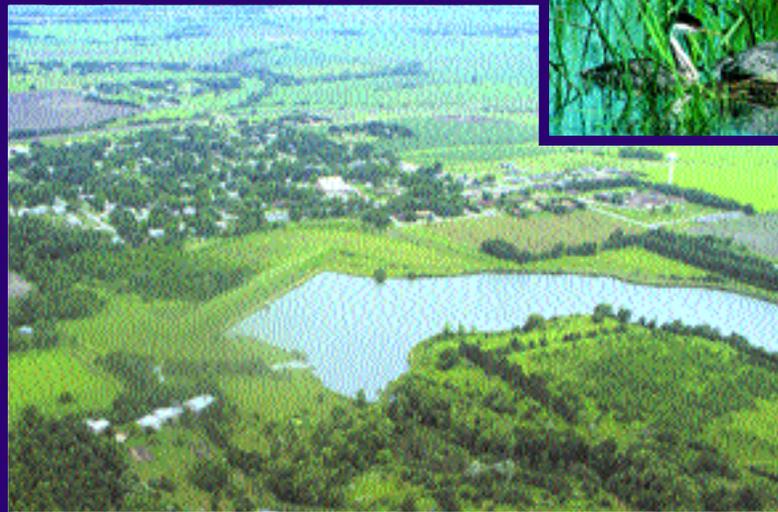
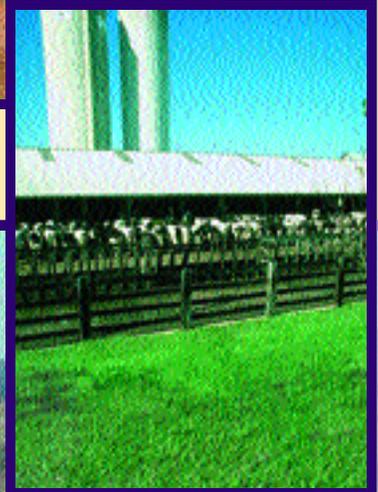
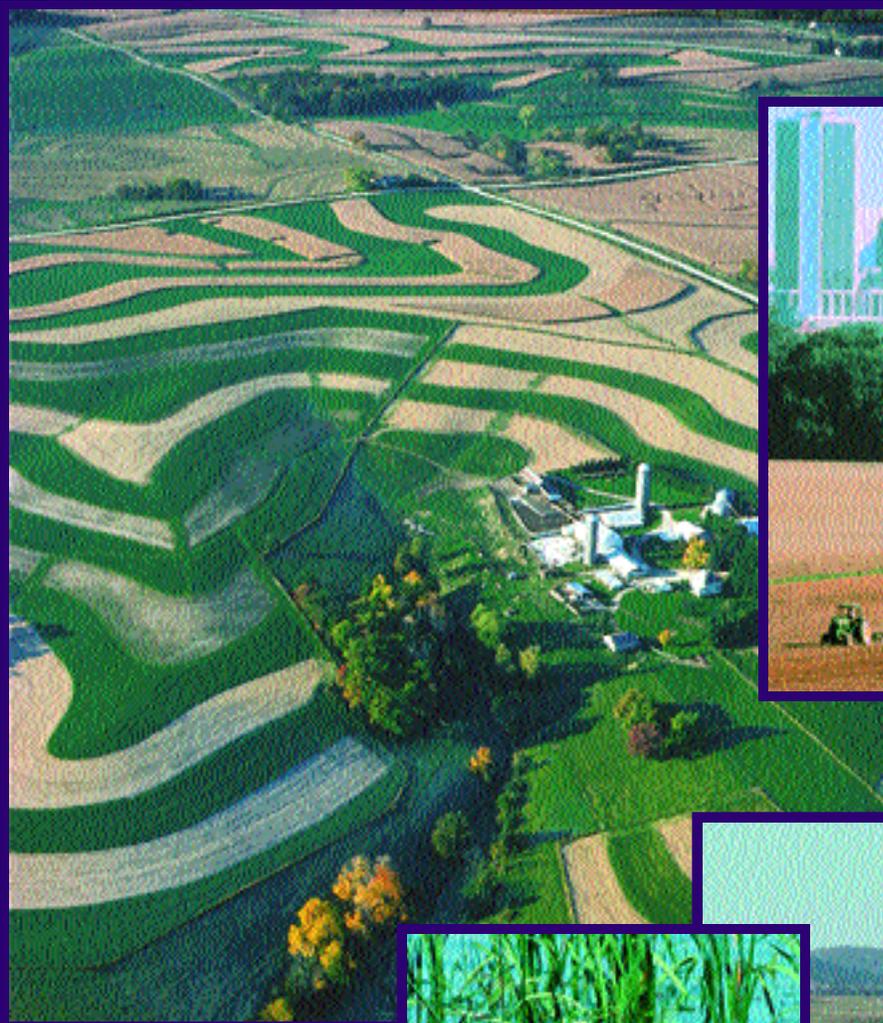


# Interim Appraisal and Analysis of Conservation Alternatives

## Executive Summary



Issued September 2001

This document is a publication of the Natural Resources Conservation Service (NRCS) of the U.S. Department of Agriculture. NRCS works in partnership with the American people to conserve and sustain natural resources on private lands.

NRCS drew from legislative mandates, its own expertise and the work and reports of other federal agencies, local conservation districts and state agriculture and forestry departments to prepare "A Resource Conservation Act Report: Interim Appraisal and Analysis of Conservation Alternatives," upon which this executive summary is based. The agency examined findings from a diverse array of agricultural-related entities, forums and reports, including the National Drought Policy Commission, the Commission on 21st Century Production Agriculture, the Soil and Water Conservation Society, USDA's Policy Advisory Committee and nationwide hearings of the House Agriculture Committee. NRCS also requested comments and information from approximately 60 agricultural and environmental interest groups.

The executive summary and full report are available on the Internet at [www.nhq.nrcs.usda.gov/land/pubs/rca\\_interim.html](http://www.nhq.nrcs.usda.gov/land/pubs/rca_interim.html)

# An RCA Report: Executive Summary

## Introduction

In 1977, Congress passed the Soil and Water Resources Conservation Act. The primary purpose of the Act was to address the importance of conserving soil and water resources on private and other non-federal lands across this country.

In response, USDA formed a national conservation program through an assessment of the condition of and trends in soil, water and related resources and in combination with the findings of other federal agencies, non-federal partners, non-governmental entities and the general public.

Subsequent periodic assessments focused on issues such as the need to reduce excessive soil erosion and agricultural non-point source pollution of water, improve irrigation efficiency to make more effective use of water, reduce upstream flood damages and strengthen conservation partnerships.

Public comments strongly favored linking USDA program benefits with conservation goals. The Department introduced the concept of cross compliance in its 1982 conservation

program, and Congress incorporated cross-compliance provisions for highly erodible lands and wetlands in the 1985 farm bill. Provisions in the 1990 and 1996 farm bills also incorporated conservation priorities.

This document summarizes the findings from “A Resources Conservation Act Report: Interim Appraisal and Analysis of Conservation Alternatives.” The report presents information garnered during 2000 and 2001 from an initial appraisal of soil, water and other resource conditions and trends on private lands in this country. It describes conservation needs that have been identified in recent public policy forums, by regulatory and legal requirements and through the work and reports of local conservation districts, state agriculture and forestry departments and various non-governmental groups interested in agricultural and resource conservation policy.

The full interim report also discusses results of potential conservation initiatives that address many of the conservation needs.

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# An RCA Report: Executive Summary

*Keeping soil and water resources healthy is one of the greatest conservation challenges facing this nation in the foreseeable future.*

## Working lands

Working private lands — cropland, pasture, rangeland and forestland — in this country are the mainstay of U.S. food and fiber production. These lands are important to our nation's security and future prosperity. From these lands, we feed, clothe and house ourselves and millions of other people around the planet.

The United States plays a pivotal role in a world where concerns about food supplies and development of natural resources are becoming increasingly prominent. It is in this country's interests to maintain a strong, dynamic agricultural sector.

Americans count on the stewardship of the people who own and

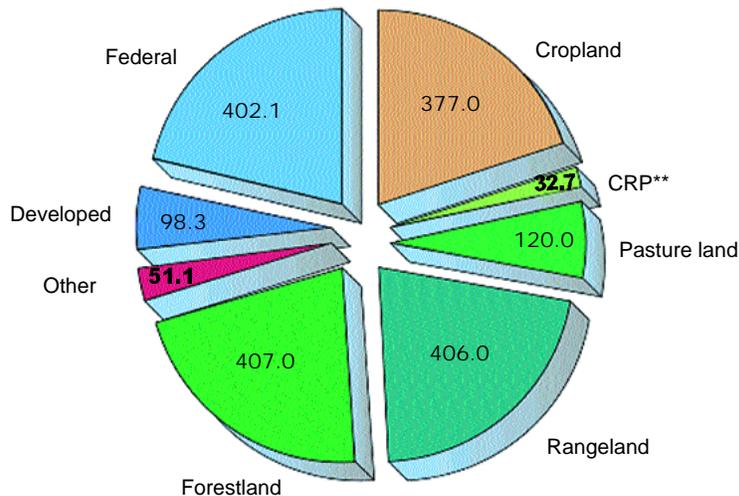
work the land — most of them family farmers and ranchers — to continue producing the safest, most nutritious and abundant food and fiber on Earth.

At the same time, we expect that landowners will protect soil, water and other natural resources. Soil and water — and the way we take care of them — are the basis for successful agriculture. They are also the source of clean air and habitat for thousands of wildlife species. They assure a high quality of life for people who live in rural and urban communities.

These are the attributes that make life as we know it possible. We expect them from the land.

## How the land is used

Millions of Acres\*



\*Non-federal land: 1,491.1 million acres, including conterminous United States, Hawaii, Puerto Rico, and U.S. Virgin Islands.

\*\*Conservation Reserve Program Land

Source: USDA, Natural Resources Conservation Service 1997 National Resources Inventory Revised December 2000

**Almost 1.5 billion acres (about 76 percent) of land in this country outside Alaska are owned by private individuals and state, local and tribal governments. Most of that is “working land” — cropland, pastures, rangeland and private forest tracts.**

# An RCA Report: Executive Summary

## Resource conservation goals

Five broad categories of resource conservation goals emerge from the findings of the interim appraisal and analysis. They address the need to improve soil quality, water quality, efficient use of water and air quality and to conserve prime farmland, wetlands and grazing lands. It will require sufficient conservation technical assistance, education, research, technology transfer and financial incentives to achieve these goals.

### Goal 1. Healthy and productive lands

Analyses of soil resources on non-federal lands indicate that much progress has been made over the past several decades to reduce soil erosion, build up soil organic matter and eliminate excess nitrates and phosphates through alternative soil enhancement and pest management techniques.

As an example, 170 million acres, or 40 percent of all cropland in this country, were eroding at greater than acceptable levels in 1982. By 1997 — after 15 years of applying soil conservation practices — the amount of cropland eroding at unacceptable levels had been reduced to about 108 million acres, or 28 percent of total cropland acreage at that time.

Despite conservation progress, much remains to be done. An estimated 29.9 percent of our cropland is still eroding at rates great enough to have adverse impacts on long-term soil productivity and overall soil and water quality.

Most of the pasture and rangeland acres in this country are more susceptible to degradation than our best cropland. Thus, these grazing lands, like croplands, should be managed to maintain long-term productivity and prevent degradation caused by excessive erosion.

Major recommendations to achieve the goal of healthy and productive lands include, among others: reduce soil erosion to tolerable or acceptable levels on all lands, continue “sodbuster” and conservation compliance provisions, fund USDA’s Environmental Quality Incentives Program at needed levels and increase the allowable acreage in the Conservation Reserve Program.

### Goal 2. Safe and healthy water

Conservation partnerships in water quality projects across the country are helping to reduce the amount of agricultural pollutants that reach water bodies, particularly waters in heavily populated areas where public health may be at risk.

As examples, most local dairy farmers are participating in the Skaneateles Lake Watershed Agricultural Program, which allows Syracuse, New York to boast the second-best drinking water

### Underlying principles of resource conservation goals

- Working private lands — cropland, pastures, rangeland and forestland — are the mainstay of U.S. food and fiber production.
- Conservation is integral to U.S. agricultural policy.
- Conservation is best achieved through voluntary, incentive-based approaches that emphasize partnerships.
- Conservation decisions must
  - respect private property rights
  - be grounded in equity
  - encourage managers to sustain natural resources
  - be based on sound research and technology

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supply in the nation (first are the glacial waters of Anchorage, Alaska). In five West Virginia counties, conservation practices led to a 90-percent reduction in nutrient runoff. And conservation efforts are preventing 4,500 tons of nitrates from entering the Suwannee River Basin in north central Florida every year.

Still, agricultural production continues to contribute to water quality problems. This occurs where soil erosion is excessive, efficient irrigation is not practiced, management of pesticides is inadequate and application of livestock and poultry manures and residuals is excessive. USDA and its conservation partners estimate that

approximately 272,600 agricultural operations will need assistance to develop and implement comprehensive nutrient management plans to maintain a healthy environment and, in some cases, satisfy regulatory requirements.

Major recommendations to achieve the goal of safe and healthy water include, among others: complete and implement compre-

hensive nutrient management plans for agricultural operations, increase the miles of buffers along the nation's waterways and fund USDA's Environmental Quality Incentives Program to improve water quality.

## Goal 3. Water management

Even though the amount of irrigated land in this country grew by about five million acres over the past two decades, the total water applied for irrigation is near the same level as 25 years ago. Farmers who irrigate their crops reduced water use by 4.7 million acre-feet, enough to cover the state of Rhode Island's nearly 700,000 acres with seven feet of water.

This occurred primarily because irrigators adopted more efficient irrigation systems and other water-saving techniques such as precision field leveling, shortened water runs, surge flow and reuse of tail water. The success of these techniques is due in part to continuing research and technology developments that enable more precise water and soil moisture measurements.

Additional progress in relation to water management is needed — certainly to prepare for drought years when competition for water among agricultural, urban and wildlife uses intensifies.

Flooding is also a problem in parts of the country. Over the past several decades, small watershed projects have helped reduce the risks to life and property from floods. But many of the projects are quickly approaching the end of their planned service lives. A recent survey of 22 states revealed that more than 2,200 dams need rehabilitation. Some 650 of these dams, should they fail, pose a threat to public safety for people downstream of the dams.

Major recommendations to achieve the water management goal include, among others: improve technology



*Vegetated buffers build up soil organic matter — the heart of healthy soil — and help prevent sediment, nutrients and some pesticides from entering waterways. They also create habitat for wildlife.*

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related to gathering and dispensing accurate soil moisture data, rehabilitate aging watershed structures, incorporate floodplain easements in conservation planning and practices, incorporate watershed-wide concepts into conservation planning and management, incorporate drought monitoring and assessment data into risk assessments and improve irrigation management.

## Goal 4. Clean air

Agricultural production can be a source of atmospheric pollutants such as particulates (dust-sized pieces of soil minerals, agricultural chemicals and plant and animal organic material) and greenhouse gases such as carbon dioxide, nitrous oxides and methane. In this country, agriculture accounts for about three percent of carbon dioxide, 60 percent of nitrous oxides and 33 percent of methane in the atmosphere.

Farms and ranches may also contribute offensive odors from animal manure and agricultural chemicals. They can feed the processes that drive global climate change, including increased atmospheric carbon dioxide, changing land-use patterns, weed and pest invasions and water availability.

We do not know what the precise impacts of global climate changes — many of them not attributable to agriculture — will ultimately mean to our working lands. Additional research will be key to the answers. What we do know is that well-managed cropland and private forestland have the potential to store carbon, thus removing carbon dioxide, one of the most

pernicious greenhouse gases, from the atmosphere while building soil organic matter — the heart of healthy soil.

Major recommendations to achieve the air quality goal include, among others: enhance the land's ability to sequester carbon and reduce odor, dust and fuel emissions from farm and ranch operations.

## Goal 5. Diverse and resilient landscapes

This nation's private lands account for more than 111 million acres of wetlands, 400 million acres of forestland and 526 million acres of pastures, rangeland and grazing lands. These landscapes, together with prime farmland, play a vital role in agriculture as well as in maintaining environmental benefits such as wildlife habitat, clean water and air and productive soils for the country.

Private pasture and range lands total more acreage than either cropland or private forestland. This means that grazing is the most extensive use on private lands in this country, and it is also a significant use on federal lands. Grazing lands therefore play a major role in regulating water quality and quantity in watersheds across the nation. Conservation practices on



*About one-fifth of this country's prime cropland is within 50 miles of our largest cities and is potentially at risk of development.*

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grazing lands have the potential to pay large dividends in relation to abundant and safe water supplies for many communities, particularly in the arid and semi-arid West.

The effects that agriculture has on soil, water and air quality can be significant, but it is also true that other land uses have important repercussions for agriculture. From 1982 to 1997, for example, the amount of urban and built-up land in this country increased by 26 million acres, an area roughly the size of Ohio. This trend may prove especially detrimental to the nation's best farmland. Roughly one-fifth of this country's 250 million acres of prime cropland can be considered at risk of development because it is within 50 miles of our largest cities. Agriculture cannot compete in the current marketplace for land where, given the brisk

demand for new housing, developers can pay \$30,000 or more per acre.

While we have yet to achieve the national goal of "no net loss" of wetlands, progress is evident — certainly in agriculture. Between 1992 and 1997, conversion of wetlands by agriculture accounted for the loss of 26,800 (+/- 4,500) acres of wetlands per year. This was a significant drop in the agricultural-caused wetland losses of 157,000 acres a year from 1974 to 1983 and 398,000 acres a year from 1954 to 1974.

Fifty-eight percent of this country's forestland is privately owned, and two-thirds of that is in small, non-industrial tracts owned by more than 10 million individuals. Studies show that private forestland is becoming increasingly fragmented as large- and medium-sized forest tracts are subdivided into smaller parcels owned by

more people. It is likely that population increases will lead to greater conversion of forests for development purposes in the future.

On privately owned grazing lands, critical resource concerns include maintenance of plant cover (especially natural cover), the impacts of invasive species and conversion of grasslands to other uses.

Despite these concerns, farmers, ranchers and owners of private forestland who participate in land conservation and reserve programs are helping to maintain or create millions of acres of wildlife habitat. Habitat management

Average annual wetlands loss due to agriculture



\*1954-74 data from Frayer et al. 1983

\*\*1974-83 data from Dahl and Johnson 1991

\*\*\*1992-97 data from NRCS 2000a [1997 NRI, which excludes federal lands]

See bibliography in full report for complete references.

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practices, with USDA technical assistance, were applied on 12.3 million acres in fiscal year 2000 alone. Nearly 1.4 million acres of private land are now enrolled in the Wildlife Habitat Incentives Program. Since 1985, nearly 17 million acres in the Conservation Reserve Program have been planted in cover that is best suited to wildlife. And as of March 2001, almost 1,049,000 acres were enrolled in the Wetlands Reserve Program.

Vegetated conservation buffers on working lands also contribute to

wildlife habitat and help to improve soil, water and air quality.

Major recommendations to achieve the diverse and resilient landscapes goal include, among others: continue "swampbuster" provisions; fund the Wildlife Habitat Incentives Program, Wetlands Reserve Program and Farmland Protection Program at appropriate levels; initiate a new grazing land easement program; and increase technical assistance and financial incentives to owners of private forestland.



*NRCS and its partners have restored more than 700 acres of salt marsh in New Hampshire. The Wetlands Reserve Program provided a significant portion of the funding for this cooperative effort.*

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## Public views

Since the devastating Dust Bowl era, Congress has authorized numerous federal conservation initiatives aimed at maintaining healthy soil, water and related resources. From the inception of the first local conservation district, these initiatives have emphasized locally led conservation partnerships among state, tribal, local and federal governments and the owners of private lands.

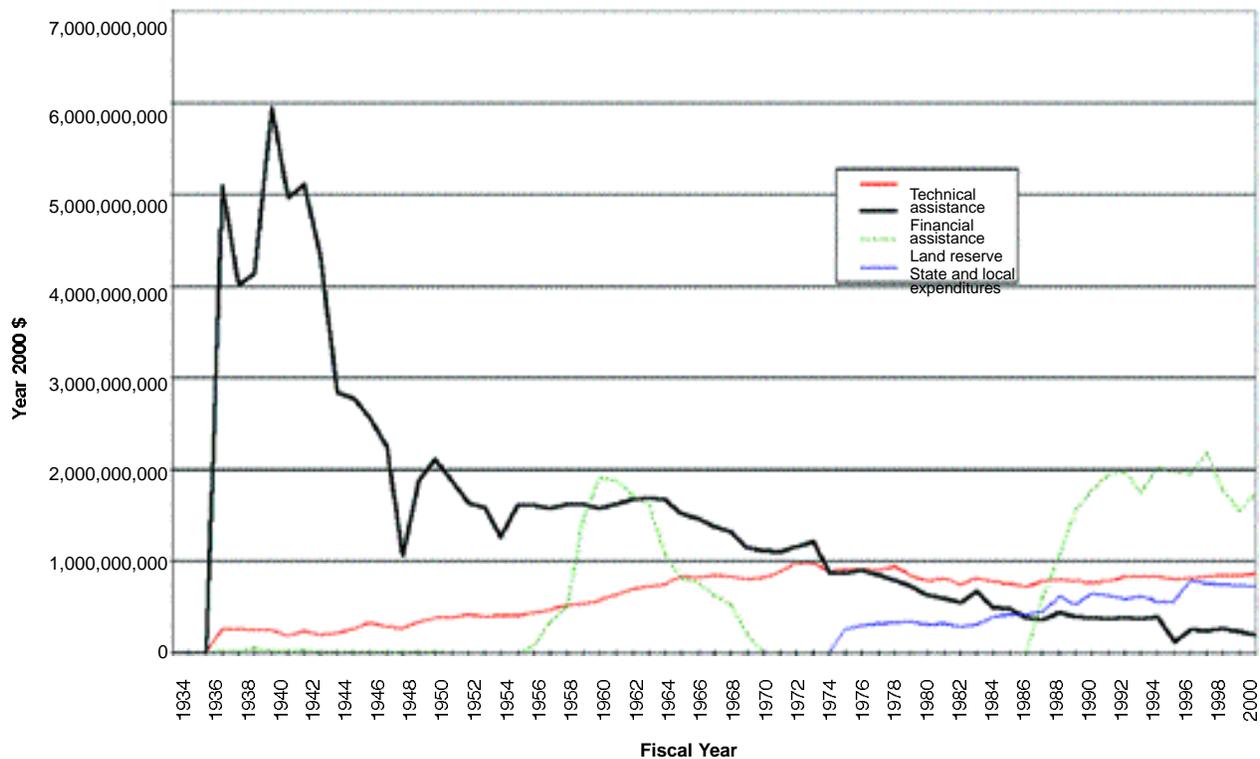
The role of the U.S. Department of Agriculture is to help deliver many of the products and services of federal

conservation initiatives on non-federal lands in the most efficient and effective manner possible. In 2000, USDA expenditures for conservation technical and financial assistance programs, coupled with state and local government expenditures, totaled about \$3.5 billion — or about \$12 per person in this country.

These expenditures support conservation practices that have enhanced soil and water quality and other environmental attributes of the land, as summarized in the preceding section. As also indicated above,

## Major USDA conservation expenditures, 1934-2000

Funding for technical assistance, financial assistance, land reserves, state and local governments



In the early 1940s, federal investments in financial and technical assistance to agriculture topped \$6 billion (constant year 2000 \$). Combined financial and technical assistance along with land reserve incentives totaled \$3.5 billion in 2000.

The National Association of Conservation Districts (2001a) reports that state and local funding for conservation on private lands grew from almost nothing in the 1930s and 1940s to more than \$1.3 billion in 2000 and that private sector contributions now exceed \$1 billion.

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more must be done to achieve resource conservation goals.

Work leading to preparation of the full interim report revealed a number of common themes in what the public desires from national soil and water conservation policy:

- Extension and modification of existing programs, including increased funding and expanded eligibility.
- Initiation of new programs and modification of existing programs to enable private landowners to maintain or increase income while conserving natural resources.
- Stewardship-based agricultural conservation policy that rewards landowners for resource conservation practices.
- Greater awareness of the relationships — and possible contradictory interactions — between agricultural production programs and conservation programs.
- Increased technical capacity for conservation technical assistance.
- Program elements that provide a “safe harbor” to agricultural

## Locally led conservation

One size does not fit all. On each farm, ranch or forest tract, conservation partnerships focus on the best mix of a wide range of solutions.

Among those solutions are reduced tillage and efficient irrigation practices, efficient use of nutrients, effective crop and grazing rotations, placement of land in easement and reserve programs and planting of vegetated windbreaks and grassed buffers.

All soil, water and related resource conservation programs benefit from local, state and USDA technical assistance. Economic incentives, including cost-share initiatives and financial assistance, are also vital to conservation programs.



producers through a balance of regulatory and voluntary approaches.

- Recognition of the secondary benefits or public goods that accrue from agricultural resource conservation.

A 2001 survey conducted by American Farmland Trust indicates that Americans favor linking government support of farmers to conservation practices. According to the survey:

- 75 percent said government support to farmers should require the farmers to apply “one or more conservation practices” and
- 53 percent said increased funding to keep productive farmland from being developed should be a national priority.

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## Analysis of program options

For the full interim appraisal and analysis report, USDA analyzed several program options to help accomplish natural resource conservation goals. USDA's Natural Resources Conservation Service conducted the analysis in partnership with the Department's Agricultural Research Service and Texas A&M University.

The analysis involved comparing estimated agricultural baseline conditions (consistent with the USDA agricultural outlook baseline) to the results obtained from modeling the program options.\*

The analysis shows significant potential to improve soil, water and environmental conditions through sustained and enhanced voluntary incentives for farmers and ranchers. The two combinations of several program options summarized below indicate the costs and effects of alternative levels of conservation activity. The combinations are (a) reduce resource degradation and (b) improve resource health.

### A. Reduce resource degradation

Current voluntary requests for conservation technical and financial assistance exceed the ability of USDA and its conservation partners to deliver results. Not all landowners who request technical assistance can be accommodated within a reasonable time frame. In many cases, landowners who are willing to apply conservation

techniques using their own funds cannot get technical assistance because of the lack of available partnership staff resources. And applications for financial assistance to all USDA cost-share and land retirement programs are several times more than can be funded with available dollars.

The results of the analysis to reduce resource degradation indicate that total costs would be an additional \$2.4 billion above current levels. Included in that amount are \$2 billion in direct financial assistance and \$0.9 billion in federal and state technical assistance after adjusting for net benefits to the agricultural sector.

It was assumed that landowners would need assistance to:

- Install two million miles of conservation buffers.
- Retire 45 million acres of environmentally sensitive land.
- Reduce erosion on all cropland to rates that satisfy conservation compliance requirements.
- Protect 12 million acres of grazing land in a reserve.
- Restore an additional 250,000 acres of wetlands and associated uplands each year for five years.
- Protect more than 115,000 acres of prime and unique farmland per year.
- Expand funding modestly for the Forestry Incentives Program.
- Enhance wildlife habitat on 1.3 million acres per year.

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\*Models used in the analysis considered cropland, Conservation Reserve Program lands, pasture lands, federal and non-federal grazing lands, irrigation water use (surface and pumped sources) and labor (family and hired). Crops covered include barley, oats, rice, wheat, corn, sorghum, soybeans, cotton, potatoes, hay, tomatoes, oranges, grapefruit, sugar beets and sugar cane. Livestock includes cattle, dairy, hogs, poultry and sheep.

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Program initiatives to reduce resource degradation would respond to the need for improved water and soil quality; reduced soil erosion; protection of marginal lands, prime cropland, forestland and wetlands; and improved conditions on grazing lands.

Overall long-term social costs would be balanced by reduced degradation to soil and water resources and fewer environmental risks. Estimated benefits — primarily in relation to improved wildlife habitat and water quality — from reducing resource degradation would be \$7.4 billion above the baseline, or three times more than the costs.

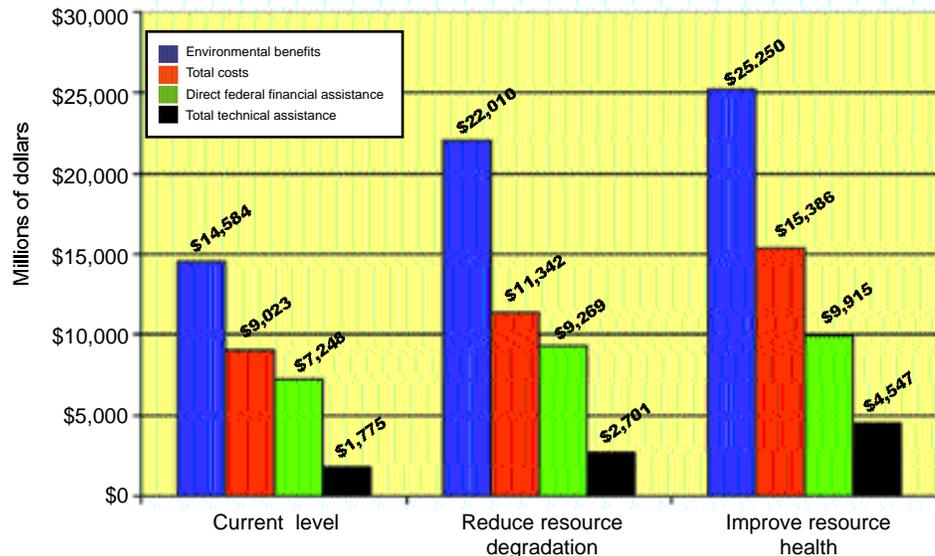
## B. Improve resource health

A national conservation program to reduce resource degradation will not fully protect natural resources. It will merely ensure assistance to landowners who are already aware of the need to protect or enhance natural resources and are ready, with some assistance, to take appropriate action.

As these landowners know, good stewardship is more than solving problems and repairing damage. It requires the prevention of problems and the maintenance of healthy resources. And it is a never-ending process.

Farmers and ranchers make frequent changes in their production practices in response to changes in the agricultural economy, their own financial situations, production technology, laws that affect their opera-

Benefits and costs to continue conservation investments at current levels, reduce resource degradation and improve resource health



tions and so forth. When they consider altering their management practices for any reason, they often request information on how their new decisions will affect their natural resources, and they may request technical assistance to plan and apply management systems that protect those natural resources.

To improve resource health and thereby emphasize management of resources for sustainability on all cropland — the highest level of conservation considered in the analysis — total social costs increased to \$6.4 billion per year above the baseline. Included in that amount are \$2.7 billion for financial incentives and \$2.8 billion for federal and state technical assistance. Technical assistance costs are higher than those needed to reduce resource degradation because it will require more intense management to improve resource health.

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The analysis assumed that landowners will have adequate assistance to take all actions listed under the “slow resource degradation” scenario and practice high-level stewardship on all of their lands. In addition, erosion would

be reduced to the acceptable rate on all cropland.

This level of conservation effort would result in estimated benefits of \$10.7 billion per year above the baseline, or one and half times more than the costs.

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## Conclusion

Adoption of conservation practices by many of this nation’s private landowners has helped reduce the impacts of food and fiber production on soil, water and air quality.

Conservation of the land’s resources is an ongoing process, however. As summarized above, much remains to be done to ensure healthy soils and clean water and air to support viable communities (both urban and rural), contribute to a strong economy and our national security and protect important environmental attributes such as wildlife habitat.

Our increasing human population and prevailing public views challenge landowners and agribusiness to produce food and fiber without harming the nation’s natural resources. The public looks to the government to ensure that farmers and ranchers produce an abundance of safe food and fiber at affordable prices while protecting and sustaining the nation’s natural resource base. Farmers and ranchers look to the government for technical and financial assistance, research and technology and an income safety net needed to meet the challenge.

An effective program to achieve natural resource conservation goals

will consider these needs. Each program element should recognize the important connection among technical assistance, education, research and technology and economic incentives for landowners who practice high-level stewardship.

As an example, to reduce erosion rates on all cropland to acceptable levels will require conservation practices across a variety of soils, terrains, crops and climates. It will be more challenging in some parts of the country than in others. Likely, many farmers and ranchers will request technical assistance to apply the conservation measures. Because “one size will not fit all,” new or improved technology springing from research will be necessary. In some areas, financial incentives and assistance will help ease any economic burden of achieving the goal.

To meet the needs identified by the public and achieve resource conservation goals, this country must recommit to a conservation program — a program to ensure that private landowners, who are the stewards of 70 percent of this nation’s land, have the technical assistance, research and financial incentives to sustain our soil, water, air and wildlife habitat in perpetuity.



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