

National Park Service
U.S. Department of the Interior

Natural Resource
Stewardship and Science



Funding the Natural Resource Challenge

A Report to Congress, Fiscal Year 2001

Colias eurytheme
Great Smoky Mountains National Park
All Taxa Biodiversity Inventory



Butterfly Scan: Digital Imaging Center in Asheville, North Carolina by John Smith
Collector of Specimen: Rebecca P. Shiflett in Knoxville, Tennessee

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Introduction and Overview

The National Park System is a reflection of our nation's natural heritage. The National Park Service must provide protection to this heritage by informed management of the wild life, plant life, water, soils, rocks, and atmospheric resources and their processes and relationships in a changing landscape. If successful, protected resources will sustain invaluable aesthetic, environmental, biodiversity, and scientific qualities for the enjoyment of present and future generations.

To position the NPS to succeed in preserving our natural resources, while improving its ability to provide public access, the NPS developed the Natural Resource Challenge in 1999. The Natural Resource Challenge is a multi-year plan that proposes bringing both public and private resources to bear on confronting issues and resolving problems with good science. Beginning that same year, the NPS took action to implement the Challenge with tasks that could be achieved within available finances and staffing levels. These actions, however, were not enough.

The Challenge includes new funding requests, designed by field superintendents and subject matter experts, necessary to meet future natural resource needs. Congress endorsed and took the first steps to fund the Challenge beginning in Fiscal Year 2000 (\$14,329,000). That commitment was sustained in Fiscal Year 2001 with an additional appropriation of \$15,219,000. This brought the Challenge to an annual funding level of \$29,548,000 for FY 2001.

This report documents the expenditures and related accomplishments for FY 2001, as directed in the House Report 106-22 for the FY 2000 appropriations for the NPS and other Department of the Interior and related agencies. Our report for FY 2000 was completed in July 2001. This report for FY 2001 discusses key emerging patterns, places the Challenge initiative within the NPS's strategic planning context, and provides a synopsis of the activities the National Park Service has initiated or completed with the additional funding provided as a result of the Challenge. The intent of the report is to demonstrate agency accountability for stewardship responsibilities and financial obligations and to communicate that implementation of the Challenge has been extremely successful to date.

The Challenge, a large and complex conglomeration of programs and activities, is organized around three central themes or categories – complete inventories and monitor resources (science for parks), eliminate the most critical resource problems, and attract scientists and good science (parks for science).

During FY 2000, four programs were funded (inventories of plants and animals, Natural Resource Preservation Program, native and nonnative species management, geologic resources preservation), providing an excellent foundation for Challenge implementation. These four programs fall within two of the Challenge themes. During FY 2001, those four programs continued and nine others were instituted or preexisting programs were expanded. Those nine areas were: vegetation mapping, water quality monitoring, air emissions inventory, park vital signs monitoring, making natural resource data usable, park resource preservation programs, water resources protection, learning centers, and Cooperative Ecosystem Studies Units.

Section V. provides budget information for FY 1999 through FY 2002, and the FY 2003 budget request related to the Challenge, as well as more details concerning FY 2001.

Emphasis during FY 2001 was placed on making substantial progress in completing natural resource inventories and in putting monitoring programs in place. Programs that were funded in previous years also continued.

Natural Resource Challenge Funding in Fiscal Year 2001

	<i>Increase</i>	<i>Cumulative¹</i>
Complete Inventories and Monitor Resources		
Natural Resource Inventories, except vegetation mapping		\$7,309,000
Vegetation Mapping	\$1,746,000	1,746,000
Park Vital Signs Monitoring	4,191,000	4,191,000
Water Resource Monitoring	1,272,000	1,272,000
Air Emissions Inventory	200,000	200,000
Making Natural Resource Data Usable	1,098,000	1,098,000
Subtotal	\$8,507,000	\$15,816,000
Eliminate Most Critical Resource Problems		
Funding Increases to Parks	\$3,395,000	\$3,395,000
Natural Resource Preservation Program	2,875,000	2,875,000
Native/Non-Native Species Management	3,449,000	3,449,000
Geologic Resource Protection		696,000
Water Resource Protection	823,000	823,000
Subtotal	\$7,020,000	\$11,238,000
Attract Scientists and Good Science		
Cooperative Ecosystem Studies Units	\$1,596,000	\$1,596,000
Learning Centers	898,000	898,000
Subtotal	\$2,494,000	\$2,494,000
Total Increase	\$15,219,000	\$29,548,000

¹ With increases received in FY 2000

Significant progress has been made in the preservation of park resources. The vast majority of the funds received under the Challenge have been used to resolve park issues or to place information and tools in park managers' hands. Remaining funds were used to develop expertise and Servicewide systems that could be consulted and used by park managers directly. As a result of the availability and application of Challenge funding an important trend of greatly enhanced entrepreneurialism has emerged.

Challenge dollars are being used to leverage funding from a variety of other sources as demonstrated under the themes: Complete Inventories and Monitor Resources and Attract Scientists and Good Science programs. Partnerships are also flourishing across all three themes of the Challenge.

II. Emerging Trends

A. Parks – The Front Lines in Natural Heritage Preservation

The NPS has entered the 21st Century with a long history and tradition of decentralization. The foundation of the National Park System is its individual units, such as parks, historic sites, and recreation areas. Long experience has shown that initiatives undertaken by the agency must be relevant to individual parks and aid in resolving local problems if they are to achieve any degree of organizational acceptance, be successful in achieving goals and objectives, and foster public endorsement.

Examples of park-based activities implemented under the Challenge include:

- Out of the 385 units in the National Park System, 270 qualify for natural resource inventory products. By 2001, 248 parks had base cartographic material available and this information was in preparation for another 22. Two hundred and ten parks had current species lists and another 60 were developing that information.
- Those same 270 parks qualify for the Park Vital Signs Monitoring program. By the end of 2001, 55 parks were designing or conducting monitoring activities.
- Seventeen parks received increases to their appropriations in FY 2001 in support of specific Challenge programs focused on exotic species management and endangered species recovery and habitat protection. While not easily analyzed, this appears to represent an unprecedented number of increases specifically for resource preservation purposes in a single year.
- One million dollars of the Natural Resource Preservation Program (as a small parks project fund) supported 91 projects in 79 different parks with limited budgets and represents a doubling of the pre-Challenge effort.
- Over 260 projects were initiated in parks as a result of staff and cooperators associated with the system of Cooperative Ecosystem Studies Units. The Challenge funded some of the CESU projects and the participation of the NPS.

B. Applying the Results – Out of the File Cabinet/Off the Computer

A substantial portion of the Challenge is aimed at developing natural resource information that is intended to be used by the NPS for resolution of resource issues. Many obstacles exist that may interfere with the successful application of information to park management. Despite those obstacles it is becoming increasingly evident that park managers are responding to information generated by programs established or expanded through the Challenge and applying what has been learned.

The following are examples of how managers are using the types of information being generated as a result of the Challenge. Information in some of the examples was developed prior to the Challenge.

- The staff at Zion National Park is using its geologic map to identify rockfall prone areas and determine slope stability. This information aids in facility siting and design, and improving visitor safety.
- The monitoring of abalone at Channel Islands National Park led to the closing of fishing by state authorities and the first listing of a marine invertebrate on the Endangered Species List.
- Grand Canyon National Park staff are using geologic map information in concert with topographic and vegetation information to delineate Mexican Spotted Owl habitat.
- Monitoring information about ginseng at Great Smoky Mountains National Park has been used by law enforcement personnel to provide better protection to those plants and has been used by the U.S. Fish and Wildlife Service to ban all exports of ginseng roots younger than five years of age.
- At Wrangell-St. Elias National Park, geologic resource inventory information has been distilled into a monograph that has popular as well as technical appeal and is being sold by the park's cooperating association as an interpretive item.

C. Leveraging

A substantial portion of the funds appropriated to the NPS for the Challenge is being used to increase buying power by leveraging alternative sources of funding. Examples of opportunities that have been sought to work cooperatively with other appropriated sources, agencies and organizations, and the private sector include:

- Park appropriations, totaling \$455,284, were used in concert with Challenge funding for resource network biological inventories.
- Funds totaling \$1,163,776 from the USGS-Biological Resources Division and \$1,372,000 from the NPS Fire Management Program were combined with Challenge funding for vegetation-mapping. The map products were used by both natural resource managers and fire management personnel.
- The investment of \$1,596,000 appropriated for Cooperative Ecosystem Studies Units (CESUs) has resulted in \$9,322,331 expended through the CESUs for technical assistance, research, and educational projects that benefit NPS natural resource stewardship—without expanding the federal workforce.

D. Partnerships with Results

Partnerships in the form of cooperative activities and outsourcing have become increasingly more common in the NPS natural resource management circles. The NPS has come to recognize that partnerships foster endorsement of its approaches and policies, bring better science and technology to bear on resource issues, extend parks' spheres of influence, and result in more accomplishments at less cost, as well as support goals related to private sector involvement and growth.

To help manage the NPS Inventory and Monitoring Program, the 270 parks that participate in the program were organized into 32 networks in which they share staffing, funds, and technological resources leading to more efficiency and better coordination.

Examples of partnerships evident throughout the Challenge include:

- Both the Cooperative Ecosystems Studies Units and the Learning Centers are founded on the concept of partnering. The 10 CESUs currently have 80 partners working with them. The partners are primarily colleges and universities but they also include non-governmental organizations.
- While comprehensive data are not available, additional monitoring and resource preservation activities are supported via contracts and agreements with the private sector, state agencies, and nonprofit organizations. For example, Denali National Park has a cooperative agreement with the Alaska Department of Fish and Game to develop bear population estimation techniques and has used two separate bird conservation organizations for development of avian monitoring techniques.
- Inventory and monitoring networks provided \$1,760,785 in Challenge funding to universities and \$1,296,808 to other cooperators to conduct biological inventories.
- In the first five vital signs monitoring networks funded, over \$858,000 went to universities, \$278,000 to other non-federal entities including private sector contractors, and approximately \$264,000 to other federal agencies, including the United States Geological Survey.
- The Florida Exotic Plant Management Team works under the auspices of the Florida Department of Environmental Protection Upland Invasive Plant Management Program and is supplemented by volunteer support from Pillsbury Corporation, Inc. to provide labor. The team uses contractors associated with the South Florida Water Management District and the Florida Department of Environmental Protection.

III.

Strategic Planning

The Government Performance and Results Act (GPRA) stresses measuring performance by tracking outcomes. In managing the natural resources of the National Park System, the desired outcome is resources that are in good condition. Many factors contribute to a particular resource's condition, such as population size, trends, distribution, age and sex ratios within populations, and individual animal health. Distilling and agreeing on the appropriate factors to measure resource conditions in the ecologically diverse National Park System is not simple and numerous factors affect the condition of natural resources. Scientifically based condition information is needed to develop management strategies and activities, to work with stakeholders and partners that influence resource conditions, and to evaluate natural resource management activities.

The framework for implementation of GPRA by the NPS is found in the 1997 Strategic Plan and 2001 Annual Performance Plan.

Development of both the NPS Strategic Plan and the Challenge was closely linked. Activities associated with the Challenge have contributed to achievement of nearly all of the Servicewide long-term goals directly linked to resource preservation. Of particular note have been contributions dealing with natural resource inventories (Goal Ib1), vital signs monitoring (Goal Ib3), exotic species management (Goal Ia1B), threatened and endangered species protection (Goals Ia2A and Ia2B), and visitor understanding and appreciation (Goal Iib1).

Mission goals and long-term goals listed below are those that have the most direct link to the Challenge. NPS's Strategic Plan and Annual Performance Plan contain a complete list of goals. Highlights of activities conducted under the Challenge that support an individual goal are also provided.

Mission Goal Ia: Natural, cultural and associated values are protected, restored and maintained in good condition and managed within their broader ecosystem context.

- Ia1A. Disturbed Lands: 10.1 percent of targeted parklands, disturbed by development or agriculture as of 1999 (22,500 of 222,300) are restored. (2 percent by 2001)

Natural Resource Preservation Program – Disturbed Lands funds supported 12 projects aimed at ecological restoration. These projects combined, when completed, will result in a total of 140 acres restored to a natural condition. Many of the areas were severely disturbed by mineral exploration and development, agricultural improvements such as dams and canals, and the associated roads, and therefore require intensive rehabilitation efforts.

- Ia1B. Exotic Plants: Exotic vegetation on 6.3 percent of targeted acres of parkland (167,500 of 2,656,700) acres is contained. (1.3 percent by 2001)

Four Exotic Plant Management Teams completed their first full operational year focusing control efforts on 100 high priority exotic species. Five thousand eight hundred and twelve acres were treated and 8,215 acres were inventoried to determine the presence of species needing removal.

Thirteen parks that received funding increases addressed exotic species management.

The Pulling Together Initiative and the Plant Conservation Alliance: The National Fish and Wildlife Foundation coordinated with the Biological Resources Management Division to implement two cost share programs that provide federal funds for park based partnership efforts. In both the Initiative and the Alliance, all federal funds must be matched at a minimum dollar for dollar. These partnerships focus on invasive plant management efforts and restoring native species. Examples of projects funded this year include: Dinosaur National Monument weed control, Cowles Bog at Indiana Dunes-National Lakeshore restoration, and Zion National Park native plant restoration.

- Ia2A. Threatened and Endangered Species: 19 percent of the 1997 identified park populations (84 of 442) of federally listed threatened and endangered species with critical habitat on park lands or requiring NPS recovery actions have improved status (14 percent by 2001) and an additional 18.1 percent (80 of 442) have stable populations. (18.1 percent by 2001)

Natural Resource Preservation Program funds supported nine projects dealing with listed species.

Six parks that received funding increases addressed threatened and endangered species.

- Ia2X. Native Species of Special Concern: Populations of plant and animal species of special concern are at scientifically acceptable levels.

The Park Flight program funded seven bird conservation and education projects encompassing 13 national park units.

- Ia3. Air Quality: Air quality in 80 percent of reporting park areas has remained stable or improved. (60 percent by 2001)

The first phase of baseline air quality inventories was completed for 270 park units through an agreement with the University of Denver.

Audits of in-park air pollution sources were initiated at 56 parks. Twenty-three of those were completed. Funding permitted expanding the NPS contribution to the activities of the Western Governor's Association and the Western Regional Air Partnership.

- Ia4. Water Quality: 85 percent of park units have unimpaired water quality. (65 percent by 2001)

Funding was provided to 12 monitoring networks, involving 103 parks, to plan, design, and implement water quality monitoring. In addition, funds supported the development of a Servicewide water quality data management program within the Environmental Protection Agency STORET national water quality database. This will allow NPS water quality monitoring data to be widely shared.

Funding more than doubled for water resources protection projects; a total of 16 projects in 11 individual parks and multi-park projects were funded. These projects focused on data collection and analysis used to describe surface and ground water flow regimes and investigate the dependence of park resources upon water.

- Ia9A. Geologic Resources, Paleontological Resources: 20 percent of known paleontological localities in parks are in good condition. (5 percent by 2001)

Using Challenge funds, the Geologic Resources Division conducted a survey of 278 parks for fossil resources and fossil assessments were conducted at four parks.

Mission Goal Ib: The NPS contributes to knowledge about natural and cultural resources and their associated values. NPS management decisions about resources and visitors are based on adequate scholarly and scientific information.

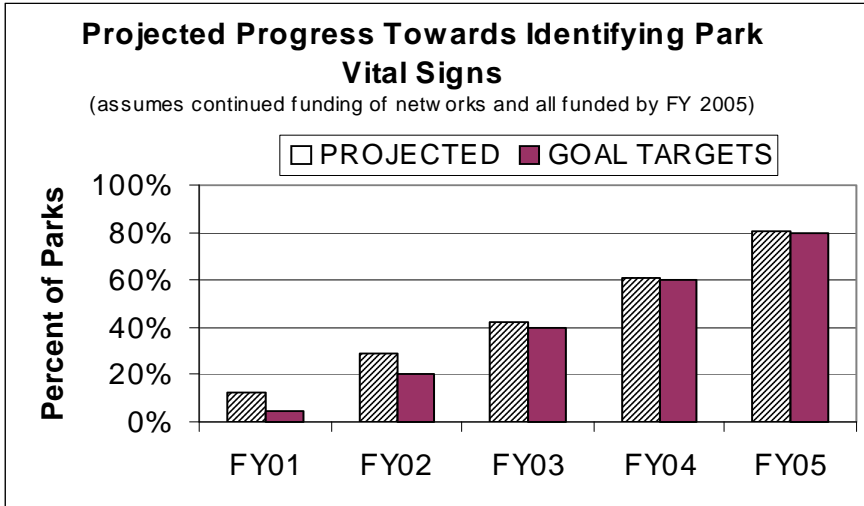
- Ib1. Natural Resource Inventories: Acquire or develop 87 percent (2,203) of the 2,527 outstanding data sets identified in 1999 of basic natural resource inventories for all parks. (30 percent by 2001)

This performance goal is being met as a result of Challenge funding:

Year	# to Acquire	Cumulative %	Status
FY00	453	19.8%	met
FY01	768	30.4%	met
FY02	1121	44.4%	on target
FY03	1498	59.3%	on target
FY04	1883	74.5%	on target
FY05	2203	87.2%	on target

- Ib3. Vital Signs: 80 percent of 270 parks with significant natural resources will have identified their vital signs for natural resource monitoring. (5 percent by 2001)

This performance goal is being met as a result of Challenge funding:



- Ib3. Geologic Resources: Geologic processes in 53 parks (20 percent of 270) are inventoried and human influences that affect those processes are identified. (6.4 percent by 2001)

By the end of FY 2001, 57 parks were in the process of developing geologic resource information with the USGS and state geologic agencies.

Mission Goal IIb: Park visitors and the general public understand and appreciate the preservation of parks and their resources for this and future generations.

- IIb1. Visitor Understanding and Appreciation: 86 percent of visitors understand and appreciate the significance of the park they are visiting. (84 percent by 2001)

Five Learning Centers moved into various stages of development and operations focused on providing opportunities for cooperating scientists to work in parks and to communicate the results of their work to the public.

A template for park display of natural resource information on the Internet was developed and disseminated to parks; when fully implemented, it will provide new information to the public and allow new ways of searching for resource information about parks.

IV.

Action Plan Focus, Accomplishments, and Financial Summaries

This section of the report briefly describes and summarizes what the NPS emphasized during FY 2001, what was accomplished, and how funds were allocated to various programs. Examples in various program areas are also provided.

Because the Complete Inventories and Monitor Resources theme constitutes the foundation of NPS natural resource management and because many other program areas of the Challenge are dependent upon it, the theme was given priority attention during FY 2001.

A. Complete Inventories and Monitoring Theme

Information regarding species distributions, abundance, trends, air and water quality, and other measurements from park vital signs is fundamental to sound management and decision-making as well as resource problem characterization. The Complete Inventories and Monitor Resources component of the Challenge is aimed at placing a fundamental suite of inventory information and trend data in the hands of park managers.

Inventory and monitoring activities are carried out in several program areas, such as the Air Quality Program in the Servicewide Air Resources Division, and to a limited degree, as a part of park-based funded activities. Individual inventory projects may be funded through a variety of sources. In addition, the NPS has established an Inventory and Monitoring Program to fund and oversee the coordinated acquisition of a set of basic natural resource inventories and to establish comprehensively designed monitoring programs. This program provides an in-depth approach to monitoring and coordinates with other specific monitoring programs, such as those for air and water quality.

Natural Resource Challenge Funding

FY 2000 Increases

Natural Resource Inventories, except Vegetation Mapping	\$7,309,000
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FY 2001 Increases

Vegetation Mapping	\$1,746,000
Park Vital Signs Monitoring	4,191,000
Water Resource Monitoring	1,272,000
Air Emissions Inventory	200,000
Making Natural Resource Data Usable	1,098,000
Subtotal	\$8,507,000

Inventory and Monitoring Program

Completing resource inventories and establishing monitoring programs in units of the National Park System is no easy task. The NPS has identified 270 natural resource parks. Each of those units is to obtain 12 basic inventory products. Thus 3,240 products must be prepared. Often a single inventory effort will produce multiple sub-products (databases, reports, specimens, maps, etc.). Furthermore, the 32 networks are charged with development of individually tailored monitoring programs. Often those programs are multifaceted having wildlife, plant life, water and air quality, and landscape components. Until program planning and design is finished, it is not possible to predict how many monitoring program components will eventually be in operation. It can, however, be stated that the system will be complex.



The NPS has adopted two strategies for success. First, the natural resource parks have been organized as a series of networks. Parks within these networks are expected to coordinate fieldwork, share staff and equipment, implement smart business practices jointly, and develop resource trend data indicative of the network at large. By doing this, duplication of effort and costs should be reduced and the integrity of science programs will be improved. Second, each Challenge program that is large and complex is being approached

incrementally. Programs have started with a few parks or networks initially and more parks or networks are added each year. Emphasis is placed on building on the experience gained from early efforts to improve subsequent activities.

- Inventory and monitoring networks provided Challenge funding to universities (\$1,760,785) and other cooperators (\$1,296,808) to conduct biological inventories.
- In the first five vital signs monitoring networks funded, over \$858,000 went to universities, \$278,000 to other non-federal entities including private sector contractors, and approximately \$264,000 to other federal agencies, including USGS.

Inventory and Monitoring Program Funding

Funding Available in FY 2000	\$12,799,000
Uncontrollable Change to Base	7,000
Transfers to Parks	(251,000)
Recision to Base	(27,000)
Net Available After Changes to Base	\$12,528,000
Natural Resource Challenge Increase in FY 2001	
Vegetation Mapping	\$1,746,000
Park Vital Signs Monitoring	4,191,000
Subtotal of Increases	5,937,000
Total Available in FY 2001	\$18,465,000

Complete Inventories and Monitor Resources has received 54 percent of Challenge funding to date. Over 30 percent of targeted inventories have been completed and 87 percent are on target to be completed by 2005.

Basic Inventories NPS continued its effort to complete 12 basic inventories, listed below, in the 270 natural resource parks. The rate at which these basic inventories are being completed has been greatly accelerated as a result of the Challenge.

12 Basic Natural Resource Inventories	Under way FY 01	Completed FY 01
Natural Resource Bibliography	2	257
Base Cartography Data	22	248
Higher Plant and Animal Occurrence (Species List)	62	210
Occurrence and Distribution of Species of Special Concern	270	0
Vegetation Map	17	22
Soils Map	117	37
Geologic Resource Information	239	2
Water Chemistry Data	46	225
Water Body Classification and Location (digital)	270	0
Air Quality Data	0	270
Air Quality Related Values	0	0
Meteorological Data	0	0
	Total 1,107	1,251

See Appendix A for a complete list of the status of all basic inventories for the 270 natural resource parks. The NPS is also working toward implementation of monitoring programs in those same 270 natural resource parks.

Number of Parks with Biotic Inventories in Progress:

Major Taxa	Parks
Amphibians/Reptiles	232
Mammals	231
Birds	198
Fish	189
Vascular Plants	175

Inventory accomplishments include:

- During FY 2001, parks in 28 networks were actively collecting historical biological information and recording it in the NPSpecies database. A total of 136,372 vouchers and 257,422 species listings have been entered into the database.
- A significant number of parks have already met the 90 percent completion criterion for each major taxon included in the biological inventory program.
- Thirty of the 32 networks of parks received funding to conduct inventories on a coordinated network basis for vertebrates and vascular plants. Examples of work initiated include: plant, fish, and small mammal inventories in the Central Alaska Network (Denali NP, Wrangell-St.Elias NP, Yukon-Charley Rivers NPres); exotic plant, amphibian and reptile and native vascular plant inventories in the Heartland Network (Buffalo National River, Cuyahoga Valley NP, Homestead NM, Ozark NSR, etc.); and fish

inventories in the North Coast and Cascades Network (Mount Rainier NP, Olympic NP, North Cascades NP, et al.).

- Funding in FY 2001 was allocated to complete bird inventories in eight park units (Yukon-Charley Rivers NP, Grand Canyon NP, and six small park units in the Northeastern U.S.) and to complete inventories of amphibians and reptiles in three park units (Olympic NP, Fort Necessity NB, and Friendship Hill NHS). These inventories documented the occurrence and distribution of the animals in each park and will complement the biological inventories funded on a network-wide basis.
- Twenty-nine new vegetation-mapping projects were started, representing a substantial increase over previous years. Each project is developing roughly 28 products including: maps, classification reports, keys, aerial photography, and accuracy assessment information.
- Ten soil survey projects were underway during the year. Soil surveys provide basic information needed to manage soil sustainability and to protect water quality, wetlands, vegetation communities, and wildlife habitats. Soil surveys also provide managers with the ability to predict the behavior of a soil under alternative uses, its potential erosion hazard and ground water contamination, its sustainability for control of exotic species and establishment of native communities, and its potential for preservation of cultural sites and landscapes.
- Special bibliographies of geologic data have been completed for 228 of the natural area parks and are available on the NPS Web site, as are digital geologic maps for 16 parks. Geologic reports are complete for the 11 Utah parks, two in Colorado, and one in Alaska. A publication on the geology of the 13 New Mexico parks is underway in partnership with the New Mexico Bureau of Mines and Geology.
- The NPS continued providing funding for a number of other abiotic inventories. This included support of the Natural Resource Bibliographies National Database. It also included limited funding for water quality inventories to develop a field sampling strategy for large Alaskan parks and to complete field inventories for several basic water quality parameters in the following three park units: Sagamore Hill NHS, Richmond NB, and Hopewell Furnace NHS.
- The first phase of baseline air quality inventories was completed for 270 park units through an agreement with the University of Denver.
- Audits of in-park air pollution sources were initiated at 56 parks and 23 were completed.
- Inventory funding was leveraged through the use of \$455,284 in park appropriations for network biological inventories. Further leveraging was obtained using \$1,163,776 in funds from the USGS-Biological Resources Division and the NPS Fire Management Program (\$1,372,000) in combination with Challenge funding for vegetation-mapping.



Freshwater Mussels in the Mississippi River

The freshwater mussel inventory at Mississippi NRRRA suggests that water quality regulations have helped improve habitat for native mussels. Because freshwater mussels can act as the “canary in the coal mine” for aquatic environments, this could have good implications for human health as well. It is also significant that very few exotic zebra mussels were found during the survey and that there were no noticeable impacts to native mussels. Improved water quality and the near absence of zebra mussels may mean that Mississippi NRRRA is one of the last big river mussel refuges in



the Midwest. The Minnesota Department of Natural Resources and Mississippi NRRRA have already relocated several state listed and one federally listed species to sites within the Mississippi NRRRA corridor and the inventory data will help locate other sites for reintroduction.



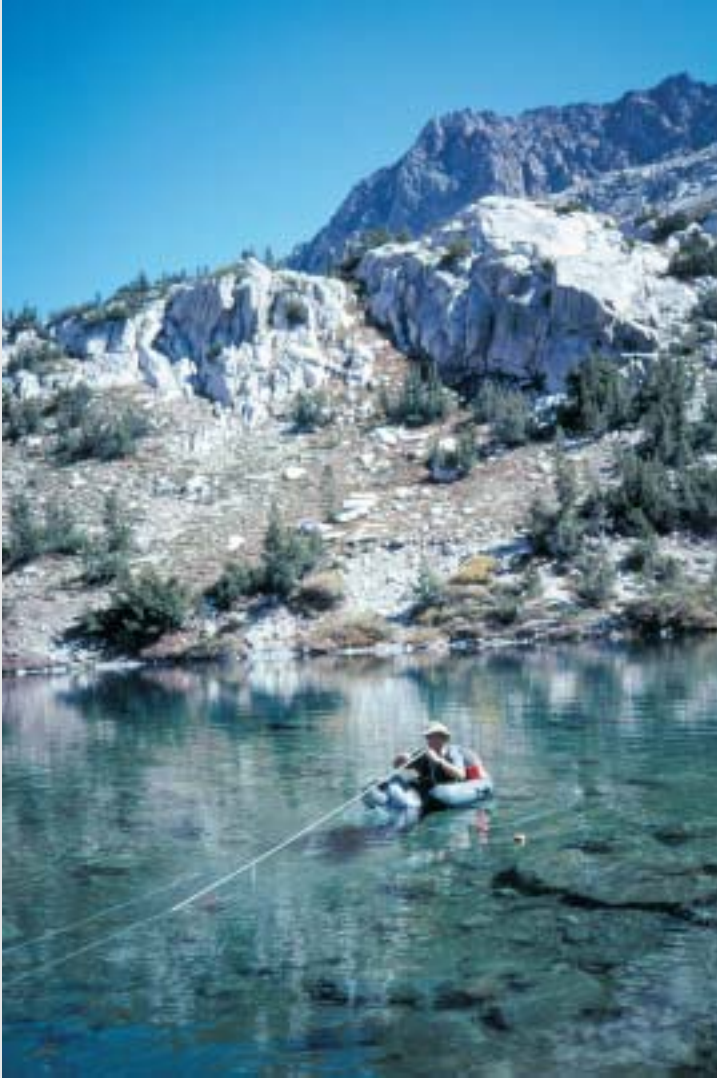
Saguaro National Park Comprehensive inventories of vascular plants and vertebrates at Saguaro NP documented 29 new species of plants, two new species of birds, and one new species of mammal. The surveys documented four species of reptiles that have not been seen at Saguaro for many years. These results highlight the importance of a comprehensive inventory program even for parks that already have species lists. The Sonoran Desert network, of which Saguaro NP is part, will use the work begun in FY 2001 in Saguaro and other desert parks to monitor biodiversity as well as changes in abundance of vertebrates and vascular plants.

Soil Survey at Redwood National Park At Redwood NP, the soil resources inventory is designed to gather soil data and prepare maps of soils and potential vegetation with interpretations necessary to plan and manage land for recreation, forest health, prairie restoration, and watershed planning. Work is also being coordinated with current soil mapping activities outside the park to create a soils database for the NPS and the California Department of Parks and Recreation to effectively manage the soil resources of Redwood National and State Parks. Issues regarding soil erosion rates and slope stability potentials by watersheds will be pursued, as well as the identification of any tsunami deposits that may be present within soil profiles in lower watershed reaches. Other products which will be provided are detailed soil, chemical, and physical characterizations of representative soil profiles within the Tall Trees Redwood Grove, to provide insight as to the remarkable growth rates of these trees. Interpretive products such as soil monoliths, which will help visitors visualize the highly productive soils in the park, will also be provided as part of this inventory. The scheduled completion date for this inventory is FY 2005.

Northeast Region Parks A new vegetation-mapping project initiated during FY 2001 involves a cluster of nine parks located in the NPS Northeast Region. Of the Challenge funds, \$50,953 was used as matching funds with the U.S. Fish and Wildlife Service to contract with the Association for Biodiversity Information office for region-wide ecological characterization efforts. At Delaware Water Gap NRA, the Fire Program matched funds. Photo acquisition and mapping efforts were also undertaken at Morristown NHP, Thomas Stone NHS, New River Gorge NR, and in the following parks in Virginia: Appomattox Courthouse NHP, Petersburg NB, Richmond NBP, Fredricksburg and Spotsylvania County Battlefields, and Booker T. Washington NM.



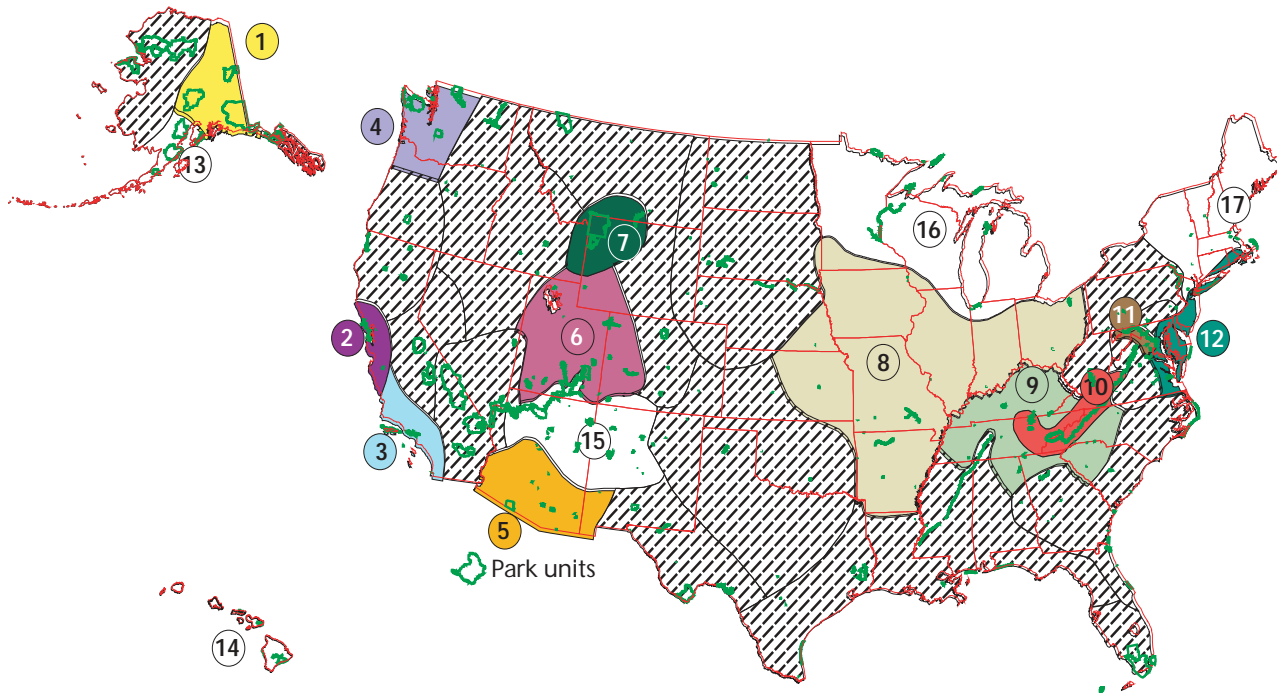
Death Valley National Park Geologic Mapping Above: Death Valley NP is one of the most complex and fascinating park in the world and while studied for years, no comprehensive, dedicated map existed until now. The USGS compiled existing and new maps into a single geologic map of Death Valley NP. The project was funded entirely by NPS inventory funds. Death Valley NP is using USGS maps and scientists as part of facilities planning to avoid construction atop active faults and to help manage ongoing mineral development. The map will be available in the park's visitor center and will be used in the park's interpretive programs.



Courtesy of Rachel Mazur

Sequoia and Kings Canyon NP, and Yosemite NP An important component of the biological inventories conducted by this network during FY 2001 focused on aquatic systems. Mountainous regions of the Western United States contain thousands of small lakes, approximately 95 percent of those were historically without fish. Roland Knapp and staff from the Sierra Nevada Aquatic Research Lab (UC Santa Barbara) surveyed 1,500 bodies of water in Yosemite NP, resulting in a total of 2,700 water bodies surveyed for the project. This is about 90 percent of lakes and ponds in the park. Sequoia and Kings Canyon NP wildlife biologists received additional funding from the park's fee demonstration project to complete aquatic surveys in those parks for fish, frogs, invertebrates, and habitat characteristics. Funding was also obtained to resurvey areas surveyed in 1997 for frogs and incidence of disease in amphibians and to do genetic tissue sampling. In FY 2002, the Yosemite NP data will be analyzed and recommendations provided for restoring of aquatic ecosystems.

Park Vital Signs Monitoring Networks



Monitoring networks funded as of FY 2002 for core park vital signs and water quality


- 1 Central Alaska monitoring network includes three parks located in interior Alaska.
- 2 San Francisco Bay monitoring network includes six parks located in the vicinity of San Francisco.
- 3 Mediterranean Coast monitoring network includes three parks located in southern California.
- 4 North Coast and Cascades monitoring network includes seven parks located in the Pacific Northwest.
- 5 Sonoran Desert monitoring network includes 11 parks in the Southwest.
- 6 Northern Colorado Plateau monitoring network includes 16 parks located in the intermountain West.
- 7 Greater Yellowstone monitoring network includes three parks located in the northern Rocky Mountains.
- 8 Heartland monitoring network includes 15 parks in the Midwest.

- 9 Cumberland/Piedmont monitoring network includes 14 parks located primarily in the Southeast.
- 10 Appalachian Highlands monitoring network includes four parks located in the Southeast.
- 11 National Capital monitoring network includes 11 parks located in the Washington, D.C., area.
- 12 Northeast Coastal and Barrier monitoring network includes eight parks located in New England and the Northeast.

Monitoring networks proposed for funding in FY 2003 for core park vital signs

- 13 Southwest Alaska monitoring network includes five parks in the southwestern part of the state.
- 14 Pacific Island monitoring network includes nine parks located in Hawaii, American Samoa, Guam, and Saipan.
- 15 Southern Colorado Plateau monitoring network includes 19 parks located in the southern part of the Four Corners region.
- 16 Great Lakes monitoring network includes nine parks associated with the Great Lakes.
- 17 Northeast Temperate monitoring network includes 10 parks in New England and the Northeast.

Unfunded networks

-  Fifteen monitoring networks are not proposed for funding in FY 2003 and remain unfunded. They are indicated by cross-hatching.

Monitoring Program In FY 2001, five networks, which include 55 parks, received their first funding to plan and design their monitoring programs. The five networks are shown at the left: North coast Cascades, Sonoran Desert, Heartland, Cumberland/Piedmont, and Northeast Coastal and Barrier. All five networks organized themselves, establishing governing boards and technical committees, developed charters to formalize working relationships among parks, and hired network coordinators. Staff time was largely committed to planning and design of monitoring programs through workshops, program reviews, literature reviews, and consultations with scientific experts. Many of the first 55 parks were already conducting some level of monitoring using various other sources of funds. These programs will be incorporated into the Park Vital Signs Monitoring effort or will be closely affiliated with it.

Number of parks from the first five networks (n = 55 parks) that were in various phases of designing and conducting long-term monitoring of natural resources in FY 2001 using funding from the Challenge or other sources (e.g., base funds or partnerships).

	Air Quality	Water Quality	Water Quantity	Geologic Resources	Plants	Animals	Landscape
Planning and Design							
Number of parks monitoring with other funding	7	22	5	13	22	16	6
Protocols Implemented							
Number of parks monitoring with NRC funding	3	3	0	3	5	4	4
Number of parks monitoring with other funding	10	13	4	7	12	16	2
Analysis/Synthesis Available							
Number of parks monitoring with NRC funding	3	3	0	1	4	6	3
Number of parks monitoring with other funding	6	11	3	2	5	12	0

Design and implementation for newly funded Park Vital Signs Monitoring are not yet complete, but significant efforts are underway and promising. For example:

- Assateague Island NS is part of the Northeast and Coastal Barrier network funded for Park Vital Signs Monitoring in FY 2001. In a cooperative effort with NASA and the USGS, an aerial technology called LIDAR is being used to detect fine-scale changes in the park's topography and results are already being used to improve restoration plans. The US Army Corps of Engineers used a map generated by LIDAR data in conjunction with the park's GIS maps to make adjustments to a proposed restoration project to better fit the desired outcome of the project. The LIDAR project is being evaluated for use in other Northeast Coastal Barrier parks, and perhaps other coastal parks, for monitoring shoreline change.
- Seed money was made available to seven other networks, representing 46 parks, to allow them to begin gathering information and start the hiring process for their network coordinators. These networks include: Central Alaska, National Capital, Northern Colorado Plateau, Mediterranean Coast, Greater Yellowstone, Appalachian Highlands, and San Francisco Bay. These networks are receiving full funding in FY 2002.
- In 1992, the NPS launched the Prototype Long-Term Ecological Monitoring Program. As originally conceived, a small number of parks were to be developed as "centers of excellence" that would engage in in-depth monitoring and would be in a position to share expertise and technical assistance with other parks in the system. Since its creation, the Biological Resources Division, USGS has worked in partnership with the NPS at each of these parks in ecological modeling, sampling design and protocol development. The first phase of development of this program called for 11 monitoring programs involving 22 parks. Seven of the original 11 programs are now base funded or largely funded to conduct their monitoring programs. During FY 2001, Challenge funding was used to support the remaining four prototype parks in the planning and design of their programs.

Application of the results from the prototype monitoring programs are indicative of the uses which Park Vital Signs Monitoring data will be used in the future. Some examples include:

- Data from five years of monitoring the island fox population at Channel Islands NP indicated that the park's fox population was in grave danger of becoming extinct. This information was made available in time for park managers to initiate a captive-breeding program to stabilize the population. Without the data, the island fox population on at least one of the islands might have been completely lost before the severity of the decline was apparent.
- At Great Smoky Mountains NP, flowering dogwood, a key species in the park, is being killed by dogwood anthraxnose, an exotic fungus. Monitoring information suggests that low intensity fire may be an effective way to counteract the fungal infestations. Also at Great Smoky Mountains NP, monitoring data are being used by law enforcement to protect American ginseng, a rare, long-lived herb that is the park's most poached species. Plants seized by rangers are aged and replanted and become part of the monitoring program to assess poaching pressure and effectiveness of countermeasures. Information to date has proved decisive in banning all U.S. exports of roots younger than five years of age.

- Cape Cod NS monitoring data are being shared with neighboring municipalities to allow both the NPS and local towns to better evaluate environmental impacts of proposed actions outside parklands. The data are also being shared with state agencies to assist in statewide planning and analyses, and to evaluate the regional importance of Cape Cod NS to state threatened and endangered species such as the piping plover.
- Vegetation-monitoring results at Big Meadows in Shenandoah NP have recently been used to mitigate impacts of archeological work on rare plant communities, determine success of a large prescribed burn to control shrubs, and to educate visitors and staff.

Water Resources Monitoring

The NPS is committed to protecting unimpaired water quality in parks from future impairment, including waters classified as Outstanding National Resource Waters (ONRW's) or state-equivalent listed waters. NPS is also committed to working with state Clean Water Act programs, as well as taking appropriate management actions within parks, to support the restoration of impaired water bodies in parks to an unimpaired condition. Presently, approximately 116 parks have state-listed impaired water bodies within their boundaries. Approximately 60 percent of the FY 2001 water quality monitoring funding increase is earmarked for monitoring impaired waters, and approximately 40 percent is for pristine waters.

Water Resource Monitoring is a portion of the Water Resources Program. The complete funding for the Water Resources Program is shown below:

Water Resources Program Funding

Funding Available in FY 2000

Water Resource Projects	
Water Resource Protection	\$674,420
Competitive Projects	805,000
Other	27,000
Water Resource Technical Assistance	2,534,500
Other Water Resource Management	730,000
Subtotal	4,770,920
Natural Resource Challenge Increase in FY 2001 ¹	1,275,000
Natural Resource Challenge Increase in FY 2001 ²	825,000
Recision	(2,000)
Total Available in FY 2001	\$6,868,920

¹ Increase for Water Resource Monitoring – reported on in previous section.

² Increase for Water Resource Protection – reported on below

Water Resource Monitoring Funding Portion of Water Resource Program

Water Resource Monitoring Funding Available in FY 2000	0
Natural Resource Challenge Increase in FY 2001	\$1,275,000
Total Available in FY 2001	\$1,275,000

The planning and design of Water Resources Monitoring is slated to be implemented in full integration with the NPS Park Vital Signs Monitoring Program. This is because water quality is a key vital sign in determining overall aquatic ecosystem health. By factoring in priorities for Park Vital Signs Monitoring in the determination of water quality monitoring priorities, it will be possible to meet the monitoring objectives of the NPS water quality management program and support the broader Park Vital Signs program goal of assessing the status of park ecosystems, especially aquatic ecosystem health. By fully integrating the design of these programs, considerable cost efficiencies have been and will continue to be realized in staffing, planning and design, administration, implementation, data management, and reporting.

- Full water quality monitoring program funding was allocated to the first 12 Park Vital Signs Networks in FY 2001. The money supported the development of an NPS Servicewide water quality data management program within the Environmental Protection Agency STORET national water quality database, supported the Water Resources Division in procuring necessary database management technology, and supported division staff travel in support of network planning and design endeavors.
- The Water Resources Division allocated 13 work months involving five members of its staff to support program administration and the development of program technical guidance, technical protocols, detailed study plan and Quality Control/Quality Assurance Plan guidance, and database management.

North Coast and Cascades Water Quality Monitoring

A cooperative agreement with Evergreen State College was initiated for \$30,000 to compile and analyze available water quality data for Mount Rainier NP, San Juan Islands NHP, Ebey's Landing NHR, and Fort Clatsop NM. The USGS-BRD was funded \$10,890 to support taxonomic identification of zooplankton and aquatic macroinvertebrates at Mount Rainier NP as a baseline for aquatic biomonitoring. Funding also supported developing a zooplankton and macroinvertebrate baseline at North Cascades NP, data mining and compilation at Olympic NP, GIS development, and a series of network planning workshops.

Air Emissions Inventory

The Air Emissions Inventory is a portion of the Air Resources Program. The complete funding for the Air Resources Program is shown below:

Air Resources Program Funding

Funding Available in FY 2000	\$6,285,000
Natural Resource Challenge Increase –FY 2001 for Air Emissions	200,000
Total Available in FY 2001 for entire Air Resource Program	\$6,485,000

Audits of in-park air pollution sources were initiated at 56 parks. Twenty-three of those were completed and parks were found to be substantially in compliance with air pollution control, permitting, and emissions requirements. Sample performance measures and strategies for reducing pollution from typical in-park facilities were shared with parks. This effort furthers the partnership of the Air Resources Division with the Western Governor's Association and the Western Regional Air Partnership.

Making Natural Resource Data Usable

Prior to the FY 2001 funding increase, the NPS ability to provide data and information to others was limited to development of an annual report on the Inventory and Monitoring Program, production of a series of fact sheets on natural resource topics, production of *Park Science*, and a semi-technical report titled *Natural Resource Year in Review*. The increase more than tripled the amount of funding available to work on making natural resource data usable.

Funding to Make Natural Resource Data Usable

Funding Available in FY 2000	\$456,000
Uncontrolled Changes	(9,000)
Recision	(3,000)
Natural Resource Challenge Increase in FY 2001	1,098,000
Total Available in FY 2001	\$1,542,000

Challenge increases were used in two programmatic areas – integration of natural resource data and development of information tools for resource management and education.

- The NPS new Research Permit and Reporting System was put on-line after six years of planning and development. The system expedites the permitting process and allows NPS employees and the public to make inquiries about the nature of scientific investigations that are underway in parks. Between January 1, 2001 and September 30, 2001, over 2,700 permit applications were submitted via the automated system. One hundred and seventy parks processed 2,200 of those permits during that same time.
- Synthesis, an information management system, which has been under development for several years, was ready for wide distribution throughout the National Park System. Synthesis provides an automated, user-friendly platform to store and access a variety of natural resource information including maps, species lists, and text from documents. Nine networks, representing 86 parks, 17 individual parks,

and one regional office requested installation of Synthesis during the year. Synthesis training opportunities and materials were also prepared. Cooperators working with the NPS on Synthesis are Pennsylvania State University, James Madison University, and the University of Arizona.

- The agency’s natural resource Web site, NatureNet, was redesigned to comply with new agency style standards and improvements were made to the Natural Resources Intranet making it more useful and accessible. NatureNet received more than 3.5 million hits during the year. Additionally, a template for park display of natural resource information was developed and disseminated to parks.
- On the suggestion of staff at Petersburg National Battlefield, the Synthesis staff developed means to repackage Synthesis information into a form applicable for use by park interpreters and educators. Innovative programming techniques, like virtual reality software, were used to present natural and cultural resource information in an entertaining fashion. The team has developed virtual walk-throughs from historic and prehistoric cultural and natural landscapes. To provide supportive information for these virtual experiences, the team developed several HTML-based “knowledge centers.” These knowledge centers present basic information on natural resource themes and show linkages (within these themes) among NPS units. For example, a knowledge center might offer general information on paleontology, identify NPS units that have fossils, and present park-specific information on those fossils. Six park-based virtual experiences were initiated in FY 2001 and seven knowledge centers.

B. Mitigation of Critical Resource Problems Theme

Eliminate Most Critical Resource Problems has received 38 percent of Challenge funding to date. While the natural resources of the National Park System may appear to be in good or even excellent shape, many resource problems are more deeply rooted than they appear superficially. Plants and animals may have completely disappeared or be on the brink of extirpation from a given park yet this condition may not be conspicuous. Species that do not normally reside in a park may have invaded and may now be excluding or adversely influencing the plants and animals that would normally be there. Water quality may be poor but no visual clues are present. Mitigation of Critical Resource Problems constitutes the second largest of the three central themes of the Challenge.

Seventeen parks received increases to their appropriations targeted at removal of exotic species, protection of endangered species and their habitat, and multicomponent management programs.

FY 2000 Increases

Natural Resource Preservation Program	\$8,307,000
Native/Nonnative Species Management	3,441,000
Geologic Resource Protection	696,000

FY 2001 Increases

Water Resource Protection	825,000
Park Bases	\$3,395,000

Funding Increases to Parks

This section addresses the following increases received in FY 2000 and 2001:

As part of the Challenge, base increases were provided to parks in FY 2001, with special emphasis on parks proposing activities related to control of exotic plants and animals and recovery of threatened and endangered species.

Park Funding Increases

Park Funding Increases FY 2000	0
Portions of park bases specific to the Challenge	
Natural Resource Challenge Increase in FY 2001	3,395,000
Total Available in FY 2001	\$3,395,000

Funding Increases to Parks for Controlling Exotic Species, Restoring Threatened and Endangered Species, and Other Natural Resource Management Activities

Antietam National BP	\$150,000
Big Cypress NPres	399,000
Buck Island Reef NM	100,000
Catoctin Mountain Park	89,000
Coronado NMem	60,000
Curecanti NR	141,000
Great Smoky Mountains NP	402,000
Haleakala NP	480,000
Jewel Cave NM	50,000
John Day Fossil Beds NM	95,000
Mojave NPres	470,000
Rock Creek Park	163,000
Saugus Iron Works NHS	58,000
Sequoia & Kings Canyon NP	112,000
Theodore Roosevelt NP	133,000
Virgin Islands NP	399,000
Zion NP	94,000

In the case of small parks with limited expertise for resource management activities, the increases may broaden natural resource management capabilities, such as a single position with multiple responsibilities, if exotic species or threatened or endangered species are among the issues for the park. Twelve of the parks that received increases worked on exotic species problems in their parks. Highlights of park accomplishments resulting from the increases in FY 2001 are summarized below.

- Leveraging the Challenge dollars with funds from Fee Demonstration funds, park base, and a Public Land Corps grant made it possible for Zion NP to support two critical positions and supervise over 4,500 hours of volunteer service. Positions responsible for invasive weed inventory, control and follow-up revegetation were established. The park crew and numerous volunteer work groups treated over 800 acres, with a focus on control of tamarisk and Russian olive in desert riparian zones, areas of high biological productivity overall and important habitat for the endangered Southwest Willow Flycatcher and the Virgin Spinedace – currently under a conservation agreement. Other targeted exotic species include knapweeds, white top, mullein, bull thistle and Scotch thistle in disturbed lands; and Johnson grass, Russian thistle, nonnative annual mustards, and grasses in developed zones.
- Theodore Roosevelt NP moved its exotic species control program from a project-funded program to a based-funded program, hiring a biologist to administer the exotic plant management program and training volunteers and interns. The park implemented its Biological Control Program for leafy spurge with these personnel. Three species of biological control agents (beetles) were collected and distributed throughout the months of June and July. Collection reached nearly seven million beetles, which were distributed to 11 different states and two Canadian provinces and included 52 releases in the park. Three hundred and thirty vegetation-plots were monitored, gathering specific data on biological and chemical control efforts. Photo-point documentation was also completed. Chemical treatment was also applied to approximately 154 acres on the ground and an additional 652 acres by air. Finally, the park mapped exotic species-related data in its GIS with Challenge support.
- Haleakala NP hired a student intern and volunteer coordinators. Volunteers were recruited who actively engaged in alien species control throughout the summer, supplementing the ongoing activities of NPS biological technicians to control Australian tree fern, clidemia, tibouchina, kahili ginger and other invasive plants detrimental to the health of native Hawaiian ecosystems. Most of the funding was committed to an ongoing cooperative agreement with University of Hawaii for hiring personnel for feral animal and alien plant control research and endangered species monitoring.
- Big Cypress NP concentrating its efforts on Melaleuca removal and treatment, primarily in the Addition Lands area, a large portion of the northeastern part of the preserve that was recently acquired. The park applied primary treatments on about 16,556 acres of melaleuca-infested wetland, which will contribute to habitat restoration of the entire preserve and completes the first round of treatment for the entire preserve. This initial treatment will require a continuing program to control invasive exotic plants, especially Melaleuca, on about 50,000 acres, to prevent a loss of recent progress (costing \$3 million dollars provided by a Miami-Dade County mitigation project). The removal of Melaleuca from the preserve's sensitive wetlands will permit the reestablishment of native plant communities and increase plant and animal diversities and productivity.
- Significant progress was made in Great Smoky Mountains NP in addressing the issues of exotic plant removal and habitat restoration, removal of nonnative rainbow trout to provide habitat for the only native trout species occurring in the park, and expanded emphasis on control of the exotic European

Boar. Results included conversion of additional acreage of exotic fescue fields to native warm season grasses; removal of 5,799 Princess Trees (*Paulownia*), 683 Trees of Heaven (*Ailanthus*), removal of exotic plants along Highway 129 and the Foothills Parkway that are sources of exotic seeds invading prescribed burns and wildfires on the west end of the park including the removal of 2,034 Princess Trees and 3,638 Trees of Heaven. Altogether, 60 acres were treated, exclusive of the highway/parkway area, representing nearly a threefold increase in treatment from the previous year.

- John Day Fossil Beds NM supplemented its paleontological resource management with a natural resource management specialist, as well as a temporary position to work primarily on riparian restoration and noxious weed control. The primary accomplishment was the treatment of almost 1,000 acres of noxious weeds. The weeds included dalmation toadflax, Russian knapweed, Mediterranean sage, whitetop, and mullein.
- Sequoia and Kings Canyon NP hired a restoration ecologist and filled a new exotic plant/restoration crew position. With these positions, seasonal staff, and additional funding from other sources, exotic plant surveys were conducted on 350 acres and approximately 315,000 acres of high priority exotic plants were removed, including bull thistle, foxglove, woolly mullein, and Italian thistle. In addition, the park planted a total of 4,020 shrubs, trees, grass, and forb plugs and collected 10 pounds of seed, and containerized over 6,700 bareroot conifer seedlings for future restoration.
- Virgin Islands NP and Buck Island NM are primarily concerned with exotic animals—mongoose, donkeys, rats, and feral cats. At Virgin Islands NP, a full-time biologist and other staff were hired to undertake exotic animal-related activities. The park completed compliance activities for construction of a donkey exclusion fence, gathered preliminary information for a donkey reduction plan, and undertook planning and compliance for reduction and control of feral goats and hogs. Buck Island NM also worked on an assessment for rat eradication. At Virgin Islands NP trails and other damage from feral hogs were repaired and patrols to respond to exotic animal incidents increased.
- Rock Creek Park hired seasonal and intern personnel, primarily for maintenance of previously treated areas. A total of 186 acres were treated, including 11 previously untreated acres and 20 reinfested acres, as well as maintenance control activities on 155 acres. A new invasive, Japanese stiltgrass, was treated on about half of the acreage. Removal of exotics in the floodplain is allowing reemergence of several populations of green dragon, a rare species in the area.
- Catoctin Mountain Park hired a full-time biologist and an environmental specialist; its resource management activities were formerly addressed part-time by a supervisory ranger. The new staff worked with the Exotic Plant Management Team on exotic species control projects and the full-time professional staff at the park will allow the park to provide the necessary follow-up activities to maintain control.
- Jewel Cave NM hired a seasonal exotic species control crew that began a GPS inventory of exotic species, developed a control plan, and treated 15 acres.
- Zion NP permanently established monitoring that is consistent with recovery program guidelines for peregrine falcons and Mexican spotted owls, which previously had no secure funding and had been inconsistent. The park relocated and monitored 19 historic peregrine territories, as well as three new ones, together involving 33 young. The park also relocated and monitored 16 historic and four new owl

territories. Two fledglings of these hard-to-view birds were seen. Documentation, management, and distribution of data for these and other species was improved, including information on past and current nesting success and productivity.

- At Curecanti NR, a full-time ecologist was hired, but did not begin during the fiscal year. The increase in funding in FY 2001 provided for additional interns and a term position to expand monitoring of peregrine falcons, especially eyries located in popular rock climbing areas, expand exotic species control, participate in planning and evaluation related to endangered fish recovery, and other resource management activities.
- At Coronado NMem, the Challenge is providing for the upgrade of the resource management position consistent with NPS standards, and for increased professional and seasonal staffing. In FY 2001, the Memorial hired two persons to monitor lesser known long-nosed bats and Mexican long-tongued bats, Mexican spotted owls, barking frogs, agaves (primary bat food source), and nocturnal rodents. In addition, it leveraged funds from Bat Conservation International and the Natural Resource Preservation Program's small-park-fund to install bat gates at two abandoned mines.
- Buck Island NM, which has an active sea turtle monitoring program, was able to significantly expand its resource management capabilities by hiring two biological technicians and supporting its inventory and monitoring biologist. The new positions monitor and assist with endangered sea turtles, brown pelicans, coral reefs, fisheries, and exotic rat control. Monitoring has been assured, allowing permanent positions to perform work for which there was previously no secure funding.
- Mojave NPRES is implementing the Desert Tortoise Recovery Plan to contribute to efforts to delist the species within 25 years. A new wildlife biologist is effecting coordination with other agencies and managing tortoise monitoring. A science advisor assists in evaluating methodologies of data and coordinating research. A compliance specialist is assuring that park activities and planning are evaluated for their effects on tortoises. A new agreement has been signed with U.S. Fish and Wildlife Service. Finally, expanded education efforts are helping to protect tortoises.
- Antietam National BP is a smaller park needing broader resource management capability. It undertook the administrative actions to hire a full-time natural resource program manager and hired seasonal staff to address inventory and monitoring, exotic species, and species of special concern. In FY 2002, the park will be able to support limited seasonal staff in addition to the full-time program manager.

As indicated for several of the parks above, pending filling of permanent positions, funding was often used to undertake resource management activities using temporary positions or contracts. Saugus Iron Works NHS, for example, used the lapse funding for research and planning related to the Saugus River hydrology, habitat, water quality and dams; a herpetology study, collections management, and wetlands compliance. At Great Smoky Mountains NP unused position funding supported construction of a greenhouse to propagate native plants for restoration subsequent to exotics removal and for mitigation purposes. At Coronado NMem such funding contributed to preparing office space for the enhanced resource management staff. Many of the parks also purchased equipment for new resource management staff, such as computers, monitoring equipment, and supplies for exotic plant control.

Natural Resource Preservation Program

Natural Resource Preservation Program Funding

Funding Available in FY 2000	\$8,307,000
Natural Resource Challenge Increase in FY 2001	0
Total Available in FY 2001	\$8,307,000

Most resource management activities are undertaken at the park level, where resource management funding provides salary and support costs for personnel in parks. Parks usually have little or no flexible, dedicated funding for cyclic and one-time project needs. To undertake expensive projects most parks require special project funding. The major source of such funds is the Natural Resource Preservation Program (NRPP). It provides the only reliable and dedicated source of large NPS project funding (project costs greater than \$50,000) available to parks for natural resource management projects. The Challenge resulted in an increase of \$2.875 million to the NRPP in FY 2000, a 52.9 percent increase over the previous \$5.432 million available. As part of the Challenge, two special portions of NRPP were established to fund disturbed lands and threatened and endangered species restoration projects.

Over 86 percent, totaling \$7.2 million, in funds was used in FY 2001 for park-level natural resource management projects. Some of these funds strategically target specific needs and are generally distributed as follows: \$1,000,000 for Small Park Projects, \$850,000 for Disturbed Lands Restoration, \$500,000 for Threatened and Endangered Species Projects, \$225,000 for USGS/BRD Technical Assistance Projects, and \$600,000 for Servicewide projects. Some variation in this distribution occurs annually.

The FY 2001 distribution is shown below. The funds supported 165 endangered species, disturbed lands restoration, and other natural resource management projects in parks. Fourteen Servicewide projects were also supported as well as two special initiatives: the USGS Technical Assistance Agreement and Brucellosis Research.

Natural Resource Preservation Program Summary

Type of Project	Number of Projects	Funding Allocation
Natural Resource Management	53	\$4,818,000
Threatened and Endangered Species	9	500,000
Disturbed Lands Restoration	12	850,000
Small Park	91	1,000,000
USGS Technical Assistance Agreement	NA	255,000
Brucellosis Research	1	150,000
Servicewide Projects	14	715,000

See Appendix E for a complete list of all projects funded under the NRPP.

The Natural Resource Management category is the largest segment of the NRPP. Priority park projects are submitted by regions and reviewed and ranked by a panel of subject matter experts, which recommend projects for funding based on project quality, resource threats and other factors. Projects must cost at least \$50,000 but no more than \$900,000 and may last no more than three years. The projects listed below have received their final funding installment. Although these projects will not receive additional funding from the NRPP program beyond FY 2001, fieldwork, data analysis, report writing, peer review of reports or other parts of the project may continue into the next fiscal year.

Region	ST	Park	Project	Total Funding	FY 2001 Funding
AKR	AK	Cape Krusenstern NM	Assessment of lead levels in plants	\$75,000	\$75,000
IMR	AZ	Grand Canyon NP	Control of Himalayan blackberry	\$54,000	\$27,000
IMR	CO	Rocky Mountain NP	Restore Hidden Valley ski area	\$372,000	\$52,000
IMR	NM	White Sands NM	Non-lethal removal of exotic Oryx	\$200,000	\$55,000
MWR	AR	Buffalo NR	Assess macroinvertebrate community	\$50,000	\$25,000
IMR	TX	Big Bend NP	Eradicate saltcedar at spring	\$60,000	\$23,000
NER	VA	Shenandoah NP (+7 NER parks)	Control invasive exotic vegetation	\$390,000	\$205,000
PWR	CA	Channel Islands NP	Develop exotic species control strategy	\$148,000	\$10,000
PWR	CA	Lake Mead NRA (+4 other parks)	Remove exotic tamarisk	\$595,000	\$195,000
PWR	CA	Mojave NPRES	Remove exotic burros	\$899,000	\$296,000
PWR	ID	Hagerman Fossil Beds NM	Survey and map paleontology sites	\$96,000	\$34,000
SER	FL	Big Cypress NPRES	Develop mineral management plan	\$120,000	\$70,000
SER	KY	Mammoth Cave NP	Evaluate food chain for endangered Unionid Mussels	\$48,000	\$24,000
NER	VA	Shenandoah NP	Test backcountry plan	\$567,000	\$125,000
NER	VA	Shenandoah NP	Develop definitive air quality related values report	\$428,000	\$140,000
			Total		\$1,356,000



Removal of Exotic Burros from Mojave National Preserve Feral burros (*Equus asinus*) have had serious and potentially irreversible impacts on native flora and fauna of Mojave National Preserve. This ecosystem cannot be restored until the feral burro population is drastically reduced. Burro eradication has therefore, been designated the top resource management priority for the preserve. FY 2001 concluded a five-year effort to non-lethally remove feral burros. A total of 1,768 feral burros were removed by nonlethal means. Two methods were used: helicopter assisted roundup captured 889 burros and water trapping captured 879 burros. The Bureau of Land Management and the Fund for Animals provided assistance in burro adoption. Animals captured that may have entered the preserve from adjacent public lands were taken to the BLM horse and burro adoption facility in Ridgecrest, California. The remaining burros were transferred to Euclid Stockyards, where they were sold as pets or relocated to the Fund for Animals' Black Beauty Ranch. No trapping efforts were conducted at springs, wetlands, riparian areas, or other sensitive environments. All trapping locations chosen were in sites previously impacted by livestock and feral burros.

Native/Nonnative Species Management

Native/Nonnative Species Program Funding

Funding Available in FY 2000	\$3,449,000
Recision	(8,000)
Increase in FY 2001	0
Total Available in FY 2001	\$3,441,000

FY 2002 Native/Nonnative Species Funding Categories

Exotic Plant Management & Ecological Restoration	\$1,987,000
Endangered Species Program	260,000
Integrated Pest Management Program	197,000
Wildlife Management Program	383,000
Biological Resource Projects	685,000
Subtotal	\$3,441,000

Exotic Plant Management and Ecological Restoration The national parks are home to complex native communities of plants and animals that have developed over millions of years. This natural heritage is threatened by the invasion of exotic plants and animals and other human caused disturbances that foster the establishment of exotic species. The introduction of harmful exotic species is an emerging global problem and control of exotic species is one of the most significant land management issues facing the National Park System.

- Seventeen parks received funding increases in whole or in part to address exotic species management and recovery of threatened and endangered species.
- Modeled after the approach used to fight wildfires, Exotic Plant Management Teams (EPMTs) are designed to provide highly trained mobile strike forces of plant management specialists to assist parks in the control of exotic plants. These field or park-based teams are: Florida, based at Everglades NP, Florida; National Capitol Region, based at Rock Creek Park, Washington, D.C.; Chihahuan Desert/Southern Shortgrass Prairie, based at Carlsbad Caverns NP, New Mexico; and Pacific Islands, based at Haleakala NP, Hawaii.
- Four EPMTs completed their first full operational year. The teams focused control efforts on 100 high priority exotic species, treated 5,812 acres, and inventoried 8,215 acres to determine the presence of species needing removal.
- Six species have been eradicated from parklands for the first time in recent history. Haleakala NP is now free of damaging silk oak and thatching grass and Loggerhead Key in Dry Tortugas NP is now exotic species free.
- The Pulling Together Initiative and the Plant Conservation Alliance, through the National Fish and Wildlife Foundation, utilized two cost-share programs that provided matching federal funds for 10 park-based partnership efforts related to invasive plant management efforts and restoring native species.

- The Biological Resources Division staff also began efforts to work more closely with the NPS Fire Management Program Center with parks involved in ecological restoration efforts.

Florida Partnership Exotic Plant Management Team While some other Exotic Plant Management Teams (EPMTs) utilize in-house crews, the efforts in Florida reflect the flexibility of the team concept. All work in Florida is accomplished through a partnership with the State of Florida Department of Environmental Protection Upland Invasive Plant Management Program, which matches every NPS dollar with a state dollar. Work is accomplished through contracted crews. More than 1000 acres were treated, including initial treatment of the entire acreage of



DeSoto National Monument and Loggerhead Key in the Dry Tortugas. These efforts involved volunteers from park staffs as well as 50 volunteers from Pillsbury Inc. Community support through volunteerism is a significant part of management and control of exotic plant species in Florida's national parks.

To increase efficiency and encourage broad support for exotic plant control, the

EPMT initiated two agreements with the South Florida Water Management District, one on exotic plant monitoring and one that will allow District contractors to treat weeds within Everglades National Park. The EPMT helped establish a new organization, the South Biscayne Bay Exotic Plant Management Working Group (SBBEPWG), which anticipates production of an exotic plant management plan in 2002. SBBEPWG includes representatives from Biscayne National Park, Miami-Dade County, the Nature Conservancy, Florida Power and Light and the State of Florida. Finally, the EPMT prepared a successful proposal to the U.S. Army Corps of Engineers on behalf of Everglades NP. As a result, the Corps will provide \$700,000 over five years for treatment of exotic plants in the habitat of the Cape Sable seaside sparrow, a federally listed endangered species.

Total Exotic Plant Management Teams Accomplishments – FY 2001

Acres Treated	5813
Acres Retreated	192
Acres Inventoried	8215
Acres Monitored	3304
Acres Restored	2
Species Eradicated from Parks Served	6

Florida Partnership EPMT FY 2001 Accomplishments

Acres Treated	1100
Acres Retreated	20
Acres Inventoried	4694
Acres Eradicated	4

Endangered Species Program During FY 2001 the Challenge again provided important opportunities for the Endangered Species Program to contribute to the stabilization and recovery of threatened and endangered species in national parks. The NPS endangered species databases (see table page 37) are being updated and summaries are being written of needed recovery actions for each listed species that occurs in NPS units. These concise reviews can be utilized by NPS resource managers to identify project priorities for funding, and to evaluate the consequences of park operations on listed species.

- The Endangered Species Program is working closely with the Smithsonian Institution to provide more efficient curation of specimens collected in national parks and is also working on a new program to preserve seeds from endangered plants with the National Seed Storage Laboratory and Center for Plant Conservation.
- Program endangered species biologists have provided technical assistance to park units from coast to coast, including advice on listed plants and birds to Colonial NHP, as it prepares for its 400th anniversary, and to Channel Islands NP which has brought its endemic island foxes into a captive breeding program.
- The final 2001 issue of the U.S. Fish and Wildlife Endangered Species Bulletin focuses exclusively on conservation efforts in national parks; there are articles from each NPS region as well as an overview of the NPS program.

- The Endangered Species Program has taken a lead role in drafting and negotiating memoranda of understanding (MOU) with other federal agencies in order to prevent further species declines.
- An MOU on black-tailed prairie dogs, another on amphibians and reptiles, and a third on migratory birds will provide NPS managers with clear direction in conservation efforts.
- In order to stabilize species that move beyond park boundaries, the Endangered Species Program has helped the NPS develop new partnerships with Bat Conservation International, Partners in Flight, and the International Association of Fish and Wildlife Agencies.

Number of Endangered Species in National Park System

Plants	193
Invertebrates	43
Fish	40
Amphibians	4
Reptiles	19
Birds	53
Mammals	46
Total	398

Integrated Pest Management Program The NPS Integrated Pest Management Program (IPM), viewed as a model by other resource agencies in managing pest species, continued to provide a broad range of technical services and IPM training in FY 2001. The IPM Program provides low risk strategies for the management of exotic and native pests adversely impacting park management objectives through training and technical assistance. This technical assistance is provided to more than 100 parks per year through on-site consultations by IPM staff, providing material or remote consultations on problems and by identifying other experts who provide assistance to park personnel. The technical assistance provided by the IPM program often results in a more economical and permanent solution to pest management problems. The IPM program not only assists with natural resource management and pest management issues but assists many other program areas within the NPS including, operations, concessions, cultural resources and visitor safety.

Wildlife Management Program The Biological Resources Management Division's Wildlife Management Program provides policy guidance, technical assistance, and training to enhance the ability of park staff to meet the increasing demands for professional wildlife management. This includes the areas of wildlife health, wildlife restoration, exotic species management, wildlife population management, and the identification of wildlife research needs.

The Park Flight Migratory Bird Program works to protect shared migratory bird species and their habitats in both U.S. and Latin American national parks and protected areas. The program develops bird conservation and education projects and creates opportunities for technical exchange and cooperation. Park Flight is a partnership between NPS, National Park Foundation, National Fish & Wildlife Foundation, American Airlines, and the University of Arizona. The program is made possible through the generous support of American Airlines and the NPS Challenge. Technical direction is provided through the University of Arizona Desert Southwest Cooperative Ecosystem Studies Unit and NPS Biological Resource Management Division.

Foot-and-mouth Disease An outbreak of foot-and-mouth disease (FMD) in the United States could have dramatic impacts not only on the nation's domestic livestock, but on natural resources as well. The NPS proactively addressed the potential impacts of FMD on wildlife, other natural resources, and visitor opportunities by preparing FMD prevention and response plans. The plans were prepared using a unique combination of technical expertise provided by the Biological Resource Management Division and other science consultants with the emergency incident integrated response expertise of an NPS Type I Incident Management Team. The FMD prevention plan has been implemented in the NPS and the response plan stands ready if needed. Further, these plans serve as a template for NPS emergency response, for example in the case of bioterrorism, to other disease threats to wildlife species.

- In FY 2001, Park Flight funded seven bird conservation and education projects encompassing 13 U.S. national park units.
- In cooperation with the National Fish and Wildlife Foundation/ USAID Neotropical Migratory Bird Conservation Program, Park Flight also funded priority projects at important bird conservation sites in Guatemala, El Salvador, Nicaragua, Honduras, Panama, and Mexico. One project provides for educational field trips for K-12 children to learn about migratory birds, several projects provide for the exchange of technical expertise among US National Parks, Central American parks and protected areas and also increases understanding of the cultures of the participating countries.
- Projects will increase park and protected area outreach efforts capabilities to reach visitors by establishing bird trails and other interpretive efforts.
- As part of the FY 2001 Park Flight technical exchange effort, interns from Mexico and Nicaragua assisted with monitoring and education efforts at Sequoia/Kings Canyon NP and Point Reyes NS/ Golden Gate NRA. These technical exchanges are coordinated through the NPS Office of International Affairs International Volunteer in Parks program. In addition, an NPS employee provided technical assistance for a Park Flight project in Nicaragua.

Biological Resources Projects Thirteen competitively chosen Biological Resource Management projects in parks were supported.

FY 2001 Biological Resource Management Competitive Projects

Park	Project Title	Funding Status
Lake Clark NP & Pres.	Tracking sockeye salmon	Complete
Badlands NP	Translocate and restore bighorn sheep	Ongoing
3 Hawaii Parks	Identify invasive plants threatening ecosystem	Complete
Cape Hatteras NS	Develop and implement feral cat management plan	Complete
Channel Islands NP	Eradicate black rats from San Miguel Island	Complete
Cape Hatteras NS	Determine natural resource impacts from recreation	Complete
Voyageurs NP	Protect Muskellunge in Shoepack Lake	Ongoing
Santa Monica Mts. NRA	Assess distribution and status of Mountain Lion	Ongoing
Cape Cod NS	Survey Horseshoe Crabs	Ongoing
Sequoia Kings Canyon NP's	Protect resource from trespass cattle	Complete
Golden Gate NRA	Northern Spotted Owl demographic study	Complete
Santa Monica Mts. NRA	Assess reptile and amphibian distribution & status	Ongoing
Rock Creek Park	Determine ecological vulnerability of Kenk's Amphipod	Ongoing

Geologic Resources Protection

Geology Program Funding

Funding Available in FY 2000	
Other Geology Programs (not Challenge)	\$1,952,000
Geologic Resource Protection	696,000
Subtotal	\$2,648,000
Natural Resource Challenge Increase in FY 2001	0
Recision	(6,000)
Total Available in FY 2001	\$2,642,000

- Challenge funds (\$696,000 of the FY 2001 total program funds) were used to provide technical expertise in a variety of geologic fields other than minerals management, which is the focus of the balance of the program. This Challenge funding has put the Geologic Resources Division in a position in which it is able to respond to all parks seeking assistance with technical aspects of geology as it applies in park settings.
- The Geologic Resources Division staff provided technical assistance on 33 disturbed lands restoration projects and assumed responsibility for management of the Disturbed Lands portion of the Natural Resource Preservation Program fund source.
- The Division staff responded to 14 assistance requests on coastal processes, and 10 requests for aid related to geologic hazards.
- Surveys of 278 parks regarding fossil resources were conducted and fossil assessments were conducted at four parks.
- The Division worked jointly with the USGS in the development of Coastal Vulnerability to Sea Level maps for three parks. This will be critical information for park planning and management purposes.
- The agency's involvement with cave and karst resources was elevated through sponsorship of a National Cave and Karst Management Symposium and other professional activities.

Water Resources Protection

Water Resources Program Funding

Funding Available in FY 2000

Water Resource Projects	
Water Resource Protection	\$674,420
Competitive Projects	805,000
Other	27,000
Water Resource Technical Assistance	2,534,500
Other Water Resource Management	730,000
Subtotal	4,770,920
Natural Resource Challenge Increase in FY 2001 ¹	1,275,000
Natural Resource Challenge Increase in FY 2001 ²	825,000
Recision	(2,000)
Total Available in FY 2001	\$6,868,920

¹ Increase for Water Resource Monitoring – reported on in previous section.

² Increase for Water Resource Protection – reported on below

- A total of 16 projects in 11 individual parks and multi-park projects were funded. These projects focused on data collection and analysis used to describe surface and ground water flow regimes and investigated the dependence of park resources upon water.
- The majority of FY 2001 project funds were used to support ongoing studies. In the desert southwest, projects are developing modeling capabilities for regional ground water flow systems. In the eastern states, hydrologic studies are developing information on the results of impoundments on surface river systems. These tools are needed by decision-makers to understand the potential impacts to park water resources from a number of existing water development proposals. Other results are being developed to better understand the potential impact on water-dependent resources of potential changes in stream and ground water flow.
- Funding is also used by the Department of the Interior Office of the Solicitor to supply legal advice and prepare technical, written opinions on behalf of the NPS. Extensive interface exists between these activities and other agencies including the U.S. Fish and Wildlife Service, the Bureau of Reclamation, the U.S. Army Corps of Engineers, and the U.S. Geological Survey. See Appendix E for a list of all Water Resource Protection projects.

C. Attract Scientists and Good Science

NPS has long recognized the need to have access to high-quality science to improve management of parks and particularly the natural resources in those parks. Parks need to become attractive to cooperating scientists and graduate students. Park managers need to become more aware of the current state of scientific knowledge. A logical outcome would also be translation of scientific findings in parks to laymen's terms and transfer of information to the scientific community and the public. The Attract Scientists and Good Science theme of the Challenge is aimed at fostering a climate conducive to scientific investigation and has received eight percent of Challenge funding to date.

- Both the Cooperative Ecosystems Studies Units and the Learning Centers are founded on the concept of partnering. The 10 CESUs currently have 80 partners working with them. These are primarily colleges and universities but they also include non-governmental organizations.
- Between January 1, 2001 and September 30, 2001, over 2,700 permit applications were submitted via the new NPS automated research and collecting permit system. One hundred and seventy parks processed 2,200 of those permits during that same time.

This section addresses the following increases received in FY 2001:

FY 2001:

Cooperative Ecosystem Studies Units	\$1,596,000
Learning Centers	898,000
Total	\$2,494,000

Cooperative Ecosystem Studies Units

CESUs are interdisciplinary, multi-agency partnerships with the nation's universities and other institutions. Individual CESUs are part of a national network that has been established recently with leadership from the NPS, the USGS, and other federal agencies. Their broad scope includes the biological, physical, social, and cultural sciences needed to address natural and cultural resource management issues at multiple scales and in an ecosystem context.

About 260 projects were completed in parks as a result of staff and cooperators associated with the system of Cooperative Ecosystem Studies Units. The Challenge funded \$1,596,000 in NPS participation in these units and 69 projects. Together with other funding, a total of \$9,322,331 was expended through the CESUs for technical assistance, research, and educational projects from other sources, including funds for 197 projects using non-CESU funding.

Cooperative Ecosystem Studies Units Funding

Funding Available in FY 2000	\$0
Natural Resource Challenge Increase in FY 2001	1,596,000
Total Available in FY 2001	\$1,596,000

Cooperative Ecosystem Studies Unit Projects – 2001

CESU	Challenge Projects	Leveraged Projects
Colorado Plateau	10	43
Desert Southwest	14	20
Rocky Mountain	22	45
Great Plains	2	10
Chesapeake Watershed	1	3
North Atlantic Coast	2	7
Great Basin	1	3
Pacific Northwest	11	26
South Florida/Caribbean	1	26
Southern Appalachian	5	10

Learning Centers

The Learning Centers have been designed as public-private partnerships that involve a wide range of people and organizations including researchers, universities, educators, and community groups. Learning Centers are field stations for collaborative research activities, providing researchers with laboratory, office and dormitory facilities. Collaboration and cooperation help to leverage available resources to address the National Park System's current backlog of research projects. Learning Centers are cost-effective because each will have a small core staff and operational expenses will be shared with partners. The actual facilities are housed in either adaptively reused buildings in parks or facilities in surrounding communities.

As part of the Challenge five Learning Centers moved into various stages of development and operations focusing on providing opportunities for cooperating scientists to work in parks and to communicate the results of their work to the public. Four of the following Learning Centers were funded by the Challenge. The Ocean Alaska Science and Learning Center was funded through an add-on; however, it was originally developed as a result of the Challenge.

- The Appalachian Highlands Learning Center provided services to 39 of Great Smoky Mountains NP's 155 research permit holders. A total of 100 professors, graduate assistants and others from 31 colleges and universities were involved in activities at the Learning Center. The Learning Center also received over \$500,000 in grants and in-kind donations.
- The Pacific Coast Learning Center at Point Reyes NS already has a number of inventory, monitoring and research projects underway, supported in part by over \$150,000 in funds and in-kind donations from partners.
- The Atlantic Learning Center at Cape Cod National Seashore has several partners such as Intel Corporation and the Federal Energy Management Laboratory assisting in rehabilitating park structures for use by the Learning Center. Research projects and education activities are underway, and a research catalog for prospective researchers is being developed. Research permits for the park have doubled.

- The Continental Divide Research and Learning Center at the McGraw Ranch at Rocky Mountain NP is in nearly full-operation, although all renovations, funded privately, are not yet complete. In addition to funds for the historic property renovations, the Learning Center received over \$800,000 in donated funding and in-kind support for research.
- The Ocean Alaska Science and Learning Center, based at Kenai Fjord NP and the Alaska Sealife Center, was involved in several exciting projects to disseminate science information, including a Web-based project focused on satellite and radio telemetry and teacher workshops on using the Learning Center and the park in classrooms and field trips.

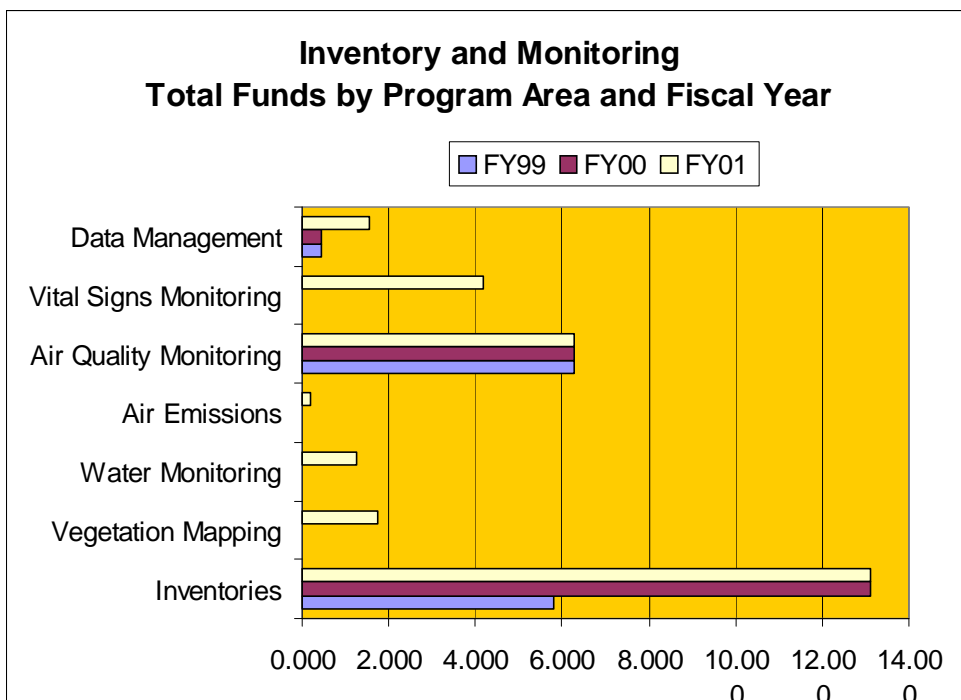
V.
Financial Details
Natural Resource Challenge Funding History
(In Thousands of Dollars)

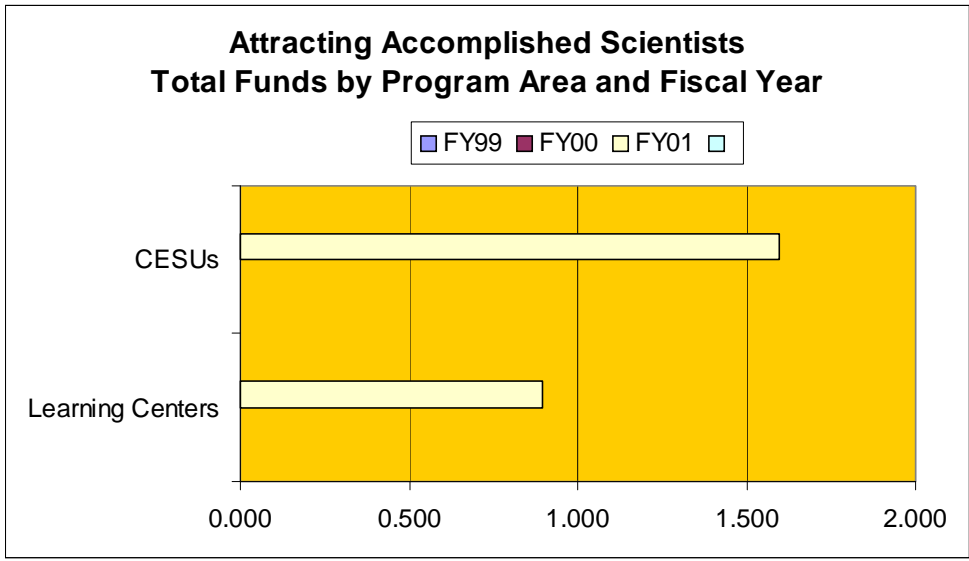
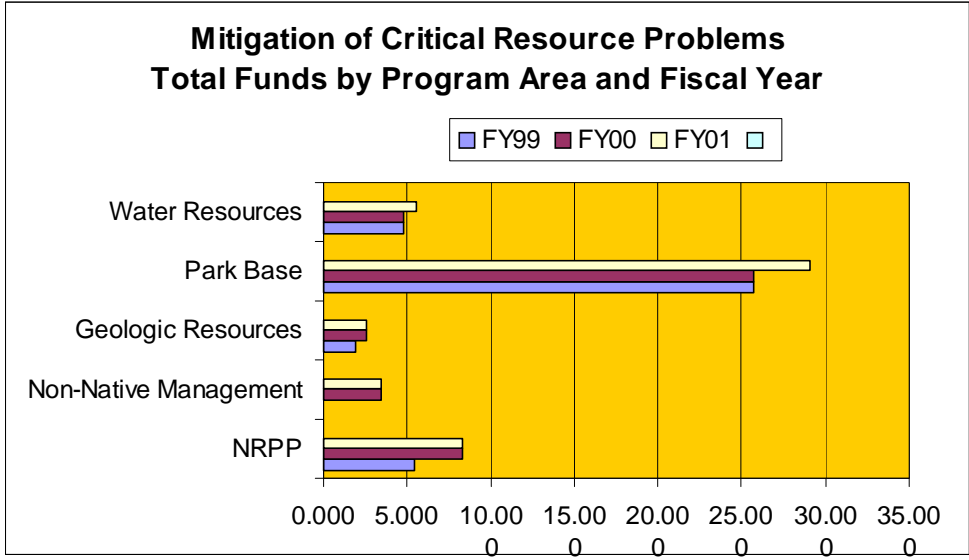
	FY 1999 Base 11/	FY 2000 Change	FY 2001 Change	FY 2002 Change	FY 2003 Change Request
Complete Inventories & Monitor Resources					
Complete basic natural resource inventories, except vegetation mapping <u>1/</u>	5,787	7,309			2,000
Vegetation mapping cost-share with USGS	0		1,746		2,250
Monitor vital signs in networks of parks	0		4,191	4,200	6,900
Monitor water quality in parks and assess watershed conditions	0		1,272		3,600
Expand air quality monitoring and related activities	6,285			2,600	
Inventory air emissions in parks <u>2/</u>	0		200		
Make natural resource data useable for management decisions and public <u>3/</u>	455		1,098		
Synthesize resource information for planning					
Subtotal	12,527	7,309	8,507	6,800	14,750
Eliminate Most Critical Mitigation Problems					
Expand NRPP project fund, specialized inventories, training	5,432	2,875		4,000	500
Create native/nonnative program/field teams for nonnative species management	0	3,449		2,400	2,145
Establish resource protection fund	0			300	
Implement Resource Protection Act – restore resources	0			500	
Protect geologic resources <u>4/</u>	1,918	696			
California Desert restoration					
Increase park bases for nonnative and threatened & endangered species recovery <u>5/</u>	25,693		3,395	3,200	
Expand water resource protection & restoration <u>6/</u>	4,754		823	1,000	200
Subtotal	37,797	7,020	4,218	11,400	2,845
Attract Good Science					
Establish Learning Centers	0		898	1,800	
Establish CESUs	0		1,596		400
Involve scientists with parks					
Subtotal	0		2,494	1,800	400
Nat. Res. Challenge Plus Affected Programs	50,324	14,329	15,219	20,000	17,995
Non-Challenge Natural Resource Categories <u>7/</u>					
Park Base	31,402	5,046	6,014	3,835	1,556
Regional Project Programs	2,093	0	0	0	0
Servicewide Project Programs <u>8/</u>	2,216	-23	8	12	8
Central Office Support <u>9/</u>	8,196	1,731	1,498	156	-448
Total Natural Resource Categories Not Affected	43,907	6,754	7,520	4,003	1,116
Everglades Restoration and Research	12,800	-4,092	1,299	862	
Total Natural Resources Appropriation by Year <u>10/</u>	107,031	124,022	148,060	172,925	188,085

- 1/ FY 1999 figure includes program support and \$895,000 for monitoring projects; in addition, \$2.2 million appropriated for this program was previously transferred to parks for their prototype monitoring activities.
- 2/ Included in Budget Justification as Air Quality Program, with air quality monitoring, shown separately here.
- 3/ In FY 1999, these funds were not shown separately in the Park and Program Summary.
- 4/ Part of a larger Geologic Resources Program that also includes Abandoned Mine Land Restoration and other mining and minerals-related activities.
- 5/ Estimated amount in park bases, prior to the initiation of the Natural Resource Challenge, devoted to activities related to invasive and threatened and endangered species management. Estimated amount is derived from park base amounts contained in official NPS accounting system, adjusted to reflect portions of amounts identified against GPRA Goals (Ia1 and Ia2).
- 6/ Part of larger Water Resource Program; Water Quality Monitoring will be included in this total in the Budget Justification as well.
- 7/ Primarily consists of “uncontrollable changes” (i.e., pay cost) and park specific increases (outside the Challenge) affecting natural resources. Small amounts of uncontrollable changes affecting base amounts in Natural Resource Challenge categories are included here. Uncontrollable changes to base have not been tracked in the Natural Resource Challenge numbers.
- 8/ Oil Pollution Program and Geographic Information Program.
- 9/ Includes Headquarters and Regional Office support
- 10/ Comprised of the following three Program Components included as part of the Resource Stewardship Budget Subactivity in ONPS: Natural Resource Research Support; Natural Resources Management, and Everglades Restoration and Research.
- 11/ Enacted amount shown in FY 2000 Budget Justification.

Comparisons of Funding Between Fiscal Years

The following three tables provide comparisons between Fiscal Years 1999, 2000, and 2001 for each Natural Resource Challenge Program Area grouped by Challenge themes.





Appendix A

Projected completion schedule for baseline natural resource inventories being conducted by the National Park Service Inventory and Monitoring Program ^{1/}

Basic Data Sets	2001 ^{2/}		2002		2003	2004	2005-10
	Underway	Completed	Underway	Completed	Completed	Completed	To be Completed
Automated Bibliographies	2	257	7	263	270	270	0
Base Cartographic Data	22	248	0	270	270	270	0
Higher Plant and Animal Occurrence (species lists)	62	210	0	270	270	270	0
Distribution of Species of Special Concern	271	0	271	0	0	250	21
Vegetation Maps	17	22	40	27	37	52	218
Soils Maps	117	37	97	57	80	100	172
Geology Maps	239	2	227	14	26	38	232
Water Resource Locations (digital) ^{3/}	271	0	141	271	271	271	0
Water Chemistry	46	225	0	271	271	271	0
Air Quality	0	250	0	250	250	250	0
Air Quality-Related Values	0	0	0	0	0	50	220
Meteorological Data	0	0	135	135	270	270	0

1/ The Servicewide program acquires basic inventory data sets for about 272 parks with significant natural resources. However, some parks have acquired some of these data sets and a few parks may not need all 12 sets. The parks to complete reflects the number of parks Servicewide with outstanding needs.

2/ Based on 11/24/99, 2/27/01, and 6/21/01 data. Numbers reflect end of FY conditions and available funding.

3/ Figures are based on provision of digital hydrography at a scale of 1:100,000. Use of 1:24,000 scale hydrography from the USGS National Hydrography Dataset is preferable for use in measuring water condition by water bodies. This data set includes identification of stream reaches with unique codes, allowing correlation with data in the STORET database. These data will not be included and completed by 2004 at the current funding level.

Appendix B- Inventory and Monitoring Funding Categories

FY 2001 Inventory and Monitoring Funding Categories:	
Resource Inventory Projects	\$10,759,500
Monitoring and projects	5,588,000
Database Development	730,000
Regional Coordinators	605,000
Program Administration	<u>782,500</u>
TOTAL	\$18,465,000

Appendix C – Network Funding for Vertebrate and Vascular Plant Inventories

Amount of funding provided to individual park networks during FY 2001 for conducting inventories of vertebrates and vascular plants.

Network	Total Budget	Allocation
Southwest Alaska Network	1,331,828	180,200
Northwest Alaska Network	1,437,470	348,183
Central Alaska Network	942,915	262,334
Southeast Alaska Network	404,648	145,372
Great Lakes Network	1,181,860	245,651
Heartland Network	788,301	230,100
Northern Great Plains Network	782,749	128,456
Mid-Atlantic Network	424,635	0
Eastern Rivers and Mountains Network	602,551	30,000
Northeast Coastal and Barrier Network	866,885	0
Northeast Temperate Network	579,880	262,334
National Capital Network	686,257	114,026
Cumberland/Piedmont Network	565,541	135,005
Southeast Coast Network	1,163,014	228,857
Gulf Coast Network	852,881	203,800
Appalachian Highlands Network	675,657	151,952
South Florida/Caribbean Network	1,398,877	305,417
Northern Colorado Plateau Network	1,037,439	290,643
Rocky Mountain Network	580,733	95,000
Greater Yellowstone Network	665,742	142,100
Southern Colorado Plateau Network	1,185,253	444,403
Southern Plains Network	310,302	171,000
Sonoran Desert Network	615,521	533,500
Chihuahuan Desert Network	709,820	13,000
North Coast and Cascades Network	787,636	163,100
Northern Semi-Arid Network	481,769	139,792
San Francisco Bay Network	682,333	158,765
Mojave Desert Network	780,669	100,000
Mediterranean Coast Network	731,032	149,504
Sierra Network	602,002	107,500
Pacific Islands Network (Hawaiian parks)	900,000	217,860
Klamath Network	731,392	79,032
Guam	129,669	41,669
American Samoa	190,210	61,210
Saipan	86,528	26,528
Totals	25,893,999	5,906,293

Appendix D – Allocations for Inventories other than Network Biological Inventories
Allocations for Inventories other than Network Biological Inventories

Organization	Title	FY 2001 Funding
BIOTIC INVENTORIES		
NPS	Database Contract	\$ 135,000
NPS	IT IS Development	20,000
Grand Teton NP	Vegetation	2,500
Bandelier NM	Vegetation	2,500
Thomas Stone NHS	Vegetation	109,447
New River Gorge National River	Vegetation	70,770
Rocky Mountain NP	Vegetation	20,000
Northeast Regional Office	Vegetation	85,700
Yosemite NP	Vegetation	2 75,000
Sequoia/Kings Canyon NP	Vegetation	195,300
Glacier NP	Vegetation	199,500
Delaware Water Gap NRA	Vegetation	146,000
Morristown NHP	Vegetation	11,300
Coastal and Barrier Network	Vegetation	57,500
Mid-Atlantic Network	Vegetation	160,400
Cape Cod NS	Vegetation	8,000
Black Canyon of the Gunnison NM	Vegetation	11,000
Great Smoky Mountains NP	Vegetation	35,000
Florissant Fossil Beds NM	Vegetation	137,814
Fort Union Trading Post NHS	Vegetation	45,000
Effigy Mounds NM	Vegetation	128,081
Alaska NP's	Vegetation	500,000
Olympic NP	Amphibian Inv (cont. FY00)	108,000
Fort Necessity	Herp Inventory (cont. FY00)	35,000
Friendship Hill	Herp Inventory (cont. FY00)	35,000
Gettysburg NMP	Bird Inventory (cont. FY00)	30,000
Hopewell Furnace NHS	Bird inventory (cont. FY00)	30,000
Valley Forge NHP	Bird Inventory (cont. FY00)	30,000
Eisenhower NHS	Bird Inventory (cont. FY00)	30,000
Allegheny Portage Railroad NHS	Bird Inventory (cont. FY00)	30,000
Johnstown Flood NM	Bird Inventory (cont. FY00)	30,000
Grand Canyon NP	Bird Inventory (cont. FY00)	44,600
Yukon-Charley Rivers NP	Bird Inventory (cont. FY00)	81,200
Alaska NP's	Habitat Delineation	197,000

Appendix D – Allocations for Inventories other than Network Biological Inventories

NPS	Base Cartography	80,000
NPS	Map Digitizing	55,000
NPS	Horizon Report Format	100,000
NPS	Water Body Classification	50,000
Sagamore Hill NHS	Water Quality	4,700
Hopewell Furnace NHS	Water Quality	29,500
Richmond NBP	Water Quality	28,000
Walnut Canyon NM	Water Quality	2,800
Navajo NM	Water Quality	17,000
Alaska NP's	Water Quality	24,000
Appalachian Trail	Bibliography	40,000
Columbia-Cascades SO	Bibliography	70,000
Intermountain Region Parks	Soils	26,100
Denali NPP	Soils	87,200
Big Bend NP	Soils	12,000
Crater Lake NP	Soils	79,500
Channel Islands NP	Soils	126,500
Redwoods NP	Soils	112,800
Grand Canyon NP	Soils	177,000
Padre Islands NP	Soils	100,000
Big Bend NP	Soils	15,000
Great Smoky Mountains NP	Soils	195,000
Hovenweep NM	Geology	1,500
Glen Canyon NRA	Geology	50,000
Death Valley NP	Geology	50,000
Great Smoky Mountains NP	Geology	5,000
Guilford Courthouse NMP	Geology	1,500
Kings Mountain NMP	Geology	22,000
Badlands NP	Geology	4,000

Appendix E- Natural Resource Preservation Program Projects

E-1a. Natural Resource Management Projects – Fully Funded – Table included in text of report.

E-1b. Natural Resource Management Projects – New and Ongoing

Region	State	Park	Project	Total Funding	FY 2001 Funding
AKR	AK	Denali NP and Pres	Managing human use and wildlife resources	\$260,000	\$75,000
AKR	AK	Glacier Bay NP	Quantifying commercial and sport fishing harvest	\$160,000	\$66,000
AKR	AK	Katmai NP	Alagnak River management plan	\$394,000	\$151,000
AKR	AK	Kenai Fjords NP	Carrying capacity Exit Glacier	\$275,000	\$84,000
AKR	AK	Noatak National Pres	Population abundance and demography of Dall's Sheep	\$280,000	\$90,000
IMR	AZ	Petrified Forest NP	Preservation of petrified wood	\$168,000	\$56,000
IMR	TX	Lake Meredith NRA	Control non-native saltcedar	\$132,000	\$44,000
IMR	WY	Fossil Butte NM	Assessment and protection of new paleontological sites	\$168,000	\$56,000
IMR	WY	Grand Teton NP	Monitoring of wolves	\$396,000	\$133,000
IMR	WY	Yellowstone NP	Native cutthroat trout conservation in Yellowstone Lake	\$226,000	\$26,000
IMR	WY	Yellowstone NP	Trout conservation	\$445,000	\$251,000
MWR	AR	Buffalo NR	Assessment of fish	\$405,000	\$175,000
MWR	MI	Isle Royale NP	Impact to natural fire regime due to moose browsing	\$204,000	\$74,000
MWR	MI	Sleeping Bear Dunes NL + Pictured Rocks NL	Restoration biodiversity	\$364,000	\$121,000
MWR	SD	Badlands NP	Baseline mapping of fossil bone beds	\$235,000	\$75,000
NER	MA	Boston Harbor Island NRA	Establish ecological and social carrying capacity	\$239,000	\$80,000
NER	MA	Cape Cod NS	Effects of off-road traffic on biotic community	\$173,000	\$53,000
NER	MA	Cape Cod NS	Effects of ground water	\$195,000	\$82,000
NER	NY	Fire Island NS	Adaptive management of deer, people, plants	\$360,000	\$120,000
NER	VA	Shenandoah NP	Acidic impacts on fish	\$316,000	\$289,000
PWR	CA	Channel Island NP	Rescue island fox population	\$416,000	\$167,000
PWR	CA	Golden Gate NRA	Cape ivy management	\$600,000	\$173,000
PWR	CA	Pinnacles NM	Protect vulnerable park resources	\$153,000	\$51,000
PWR	CA	Point Reyes NS	Coastal dune restoration	\$333,000	\$103,000
PWR	CA	Redwood NP	Remove English ivy	\$218,000	\$84,000
PWR	HI	Haleakala NP	Biologically rich lands	\$427,000	\$93,000

Region	State	Park	Project	Total Funding	FY 2001 Funding
PWR	HI	Haleakala NP (+3 other HI parks)	Stabilize threatened and endangered plant species	\$549,000	\$180,000
PWR	NV	Great Basin NP	Cutthroat trout	\$164,000	\$54,000
PWR	WA	Olympic NP	Evaluation of goat management	\$79,000	\$20,000
PWR	WA	Olympic NP	Conduct demographic monitoring of Northern spotted owl	\$190,000	\$63,000
SER	FL	Gulf Island NP	Post nesting satellite tracking of Loggerhead turtles	\$54,000	\$18,000
SER	LA	Jean Lafitte NHP & Pres	Modeling risk of Chinese tallow invasion	\$196,000	\$57,000
SER	NC	Cape Lookout NS	Immunocontraception and EIA testing feral horses	\$81,000	\$30,000
SER	SC	Congaree Swamp NM	Species diversity and condition of fish community	\$71,000	\$24,000
SER	TN	Great Smoky Mountain NP	Complete natural resources inventory and atlas	\$310,000	\$80,000
SER	TN	Great Smoky Mountains NP	Inventory and delineation of remnant Fraser Fir stands	\$45,000	\$15,000
SER	TN	Great Smoky Mountains NP	Brook trout reclamation of Sam's Creek	\$215,000	\$70,000
SER	TN	Great Smoky Mountains NP (+13 other SER parks)	Invasive exotic plant management in smaller parks	\$249,000	\$83,000
Total					\$3,466,000

E-2a. Threatened and Endangered Species Projects – Fully Funded

Region	State	Park	Project	Total Funding	FY 2001 Funding
PWR	CA	Mojave National Pres	Maintenance of Tui chub habitat	\$80,000	\$80,000
PWR	HI	Haleakala NP & Hawaii Volcanoes NP	Control feral cats	\$126,000	\$126,000
PWR	WA	North Cascades NP	Implement human/bear management plan	\$98,900	\$44,400
SER	TN	Big South Fork NRR	Conduct genetic analysis for duskytail darter	\$21,000	\$21,000
Total					\$271,400

E-2b. Threatened and Endangered Species Projects - Ongoing

Region	State	Park	Project	Total Funding	FY 2001 Funding
IMR	AZ	Grand Canyon NP	Inventory for Mexican spotted owls	\$104,000	\$52,000
IMR	UT	Capitol Reef NP	Endangered plant inventory	\$163,000	\$53,000
MWR	WI	St. Croix NSR	Mussel communities in the St. Croix	\$40,000	\$20,000
PWR	CA	Mojave NPres	Baseline survey of desert tortoise	\$136,000	\$52,000
SER	SC	Cape Hatteras NS + Assateague Island NS + Cape Lookout NS	Seabeach amaranth: habitat assessment and restoration using remote sensing data	\$103,400	\$51,400
Total					\$228,400

E-3a. Disturbed Lands Restoration Projects – Fully Funded

Region	State	Park	Project	Total Funding	FY 2001 Funding
SER	FL	Big Cypress NPres	Restore Turner River headwaters	\$100,000	\$50,000
SER	KY	Mammoth Cave NP	Plug improperly abandoned oil & gas wells	\$106,000	\$106,000
SER	LA	Jean Lafitte NHP & Pres	Backfill dead-end oil & gas canals	\$250,000	\$50,000
Total					\$206,000

E-3b. Disturbed Lands Restoration Projects – Ongoing

Region	State	Park	Project	Total Funding	FY 2001 Funding
AKR	AK	Denali NP & Pres	Remove hazardous conditions at the Kantishna Mining District	\$149,500	\$79,000
AKR	AK	Denali NP& Pres	Caribou Creek restoration	\$200,000	\$82,000
IMR	NM	Florissant Fossil Beds NM	Removal and restoration of earthen dams	\$142,000	\$98,000
IMR	TX	Palo Alto Battlefield NHS	Restore Resaca wetlands	\$116,200	\$66,200
MWR	AR	Buffalo NR	Stream restoration in Boxley Valley	\$167,000	\$64,000
NER	NY	Fire Island NS	Plug and abandon flowing water wells	\$74,600	\$58,800
PWR	CA	Channel Islands NS	Protect endemic island oak and rehabilitate eroding areas	\$85,300	\$46,200
PWR	CA	Golden Gate NRA	Lower Eastkoot Creek restoration	\$154,500	\$77,500
PWR	NV	Great Basin NP	Restoration of the Bonita Mine	\$214,200	\$72,300
Total					\$644,000

E-4. Servicewide Projects

Project	Funding
Haskell Indian College Agreement	\$6,300
Director's Awards for Natural Resource Stewardship and Science	\$23,000
Partnerships with Professional Organization	\$50,000
Natural Resources Year-In-Review Report	\$58,700
Park Science	\$46,300
Research Permit/IAR Integration	\$18,000
MAB (Man in the Biosphere)	\$50,000
Training on Research Permit and Reporting System	\$58,000
National Cave and Karst Institute	\$75,000
Develop RAMS	\$57,000
Southeast CESU	\$10,000
Soundscape Monitoring Projects	\$200,000
Chesapeake Bay CESU – Chestnut Management Symposium	\$27,000
Arizona CESU – Migratory Bird Symposium	\$17,000
Unexpended Funds	\$18,700
Total	\$715,000

E-5. Small Park Projects Funded in FY 2001

Region	State	Park	Project	Funding
AKR	AK	Klondike Gold Rush NHP	Aerial photos sheep camp	\$5,000
AKR	AK	Klondike Gold Rush NHP	GIS basemap for Dyea area	\$5,000
AKR	AK	Sitka NHP	Indian River macroinvertebrate study	\$10,000
IMR	AZ	Navajo NM	GIS systems	\$14,500
IMR	AZ	Tonto NM	Fence boundary	\$14,900
IMR	AZ	Tumacacori NM	Inventory	\$14,000
IMR	AZ	Walnut Canyon NM	Survey rockmat	\$7,500
IMR	CO	Bent's Old Fort NHS	Landscape restoration	\$15,000
IMR	CO	Florissant Fossil Beds NM	Website development for literature	\$12,000
IMR	CO	Florissant Fossil Beds NM	ID plants and insects	\$3,000
IMR	MT	Grant-Kohrs Ranch NHS	Defer cattle grazing on native range	\$15,000
IMR	NM	Aztec Ruins NM	Revegetate rooms & picnic area	\$5,000
IMR	NM	Fort Union NM	Base inventory	\$12,000
IMR	OK	Chickasaw NRA	Soil Survey	\$5,000
IMR	OK	Washita NB	Tamarisk eradication	\$8,300
IMR	TX	Alibates Flint Quarries NM	Assess wildfire impacts	\$2,500
IMR	TX	Lake Meredith NRA	Non-native species	\$6,000
IMR	TX	Lyndon B. Johnson NHP	Re-establish vegetation	\$3,500
IMR	TX	Palo Alto NHB	Mesquite eradication	\$8,000
IMR	TX	San Antonio Mission NHP	Exotic chinaberry	\$9,900
IMR	UT	Golden Spike NHS	Vegetation management plan	\$8,000
IMR	UT	Timpanogos Cave NM	Photo-monitoring	\$15,000
IMR	WY	Fort Laramie NHS	Vegetation management plan	\$12,000
IMR	WY	Fossil Butte NM	Paleontological data	\$14,900
MWR	AR	Pea Ridge NMP	Disease threaten safety	\$15,000
MWR	AR	Hot Springs NP	Stabilize rock slope at Hot Springs	\$10,000
MWR	IA	Herbert Hoover	Bank stabilization	\$5,000
MWR	IN	Lincoln Boyhood NM	Insect inventory	\$10,100
MWR	MN	Grand Portage NM	Fire history	\$9,800
MWR	MN	Grand Portage NM	Inventory of butterflies	\$2,400
MWR	MN	Grand Portage NM	Snowmobile activity	\$4,900
MWR	MN	Pipestone NM	Tallgrass prairie	\$8,000

Region	State	Park	Project	Funding
MWR	MO	Fort Union Trading Post NHS	Erosion management – Phase I	\$10,000
MWR	MO	George Washington Cover NM	Vegetation management plan	\$9,800
MWR	MO	Wilson’s Creek NB	Exotic species	\$15,000
MWR	MO	MWR Multi-Park	Orthrophoto rect. – Heartland I&M Network	\$23,600
MWR	ND	Arkansas Post NM	Stabilize banks	\$9,900
MWR	ND	Knife River Indian Village NHS	Noxious plant control	\$15,000
MWR	NE	Agate Fossil Beds NM	Weed control	\$7,500
MWR	NE	Scotts Bluff NM	Rodent-proof structures	\$15,000
MWR	OH	Hopewell Culture NHP	Lands restoration	\$15,000
NCR	MD	Antietam NB	Riparian buffer	\$10,000
NCR	MD	Catoctin Mountain Park	Vegetation monitoring and management	\$6,500
NCR	MD	Catoctin Mountain Park	Invasive exotic brochure	\$2,000
NCR	MD	Chesapeake & Ohio Canal NHP	Harperella	\$10,000
NCR	MD	Chesapeake & Ohio Canal NHP	POGO upland forest	\$2,800
NCR	MD	Chesapeake & Ohio Canal NHP	Analyze breeding bird data	\$10,000
NCR	MD	Chesapeake & Ohio Canal NHP	Wayside and brochure	\$6,500
NCR	MD	National Capitol Parks – East	Butterfly inventory	\$1,900
NCR	MD	National Capitol Parks – East	Bird checklist brochure	\$3,500
NCR	VA	George Washington Memorial PKY	Dike marsh fish inventory	\$10,000
NCR	VA	George Washington Memorial PKY	Mosses, liverworts, lichens	\$6,800
NCR	VA	Manassas NB	Vegetation mapping	\$5,600
NCR	VA	Wolf Trap Farm Park	Water quality equipment	\$4,600
NCR	VA	Wolf Trap Farm Park	Wayside exhibit	\$2,800
NCR	WV	Harpers Ferry NHP	Peregrine falcon restoration	\$5,000
NER	CT	Weir Farm NHS	Dam restoration	\$10,000
NER	MA	Boston Harbor Island NRA	Native vegetation	\$20,000
NER	MA	Saugus Iron Works NHS	Watershed project	\$24,000
NER	PA	Gettysburg NMP	Re-evaluate effects of deer	\$54,000
PWR	AS	American Samoa NP	Assess Tutuilla stream biota and condition	\$40,900
PWR	CA	Cabrillo NM	Abundance and distribution of small mammals	\$19,700
PWR	CA	Fort point NHS	Monterey Cypress removal	\$7,800
PWR	CA	John Muir NHS	Mount Wanda exotic tree control	\$10,000
PWR	CA	Muir Woods NM	Remove cape ivy	\$1,000
PWR	HI	Kaloko-Honokohua NHP	Green sea turtle status, health, and habitat	\$19,900
PWR	HI	Kalaupapa NHP	Repair Kauhako Crater/ Kukaiwaa fences	\$19,700
PWR	ID	City of Rocks NPres	Map non-native plants	\$16,000
PWR	ID	Hagerman Fossil Beds NM	Fossil protection	\$15,000

Region	State	Park	Project	Funding
PWR	ID	Hagerman Fossil Beds NM	High-resolution photo analysis	\$16,000
PWR	ID	Hagerman Fossil Beds NM	Tracer tests	\$6,000
PWR	OR	Fort Clatsop NM	Map Reed canarygrass	\$3,000
PWR	WA	San Juan NHP	Thin American camp (year 2 of 2)	\$10,000
PWR	WA	San Juan NHP	Survey marbled murrelets	\$10,000
PWR	WA	San Juan NHP	Control exotics	\$12,000
PWR	WA	Whitman Mission NHS	Revegetate 5 acres	\$7,000
PWR	WA	Whitman Mission NHS	Pesticide monitoring	\$6,000
PWR	WA	Whitman Mission NHS	Baseline on natural quiet	\$15,000
PWR	WA	Whitman Mission NHS	Compile history of vegetation manipulation	\$10,000
SER	FL	De Soto NM	Vertebrates inventory	\$6,700
SER	GA	Fort Pulaski NM	Conduct baseline water quality survey	\$12,000
SER	GA	Jimmy Carter NHS	Develop Integrated Pest Management plan	\$9,000
SER	KY	Multi-Park (MACO)	Vital Signs workshop coordination	\$15,000
SER	KY	Multi-Park (MACO)	Network vegetation mapping needs assessment	\$10,000
SER	LA	Cane River Creole NHP	Inventory plants and animals	\$10,700
SER	NC	Carl Sandburg NHS	Exotic plant management	\$6,000
SER	NC	Carl Sandburg NHS	Hazard tree removal	\$7,000
SER	SC	Kings Mountain NMP	Vegetation management plan	\$22,000
SER	SC	Multi-Park (KIMO & COWP)	Resource management assistance	\$32,000
SER	TN	Obed W&SR	Analysis of historic Obed flow data	\$10,000
SER	TN	Shiloh NMP	Long-term monitoring of aquatic resources	\$6,600
			TOTAL	1,000,000

Appendix F- Allocation of Water Quality Vital Signs

Allocation of Water Quality Vital Signs Monitoring Funding, FY 2001

NETWORK	REGION	NUMBER OF AFFECTED PARKS	WQ ALLOCATION \$(000)
Central Alaska	Alaska	5	98
Heartland	Midwest	15	82
NE Coastal and Barrier	Northeast	8	90
National Capital	National Capital	11	71
Cumberland/Piedmont	Southeast	14	59
Appalachian Highlands	Southeast	4	70
North. Colorado Plateau	Intermountain	16	108
Greater Yellowstone	Intermountain	3	71
Sonoran Desert	Intermountain	11	64
North Coast & Cascades	Pacific West	7	82
San Francisco Bay	Pacific West	6	70
Mediterranean Coast	Pacific West	3	76
TOTAL: 2001 Network Monitoring	7 NPS REGIONS	103	941
Cooperative Agreement, Colorado State University: Data Management			203
Program Administration, Support, Technical Guidance, Travel			131
GRAND TOTAL			1,275

Appendix G. Water Resource Protection Projects - FY 2001

PARK	REGION	PROJECT TITLE (s)	FUNDING \$(000)
ALL	ALL	Support to the Office of the Solicitor	154.5
ALL	ALL	Water Rights Docket Scanning	19.0
MANY	IMR, PWR	Water Rights Application Review	9.0
LAME	PWR	Spring Flow Monitoring, Preparation for Administrative Hearings	339.0*
BLCA	IMR	Preparation for Negotiation/Litigation, Adjudication of Colorado Water Division 4	75.0
BUFF	MWR	Investigation of Water Related Values	144.0**
DEVA	PWR	Devil's Hole and Spring Flow Monitoring, Evapotranspiration Study, and Groundwater Modeling	174.0*
AZ Parks	IMR	Preparation for Negotiation/Litigation, Adjudication of the Little Colorado River Basin in Arizona	16.8
GRSA	IMR	Support for Creation of Park and Preserve	41.6**
GRCA	IMR	Hydrologic Investigation, Spring Protection	271.0**
ARCH	IMR	Preparation for Negotiation/Litigation, Adjudication of Southeastern Utah	33.0**
OBRI	SER	Stream Flow Monitoring, Surface Hydrology Study	35.5**
CRLA	PWR	Preparation for Hearing, Adjudication of the Klamath River Basin in Oregon	5.12
UT Parks	IMR	Preparation for Negotiation/Litigation, Adjudication of Various Areas in Utah	56.3
YELL	IMR	Implement Reese Creek Water Rights Agreement	11.1**
ALL	ALL	Technical and Administrative Support to All Projects	112.5*
		TOTAL FOR WATER RESOURCE PROTECTION PROJECTS	1,497.42

* Projects that were expanded due to the \$ 823,000 increase in funding.

** Projects that were started due to the \$ 823,000 increase in funding.

APPENDIX H - USGS Biological Resources Division Park Oriented Biological Support Summary of Progress Made in FY 2001

Title of Project	FY 2001 Progress
Repatriating black bears to the Big South Fork of the Cumberland	Withdrawn from POBS, converted into a larger proposal to NPS, and subjected to NEPA analysis.
Determining causes and rates of adult elk mortality in Yellowstone	Study progressing according to schedule, with continued monitoring of elk radio-collared in FY 2000. Cow elk mortality to date due as much to human causes as to predator causes.
Effect of <i>Euphorbia esula</i> on pollination and seed set of native plants	Study progressing according to schedule, with continued collection of field data. Analysis of data pending.
Effects of fire at Joshua Tree National Park	Study focused on completing necessary layout of experimental burn plots, burn plan, and environmental and endangered species act compliance activities. Prescribed burning scheduled for Calendar Year 2002.
Implications of 1998/1999 mortality pulse to genetic diversity and population of the grizzly bear population in Glacier National Park	Initiated genetic analyses of hair samples that were assembled in the previous year. Prepared database to receive genetic analysis data once data delivered by the lab conducting the analyses.
Expanded collection and collation of erosion data and landscape change information to protect pinyon-juniper woodland resources at Bandelier NM	No report available.
Population estimation and development of a land-based classification protocol for bighorn sheep in Grand Canyon National Park	Fieldwork initiated in summer 2001. Two-year research permit issued in 2001 following completion of detailed study approach that responded to park constraints on wilderness activities, ground disturbance, and other proposed field activities.
Predicting exotic plant species locations in Rocky Mountain National Park	No report available.
Red-throated loons of Bering Land Bridge National Preserve: Ecological predisposition to present and future perils	No report available.
Streamflow-vegetation relations to quantify Federal reserved water rights	Because high stream flows and logistical difficulties prevented conducting planned fieldwork in 2000, fieldwork was conducted in summer 2001.
Post-fire burn assessment by remote sensing on National Park Service lands	Remotely sensed images of one or more fires in six parks have been analyzed using the research protocol. Preliminary results show GIS system can provide quantified analyses of burn area delineation and probable long term effects on existing vegetation. Project results have helped stimulate other research projects.
Exotic species invasion and structural damage along horse trails in sensitive natural areas at Ozark National Scenic Riverways	All fieldwork has been completed and final report is in preparation.
Population monitoring and population dynamics of elk at Theodore Roosevelt National Park	Monitored survival of 35 cow and 15 bull elk. Observed causes of elk deaths included hunter kills outside the park and entanglement in fencing. Initial calf survival data and cow pregnancy rates data collected but not yet fully analyzed.

Assessing aerial survey methods to determine community composition and resource hotspots for waterbirds in coastal parks	Fieldwork completed. Workshop conducted. Preliminary reports on data and methodological issues and a draft manuscript on marshbirds submitted to Cape Cod N.S.
Developing indicators of freshwater emergent wetland ecosystem integrity for monitoring and management at Acadia National Park	Selected 20 wetlands, conducted field sampling, examined a time series of aerial photography, and created a GIS database to support follow-up analyses.
Historical salmon production in Lake Clark National Park and Preserve: relevance to emerging subsistence use issues	Have determined ages of a few sites to help with estimation of when spawning habitats were first colonized following deglaciation. Unable to collect lake cores as planned last winter due to absence of lake ice which is necessary as a working platform. Plan to take lake cores in the coming winter. Will use analysis of the sediments in the cores to reconstruct long-term changes in salmon abundance.
Evaluation of native freshwater mussel populations in the C&O Canal National Historical Park: Strategies for integrating management of biological with cultural resources	Initial fieldwork delayed by late funding and by weather. The first phase surveys are now completed and detailed surveys are underway.
Synthesis of over 60 years of surface and ground water data at Indiana Dunes National Lakeshore	Physical and chemical data for surface water and ground water sites in and near Indiana Dunes N.L. have been obtained from the park, the USGS Water Resources Division, and the Environmental Protection Agency. Procedures to format the data, support data queries, and provide reports are being developed.
Great Basin National Park freshwater mollusk inventory	Mollusks have been collected and shipped to the research facility. Identification of collections has progressed slowly due to backlog of other pressing work.
A clearinghouse for natural resources data at North Cascades National Park	Of 36 identified categories of data, one category is barely started, five have obtained and are processing data, two have a completed draft, 18 are in final draft preparation or review, three are with the park for its review, and seven been finished and released.
Inventory of cryptogams of Olympic National Park	Collected more than 7,000 samples from trail access corridors in several watersheds. Identification and curation of samples in progress.
Integrating beaver, water and willow in the Savanna model at Rocky Mountain National Park	Model being developed using data collected from an earlier project.
Ecological integrity of McDonald Watershed, Glacier National Park: Biotic indicators of water quality impairment and the reconstruction of Going-to-the-Sun Road	No report available.
Identification of population structure, meta-population extent, and evolutionarily significant lineages of the spotted salamander and wood frog inhabiting vernal pools in three national parks	Tissue samples have been collected in preparation for DNA analyses.
A decision support system for the Saint Croix National Scenic River	Project experienced a change in principal investigator. Assembly and entering of data into the computer almost finished.

APPENDIX I - Brucellosis Research Projects

Title	Purpose	Anticipated Completion
Epidemiology and pathogenesis of brucellosis in Yellowstone National Park bison	To understand modes of brucellosis transmission and pathogenesis in YNP bison and to assess persistence of <i>Brucella</i> in the environment.	October 2001
Reproduction and demography of brucellosis infected bison in the southern Greater Yellowstone Area (GYA)	To improve understanding of factors that affect potential risks of disease transmission and population growth in the growing Jackson Bison Herd (JBH) and to provide information important for developing demographic intervention strategies.	September 2001 part, rest during 3 years assisting Jackson Bison & Elk Management Plan & EIS
Brucellosis seroprevalence in moose of the southern GYA	To see if moose populations that are declining in the southern greater Yellowstone area, an area which also has populations of elk and bison highly affected by brucellosis, are highly sensitive to brucellosis and if the disease has affected the moose populations.	On-going monitoring based on opportunistic sampling of moose in the southern GYA
Appearance of RB51 during pregnancy in bison exposed in-utero	To determine through opportunistic study whether RB51 vaccine used in bison would infect fetuses and express itself as disease during first pregnancy of RB51 vaccinated animals.	Completed in FY01
Efficacy of calfhood vaccination with Strain 19 (S19) in elk	To examine the ability of single dose calfhood vaccination with S19 to protect elk from brucellosis.	September 2002
Effects of oral RB51 exposure on grizzly bear reproduction	To assess the effects of RB51 (a living vaccine of brucella) on grizzly bear reproduction and the requirements for delisting from the Endangered Species list, based on using opportunistically available female grizzly bears (problem animals scheduled for euthanasia) and two captive animals. The probably small number of breeding age females that will become available over the next three year limits the study design.	September 2003
Improvements in ballistic delivery systems for wildlife vaccination	To improve current ballistic delivery methods to be less intrusive, less labor intensive, and more accurate and reliable because current methods for ballistic delivery of vaccine require too close an approach to animals, animal habituation, too much labor, and frequently fail.	September 2002
Effectiveness of ballistic vaccine delivery in calf and yearling bison in the Greater Yellowstone Area	Use a serum biomarker incorporated into a mock vaccine biobullet to test the hypotheses that a high proportion of targeted bison could be effectively vaccinated without external marking and that vaccination range should increase.	December 2001
Operational program for ballistic delivery of <i>Brucella</i> vaccines to GYA bison	Assist development, test effectiveness, and assess intrusiveness of an operational ballistic delivery program for vaccinating free-ranging bison.	September 2003

Title	Purpose	Anticipated Completion
Safety and efficacy of iopanoic acid (IPO) as a parenteral seromarker in bison	Although iophenoxic acid (IPA) appears to be a safe, reliable serum biomarker when delivered parenterally in bison, its persistence in bison serum, potential for oral transmission to people who consume bison meat, and potential to invalidate thyroid function tests in humans call for testing another biomarking compound, iopanoic acid (IPO), which has a shorter half-life in other species.	February 2002
Brucellosis management in elk: Implications for elk herd health	To examine 1) the potential that management programs designed for brucellosis vaccination of elk could cause exacerbation of hemorrhagic septicemia (HS) in elk by bringing elk into contact with HS reservoirs, and 2) to assess the risk characteristics for HS in order to develop a brucellosis vaccination program that minimizes the risk of HS outbreaks in elk.	December 2003
Bison chemical immobilization	To assess whether tolazoline causes adverse effects during immobilization of bison with drugs and to evaluate if the current protocol provides effective and safe chemical restraint of bison.	January 2002
Efficacy of RB51 in bison	To test single and double RB51 vaccination of bison for protection against <i>Brucella</i> challenge.	September 2002
Persistence of RB51 in the environment as a model for field strain <i>Brucella</i>	To determine the appropriate temporal separation between bison and cattle on grazing allotments based upon survival of <i>Brucella</i> in the environment using live vaccine strain RB51 as a model for field strain survival under field, but controlled, conditions.	September 2003
Disappearance rate of cattle and bison fetuses in the Greater Yellowstone Area	To identify appropriate temporal separation between bison and cattle on grazing allotments in the West Yellowstone or Gardiner areas by determining how long an aborted fetus may remain in the environment in or near certain grazing allotments before being scavenged.	September 2003
Immune responses of red deer and elk to genetically altered RB51	Based on pilot studies that have suggested a better immune response to a recently developed multi-antigenic RB51 than to standard RB51, this study is to assess immune response to multi-antigenic RB51 in red deer (as surrogates for North American elk) and bison.	May 2002

