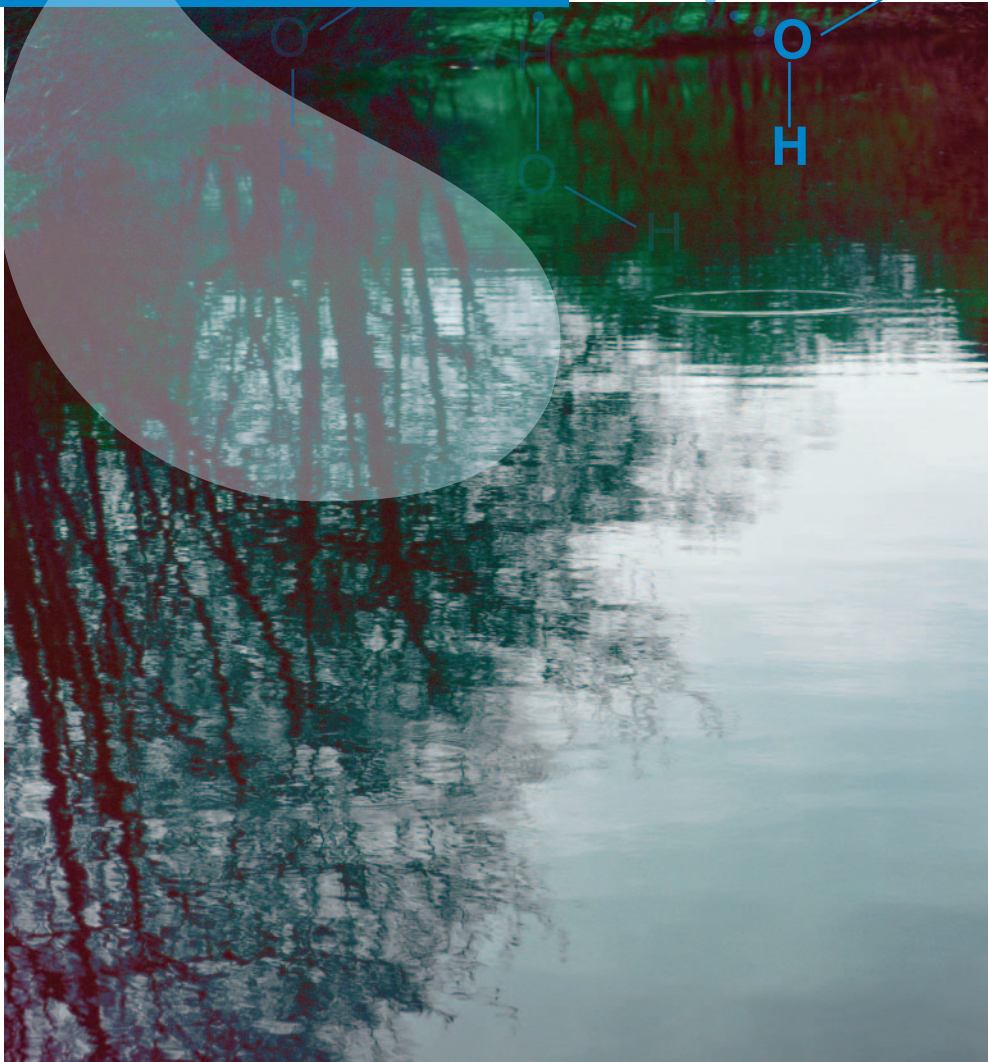
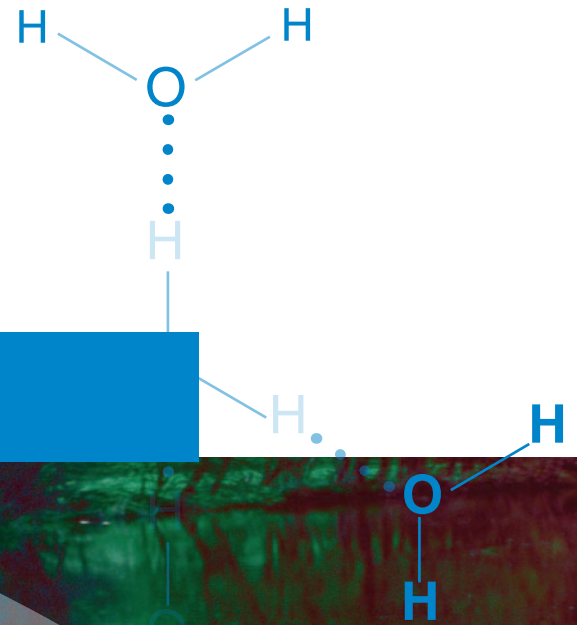


**Foundation Goals:**

Clean and Abundant **Water**





## Introduction

**T**he Nation's abundant freshwater supply is distributed unevenly across the landscape, throughout the seasons, and from year to year. In many areas, concerns are growing about the adequacy of the available ground and surface water supply and the quality of the water to support intended uses. Coupled with these concerns are the threats to public health and safety caused by floods and drought.

**Outcome:** *The quality of surface waters and groundwater is improved and maintained to protect human health, support a healthy environment, and encourage a productive landscape.*

**Objective:** *By 2010, agricultural producers will reduce potential delivery of sediment and nutrients from their operations.*

- **Indicator:** *By 2010, potential sediment delivery from agricultural operations will be reduced by 70 million tons.*
- **Baseline:** *In 2003, potential sediment delivery was 970 million tons from agricultural operations.*
- **Indicator:** *By 2010, potential delivery of nitrogen from agricultural operations will be reduced by 375,000 tons.*
- **Baseline:** *In 2003, potential annual nitrogen delivery from agricultural operations was an estimated 6 million tons.*
- **Indicator:** *By 2010, potential delivery of phosphorus from agricultural operations will be reduced by 70,000 tons.*
- **Baseline:** *In 2003, potential annual phosphorus delivery from agricultural operations was an estimated 360,000 tons.*

As the single largest user of land and water resources, agriculture has a significant role in water management. Well-cared-for watersheds are fundamental to ensuring clean and abundant water resources. Comprehensive watershed planning, undertaken by local residents and based on local natural resource conditions, provides a basic tool for communities to manage for reliable and adequate supplies of clean water.

NRCS has established objectives for sediment and nutrient reduction as indicators of the general trend in managing potential agricultural challenges to water quality. We are conducting studies to better determine the effects of conservation practices on water quality. When data are available, the current objectives may be replaced with more comprehensive indicators of improved watershed health.

**Outcome:** *Water is conserved and protected to ensure an abundant and reliable supply for the Nation.*

- **Objective:** *By 2010, conserve 8 million acre-feet of water.*
- **Baseline:** *In 2005, an estimated 2.5 million acre-feet of water were conserved.*



### Situation

#### Water Quality

In many watersheds where water quality problems have been identified, sources of impairment include point sources such as discharge pipes and nonpoint sources such as runoff from city streets, residential areas, and agricultural lands.

Agricultural runoff can carry a number of potential pollutants into the Nation's streams, lakes, ground water supplies, and estuaries. States and Tribes have identified sediment and nutrients as the

most extensive agricultural contaminants affecting surface water quality, while nutrients and agrichemicals are the major concerns for groundwater.

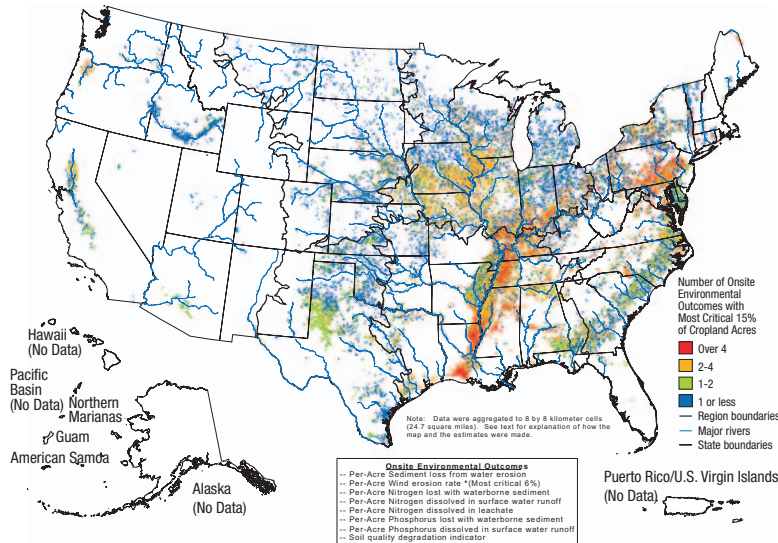
Nitrogen and phosphorus are the primary nutrients that contribute to agricultural nonpoint source pollution in lakes, streams, and oceans. Excessive nitrogen and phosphorus in waterways can cause algal blooms that decrease the amount of dissolved oxygen needed to sustain aquatic life. In the extreme, a hypoxic condition can develop where excessive nutrients are present.

Pathogens and pharmaceuticals from livestock and poultry operations are emerging water quality issues. With continuing concentration trends in animal agriculture, concerns about the potential for impairment of water and air resources have increased.

Agriculture activities may also contribute to water quality problems, associated with selenium and salinity. In slightly elevated concentrations, selenium, a naturally occurring trace element, is toxic to fish and other aquatic and terrestrial organisms. Increased salinity in surface water from irrigation return flow can threaten drinking water quality and negatively impact aquatic life.

Temperature also has an impact on water quality. Significant changes occur to a stable aquatic ecosystem when the vegetative canopy is removed. Stream segments with little to no canopy have elevated water temperatures due to increased exposure to solar ultraviolet (UV) radiation.

Map 1. Priority Cropland Acres with Highest Potential for Soil Loss, Nutrient Loss, and Soil Quality Degradation.



Source: Potter, Steven R., Dean Oman, Lee Norfleet, Jerry Lemunyon, Robert Kellogg, Jay Atwood, and Susan Andrews. 2006 (forthcoming). Model Simulation of Soil Loss, Nutrient Loss, and Change in Soil Organic Carbon Associated with Crop Production. United States Department of Agriculture, Natural Resources Conservation Service. In press.

### Great Lakes Regional Collaboration Initiative

As part of a Great Lakes Interagency Task Force, NRCS is partnering with Tribes, Great Lakes States, and local interests to design a strategy to restore and protect the largest freshwater system in the world. Building on a broad collection of existing efforts to improve and restore the Great Lakes, the Great Lakes Interagency Task Force coordinates the development of consistent Federal policies, strategies, projects, and priorities for addressing the restoration and protection of the Great Lakes system.

### Water Management

Each year, droughts and floods affect some part of the Nation. Land use changes affecting hydrology can diminish water supply, increase flood risks, and pose risks to agriculture, natural systems, and human health and safety. Development generally expands the impervious surfaces in a watershed, reducing infiltration opportunities and increasing risks from accelerated runoff.

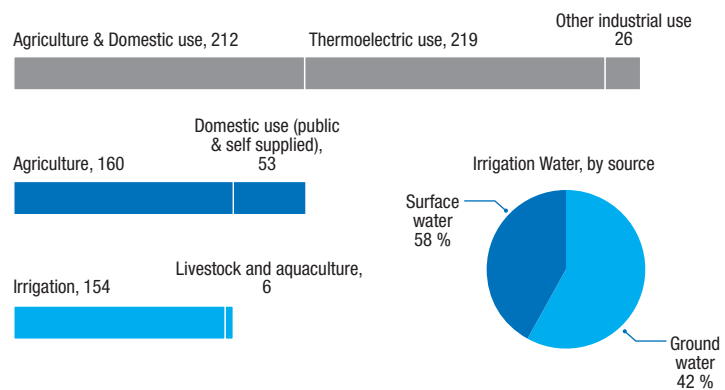
Some areas that once had plentiful water supplies are now beginning to experience shortages as development

and associated water demand increases. In flood-prone or drought-stricken areas, preparedness planning efforts are needed to minimize potential for adverse impacts.


Agriculture is one of the largest users of the Nation's surface water and groundwater, with irrigation being the greatest use. In 2000, almost 34 percent of the water withdrawn from surface water and groundwater was used in irrigated agriculture.

In arid and semi-arid areas, crop production depends almost entirely on irrigation.

Figure 3. U.S. Water Withdrawals by Use, in Million Acre Feet (maf), 2000.



Source: U.S. Geological Survey, 2002



Competition for water in these areas is increasing as a result of increased human populations. In recent years, irrigation has been increasing in eastern States, resulting in water shortages in several States.

### **Key Tasks**

A long-standing priority for NRCS, in partnership with many different entities, is assisting individuals and communities with managing a stable and safe water supply. These cooperative efforts have been marked by substantial gains over the past decades. Many of our ongoing conservation management efforts will be sustained, as will our partnerships. Increased efforts will complement this

investment and accelerate action to ensure clean and abundant water resources to meet the Nation's needs.

### **Current Conservation Management**

As the leading Federal agency for assisting in restoring watershed health on private land, NRCS provides technical and financial assistance to producers who implement conservation practices and management strategies that benefit water quality and improve water management.

Agricultural producers can efficiently use water, promote water storage, and minimize potential loss of sediment and nutrients from their operations by applying conservation practices.

- Erosion control practices keep sediment and nutrients from the Nation's waters. Other practices applied specifically to protect surface water include filter strips and other types of buffers along streambanks, wetlands, and shorelines.
- Comprehensive nutrient management plans minimize potential for nutrient and pathogen losses from animal feeding operations.
- Efficient irrigation systems, such as micro-irrigation and low-pressure sprinkler systems, can reduce water need, risk of irrigation-induced erosion, and energy costs, while maintaining yields. Water

management plans, including evapotranspiration management, address salinity.

- Restoring or creating wetlands in strategic locations can improve ground and surface water quality and help manage water quantity.
- Restoring riparian buffers to reduce UV radiation can have beneficial effects on shallow streams, especially during late-summer, low-flow periods when dissolved oxygen concentrations are reduced.



*Efficient irrigation systems help save water and decrease leaching of salts.*

- Controlling invasive species can improve water availability.
- Land use planning can mitigate the effects of drought or floods.

NRCS also provides leadership and assistance for cooperative action on a watershed basis. We help communities use a comprehensive watershed approach that provides multiple natural resource and societal benefits. These benefits include the reduction of water treatment costs, the improvement of freshwater aquatic habitats, and the enhancement of coastal health and near-shore aquatic habitats, which also serve to benefit local economies.



### **Cooperative Action Provides Essential Data for Water Management**

Managing water resources to maintain or improve water quality and to balance competing demand requires cooperation among Federal, Tribal, State, and local agencies and private organizations. Good management relies on accurate and timely information. NRCS, in partnership with other Federal and State agencies, conducts snow surveys to provide information on future water supplies in 12 western States and Alaska. NRCS field staff collect and analyze data on depth and water equivalent of snowpack from more than 900 snow courses and 700 automated mountain sites, and estimate annual water availability, spring runoff, and summer streamflows. The National Weather Service includes the forecasts in their river forecasting function.

Individuals, organizations, and State and Federal agencies use these forecasts for decisions relating to agricultural production, fish and wildlife management, municipal and industrial water supply, urban development, flood control, recreation power generation, and water quality management. Major cooperators include the Bureau of Reclamation; Army Corps of Engineers; Bonneville Power Authority; State and local agencies; power utilities; irrigation districts; Tribal nations; the Provincial Government of British Columbia, Alberta, the Yukon Territory; and Mexico.

*This sediment basin prevents sediment from entering streams.*



### Strategic Emphases

To accelerate existing efforts and stimulate new activities to improve, protect, and maintain water quality and quantity, NRCS will:

1. Invest in improved technology and information needed to support planning for watershed health. Specific tasks are to:

- Accelerate efforts to develop methods and models to credibly estimate effects of conservation measures on water quality and quantity;
- Develop field-scale technology to quantify the effects of conservation on water quality and quantity to foster development of markets for private sector investment;
- Integrate conservation benefits information into watershed-scale planning assistance to help communities focus resources on priority practices and geographic areas;
- Expand water supply forecasting nationwide to assist individuals and communities that are beginning to experience water quantity challenges; and

- Work with the USDA Agricultural Research Service and Cooperative State Research, Education, and Extension Service to identify water-efficient plants and technologies as a research priority. Make water-efficient conservation plantings a Plant Materials Center research and development priority.

2. Provide incentives, including market-based incentives, for:

- Entities to develop, promote, and deliver innovative technologies to meet water quality and quantity objectives;
- Converting irrigated land to less water-intensive uses, particularly in areas experiencing water shortages, or converting frequently flooded areas to floodplains or wetlands;
- Maintenance and improvement of existing drainage systems to achieve water quality and quantity objectives; and
- Adoption of water conserving crops or crop varieties and production systems.

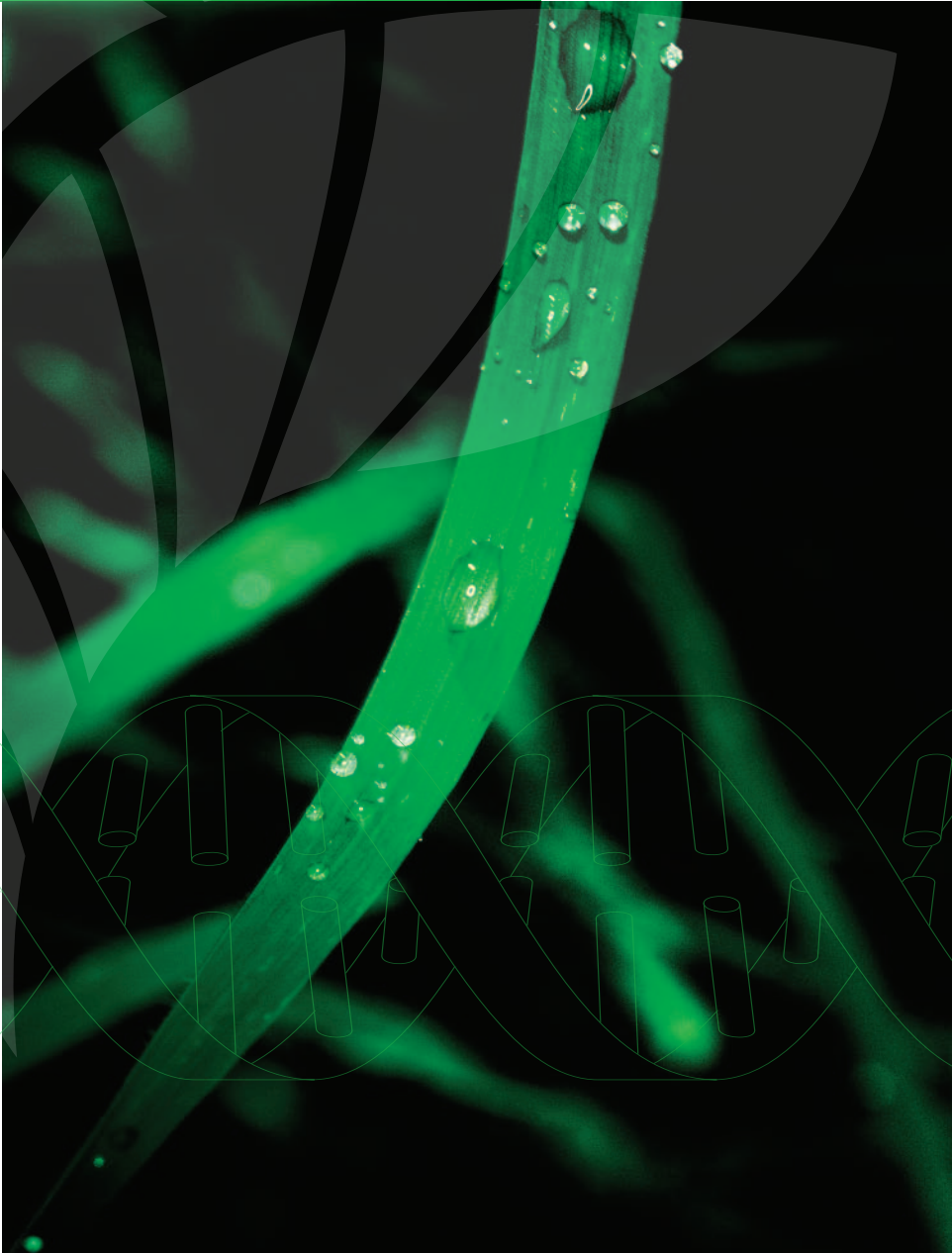
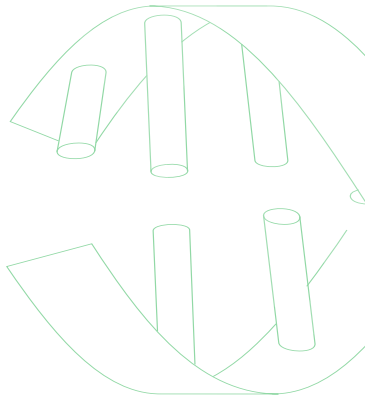
*In-field watering helps water quality by keeping cattle out of streams.*





**Foundation Goals:**

Healthy **Plant and Animal** Communities





## Introduction

**H**ealthy plant and animal communities provide economic and aesthetic benefits and are essential to people's quality of life. Sustaining plant and animal communities cannot be achieved by focusing on individual species or isolated areas. Rather, the web of interacting relationships between plant and animal species within a given ecosystem, and their relationship to the physical features and processes of their environment, must be sustained to maintain the health and vigor of the system.

**Outcome:** *Grassland, rangeland, and forest ecosystems are productive, diverse, and resilient.*

**Objective:** *By 2010, farmers, ranchers, and private non-industrial forest landowners will apply management that will maintain or improve long-term vegetative condition on 150 million acres of grazing and forest land.*

**Baseline:** *In 1999, about 500 million acres of non-Federal grazing land and non-industrial forest were considered to be in minimal or degrading vegetative condition.*

**Outcome:** *Working lands and waters provide habitat for diverse and healthy wildlife, aquatic species, and plant communities.*

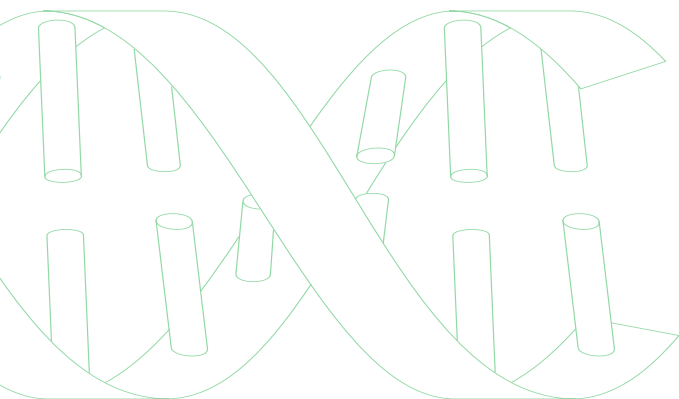
**Objective:** *By 2010, an additional 9 million acres of essential habitat will be improved and managed to benefit at-risk and declining species.*

**Baseline:** *In 2005, NRCS helped farmers and ranchers improve habitat for declining and at-risk species on 2 million acres.*

**Outcome:** *Wetlands provide quality habitat for migratory birds and other wildlife, protect water quality, and reduce flood damages.*

**Objective:** *By 2010, resource managers will create, restore or enhance 1.5 million acres of wetlands on non-Federal lands.*

**Baseline:** *In 2003, there were 111 million wetland acres on non-Federal lands in the contiguous United States.*





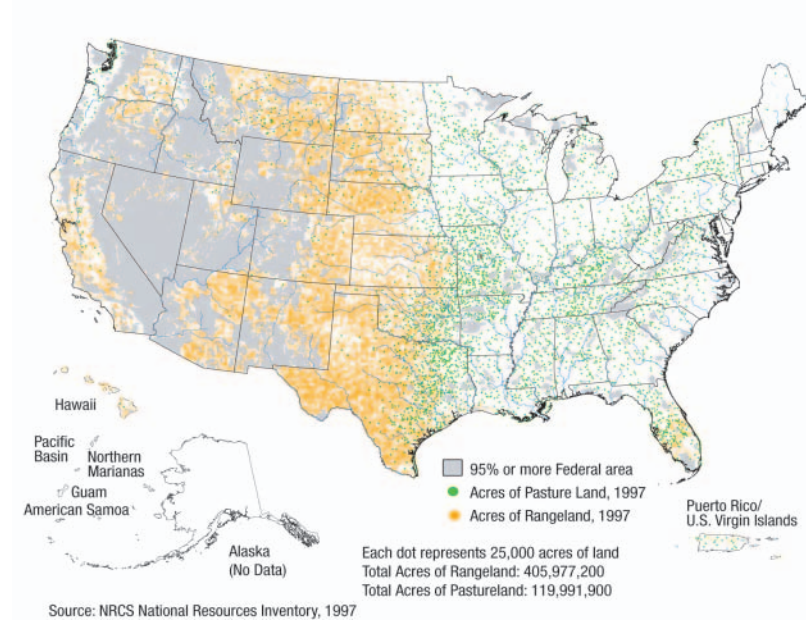
## Situation

### Permanent Vegetation Resources

Healthy, vigorous plant communities on rangeland, native and naturalized pasture, and forest lands protect soil quality, prevent soil erosion, provide sustainable forage and cover for livestock and wildlife, provide fiber, improve water quality, provide diverse habitat for wildlife, and sequester carbon. Non-Federal lands in these ecosystems make up almost one-half of the area of the 48 contiguous United States. Because the acreage of range, native and naturalized pasture, and forest ecosystems is so great, poor cover quality can have significant effects on the Nation's soil, water, and wildlife.

Active, science-based management of vegetation is essential to maintaining healthy, diverse, and resilient ecosystems. Preventing degradation requires careful planning and management, takes into consideration all resource issues for a site, and is more cost effective than correcting a problem after it has developed, especially in low rainfall areas. Healthy and diverse plant communities on rangeland are better able to withstand

Map 2. Acres of Grazing Land, 1997.



drought and invasive species. Well-managed forests are less susceptible to pests, disease, and catastrophic fires.

Invasive plants are a major concern in native grasslands, rangelands, and forests. An "invasive species" is one that has been introduced into an ecosystem where it is not native. Invasive plants may crowd out native plants, make areas more susceptible to catastrophic fire, degrade habitat quality for native wildlife, and may harm economic, environmental or human health. For example, cheatgrass has accelerated the fire cycle in western States by twenty-fold, and saltcedar has diminished water supplies, altered soil chemistry, and affected native plants and wildlife.

### Cooperative Actions Protect Rangelands

NRCS works cooperatively with private sector organizations, State and Federal agencies, and Tribes to protect rangelands. An example of these locally led, cooperative efforts is the Malpai Borderlands Group, which is working to restore rangeland in southwest New Mexico and southeast Arizona. The Malpai Group was organized and led by area ranchers who saw that the land, and their way of life, were threatened



by deteriorating rangeland and by the spread of development and subdivisions from nearby towns.

The group originated as a series of informal discussions among ranching neighbors and was formally organized as a non-profit organization in 1994. Since then, the group has pursued activities to protect and restore the ecological diversity and productivity of the land, including rangeland restoration, reintroduction of fire, wildlife conservation, and endangered species recovery. The Malpai Borderlands Group pioneered the GrassBank, which allows ranchers to rest their grasslands while sustaining their livestock. Grass on one ranch is made available to another rancher's cattle in return for conveying land-use easements prohibiting subdivision. The Malpai Borderlands Group holds the easements.

Key partners in the group include Arizona and New Mexico ranchers, Hidalgo and Whitewater Draw Natural Resource Conservation Districts, NRCS, USDA Forest Service, USDOJ Bureau of Land Management and Fish and Wildlife Service, Arizona State Land Department, universities in New Mexico and Arizona, Arizona and New Mexico Game and Fish Departments, the Animas Foundation, and The Nature Conservancy.

### Fish and Wildlife Habitat

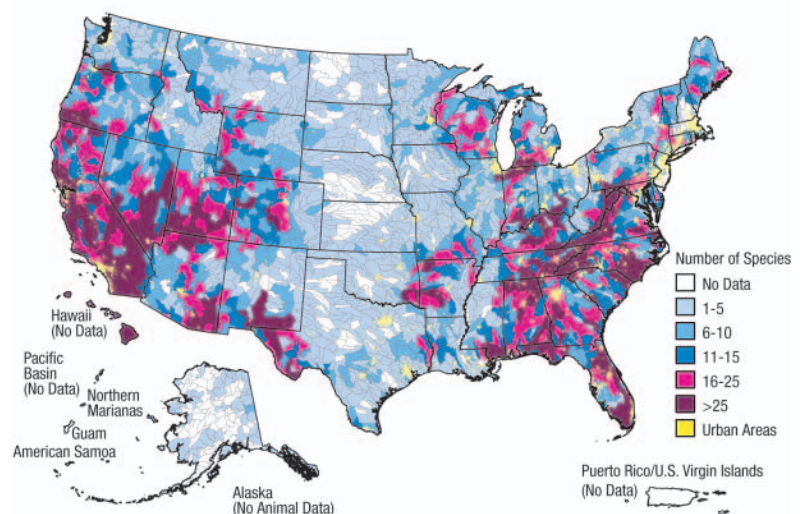
Privately-owned and other non-Federal lands provide habitat for much of the Nation's wildlife. When people use the land, they change the quantity and the quality of the habitat the land provides to wildlife and, therefore, the number and types of wildlife that can live there. The use and condition of the land affects aquatic habitat as well.

Fragmentation and loss of habitat resulting from urban and suburban development and from intensive agricultural uses have contributed to declines in populations of many terrestrial and aquatic species. Invasive species

are second only to habitat destruction as the cause of native species declines.

Protecting specific ecosystems and landscapes—including wetlands, grasslands, floodplains, and certain types of forests—can help support wildlife and aquatic species and provide benefits in the form of recreation, hunting, and other forms of agri-tourism. Improving the habitat for declining and at-risk species is key to preventing further declines and ensuring the continued survival of those species and the overall health of the ecosystems of which they are part.

Map 3. Number of Plant and Animal Species of Concern by Watershed.



This figure displays species of concern as identified by the State Heritage Programs, and including species listed as "candidates" under the U.S. Endangered Species Act. The "No Data" category should not be considered a definitive statement of the presence, absence, or condition of biological elements at any given location. The lack of data for any geographic area cannot be construed to mean that no features are present.

Source: NatureServe, March 2006



### Wetlands

Wetlands provide wildlife habitat, protect and improve water quality, attenuate water flows due to flooding, and recharge ground water. Land use changes led to the drainage and alteration of almost 54 percent of wetlands, and in some States, the loss is as high as 90 percent since the beginning of the last century. Increased knowledge about the importance of wetland functions influenced national policy and moved the Nation toward restoring wetlands.

In 1985, the Nation’s focus was on “no net loss” of wetland acreage. National Resources Inventory (NRI) data for 1997 and 2003 showed that the “no net loss” goal had been achieved, and there was no longer an overall net loss of wetlands occurring within the contiguous United States. In 2004, based in part on the accomplishments documented by the NRI and a recognition of the benefits wetlands give the Nation, the President set a national goal to restore, create, enhance, and protect 3 million acres of wetlands by 2010.

### Key Tasks

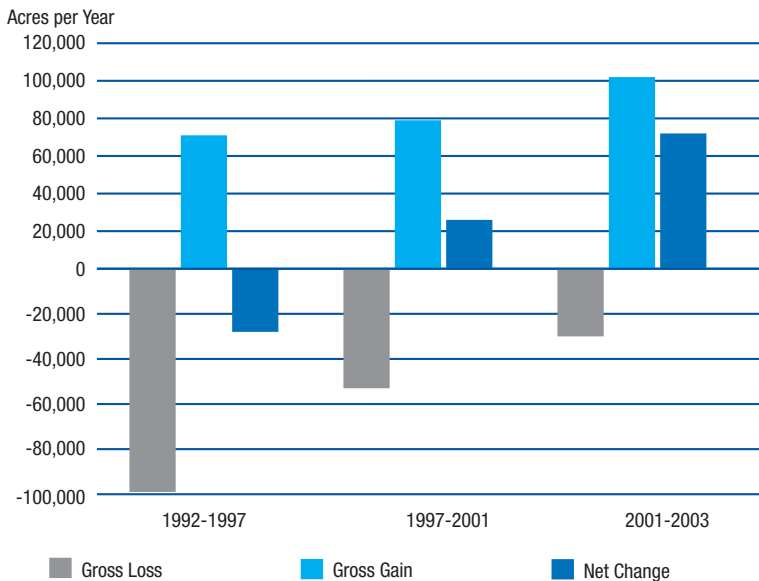
A long-standing priority for NRCS, in partnership with many different entities, is assisting individuals, communities, and Tribes to maintain, restore, and enhance the productive capacity of grazing lands and forestland. We also have decades of experience in helping people maintain, restore, or enhance wetland ecosystems and fish and wildlife habitat. In the period covered by this strategic plan, our current conservation efforts will be continued, as will our partnerships with Federal and State agencies, Tribes, and local governments and organizations. Strategic emphases to implement our three key strategies will accelerate progress toward our goals.

### Current Conservation Management

NRCS helps people plan sustainable use and protection of grassland, rangeland, forestland, and critical habitat. We provide technical assistance and tools for comprehensive conservation management systems to prevent problems and maintain good conditions.

On grazing land, vegetative degradation is addressed through replanting and

Figure 4. Change in Palustrine and Estuarine Wetlands on Non-Federal Land and Water Area, Gross Losses and Gains and Net Change, 1992-2003.



Source: NRCS, National Resources Inventory, 2003



through management practices, including eradicating or controlling invasive species, applying sustainable stocking densities, water management, and proper nutrient management. Assistance to non-industrial private forest landowners and managers includes tree and shrub establishment and forest stand improvement.

We help farmers, ranchers, non-industrial private forest landowners, and other natural resource managers with wildlife considerations when they plan the use of their land. These land stewards consider wildlife needs for shelter; access to water; and food in proper amounts, locations, and times to sustain wildlife populations that inhabit the area during a portion of their life cycle. Management may include controlling invasive species, adopting practices to improve grassland or forest habitat, or managing water levels in wetlands to control vegetation. Actions to sustain and enhance aquatic habitat include applying conservation practices that filter potential pollutants and moderate stream temperatures. Our priority for action is helping to maintain or enhance habitat for at-risk species so that populations remain stable or increase.

NRCS supports voluntary incentive-based approaches to wetland restoration.

We also make wetlands determinations and conduct compliance reviews to

### Cooperative Action Enhances Wildlife Habitat in Bottomland Hardwoods

Between the 1960s and 1980s, thousands of acres of lower Mississippi River Valley bottomland hardwoods were converted to row-crop agriculture, resulting in loss of habitat essential for migratory birds including waterfowl and neotropical songbirds. Fragmentation of the landscape also damaged habitat for local black bears, preventing genetic interchange among individual black bear populations. In the 1990s, NRCS, through its Wetlands Reserve Program (WRP), became an important partner in efforts and initiatives to restore the critical wetlands and woodlands of the Mississippi Delta. The Black Bear Corridor Special Project, an initiative designed to create a contiguous wooded and wetland corridor between two black bear populations in Louisiana, is one of many projects in which NRCS cooperates. The Black Bear Corridor Special

Project is targeting easement acquisition and restoration on 56,250 acres in the State. Future goals include a wooded wetland corridor from northeast Louisiana to the Gulf of Mexico. The project will also provide uninterrupted habitat for neotropical songbirds and waterfowl during spring and fall migrations between South America and Canada.

Key cooperators include cooperating landowners, Louisiana soil and water conservation districts, Ducks Unlimited, Black Bear Conservation Committee, USDOJ Fish and Wildlife Service, The Nature Conservancy, U.S. Geological Survey National Wetlands Research Center, National Wild Turkey Federation, USDA Farm Service Agency, and many other local, State and Federal agencies, committees, societies, refuges, and land trusts.



ensure that USDA program participants are meeting their responsibility to protect wetlands.

Efforts to ensure that diverse and healthy ecosystems are sustained involve partnerships across ownership and political boundaries. Many entities with different roles cooperate in these efforts. As part of the assistance we provide on private lands, NRCS works to improve coordination among these many stakeholders.

### Strategic Emphases

To increase the effectiveness of our ongoing efforts to help people protect and enhance plant and animal communities on private lands, NRCS will:

1. Enhance the ability to measure conditions and project the results of management options. Specific actions include:

- Accelerate development of methodology to measure and monitor grazing land health;
- Enhance technology to measure effects of conservation practices on agricultural lands, wetlands, and wildlife resources; and

- Cooperate with Tribes, State and local governments, Federal agencies, and private sector organizations to develop and adopt a set of standard, science-based resource indicators that could be used to assess the condition of selected fish and wildlife resources;

2. Develop enhanced technology, including expanding plant trials to develop plants that have a natural resistance to pests.

3. Enhance effectiveness of efforts to protect ecosystems by:

- Expanding partnerships with State and local governments, Federal agencies, Tribes, and private sector organizations to develop collaborative strategies to address grazing land health, including efforts to control invasive species.
- Facilitating the adoption of landscape-scale habitat protection plans that provide at-risk and declining species access to water, food, and shelter, as well as corridors for seasonal migration. Provide funds to help develop and implement such area-wide plans.

- Cooperating with stakeholders in the public and private sectors to develop watershed and area-wide plans that are designed to restore, protect, and manage wetlands.

4. Enhance the performance of programs we administer to protect wetlands and other wildlife habitat by:

- Actively managing conservation easement lands under the Agency's administrative control to maximize benefits to wildlife and wildlife habitat;
- Developing wildlife management plans for all wetland acres enrolled in NRCS programs; and
- Focusing funding resources in areas with the greatest potential to restore wetlands on the agricultural landscape, that is, on areas where there are opportunities and infrastructure in place for restoration.



*NRCS works cooperatively with the U.S. Fish and Wildlife Service and the Caddo Tribe's Environmental Officer on Oklahoma's Wichita Wildlife Refuge.*



*NRCS provides assistance for a prescribed burn on the Wichita Wildlife Refuge.*