



History of Soil Conservation Service* National Resource Inventories

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INTRODUCTION

Citizens of the United States have shown concerns about environmental issues for many decades. The dust bowl of the thirties caused such public concern that new federal agencies were created to deal with the problems of soil erosion. Special programs, such as the Great Plains Conservation Program have been in existence for 60 years. The environmental issues that concern the public change over time. The environmental issues of the sixties included preservation of prime farmland, and clean water. Today there are many new issues, such as the spotted owl, and concerns that voluntary conservation programs are not getting the job done. A movement is underway in Congress to eliminate some existing conservation programs, such as the Great Plains Conservation Program and the Rural Abandoned Mine Program. Congress may argue that the purpose for which these programs were created has been accomplished, that the programs are not working, or maybe that they are too expensive for the benefits received.

The problem with public concerns about environmental issues is that they may be real or perceived. By the time gullies show up in fields, the amount of soil loss is many times the amount that can safely be lost and still maintain the potential to produce. If the dust is gone, is there no more problem? How do we know what conservation work has been accomplished and what remains to be done?

The truth is that not even trained resource specialists can drive down the highway and answer these questions. Environmental issues are very interrelated. Dust affects air quality. Erosion from crop fields affects water quality. Many environmental factors must be known to calculate the amount of wind and water erosion taking place. The only way to understand the real environmental issues and to deal with the dynamics of environmental issues is to have resources inventory data bases that contain millions of pieces of information. These data bases must be able to change over time to keep up with the current environmental issues and even try to anticipate the new issues of the future.

*Note that the Soil Conservation Service has been renamed the Natural Resources Conservation Service

The Soil Conservation Service (SCS) National Resources Inventories (NRI's) serve as the Federal Government's principle source of information on the status, condition, and trends of soil, water, and related resources for all non-federal lands. The fact that the NRI's are linked to the SCS soil data base gives users of the data bases the opportunity to analyze many resources, their capabilities, and potential for various uses.

Over the last 60 years, SCS has conducted nine major nationwide inventories. Each of these inventories was designed or tailored to meet specific national priority needs for resource information. A review of the history and evolution of the SCS National Resources Inventories should help establish an understanding of the potential uses and importance of utilizing the 1992 NRI data base.

1934 NATIONAL EROSION RECONNAISSANCE SURVEY

The 1934 National Erosion Reconnaissance survey was the first well-documented nationwide resources inventory ever conducted. The 1934 inventory located eroding areas, primarily on plowed fields, and determined the degree of erosion caused by wind and water. All 1.9 billion acres in the United States, including Federal lands, were included in the survey. The survey was conducted by the United States Department of Interior Soil Erosion Service (SES) using 115 trained soil-erosion specialists who completed the field work in the unbelievably short time of two months. The survey mapped all land areas into one of 30 descriptive land features or qualitative general erosion conditions which described the degree of wind and/or water erosion damage observed.

About six months after the National Erosion Reconnaissance survey field work was completed, congress passed the "Soil Conservation Act of 1935." This act established the Soil Conservation Service, under the United States Department of Agriculture, as a replacement for the Soil Erosion Service.

The results of the National Erosion Reconnaissance survey were published in 1935 as sections of a document titled "Soil Erosion, A Critical Problem in American Agriculture." A "United States Erosion Reconnaissance Survey Map" was included as part of this publication.

1945 CONSERVATION NEEDS INVENTORY

After several years of farmers cooperating with SCS to apply comprehensive soil and water conservation measures, SCS was faced with an ever increasing demand for technical assistance and limited resources to meet the demand. It was then the agency managers realized they needed resource information to develop programs and set priorities for the various types of conservation needs in all sections of the country. SCS also realized that the agency could not afford to collect all the data it wanted. The agency began conducting an extensive analysis of resource information already available. This included information from the U.S. Census of Agriculture, Agricultural statistics reports, State and local agencies, knowledge of SCS field people, and other sources. The data assembled contained information on land cover, land use, conservation needs, and the physical characteristics of the land, especially as related to soils. The assembly and analysis of the information began in 1942, was completed in 1945, and did not include any resources inventory field data collection activities.

In June 1945, SCS published a 109-page report titled, "Soil and Water Conservation Needs Estimates for the United States, by States." The authors of the document indicated that they were aware of the need to update and refine the mix of information from different sources. They said, "NOTE These data are preliminary, tentative, and subject to revision

and inclusion of additional information when available." The Soil and Water Conservation Needs Estimates of 1945 became the first "Conservation Needs Inventory" (CNI) and set the stage for future SCS conservation needs inventories.

1958 SOIL AND WATER CONSERVATION NEEDS INVENTORY

Even though language in the 1945 CNI pointed out an ongoing need for updating resources information, it wasn't until April 10, 1956, that the Secretary of Agriculture issued Memorandum No. 1396 stating that "A National Inventory of Soil and Water Conservation Needs (later renamed the 1958 Conservation Needs Inventory, CNI) will be made and kept current by the Department of Agriculture." The memorandum also stated, "From it the Department could arrive at reasonable estimates of the magnitude and urgency of the various conservation measures needed to maintain and improve the country's productive capacity for all the people."

The Department named eight agencies to work cooperatively on the CNI. These were the: Agricultural Conservation Program Service and the Commodity Stabilization Service (now Agricultural Stabilization and Conservation Service, ASCS), Soil Conservation Service, Agricultural Marketing Service, Agricultural Research Service, Federal Extension Service, Farmers Home Administration, and the Forest Service. The SCS was assigned leadership responsibility. Representatives from each of these agencies became the Conservation Needs Committees at the Department, State, and local levels. State and local groups, organizations, or agencies, such as soil and water conservation districts, State forestry agencies, State Agricultural Experiment Stations, and Agricultural Stabilization and Conservation Committees concerned with soil, water, forest, range, and wildlife conservation were also invited to participate. Each State Conservation Needs Committee developed a plan which established guidance, priorities, organization, and responsibilities for making the inventory in the counties, including procedures, standards, and criteria. The plan was submitted to the Department Committee for approval before the inventory began.

Memorandum No. 1396 also stated: "Data will be developed separately for privately owned and publicly owned land." The Policy and Procedure for Development of National Inventory of Soil and Water Conservation Needs stated, "Federal lands to be excluded are: Those managed by the Forest Service, Bureau of Land Management, National Park Service, Bureau of Sports Fisheries and Wildlife, Bureau of Reclamation, Tennessee Valley Authority, Department of National Defense, and Atomic Energy Commission." These lands except for Federal cropland operated under lease or permit by private persons or organizations were excluded from the county inventories. This was the first time that Federal land had been excluded from SCS inventories. The SCS was responsible for collection of soil and water data for all non-Federal lands except forested areas. The Forest Service collected forest data on non-Federal forest lands. Inventories on land under the jurisdiction of the Forest Service and other federal land management agencies were the responsibility of the individual agencies involved but were not part of the 1958 CNI.

Again, the SCS could not afford to go to every parcel of private land (census) to collect the soil and water data. To overcome this limitation the first application of statistical sampling to collect resources inventory data was used by SCS. The area samples (sample plots) for the 13 Northeastern States were drawn by the Biometric Unit at Cornell University. The area samples for the remainder of the country were drawn by the Statistical Laboratory at Iowa State College (now Iowa State University, ISU). Random area samples were selected for each county in the United States, except those strictly metropolitan in character. As standard procedure the statistical laboratories selected two separate sets of area sample units in each county, each set representing 2 percent of the county. In counties 250,000 to 500,000 acres, only one of the 2 percent sample sets was used to collect the data. In smaller counties, a higher sampling rate was needed so both 2 percent

area sample sets were used. States also had the option of requesting higher sampling rates for land-resource units where they needed more reliable data. In counties larger than 500,000 acres, the laboratory could reduce the sampling rate below 2 percent.

Land resource maps, formerly called problem area maps, were developed from soil association maps subdivided to show differences in climate, water resources, land use, or type of farming. These base maps were the forerunners of maps now showing the Land Resource Regions (LRR) and Major Land Resource Areas (MLRA) of the United States.

Each County Conservation Needs Committee provided county maps which showed the boundaries of land resource units and blocks of federal land to both statistical laboratories. Soil conservation district and other boundaries could also be shown in the event that States wanted data compiled for such areas. Acreage figures were also provided for desired combinations of land resource units. This was the beginning of what SCS now refers to as County Base Data.

Data collection was accomplished by complete mapping of the soils within each area sample. The inventory acreage for each area sample was then mapped into four land cover/use categories. They were cropland, pasture and range, forest and woodland, and other land. Forest and woodland were subdivided into "forest in farms or operated for the production of forest products" and "other forest and woodland." Other land was subdivided into "in farms" and "not in farms." Additional subdivisions of any land use, such as the separation of irrigated cropland from dry cropland, or pasture from range, could be made in a State or county as approved by the State Conservation Needs Committee. The area sample maps were then measured to determine the amount of each land cover/use for each soil land capability unit mapped within the area sample. States had the option of measuring the data locally (locally may be interpreted as the SCS State Office) or to send the maps to an SCS cartographic unit to be measured on a reimbursable basis.

After the soil and land use data for the sample areas were measured, it was expanded to give the estimated acreage for the county. States were provided instructions to expand the data locally using manual methods, or the data could be entered on an IBM punch card for automated processing. This is the first indication that automated data processing was used to process SCS inventory data. All of the data collected was entered on a single IBM punch card, utilizing only 72 of the 80 rows. Some States made arrangements to have their data expanded by local agencies that had the necessary data processing facilities. For states without data processing facilities, cooperative agreements had been entered into with the Statistical Laboratory of Iowa State College, Texas Agricultural Experiment Station, and the Biometrics Unit of Cornell University to expand the data without charge to the individual State offices.

The expanded data were presented to the County Conservation Needs Committee who could use any available data or knowledge of the members of the committee to adjust the acreage figures to more accurately represent present acreages. Urban and Built-up Areas and Water were included in the data base; however, the acreages for these land uses were determined from the county base maps. The committee then estimated the probable land use changes in the county between 1958 and 1975. Next, they estimated the acres of conservation problems and acres needing treatment, by land use for 1975, based on the present condition of the land or vegetative cover. Problems and treatment needs for cropland and other land were represented by land-capability units, singly or in groups. Each group was identified by the dominant and secondary problems based on the soil land-capability subclasses of water or wind erosion (e), excess water (w), unfavorable soil conditions (s), or adverse climatic conditions (c). Pasture and range acres needing treatment were based on conservation problems related to the establishment and maintenance of cover. Treatment needs were based on four conservation practices; establishment or reestablishment of vegetation, improvement of vegetative cover, protection of vegetative cover, and water management. Acres where treatment was not considered feasible were not included in the estimates. Acres

needing treatment for forest land were based on six conservation practices; establishment and reinforcement of timber stand, improvement of timber stand, protection of timber stand, erosion control, establishment of shelter belts and windbreaks, and improved naval stores methods. Acres of forest land withdrawn from timber utilization, incapable of yielding usable wood products, so physically inaccessible as to be unavailable economically in the foreseeable future, or where treatment is not feasible under good forest management, were not considered in the conservation needs estimates.

The information on small watershed project needs was assembled for both public and private lands from information available both within and outside of the USDA. The watershed project needs were based on flood prevention, agricultural water management, and nonagricultural water management. When the available data did not provide adequate information on which to reach a decision, the judgement of the State or County Conservation Needs Committee was used rather than collecting additional field survey data.

1967 SOIL AND WATER CONSERVATION NEEDS INVENTORY

In March of 1965, the Assistant Secretary of Agriculture for Rural Development and Conservation authorized the update of the 1958 CNI. Like the 1958 CNI, the 1967 CNI was a joint venture of eight USDA agencies and the Department of Interior's Bureau of Indian Affairs. The SCS was again assigned leadership responsibility. As in the 1958 CNI, the 1967 CNI only inventoried privately owned land, except Federal cropland farmed under lease or permit by private individuals or organizations.

Stratified random sample areas were selected for each county in the United States except those strictly metropolitan in character. Except for a few new samples selected for areas not adequately covered, the sample areas were the same samples as were used for the 1958 CNI. Nationwide the sampling rate ranged from less than 1 percent to 8 percent with intensively developed irrigated areas as high as 32 percent.

Since the 1967 CNI was an update of the 1958 CNI, data were collected on the same data items used in the 1958 inventory. However, a different method was used to collect the information contained within the sample areas. The field data collectors were instructed to spin a plastic template, containing a pattern of dots, over the selected sample areas and mark the dots that fell within the sample area on the source map. There were typically 34 to 38 dots (sample points) marked on a 160 acre area sample. This became the first use of sample points to collect resources inventory data within SCS. Since the dots were called secondary sample units (commonly referred to as points), the area samples became known as primary sample units (PSU's). The collection of data using points proved to be less costly in terms of field work and were easier to process.

The acreage of the soil data, land use and treatment needs for cropland, pastureland, and rangeland were determined by the expansion of the point data. The Statistical Laboratories at Iowa State University and Texas A&M entered, processed, and expanded the sample area data for the inventory acreage for each county. Treatment needs for forest land and other land were estimated by the County Conservation Needs Inventory Committee. The expanded data were analyzed by the Department Committee, State Committees, and the County Conservation Needs Inventory Committees and were adjusted if the data varied substantially in any category from known county values.

Since the data for the 1958 CNI were collected using complete mapping and measurement of the sample segment (PSU), and the 1967 CNI data were collected using points; the data were useful for estimating gross patterns of change, but could not be used to determine precise resource dynamics.

By the mid 1970's SCS had developed procedures to insert the names of phases of soil series associated with the soil symbols contained in the 1967 CNI data base. This was the first time that resources inventory data could be (manually) linked to soils data. This facilitated many new applications of the 1967 CNI data.

RURAL DEVELOPMENT ACT OF 1972

Until 1972 all SCS resources inventory activities had been directed by the SES, SCS, or the U.S. Department of Agriculture. However, public interest in several new environmental issues prompted congress to pass the Rural Development Act of 1972 (Public Law 92-419). Section 302 of this act provided new authority and requirements for resources inventory activities. Section 302 states: "In recognition of the increasing need for soil, water, and related resource data for land conservation, use, and development, for guidance of community development for a balanced rural-urban growth, for identification of prime agricultural producing areas that should be protected, and for use in protecting the quality of the environment, the Secretary of Agriculture is directed to carry out a land inventory and monitoring program to include, but not be limited to, studies and surveys of erosion and sediment damages, flood plain identification and utilization, land use changes and trends, and degradation to the environment resulting from improper use of soil, water, and related resources. The Secretary shall issue at not less than 5 year intervals a land inventory report reflecting soil, water and related resource conditions."

The Secretary of Agriculture assigned the responsibility for implementation of Section 302 of the Rural Development Act to SCS. This necessitated that questions about rural and urban growth, prime farmland, flood plains, and conservation practices be added to the list of resources inventory items already collected by SCS. It also required that the frequency of resources inventories be increased from approximately once every 10 years to once every 5 years. In January 1973, SCS amended a cooperative agreement they had with Iowa State University to look at the sample plots used in the 1958 and 1967 CNI's for selection of stratified sample areas.

Also in 1973, USDA and SCS each formed a Land Inventory and Monitoring Advisory Group which officially recognized SCS's Land Inventory and Monitoring activities as a program. This led to the establishment of the Land Inventory and Monitoring (LIM) Division on July 30, 1973. For the first time SCS had a budget and full-time staff devoted to resources inventory data collection.

1975 POTENTIAL CROPLAND STUDY

SCS planned to collect the data required by the 1972 Rural Development Act starting in 1974 and finishing in 1979. However, several environmental issues caused those plans to change. Although control of soil erosion continued to be a major concern in SCS, the agency was involved in other highly visible issues, such as preservation of prime, unique, and other important farmlands, preservation of wetlands, and minimizing the adverse effects of converting marginal land for cropland. Urban development on some of the Nation's best cropland added to the concern. It was recognized that some economic and physical factors may cause land suited for cropland to be unavailable for such use.

It was determined that up-to-date statistical data related to these concerns were needed at the regional and national levels. A subset of 5,300 PSU's from the 1967 CNI for 506 counties was selected for the Potential Cropland Study. Data were collected on eight to nine points per PSU. This was the first time that SCS had ever conducted a national special inventory and was also the first time that subsampling had been used for a national survey.

1977 NATIONAL RESOURCES INVENTORY

After completing the 1975 Potential Cropland Study, SCS again turned its attention to fulfilling the requirements of the Rural Development Act of 1972. SCS management decided to conduct a State-reliable inventory using nearly 70,000 PSU's, about half of which were part of the 1967 CNI sample, with data collected on three points per PSU. All three points were selected using a different method from prior inventories, so there was no possibility to detect changes between the data for the 1977 inventory and the previous CNI's. The 1977 inventory was on privately owned land only. All Federal lands, even Federal cropland that was leased to private individuals and organizations was excluded.

The 1977 NRI gathered data on the items historically inventoried by SCS, such as soil capability, land use, and conservation treatment needs. In addition new items were added which included potential cropland, prime farmland, wetlands, and flood prone areas. Also for the first time, data needed to calculate estimates of erosion using the Universal Soil Loss Equation (USLE) and Wind Erosion Equation (WEQ) were added to the inventory. Because this was the first nationwide database containing quantitative erosion estimates, the inventory was originally called the "1977 Erosion Inventory", but was later officially named the 1977 National Resources Inventory (NRI).

The 1977 NRI was the first time that SCS used both sample areas (PSU's) and points to collect data. PSU data were collected on urban and built-up, small built-up, farmsteads, water bodies less than 40 acres, perennial streams less than 1/8 mile wide, perennial streams greater than 1/8 mile wide, construction, roads, and active gullies. This was done because these land features are hard to capture using point data. More than 30 inventory data items were collected as point data.

The Erosion Inventory Quality Control Evaluation Plan indicates that both manual and computer checking were used to identify inconsistencies in data reporting. This is the first indication that computers were used for quality assurance in addition to data entry and analysis.

A stage of the 1977 NRI called "Phase II" was conducted in 1978-79 to collect data on sources of erosion not considered in the basic NRI. Erosion data for such areas as stream banks, gullies, construction areas, roads, and roadsides were collected.

The issue of potential cropland remained a highly visible issue even after the 1975 Potential Cropland Study and the 1977 NRI were completed. It was so important that in 1978 the Economic Research Service conducted a study called "Potential Gopland: The Ownership Factor." To provide the framework for this survey, SCS provided the name and address of the owner of the first point in each 1977 NRI PSU at the time data were collected. This was meant to facilitate the analysis of data collected by two agencies on the same point and in the same timeframe. However, due to differences in data element definitions and SCS not being involved in data editing or development of expansion factors, there were many inconsistencies between the two data bases. This study taught SCS how important it is to work with other agencies on data collection and processing specifications when they are trying to link their surveys to the NRI database.

1982 NATIONAL RESOURCE INVENTORY

The Soil and Water Resources Conservation Act (RCA) of 1977 reinforced inventory activities authorized in the 1972 Rural Development Act. Section 5 (a) of the RCA stated in part:

"In recognition of the importance of the need for obtaining and maintaining information on the current status of soil, water, and related resources, the Secretary is authorized and directed to carry out a continuing appraisal of the soil, water, and related resources of the Nation. The appraisal shall include, but not be limited to:

- (1) data on the quality and quantity of soil, water and related resources, including fish and wildlife habitats;
- (2) data on the capability and limitations of those resources for meeting current and projected demands on the resource base;
- (3) data on the changes that have occurred in the status and condition of those resources resulting from various past uses, including the impact of farming technologies, techniques, and practices; ...".

Section 5 (b) further stated: "The appraisal shall utilize data collected under this Act and pertinent data and information collected by the Department of Agriculture and other Federal, State, and local agencies and organizations. The Secretary shall establish an integrated system capable of using combinations of resource data...".

Even though the 1977 NRI was designed and initiated before passage of the 1977 RCA, the first RCA appraisal report, released in 1980, relied heavily on information from the 1977 NRI. However, the RCA Appraisal recognized over 100 "data gaps" many of which could be fulfilled by a more comprehensive NRI than that conducted in 1977. The appraisal also created an awareness that there was a need for more accurate NRI data, especially on built-up areas. To meet these new needs, the number of data elements collected during the 1977 NRI were "doubled", and the number of sample units was increased from 70,000 to 320,000 which provided multi-county or MLRA level of reliability. Many States requested that additional PSU's be added to provide county reliable data (approximately 45,000 PSU's for 240 counties).

The Department and cooperating agencies had a very positive attitude toward the 1982 NRI. However, in spite of the seemingly generous 19 million dollars allocated for the NRI; funding was considered inadequate for an operation designed to collect all the data using field visits. Previous SCS resources inventories were designed so that the major data collection effort was accomplished in a single year. By contrast, to help offset the budget shortfall and even out the inventory workload the 1982 NRI data collection process included all of 1982 and portions of fiscal years 1981, and 1983.

The 1982 NRI data were collected on worksheets, and edited by hand. Prior to 1982 data entry had been done by the ISU Statistical Laboratory. Although half of the 1982 data entry was done by the ISU Statistical Laboratory, a third of the States used State office computers to key in their data. This was the first time SCS State offices had done any of their own electronic data entry. In addition, the Statistical Laboratory created the first automated link between the soils data and the NRI data base to facilitate data analysis.

Because of the heavy NRI data collection workload placed on the SCS field offices, the Resources Inventory Division (RID) found itself repeatedly responding to congressional inquiries stimulated by Conservation Districts and others at the field level. They wanted to know why the inventory work was so important that it should detract from other field work.

Not only did the 1982 NRI impact SCS field staff; but also, those processing the data. The volume of data collected was so large it took a significant amount of time to process the data for release to the public. The delay caused numerous requests for information prior to the publication of the 1982 NRI data. Requests included data needed for the 1985 RCA appraisal, formulation of the 1985 Farm Bill, and the Food Security Act.

It became evident that four things needed attention for future NRI's. First was the need to better communicate the importance of the NRI data to the State and local levels. Second was the need to improve inventory operations to minimize the data collection workload on SCS Field Offices. Third was to reduce the impact on limited budgets. Fourth was the need to develop less time-consuming methods for collecting, distributing, and analyzing NRI data.

1987 NATIONAL RESOURCES INVENTORY

SCS and RID were so committed to making NRI data collection operations more efficient and effective that a "National Resources Inventory Remote Sensing Pilot Project" was initiated in April 1984. The primary goal of the project was to reduce the impact of NRI activities on SCS field personnel by at least 50 percent, as compared to the 1982 NRI. Other goals were to reduce costs and develop remote sensing technologies for future NRIs. The project was completed in December 1985 at only 25 percent of the estimated cost, which proved how cost-effective remote sensing could be to collect inventory data. One additional benefit was that SCS developed a cadre of personnel trained in remote sensing data collection techniques. Several informal publications and reports resulted from this project that not only changed the way NRI data are collected, but also was the prime impetus for SCS creating several formal remote sensing and Geographic Information System (GIS) training courses.

In February 1985, the Office of Management and Budget announced in the Federal Register a mandated study called the "Circular A-76" Productivity Improvement Program (PIP). As a result of the problems mentioned above, resources inventories was selected as a PIP study. Although the study results were not finalized until 1987; many of the issues that surfaced during the study influenced how the 1987 NRI was conducted.

The "Food Security Act of 1985" extended the "Soil and Water Resources Conservation Act of 1977" to 2008 and lengthened the appraisal period from five years to 10 years. Since the RCA appraisal was extended to 10 year intervals, the need to collect NRI data for 1987 was questioned. However, SCS recognized the need to provide up-to-date data for State and national policy, program formulation, and developing the 1990 Farm Bill. In addition, the Rural Development Act of 1972 called for a report every 5 years, and annual funding had been appropriated for the program. After considering several options, SCS decided to proceed with data collection on a State level inventory. This decision was primarily based on the estimate of \$10-12 million for State level data, versus a cost estimate of \$27-30 million to collect MLRA level data.

The 1977 and 1982 NRIs focused on the status and condition of the resource base. Although the 1975 potential cropland study showed some limited dynamic shifts between land uses, both the 1982 and 1987 NRIs were designed to detect changes between two inventory years for numerous resource conditions. Nevertheless, the plan was not fully implemented for 1982, so for the first time in its 52-year history SCS was able to implement the change detection design--between 1982 and 1987, for the 1987 NRI. However, data that have been collected using different definitions and procedures do not provide accurate information about change. Therefore, the data collectors for the 1987 NRI were instructed to not only collect data for 1987, but to correct any errors they found in the 1982 data base, and to update some 1982 data elements to 1987 technology standards.

Although not required to do so, nearly half of the States used teams to collect the 1987 NRI data and almost 30 percent of the sample data were collected using remote sensing as recommended by the "NRI Remote Sensing Pilot Project."

As in the 1982 NRI, the data were collected on worksheets, but all of the 1987 data were keyed into computers in each SCS State office. To improve data quality; the data entry software performed extensive automated edit and compatibility checks. RID contracted to have NRI data access software (NRIDAS) developed. This provided States the opportunity to access and sort NRI data without using a mainframe computer. It also allowed States to provide NRI data to the public quicker and much less expensive than previously possible.

1992 NATIONAL RESOURCES INVENTORY

The PIP study recommended that a special work group be assigned to determine alternative ways to streamline the overall NRI process for 1992 and beyond. In March 1988, RID appointed a work group representing each SCS organizational level, disciplines involved in data collection, and users of the data base. The work group was given three charges: (1) develop alternatives that will remove the NRI data collection workload from the field office and area office staff, (2) recommend a data collection process that can be funded with a level annual budget, and (3) consider the use of any technology that can reduce the amount of SCS personnel resources needed to conduct the NRI or improve the quality of NRI data. The work group determined that the traditional method of the field office staff going to the field to collect NRI data was no longer a feasible alternative. In March 1989 the work group published a report titled "Streamlining the National Resources Inventory Process." Although the report contained many specific suggestions it can be summarized into five major recommendations: (1) collect only data items that are necessary to meet NRI objectives, (2) use a continuous inventory process to facilitate operating within a level budget, (3) use highly trained State and regional teams to collect the NRI data in order to remove the workload from the Field Office and Area Office staff, reduce training costs, and improve efficiency, consistency, and accuracy, (4) use remote sensing and computer based technologies; such as GIS to acquire, input, and manage data to reduce SCS personnel needs to conduct the NRI, and (5) cooperate with State, and Federal agencies to collect inventory data. The SCS top staff accepted all of the recommendations in the Streamlining Report, and directed RID to begin implementation immediately.

The 1992 NRI was also influenced by the Food Security Act of 1985, as amended by the Food, Agriculture, Conservation, and Trade Act of 1990, which stated: "the Secretary Shall-(1) assess the progress made toward the national objective of nondegradation of the soil resources through the implementation of the relevant provisions of this title,...". To carry out the new continuous inventory process, States were provided funds to create full-time state resources inventory specialist (RIS) positions. The RIS was responsible for developing the State plan to conduct the NRI, acquiring equipment and materials, selecting team members for specific inventory needs, making sure team members are properly trained, and ensuring that inventory work is performed as a primary responsibility rather than an additional task for team members.

Aerial photography, where available, was used to collect the 1992 NRI data, verify the 1982 and 1987 data, and to fill in missing data for prior inventory years. Using 1992 crop year photography allowed photo interpretation to continue into 1993 without compromising the "snapshot" value of the 1992 NRI.

Many of the data elements and definitions used to collect the 1992 NRI data were developed to be compatible with data contained in the Census of Agriculture, and data bases managed by the U.S. Forest Service, U.S. Geological Survey, National Agricultural Statistics Service, and the U.S. Fish and Wildlife Service.

Data collectors not only assembled the 1992 NRI data, but also corrected any errors found in the 1982 and 1987 data and updated the 1982 and 1987 databases to 1992 technology standards. In order to provide trend data for substate analysis, data collectors were also instructed to fill in selected 1987 data items for the almost 200,000 PSU's that were not inventoried during the 1987 NRI. The ISU Statistical Laboratory used the updated 1987 NRI data and imputation methods to create a substate reliable database for 1987. The consistency of the 1982-1987-1992 data created the first 10-year trending database ever produced by SCS.

The 1992 NRI data entry software was developed to assure that the NRI would be a high quality database. Each PSU passed almost 2100 automated edit checks before the ISU Statistical Laboratory produced the final data tables. The continuous inventory process permitted NRI data to be transmitted to the Statistical Lab in batches, rather than waiting until

all data collection was complete. The automated checks eliminated many of the problems that typically delayed data processing. As a result, the Statistical Laboratory processed the 1992 NRI data in an unprecedented 12 months. This permitted the 1992 NRI data to be used for the 1995 RCA appraisal process and the 1995 Farm Bill negotiations.

As part of the 1992 NRI process, each PSU and its points were digitized for use in GIS analysis. Digitized PSU's increased the efficiency, effectiveness, and quality of data collection, and facilitated the creation of software that could provide both tabular and spatial analysis of the NRI data.

Historically, NRI data have been made available in basic statistics publications, standard tables, and on mainframe computer tapes. However, non-USDA personnel do not have access to USDA computers. To make the 1992 NRI data base accessible, SCS developed data analysis software which runs on computer workstations. Users could sort the NRI data base using user defined criteria, and output results to reports, tapes, diskettes, maps, or files. All features are available to users without prior knowledge of data base management software, operating systems, or Geographic Information Systems.

SUMMARY

SCS is the expert on national data bases related to the Department of Agriculture's mission on natural resources and the environment. National Resources Inventory data are now more accessible, easier to use, and will provide opportunities for types of resource analysis previously not possible. History has shown that resources inventory data are a powerful force that can be used to spawn new programs, set new priorities, redirect budgets and staff, and provide a "report card" on program accomplishments. The 1992 NRI will be used extensively to shape SCS into the new Natural Resources and Conservation Service. Although the evolution of forces that shape each inventory will cause the NRI's of the future to be different than today, the Soil Conservation Service can be proud of the fact that the 1992 NRI is a top quality resources data base that is second to none.

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