

Seven Decades of Resource Inventories

Throughout its history, NRCS has conducted periodic inventories of the Nation's natural resources. The 1945 Soil and Water Conservation Needs Inventory (CNI), a reconnaissance study, was the foundation for the 1958 and 1967 CNIs, the agency's first efforts to collect data nationally for scientifically selected field sites. The 1975 Potential Cropland Study focused on identifying lands best suited for cultivation. The National Resources Inventory (NRI) was first conducted in 1977, and every 5 years thereafter through 1997. Several less intensive, special-issue inventories also were performed during the 1990s to investigate topical matters of concern and to supplement the NRI. The release of the 2001 Annual NRI estimates ushers in the newest stage of NRCS natural resource inventory activity.

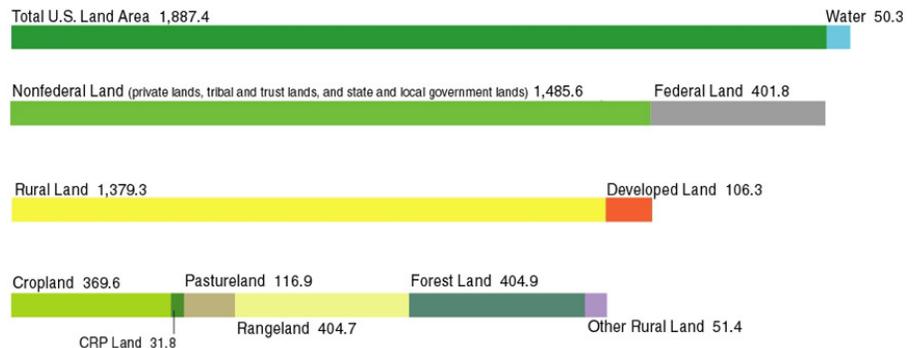
Information about the condition of the land and related natural resources is needed at many different scales to inform decision makers. The U.S. Department of Agriculture (USDA) gathers data and information through a variety of efforts such as farmer and rancher surveys, censuses, and natural resource surveys. These efforts culminate in a variety of databases, assessments, publications, and other products—useful for many purposes and at many levels—that help to inform the public, from land users and local governments to national policy makers.

The National Resources Inventory

- The National Resources Inventory (NRI) is a statistical survey designed to help gauge natural resource status, conditions, and trends on the Nation's nonfederal land - nonfederal land includes privately owned lands, tribal and trust lands, and lands controlled by State and local governments.
- The NRI is conducted by the Natural Resources Conservation Service (NRCS) in cooperation with Iowa State University's Center for Survey Statistics and Methodology.
- The NRI is carried out under the authority of a number of legislative acts including the Rural Development Act of 1972, the Soil and Water Resources Conservation Act of 1977, the Federal Agriculture Improvement and Reform Act of 1996, and the Farm Security and Rural Investment Act of 2002.

America's Land Base in 2001

in Millions of Acres



Wetlands and Irrigated Cropland Estimates

Status and trend estimates on wetlands and irrigated cropland are not available in the 2001 Annual NRI. Changes in wetlands and irrigation occur on a very small portion of the landscape; therefore data from several inventory years must be assimilated and analyzed in order to present estimates that meet statistical standards and that are scientifically credible in accordance with NRCS policy and Office of Management and Budget and USDA Quality of Information Guidelines. In the interim, the 1997 NRI estimates remain the best available, nationally consistent information on irrigated cropland and wetlands status and trends.

The Annual NRI

- The NRI has been conducted every 5 years since 1977, but today it is in transition to a continuous, or annual, inventory process. This shift helps align the NRI with the need for timely information to support agricultural and conservation policy development and the assessment of the impacts of policy choices and conservation program implementation.
- The design challenge for the Annual NRI was to ensure continuing capacity for long-term trend analyses, while accelerating the acquisition and delivery of new information on natural resource conditions and trends.
- For the Annual NRI, data are gathered for a scientifically selected subset of the 800,000 sample sites that were established for previous NRIs. This sub-sample includes a set of “Core” sample sites, which are sampled each year, and “Rotation” (or “supplemental”) sample sites that vary by inventory year and allow an inventory to focus on an emerging issue. Additional on-site data gathering is conducted for items that cannot be determined remotely, to establish baseline conditions, and for quality assurance purposes.
- Transition to a fully implemented Annual NRI is taking place over several years. In 1999 and 2000, baseline data were gathered at Core sample sites; these data were used during preparation of the statistical database for the 2001 Annual NRI. In 2001, data were gathered from approximately 200,000 Core and Rotation sample sites.
- The 2001 Annual NRI is the first of the annual NRI releases and presents national-level estimates for Land Use, Soil Erosion, and Urbanization and Development status and trends on nonfederal lands in the contiguous United States. Subsequent Annual NRIs will provide a broader spectrum of results – additional topics, and estimates at additional geographic levels (regional, then state-level, and eventually sub-state).

What to Look for in the Future

- The Annual NRI has two major directions for the future: 1) to build a database that provides estimates of the same extent and scale as in previous inventories, 2) to increase the breadth of analyses supported by the NRI as well as agency initiatives to determine the benefits of conservation programs and activities.
- The scale of NRI estimates is affected during the transition to full implementation of the Annual NRI approach. It will take a number of years before the Annual NRI provides reliability levels comparable to those of the 1997 NRI. Importantly, reliability at the state and sub-state levels will not be reached simultaneously because of differences in sampling needs to achieve adequate reliability.
- The 2002 Annual NRI included nearly 150,000 sample sites where data were gathered from July 2002 through March 2003. These data are going through quality assurance and other statistical processing steps. Results will be released in early 2004 and will include some regional level estimates.
- The 2003 Annual NRI will include about 200,000 sample sites. Data will be gathered between June 2003 and February 2004. Results released in early 2005 will be at the regional level, with some state-level status estimates.
- Sample sizes for the 2004 and 2005 Annual NRIs will be similar to the sample for the 2003 NRI. The 2005 NRI reliability level should approach that of the 1997

NRI, with the exception that many sub-state level trend estimates still will have unacceptable levels of statistical uncertainty.

- Future NRIs will address an increasing number of issues of national significance, for example:
 - o Conservation Benefits. The annual NRI will provide updates on resource condition on an annual basis, which can contribute to more timely evaluation of the environmental benefits of conservation programs and activities. In 2003, the NRI also will begin supporting a more detailed, large scale assessment of the environmental benefits of conservation practices and programs. Additional site data and farming, conservation, and program participation information will be gathered for selected NRI sample sites. Reporting will begin with national level benefit estimates focused on water quality, water use conservation, soil erosion, soil quality, and carbon sequestration associated with cultivated cropland and cropland enrolled in the Conservation Reserve Program. As additional data are collected and modeling capabilities increase, assessments will provide regional level estimates and include a broader range of land uses and benefits, such as air quality and wildlife habitat.
 - o Grazing Lands. Nonfederal grazing land — rangeland, pastureland, and grazed forest — accounts for 577 million acres, or nearly 30 percent of the contiguous United States (see Land Use). Since the mid-1990s, NRCS, in cooperation with other agencies, has been developing new field-based rangeland inventory protocols in order to improve the information available on rangeland condition. These new protocols are being introduced as part of the 2003 Annual NRI. Data collected for the 2003, 2004, and 2005 Annual NRIs will be assimilated and assessed to provide National and regional level estimates on the condition of rangeland ecosystems. Field-based inventory protocols for pastureland and grazed forest land are under development and will be introduced in future Annual NRIs.
 - o Soil Quality. The NRI includes data on soil type, soil characteristics, and soil interpretations, in addition to historical information on land use, management practices, and erosion. These data, along with historical climate data, are being used to assess soil quality by deriving a Soil Conditioning Index (SCI) value for each NRI sample site. The SCI quantifies the effects of cropping sequences, tillage, and other management inputs on soil organic matter content, which serves as an indicator of soil quality. Soil quality has direct implications for agricultural productivity, erosion potential, and potential for impacts on associated air and water resources. Future Annual NRI results will present long-term trends in soil quality.

About the Inventory Process

- NRI data are collected at scientifically selected sample sites. NRI uses a stratified two-stage unequal probability area sample. The first stage sample unit – primary sample unit (PSU) – is an area or segment of land. The second stage of sampling is one or more points within the PSU.

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- Sample sites are located in all counties and parishes of the 50 states and in Puerto Rico, the Virgin Islands, the District of Columbia, and selected portions of the Pacific Basin. The 1997 NRI gathered data from 800,000 points in 300,000 primary sample units (PSUs).
- Detailed NRI data are collected for the specific sample points, but some items are also collected for the entire PSU/segment. Some data, such as total surface area, federally owned land, and area in large water bodies, are collected on a census basis external to the sample survey.
- Data are collected for PSUs using photo-interpretation and other remote sensing methods and standards. Data gatherers also use ancillary materials such as USDA field office records, information from NRCS field staff, soil survey and other inventory maps and reports, and tables and technical guides developed by local field office staffs.
- The NRI approach to conducting inventories facilitates examining trends over time because the same sample sites have been studied since 1982, the same data have been collected since 1982 [definitions and protocols have remained the same], and quality assurance and statistical procedures are designed/developed to ensure that trend data are scientifically legitimate and unambiguous. Data undergo rigorous quality review and a statistical estimation procedure that assigns weights to sample points based on sampling (selection) probabilities, estimates from previous NRIs, and known land base attributes from the Census Bureau and other sources.
- Results calculated from the NRI database produce estimates – not absolute facts. This is because the results are tabulations of NRI sample data as opposed to data from a census or a direct measurement. Thus, proper interpretation of NRI results requires an understanding of the inventory procedures and the amount of uncertainty associated with each estimate. Margins of error are reported for all NRI estimates.
- The precision of NRI estimates depends upon the number of samples within the region of interest, the distribution of the resource characteristics across the region, the sampling procedure, and the statistical estimation techniques. Characteristics that are common and spread fairly uniformly over an area can be estimated more precisely than characteristics that are rare or unevenly distributed.

More Information

For more information about the NRI, visit <http://www.nrcs.usda.gov/technical/NRI/>

See the 2001 Annual NRI Glossary for definitions of key terms:
<http://www.nrcs.usda.gov/technical/land/nri01/glossary.html>

To obtain State and local 1997 NRI data, contact your NRI coordinator. Links to State NRI websites and contact information can be found at:
http://www.nrcs.usda.gov/technical/NRI/1997/obtain_data.html

Send comments and questions to nri@nhq.nrcs.usda.gov