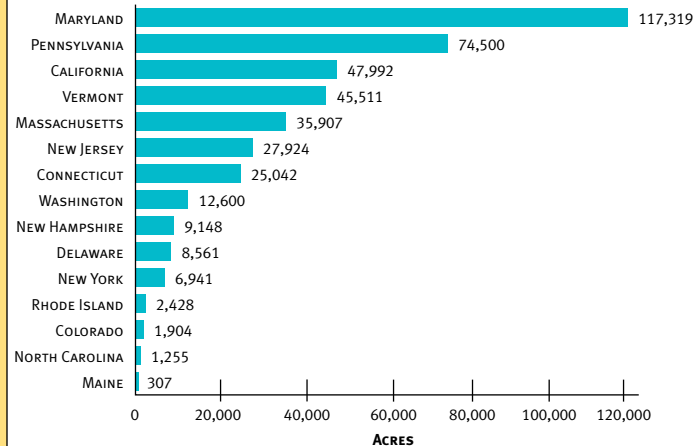
Since the mid-1970s, farmland preservation laws have protected nearly 420,000 acres of farmland at a cost of almost \$730 million—about \$1,750 an acre. Funding for the programs has come mostly from sale of bonds and levy of sales, property, and other taxes. An additional \$195 million was available early in 1996 for

further purchases—\$107 million in New Jersey alone.

Among the leaders in farmland protection are Maryland, which has spent about \$125 million to purchase easements on 117,000 acres of farmland, and Pennsylvania, which has spent more than \$150 million to protect almost 75,000 acres. Massachusetts and New Jersey have each spent more than \$80 million to protect 35,907 acres and 27,924 acres, respectively.

The Federal Agriculture Improvement and Reform Act of 1996 established a Farmland Protection Program with a funding level of \$35 million. The program will help states with farmland protection programs purchase conservation easements. Prior to the end of the 1996 Federal fiscal year, \$15 million were made available under the new program in 17 states through 37 individual programs. An estimated 150 to 200 farms will be signed up under these various programs.

LETTING FARMLAND STAY FARMLAND



Source:
American Farmland Trust, 1996

Ever-Changing Land Use

Use and management of private land change constantly in response to economic, social, and environmental forces. The amount of cropland in the United States has remained essentially the same since the 1920s, for example; but during those intervening decades, changes in agricultural markets, technology, and practice have dramatically affected the location and use of that cropland. Millions of acres of what was once cropland now support forests in the northeastern and southern states.

Mississippi River bottomland forest and Great Plains grassland are cropped instead. Millions of other cropland acres have been converted for residential, business, and industrial uses.

Farm numbers have declined dramatically, and average farm size has increased proportionately. Today, there are about 2 million farms. The number of farms in both the small and large ownership categories has increased, while the number of mid-size farms has dwindled.

This increasing pattern of small ownerships, coupled with rapid population growth in many rural areas, means a dramatic increase in the “edge effect” as urban land uses press into rural ones. Rural homesites and “ranchettes” increasingly mix with prime farm and forest land. The conflicts that develop between rural residents and agriculture make commercial production more expensive and difficult. Increasing taxes, regulations, and land prices often lead farm and forest landowners to give up and sell out.

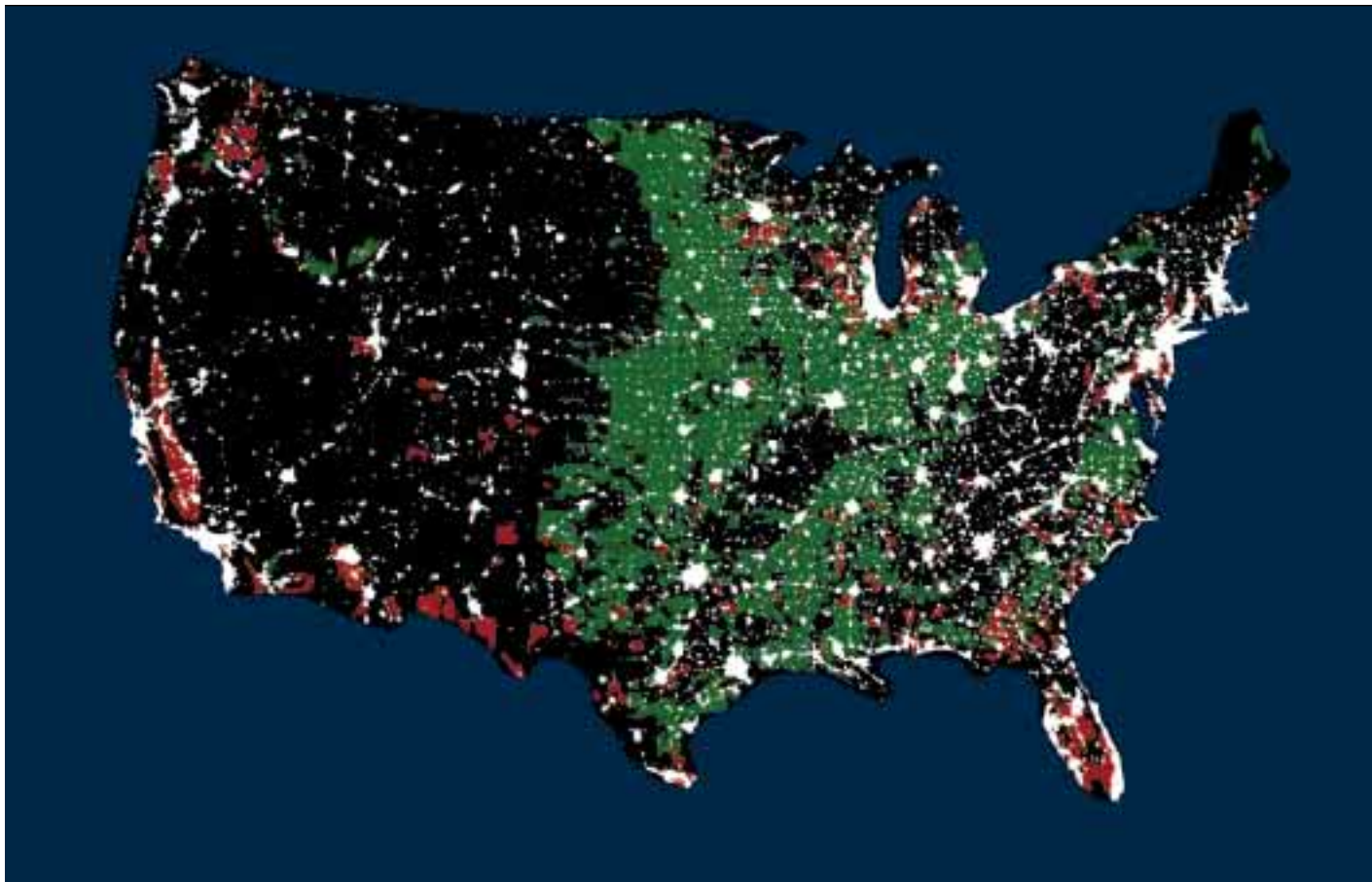
The increasingly complex mix of urban and rural land uses also has natural resource impacts that extend well beyond land use competition. Urbanization brings streets and rooftops that run stormwater directly into drains and drainageways instead of filtering it naturally through the soil. There are new pollutants as well, such as oil leaked from automobiles or chemi-

cals leached from suburban lawns. Watersheds where the maintenance of healthy conditions formerly depended on the land stewardship of a few dozen agricultural managers now often rely on the actions of hundreds of small landowners, making the task of developing effective, cooperative efforts all the more difficult and necessary.

Changes in land use obviously affect the landscape and the environment. The first step in helping to ensure that those

changes are not harmful is to evaluate current land use trends and assess how well the basic natural resources—soil, water, air, plants, and animals—are faring. Good evaluation and assessment enable landowners to use and manage their land within its capabilities.

HIGH QUALITY FARMLAND AND POPULATION SETTLEMENT



High quality farmland includes areas that in 1992 had large amounts (greater than or equal to 25 percent) of prime farmland and large tracts (greater than or equal to 3,000 acres) of unique farmland. Unique farmland is used to grow vegetables and horticultural crops.

LEGEND

- Concentrations of Unique Farmland (minimum 3,000 acres)
- Concentrations of Prime Farmland (minimum 25 percent)
- Populated Areas

Source:
American Farmland Trust and the
Laboratory for Cartography and
Spatial Analysis, Northern Illinois
University, 1996.

Artwork:
Diane Buric