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Funding the Natural Resource Challenge A Report to Congress, Fiscal Year 2002

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Contents



1 Executive Summary

4 Strategic Planning

11 Emerging Trends

11 Parks: The Front Lines in Natural Heritage Preservation

11 Applying the Results: Out of the File Cabinet and Off the Computer

12 Leveraging

13 Partnerships Bring Results

15 Action Plan Focus, Accomplishments, and Financial Summaries

15 Complete Park Inventories and Monitor Park Resources Theme

Inventory and Monitoring Program

Water Resource Monitoring

Air Quality Monitoring

Air Emissions Inventory

Making Natural Resource Data Useable

27 Mitigate Damaged Resources Theme

Funding Increases to Parks

Natural Resource Preservation Program

Native and Nonnative Species Management

Geologic Resource Protection

Water Resource Protection

Establish Resource Protection Fund

Implementation of Resource Protection Act

49 Attract Good Science and Scientists Theme

50 Cooperative Ecosystem Studies Units

50 Learning Centers





56 Financial Details

56-57 Natural Resource Challenge Funding History

59 Appendices

59 Park Alpha Code Directory

67 Appendix A: Projected Completion Schedule for Baseline Inventories

68 Appendix B: Amount of Funding for Major Vegetation Mapping Projects

69 Appendix C: Network Funding for Vertebrate and Vascular Plant Inventories

70 Appendix D: Allocations for Inventories Other Than Network Biological Inventories

71 Appendix E: Natural Resource Preservation Program Projects

81 Appendix F: Allocation of Water Quality Vital Signs

82 Appendix G: Water Quality Protection Projects

84 Appendix H: USGS Biological Resources Discipline Park-Oriented Biological Support, Summary of Progress Made in Fiscal Year 2002

88 Appendix I: Projects and Activities Supported with Natural Resource Challenge Funding Allocated for Cooperative Ecosystems Studies Units



Executive Summary

Funding the Natural Resource Challenge Fiscal Year 2002 is the National Park Service's third annual report documenting the expenditures and related accomplishments of the Natural Resource Challenge. The Challenge, a multi-year action plan, provides the framework national parks are now using to successfully preserve the natural resources protected by the National Park Service, while at the same time improving access to the public.

House Report 106-22 for FY 2000 calls for the National Park Service to demonstrate accountability for stewardship responsibilities

Scientists—in order to base all decisions on good science by attracting qualified scientists.

This report outlines key emerging and evolving patterns, places the Challenge initiative within the NPS strategic planning context, and provides a synopsis of the activities initiated or completed with Challenge funding.

Typically, Natural Resource Challenge funds are distributed based on 1) the need for the work to be accomplished (which is determined by Servicewide assessments); 2) the ability of the parks to successfully complete

THE GOAL OF THE CHALLENGE IS TO UNDERSTAND, MEASURE, AND IMPROVE THE HEALTH OF PARK ECOSYSTEMS.

and financial commitments. This report, *Funding the Natural Resource Challenge FY 2002*, fulfills that obligation and communicates the extremely successful implementation of the Challenge to date.

The President has also placed a high priority on the Challenge, committing during his presidential campaign to invest an additional \$100 million in this program. In 2001, base funding for the Natural Resource Challenge was \$29.6 million. Including requested increases in funding in the President's 2004 Budget Request, base funding for the Natural Resource Challenge initiative will total \$76.1 million in 2004. This will mark a cumulative increase in funding for the Natural Resource Challenge since 2001 of nearly \$104 million.

This Challenge report is organized around three central themes: 1) Complete Park Inventories and Monitor Park Resources—to determine what exists in national parks and if these resources are being protected. 2) Mitigate Damaged Resources; fix the current problems. 3) Attract Good Science and

the work, determined through a competitive peer review process; and 3) accountability (dollars spent and results achieved are closely monitored).

The Challenge funded four programs in FY 2000: inventories of plants and animals for 270 parks, the Natural Resource Preservation Program, native and nonnative species management, and geologic resource preservation. Funding in FY 2001 added or expanded nine other programs: vegetation mapping, water quality monitoring, air emissions inventory, park vital signs monitoring, making natural resource data useable, park resource preservation programs, water resource protection, park research and learning centers, and Cooperative Ecosystem Studies Units (CESUs)—partnerships with universities. In FY 2002, these 13 programs continued, and air quality monitoring, Resource Protection Fund, and Resource Protection Act implementation were added.

As the Challenge actions are implemented, important changes are occurring in the way

Executive Summary

the National Park Service manages resources. Natural resource managers are working together to inventory, monitor, and preserve and maintain national park resources. Small parks are receiving attention and help as part of organized monitoring networks. Park resource inventories now range from the most basic list of species to maps and datasets describing complex assemblages of plants and animals and their physical environments. Future assessments of change, predictive capabilities, and actions taken by NPS partners and collaborators to preserve natural heritage and plans for accommodating and improving visitor access are based on these data.

To ensure the successful preservation of park

natural resources through the Challenge plan, the National Park Service adopted two key strategies. First, 270 natural resource parks were organized into a series of 32 networks in order to share capabilities. Parks within these networks coordinate fieldwork, share staff and equipment, implement smart business practices jointly, and develop resource trend data indicative of the network at large. Through cooperation, duplication of effort and costs are reduced and the integrity of resource and science programs improved. Parks share learning centers, Exotic Plant Management Teams, aquatic specialists, and other joint activities.

The second strategy for success involves

Natural Resource Challenge Funding in Fiscal Year 2002 ^{1/}

	Increase	Cumulative ^{2/}
Complete Park Inventories and Monitor Park Resources Theme		
Natural Resource Inventories	\$ 0	\$ 7,309,000
Vegetation Mapping	0	1,746,000
Park Vital Signs Monitoring	4,200,000	8,391,000
Water Resource Monitoring	0	1,272,000
Air Quality Monitoring	2,600,000	2,600,000
Air Emissions Inventory	0	200,000
Making Natural Resource Data Useable	0	1,098,000
Subtotal	\$6,800,000	\$22,616,000
Mitigate Damaged Resources Theme		
Funding Increases to Parks	\$ 3,200,000	\$ 6,595,000
Natural Resource Preservation Program	4,000,000	6,875,000
Native/Nonnative Species Management	2,400,000	5,849,000
Establish Resource Protection Fund	300,000	300,000
Geologic Resource Protection	0	696,000
Water Resource Protection	1,000,000	1,823,000
Resource Protection Act Implementation	500,000	500,000
Subtotal	\$11,400,000	\$22,638,000
Attract Good Science and Scientists Theme		
Cooperative Ecosystem Studies Units	\$ 0	\$ 1,596,000
Learning Centers	1,800,000	2,698,000
Subtotal	\$ 1,800,000	\$ 4,294,000
Total Increase	\$20,000,000	\$49,548,000

^{1/} See page 56 for funding history in the context of the resource stewardship budget

^{2/} Including increases received in FY 2000 and FY 2001

Executive Summary

approaching each large and complex Challenge program incrementally. Programs have been initiated with a few parks or networks, with more added each year as experience dictates. Emphasis is placed on building on the experience gained from early efforts to improve subsequent activities.

In FY 2002, emphasis continued to be placed on completing natural resource inventories, while the effort to institutionalize park vital signs monitoring increased. The Mitigate Damaged Resources Theme grew in emphasis, becoming as important as the Complete Park Inventories and Monitor Park Resources theme.

The National Park System reflects our nation's natural heritage. The Natural Resource Challenge provides the National Park Service with the strategic tools to preserve that heritage by providing the organizational capability to confront issues and resolve problems with good science. In doing so, as reflected in the following section, Strategic Planning, the

Challenge is significantly aiding the National Park Service in accomplishment of its strategic plan goals.

The preservation of park resources progresses significantly. The vast majority of funds received under the Challenge resolved park issues or placed information and tools into the hands of park managers. Remaining funds paid for developing expertise and Servicewide systems that are useful to park managers and directly support them.

As an unexpected result of the availability and application of Challenge funding, an important trend of greatly enhanced entrepreneurialism emerged. Challenge dollars have been leveraged from a variety of other sources as demonstrated under the themes: Complete Park Inventories and Monitor Park Resources and Attract Good Science and Scientists.

Partnerships are flourishing across all three themes of the Challenge.



*National Park Service
Biological Sciences
Technician Cheryl
Guster (foreground)
and seasonal employee
Adrienne Harris pre-
pare E. coli samples
for analysis.*

Strategic Planning

In managing the natural resources of the National Park System the desired outcome is resources in good condition (i.e., unimpaired for present and future generations). Many factors contribute to a particular resource's condition, including stable communities of plants and animals with appropriate population sizes, trends, distribution, age and sex ratios, and individual animal health. Determining the appropriate factors needed to measure the ecologically diverse National Park System is complicated. The National Park Service needs scientifically based information on the condition of the resources in order to develop appropriate management strategies. The National Park Service also works with stakeholders and partners to determine effective strategies, and regularly tracks the effectiveness of natural resource management activities.

Development of the initial National Park Service Strategic Plan (1997) and the Challenge were closely linked. Activities associated with the Challenge have contributed to achievement of nearly all the long-term Servicewide goals directly connected to resource preservation. Of particular note are contributions dealing with natural resource inventories, park vital signs,

invasive nonnative species management, threatened and endangered species protection, and visitor understanding and appreciation. The framework for assessing NPS accomplishment of Government Performance and Results Act (GPRA) goals in FY 2002 is found in the 2002 Annual Performance Plan.

Highlights of activities conducted under the Challenge supporting individual mission and long-term goals are explained in this chapter.

Strategic Plan Goal One

The National Park Service aims to ensure that natural, cultural, and associated values are protected, restored, and maintained in good condition and managed within their broader ecosystem context. Examples of how this goal is being accomplished follow.

Disturbed Lands

The National Park Service uses Challenge funds to restore and protect natural resources. Throughout the National Park System many areas have been severely disturbed by roads, mineral exploration and development, and agricultural improvements such as dams and canals. These areas require intensive rehabilitation efforts. From FY 2000 to FY 2002 the

Nature Resources Preservation			
Performance Measures	FY 2002 Actual	FY 2003 Estimate	FY 2004 Estimate
Federally listed species found in parks making progress toward recovery	14.5% improved (64 of 442) 22.3% stable (99 of 442)	14.5% improved (64 of 442) 22.3% stable (99 of 442)	33% (328 of 990)
Improvement of park air quality (percent from 1997 baseline performance measure)	51%	63%	65%
Acres of disturbed park lands restored (cumulative)	3.8% (8,565 of 0.22m)	5.2% (11,500 of 0.22m)	4,700 New Baseline
Park units with unimpaired water quality as defined by Clean Water Act	64% (184 of 288)	65% (187 of 288)	65% (187 of 288)
Park lands with exotic plant invasion effectively controlled	3.9% (105,000 of 2.657m)	4.6% (122,600 of 2.657m)	1.5% Baseline TBD

Strategic Planning

National Park Service exceeded its own goal of restoring 8,900 acres by more than 3,100 acres. In FY 2002 the National Park Service supported 12 natural resource preservation projects that will restore 2,700 acres when completed.



Caribou Creek in Denali National Park and Preserve, Alaska has been the target of recent disturbed lands restoration efforts to repair a stream's flow and remove scrap steel, old mining equipment including sluice boxes, conveyors, several old trucks, scrap bridge steel support, and other trash. The picture shows the Caribou Creek valley bottom and floodplain and flattened tailings piles used by miners as an airstrip. The creek's channel was trapped between the tailings piles and hills on either side of the valley. Following restoration efforts the tailings piles have been removed and the stream banks re-contoured to allow for a more natural course.

Examples of projects funded in FY 2002 include:

- restoring an abandoned road through sensitive wetland and thermal areas in Yellowstone National Park,
- returning man-made impoundments to free-flowing streams that provide brook trout habitat in St. Croix National Scenic River,
- removing a road corridor to restore a functioning floodplain in Pinnacles National Monument,
- rehabilitating areas disturbed by unauthorized off-road-vehicle use in Lake Mead National Monument,

- plugging artesian wells to restore native dune habitat and conserve groundwater resources at Fire Island National Seashore, and
- identifying appropriate restoration actions for unique and fragile areas at Palo Alto Battlefield National Historic Site and Big Bend National Park.

Nonnative Plants

During FY 2002, nine Exotic Plant Management Teams funded by the Challenge focused their control efforts on 100 high-priority invasive nonnative species, treated 68,751 infested acres, retreated 329 acres, inventoried 29,304 acres, and monitored 34,865 acres. The teams exceeded the FY 2002 containment goal for invasive nonnative species. The National Park Service used Natural Resource Preservation Program small park funds on at least 10 projects addressing control of invasive nonnative species. Of the parks that received base increases, 26 addressed invasive nonnative plant species management in FY 2002.

Twenty-nine parks received approximately \$3.6 million in increases to manage invasive nonnative species. Two examples of this work follow.

- In winter 2002-2003, the last stand of melaleuca was treated at Big Cypress National Preserve. This marks a decades-long battle against this invasive nonnative species, which grows rapidly and produces dense forests that displace native plants and provide little food for wildlife. The National Park Service, which has treated about 14 million stems since 1984, may be the first land management agency to bring melaleuca to the maintenance management level across such a large landmass (having treated about 14 million stems since 1984). Exotic plant management teams will check treated sites in the 729,000-acre preserve to ensure that no seedling establishment occurs.
- Stones River National Battlefield targeted 46 invasive nonnative species on

Strategic Planning

about 250 acres in culturally and ecologically significant and highly visible areas. This number represents an increase of 24 species over last year. The Tennessee Exotic Pest Plant Council considered the species targeted significant or severe threats.

Threatened and Endangered Species

As of FY 2002, there are 1,129 populations of threatened, endangered, proposed, and candidate species known to be on NPS managed lands. At least 380 (34%) of these populations are making some progress towards recovery, exceeding the NPS goal of 15.2% by September 2002. A total of 86 populations (7.6%) are known to be improving. Another 294 (26%) populations are stable or not at risk, exceeding the mission goal of 21.3%. Natural Resource Preservation Program funds supported 12 projects dealing with listed species. Four projects were funded through Biological Resource Management Division competitive project funds. Eight parks received park base increases funded by the Challenge. This \$1.1 million supported work related to addressing threatened and endangered species issues. Examples follow.



A federally endangered Karner Blue butterfly at Indiana Dunes National Lakeshore.

- Minnesota is using information from inventories at Mississippi National River and Recreation Area to relocate threatened and endangered mussels to stretches that can serve as refuges.
- Dinosaur National Monument is studying nonnative brown and rainbow trout to help recover four endangered Green River fish species threatened by the nonnative trout species.

Native Species of Special Concern

The Challenge helps parks meet their park level goals for keeping populations of plant and animal species of concern at scientifically acceptable levels.

- Challenge funded work is protecting important native fish species. Efforts at Great Basin National Park helped prevent the listing of the Bonneville cutthroat trout under the Endangered Species Act. At Yellowstone National Park, efforts to protect Yellowstone cutthroat trout from non-natives increased seven to nine times over earlier efforts as a result of Challenge-funded projects. Native brook trout are being restored at Great Smoky Mountains.
- Information collected about declining amphibians contributes to protection strategies. Surveys documented severe declines in yellow-legged frog populations native to high sierra lakes at Sequoia and Kings Canyon National Parks. As a result, restoration projects are underway. Surveys at Cape Cod located a regionally significant population of eastern spadefoot toad and identified specific road areas as threats. The information helps determine possible management options.
- The Park Flight Migratory Bird Program, in its second year, funded 7 bird conservation and education projects, benefiting 13 U.S. national parks and protected areas in Guatemala, El Salvador, Nicaragua, Honduras, Panama, and Mexico.

Air Quality

In FY 2002, 28 of 51 (55%) park areas reported that air quality has remained stable or improved. The air quality goal performance measure is based on 10-year trends of ozone, visibility, and acid deposition air quality data.

The air quality data inventory has been completed for 250 of the 270 natural resource parks. Audits of in-park air pollution sources were initiated in over 50 parks. The National Park Service is expanding its air quality monitoring network to improve eco-regional and geographic coverage, with emphasis on units most threatened by air pollution or most vulnerable to degradation. The National Park Service's August 2002 report, *Air Quality in the National Parks, Second Edition*, summarizes the results of 10 years (1990-1999) of air quality monitoring

Strategic Planning

activities in 32 national parks. According to the report, air quality is improving or remaining stable in more than half of the parks monitored, but restoring clean air to parks will require continuing efforts. Twenty-three parks showed a same or decrease in sulfate levels, while 14 showed a same or decrease in nitrate levels. Fourteen parks showed same or lower levels of both sulfates and nitrates. Ground-level ozone levels improved in eight parks, but deteriorated or stayed the same in 21 parks.

Water Quality

Presently, approximately 65% (184) of National Park System units have unimpaired water quality. (Thirty-five percent have within their



NPS employee conducts water quality monitoring at Stones River National Battlefield, Tennessee.

boundaries one or more water bodies with some type of impairment to recreation or aquatic life support.) A mission goal of the Strategic Plan was to improve the water quality of 70% of park units to an unimpaired level by the end of September 2002. Examples of efforts to improve water quality follow.

- Channel Islands National Park completed a water quality monitoring project assessing vegetation and stream morphology on Santa Rosa Island, with the goal of documenting changes in water quality since cattle were removed from the island in 1998. Work included channel morphology, vegetation sampling, inorganic and bacterial water quality

sampling, and photopoint monitoring. Preliminary analysis indicates that riparian vegetative cover and diversity have measurably increased and water quality has improved over the last five years. The information will be included in a report to the State of California Central Coast Water Quality Control Board that will use the information to decide whether a long-standing cleanup or abatement order can be lifted for Santa Rosa Island.

- Working in concert with the U.S. Forest Service, the National Park Service made considerable progress in reducing toxic metal loadings in Soda Butte Creek in Yellowstone National Park.
- The National Park Service developed a Servicewide water quality data management program within the Environmental Protection Agency's STORET national water quality database.

Geologic and Paleontological Resources

As of the end of FY 2002, 25% of known paleontological localities in parks are in good condition and 81,320 square feet of cave floor in parks are restored, exceeding the annual goal of 10% of known paleontological localities in good condition and 72,500 square feet of cave floors restored. Using Challenge funds in FY 2001, the Geologic Resources Division conducted surveys of 278 parks for fossil resources. Fossil Butte National Monument used Natural Resource Preservation Program funds to produce a geologic map of the park's primary fossil-bearing formations. The park's main formation, the Green River Formation, which is from the Eocene period approximately 50 million years ago, has the greatest known collection of vertebrate fish fossils in the world. A map in production will have greater scope of detail than previously available and be used by the monument to assess the preservation success. Fossil Butte National Monument is also completing an inventory of paleontological resources.

Strategic Planning

Strategic Plan Goal Two

The National Park Service aims to contribute to knowledge about natural and cultural resources and their associated values to make sure NPS management decisions about resources and visitors are based on adequate scholarly and scientific information. Examples of how this goal is being accomplished follow.

Natural Resource Inventories

Year	Number to Acquire	Cumulative Percentage	Status
FY00	453	19.8%	Met
FY01	768	30.4%	Met
FY02	1121	44.4%	Met
FY03	1498	59.3%	On target
FY04	1883	74.5%	On target
FY05	2203	87.2%	On target

By the end of FY 2002 at least 1,355 or 49% of the outstanding natural resource inventories were completed, exceeding the target by 4.6%. At national parks across the country, Challenge-funded inventory projects yielded useful results. All 270 parks have completed two categories of inventories, and nearly all have finished work in another four categories. Parks in all 32 networks were actively collecting historical information on vouchers and species occurrence in parks and entering these data into the NPSpecies database. At the end of FY 2002, a total of 225,630 vouchers and 301,169 species listings were entered into the database representing a 65% increase in documented vouchers and a 17% increase in documented species compared to FY 2001. During FY 2002, each of the 32 networks received funding for and began inventories of vertebrates and vascular plants.

Park Vital Signs

Park Vital Signs	FY 2002 Actual	FY2003 Plan	FY2004 Plan
Vital signs identified	17% (46 of 270)	40% (108 of 270)	76% (207 of 270)
Vital signs implemented	N/A	N/A	3.7% (10 of 270)

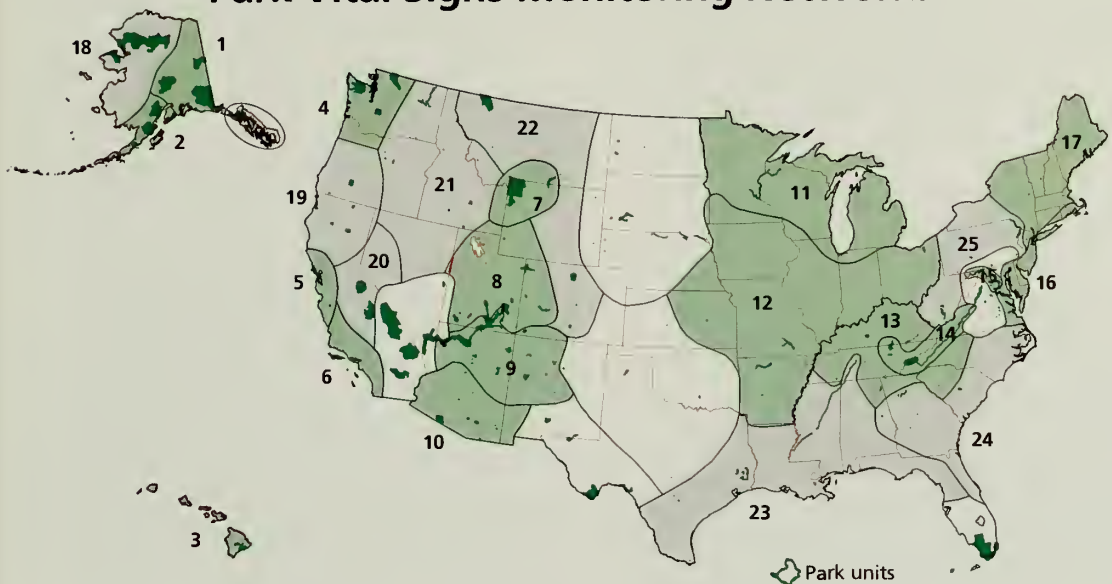
As of the end of FY 2002, 46 parks (17%) identified their vital signs, compared to the annual goal of 54 parks. The National Park Service implemented more stringent quality assurance requirements in FY 2002, including three phases of peer review and approval to ensure that monitoring addresses the most critical information needs of each park, produces scientifically credible data that is accessible to managers and researchers all in a timely manner, builds upon existing information and understanding of park ecosystems, and makes maximum use of leveraging and partnerships with other agencies and academia. The National Park Service is on target to exceed this goal in FY 2003, but the first 12 networks to be funded under the Challenge have been given an additional six months to plan and design their monitoring programs to meet the more stringent requirements.

Geologic Processes

As of the end of FY 2002, 17 inventory products such as maps and reports have been produced identifying geologic processes and human influences. The goal was 12 inventory products within FY 2002. Examples follow.

- At Glacier National Park, analysis suggests that glaciers in the park will disappear by the year 2030. The park has since begun to communicate this information. The park has also discovered that 27% of the lands in several of the mapped areas were made up of avalanche chutes, which have a significant role in the ecosystem of the park.
- Geologic processes are often obscured in the urban environment. Several drainages in George Washington Memorial Parkway and National Capital East have affected flows and sediment transport, affecting the marshes in the Potomac and Anacostia Rivers. This information may present an opportunity for problem solving in the future.

Park Vital Signs Monitoring Networks



Seven monitoring networks will not be funded as of FY 2005 and are indicated in white

Monitoring networks funded in FY 2001-2003 for core park vital signs and water quality monitoring

- 1 Central Alaska Network (three parks)
- 2 Southwest Alaska Network (five parks)
- 3 Pacific Island Network (nine parks located in Hawaii, American Samoa, Guam, and Saipan)
- 4 North Coast and Cascades Network (seven parks)
- 5 San Francisco Bay Area Network (six parks)
- 6 Mediterranean Coast Network (three parks)
- 7 Greater Yellowstone Network (three parks)
- 8 Northern Colorado Plateau Network (16 parks)

- 9 Southern Colorado Plateau Network (19 parks)
- 10 Sonoran Desert Network (11 parks)
- 11 Great Lakes Network (nine parks)
- 12 Heartland Network (15 parks)
- 13 Cumberland/Piedmont Network (14 parks)
- 14 Appalachian Highlands Network (four parks)
- 15 National Capital Region Network (11 parks)
- 16 Northeast Coastal and Barrier Network (eight parks)
- 17 Northeast Temperate Network (10 parks)

Monitoring networks proposed for funding in FY 2004 for core park vital signs and water quality monitoring

- 18 Arctic Network (five parks)
- 19 Klamath Network (six parks)
- 20 Sierra Nevada Network (three parks)
- 21 Northern Semi-arid Network (eight parks)
- 22 Rocky Mountain Network (six parks)
- 23 Gulf Coast Network (eight parks)
- 24 Southeast Coast Network (17 parks)
- 25 Eastern Rivers and Mountains Network (nine parks)

Strategic Planning

Strategic Plan Goal Three

The National Park Service will help park visitors and the general public understand and appreciate the park resources and their preservation for this and future generations.

Examples of how this is being accomplished follow.

Visitor Understanding and Appreciation

In FY 2002, 82% of park units reported visitors understood the significance of the parks they were visiting. In the four parks that began receiving learning center funding in FY 2001, and thus were operational in FY 2002, this value ranged from 84% (Great Smoky Mountains National Park) to 98% (Rocky Mountain National Park). There are now 13 learning centers in various stages of development focused on providing opportunities for cooperating scientists to work in parks and to communicate the results of their work to the public.

- The Natural Resource Information Division developed a Servicewide training session on communicating natural resource topics and issues.
- Great Smoky Mountains National Park established the Appalachian Highlands Learning Center at Purchase Knob. In FY 2001, just over 1,700 people were involved in learning center programs. By FY 2002, with two personnel hired for the learning center, the number of people in learning center programs more than doubled to 3,819. The number of research permits issued increased by 16%. Middle and high school students are participating in inventories and monitoring of birds, moths, and salamanders. Students at Cherokee and Central Haywood High Schools took part in a snail inventory, discovering two species new to Swain County.

Emerging Trends

Parks: The Front Lines in Natural Heritage Preservation

Because each unit of the National Park System is unique, the architects of the Challenge are designing common foundations for natural resource management programs that do not diminish the capacity to deal with park-specific problems and issues. Activities implemented under the Challenge to date follow.

- Twelve basic inventories are being completed for each of the 270 parks that contain significant natural resources. All 270 parks have achieved significant accomplishments, such as completion of species lists and baseline water quality data inventories. Nearly all have completed their natural resource bibliographies (263 parks out of 270), base cartography (260 parks), air quality inventories (250 parks), and water body location and classification inventories (220 parks). Of the 3,240 inventories to be done, 1,828 were complete by the end of FY 2002 and another 754 were underway.
- The 270 parks with significant natural resources qualify for coverage by the Park Vital Signs Monitoring Program. By the end of FY 2002, 101 parks in 12 networks made considerable progress

toward the difficult task of developing integrated natural resource monitoring programs. Another 52 parks, in 5 networks, received funding for planning monitoring programs.

- Beginning in either FY 2001 or FY 2002, 36 parks received increases in their appropriations in support of Challenge programs focused on invasive nonnative species management and endangered species recovery. Parks in the second year of funding increases gained considerable momentum in delivering outcomes in support of the Challenge and demonstrating accountability to strategic plan goals.
- In FY 2002, the Natural Resource Preservation Program conducted over 330 projects compared to approximately 200 projects in FY 2001. One million dollars supported 79 projects in small parks with limited budgets.
- Parks initiated over 380 projects using the resources of the 80 universities that successfully competed to be a part of the Cooperative Ecosystem Studies Unit (CESU) Network.

Applying the Results: Out of the File Cabinet and Off the Computer

A substantial portion of the Challenge targets the development of natural resource information intended for use by the National Park Service in managing resources or resolving issues. The Challenge is now moving into a phase of planning and developing monitoring programs. In FY 2002, the Mitigate Damaged Resources Theme became as much of an emphasis in the Challenge as the Complete Park Inventory and Monitor Park Resources Theme. The two themes are inextricably linked—action follows understanding.

The following are examples of how managers are using information generated as a result of the Challenge and how the Challenge supports management action.

- At Sequoia and Kings Canyon National

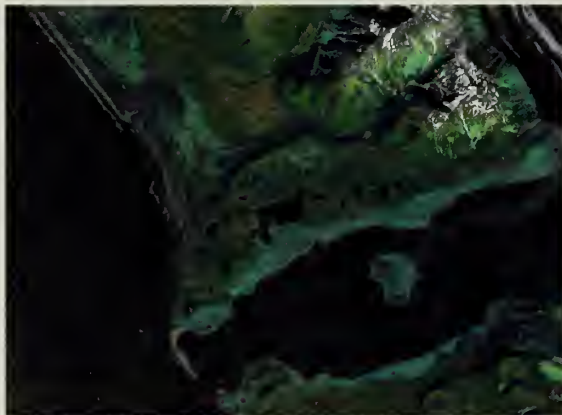
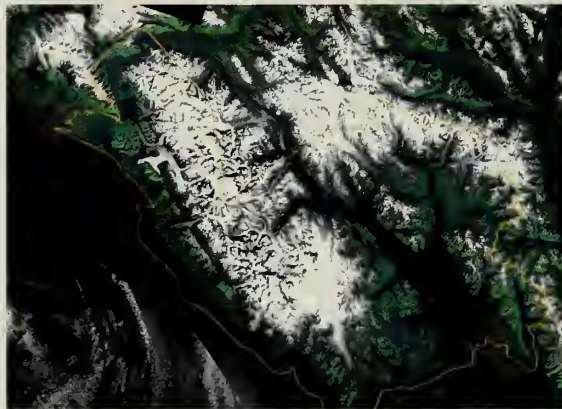


NPS hydrologist Katie Seadler, for the Cumberland-Piedmont Network (stationed at Mammoth Cave NP), analyzes water samples for anions, cations, trace metals and pesticides using an Ion Chromatograph.

Emerging Trends

Leveraging for Learning Centers

The Denali Science and Learning Center provides an example of the appeal of leveraging funds. Although Denali National Park has yet to receive Challenge funds in support of a learning center, the park has already adopted the learning center concept. By adapting the old Denali Park Hotel structures into campus style facilities, the park can support research in the park by providing living space to researchers who often bring their own funding. The campus will be located in the old park hotel area, and offer the visiting researchers dorms and dining facilities operated by the park's concessioner, Doyon/ARAMARK, a joint enterprise. The current program is operating out of the existing park visitor center and Denali Foundation facilities and using local hotels and community centers and facilities in other partner parks. A core team of partner and concessioner representatives, including the Alaska Natural History Association, the Denali Institute, and the Denali Foundation, completed planning for the center. The new center will serve a group of seven northern Alaska parks. Some facilities will be available in 2004, with completion of the center scheduled for 2005.



These two photos were taken by satellite and show Glacier Bay National Park and Preserve at two different zooms. Photos like these provide valuable baseline information about vegetation and aid park managers in conducting ecological assessments that include habitat evaluation and fire fuels modeling.

Parks, weed crews surveyed 12 times or 1,249% more acreage (6,245 acres) than in FY 2000, the year before their Challenge funding increased. The amount of invasive nonnative plant control work expanded dramatically. Weed crews treated 27 times or 2,725% more plants (817,592) than in FY 2000. Crews controlled invasive nonnative species on 320 acres in 2001 and 588 acres in 2002, for a total of 908 acres. The cumulative goal was to treat 444 acres. Weed crews treated many invasive nonnative plants in early phases of establishment, preventing future population explosions that would have been difficult and extremely costly to control.

- With Challenge funding, a U.S. Geological Survey biologist conducted a Southwestern willow flycatcher habitat assessment at Zion National Park. The biologist determined status and condition of willow flycatcher habitat in the park and made recommendations for restoring the riparian community and flycatcher habitat. The park dramatically improved its management of invasive nonnative plants and treated over 350 acres for high priority invasive weeds. Of the acres treated, 147 directly benefited riparian restoration efforts.
- Catoctin Mountain Park worked with the University of Georgia to evaluate deer population and browse impact data and began a herd health evaluation that provided information for a revised deer management plan for the park.
- Nine Exotic Plant Management Teams identified, treated, retreated, inventoried, or monitored more than 100 high-priority nonnative plant species on 133,250 acres, treating 68,751 acres, with no time lost to accidents.

Leveraging

The National Park Service increases the funds appropriated for the Challenge by leveraging alternative sources of funding. The following examples show instances of cooperative work

Emerging Trends

with other appropriated sources, agencies and organizations, and the private sector.

- Vegetation maps are fundamental to planning decisions and are used by natural resource managers and fire managers. Challenge funding was combined with \$985,000 from the U.S. Geological Survey, Biological Resource Discipline, and \$1,418,500 from the NPS Fire Management Program to support vegetation mapping.
- By leveraging matching or contributed funds from university or institutional partners, a \$1,596,000 appropriation was increased to over \$15,000,000, which was distributed through the Cooperative Ecosystem Studies Units for technical assistance, research, and educational projects that benefit NPS natural resource stewardship—without expanding the federal workforce.

Partnerships Bring Results

The National Park Service recognizes partnerships foster endorsement of NPS philosophies 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. Partnerships also support goals related to private sector involvement and growth. Partnerships in the form of cooperative activities and outsourcing are increasingly common in NPS natural resource management circles.

The National Park Service has organized 32 networks comprised of 270 natural resource parks to help manage the NPS Inventory and Monitoring Program. Staffing, funds, and technological resources are shared throughout the networks, increasing efficiency and coordination. Parks now partner routinely to achieve natural resource goals.

Examples of partnerships encouraged by the Challenge follow.

- Cooperative Ecosystem Studies Units

and learning centers are founded on the concept of partnering. In FY 2002, 12 Cooperative Ecosystem Studies Units had over 100 partner universities and organizations.

- Successful treatment of invasive nonnative plants in many parks has been enhanced by the involvement of partners.
 - Leveraged by Challenge funds, Zion National Park exceeded its performance goal to control invasive nonnative species on 100 acres by 250 acres. Over 2,500 volunteer service hours contributed to this success. Partners included local elementary schools, college groups, a prison crew, Americorps, the Student Conservation Association, Wilderness Volunteers, Boy Scouts of America, and the Utah Native Plant Society.
 - In Virgin Islands National Park, the distributions of feral and nonnative animals were mapped. Volunteers, staff, the U.S. Department of Agriculture-Animal Plant Health Inspection Service, and other cooperators then captured and removed approximately 40 feral cats and 138 mongoose and rats.
 - In response to the September 11th terrorist attacks, the State of Hawaii established the Emergency Environmental Task Force to provide employment for displaced workers. Seventeen workers contributed 5,380 hours to the Pacific Islands Exotic Plant Management Team to target *Miconia calvescens*, an invasive Central American tree.
- The Park Flight Migratory Bird Program works to protect shared migratory bird species and their habitats in both U.S. and Latin American national

Emerging Trends

parks and protected areas. The program's partners include the National Park Service, the National Park Foundation, American Airlines, the National Fish and Wildlife Foundation, the U.S. Agency for International Development, and the University of Arizona. The University of Arizona Desert Southwest Cooperative Ecosystem Studies Unit and the NPS Biological Resource Management Division provide technical direction.

- The inventory and monitoring networks distributed \$2,256,929 in Challenge funding to universities, \$1,059,633 to non-federal cooperators, \$715,314 to the U.S. Geological Survey, and \$329,208 to other federal agencies. Approximately \$251,000 came from non-Challenge park base funding and \$105,000 from other partners or cooperators.
- Of the monitoring park vital signs funds,

networks distributed \$1,832,854 to universities, \$2,303,868 to non-federal cooperators, \$152,466 to the U.S. Geological Survey, and \$271,337 to other federal agencies.

- At Dry Tortugas National Park, in work done through the South Florida-Caribbean Cooperative Ecosystem Studies Unit, more than 50 divers completed a series of "live" fish surveys to assess the efficacy of management plans established in marine protected areas in the waters of coastal Florida. A 30-day marine life census covered approximately 230 miles of coast and ocean. This collaborative effort included the National Park Service and other federal agencies including the National Oceanic and Atmospheric Administration, numerous universities including the University of Miami and the University of North Carolina-Wilmington, and other organizations. *National Geographic News* and other media sources covered the project.

Action Plan Focus, Accomplishments & Financial Summaries

This section briefly describes and summarizes what the National Park Service emphasized under the Natural Resource Challenge during FY 2002. It describes accomplishments and allocation of funds to programs. This information is presented as it applies to each of the following three themes:

- Complete Park Inventories and Monitor Park Resources
- Mitigate Damaged Resources
- Attract Good Science and Scientists

While several of the actions represent new directions and new program areas, many are expansions of existing programs. As a result, only some of the Challenge budget increases are easily identifiable as separate line items. In other cases, the Challenge funds are mixed with previous park or program base funding. Financial information is provided for each of the Challenge actions by affected programs, whether they are Challenge-created programs or expanded as a result of the Challenge.

The report's funding tables are designed to provide information about a specific set of actions included in the Challenge. Officials from the Department of the Interior and the Office of Management and Budget agree upon the standards and format for the funding tables the report uses.

The full budgets of each program are provided, along with information on increases to the program provided by the Challenge and the total funding allocated to related activities. If a program, project, or action received funding in more than one thematic area, the funding information may appear more than once in the report. Where the Challenge increases represent a simple increase or acceleration of previous actions, such as inventories or Natural Resource Preservation Program projects, it is not possible to determine which expenditures were funded by increases and which by previous base funding. For these the report provides a description and

accounting of the full programs.

Each program and park that received Challenge funding increases is required to document the funds available and used for program and park natural resource management activities before and after the funding increases to demonstrate accountability to Congress. Programs and parks are required to document their accomplishments as a result of increased capability, and highlight any connection with the NPS Strategic Plan.

Complete Park Inventories and Monitor Park Resources Theme

The Complete Park Inventories and Monitor Park Resources theme of the Challenge is aimed at placing a fundamental suite of inventory information and trend data in the hands of park managers. Because this theme constitutes the foundation of NPS natural resource management and because many other program areas of the Challenge are dependent upon it, this theme was given priority attention in FY 2000, which has continued through FY 2002. Great progress has been made toward the goal of completing 12 basic inventories for each of the 270 natural resource parks, and many of the network-designed biotic inventories are progressing toward completion. Planning and design of park vital signs monitoring programs received emphasis in a select group of networks in 2002, in preparation for extending this initiative to a greater number of networks in the future. In addition to these elements of the Servicewide Inventory and Monitoring

Natural Resource Challenge Funding

FY 2000 and 2001 Inventory and Monitoring Increases	
	\$15,816,000
FY 2002 Increases	
Park Vital Signs Monitoring	\$ 4,200,000
Air Quality Monitoring	2,600,000
Subtotal	\$ 6,800,000

Action Plan Focus, Accomplishments & Financial Summaries

Program, air-related programs and information and data management & distribution fall under this Theme.

Inventory and Monitoring Program

Completing resource inventories and establishing monitoring programs in units of the National Park System is no easy task. The National Park Service has identified 270 natural resource parks and organized them in a system of 32 networks. Each of these parks is to obtain 12 basic inventory products. Thus, 3,240 products must be prepared. Often a single inventory effort will produce multiple sub-products, such as databases, reports, specimens, and maps.

The 32 networks are also charged with developing individually tailored monitoring programs for their parks. Often those programs are multifaceted, having wildlife, plant life, water quality and landscape components. Until program planning and design is finished, it is not possible to predict how many monitoring program components will eventually operate.

It can, however, be stated that the system will be complex.

The Inventory and Monitoring Program reflects the National Park Service's strategies for success. Parks within the 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 improved. The Park Vital Signs Monitoring component of the Inventory and Monitoring Program, which is large and complex, is being approached incrementally. Emphasis has been placed on building on the experience gained from early efforts to improve subsequent activities.

Inventories

FY 2002 Total Funding Allocation

(including pre-challenge funds): \$10,834,000

The National Park Service conducts inventories using a combination of network collaboration with centralized data acquisition to ensure

Inventory and Monitoring Program Funding

Funding Available in FY 2001	\$18,465,000
Uncontrollable Change to Base	10,000
Streamlining Change to Base	(2,000)
Transferred Permanently to Prototype Parks	(916,000)
Park Vital Signs Monitoring Increase	4,200,000
Total Available in FY 2002	\$21,757,000

FY 2002 Categories of Inventory and Monitoring Funding

Resource Inventory Projects	\$10,834,000
Monitoring and Other Projects	8,575,000
Database Development	755,000
Regional Coordinators	605,000
Program Administration	988,000
Total	\$21,757,000

Action Plan Focus, Accomplishments & Financial Summaries

cost efficient sharing of researchers and methods. Park managers must make decisions concerning the most vital inventory needs, based on the context of resources and larger ecosystem settings. The inventories are being closely coordinated to ensure that they satisfy several important criteria.

- Collectively, the inventory data represent the “core” information park managers need to deal effectively with park planning, management, and protection.
- The inventories are conducted in accordance with clearly defined protocols and quality-assurance standards.
- Data obtained through the inventories are compatible to allow for synthesis and analysis at ecosystem and other broad levels.

The National Park Service continued its efforts to complete 12 basic inventories for each of the 270 natural resource parks. The Challenge greatly accelerates the rate at which these basic inventories are completed.

Vegetation Mapping

FY 2002 Funding Allocation

(including pre-challenge funds):
\$2,250,000

Vegetation information is a high-priority inventory need for most parks and is important information for park resource management and protection. Vegetation assemblages integrate diverse information on air quality, soils, topography, hydrology, meteorological conditions, and animal interactions to provide park managers with key measures on status of the natural systems they are managing. Vegetation maps are vital for the management and protection of wildlife habitat, modeling vegetation flammability and fuel implications for fire management, analyses for site development suitability, and evaluation of

resources at risk.

Challenge funding for vegetation mapping greatly accelerates the rate at which parks are mapped. By combining Challenge funding with other funding provided by the U.S. Geological Survey and NPS Fire Program, the National Park Service completed 12 vegetation mapping projects, continued 45 ongoing projects, and initiated 22 new park mapping projects. Each project includes maps, classification reports, keys, aerial photography, and accuracy assessment information.

Appendix B illustrates Challenge funding for major vegetation mapping projects during FY 2002.

Species Occurrence and Distribution Inventories *FY 2002 Funding Allocation: \$6,353,700*

The basic goal of the species occurrence and distribution inventory effort is to provide park

12 Basic Natural Resource Inventories

	Underway	Completed through FY02
Natural Resource Bibliography	2	263
Species List	0	270
Vegetation Map	45	28
Base Cartography Data	10	260
Species Occurrence and Distribution	270	0
Soils Map	97	57
Geology Map	227	14
Baseline Water Quality Data	0	270
Water Body Location and Classification	50	220
Air Quality Data	0	250
Air Quality Related Values	0	0
Meteorological Data	53	196
Totals	754	1828

Note: All numbers represent status as of the end of FY 2002. See Appendix A for a complete list of the status of all basic inventories for the 270 natural resource parks, including those yet to be completed. The National Park Service is working toward implementation of monitoring programs in those same 270 natural resource parks.

Action Plan Focus, Accomplishments & Financial Summaries

managers with comprehensive, scientifically-based information about the nature of selected biological resources occurring within park boundaries. The information is to be presented in a form that increases its utility for and use by decision-makers and the public. The inventories also lay the groundwork for developing effective monitoring programs and resource management strategies. To attain these goals, biological inventories are designed to meet three fundamental objectives.

1. Document through existing verifiable data and targeted field investigations the occurrence of at least 90% of the species of vertebrates and vascular plants currently estimated to occur in individual parks.
2. Describe the distribution and relative abundance of species of special concern, such as threatened and endangered species, invasive nonnative species, and other species of special management interest occurring within park boundaries.
3. Provide baseline information for developing general monitoring strategies and assisting in addressing specific park threats and resource issues.

At the end of FY 2002, all 32 networks had approved biological inventory study plans. During FY 2002, an additional 141 biotic inventories began. The following table indicates the number of parks with inventories in progress, organized by major taxa.

Parks in all 32 networks were actively collecting

Number of Parks with Biotic Inventories in Progress		
Major Taxa	Parks	Increase in FY 2002
Amphibians/Reptiles	246	14
Mammals	259	28
Birds	271	73
Fish	208	19
Vascular Plants	282	107

historical information on vouchers and species occurrence in parks and entering these data into the NPSpecies database. At the end of FY 2002, a total of 225,630 vouchers and 301,169 species listings had been entered into the database, representing a 65% increase in documented vouchers and a 17% increase in documented species compared to FY 2001.

During FY 2002, each of the 32 networks received funding for vertebrate and vascular plant inventories. At national parks across the country, inventory projects are yielding results.

Soils Mapping

FY 2002 Funding Allocation: \$985,500

Soils mapping provides managers with the ability to predict the behavior of soil under alternative uses. It helps to determine the potential for soil erosion, groundwater contamination, and preservation of cultural sites and landscapes. Soils mapping also helps determine the ability of the ecosystem to sustain newly established native plant communities in order to control invasive nonnative species.

Through FY 2002, 57 soil surveys have been completed in park units, working with the Natural Resources Conservation Service of the U.S. Department of Agriculture and consulting soil scientists.

Geology Mapping

FY 2002 Funding Allocation: \$600,000

In addition to their use in traditional geologic applications, parks use geologic inventory products when dealing with landslides, rock-falls, and human health and safety issues. Information gained from geologic inventories is also used for scientific, educational, and interpretive purposes.

During FY 2002, the National Park Service spent \$600,000 on geologic inventories, with approximately \$400,000 coming from Challenge funding. The U.S. Geological Survey and state geologic agencies leveraged funds considerably.

Of the 273 parks with geologic resources, 78

Action Plan Focus, Accomplishments & Financial Summaries

Inventories Across the Country

In FY 2002, the National Capital Network of 11 parks continued biological inventories for amphibians, reptiles, small mammals, and birds, and initiated inventories for fish and vascular plants in several parks. In addition, considerable effort was

put into populating the Service-wide NPSpecies database with historical data from all parks in the network.

NPSpecies now contains 22,013 records for the network parks, supported by 284 references, 3,730 voucher entries, and 24,698 observations. The network recorded 5 federal threatened and endangered species, 209 state threatened and endangered species, and 433 invasive nonnative species as present in the parks. The network also enlisted the assistance of volunteers for bird inventories at several parks.

Analysis of data collected by volunteers revealed that no additional inventories are needed at Antietam National Battlefield, Catoctin Mountain Park, Manassas National Battlefield and Park, and Prince William Forest Park.

The North Coast and Cascades Network focused on data mining for all 7 network parks with an

emphasis on geo-referencing the verified species records for use with geographic information systems. Working with the University of Washington, 2,000 records were recovered documenting plant collections in the university's

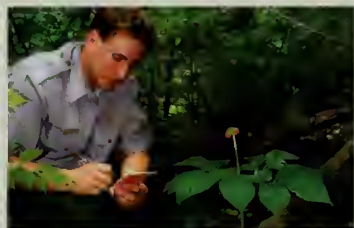
herbarium from the 7 network parks. Contractors seined beaches at 6 sites in the intertidal zones and 21 tidal pools at Olympic National Park to assess intertidal fish populations. Native vascular plant inventories also received considerable attention at several parks. At Mount Rainier National Park, surveys were conducted in 31 locations to document the status of 14 state listed sensitive species. The park found rare plant populations at 8 locations, 7 of which were new sites. Several observations documented records more than 50



NPS employee Bill Baccus gathers data from a General Ecological Model weather station as part of Olympic's environmental monitoring program in cooperation with EPA.



NPS staff arrange nets at Olympic National Park as part of tide pool fish monitoring.



An NPS employee conducts ginseng monitoring in Catoctin National Park.



Coyote attracted to a bait station at Olympic National Park as part of the forest carnivore inventory and monitoring program. The hair snair pictured in this photo show how hair samples are being collected for DNA analysis.

Action Plan Focus, Accomplishments & Financial Summaries

Inventories Provide Predictive Powers

Staff from the Northern Colorado Plateau Network, Dinosaur National Monument, and Utah State University developed new methods for mapping the distribution of invasive nonnative plants posing serious threats to park resources. Using a satellite global positioning system and geographic information system, analyses of known invasive nonnative plant distributions and factors such as soil type may help park staff predict, prevent, and manage these plant invasions.



Similarly, data gathered by Yosemite National Park staff and The Nature Conservancy were used by University of California, Davis, researchers to develop a model to predict the distribution of nonnative species in areas of natural disturbance. The researchers also developed a random-sampling strategy for use in monitoring nonnative plants in burned and riparian areas.

Cultural Landscapes Protect Biodiversity

An intensive survey documented five new species in Sitka National Historic Park in the Southeast Alaska Network. Most noteworthy was a species of bluegrass listed by the U.S. Forest Service as a sensitive species for the Tongass National Forest. This species has only been found in fewer than 15 sites in Alaska.

Challenge Work Generates Interesting Finds

On 8,000 acres of newly acquired lands in Pinnacles National Monument, 24 new plant species were documented. One of these species, a mustard in the *Streptanthus* genus, is new to science.

During the 2002 field season, a crew from the Wildlife Conservation Society worked cooperatively with the National Park Service to inventory amphibians and reptiles. In the course of their work, the crew recaptured a box turtle in a unit of Fire Island National Seashore. The turtle was originally marked by J.T. Nichols in 1921. J.T. Nichols described the turtle as mature, or about 20 years old, when he first marked it, making the turtle at least 100 years old in 2002.

In the Southwest Alaska Network a total of 523 vascular plant specimens were collected, recorded, and pressed for Katmai National Park and Preserve and Alagnak Wild River. Of the 523 specimens, approximately 130 had never been documented, providing the park with new records on these species. A number of discoveries made during this collection indicate significant range expansions. For example, staff found a population of the wetland tundra grass (*Dupontia fisheri*) at Swikshak Lagoon over 200 miles east of its previously known range in northwestern Alaska and northern Siberia. Small, disjunct populations also occur in these park units at Hazen Bay and Cold Bay. Additionally, the crew made the first discovery of the wetland tundra grass growing in a woodland marsh in Alaska.

Action Plan Focus, Accomplishments & Financial Summaries

parks, in 23 states held scoping meetings to evaluate geologic resources and issues. Twenty-five parks completed geological information system maps, 98 that can be posted on and downloaded from the NPS website.

Preliminary digital coverage exists for another 46 parks, and many of the other scoped parks have maps at some stage of completion, either in the digitizing process (24 map sheets completed) or underway in the field with cooperating government agencies or academic institutions.

Geologic resource bibliographies have been completed for 235 natural area parks and are posted on the NPS website.

Reports are complete for 11 Utah parks, 6 Colorado parks, and one park in Alaska. An overview report of the regional geology for parks in the western U.S. is currently in progress.

Baseline Water Quality Data

FY 2002 Funding Allocation: \$235,000

Perhaps few resources in parks are more affected or influenced by activities outside park boundaries than water resources. Park managers urgently need information about the current status of water quality in parks and benchmarks to evaluate change.

Drawing on existing Environmental Protection Agency databases, particularly STORET, the national water quality database, a baseline water quality data inventory and analysis report is being prepared for each of the 270 park units containing significant natural resources. These reports provide a complete inventory of all water quality data; descriptive statistics and graphics characterizing annual, seasonal, and period-of-record central tendencies and trends; and comparisons of park data with relevant U.S. Environmental Protection Agency national water quality criteria and standards.

The Number of Parks from the First 12 Networks that were in Various Phases of Design and Conducting Long-term Monitoring of Natural Resources at the End of FY 2002

	Air Quality	Water Quality	Water Quantity	Geologic Resources	Plant	Animals	Landscape
Planning and Design	18	39	14	21	37	37	12
Number of Parks Monitoring With Other Funding	4	4	1	3	12	12	4
Protocols Implemented	21	29	12	15	34	51	13
Number of Parks Monitoring With NRC Funding	4	4	1	1	5	7	3
Number of Parks Monitoring With Other Funding	12	19	6	5	14	30	2
Totals	59	95	34	45	102	137	34

Notes: 1/ Total number of parks = 101; 2/ Funding is from the Challenge or other sources (e.g., base funds or partnerships)

Action Plan Focus, Accomplishments & Financial Summaries

The Value and Application of Park Vital Signs Monitoring

Monitoring of reptiles and amphibians on Anacapa Island in Channel Islands National Park is taking place in conjunction with the eradication of rats on the island. Rats were eradicated from East Anacapa in Fall 2001; Middle and West Anacapa were treated in Fall 2002. The reptile and amphibian monitoring data indicate that twice as many juvenile Channel Islands slender salamanders, an endemic species, and side-blotched lizards were found on East Anacapa as on Middle Anacapa. In past years the numbers for the two islets were comparable.

Monitoring Avian Productivity in the Sierra Nevada Network

Avian productivity monitoring stations in Yosemite National Park operated by The Institute for Bird Populations and funded by the Yosemite Fund show bird populations have decreased slightly over the nine-year period of analysis, with slightly more species decreasing than increasing. Of 25 species analyzed for population trends, substantial nine-year declines were observed in 7 species and substantial increases noted in 5 species. Analysis indicates that weather may have been a factor in some declines, while overall low productivity is a factor contributing to decline in others. As a result of these data and the Sierra Nevada Breeding Bird Survey, numerous species have been identified as in need of active management and conservation measures. Most critical are the red-breasted sapsucker, dusky flycatcher, hermit warbler, chipping sparrow, and black-headed grosbeak.



NPS photo by Linda Mutch

A red-breasted sapsucker is displayed for Devils Postpile National Monument visitors. Point Reyes Observatory biologists fitted the bird with a numbered leg band as part of the 2002 Bird Demographic Monitoring and Interpretive Outreach project.

Sequoia and Kings Canyon National Parks obtained a Park Flight grant, which enabled the parks to operate two avian productivity monitoring stations to monitor neotropical birds. The parks established partnerships with national parks in Central America. Two interns from Guatemala and one from Nicaragua came to the parks to work on the project, and one Sequoia and Kings Canyon employee participated in workshops in Central America.

Action Plan Focus, Accomplishments & Financial Summaries

By the end of FY 2002, baseline water quality assessment reports were completed or in the final stages of completion for all 270 natural resource park units. In addition, level one field-based inventories have been initiated in 52 parks where park coverage is incomplete and data gaps need to be filled.

Other Inventories

FY 2002 Funding Allocation: \$409,800

Several of the inventories listed in Appendix D were administered at the national level, and are not accounted for among the activities in the previous inventory headings. Most are complete or nearly completed or, in one case, not yet initiated.

Park Vital Signs Monitoring

FY 2002 Funding Allocation

(including pre-challenge funds): \$8,575,000, of which \$4,200,000 is an FY 2002 increase

In FY 2002, the National Park Service funded 12 inventory and monitoring networks, encompassing 101 parks, and made considerable progress toward accomplishing the difficult task

Air Resource Program Funding

Funding Available in FY 2001	\$6,443,000
Uncontrollable Change to Base	28,000
Streamlining Change to Base	(6,000)
Natural Resource Challenge Increase in FY 2002 ^{1/}	2,600,000
Total Available in FY 2002	\$9,065,000

Air Resource Program Funding by Categories

Air Emissions Inventory ^{2/}	\$ 200,000
Air Quality Monitoring, Analysis, and Technical Assistance	8,865,000
	\$9,065,000

Note: 1/ Increase addressed separately under Air Quality Monitoring and Assistance. 2/ Increase addressed separately under Air Emissions Inventory.

Water Resource Program Funding

Funding Available in FY 2001 ^{1/}	\$6,869,000
Uncontrollable Changes To Base	47,000
Streamlining Changes To Base	(11,000)
Natural Resource Challenge Increase in FY 2002 2/	1,000,000
Total Available in FY 2002	\$7,905,000

Note: 1/ Reflects an increase of \$1,275,000 in FY 2001 for water quality vital signs monitoring, discussed under Water Quality Monitoring. 2/ For water resource protection--aquatic resource specialists in FY 2002 (discussed in a subsequent section)

Water Resource Program: FY 2002 Base Funding by Category

Water Resource Projects	
Water Resource Protection	\$1,400,000
Competitive Projects	752,000
Other Projects	17,000
Water Quality Monitoring	1,275,000
Water Resource Protection-Aquatic Resource Specialists	1,000,000
Water Resource Technical Assistance	2,728,300
Other Water Resource Management	732,700
Total	\$7,905,000

of developing an integrated natural resource monitoring program. Another 5 networks, with 52 parks, received planning funds. Together, these 17 networks are designing a systems-based natural resource data collection, analysis, and reporting system that is unprecedented in the history of the National Park Service.

Park vital signs are significant indicators of ecological conditions and may include the natural resources of greatest concern in a park. This program is allowing the National Park Service to begin measuring its progress in achieving desired outcome of resources in good condition. Monitored park vital signs can be used to provide managers with the broad-based, scientifically sound information needed to effectively manage parks and natural resources.

Action Plan Focus, Accomplishments & Financial Summaries

Monitoring provides a basis for understanding and identifying meaningful change in natural systems characterized by complexity, variability, and surprise. Knowledge and understanding result in better management decisions and allow park managers to work more successfully with the public and other agencies to protect park resources. In complex land issues, such as where physical and biological processes such as fire or flooding have been altered or no longer operate as they did in maintaining ecosystems, credible scientific information can help all involved to identify possible solutions.

By the end of FY 2002, the first 12 networks completed phase one of the three-phase planning and design process, as scheduled. The phase one report developed for each network includes the results of: defining goals and objectives; beginning the process of identifying, evaluating, and synthesizing existing data; developing draft conceptual models; and completing background work that must be done before the initial selection of ecological indicators. These reports were peer reviewed and approved at the regional level.

Phase two of this effort involves the process of prioritizing and selecting the park vital signs to be included in each network's initial integrated monitoring program. This work is to be completed for the first 12 networks by the end of FY 2003. Phase three focuses on the detailed design work needed to implement the monitoring, including the development of sampling protocols, a statistical sampling design, plan for data management and analysis, and details on the type and contents of various products.

Water Resource Monitoring

FY 2002 Funding Allocation: \$1,275,000

The National Park Service is committed to protecting water quality in parks from future impairment, including waters classified as Outstanding National Resource Waters or state-equivalent listed waters. To fulfill this commitment the National Park Service works with state clean water act programs and takes appropriate

management actions within parks to support the restoration of impaired water bodies in parks to an unimpaired quality. Presently, approximately 116 parks have state-listed impaired water bodies within their boundaries.

Planning and design of the Water Resource Monitoring program continues 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. In addition, by fully integrating the design of these programs, considerable cost efficiencies have and will continue to be realized in staffing, planning and design, administration, implementation, data management, and reporting.

Note: This section of the report addresses activities and accomplishments related to Water Quality Monitoring during FY 2002. The activities under other funded categories are discussed in Water Resource Protection, under the theme Mitigate Damaged Resources.

The 12 Park Vital Signs Monitoring Networks that were fully funded committed their water quality funding to compiling background information, analysis of issues and threats, detailed program planning, and supporting synoptic-level field assessments. Network planning activities included completing personnel hiring, creating university cooperative agreements and U.S. Geological Survey Interagency Agreements, and acquiring equipment. All networks accomplished the following activities:

- network water quality planning workshops,
- historic data compilations and analyses,
- information on state-listed impaired waters and park "outstanding" waters,
- documentation of significant water quality stressors and threats,
- synoptic inventory studies in support of detailed statistical design, and
- database management and geographic information systems support programs.

Program funding allocated to the 12 Park Vital

Action Plan Focus, Accomplishments & Financial Summaries

Signs Networks in FY 2002 is included in Appendix F. Other major accomplishments include the following:

- Water Quality Monitoring funds supported the development of an NPS Servicewide water quality data management program within the U.S. Environmental Protection Agency STORET national water quality database.
- The Water Resources Division procured necessary database management technology, conducted program administration, and provided technical guidance to parks. The division developed detailed technical guidance for water quality monitoring protocol. It also prepared a detailed study plan, guidance for a quality control and quality assurance plan, and conducted database management.

Air Quality Monitoring

FY 2002 Funding Allocation: \$8,805,000, of which \$2,600,000 is an FY 2002 increase. The air quality monitoring network is being expanded under the Natural Resource Challenge to provide improved geographical representation, with emphasis on parks most threatened by air pollution or most vulnerable to degradation caused by air pollution. This expansion is guided by information developed for air resource inventories and conducted under the Inventory and Monitoring Program. Complementary activities related to data management, reporting, and interpretation will be augmented, as will funds provided to parks to support monitoring efforts. The increased funding enables the National Park Service to fill gaps in the existing monitoring networks, expand the scope of air quality monitoring activities for additional pollutants, and enhance understanding and interpretation of air pollution transport, concentrations, and effects.

- The expansion will provide complete air quality monitoring at an additional 30 parks, expanding the air quality

information base to all Class I area parks and to a selected number of Class II area parks.

- There are now 58 parks where visibility monitoring is being conducted with the U.S. Environmental Protection Agency providing some of the funding.
- The 32 networks have air quality related inventory and monitoring activities as part of their integrated inventory and monitoring programs.

New monitoring efforts follow.

- Special air quality sampling studies are underway at Great Smoky Mountains National Park (cloud water chemistry), Isle Royale National Park (development and testing of monitoring equipment for remote locations), and Yosemite National Park (measurement of ozone and its precursors in Yosemite Valley).
- Mercury monitoring was initiated in eight parks in FY 2002 in cooperation with the National Atmospheric Deposition Program, Mercury Deposition Network. (Monitoring in two of these sites was leveraged with U.S. Environmental Protection Agency funds.) A national database of weekly concentrations of mercury in precipitation will be developed to help improve estimates of the amount of mercury being deposited into ecosystems. Mercury deposition into lakes and streams can trigger biological processes that chemically transform mercury into a toxic form that can bioaccumulate in fish and animals.
- Airborne contaminants will be monitored using a network of sites in parks in the western United States to provide information regarding exposure, accumulation, and impacts. These contaminants can pose serious health threats in wildlife and humans, as some of these compounds tend to biomagnify in the food chain. Foods consumed by subsistence-users will be assessed in Alaska.

Action Plan Focus, Accomplishments & Financial Summaries

- Ecological effects of pollutants will be assessed in four park-specific projects that were contracted to universities and other agencies.

The Challenge funded 8.5 professionals to provide air resource protection expertise for field units, and another three positions for the Air Resources Division. These positions will be responsible for working closely with park neighbors, regulatory agencies, other federal land managers, and the five regional planning organizations established by the U.S. Environmental Protection Agency to develop visibility protection programs. They will also provide or broker technical assistance and scientific expertise for parks.

Air Emissions Inventory

FY 2002 Funding Allocation: \$200,000

With \$200,000 in funds, the Air Resources Division continued its effort to address in-park air pollution sources. The National Park Service initiated or completed audits of air pollution sources in over 50 parks. These audits are used to calculate emissions, identify strategies to reduce or prevent pollution from park operations, and determine compliance with state and federal air pollution regulations. Most recently, the Air Resources Division contracted emission inventory development for 12 additional parks.

Park operations are found to be substantially in compliance with air pollution control, permitting, and emission fee requirements. In addition, many parks are currently implementing green strategies that reduce air pollution emissions, such as alternative transportation measures, use of alternative fuels and vehicles, and fire management practices aimed at preventing the accumulation of woody fuels.

Challenge funds made it possible for the Air Resources Division to provide more specialized and intensive service to parks engaged in environmental planning for activities that result in air pollution, such as use of recreational vehi-

cles, prescribed burning, and oil and gas exploration and production.

Making Natural Resource Data Useable

FY 2002 Funding Allocation

(including pre-challenge funds): \$1,553,000

Before the Challenge, NPS ability to provide natural resource 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 an annual report *Natural Resource Year in Review*. The increase from the Challenge more than tripled the amount of funding available to work on making natural resource data useable.

Natural Resource Information Management Program Funding

Total Available in FY 2002 \$1,553,000

Includes an FY 2001 \$1,098,000 Natural Resource Challenge increase

Databases

Data that can be accessed and used correctly are of great value to the National Park Service. To that end, the Natural Resources Information Division assisted the overall Challenge effort by setting up and administering Oracle databases that support the NPSpecies database, NatureBiB and the National Park Service's automated research permit and reporting system.

To make information useable the National Park Service adopted standardized data protocols and provides contractors, partner institutions, and NPS staff with specifications on how to deliver data.

In the past, much of the data from research in parks were provided to the National Park

Action Plan Focus, Accomplishments & Financial Summaries

Service in a form that was hard to interpret or use. As a result of the Challenge, methods for data management are standardized. The Natural Resource Database Template provides cooperators and staff with standardized, yet highly flexible natural resource data management capability, linking observational data to geographic locations. The Geographic Information System Theme Manager provides parks and networks the ability to organize and access their spatial data themes.

In support of these databases, a web-based platform was developed to enable park staff to effectively use the NPS intranet as a wide-area network to store and use data supporting resource stewardship programs. Planning and initial implementation was undertaken to warehouse natural resource data in a central repository. Information was digitized and classified with standard metadata (data about data), to support rapid access and tracking by users.

The NPS automated research permit and reporting system received and processed over 3,553 permit applications and over 2,098 accomplishment reports during FY 2002. Refinements made to the system improved the way the international scientific community and NPS staff prepare, process, and track electronic research permit application records, issue permits, and submit annual scientific accomplishment reports.

The Natural Resources Information Division secured services to update the database tool that helps assess, plan, and decide on the allocation of natural resource personnel and funding.

Data Distribution

A continually developing synthesis project, "Views of NPS," depicts and explains park natural resources to the public and NPS staff. This project makes data more useable by integrating a vast array of information sources into four interactive web-based views that use synthesized images and interpretive descriptions.

The Natural Resource Information Division

designed, developed, tested and implemented an information system to process and track applications to conduct scientific sabbatical studies in the parks, and spearheaded an initiative to improve access to data and information applicable to successful resource stewardship activities around the National Park System.

Educational and Interpretive Information

To foster communication and information transfer, the Natural Resource Information Division has accomplished the following.

- The division worked cooperatively with Montana State University's Master of Fine Arts program in natural science filmmaking. Two masters' degree candidates are producing 30-minute film features on National Park Service natural resource topics, one at Glacier National Park and one at Yellowstone National Park.
- The division published the annual *Natural Resource Year in Review*.
- The division created and updated a variety of natural resource program informational pamphlets, including *The Natural Resource Challenge*, *Exotic Plant Management Teams*, *Parks for Science*, *Resource Inventories*, *Learning Centers*, *Park Vital Signs Monitoring*, and others.
- The division developed a Servicewide National Learning Center Clearinghouse, which is an intranet website that promotes coordination and communication among the 13 existing learning centers, and began developing an Internet website for the public.

Mitigate Damaged Resources Theme

The activities described under this theme have received 43.7% of the 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. Plants and animals may have completely disappeared or be on the brink of

Action Plan Focus, Accomplishments & Financial Summaries

extirpation from a given park, yet this condition may not be conspicuous. Species that do not normally reside in a park may invade and exclude or adversely influence the native plants and animals. Water quality may be poor but with no visual clues present.

parks get increases and decreases, such as cost-of-living and fixed-cost increases and decreases through assessments, which are applied to the entire park budget before it is apportioned among programs. All parks experience short-falls as the increases generally fail to cover all increased costs, particularly personnel costs.

Funding Available to Mitigate Damaged Resources

FY 2000 Increases

Natural Resource Preservation Program	\$2,875,000
Native/Nonnative Species Management	3,449,000
Geologic Resource Protection	696,000

FY 2001 Increases

Water Resource Protection	\$ 823,000
Funding Increases to Parks	3,395,000

FY 2002 Increases

Funding Increases to Parks	\$3,200,000
Natural Resource Preservation Program	4,000,000
Native/Nonnative Species Management	2,400,000
Establish Resource Protection Fund	300,000
Water Resource Protection	1,000,000
Resource Protection Act Implementation	500,000
Total FY 2002 Increase	\$11,400,000

Challenge-related park base increases, like other types of increases, are unlikely to be able to avoid a share in program reductions when parks are faced with assessments, Servicewide reductions, and increased costs to respond to mandates related to security or other issues that are not fully funded. Although parks have some discretion as to how to apply reductions, the circumstances of parks facing combinations of assessments, increased personnel costs, and special needs, such as increased security requirements, appear to provide some parks little flexibility. Most of the parks that were forced to reduce their resource programs nonetheless reported significant progress that without the increases would likely not have been possible.

Funding Increases to Parks

Over the past two years, 36 parks have received base increases for critical resource mitigation, 17 in FY 2001 and 20 in FY 2002. (Zion National Park received increases in both years.) Parks eligible for increases were those requesting increases primarily to address nonnative species problems or threatened and endangered species. Generally, small parks with no resource manager were eligible to receive funds to address a range of resource issue. Eligible parks were selected on the basis of regional priorities.

Changes to funding of park natural resource programs typically vary from year to year. Most parks do not give their programs and divisions fixed base funding. Each year some parks get targeted increases, such as those from the Challenge. However, all

Parks were required to report on their natural resource program funds and changes since receiving Challenge increases. Reports from parks receiving Challenge base increases show a wide range of responses to these changes, especially among those for which FY 2002 was the second year of funding. Five of the 17 parks receiving funding first in FY 2001 reported no change. Two parks allocated additional funds to natural resource programs from other parts of their base. Three parks distributed cost-of-living increases to their natural resource programs

Park Funding Increases

Park Funding Increases FY 2000	\$ 0
Park Funding Increases FY 2001	3,395,000
Park Funding Increases FY 2002	3,200,000
Total Available in FY 2002	\$6,595,000

Action Plan Focus, Accomplishments & Financial Summaries

Funding Increase Amounts by Park		
Park	Funding (and Amount) First Received In FY 2001	FY 2002
Acadia NP		\$ 345,000
Antietam NB	\$ 150,000	
Appalachian National Scenic Trail		142,000
Big Cypress NP	399,000	
Buck Island Reef NM	100,000	
Catoctin Mountain Park	89,000	
Channel Islands NP		498,000
Coronado NMem	60,000	
Curecanti NRA	141,000	
Dinosaur NM		189,000
Gates of the Arctic NP and Pr		148,000
Great Basin NP		126,000
Great Sand Dunes NP		180,000
Great Smoky Mountains NP	402,000	
Haleakala NP	480,000	
Homestead NM of America		82,000
Hopewell Culture NHP		105,000
Jewel Cave NM	50,000	
John Day Fossil Beds NM	95,000	
Kalaupapa NHP		211,000
Lake Clark NP and Pr		147,000
Little River Canyon NPr		85,000
Mojave NPr	470,000	
Monocacy NB		118,000
Obed W and SR		195,000
Padre Island NS		95,000
Pictured Rocks NL		55,000
Rock Creek Park	163,000	
San Juan Island NHP		95,000
Saugus Iron Works	58,000	
Sequoia and Kings Canyon NPs		112,000
Stones River NB		132,000
Sunset Crater, Walnut Canyon, and Wupatki NMs		100,000
Theodore Roosevelt NP	133,000	
Virgin Islands NP	399,000	
Zion NP	94,000	152,000
Totals		
FY 2001	\$3,395,000	
FY2002		\$3,200,000

Action Plan Focus, Accomplishments & Financial Summaries

(not necessarily resulting in a net increase).

However, several parks that received increases in FY 2001 reported some kind of net decrease, other than one-time regional assessments, that affected their natural resource programs. Some of the decreases to their overall resource programs were substantial—more than a few thousand dollars. In most cases the natural resource programs affected by such reductions are larger than the Challenge components and some parks stated that the program elements increased by the Challenge had not been reduced. Of the parks receiving a new Challenge increase in FY 2002, six made reductions or reallocations in base funding for their natural resource programs, mostly relatively small ones (excluding one-time assessments from the region).

Increases to park bases have major positive consequences for park resource management programs, especially in smaller parks. The increases may broaden natural resource management capabilities, such as a single position with multiple responsibilities, or they may simply increase the amount of work accomplished.

Accomplishments of Parks in Second Year of Funding Increases

Parks receiving their second year of funding increases have now hired personnel, contracted for research, constructed native plant nurseries, prepared and moved into office space, and procured the equipment needed to support professional resource management work. Parks can now create momentum and accomplish the goals of the Challenge. The following information is derived from reports from the parks and focuses primarily on accomplishments.

Antietam National Battlefield took control actions on *Ailanthus altissima*, Japanese honeysuckle, multiflora rose, Johnsongrass, and several species of thistle, concentrating on the northern portion of the battlefield and on the recently acquired, 55-acre Newcomer Farm. Invasive nonnative plants are being mapped and control projects planned. A fuel load and-

nonnative plant transect project was initiated, working with the University of Massachusetts and the U.S. Forest Service to research the effects of fire on various invasive species. A white-tailed deer monitoring program was also developed.

Big Cypress National Preserve continued its extensive, labor intensive program to treat *Melaleuca*, following up on last year's treatments with secondary treatments on approximately 145 square kilometers to prevent reestablishment. Contract crews cut the trees and chemically treated stumps to minimize regrowth. Nonnative *Lygodium* was mapped in about 50% of the preserve, and systematic reconnaissance flights were done to map *Schinus*. Areas that are typically dominated by *Hydrilla* have also been mapped.

Buck Island Reef National Monument began monitoring endangered brown pelicans, threatened least tern nesting populations, and nonnative rats to check post eradication populations. Working with the South Florida/Caribbean Cooperative Ecosystem Study Unit and University of Central Florida, the National Park Service is preparing an analysis to determine whether a newly discovered mouse population is nonnative. The park increased its involvement in endangered sea turtle research and monitoring, and also surveyed extensive sections of the barrier reef to document the distribution and recovery of elkhorn coral, which has undergone major die offs and devastation by Hurricane Hugo. A reef fish census was conducted in the park's three major marine habitats, in cooperation with the National Oceanic and Atmospheric Administration. Park staff and partners conducted an island-wide herptofauna and plant inventory.

Catoctin Mountain Park, in preparation for writing a new deer management plan, evaluated population and browse impact data and began a deer herd health evaluation, working with the University of Georgia. Working in cooperation with the U.S. Forest Service, 401

Action Plan Focus, Accomplishments & Financial Summaries

acres in the park have been treated for gypsy moth, and a test of an insecticide to control hemlock woolly adelgid has been set up on 50 large hemlock trees. Vegetation surveys targeted species of special concern, under-represented taxa, and deer browse impacts on forest regeneration.

Coronado National Memorial monitored a number of important species, including the largest known population of barking frogs in Arizona. The park monitored bats and their use of gates installed at two abandoned mines. The park also monitored Palmer's agaves, the food source for the endangered lesser long-nosed bats, and nocturnal rodents. The memorial contracted for assistance in rehabilitating disturbed lands.

Curecanti National Recreation Area and Black Canyon of the Gunnison National Park completed weed surveys and identified, mapped, and controlled ten hectares of invasive weeds, most of which were on the State of Colorado noxious weeds list. The parks mapped and managed tamarisk on 26 sites on Blue Mesa Reservoir, cutting and spraying approximately 500 mature and seed producing trees and mapping 20,000 saplings and mature trees for future control actions. Habitat restoration work occurred on five closed roads and other locations. An inventory of disturbed sites was completed, and a disturbed lands restoration plan was initiated. For vegetation mapping, 210 vegetation sampling plots and 62 observation points were completed. Plant community descriptions were improved and ground-truthed, and unique environments inventoried. Five peregrine falcon eyries were monitored. A study of Gunnison sage grouse habitat was completed, with data from 177 locations, and another study that looks at factors limiting population growth of bighorn sheep began at the University of Washington.

Great Smoky Mountains National Park used an ichthyocide (Antmycin) to remove invasive non-native rainbow trout from segments of Sams Creek so that native southern Appalachian

strains of brook trout could be reestablished. Staff also provided technical assistance to Great Basin, Rocky Mountain, and Yellowstone national parks, using the same restoration methods. Great Smoky Mountains National Park installed a greenhouse to grow plants for restoration projects. The park planted over 17,000 grass and wildflower plugs and 800 trees from the Natural Resource Conservation Service Beltsville Plant Materials Center at Cades Cover and Foothills Parkway. Forest insects and diseases were monitored, and fire sites were monitored and treated for nonnative plant invasions. Of 757 sites, 250 were managed for invasive nonnative plants, with 247 *Paulownia* removed. Over 30 adelgid-infested hemlock sites were treated, some with predatory beetles and one with a test treatment. Hog traps were constructed and 241 wild hogs removed. Park staff made an extensive community outreach to educate the public on the complex natural resource management issues in the park.

Haleakala National Park increased its ability to protect endangered species by adding 46% more predator traplines and increasing monitoring of the lines. To try to improve Nene gosling survival rates, the park tested a supplemental feeding strategy; data entry and analysis is now taking place. The park continues to monitor feral cats and axis deer, and a feral pig fence was upgraded to an axis deer deterrent fence; in addition, half a mile of new axis deer fence was constructed. The park monitored for *Miconia* and other nonnative species, but found no *Miconia* within the park. However, cooperators found three *Miconia* fruiting trees outside park boundaries. Challenge funding was provided to the University of Hawaii to assist in a research effort to find biological controls for *Miconia*, and for research and monitoring on the most invasive nonnative species in and around the park.

Jewel Cave National Monument treated 5 acres of leafy spurge and 15 acres of Canada thistle. The entire monument was surveyed for nonnative plants, with new sites identified. A com-

Action Plan Focus, Accomplishments & Financial Summaries

prehensive database was constructed. The monument completed geographic information system mapping and analysis.

John Day Fossil Beds National Monument inventoried birds, mammals, amphibians, and reptiles on 14,000 acres, finding 14 of the 15 bat species known to occur in Oregon. Over half of these bat species are listed as species of concern. A new fish diversion with year-round fish passage was constructed on Rock Creek, which should benefit the threatened Mid-Columbia steelhead. Nearly 500 alder, cottonwood, and willows trees were planted along the John Day River in areas that historically had "galleries" of these tree species. The Sheep Rock Unit completed a survey of and treated for noxious weeds. Prescribed fire was used to control juniper and brush encroachment.

Mojave National Preserve generated multiple geographic information system data layers for projects and programs. Staff monitored desert tortoise to establish population location and density. Fort Piute, a historic site, was evaluated for condition, and site stabilization and restoration work was completed. A baseline sound study was conducted. Spring and surface waters were inventoried and water quality testing accomplished for all sites. Revegetation projects resulted in placement of over 2,000 plants.

Rock Creek Park eliminated invasive nonnative species on 275 acres of natural area. The potential effectiveness of contracting invasive nonnative species removal work was evaluated. Previously unknown rare species were documented.

Saugus Iron Works National Historic Site monitored and conducted compliance work for future treatment of carpenter bees and carpenter ants in buildings, and invasive nonnative species and other vegetation on the historic slagpile. Invasive nonnative plant species were mapped with the aid of global positioning and geographic information systems. A draft fire management plan was begun. Water level and quality in the Saugus River were monitored,

and 216 species were documented in the NPSpecies database.

Sequoia and Kings Canyon National Parks expanded their nonnative plant control work, surveying 6,245 acres and treating 817,592 plants on 444 acres. A number of the highly threatening nonnative plant populations were controlled in an early phase of establishment. More widespread species were controlled in high-priority sites such as meadows and riparian areas. A nonnative plant management newsletter was produced and distributed. A contractor developed a nonnative plant management Web-page slated to go on-line in 2003. A draft management directive was produced to prevent the import and spread of invasive nonnative plants. A complex nonnative plant management database was created for use in monitoring infestations and treatments.

Theodore Roosevelt National Park concentrated on controlling nonnative weeds in both units of the park. Annual control targets increased from 50 to 75 acres. The park established 50 additional bio-control sites and completed site preparation work on over 300 acres.

Virgin Islands National Park mapped the distribution of feral and nonnative animals throughout the park, including donkeys, goats, sheep, hogs, cats, rats, mongoose, and deer. Control actions were taken by volunteers, staff, the U.S. Department of Agriculture, the Animal Plant Health Inspection Service, and other cooperators, capturing, for example, approximately 40 cats and 138 mongoose and rats. Denis Bay was included because of the heavy hawksbill turtle nest predation. A donkey exclusion fence was built, and planning and National Environmental Protection Act compliance initiated for separate plans on the control of feral hogs, goats, sheep, and donkeys.

Zion National Park treated high priority invasive weeds on over 350 acres and 147 acres supported riparian restoration efforts. Tamarisk and Russian olive were treated along eight miles of stream, and invasive weeds inventoried

Action Plan Focus, Accomplishments & Financial Summaries

and mapped on 374 acres. An nonnative plant database was developed, and the park began cooperative activities with a local weed management district. Peregrine falcon monitoring occurred at 16 historical eyries, and Mexican spotted owls were monitored in 20 territories. Four small mammal plots were sampled in spotted owl prey-base studies. The U.S. Geological Survey conducted an assessment of Southwestern willow flycatcher habitat and reported recommendations for riparian restoration. Two Virgin River spinedace monitoring stations were established. Desert tortoise habitat was surveyed. Over 15 acres of disturbed riparian floodplain were revegetated, exceeding park performance goals. Over 1,200 plants grew in the park nursery and volunteer groups collected over 20 pounds of native seed.

Accomplishments of Parks in First Year of Funding Increases

Nineteen parks received base increases in FY 2002 for work focused on native and nonnative species management or Alaska subsistence matters. The following accomplishments in parks were achieved with first year increases.

Acadia National Park completed its hiring and facility improvements to support invasive non-native species management and protection of threatened, endangered, and rare species. The park funded studies of nonnative species and completed integrated pest management plans for 25 high priority invasive species. To help quantify nutrient inputs into a park estuary, a stream gage was established.

The Appalachian National Scenic Trail obtained digital information on several hundred occurrences of rare, threatened, and endangered species found during the 14 natural heritage inventories of the Appalachian Trail corridor conducted over the last 12 years. Maps were made for both rare and nonnative species. A physical science position was filled.

Channel Islands National Park, working

through a Cooperative Ecosystems Studies Unit, initiated collection of pre-eradication baseline information focusing on natural resources affected by feral pigs. This information served as a baseline for the Santa Cruz Island Restoration Plan, funded through the Challenge increase. The park also hired personnel and bought equipment for the impending management actions.

Restoring Cutthroat Trout

At Great Basin National Park the Challenge measurably assisted in preventing the listing of a declining trout species. Great Basin National Park has been working on the restoration of Bonneville cutthroat trout, using limited project funding. Without dedicated staff, the park was unable to meet the schedule included in the conservation agreement for the species. With Challenge funding, the park hired a permanent fisheries technician to take charge of the project. The National Park Service doubled its efforts and met its commitment in the conservation agreement. Without this funding, there may have been a need to reassess the entire multi-state Bonneville cutthroat trout program. If the National Park Service could not have kept its commitment and the plan had not achieved its purpose of restoring viable populations of Bonneville cutthroat trout within its historic range, then the fish would have been eligible for listing as a threatened species.

Dinosaur National Monument funded an assessment of the impacts of nonnative brown and rainbow trout on four endangered fish species in the Green River: Colorado pikeminnow, razorback sucker, humpback chub, and bonytail chub. Successful recovery may require understanding of the impacts of these fish and management in collaboration with the U.S. Fish and Wildlife Service, the U.S. Bureau of Reclamation, and the states of Colorado, Utah, and Wyoming. The park

Action Plan Focus, Accomplishments & Financial Summaries

increased coordination of its volunteer Weed Warrior Program, with 462 volunteers for the year, and initiated invasive weed inventories and weed management planning.

Flagstaff area parks funded five priority studies, including studies addressing: forest stand dynamics and fire ecology of formally-designated critical Mexican Spotted Owl habitat at Walnut Canyon National Monument, physical impact of off-trail trampling and off-road driving on unique volcanic cinder deposits, ponderosa pine forest succession and Sunset Crater penstemon habitat at Sunset Crater Volcano National Monument, an assessment of the rate of juniper woodland expansion and loss of grassland habitat for pronghorn in the Antelope Prairie at Wupatki National Monument, a juniper woodland age-class distribution and fire history in order to understand the loss of grassland habitat for pronghorn in the Antelope Prairie of Wupatki National Monument, and study of prescribed burning at Bonito Park to restore unique pine meadow vegetation and seasonal pronghorn habitat near Sunset Crater Volcano.

Gates of the Arctic National Park and Preserve completed hiring and undertook studies of Dall's sheep—a subsistence species, and muskox. Staff also assisted in wolf and sheep studies at Yukon Charley Rivers. The park evaluated aerial line-transect sampling as a new technique for brown bear population monitoring, and formulated a study for caribou.

Great Basin National Park hired a permanent fisheries technician to work on the Bonneville cutthroat trout project and to meet the NPS commitment in the Conservation Agreement. Park staff surveyed, mapped, and inventoried eight caves; surveyed for bats, several of which are sensitive or former candidate species for threatened and endangered designation; completed amphibian and reptile inventories in seven watersheds; and contracted for inventory of small mammals. NPS staff also initiated aggressive nonnative plant controls.

Great Sand Dunes National Monument and

Preserve initiated a grazing lease program and extended resource management operations onto lands transferred to the National Park Service from the U.S. Bureau of Land Management. Invasive species were treated, including 7.2 acres of Canada thistle and 16.5 acres of leafy spurge. A project with the Colorado Division of Wildlife was initiated to assess the feasibility of restoring three native fishes listed by the state as endangered or species of special concern.

Homestead National Monument of America reviewed erosion issues in Cub Creek, working with the City of Beatrice, Lower Big Blue Natural Resource District, and the USDA's Natural Resources Conservation Service. An action plan will be developed to guide erosion monitoring and control efforts. The park hired its first permanent natural resource specialist.

Hopewell Culture National Historical Park hired a natural resource specialist to manage, monitor, and protect natural resources, including overseeing the restoration of 400 acres of land. Park staff controlled invasive nonnative vegetation on 13.7 acres, removed feral animals, completed invertebrate inventories, and monitored bluebird boxes.

Kalaupapa National Historical Park contracted with the University of Hawaii to restore native species and their habitat, and to inventory and monitor natural resources. The park hired a horticulturalist and pest control specialist, built a greenhouse, and is currently growing tree propagules. Staff collected seeds from 20 species, including 5 threatened and endangered species and 5 species of concern.

Lake Clark National Park and Preserve gathered data on bear foraging, aircraft and all-terrain vehicle access to beaches, visitor use, and recorded ambient sound levels. Once analyzed, the data can be used to develop access and visitor use guidelines for viewing bears on the coast. The park hired a wildlife biologist.

Little River Canyon National Preserve conduct-

Action Plan Focus, Accomplishments & Financial Summaries

ed post-thinning and prescribed burn monitoring on ephemeral stream banks and bog sites. The park conducted stem and flower counts of the endangered pitcher plant along permanent transects placed within the sites. For the first time, during the life of the monitoring program, staff discovered flowering plants in two of the bogs, which means the plants may be reproducing. The park took control actions on nonnative plant species, pulling and treating more than 10,000 plants, and mapped new invasions.

Monacacy National Battlefield hired personnel and set up a geographic information system program to support its efforts to gather and analyze baseline information. The park took control actions on invasive nonnative vegetation and monitored American bald eagles and gypsy moths.

Obed Wild and Scenic River hired two resource management personnel and began developing a nonnative plant management plan and a climbing management plan. Working with the NPS Water Resources Division and the U.S. Geological Survey, a paired watershed program was started to look at the effects of impoundments. The park dealt with a five-acre fire and oil well spill that occurred along the boundary in July 2002; large quantities of oil spilled into Clear Creek. The park deployed booms, fought the fire, removed soil, prepared revegetation plans, and monitored effects.

Padre Island National Seashore hired 13 seasonal staff to monitor and protect Kemp's ridley turtle nests, and found a record 28 nests. Staff coordinated patrols by over 90 volunteers. Working with the U.S. Geological Survey, 3,769 eggs were incubated and 1,000 visitors attended 10 public hatchling releases.

Pictured Rocks National Lakeshore established an invasive nonnative aquatic species monitoring program. Monitoring sites for zebra mussels were established and maintained at motorized boat launches on inland lakes within the lakeshore. Control of sea lamprey was effectively conducted at Miner's River, in cooperation with the U.S. Fish and Wildlife Service. The lakeshore hired an aquatic ecologist.



A radio-collared wolf recovers after being darted by biologists in Yukon-Charley Rivers National Reserve, Alaska.



A few muskoxen have been observed recently in Gates of the Arctic National Park and Preserve, Alaska. It is possible these animals are beginning to recolonize areas of their native habitat. Subsistence species such as muskoxen are a vital part of the natural resources in arctic parklands.



A Dall's sheep ewe is radio-collared in Yukon-Charley Rivers National Preserve, Alaska to investigate the impacts of military jet overflights on Dall's sheep.

Action Plan Focus, Accomplishments & Financial Summaries

San Juan Island National Historical Park created two resource management positions, removed nonnative plants in the vicinity of the dunes, conducted nonnative plant monitoring, worked with the Oregon Museum of Science and Industry, surveyed bats at historic Crook House, and monitored oak lopper defoliation of Garry oaks.

Stones River National Battlefield targeted 46 invasive nonnative species, an increase of 24 species over last year, on about 250 acres in culturally and ecologically significant and highly visible areas. The Tennessee Exotic Pest Plant Council considered the species as significant or severe threats. The park initiated a fire management plan, continued natural grass restoration on the earthworks at Fortress Rosecrans and Redoubt Brannan, and worked on the endangered species recovery program for *Astragalus bibulatus* with Missouri Botanical Garden and Tennessee Department of Environment and Conservation.

Natural Resource Preservation Program

Most ongoing resource management activities are undertaken and funded at the park level. Parks usually have little or no flexible, dedicated funding for cyclical and one-time project needs. Thus, to undertake larger projects, most parks require special funding. The major source of such funds is the Natural Resource Preservation Program. This program provides the only reliable and dedicated source of NPS funding for natural resource management projects in parks costing more than \$50,000. In

FY 2000, the Challenge increased Natural Resource Preservation Program funds from \$5.432 million to \$8.289 million—a \$2.875 million or 52.9% increase.

Final Allocations and Obligations by Category

Type of Project	Number of Projects	Approved Allocation	Actual Allocation
Natural Resource Management	82	\$7,377,000	\$7,346,000
Threatened and Endangered Species	13	500,000	468,000
Disturbed Lands Restoration	15	850,000	850,000
Small Parks	79	1,000,000	1,000,000
Regional Block Allocation	92	1,400,000	1,400,000
USGS, = BRD Technical Assistance Agreement	23	255,000	255,000
Brucellosis Research	1	100,000	100,000
Servicewide	22	807,000	807,000
Total	327	\$12,289,000	\$12,226,000*

* FY 2002 funds worth \$63,000 were returned to the Comptroller per assessment: \$56,000 from Natural Resource Preservation Program, Natural Resource Management, and \$9,000 from Natural Resource Preservation Program, Threatened and Endangered Species.

Natural Resource Preservation Program Funding

Funding Available in FY 2001	\$ 8,289,000
Natural Resource Challenge Increase in FY 2002	4,000,000
Total Available in FY 2002	\$12,289,000

As part of the Challenge, two special portions of the Natural Resource Preservation Program were established in FY 2000 to fund disturbed lands and threatened and endangered species restoration projects. In FY 2002, funding for

Action Plan Focus, Accomplishments & Financial Summaries

Natural Resource Preservation Program: Fully Funded Natural Resource Management Projects

Park	Project Title	Total Funding	FY 2002 Funding
Katmai NP	Alagnak River Management Plan	\$394,000	\$163,000
Golden Gate NRA	Cape Ivy Management	600,000	20,000
Badlands NP	Baseline Mapping of Fossil Bone Beds	235,000	75,000
Cape Lookout NS	Immunocontraception & EIA Testing Feral Horses	81,000	10,000
Great Smoky Mountains NP	Invasive Nonnative Plant Management in Smaller Parks	249,000	83,000
Kenai Fjords NP	Carrying Capacity Exit Glacier	275,000	73,000
Jean Lafitte NHP and Pres	Modeling Risk of Chinese Tallowtree Invasion	96,000	57,000
Noatak NPres	Population Abundance & Demography of Dall's Sheep	280,000	90,000
Cape Cod NS	Effects of Off-road Traffic on Biotic Community	173,000	53,000
Great Smoky Mountains NP	Inventory & Delineation of Remnant Fraser Fir Stands	45,000	15,000
Fire Island NS	Adaptive Management of Deer, People, Plants	360,000	120,000
Isle Royale NP	Impact to Natural Fire Regime Due to Moose Browsing	204,000	80,000
Haleakala NP	Stabilize Threatened and Endangered Plant Species	549,000	181,000
Yellowstone NP	Native Cutthroat Trout Conservation in Yellowstone Lake	226,000	25,000
Yellowstone NP	Trout Conservation (same as above)	445,000	194,000
Congaree Swamp NM	Species Diversity and Condition of Fish Community	71,000	22,000
Lake Meredith NRA	Control Nonnative Saltcedar	132,000	44,000
Olympic NP	Conduct Demographic Monitoring of Northern Spotted Owl	190,000	68,000
Channel Islands NP	Stabilize Island Fox Population	416,000	82,000
Gulf Islands NP	Post Nesting Satellite Tracking of Loggerhead Turtles	54,000	18,000
Great Smoky Mountains NP	Brook Trout Reclamation of Sams Creek	215,000	65,000
Fossil Butte NM	Assessment & Protection of New Paleontological Sites	168,000	56,000
Denali NP and Pres	Managing Human Use & Wildlife Resources	260,000	75,000
Great Smoky Mountains NP	Complete Natural Resources Inventory & Atlas	310,000	150,000
Boston Harbor Island NRA	Establish Ecological & Social Carrying Capacity	239,000	72,000
Haleakala NP	Completion of Fence for Biologically Rich Lands	93,000	0
Haleakala NP	Emergency Control of Miconia	334,000	334,000
Shenandoah NP	Acidic Impacts on Fish	316,000	27,000
Pinnacles NM	Protect Vulnerable Park Resources from Feral Pigs	153,000	102,000
Padre Island NS	Oil and Gas EIS for Multiple Parks	765,000	17,500
Arches NP	Monitor Soundscape	148,000	148,000
Wind Cave NP	Remove Blast Rubble	127,000	127,000
Acadia NP	Verify Predictive Contaminate Deposition Map	351,000	351,000
Total		\$8,654,000	\$2,997,500

Action Plan Focus, Accomplishments & Financial Summaries

Stabilizing Threatened and Endangered Plant Species in Hawaii's National Parks

The purpose of this project was to increase population sizes of threatened and endangered plant species and species of concern most at risk of extinction in the parks. All eight target species at Kalaupapa National Historic Park are under propagation and scheduled to be outplanted in FY 2003. At Hawaii Volcanoes National Park, 14 of the 20 target species are under propagation for a total of 2,850 plants ready to be outplanted. Six of the target species were outplanted in FY 2002 for a total of 1,010 plants. At Haleakala, 14 of the 20 target species are under propagation for a total of 560 plants. Seven of the species were outplanted with a total of 83 plants. This project is being carried out through a cooperative agreement, and is in its second year. Outplanting and monitoring will be stressed in the last year of the project and outplanting targets will be reached for the target species.

Native Cutthroat Trout Conservation in Yellowstone Lake

Natural Resource Preservation Program funds received by Yellowstone National Park during FY 2000 through FY 2002 were used to reduce the population level of the nonnative and highly predacious lake trout in Yellowstone Lake. Yellowstone National Park contains 90% of the remaining range of the native Yellowstone cutthroat trout, *Oncorhynchus clarki bouvieri*. This population is likely to be the most valuable source of inland cutthroat trout in the world. Having evolved in the absence of predators, inland cutthroat trout have no natural defense mechanisms against predation and are extremely vulnerable to the lake trout. Until recently, Yellowstone Lake represented the largest and most secure habitat for long-term perpetuation of this prized fish species. In 1994, the discovery that the highly predacious lake trout had established an expanding population in Yellowstone Lake caused great concern. Since that time, park personnel have been engaged in a large-scale, gill-netting program to restrict population growth of the lake trout. However, the magnitude of this task soon overwhelmed the existing aquatic resources staff.

Funds provided through Natural Resource Preservation Program allowed the purchase of a vessel designed specifically for gill-netting on Yellowstone Lake. This vessel arrived in June 2001, greatly improving working conditions for employees and efficiency of the gill-net operations. Funds were also used for additional staffing and gill-netting gear, allowing park staff to increase gill-netting efforts during these years. As of October 4, 2002, over 54,000 lake trout have been removed from Yellowstone Lake. Because of the increased gill-netting efficiency and additional staff, an increase in the removal effort of seven- to nine-fold over previous years was possible, making a significant contribution toward preserving Yellowstone cutthroat trout.

Control of Nonnative Saltcedar at Lake Meredith National Recreation Area

Natural Resource Preservation Program funds awarded in FY 2000–FY 2002 were used to begin a long-term saltcedar (tamarisk) eradication program by treating 6,000 acres of saltcedar at Lake Meredith National Recreation Area. The goals of this project included improving habitat for the threatened Arkansas River Shiner by increasing stream flow and quality, improving water quantity and quality for public drinking water, allowing native species to return, providing additional recreational usage, and protecting visitor health and safety. The park hired a four-person crew and mechanically treated 2,276 acres, 832 of which were post-prescribed fire. The Canadian River Municipal Water Authority, Texas Natural Resources Conservation, National Wild Turkey Foundation, and Chihuahuan Desert-Short Grass Prairie Exotic Plant Management Team contributed in-kind and financially toward this project.

Action Plan Focus, Accomplishments & Financial Summaries

the Natural Resource Preservation Program was increased by \$4 million, raising the (adjusted) total to \$12.289 million.

About 60% of Natural Resource Preservation Program funds (\$73 million) are usually available for most types of park-level natural resource management projects. The balance of the funds strategically target specific needs. The table, Final Allocations and Obligations by Category, shows how these targeted funds were distributed.

See Appendix E for a complete listing of projects funded under the Natural Resource Preservation Program.

The U.S. Geological Survey, Biological Resources Discipline, and the National Park Service (through the Natural Resource Preservation Program) jointly support biological projects that provide exploratory research and technical assistance to parks. In FY 2002, 26 separate projects were funded. Information on the project topics and status reports on the projects, is contained in Appendix H. Many of this year's projects address research needs, model development, and other tools that are applicable to management and conservation of large animals, amphibians, and rare species.

Natural Resource Management Projects
FY 2002 Funding Allocation: \$7,346,000
The largest segment of the Natural Resource Preservation Program funds natural resource management projects. Projects eligible for funding through this source include tactical biological studies; development of new physical science management approaches

and protocols; and combined research and follow-up resource management or mitigation actions.

The total number of natural resource management projects funded through the Natural Resource Preservation Program has significantly increased since FY 2000 (FY 2000: 49 projects; FY 2001: 54 projects; and FY 2002: 82 projects). The majority of projects funded fall within these categories: restoration, invasive nonnative species control, resource assessment and mapping, and natural resource management plan development.

Invasive Nonnative Plant Management and Ecological Restoration

FY 2002 Funding Allocation: \$3,000,000

The national parks are home to complex communities of native plants and animals that have developed over millions of years. This natural heritage is threatened by the invasion of nonnative plants and animals and by human-caused disturbances that foster the establishment of nonnative species. The introduction of harmful nonnative species is



NPS seasonal employee Adrienne Harris removing invasive nonnative black locust trees with a weedjack at Indiana Dunes National Seashore.

Native and Nonnative Species Management

FY 2002 Funding Allocation: \$5,846,000 of which \$2,400,000 is an FY 2002 increase

Biological Resources Management Funding

Funding Available in FY 2001	\$ 3,441,000
Uncontrollable Change to Base	6,000
Streamlining Change to Base	(1,000)
Net Available After Changes to Base	3,446,000
Natural Resource Challenge Increase in FY 2002	2,400,000
Total Available in FY 2002	\$5,846,000

Biological Resource Management Program Funding Categories

Exotic Plant Management Teams	\$ 3,000,000
Ecological Restoration	400,000
Endangered Species Program	522,000
Integrated Pest Management Program	625,000
Wildlife Program	612,800
Biological Resource Projects-National Level Support	686,200

Total **\$5,846,000**

Action Plan Focus, Accomplishments & Financial Summaries

an emerging global problem. A recent Cornell University study estimated that invasive plants and animals cost the U.S. economy \$137 billion annually. The Ecological Society of America noted that invasive species contribute to the listing of 35% to 46% of all threatened and endangered species. Today, invasive nonnative plants infest some 2.6 million acres in the national parks, and their control is one of most significant land management issues facing national parks.

To combat and control invasive nonnative plant species populations in national parks, Exotic Plant Management Teams were established in FY 2000. The teams are modeled after the coordinated, rapid-response crews used in fighting wildland fires. The teams are highly trained, mobile strike forces of plant management specialists that assist parks in the control of plants. In FY 2002, five new tactical exotic plant management teams joined the four already established. The teams have been lauded for their work in controlling invasive nonnative plants.

The teams finished their third year of operation in FY 2002, and identified, treated, inventoried, or monitored more than 100 high-priority nonnative plant species on 68,000 infested acres and monitored over 34,000 acres with no time lost to injuries.

Ecological Restoration

FY 2002 Funding Allocation: \$400,000

Ecological restoration was undertaken in the form of wildland fire, weed control, contaminants, and cultural resources projects. The Biological Resource Management Division increased its efforts to work with the NPS Fire Management Program Center through participation in the NPS Fire Ecology Program. The division also continued to provide National Park Service input into a plan for native plant material development. To address the issue of degraded ecosystem restoration, technical assistance was provided to parks on 12 new projects. To address the issue of contaminants, the Biological Resource Management Division

assisted or represented parks or the agency in various technical discussions and teams. A cooperative agreement was signed with the University of Wyoming to provide technical assistance to parks for biostatistical support.

Integrated Pest Management Program *FY 2002 Funding Allocation: \$625,000*

Through a broad range of integrated pest management training and technical assistance, the Integrated Pest Management Program provided low-risk strategies for the management of nonnative and native pests adversely affecting parks. Technical assistance was provided to more than 100 parks either through on-site consultations, distributed material, and remote consultations, or identification of other experts available to park personnel. In addition to assisting natural resource managers with pest management issues, the Integrated Pest Management Program assists with many other program areas, including operations, concessions, cultural resources, and visitor safety. During FY 2002 a significant ongoing activity included the maintenance of a process for reviewing and tracking pesticide proposals. During the year, a record 1,700 pesticide proposals were processed. Two weeklong integrated pest management courses were presented, reaching a total of 56 trainees. Other training was offered to facilities managers and concessionaires.

West Nile Virus continued to pose a threat to human and wildlife health. Integrated pest management staff worked closely with the Centers for Disease Control, the U.S. Fish and Wildlife Service, and the West Nile Virus Interagency Task Force to ensure that parks received the latest information on the virus and provided specimens for testing.

Endangered Species Program *FY 2002 Funding Allocation: \$522,000*

During FY 2002 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 National Park Service currently has over 400 federally

Action Plan Focus, Accomplishments & Financial Summaries

Exotic Plant Management Team Costs and Accomplishments

Team	Amount transferred to team	Gross infected acres treated	Acres retreated	Acres inventoried	Acres monitored	Acres restored	Lost-time injuries
California ^{1/}	300,000	756	0	0	0	0	0
Chihuahuan/ Southern Shortgrass Prairie	302,300	407	16	357	107	4	0
Columbia ^{1/} Cascades	261,000	1,842	115	,842	428	0	0
Florida ^{2/} Partnership	648,200	9,560	0	7,586	0	0	0
Gulf Coast ^{1/}	237,000	1,195	40	776	0	0	0
Lake Mead ^{1/}	301,200	489	95	0	0	0	0
National Capital	326,100	804	54	4,349	0	4	0
Northern ^{1/} Great Plains	300,000	958	9	14,394	3	0	0
Pacific Islands	325,200	52,740	0	0	34,327	0	0
Annual Totals	3,001,000	68,751	329	29,304	34,865	8	0

^{1/} First year for team.

^{2/} Not a team or crew per se, but a partnership with the Florida Department of Environmental Protection (DEP) Upland Invasive Plant Management Program.

listed endangered, threatened, proposed, or candidate species reported from lands that it manages. To better support the effort to recover these species, NPS staff continued to update the NPS endangered species database with information on the status of individual species in each park and to track expenditures by species, as required by the U.S. Fish and Wildlife Service. This updated information provides the National Park Service with a better picture of

where recovery efforts are succeeding and where additional emphasis should be placed.

In cooperation with Colorado State University and the Colorado Plateau Cooperative Ecosystem Studies Unit, approximately 200 draft management summaries on listed species have been prepared to help NPS resource managers identify priorities for funding and to evaluate the effects of park operations on listed species.

Action Plan Focus, Accomplishments & Financial Summaries

Extra Accomplishments in Hawaii

In response to the September 11th terrorist attacks, the State of Hawaii established the Emergency Environmental Workforce to provide employment to displaced workers in the tourism industry. Seventeen workers contributed 5,380 hours to the Pacific Islands Exotic Plant Management Team. Their primary target was *Miconia*, an aggressive tree from Central America that is poised to overrun the pristine rainforest in the Kipahulu Valley Biological Reserve in Haleakala National Park.

The Endangered Species Program worked with the National Center for Genetic Resources Preservation to develop a memorandum of understanding that facilitates the National Park Service storing seeds from highly endangered species in its seed storage laboratory. Continued efforts were made to develop a cooperative agreement with the Center for Plant Conservation that will result in the collection and preservation of seeds from over 200 NPS populations of endangered plants.

Two examples of technical assistance given to

parks in FY 2002 include providing advice on listed plants and birds to Colonial National Historical Park as it prepared for its 400th anniversary and providing advice to Channel Islands National Park, which has brought its endemic island foxes into a captive breeding program.

The Endangered Species Program continued to take a lead role in drafting and negotiating memorandums of understanding with other federal agencies in order to prevent further species declines.

Wildlife Program

FY 2002 Funding Allocation: \$612,800

The Wildlife Program provides policy guidance, technical assistance, and training to enhance the ability of park staff to meet the increasing demands for professional wildlife management. Subject areas that are typically addressed include wildlife health, wildlife restoration, nonnative species management, wildlife population management, and the identification of wildlife research needs.

The program provided technical assistance to parks via consultation, training, and fieldwork on wildlife capture and anesthesia, and evaluated and developed wildlife management actions for critical wildlife issues. Examples include assisting Theodore Roosevelt National Park in

The Taxonomic Affinity Of Endangered, Threatened, Proposed, and Candidate Species Found in National Park Service Units (as of September 30, 2002)

Taxonomic Group	Species
Plants	81
Invertebrates	50
Fish	50
Amphibians	6
Reptiles	22
Birds	59
Total	424

The Number Of Endangered, Threatened, Proposed, and Candidate Species Found in National Park Service Units (as of September 30, 2002)

Status	Species
Endangered Species	261
Threatened Species	96
Experimental Populations	7
Proposed Species	4
Candidate Species	52
Managed via Conservation Agreement	4
Total	424

Action Plan Focus, Accomplishments & Financial Summaries

evaluating management alternatives for surplus elk with regard to recent chronic wasting disease issues and assisting Pea Ridge National Military Park on alternatives and actions for white-tailed deer management.

The Biological Resource Management Division teamed up with the National Wildlife Health Center and the Colorado State University Veterinary Diagnostic Laboratory (through a Cooperative Ecosystem Studies Units agreement) to provide veterinary diagnostic services to national parks. Surveillance for emerging diseases such as chronic wasting disease of deer and elk and for common diseases provid-

ed managers with valuable information to address wildlife and public health concerns. Rabies is also a concern in some parts of the country, and the division gathered information and initiated communications with the U.S. Department of Agriculture and the Centers for Disease Control and Prevention in order to formulate guidance.

Technical assistance was provided to Olympic National Park by reviewing the technology available for contraception of free-ranging mountain goats. Improved methodology for wildlife population control by nonlethal means is a growing need of wildlife management

Biological Resources Projects

FY 2002 Funding Allocation: \$686,200. In FY 2002, 24 competitive projects were funded in 20 parks.

Biological Resource Management Competitive Projects, FY 2002 Funding Allocation

Park Unit	Region	Project Title	FY 2002 Funding
LACL	AKR	Improve a Census Technique for a Harvested Population of Moose	\$ 38,500
LACL	AKR	Tracking Sockeye	23,000
BAND	IMR	Develop a Wilderness Stewardship Plan	30,000
BAND	IMR	Monitor Ecosystem Conditions Baseline Wilderness Plan EIS	34,000
BIBE	IMR	Implement Conservation Agreement Two Candidate Plant Species	24,000
CANY	IMR	Salt Creek Invertebrates	22,000
ROMO	IMR	Restore a Population of Colorado River Cutthroat Trout	31,000
SAGU	IMR	Conduct Invasive Nonnative Grass Backcountry Hasty Search	25,000
SAGU	IMR	Status Assessment and Management Lowland Leopard Frogs	30,000
YELL	IMR	Baseline Inventory of Thermophile Biodiversity	24,000
INDU	MWR	Develop a Database for Sensitive Plants and Orchid Recovery Plan	30,500
ISRO	MWR	Develop a Fishery Management Plan for ISRO	14,000
WICA	MWR	Baseline Land Snail Inventory for WICA	25,000
VOYA	MWR	Protect Muskellunge in Shoepack Lake	23,000
GWMP	NCR	Potential Impacts of Mosquito Control Activities: Assessment of the Arthropods	25,000
ROCR	NCR	Determine Ecological Vulnerability of Kenk's Amphipod	27,700
SHEN	NER	Control Nonnative Vegetation: Essential Follow-up Controls for Several Units	25,000
UPDE	NER	Determine Size and Significance of Newly Discovered Population of Endangered Dwarf Mussels	50,000
LAME	PWR	Development of a Comprehensive Invasive Plant Management Plan for LAME	35,000
LAVO	PWR	Taxonomic Affinity, Spatial Ecology, and Resource Utilization of a Red Fox Population	42,500
PIRO	MWR	Evaluation of Seasonal Stream Usage and Inter-stream migration by Coaster Brook Trout	33,000
PORE	PWR	Habitat Assessment of the Federally Endangered Myrtle's Silverspot Butterfly	24,000
SAMO	PWR	Assess Distribution and Status of Mountain Lion	25,000
SAMO	PWR	Assess Reptile and Amphibian Distribution and Status	25,000
Total			\$686,200

Action Plan Focus, Accomplishments & Financial Summaries

agencies and parks. The division also collaborated with the Colorado Division of Wildlife on fertility control work at Rocky Mountain National Park.

Technical assistance was provided to Yellowstone National Park by supporting planning on a multi-tiered, collaborative project with Russian scientists to investigate brucella vaccines, vaccine enhancers, and delivery systems to address bison brucellosis management at the park. The park also hosted a workshop on remote delivery of pharmaceuticals to free-ranging wildlife.

The Park Flight Migratory Bird Program focused again on bird conservation and education projects and created opportunities for technical exchange and cooperation. 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 is a partnership between the National Park Service, the National Park Foundation, American Airlines, the National Fish and Wildlife Foundation, the U.S. Agency for International Development, and the University of Arizona. In FY 2002, the program's second year, 7 bird conservation and education projects were funded, benefiting 13 U.S. national parks and protected areas in Guatemala, El Salvador, Nicaragua, Honduras, Panama, and Mexico. As part of the FY 2002 Park Flight technical exchange effort, 7 interns from Guatemala, El Salvador, Nicaragua, Panama, and Mexico assisted with monitoring and education efforts at Sequoia/Kings Canyon National Parks, North Cascades National Park, Point Reyes National Seashore/Golden Gate National Recreation Area, and the New Jersey Coastal Heritage Trail Route. The University of Arizona Desert Southwest Cooperative Ecosystem Studies Unit and the NPS Biological Resource Management Division provided technical direction.

Challenge funds were used to provide geologic expertise in caves, coastal processes, disturbed

Geologic Resource Protection Geologic Program Funding Funding Available in FY 2002

Other Geology Programs (not funded by the Challenge)	\$ 2,004,000
Geologic Resource Protection	696,000
Natural Resource Challenge Increase FY 2002	0
Total Available in FY 2002	\$2,700,000

land restoration, geohazards, and paleontology. This specialized expertise is being used to support parks, regions, vital signs networks, and the inventory and monitoring program.

The Geologic Resources Division staff provided technical assistance on 37 disturbed lands restoration projects. The division managed the disturbed lands portion of the Natural Resource Preservation Program fund source, with division staff supervising 17 projects.

Division staff responded to 13 park requests for technical assistance on coastal process concerns and worked with the Geologic Resource Inventory program to develop coastal mapping protocols for barrier island parks. Work is ongoing with the U.S. Geological Survey to develop maps delineating coastal vulnerability to sea-level rise for 5 parks. This mapping information is being incorporated in park planning and management decisions.

Staff coordinated NPS development and departmental support for the Fossil Resource Protection bill, and initiated development of NPS protocols for assessment of fossil site conditions.

The cave and karst specialist responded to eight park technical assistance requests and provided guidance to park staff and the public. Products included a cave and karst management brochure, a draft *Handbook for Cave and*

Action Plan Focus, Accomplishments & Financial Summaries

Karst Management and Protection, and a cave and karst resources plan for Wind Cave National Park. To facilitate a sharing of cave management expertise and develop an NPS network of cave specialists, the division also prepared a quarterly newsletter called "Inside Earth," maintained a website for the National Cave and Karst Research Institute, and hosted a national meeting of NPS cave specialists.

Water Resource Protection

The projects in this category include the following three areas:

- water resource protection projects and other projects,
- Water Resources Division competitive projects, and
- aquatic resource professionals, stationed in field units.

Water Resource Protection Projects

FY2002 Funding Allocation: \$1,400,000

These data collection and analysis projects describe surface and groundwater flow regimes and investigate the dependence of park resources upon water. These efforts are targeted toward development of scientific information that will benefit decision-makers, including federal managers, court judges, or state administrators such as state engineers. Priorities are determined by the requirements of federal or state law.

Twenty-seven projects were funded, including one with Servicewide implications and three that were multi-park in nature. The majority of FY 2002 project funds were used to support ongoing studies designed to characterize surface or groundwater flow systems.

- In the desert Southwest, ongoing projects are developing modeling capabilities for regional groundwater flow systems.
- In the East, hydrologic studies are developing information on the effects of

impoundments on surface river systems.

- Projects also assess the relationship between water quantity and flow timing and water-dependent park resources, including riparian vegetation, fish migration, and geomorphology.

Water Resources Division Competitive Projects

FY 2002 Funding Allocation: \$752,000

The division's competitive projects support many park-based activities. A total of 17 projects were fully funded or received their last year of funding in FY 2002; another 12 projects will continue into FY 2003. See Appendix G for lists of Water Resources Division competitive projects.

Aquatic Resource Professionals

FY 2002 Funding Increase: \$1,000,000

In FY 2002, the National Park Service received an increase of \$1,000,000 through the Challenge to support 13 aquatic resource professionals, to be stationed in parks. These new professionals provide technical assistance to parks, identify and conduct technical investigations to determine the condition of park aquatic resources, determine if actions of the National Park Service or external parties impair or impact resources, assist in developing and implementing aquatic resource mitigation and restoration projects, and interpret and implement NPS water resource-related policies and regulations. These staff will work on aquatic resource issues across a number of parks, with work plans approved annually by the Water Resources Division.

Decisions on the disciplines and their duty stations were made using evaluations of existing water resource issues and needs, and on the current distribution of aquatic resource professionals in the parks. The positions funded in FY 2002 include 4 fisheries biologists, 4 aquatic ecologists, 2 hydrologists, a groundwater hydrologist, a geomorphologist, and a wetlands ecologist. Specific aquatic resource disciplines and park duty-stations identified for the 13

Action Plan Focus, Accomplishments & Financial Summaries

Water Resources Program FY 2002 Funding

Funding Available in FY 2001 ^{1/}	\$6,869,000
Uncontrollable Changes to Base	47,000
Streamlining Changes to Base	(11,000)
Natural Resource Challenge Increase in FY 2002 ^{2/}	1,000,000

Total Available in FY 2002 **\$7,905,000**

^{1/}Reflects an increase of \$1,275,000 in FY 2001 for water quality vital signs monitoring, discussed under Water Quality Monitoring, and an increase of \$825,000 in FY 2001 for Water Resource Protection projects, discussed in Water Resource Projects.

^{2/}For Water Resource Protection-Aquatic Resource Specialists

Water Resources Program FY 2002 Base Funding by Category

Water Resource Projects	
Water Resource Protection	\$1,400,000
Competitive Projects	752,000
Other Projects	7,000
Water Quality Monitoring	1,275,000
Water Resource Protection-Aquatic Resource Specialists	1,000,000
Water Resource Technical Assistance	2,728,300
Other Water Resource Management	732,700
Total	\$7,905,000

Note: This section of the report addresses activities and accomplishments related to water resource protection during FY 2002.

Action Plan Focus, Accomplishments & Financial Summaries

funded positions include: 4 fisheries biologists at Lake Clark National Park and Preserve, Northern and Southern Colorado Plateau Networks, Chattahoochee River National Recreation Area, and Isle Royale National Park; 4 aquatic ecologists at Yukon-Charley Rivers National Preserve, Point Reyes National Seashore, Saint Croix National Scenic Riverway, and the Center for Urban Ecology-National Capital Region; 2 hydrologists at Delaware Gap National Recreation Area and Grand Teton National Park; a groundwater hydrologist at the Sonoran Desert Network; a geomorphologist at Mount Rainier National Park; and a wetlands ecologist at Chattahoochee River National Recreation Area.

While these new positions work on a wide range of water resource issues facing the parks, some particularly significant issues to be addressed include the recovery of endangered fish in the Colorado River, evaluating the water quality impacts of urban development near Delaware Water Gap National Recreation Area, assessing stream stabilization and the protection of cultural resources at Klondike Gold Rush National Historical Park, analyzing the effects of beach replenishment projects at Fire Island National Seashore, evaluating groundwater development near parks at Saguaro National Park, and the reestablishment of anadromous fish populations in park waters at Point Reyes National Seashore.

Establish Resource Protection Fund

FY 2002 Funding Increase: \$300,000

The purpose of this funding source is to facilitate development of strategic approaches for using law enforcement to protect natural resources. A key component of this effort is to develop strong partnerships between natural resource and protection personnel to enhance the identification, creation, and application of field-based law enforcement tools and investigative techniques. Projects focus on strategically identifying resources at risk, sources of risk, training needs, and tools for prevention of poaching, vandalism, and other resource crimes.

Study of Runoff Components of the Tlikakila Wild River, Lake Clark National Park and Preserve, Alaska

Located in Lake Clark National Park, the Tlikakila River drains an area of about 600 square miles. The purpose of this study is to define the relative contribution of rainfall, snowmelt, glacier melt, and spring flow to the Tlikakila River. Glaciers increase the amount of water, nutrients, and sediment into Lake Clark, an important salmon habitat. Springs along the Tlikakila River provide critical winter habitat for juvenile salmon. Thus, from both a high-flow and a low-flow aspect, the Tlikakila River is important to salmon.

Sources of Methylmercury in the St. Croix National Scenic Riverway

Samples were collected at 22 surface-water sites in the St. Croix River Basin during July 2000 and 2001 to characterize total mercury and methylmercury concentrations when streams were at summer low-flow. Total mercury concentrations and yields did not differ between land-use categories. Methylmercury concentrations were greater in tributaries draining watersheds characterized by wetland or forest land cover, compared to tributaries draining agricultural or forest land use, but methylmercury yields did not differ between land use categories. Methylmercury yields in the Namekagon River and Rush Creek were four to five times greater than the mean yield for all tributary streams. Loads of both total mercury and methylmercury approximately doubled in the St. Croix River mainstem between site 17 at Nevers Dam and site 18 at Franconia.

Wetlands Mapping, Boston Harbor Islands National Park Area

The U.S. Fish and Wildlife Service, National Wetlands Inventory, is delineating and mapping marine, estuarine, and freshwater wetlands associated with the more than 30 islands that comprise the Boston Harbor Islands National Park Area. Using recent aerial photographs, draft wetland maps were completed in summer 2001. Ground truthing was conducted in fall 2001 and summer 2002, with a final accuracy assessment completed in fall 2002. A technical report will accompany the maps, highlighting spatial statistics and a detailed description of the various wetland habitats (e.g., plant species composition, significant wildlife values, and potential threats). Digital wetland maps will be integrated with the park's geographic information system database.

Action Plan Focus, Accomplishments & Financial Summaries

Challenge funds supported two projects in FY 2002.

- **Resource Stewardship and Protection Curriculum:** The purpose of this project was to develop and implement a long-term strategic approach to training NPS employees in the use of law enforcement and resource protection. Phase one included beginning the development of six training courses. Two courses, Introduction to Resource Stewardship (with 28 trainees) and Resource Stewardship for Protection Rangers (for 24 commissioned rangers), were designed and conducted at Yosemite National Park. A third course, Intermediate Resource Protection for Interdisciplinary Teams, underwent course development and will be presented in FY 2003. The entire curriculum will be evaluated by Indiana University under a cooperative agreement.
- **Biome Based Protection Demonstration at Blue Ridge Parkway, Shenandoah National Park, and Great Smoky Mountains National Park:** This project seeks to protect unique natural resources from illegal takings at three different scales: the protection of individual plants from illegal commercial exploitation, the establishment of an interagency task force within the regions to coordinate protection efforts, and the development of interdisciplinary protection tools that can be used to address threats shared across the biome. U.S. Geological Survey specialists developed predictive spatial models to map potential distribution of target species in the parks. NPS botanists validated the model and designed protocols for monitoring sites. Twenty-seven covert sampling sites were installed. Law enforcement staff established criteria for a test exchange of intelligence. James Madison University will evaluate intelligence gathering capacity and make other recommendations.

Implementation of Resource Protection Act

FY 2002 Funding Increase: \$500,000

The National Park Service conducts damage assessments and restoration activities for resource injuries in NPS units, carrying out the provisions of the Oil Pollution Act (OPA) of 1990, the Clean Water Act as amended by OPA, the National Park System Resource Protection Act (PSRPA) (16 USC 19jj), and the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA).

Funding under the Natural Resource Challenge enhanced the capabilities of the program. Accomplishments with the additional funding fell into three areas: development of policies and procedures for the program, outreach and training on damage assessment for park staffs, and technical assistance to carry out actual damage assessment for incidents in parks.

Policy work included writing Director's Order 14, Resource Damage Assessment and Restoration, and a draft procedures manual. These guidelines for the NPS outline the damage assessment process and provide detailed procedures, forms, and background.

Damage assessment activities in parks in FY 2002 included work with the U.S. Fish and Wildlife Service and the State of Tennessee on an oil well blowout that resulted in an oil spill and fire at Obed Wild and Scenic River. The National Park Service took the lead in initiating a Natural Resource Damage Assessment under the Oil Pollution Act, and provided response through placement of oil booms, fire suppression, investigation, and site restoration. Until the damage assessments are over no claims will be made.

The National Park Service also worked with the U.S. Coast Guard and Florida Marine Patrol on three vessel grounding incidents at Dry Tortugas National Park in Florida between December 18, 2001, and January 17, 2002. Significant coral reef and submerged Civil War

Action Plan Focus, Accomplishments & Financial Summaries

Oil Pollution Act and Resource Damage Assessment and Restoration Funding

Funding Available in FY 2001	\$ 886,000
Uncontrollable Changes to Base	10,000
Streamlining Changes to Base	(2000)
Natural Resource Challenge Increase in FY 2002	500,000
Total Available in FY 2002	\$1,394,000

resources were injured and lost on these jurisdictionally complex incidents.

Using Challenge funds, resource managers received training on the tools for resource damage recovery.

Examples of restoration and recovery efforts include the following.

- The breakwater at San Juan National Historical Site received successful restoration and repair after being damaged by a freighter. The 454-foot Russian freighter ran aground in November 1999 and it took a four-month effort to remove the ship from the breakwater. The project involved the combined efforts of the National Park Service, the U.S. Coast Guard, and the Commonwealth of Puerto Rico. The project came in under the original \$1.5 million estimate and was completed on schedule despite significant weather and logistical problems.
- The Hale encroachment case at Santa Monica National Recreation Area settled for \$8,000 in January 2002. The case involved removal of native vegetation inside the park boundary.
- Work was finalized with the U.S. Institute

for Environmental Conflict Resolution on developing an interagency agreement to provide the National Park Service easier access to the institute's alternative dispute resolution and mediation services.

- In December 2002, the first seagrass restoration project for the National Park Service, using funds received from a 1991 damage assessment settlement, occurred at Biscayne National Park. Staff from the park, the Environmental Quality Division Restoration Program Team, and contractors from Foster Wheeler Environmental Corporation and Marine Resources Inc. worked together to plan and implement the restoration activities. The restoration occurred at the Pure Pleasure grounding site and included placement of fill material into trenches resulting from the grounding. Restoration of the three other sites in the park is still in the planning phase and implementation is expected to be underway by summer 2003.

Attract Good Science and Scientists Theme

The National Park Service 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. This theme of the Challenge, Attract Good Science and Scientists, is aimed at fostering a climate conducive to scientific investigation and received 8.6% of the Challenge funding allocation in FY 2002.

Both the Cooperative Ecosystem Studies Units and the learning centers were founded on the concept of partnering. Cooperative Ecosystem Studies Units are interdisciplinary, multi-

Action Plan Focus, Accomplishments & Financial Summaries

agency partnerships with the nation's universities and other institutions. The 10 Cooperative Ecosystem Studies Units had 80 partners working with them in FY 2002.

Learning centers provide logistical support to researchers who work in the national parks, and serve as conduits for NPS communication with both the research community and public at large. This section addresses the funding available to both in FY 2002.

Cooperative Ecosystem Studies Units

FY 2002 Funding Allocation: \$1,596,000
Individual Cooperative Ecosystem Studies

Monitoring Coral Reef Fish and Macroinvertebrates in Dry Tortugas National Park

In work done through the South Florida-Caribbean CESU, more than 50 divers completed a series of "live" fish surveys in an effort to assess the efficacy of management plans established in marine protected areas in the waters of coastal Florida. A 30-day marine life census covered approximately 230 miles of coast and ocean and was a collaborative effort among the University of Miami, the National Park Service and other federal agencies (including the National Oceanic and Atmospheric Administration), numerous universities (including the University of North Carolina-Wilmington), and other organizations. The project was recently the focus of articles by National Geographic News and other sources. Video clips regarding this "megadive" and other related studies can be found at http://news.nationalgeographic.com/news/2002/07/0730_020730_fishcensus.html

Great Plains CESU

Geological information system data were developed to support leafy spurge control at Theodore Roosevelt National Park. The project provides critical information on spurge distribution that is being used by the Northern Great Plains Exotic Plant Management Team.

FY 2002 Funding for Cooperative Ecosystem Studies Units and Learning Centers

Cooperative Ecosystem Studies Units	\$1,596,000
Learning Centers	2,698,000
Total	\$4,294,000

Units are part of a national network established with leadership from the National Park Service, the U.S. Geological Survey, and other federal agencies. Two additional Cooperative Ecosystem Studies Units were established at the end of FY 2002, bringing the total number of Cooperative Ecosystem Studies Units to 12. Funding for NPS participation in the two additional Cooperative Ecosystem Studies Units is in the FY 2003 budget.

Cooperative Ecosystem Studies Units are organized around biogeographic areas. The broad scope of Cooperative Ecosystem Studies Units 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.

Active NPS participation in the Cooperative Ecosystem Studies Unit Network is a key component of the Challenge. Each Cooperative Ecosystem Studies Unit has an NPS research coordinator duty stationed at the respective host-university. In FY 2002, NPS participation in 10 Cooperative Ecosystem Studies Units included a diverse range of research, technical assistance, and education projects. Use of the Cooperative Ecosystem Studies Units increased from a total of over 260 NPS projects and \$10 million in FY 2001 to more than 380 NPS projects and \$15 million in FY 2002.

Learning Centers

FY 2002 Funding Allocation: \$2,698,000, a \$1,800,000 Increase for FY 2002

Learning centers have been designed as public-private partnerships that involve a wide range of

Action Plan Focus, Accomplishments & Financial Summaries

Learning Center Funding

Funding Available in FY 2001	\$898,000
Natural Resource Challenge	
Increase in FY 2002	1,800,000
Total Available in FY 2002	\$2,698,000

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 Service's current backlog of research needs and to host research of broader interest. Learning centers are cost effective because each has a small core staff, and operational expenses will be shared with partners. The facilities are either adaptively reused buildings in parks or facilities in surrounding communities.

As part of the Challenge, five learning centers were created in 2001; another seven were created in 2002. These learning centers are in various stages of development and operations, and are focusing on providing opportunities for cooperating scientists to work in parks and communicate the results of their work to the public.

Learning centers are magnets for researchers. They promote research in parks simply through their provision of logistical support (including places to sleep, eat, and work).

- The number of nights spent by researchers in Acadia National Park

increased from 371 in FY 2001 to 577 in FY 2002, a 56% increase.

- North Coast and Cascades Learning Center, also in its first year of funding, saw a 146% increase in researcher overnight stays, from 87 nights to 214 nights, and a near doubling of the number of research permits the parks issued, from 19 permits in FY 2001 to 35 permits, in FY 2002.
- For the past two years, the number of research permits issued and the number of researcher overnight stays at Great Smoky Mountains National Park has been approximately the same but significant—1,088 researcher nights and 159 research permits in FY 2002.
- In Rocky Mountain National Park, 71 research permits were issued and researchers stayed over 2,853 nights in park facilities in FY 2002, despite the fact that the park's learning center at historic McGraw Ranch will not be fully operational until sometime in FY 2003.

Partnerships are a major part of the learning center concept. Eighteen or more partner organizations have funded research and education activities at the Great Smoky Mountains National Park Learning Center. For example, the Great Smoky Mountains Learning Center partner, Discover Life in America, is spearheading the park's all-taxa inventory. The North Coast and Cascades and Point Reyes learning centers have at least a dozen partner organizations each, including colleges and universities, government agencies, and schools; many activities are funded by these partners.

Action Plan Focus, Accomplishments & Financial Summaries

Cooperative Ecosystem Studies Units (CESUs) Projects, FY 2002

CESU	Challenge CESU Funding	Number of Challenge CESU- Funded Projects	Challenge CESU \$ for Projects	Number of Leveraged Projects	\$ Leveraged Projects
Intermountain Region				173	\$7,712,577
Colorado Plateau	154,920	10	119,100		
Desert Southwest	154,920	18	144,100		
Rocky Mountain	154,920	26	146,250		
Midwest Region					
Great Plains	154,920	2	29,000	27 ^{1/}	96,026 ^{1/}
National Capital Region					
Chesapeake Watershed	154,920	2	155,000	16	546,018
Northeast Region					
North Atlantic Coast	154,920	8	110,957	4	338,643
Pacific West Region				44	2,204,700
Great Basin	154,920	4	58,000		
Pacific Northwest	154,920	8	84,300		
Southeast Region				32	2,557,787
South Florida/ Caribbean	154,920	1	27,731		
Southern Appalachian	154,920	6	56,589		
Totals	1,596,000	85	931,027	296	13,455,751

^{1/} Includes two projects for the newly established Great Lakes-Northern Forest CESU.

Action Plan Focus, Accomplishments & Financial Summaries

Established Learning Centers, Through FY 2002

Location	Learning Center Name	Funding First Received	
		FY 2001	FY 2002
Acadia National Park	Acadia Center for the Environment		X
Cape Cod National Seashore	Atlantic Learning Center	X	
Gateway National Recreation Area	Jamaica Bay Learning Center for Applied Research on Urban Ecology		X
Glacier National Park	Crown of the Continent Learning Center		X
Great Smoky Mountains NP	Purchase Knob Learning Center	X	
Indiana Dunes National Lakeshore	Great Lakes Research and Education Center		X
National Capital Region	Urban Ecology Learning Alliance		X
North Cascades, Mount Rainier and Olympic NPs	North Coast and Cascades Learning Center	X	
Point Reyes National Seashore	Pacific Coast Learning Center	X	
Rocky Mountain National Park	Continental Divide Research and Learning Center	X	
Santa Monica Mountains NRA	Center for Teaching New America		X
Seward, Alaska Sealife Center	Ocean Alaska Science and Learning Center	X*	
Congaree Swamp National Monument	Old-growth Bottomland Forest Research and Education Center		X

**Not funded through Natural Resource Challenge funding, but developed in response to the Challenge*

Action Plan Focus, Accomplishments & Financial Summaries

McGraw Ranch and the Continental Divide Research and Learning Center

Working with the National Trust for Historic Preservation and several university partners, Rocky Mountain National Park is renovating historic McGraw Ranch for use as a learning center. The National Trust for Historic Preservation raised more than \$800,000 to match other funding. Volunteers have played a major role in the rehabilitation effort, logging more than 5,000 hours to date. The McGraw Ranch facility will be open as part of the Continental Divide Research and Learning Center in May 2003. The facility will increase the bed, office, lab, and work space for researchers.

The All Taxa Inventory and the Appalachian Highlands Science Learning Center

The All Taxa Biodiversity Inventory is an attempt by the scientific community to identify all forms of life within Great Smoky Mountains National Park. The park is partnering with Discover Life in America, which is spearheading the inventory. To date there are 2,121 new species records for the park with 334 of these being new to science. In FY 2002, 46 permitted researchers used the Appalachian Highlands Science Learning Center at Purchase Knob and 32 of them provided educational services, including development of training materials, developing educational protocols, using intern assistants, and direct contact with several hundred park visitors concerning natural resources.

Leveraging in Action—Denali Science and Learning Center

Denali National Park and Preserve has not yet received learning center funding, but is moving ahead to develop a campus style facility, complete with a Denali Science and Learning Center to support scientific study and education. The campus will be located in the old park hotel area. Dorms and dining facilities will be available for students and researchers, and operated by the park's concessioner, Doyon/ARAMARK, a joint venture. A comprehensive design was developed working with a core team that included partner and concession representatives, including the Alaska Natural History Association, The Denali Institute, and The Denali Foundation. The center will serve Denali and a group of seven northern Alaska parks through research, administration, and education. Programs will be available in 2003; partial facilities will be available in 2004 and completion is scheduled for 2005.

Financial Details

Natural Resource Challenge Funding History

(In Thousands of Dollars)

Programs	FY 1999 Base ^{11/}
Complete Park Inventories and Monitor Park Resources	
Complete Basic Natural Resource Inventories, Except Vegetation Mapping ^{1/}	5,787
Vegetation Mapping Cost-Share with USGS	0
Monitor Vital Signs in Networks of Parks	0
Monitor Water Quality in Parks and Assess Watershed Conditions	0
Expand Air Quality Monitoring and Related Activities	6,285
Inventory Air Emissions in Parks ^{2/}	0
Make Natural Resource Data Useable for Management Decisions and Public ^{3/}	455
Subtotal	12,527
Eliminate Most Critical Resource Problems	
Expand NRPP Project Fund, Specialized Inventories, Training ^{12/}	5,432
Create Native/Nonnative Program/Field Teams for Nonnative Species Management	0
Establish Resource Protection Fund	0
Eliminate Most Critical Resource Problems	
Implement Resource Protection Act-Restores Resources	0
Protect Geologic Resources ^{4/}	1,918
Increase Park Bases for Nonnative, Threatened and Endangered Species Recovery ^{5/}	25,693
Expand Water Resource Protection, Restoration ^{6/}	4,754
Subtotal	37,797
Attract Scientists and Good Science	
Establish Learning Centers	0
Establish Cooperative Ecosystem Studies Units	0
Involve Scientists with Parks	
Subtotal	0
Natural Resource Challenge Plus Affected Programs	
Non-Challenge Natural Resource Categories ^{7/}	50,324
Park Base	31,402
Regional Project Programs	2,093
Servicewide Project Programs ^{8/}	2,216
Central Office Support ^{9/}	8,196
Total Natural Resource Categories Not Affected	43,907
Everglades Restoration and Research	12,800
Total Natural Resources Appropriation by Year¹	107,031

Financial Details

Natural Resource Challenge Funding History

(In Thousands of Dollars)

FY 2000 Change	FY 2001 Change	FY 2002 Change	FY 2003 Change ^{13/}	FY 2004 Change Request
7,309			2,000	
	1,746		2,250	
	4,191	4,200	6,900	7,924
	1,272		3,600	600
		2,600		
	200			
	1,098			
7,309	8,507	6,800	14,750	
2,875		4,000	500	
3,449		2,400	2,150	
		300		
		500		
696				
	3,395	3,200		
	823	1,000	200	
7,020	4,218	11,400	2,350	
	898	1,800		
	1,596		400	
	2,494	1,800	400	
14,329	15,219	20,000	18,000	8,524
5,046	6,014	1,600	782	-38
0	0	0	0	0
-23	8	9	3	-107
1,731	1,498	2,261	-584	4,717
6,754	7,520	3,870	201	4,572
-4092	1,299	862	0	-3,933
124,022	148,060	172,792	190,993	200,156

Financial Details

Notes

¹FY 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.

²Included in Budget Justification as Air Quality Program, with air quality monitoring, shown separately here.

³In FY 1999, these funds were not shown separately in the Park and Program Summary.

⁴Part of a larger Geologic Resources Program that also includes Abandoned Mine Land Restoration and other mining and minerals-related activities.

⁵Estimated amount park bases, before the initiation of the 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 (1a1 and 1a2.)

⁶Part of larger Water Resource Program; Water Quality Monitoring will be included in this total in the Budget Justification as well.

⁷Primarily 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 Challenge categories are included here. Uncontrollable changes to base have not been tracked in the Challenge numbers.

⁸Oil Pollution Program and Geographic Information Program.

⁹Includes headquarters and regional office support; equals the residual of the Natural Resource Appropriation minus the following increases or decreases: Natural Resource Challenge plus affected programs, park base, regional project programs, Servicewide programs and Everglades restoration and research.

¹⁰Comprised 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 (excludes cultural resources and resource protection activities.)

¹¹Enacted amount shown in FY 2000 Budget Justification.

¹²FY 2003 increase for Alaska projects; administratively placed in Natural Resource Preservation Program.

¹³Does not include across-the-board reduction of 0.0065%.

Appendices: Park Codes

Park Alpha Code	Park Name	Region	Primary State
ABLI	Abraham Lincoln Birthplace National Historic Site	Southeast	KY
ACAD	Acadia National Park	Northeast	ME
ADAM	Adams National Historical Park	Northeast	MA
AGFO	Agate Fossil Beds National Monument	Midwest	NE
ALAG	Alagnak Wild River	Alaska	AK
ALFL	Alibates Flint Quarries National Monument	Intermountain	TX
ALPO	Allegheny Portage Railroad National Historic Site	Northeast	PA
AMIS	Amistad National Recreation Area	Intermountain	TX
ANDE	Andersonville National Historic Site	Southeast	GA
ANIA	Aniakchak National Monument and Preserve	Alaska	AK
ANJO	Andrew Johnson National Historic Site	Southeast	TN
ANTI	Antietam National Battlefield	National Capital	MD
APCO	Appomattox Court House National Historical Park	Northeast	VA
APIS	Apostle Islands National Lakeshore	Midwest	WI
APPA	Appalachian National Scenic Trail	National Capital	WY
ARCH	Arches National Park	Intermountain	UT
ARHO	"Arlington House, The Robert E. Lee Memorial"	National Capital	VA
ARPO	Arkansas Post National Memorial	Midwest	AR
ASIS	Assateague Island National Seashore	Northeast	MD
AZRU	Aztec Ruins National Monument	Intermountain	NM
BADL	Badlands National Park	Midwest	SD
BAND	Bandelier National Monument	Intermountain	NM
BELA	Bering Land Bridge National Preserve	Alaska	AK
BEOL	Bent's Old Fort National Historic Site	Intermountain	CO
BIBE	Big Bend National Park	Intermountain	TX
BICA	Bighorn Canyon National Recreation Area	Intermountain	MT
BICY	Big Cypress National Preserve	Southeast	FL
BIHO	Big Hole National Battlefield	Pacific West	MT
BISC	Biscayne National Park	Southeast	FL
BISO	Big South Fork National River and Recreation Area	Southeast	TN
BITH	Big Thicket National Preserve	Intermountain	TX
BLCA	Black Canyon of the Gunnison National Park	Intermountain	CO
BLRI	Blue Ridge Parkway	Southeast	NC
BLUE	Bluestone National Scenic River	Northeast	WV
BOAF	Boston African-American National Historic Site	Northeast	MA
BOHA	Boston Harbor Islands National Recreation Area	Northeast	MA
BOST	Boston National Historical Park	Northeast	MA
BOWA	Booker T. Washington National Monument	Northeast	VA
BRCA	Bryce Canyon National Park	Intermountain	UT
BRCR	Brices Cross Roads National Battlefield Site	Southeast	MS
BRVB	Brown v. Board of Education National Historic Site	Midwest	KS
BUFF	Buffalo National River	Midwest	AR
BUIS	Buck Island Reef National Monument	Southeast	VI
CABR	Cabrillo National Monument	Pacific West	CA
CACH	Canyon de Chelly National Monument	Intermountain	AZ
CACL	Castle Clinton National Monument	Northeast	NY
CACO	Cape Cod National Seashore	Northeast	MA
CAGR	Casa Grande Ruins National Monument	Intermountain	AZ
CAHA	Cape Hatteras National Seashore	Southeast	NC
CAKR	Cape Krusenstern National Monument	Alaska	AK

Appendices: Park Codes

Park Alpha Code	Park Name	Region	Primary State
CALO	Cape Lookout National Seashore	Southeast	NC
CANA	Canaveral National Seashore	Southeast	FL
CANY	Canyonlands National Park	Intermountain	UT
CARE	Capitol Reef National Park	Intermountain	UT
CARI	Cane River Creole National Historical Park	Southeast	LA
CARL	Carl Sandburg Home National Historic Site	Southeast	NC
CASA	Castillo de San Marcos National Monument	Southeast	FL
CATO	Catoctin Mountain Park	National Capital	MD
CAVE	Carlsbad Caverns National Park	Intermountain	NM
CAVO	Capulin Volcano National Monument	Intermountain	NM
CEBR	Cedar Breaks National Monument	Intermountain	UT
CEHS	Little Rock Central High School National Historic Site	Midwest	NE
CHAM	Chamizal National Memorial	Intermountain	TX
CHAT	Chattahoochee River National Recreation Area	Southeast	GA
CHCH	Chickamauga and Chattanooga National Military Park	Southeast	GA
CHCU	Chaco Culture National Historical Park	Intermountain	NM
CHIC	Chickasaw National Recreation Area	Intermountain	OK
CHIR	Chiricahua National Monument	Intermountain	AZ
CHIS	Channel Islands National Park	Pacific West	CA
CHOH	Chesapeake and Ohio Canal National Historical Park	National Capital	MD
CHPI	Charles Pinckney National Historic Site	Southeast	SC
CHRI	Christiansted National Historic Site	Southeast	VI
CIRO	City of Rocks National Reserve	Pacific West	ID
CLBA	Clara Barton National Historic Site	National Capital	MD
COGA	Constitution Gardens	National Capital	DC
COLM	Colorado National Monument	Intermountain	CO
COLO	Colonial National Historical Park	Northeast	VA
CORO	Coronado National Memorial	Intermountain	AZ
COSW	Congaree Swamp National Monument	Southeast	SC
COWP	Cowpens National Battlefield	Southeast	SC
CRLA	Crater Lake National Park	Pacific West	OR
CRMO	Craters of the Moon National Monument	Pacific West	ID
CUGA	Cumberland Gap National Historical Park	Southeast	KY
CUIS	Cumberland Island National Seashore	Southeast	GA
CURE	Curecanti National Recreation Area	Intermountain	CO
CUVA	Cuyahoga Valley National Park	Midwest	OH
DAAV	Dayton Aviation Heritage National Historical Park	Midwest	OH
DELA	Delaware National Scenic River	Northeast	PA
DENA	Denali National Park and Preserve	Alaska	AK
DEPO	Devils Postpile National Monument	Pacific West	CA
DESO	De Soto National Memorial	Southeast	FL
DETO	Devils Tower National Monument	Intermountain	WY
DEVA	Death Valley National Park	Pacific West	CA
DEWA	Delaware Water Gap National Recreation Area	Northeast	PA
DINO	Dinosaur National Monument	Intermountain	CO
DRTO	Dry Tortugas National Park	Southeast	FL
EBLA	Ebey's Landing National Historical Reserve	Pacific West	WA
EDAL	Edgar Allan Poe National Historic Site	Northeast	PA
EDIS	Edison National Historic Site	Northeast	NJ

Appendices: Park Codes

Park Alpha Code	Park Name	Region	Primary State
EFMO	Effigy Mounds National Monument	Midwest	IA
EISE	Eisenhower National Historic Site	Northeast	PA
ELMA	El Malpais National Monument	Intermountain	NM
ELMO	El Morro National Monument	Intermountain	NM
ELRO	Eleanor Roosevelt National Historic Site	Northeast	NY
EUON	Eugene O'Neill National Historic Site	Pacific West	CA
EVER	Everglades National Park	Southeast	FL
FEHA	Federal Hall National Memorial	Northeast	NY
FIIS	Fire Island National Seashore	Northeast	NY
FILA	First Ladies National Historic Site	Midwest	OH
FLAG	Flagstaff Area	Intermountain	AZ
FLFO	Florissant Fossil Beds National Monument	Intermountain	CO
FOBO	Fort Bowie National Historic Site	Intermountain	AZ
FOBU	Fossil Butte National Monument	Intermountain	WY
FOCA	Fort Caroline National Memorial	Southeast	FL
FOCL	Fort Clatsop National Memorial	Pacific West	OR
FODA	Fort Davis National Historic Site	Intermountain	TX
FODO	Fort Donelson National Battlefield	Southeast	TN
FOFR	Fort Frederica National Monument	Southeast	GA
FOLA	Fort Laramie National Historic Site	Intermountain	WY
FOLS	Fort Larned National Historic Site	Midwest	KS
FOMA	Fort Matanzas National Monument	Southeast	FL
FOMC	Fort McHenry National Monument and Historic Shrine	Northeast	MD
FONE	Fort Necessity National Battlefield	Northeast	PA
FOPO	Fort Point National Historic Site	Pacific West	CA
FOPU	Fort Pulaski National Monument	Southeast	GA
FORA	Fort Raleigh National Historic Site	Southeast	NC
FOSC	Fort Scott National Historic Site	Midwest	KS
FOSM	Fort Smith National Historic Site	Midwest	AR
FOST	Fort Stanwix National Monument	Northeast	NY
FOSU	Fort Sumter National Monument	Southeast	SC
FOTH	Ford's Theatre National Historic Site	National Capital	DC
FOUN	Fort Union National Monument	Intermountain	NM
FOUS	Fort Union Trading Post National Historic Site	Midwest	ND
FOVA	Fort Vancouver National Historic Site	Pacific West	WA
FOWA	Fort Washington Park	National Capital	DC
FRDE	Franklin Delano Roosevelt Memorial	National Capital	DC
FRDO	Frederick Douglass National Historic Site	National Capital	DC
FRHI	Friendship Hill National Historic Site	Northeast	PA
FRLA	Frederick Law Olmsted National Historic Site	Northeast	MA
FRSP	Fredericksburg and Spotsylvania National Military Park	Northeast	VA
GAAR	Gates of the Arctic National Park and Preserve	Alaska	AK
GARI	Gauley River National Recreation Area	Northeast	WV
GATE	Gateway National Recreation Area	Northeast	NY
GEGR	General Grant National Memorial	Northeast	NY
GERO	George Rogers Clark National Historical Park	Midwest	IN
GETT	Gettysburg National Military Park	Northeast	PA
GEWA	George Washington Birthplace National Monument	Northeast	VA
GICL	Gila Cliff Dwellings National Monument	Intermountain	NM

Appendices: Park Codes

Park Alpha Code	Park Name	Region	Primary State
GLAC	Glacier National Park	Intermountain	MT
GLBA	Glacier Bay National Park and Preserve	Alaska	AK
GLCA	Glen Canyon National Recreation Area	Intermountain	AZ
GOGA	Golden Gate National Recreation Area	Pacific West	CA
GOIS	Governor's Island National Monument	Northeast	NY
GOSP	Golden Spike National Historic Site	Intermountain	UT
GRBA	Great Basin National Park	Pacific West	NV
GRCA	Grand Canyon National Park	Intermountain	AZ
GREE	Greenbelt Park	National Capital	MD
GREG	Great Egg Harbor Scenic and Recreational River	Northeast	PA
GRKO	Grant-Kohrs Ranch National Historic Site	Intermountain	MT
GRPO	Grand Portage National Monument	Midwest	MN
GRSA	Great Sand Dunes National Park and Preserve	Intermountain	CO
GRSM	Great Smoky Mountains National Park	Southeast	TN
GRTE	Grand Teton National Park	Intermountain	WY
GUCO	Guilford Courthouse National Military Park	Southeast	NC
GUIS	Gulf Islands National Seashore	Southeast	FL
GUMO	Guadalupe Mountains National Park	Intermountain	TX
GWCA	George Washington Carver National Monument	Midwest	MO
GWMP	George Washington Memorial Parkway	National Capital	VA
HAFE	Harpers Ferry National Historical Park	National Capital	WV
HAFO	Hagerman Fossil Beds National Monument	Pacific West	ID
HAGR	Hamilton Grange National Memorial	Northeast	NY
HALE	Haleakala National Park	Pacific West	HI
HAMP	Hampton National Historic Site	Northeast	MD
HAVO	Hawaii Volcanoes National Park	Pacific West	HI
HEHO	Herbert Hoover National Historic Site	Midwest	IA
HOBE	Horseshoe Bend National Military Park	Southeast	AL
HOCU	Hopewell Culture National Historical Park	Midwest	OH
HOFR	Home of Franklin D. Roosevelt National Historic Site	Northeast	NY
HOFU	Hopewell Furnace National Historic Site	Northeast	PA
HOME	Homestead National Monument of America	Midwest	NE
HOPI	Hohokam Pima National Monument	Intermountain	AZ
HOSP	Hot Springs National Park	Midwest	AR
HOVE	Hovenweep National Monument	Intermountain	UT
HSTR	Harry S Truman National Historic Site	Midwest	MO
HUTR	Hubbell Trading Post National Historic Site	Intermountain	AZ
IMSF	"Intermountain Support Office, Santa Fe"	Intermountain	NM
INDE	Independence National Historical Park	Northeast	PA
INDU	Indiana Dunes National Lakeshore	Midwest	IN
ISRO	Isle Royale National Park	Midwest	MI
JAGA	James A. Garfield National Historic Site	Midwest	OH
JAZZ	New Orleans Jazz National Historical Park	Southeast	LA
JECA	Jewel Cave National Monument	Midwest	SD
JEFF	Jefferson National Expansion Memorial	Midwest	MO
JEFM	Thomas Jefferson Memorial	National Capital	DC
JELA	Jean Lafitte National Historical Park and Preserve	Southeast	LA
JICA	Jimmy Carter National Historic Site	Southeast	GA
JODA	John Day Fossil Beds National Monument	Pacific West	OR

Appendices: Park Codes

Park Alpha Code	Park Name	Region	Primary State
JODR	"John D. Rockefeller, Jr., Memorial Parkway"	Intermountain	WY
JOFI	John Fitzgerald Kennedy National Historic Site	Northeast	MA
JOFL	Johnstown Flood National Memorial	Northeast	PA
JOMU	John Muir National Historic Site	Pacific West	CA
JOTR	Joshua Tree National Park	Pacific West	CA
KAHO	Kaloko-Honokohau National Historical Park	Pacific West	HI
KALA	Kalaupapa National Historical Park	Pacific West	HI
KATM	Katmai National Park and Preserve	Alaska	AK
KEFJ	Kenai Fjords National Park	Alaska	AK
KEMO	Kennesaw Mountain National Battlefield Park	Southeast	GA
KEWE	Keweenaw National Historical Park	Midwest	MI
KICA	Kings Canyon National Park	Pacific West	CA
KIMO	Kings Mountain National Military Park	Southeast	SC
KLGO	Klondike Gold Rush National Historical Park	Alaska	AK
KNRI	Knife River Indian Village National Historic Site	Midwest	ND
KOVA	Kobuk Valley National Park	Alaska	AK
KOWA	Korean War Veterans Memorial	National Capital	DC
LABE	Lava Beds National Monument	Pacific West	CA
LACH	Lake Chelan National Recreation Area	Pacific West	WA
LACL	Lake Clark National Park and Preserve	Alaska	AK
LAME	Lake Mead National Recreation Area	Pacific West	NV
LAMR	Lake Meredith National Recreation Area	Intermountain	TX
LARO	Lake Roosevelt National Recreation Area	Pacific West	WA
LAVO	Lassen Volcanic National Park	Pacific West	CA
LBME	LBJ Memorial Grove-on-the-Potomac	National Capital	VA
LIBI	Little Bighorn Battlefield National Monument	Intermountain	MT
LIBO	Lincoln Boyhood National Memorial	Midwest	IN
LIHO	Lincoln Home National Historic Site	Midwest	IL
LINC	Lincoln Memorial	National Capital	DC
LIRI	Little River Canyon National Preserve	Southeast	AL
LONG	Longfellow National Historic Site	Northeast	MA
LOWE	Lowell National Historical Park	Northeast	MA
LYJO	Lyndon B. Johnson National Historical Park	Intermountain	TX
MABI	Marsh-Billings-Rockefeller National Historical Park	Northeast	VT
MACA	Mammoth Cave National Park	Southeast	KY
MALU	"Martin Luther King, Jr., National Historic Site"	Southeast	GA
MAMC	Mary McLeod Bethune Council House National Historic Site	National Capital	DC
MANA	Manassas National Battlefield Park	National Capital	VA
MANZ	Manzanar National Historical Park	Pacific West	CA
MASI	Manhattan Sites	Northeast	NY
MAVA	Martin Van Buren National Historic Site	Northeast	NY
MAWA	Maggie L. Walker National Historic Site	Northeast	VA
MEVE	Mesa Verde National Park	Intermountain	CO
MIIN	Minidoka Internment National Monument	Pacific West	ID
MIMA	Minute Man National Historical Park	Northeast	MA
MIMI	Minuteman Missile National Historic Site	Midwest	SD
MISS	Mississippi National River and Recreation Area	Midwest	MN
MNRR	Missouri National Recreational River	Midwest	NE
MOCA	Montezuma Castle National Monument	Intermountain	AZ

Appendices: Park Codes

Park Alpha Code	Park Name	Region	Primary State
MOCR	Moore's Creek National Battlefield	Southeast	NC
MOJA	Mojave National Preserve	Pacific West	CA
MONO	Monocacy National Battlefield	National Capital	MD
MORA	Mount Rainier National Park	Pacific West	WA
MORR	Morristown National Historical Park	Northeast	NJ
MORU	Mount Rushmore National Memorial	Midwest	SD
MUWO	Muir Woods National Monument	Pacific West	CA
NABR	Natural Bridges National Monument	Intermountain	UT
NACC	National Capital Parks-Central	National Capital	DC
NACE	National Capital Parks-East	National Capital	DC
NAMA	National Mall	National Capital	DC
NATC	Natchez National Historical Park	Southeast	MS
NATR	Natchez Trace Parkway	Southeast	MS
NAVA	Navajo National Monument	Intermountain	AZ
NCRO	National Capital Support Office	National Capital	DC
NEBE	New Bedford Whaling National Historical Park	Northeast	MA
NEPE	Nez Perce National Historical Park	Pacific West	ID
NERI	New River Gorge National River	Northeast	WV
NICO	Nicodemus National Historic Site	Midwest	KS
NIOB	Niobrara National Scenic River	Midwest	NE
NISI	Ninety Six National Historic Site	Southeast	SC
NOAT	Noatak National Preserve	Alaska	AK
NOCA	North Cascades National Park	Pacific West	WA
NPSA	National Park of American Samoa	Pacific West	AS
NTST	Natchez Trace National Scenic Trail	Southeast	MS
OBRI	Obed Wild and Scenic River	Southeast	TN
OCMU	Ocmulgee National Monument	Southeast	GA
OKCI	Oklahoma City National Memorial	Intermountain	OK
OLYM	Olympic National Park	Pacific West	WA
ORCA	Oregon Caves National Monument	Pacific West	OR
ORPI	Organ Pipe Cactus National Monument	Intermountain	AZ
OZAR	Ozark National Scenic Riverways	Midwest	MO
PAAL	Palo Alto Battlefield National Historic Site	Intermountain	TX
PAAV	Pennsylvania Avenue National Historic Site	National Capital	DC
PAIS	Padre Island National Seashore	Intermountain	TX
PARA	Grand Canyon-Parashant National Monument	Pacific West	AZ
PECO	Pecos National Historical Park	Intermountain	NM
PEFO	Petrified Forest National Park	Intermountain	AZ
PERI	Pea Ridge National Military Park	Midwest	AR
PETE	Petersburg National Battlefield	Northeast	VA
PETR	Petroglyph National Monument	Intermountain	NM
PEVI	Perry's Victory and International Peace Memorial	Midwest	OH
PINN	Pinnacles National Monument	Pacific West	CA
PIPE	Pipestone National Monument	Midwest	MN
PIRO	Pictured Rocks National Lakeshore	Midwest	MI
PISC	Piscataway Park	National Capital	MD
PISP	Pipe Spring National Monument	Intermountain	AZ
POHE	Potomac Heritage National Scenic Trail	National Capital	VA
POPO	Poverty Point National Monument	Southeast	LA

Appendices: Park Codes

Park Alpha Code	Park Name	Region	Primary State
PORE	Point Reyes National Seashore	Pacific West	CA
PRWI	Prince William Forest Park	National Capital	VA
PUHE	Puukohola Heiau National Historic Site	Pacific West	HI
PUHO	Puuhonua O Honaunau National Historical Park	Pacific West	HI
RABR	Rainbow Bridge National Monument	Intermountain	AZ
REDW	Redwood National Park	Pacific West	CA
RICH	Richmond National Battlefield Park	Northeast	VA
RIGR	Rio Grande Wild and Scenic River	Intermountain	TX
ROCR	Rock Creek Park	National Capital	DC
ROLA	Ross Lake National Recreation Area	Pacific West	WA
ROMO	Rocky Mountain National Park	Intermountain	CO
RORE	Ronald Reagan National Historic Site	Midwest	IL
RORI	Rosie the Riveter/World War II Home Front National Historical Park	Pacific West	CA
ROVA	Roosevelt-Vanderbilt Headquarters	Northeast	NY
ROWI	Roger Williams National Memorial	Northeast	RI
RUCA	Russell Cave National Monument	Southeast	AL
SAAN	San Antonio Missions National Historical Park	Intermountain	TX
SACN	Saint Croix National Scenic Riverway	Midwest	WI
SACR	Saint Croix Island International Historic Site	Northeast	ME
SAFR	San Francisco Maritime National Historical Park	Pacific West	CA
SAGA	Saint-Gaudens National Historic Site	Northeast	NH
SAGU	Saguaro National Park	Intermountain	AZ
SAHI	Sagamore Hill National Historic Site	Northeast	NY
SAIR	Saugus Iron Works National Historic Site	Northeast	MA
SAJH	San Juan Island National Historical Park	Pacific West	WA
SAJU	San Juan National Historic Site	Southeast	PR
SAMA	Salem Maritime National Historic Site	Northeast	MA
SAMO	Santa Monica Mountains National Recreation Area	Pacific West	CA
SAPA	Saint Paul's Church National Historic Site	Northeast	NY
SAPU	Salinas Pueblo Missions National Monument	Intermountain	NM
SARA	Saratoga National Historical Park	Northeast	NY
SARI	Salt River Bay National Historical Park & Ecological Preserve	Southeast	VI
SCBL	Scotts Bluff National Monument	Midwest	NE
SCMA	Sand Creek Massacre National Historic Site	Intermountain	CO
SEKI	Sequoia and Kings Canyon National Parks	Pacific West	CA
SEQU	Sequoia National Park	Pacific West	CA
SEUG	Southeast Utah Group	Intermountain	UT
SHEN	Shenandoah National Park	Northeast	VA
SHIL	Shiloh National Military Park	Southeast	TN
SITK	Sitka National Historical Park	Alaska	AK
SLBE	Sleeping Bear Dunes National Lakeshore	Midwest	MI
SPAR	Springfield Armory National Historic Site	Northeast	MA
STEA	Steamtown National Historic Site	Northeast	PA
STLI	Statue of Liberty National Monument	Northeast	NY
STRI	Stones River National Battlefield	Southeast	TN
SUCR	Sunset Crater Volcano National Monument	Intermountain	AZ
TAPR	Tallgrass Prairie National Preserve	Midwest	KS
THKO	Thaddeus Kosciuszko National Memorial	Northeast	PA

Appendices: Park Codes

Park Alpha Code	Park Name	Region	Primary State
THRB	Theodore Roosevelt Birthplace National Historic Site	Northeast	NY
THRI	Theodore Roosevelt Inaugural National Historic Site	Northeast	NY
THRO	Theodore Roosevelt National Park	Midwest	ND
THST	Thomas Stone National Historic Site	Northeast	MD
TICA	Timpanogos Cave National Monument	Intermountain	UT
TIMU	Timucuan Ecological and Historic Preserve	Southeast	FL
TONT	Tonto National Monument	Intermountain	AZ
TRIS	Theodore Roosevelt Island	National Capital	DC
TUAI	Tuskegee Airman National Historic Site	Southeast	GA
TUIN	Tuskegee Institute National Historic Site	Southeast	AL
TUMA	Tumacacori National Historical Park	Intermountain	AZ
TUPE	Tupelo National Battlefield	Southeast	MS
TUZI	Tuzigoot National Monument	Intermountain	AZ
ULSG	Ulysses S. Grant National Historic Site	Midwest	MO
UPDE	Upper Delaware Scenic and Recreational River	Northeast	PA
USAR	U.S.S. Arizona Memorial	Pacific West	HI
VAFO	Valley Forge National Historical Park	Northeast	PA
VAMA	Vanderbilt Mansion National Historic Site	Northeast	NY
VICK	Vicksburg National Military Park	Southeast	MS
VICR	Virgin Islands Coral Reef National Monument	Southeast	VI
VIET	Vietnam Veterans Memorial	National Capital	DC
VIIS	Virgin Islands National Park	Southeast	VI
VOYA	Voyageurs National Park	Midwest	MN
WABA	Washita Battlefield National Historic Site	Intermountain	OK
WACA	Walnut Canyon National Monument	Intermountain	AZ
WAPA	War in the Pacific National Historical Park	Pacific West	GU
WASH	Washington Monument	National Capital	DC
WEAR	Western Arctic Park Lands	Alaska	AK
WEFA	Weir Farm National Historic Site	Northeast	CT
WHHO	The White House (President's Park)	National Capital	DC
WHIS	Whiskeytown-Shasta-Trinity National Recreation Area	Pacific West	CA
WHMI	Whitman Mission National Historic Site	Pacific West	WA
WHSA	White Sands National Monument	Intermountain	NM
WICA	Wind Cave National Park	Midwest	SD
WICR	Wilson's Creek National Battlefield	Midwest	MO
WIHO	William Howard Taft National Historic Site	Midwest	OH
WORI	Women's Rights National Historical Park	Northeast	NY
WOTR	Wolf Trap Farm Park	National Capital	VA
WRBR	Wright Brothers National Memorial	Southeast	NC
WRST	Wrangell-St. Elias National Park and Preserve	Alaska	AK
WUPA	Wupatki National Monument	Intermountain	AZ
YELL	Yellowstone National Park	Intermountain	WY
YOSE	Yosemite National Park	Pacific West	CA
YUCH	Yukon-Charley Rivers National Preserve	Alaska	AK
YUHO	Yucca House National Monument	Intermountain	CO
ZION	Zion National Park	Intermountain	UT

Projected Completion Schedule for Baseline Natural Resource Inventories
Being Conducted by The National Park Service Inventory and Monitoring Program

Appendices: Appendix A

Basic Data Sets	End of FY 2002 Underway Completed	End of FY 2003 Underway Completed	End of FY 2004 Completed	End of FY 2005 Completed	FY 2005-10 ^{1/} To be Completed	Total
Automated Bibliographies	2	263	0	270	270	1075
Base Cartographic Data	10	260	0	270	270	1080
Higher Plant and Animal Occurrence (species lists)	0	270	0	270	270	1080
Distribution of Species of Special Concern	270	0	270	0	230	1040
Vegetation Maps	45	28	36	37	52	95
Soils Maps	97	57	89	63	100	130
Geology Maps	227	14	215	26	38	70
Water Resource Locations (digital)	50	220	0	270	270	1080
Water Chemistry	0	270	0	270	270	1080
Air Quality	0	250	0	250	250	1000
Air Quality-Related Values	0	0	0	0	50	75
Meteorological Data	53	196	20	250	270	1059
Total	754	1828	630	1976	2340	710
						10748

1/ The Servicewide program acquires basic inventory data sets for about 270 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 be completed" column reflects the number of parks Servicewide with outstanding needs.

Appendices: Appendix B

**Amount of Funding for Major NPS Vegetation Mapping Projects During FY 2002
and Associated Expenditures by Partnering Entities.
(Refer also to Appendix C for Alaska Regional Expenditures)**

Vegetation Mapping Project	NPS-I&M Funding	FirePro	USGS Funding	Other NPS
Sequoia /Kings Canyon NP	\$ 127,200	\$ 75,000		
Yosemite NP	\$ 250,000			
Glacier NP	\$ 6,500		\$ 306,000	
Grand Teton NP		\$ 180,000		\$ 15,000
Rocky Mountain NP	\$ 138,800	\$ 100,000		
Bandelier NM	\$ 264,500			
Effigy Mounds NM			\$ 96,600	
Northeast Region Parks	\$ 130,750			
Wupatki NM			\$ 15,000	
Whiskeytown NRA		\$ 75,000		
Santa Monica Mts. NRA		\$ 400,000		
Point Reyes NS		\$ 100,000		
Shenandoah NP		\$ 15,000		
North. Colo. Plateau Parks	\$ 200,000	\$ 200,000	\$ 150,600	\$ 505,000
Cumberland/Piedmont Parks	\$ 100,000			\$ 144,500
Appalachian Highlands Parks	\$ 100,000			\$ 29,000
National Capital Parks	\$ 64,000			\$ 61,000
Ozark NSR		\$ 56,800		
Cape Cod NS	\$ 44,700			
Eastern River/Mts. Network	\$ 218,500			
Virginia Parks		\$ 216,700		
Other Costs:				
NatureServe Agreement			\$ 110,000	
USMESC Support			\$ 37,500	
Program Administration	\$ 102,000		\$ 269,300	
Totals	\$1,746,950	\$ 1,418,500	\$985,000	\$ 754,500

Appendices: Appendix C

Network Funding for Vertebrate and Vascular Plant Inventories

Network	Total Budget	FY 2002	Allocation
Southwest Alaska Network	1,331,828		225,500
Northwest Alaska Network	1,437,470		409,700
Central Alaska Network	942,915		233,600
Southeast Alaska Network	404,648		201,400
Great Lakes Network	1,181,860		225,800
Heartland Network	788,301		295,300
Northern Great Plains Network	782,749		197,100
Mid-Atlantic Network	424,635		74,900
Eastern Rivers and Mountains Network	602,551		173,400
Northeast Coastal and Barrier Network	866,885		248,300
Northeast Temperate Network	579,880		75,000
National Capital Network	686,257		163,800
Cumberland/Piedmont Network	565,541		98,200
Southeast Coast Network	1,163,014		310,600
Gulf Coast Network	852,881		221,300

Network	Total Budget	FY 2003	Allocation
Southwest Alaska Network	623,939		152,503
Northwest Alaska Network	596,836		145,283
Central Alaska Network	569,734		138,064
Southeast Alaska Network	542,631		130,844
Great Lakes Network	515,528		123,624
Heartland Network	488,425		116,405
Northern Great Plains Network	461,323		109,185
Klamath Network	731,392		160,000
Totals	17,141,223		4,229,808

Appendices: Appendix D

Allocations for Inventory Other than Network Biological Inventories and Vegetation Mapping during FY 2002

Organization	Title	FY 2002 Funding
BIOTIC INVENTORIES		
NPS—I&M Agreements	IT IS Support	25,000
Alaska NPs	Landcover	500,000
Olympic NP	Amphibian Inventory	24,000
Appalachian Trail	Biological Inventory	39,800
ABIOTIC INVENTORIES		
NPS—I&M Agreements	Base Cartography	80,000
NPS—I&M Agreements	Climate	178,800
NPS—WRD Agreements	Water Body Classification	50,000
Chiricahua NM	Water Quality	14,300
Coronado NM	Water Quality	42,000
Fort Bowie NHS	Water Quality	9,100
Gila Cliff Dwelling NM	Water Quality	19,500
Montezuma Castle NM	Water Quality	19,500
Organ Pipe Cactus NM	Water Quality	19,000
Saguaro NP	Water Quality	61,600
Columbia-Cascades SO	Bibliography	50,000
Intermountain Region Parks	Soils	7,400
Denali NPP	Soils	90,500
Denali NPP (NRCS)	Soils	26,500
Big Bend NP	Soils	84,500
Channel Islands NP	Soils	150,000
Redwoods NP	Soils	99,700
Grand Canyon NP	Soils	175,000
Padre Island NP	Soils	75,500
Apostle Islands NL	Soils	10,000
Saint Croix NSR	Soils	43,000
North Cascades NP	Soils	20,000
Great Smoky Mountains NP	Soils	203,400
NPS—GRD Agreements	Geology	199,000
NPS—GRD (Multi Parks)	Scoping Workshops	208,000
National Capital Region Parks	Geology	23,000
Great Smoky Mts. NP	Geology	10,000
Ozark NSR	Geology	15,000
Blue Ridge Parkway	Geology	50,000
Lake Meade NRA	Geology	20,000
Wupatki NM	Geology	25,000
Craters of Moon NM	Geology	10,000
Cape Lookout NS	Geology	20,000
Cape Hatteras NS	Geology	20,000
TOTAL		\$ 2,718,100

Appendices: Appendix E

Natural Resource Preservation Program (NRPP) Projects NRPP—Natural Resource Management New and Ongoing Projects

Park	Project Title	Total Funding	FY 2002 Funding
Olympic NP	Evaluation of Goat Management	\$79,000	\$33,000
Cumberland Island NS	Eradicate Feral Hogs	171,000	60,000
Glacier Bay NP	Quantifying Commercial and Sport Fishing Harvest	160,000	47,000
Congaree Swamp NM	Develop Feral Hog Reduction Plan	85,000	0 ¹
Petrified Forest NP	Preservation of Petrified Wood	168,000	0 ²
Grand Teton NP	Monitoring of Wolves	396,000	95,000
Sleeping Bear Dunes NL and Pictured Rocks NL	Restoration Biodiversity	364,000	120,000
Great Basin NP	Cutthroat Trout	164,000	74,000
Buffalo NR	Assessment of Fish	405,000	172,000
Point Reyes NS	Coastal Dune Restoration	333,000	114,000
Redwood NP	Remove English Ivy	218,000	68,000
Cape Cod NS	Effects of Groundwater	195,000	68,000
Badlands NP	Emergency Salvage of Collection of Fossils	341,000	138,000
Mammoth Cave NP	Restore Habitat for Indiana Bat	245,000	65,000
Western Area of Alaska	Assess Reindeer Impacts to Lichen Ecosystems	108,000	9,000
Jean Lafitte NHP and Pres	Establish a Biocontrol Program for Salvinia	111,000	35,000
Redwood NP	Restore Lost Man Creek Watershed	900,000	766,000
Lake Meredith NRA	Protect Native Habitat by Completing North Boundary Fence	153,000	51,000
Indiana Dunes NL	Restore Biological Resources of the Cowles Bog Wetland	101,000	48,000
Pinnacles NM	Re-establish California Condors	572,000	192,000
Biscayne NP	Reverse Declining Populations by Developing Fisheries Management Plan	233,000	139,000
Olympic NP	Wilderness Recovery at Boulder Hot Springs	54,000	0 ³
Glacier Bay NP and Pres	Backcountry Management Data Collection Analysis	244,000	141,000
Intermountain Region	Initiate IMR Noxious Weed Inventory and Mapping Program	578,500	214,500
Great Basin NP	Wild Cave Inventory and Management	216,000	92,000
Buffalo NR	Delineate and Characterize Karst Groundwater Recharge Zone	100,000	50,000
Point Reyes NS	Remove Iceplant at Point Reyes Lighthouse Headlands	339,000	112,000
Kalaupapa NHP	Exclude Ungulates from Pu'u Ali'i Plateau	663,000	44,000
Pinnacles NM	Restore Climbing Area	94,000	40,000
Lake Clark NP and Pres.	Refine Techniques to Survey Harvested Brown Bear Populations	235,000	0 ⁴
Denali NP and Pres	Determine Baseline Info Along Proposed North Access Corridor	370,000	123,000
Voyageurs NP	Document Changes in Reservoir Management on Mercury Accumulation in Fish and Other Aquatic Ecosystem Components	311,000	102,000
Isle Royale NP	Implement Wilderness Management Plan: Carrying Capacity and Long-term Monitoring	270,000	97,000
Pipe Springs NM	Geologic Mapping and Seismic Profile Investigations	308,000	164,000
Fossil Butte NM	Geological Mapping of Primary Formations	209,000	79,000
Rocky Mountain NP	Restore Glacier Creek Livery/Wetland	103,000	47,000
Big Bend NP	Stop BIBE Feral Hog Invasion	130,000	55,000
National Capitol Parks	Dragonflies and Damselflies: Likely Affected by WNV Management	63,000	20,000
Big South Fork NRR	Reintroduce Black Bear	120,000	0 ⁵
Wind Cave NP	Monitor for Chronic Wasting Disease	279,000	33,000
Rocky Mountain NP	Implement Interim Actions for CWD Management	453,000	25,000

Appendices: Appendix E

Natural Resource Preservation Program (NRPP) Projects NRPP—Natural Resource Management New and Ongoing Projects

Park	Project Title	Total Funding	FY 2002 Funding
Padre Island NS	Assess Impacts on Seagrass Meadow	100,000	50,000
Oregon Caves NM	Complete Cave Restoration	54,000	15,000
Golden Gate NRA	Restore Ft. Baker Mission Blue Butterfly Habitat	632,000	172,000
Capitol Reef NP	T and E Plant Pollinators	151,000	65,000
Glacier NP	Lake McDonald Fishery Management	174,000	63,000
Glacier NP	Assess Wolverine Population	186,000	46,000
Fire Island NS	Relationships Among Barrier Island Processes	188,000	107,000
Olympic NP	Determine Migratory Pathways, Spawning Areas, and Potential Sources of Threats to Listed Bull Trout	229,000	84,000
Rocky Mountain NP	Implement Invasive Plant Management Plan	150,000	14,000
Total		\$11,831,500	\$4,348,500

1 FY 2002 was the second year of a two-year hiatus at the request of Congaree Swamp. The park is scheduled to receive \$39,000 in FY 2003 and \$42,000 in FY 2004.

2 Petrified Forest NP was unable to obligate its FY 2002 allocation of \$56,000. The funding was re-allocated to IMRO's Noxious Weed Inventory and Mapping project, to be returned to Petrified Forest in FY 2003.

3 FY 2002 Olympic NP allocation of \$54,000 was returned to Comptroller per Assessment. The project, delayed one year, is scheduled to receive \$54,000 in FY 2003.

4 Lake Clark project was delayed one year and scheduled to start in FY 2003 with \$75,000.

5 Big South Fork project was delayed one year and scheduled to start in FY 2003 with \$52,000.

Appendices: Appendix E

NRPP—Threatened and Endangered Species Fully Funded Projects

Park	Project Title	Total Funding	FY 2002 Funding
Mojave NPres	Baseline Survey of Desert Tortoise	\$136,000	\$52,000
Grand Canyon NP	Inventory for Mexican Spotted Owls	104,000	52,000
Capitol Reef NP	Endangered Plant Inventory	163,000	53,000
Mammoth Cave NP	Protect Endangered Species Habitat at Wilson Cave	16,000	16,000
Total		\$419,000	\$173,000

NRPP—Threatened and Endangered Species New and Ongoing Projects

Park	Project Title	Total Funding	FY 2002 Funding
Big Thicket NPres	Reintroduce Texas Trailing Phlox	\$32,000	\$0 ¹
Cape Hatteras NS	Seabeach Amaranth: Habitat Assessment/Restoration Using Remote Sensing Data	136,400	52,000
Chesapeake and Ohio Canal NHP	Restoration and Recovery for Federally Endangered <i>Harperella</i> (<i>Ptilimnium nodosum</i>)	151,000	56,000
Lake Mead NRA	OHV Damage Control in Desert Tortoise Critical Habitat, Cottonwood Cove—Newberry Mountains, Lake Mead NRA	150,000	55,000
Pinnacles NM	Re-establish California Red-legged Frogs to the Bear Gulch Reservoir	103,000	39,000
Rocky Mountain NP	Re-establish, Stabilize, and Manage 19 Populations of Greenback Cutthroat Trout	66,000	23,000
Santa Monica Mountains NRA	Nonnative Species Removal and Habitat Restoration for Recovery of the Federally Listed Endangered Plant, <i>Pentachaeta lyonii</i>	54,000	28,000
Wind Cave NP	Reintroduction of Black-Footed Ferrets to WICA - Phase 1	100,000	42,000
Total		\$792,400	\$295,000

1 FY 2002 Big Thicket NPres allocation of \$32,000 was delayed one year: \$9,000 was returned to the Comptroller per Assessment and \$23,000 was re-allocated to NRPP-Natural Resource Management Intermountain Regional Office Noxious Weed Inventory and Mapping project. All \$32,000 will be returned to Big Thicket in FY 2003 from NRPP - Natural Resource Management funds.

Appendices: Appendix E

NRPP—Disturbed Lands Restoration Fully Funded Projects

Park	Project Title	Total Funding	FY 2002 Funding
Buffalo NR	Restore Stream, Boxley Valley	\$167,000	\$15,000
Channel Islands NS	Protect Endemic Island Oak and Rehabilitate of Actively Eroding Areas	85,300	39,100
Denali NP and Pres.	Restore Caribou Creek	200,000	67,000
Denali NP and Pres.	Remove Hazardous Conditions at the Kantishna Mining District	149,500	70,500
Florissant Fossil Beds NM	Remove and Restore Earthen Dams	142,000	44,000
Golden Gate NRA	Restore Lower Easkoot Creek	154,500	4,000
Great Basin NP	Restore the Bonita Mine	214,200	59,700
Saint Croix Island IHS	Restore Caps Creek to a Brook Trout Stream: Schultz Pond Project	95,000	95,000
Total		\$1,207,500	\$394,300

NRPP—Disturbed Lands Restoration New and Ongoing Projects

Park	Project Title	Total Funding	FY 2002 Funding
Big Bend NP	Phase 2 Nine Point Draw Watershed Restoration	\$236,700	\$80,600
Buffalo NR	Develop Mitigation Strategy to Address Runoff from Park Roads	96,800	56,600
Fire Islands NS	Plug and Abandon Flowing Water Wells	76,400	8,800
Lake Mead NRA	OHV Restoration—North Shore— Lakeshore Scenic Drive Areas	250,000	88,100
Palo Alto Battlefield NHS	Restore Resaca Wetlands	116,900	43,800
Pinnacles NP	Old Pinnacles Road Restoration	250,000	107,300
Yellowstone NP	Reclaim Three Miles of Abandoned Turbid Lake Road and Reconstruct Turbid Lake Trail	211,500	70,500
Total		\$1,238,300	\$455,700

Appendices: Appendix E

Servicewide Fully Funded Projects and Summaries

Recurring Funding

Expenditures	Initial Amount	Funded Amount
Partnerships with Professional Organizations	\$50,000	\$50,000
Director's Natural Resource Awards	50,000	42,587
Publications: Year in Review and Park Science	108,000	124,464
Haskell Agreement	11,000	0
Total	\$219,000	\$217,051

Cross-Cutting Servicewide Database Initiatives

Expenditures	Initial Amount	Funded Amount
NR-MAP revision	\$10,000	\$ 9,960
RAMS Completion/Handoff	50,000	39,242
Improve Research and Collecting Permit Process	64,000	64,000
Train Research Coordinators	30,000	21,386
Total	\$154,000	\$134,588

Special Projects

Expenditures	Initial Amount	Funded Amount
Sustainable Seascapes Symposium	\$10,000	\$0
USGS Brucellosis—Technical Assistance and Research (final year)	100,000	100,000
Parks Canada	10,000	0
Peer Review Process	35,000	35,000
Web Support	31,000	31,000
Information Needs Assessment	60,000	57,003
Natural Resource Curation Workshop	15,000	14,063
Nonnative I&M/Prioritization Workshop	15,000	14,896
Identify Toxic Hot Spots in West	65,000	65,000
Geologic Resource Projects	85,000	85,000
Merge NPS Accoustic Database with I&M	17,000	17,000
Soundscape Science Technical Meeting	61,000	66,494
Benefits Transfer Database	30,000	30,000
Total	\$534,000	\$515,546

Appendices: Appendix E

Unplanned project support, FY 2002

Expenditures	Initial Amount	Funded Amount
Enhance NPS CESU Network National Coordination	\$0	\$10,000
Develop PMIS Copy Tool/ Enhance RAMS Software	0	29,905
Total	\$0	\$39,905

NRPP—Small Park Projects Funded in FY 2002

Region	State	Park	Project Title	Funding
AKR	AK	Sitka NHP	Install Food Storage and Waste Handling Facilities to Improve Bear Safety Program	\$20,000
IMR	AZ	Hubbell Trading Post NHS	Partner with Navajo Nation to Improve Water Quality on Pueblo Colorado Wash	15,000
IMR	AZ	Navaho NM	Replace Fence to Protect Resources at Keet Seel	5,000
IMR	AZ	Tonto NM	Fence Monument Boundary	14,900
IMR	AZ	Walnut Canyon NM	Assess Breeding and Habitat Status of Mexican Spotted Owl	14,800
IMR	CO	Florissant Fossil Beds NM	Identification of Fossil Plants and Insects from Recent Excavations	5,000
IMR	CO	Yucca House NM	Spring Water Source and Quality	6,700
IMR	MT	Grant-Kohrs Ranch NHS	Develop Agricultural Use Plan	8,100
IMR	MT	Grant-Kohrs Ranch NHS	Repair Jackleg Fence along Riparian Zone	6,000
IMR	NM	Aztec Ruins NM	Restore Native Plants to West Rim	5,600
IMR	NM	Capulin Volcano NM	Install Fence to Exclude Wildlife Sewage Lagoons	10,500
IMR	NM	Pecos NHP	Eradicate Nonnative Trees	13,000
IMR	OK	Chickasaw NRA	Aquatic Macroinvertebrate Survey	8,300
IMR	OK	Washita Battlefield NHS	Perform Bioassessment of Aquatic Biological Resources	15,000
IMR	TX	Alibates Flint Quarries NM	Assess Wildfire Impacts and Develop Long-Term Fire Effects Monitoring Protocols for Vegetation	2,500
IMR	TX	San Antonio Missions NHP	Assess Mammals and Inventory of Land Mammals Including Bats	12,800
IMR	UT	Timpanogos Cave NM	Cave Restoration and Formation Repair	15,000
IMR	WY	Devils Tower NM	Control Nonnative Plants	13,300
IMR	WY	Fossil Butte NM	Riparian Restoration	14,500
MWR	AR	Arkansas Post NMem	Herpetofauna Species Richness and Habitat Use Inventory	15,500
MWR	AR	Pea Ridge NMP	Restore 30 Acres of Disturbed Lands	20,000
MWR	IA	Effigy Mounds NM	Inventory and Assessment of Red-Shoulder Hawks	5,000
MWR	IA	Herbert Hoover NHS	Develop a Prairie Management Plan	10,000
MWR	KS	Fort Scott NM	Control Nonnative Plants and Woody Species in Prairie	3,200
MWR	MN	Pipestone NM	Develop IPM Plan	18,500
MWR	MO	Wilson's Creek NB	Nonnative Species Control	18,500
MWR	ND	Knife River Indian Villages NHS	ZRAT—Control of Leafy Spurge	8,700
MWR	NE	Agate Fossil Beds NM	Canada Thistle Control	10,000
MWR	NE	Homestead NM	Restore Native Prairie: Freeman School Prairie	20,000
MWR	NE	Homestead NM	Prairie Maintenance and Improve Water Quality	10,000
MWR	SD	Jewel Cave NM	Map Karst Area Northwest of Jewel Cave	13,600

Appendices: Appendix E

NRPP—Small Park Projects Funded in FY 2002

Region	State	Park	Project Title	Funding
MWR	SD	Wind Cave NP	Locate and Evaluate Historic Trees	\$15,000
NCR	NCR	National Capital Parks—Central	Restoration of Ecological Balance in Constitution Gardens Lake (1 Yr of 3)	10,000
NCR	NCR	National Capital Region (multi-park)	Protecting Biodiversity in NCR Parks: Balancing Visitor Experience with Resource Preservation	61,000
NCR	VA	George Washington Mem Pkwy	Fish Species Inventory—Dyke Marsh on the Potomac River (2 Yr of 3)	10,000
NER	CT	Weir Farm NHS	Develop IPM Plan	20,000
NER	MA	Boston Support Office	Role of Small National Historical Parks in Natural Resource Preservation	25,400
NER	NH	Saint-Gaudens NHS	Inventory and Assess Vernal Pools	19,300
NER	PA	Gettysburg NMP	Invertebrate Taxonomic Assessment	39,300
PWR	AS	NP of American Samoa	Resuscitating Weed-Infested Rainforest on Mt Alava	1,000
PWR	CA	Devils Postpile NM	Bird Demographic Monitoring and Outreach	15,000
PWR	CA	John Muir NM	Bees and Wasps	7,000
PWR	CA	Manzanar NHS	Survey Amphibian and Reptile Species	8,000
PWR	CA	Manzanar NHS	Survey Bird Species	10,000
PWR	HI	Kaloko-Honokohau NHP	Determine Contaminant Bioaccumulation with Fat Bags	8,000
PWR	HI	Kaloko-Honokohau NHP	Assess Diphacinone as Tool for Predator Control	18,000
PWR	ID	Hagerman Fossil Beds NM	Install Groundwater Tracer Test Well	14,000
PWR	ID	Hagerman Fossil Beds NM	Complete Analysis of Microbiotic Soil Crusts	7,000
PWR	ID	Hagerman Fossil Beds NM	Complete Mapping/Boundary Survey Project	29,000
PWR	ID	Nez Perce NHP	Develop Vital Signs Monitoring Plan	5,000
PWR	MT	Big Hole NB	Develop Vital Signs Monitoring Plan	5,000
PWR	OR	Fort Clatsop NMem	Eradicate English Ivy and English Holly	10,000
PWR	OR	Oregon Caves NM	Delineate Wetlands	5,000
PWR	OR	Oregon Caves NM	Assess Clearcut and Cave Effects with Bacteria DNA	21,000
PWR	WA	San Juan Island NHS	Support Partner Resource Monitoring	6,000
PWR	WA	San Juan Island NHS	Control of Nonnative Plant Species	13,000
PWR	WA	San Juan Island NHS	Survey for Marbled Murrelets	20,000
PWR	WA	Whitman Mission NHS	Develop Vital Signs Monitoring Plan	5,000
PWR	WA	Whitman Mission NHS	Replace Nonnative Grass with Native Grasses	1,000
SER	AL	Horseshoe Bend NMP	Monitor and Control Nonnative Plant Species	6,000
SER	FL	Timucuan Ecological and HPres	Inventory Vegetation on Newly Acquired Lands	10,000
SER	GA	Chattahoochee River NRA	Inventory Threatened and Endangered Aquatic Mussels	10,000
SER	GA	Chattahoochee River NRA	Inventory Aquatic Plants	10,000
SER	GA	Chattahoochee River NRA	Develop Vegetation Management Plan	8,600
SER	GA	Chattahoochee River NRA	Upgrade/Outfit Park's Water Quality Lab	3,000
SER	GA	Chickamauga and Chattanooga NMP	Design Landscape Rehabilitation Plan for Sunset Rock on Lookout Mountain	15,000
SER	GA	Fort Frederica NM	Delineation and Inventory of Wetlands and Water Resources	5,000
SER	GA	Fort Pulaski NM	Conduct Baseline Water Quality Survey	3,000
SER	GA	Jimmy Carter NHS	Develop IPM Plan	2,000
SER	GA	Kennesaw Mountain NBP	Resource Management Assistance for Cowpens and Kings Mountain	32,000
SER	GA	Ocmulgee NM	Remove Fire and Safety Hazard Vegetation	10,000
SER	GA	Ocmulgee NM	Eradicate Invasive Nonnative Flora and Fauna	15,000

Appendices: Appendix E

NRPP—Small Park Projects Funded in FY 2002

Region	State	Park	Project Title	Funding
SER	MS	Vicksburg NMP	Natural Resources Inventories: Aquatic Resources	\$ 8,000
SER	MS	Vicksburg NMP	Nonnative Plant Management	13,000
SER	NC	Guilford Courthouse NMP	Obtain Geographic Information Systems Equipment	5,000
SER	NC	Kings Mountain NMP	Conduct Inventory and Assessment of Avifauna Species	14,800
SER	NC	Kings Mountain NMP	Conduct Wetlands Delineation and Water Resource Inventory	26,100
SER	NC	Moore's Creek NB	Complete EA for Fire Management Plan	5,500
SER	TN	Stones River NB	Monitor Nonnative Plant Populations	10,000
Total				\$1,000,000

NRPP—Regional Block Allocation Projects Funded in FY 2002

Region	State	Park	Project Title	Funding
AKR	AK	Alaska Support Office	Management of Bears and Human-Bear Interactions And Providing For Visitor Safety in Alaska's National Parks	\$41,000
AKR	AK	Alaska Support Office	Science Symposium	10,000
AKR	AK	Alaska Support Office	Science Journal	25,000
AKR	AK	Alaska Support Office	Alaska Watershed and Stream Hydrography Enhanced Datasets	30,000
AKR	AK	Alaska Support Office	AK Fish and Wildlife Service Cooperative Unit Support	25,000
AKR	AK	Alaska Support Office	Create Public Outreach Materials for Ecological Tour of Alaska	30,000
AKR	AK	Alaska Support Office	Develop Web Based Curriculum Project on the Culture of Wilderness	24,000
AKR	AK	Denali NP and Pres	Implement Education Program to Reduce Human-Wildlife Interactions: Educate Visitors to Not Feed or Approach Wildlife	5,000
AKR	AK	Gates of the Arctic NP and Pres	Brown Bear Conference	10,000
IMR	AZ	Grand Canyon NP	Resident Eagle Inventory: Emphasis on Declining Golden Eagle	20,000
IMR	AZ	Southern Arizona Group	Monitoring Avian Migration in Southeastern Arizona	20,000
IMR	AZ	Tonto NM	Conduct Aerial Photography	2,800
IMR	AZ	Wupatki NM	Assess Juniper Woodland Succession	18,700
IMR	CO	Bent's Old Fort NHS	Native Vegetation Restoration Plan	10,000
IMR	CO	Florissant Fossil Beds NM	Establish Interpretive Exhibit	1,000
IMR	CO	Florissant Fossil Beds NM	Control Four Species of Noxious Weeds	19,000
IMR	CO	Great Sand Dunes NP	Seismic Hazard Assessment	19,900
IMR	TX	San Antonio Missions NHP	Controlling Nonnative Plant Species in Mission Labores Area	20,000
IMR	UT	Bryce Canyon NP	Soundscape Monitoring	20,000
IMR	UT	Cedar Breaks NM	Repair and Rehabilitate Eight Miles	13,600
IMR	WY	Fort Laramie NHS	Develop IPM Plan	15,000
IMR	WY	Yellowstone NP	Restoration Stream Flow Allocation to Protect Native Fish	20,000
MWR	AR	Buffalo NR	Monitor Post-Oak Savanna Ecological Restoration	10,000
MWR	MI	Pictured Rocks NL	Black Bear Ecology in Relation to Consumptive and Non-Consumptive Human Use	25,000
MWR	MN	Grand Portage NM	Inventory and Characterization of Carabid Beetle Assemblages in Six Plant Communities	6,200

Appendices: Appendix E

NRPP—Regional Block Allocation Projects Funded in FY 2002

Region	State	Park	Project Title	Funding
MWR	MN	Mississippi NRR A	Identify Open Space and Habitat Protection Opportunities	\$ 10,000
MWR	MN	Voyagers NP	Control of Nonnative Smallmouth Bass to Restore Native Predator	25,000
MWR	MO	George Washington Carver NM	Special Natural History Research Study, Phase I	10,000
MWR	MO	Ozark NSR	Catalog Natural History Collection, Phase III (Post-1987)	17,200
MWR	OH	Cuyahoga Valley NP	Assess Landscape Composition Effects on White-tailed Deer Distribution and Impacts	15,200
MWR	SD	Wind Cave NP	Mitigate Cave Algae	12,500
MWR	SD	Wind Cave NP	Resource Management Assessment and Scoping Meeting	19,900
MWR	WI	Apostle Islands NL	Determine Population Status of Black Bears and Develop Monitoring Protocols	24,000
MWR	WI	Saint Croix/Lower Saint Croix NSR	Visitor and Recreational Use Monitoring—Yr 2	24,300
NCR	MD	Antietam NB	Wildlife Education Outreach	3,500
NCR	MD	Antietam NB	Resource Management Journa	12,300
NCR	MD	Catoctin Mountain Park	Supplement Water Quality Monitoring	4,000
NCR	MD	Catoctin Mountain Park	Add 1/2 Mile Zone to Complete Park Vegetation Mapping	6,500
NCR	MD	Chesapeake and Ohio Canal NHP	Complete Proposed Vegetation Mapping in Designated State and Federal Significant Natural Areas	6,500
NCR	MD	Chesapeake and Ohio Canal NHP	Evaluate Impacts of White-tailed Deer CHOH/ANTI (1 Yr of 3)	10,000
NCR	MD	Monocacy NB	White-tailed Deer Necropsy and Herd Heath Assessment (ANTI and MONO)	10,000
NCR	NCR	National Capital Parks East	Moth inventory of Piscataway and Fort Washington Parks	2,900
NCR	NCR	National Capital Region	Building a Vegetation Classification for the National Capital Region	25,000
NCR	NCR	National Capital Region	Fostering Natural Resource Stewardship (1 Yr of 3)	11,200
NCR	NCR	National Capital Region	West Nile Virus Testing	1,500
NCR	NCR	National Capital Region	Employee Development—Water Monitoring	1,300
NCR	NCR	National Capital Region	Employee Development—Penn State Scholarship (Management Program for Natural Resource Managers)	4,300
NCR	NCR	National Capital Region	Employee Development—coping Session Facilitator	2,500
NCR	NCR	National Capital Region	Employee Development—Contractor Officers Representative	9,400
NCR	NCR	National Capital Region	Employee Development—Cooperative Agreements	11,000
NCR	NCR	National Capital Region	Ortho-rectify Aerial Photos and Create Digital Mosaics for Lands Adjacent to ANTI	7,100
NCR	NCR	National Capital Region	Ortho-rectify Aerial Photos and Create Digital Mosaics for Lands Adjacent to CATO	3,200
NCR	NCR	National Capital Region	Processing Aerial Photography for Lands Adjacent to CHOH: Ortho-rectify and Digitize Mosaics	7,000
NCR	NCR	National Capital Region	Avoiding Adverse Impacts to GWMP Natural Resources: Developing Accurate Maps of Local Environs	6,300
NCR	NCR	National Capital Region	Managing Resources Proactively: Creating Vegetation Maps of HAFE Adjacent Lands	2,900
NCR	NCR	National Capital Region	Quantify Threats from Land Around MANA Using Vegetation Mapping	2,700
NCR	NCR	National Capital Region	Complete 1st Step to Mapping Vegetation on Adjacent Lands Adjacent to MONO	1,600

Appendices: Appendix E

NRPP—Regional Block Allocation Projects Funded in FY 2002

Region	State	Park	Project Title	Funding
NCR	NCR	National Capital Region	Preserving and Managing NACE's Natural Resources: Starting the Vegetation Map to Adjacent Lands	7,000
NCR	NCR	National Capital Region	Facing Challenges from Land Pressures Surrounding PRWI: Vegetation Mapping	9,000
NCR	NCR	National Capital Region	Placing WOTR Natural Resources in a Regional Context: Vegetation Mapping Adjacent Lands	500
NCR	NCR	Rock Creek Park	Restoration of the Old Maintenance Storage Yard Near Fenwick Branch	2,900
NCR	NCR	Rock Creek Park	Miscanthus: An Ornamental and Invasive Plant	1,300
NCR	VA	George Washington Mem Pkwy	Classification of Ecological Communities in Potomac Gorge Section (1 Yr of 3)	10,000
NCR	VA	Manassas NB	PClassification and Mapping of Forested Natural Communities (2 Yr of 3)	4,200
NCR	VA	Prince William Forest Park	Locate and Monitor Vegetation Plots	8,400
NCR	VA	Prince William Forest Park	Produce Wayside Exhibit for Taylor Farm—Nonnative Species	4,000
NCR	WV	Harpers Ferry NHP	Assessing Aquatic Environmental Associations and Ecological Vulnerability (1 Yr of 2)	10,000
NER	MA	Boston Support Office	Wetlands Issues for Parks of the Northeast U.S.	48,000
NER	MA	Cape Cod NS	Control Purple Loosestrife	56,000
NER	MD	Fort McHenry NMandHS	Clean Up Tidal Wetlands at Park	10,000
NER	PA	Gettysburg NMP	Convert 20 Acres Agricultural Fields to Meadows to Improve Habitat for State-listed Bird Species	40,000
NER	PA	Valley Forge NHP	Evaluate Effectiveness of Single Pin Meadow Sampler	46,000
PWR	CA	Pinnacles NM	Landslide Hazard Assessment	24,000
PWR	CA	Santa Monica Mountains NRA	Reptile/Amphibian Distribution, Status, Urban Impacts	28,400
PWR	ID	Craters of the Moon NM	Dating of Pre-Holocene Lava Flows to Support Geologic Mapping	15,000
PWR	ID	Nez Pierce NHP	Vital Signs Workshop-South Parks in Northern Semi-Arid Network	15,000
PWR	ID	Nez Pierce NHP	Vital Signs Workshop-North Parks in Northern Semi-Arid Network	15,000
PWR	OR	John Day NM	Paleoecological Synthesis of the John Day Basin	15,000
PWR	OR	Oregon Caves NM	Assess Clearcut, Climate, and Cave Trail Effects on Soil Microfungi	6,000
PWR	OR	Oregon Caves NM	Control Trail Erosion and Disease	8,500
PWR	WA	Lake Roosevelt NRA	Character and Toxicity of Exposed Bank Sediments	15,000
PWR	WA	Lake Roosevelt NRA	Survey and Map Distribution of Antennaria parvifolia and SurveyOxytropis campestris var. columbiana	15,000
PWR	WA	Mount Rainier NP	Meadow Monitoring and Protection	15,000
PWR	WA	North Cascades NP	Complete the Pilot Mountain Goat Project	11,600
PWR	WA	Olympic NP	Develop Intertidal Species Identification Guides	16,500
SER	GA	Chattahoochee River NRA	Establish Long-Term Water Quality Monitoring Project for CHAT streams	35,000
SER	KY	Cumberland Gap NHP	Protect Cave Endangered Species and Geologic Formations	25,000
SER	KY	Mammoth Cave NP	Eliminate Lamp Flora in MACA	25,000
SER	TN	Big South Fork NRRRA	Plug Abandoned Well #5175 in the Williams Creek Area	38,000
SER	TN	Great Smoky Mountains NP	Control Nonnative Trees and Multiflora Rose in Little Cataloochee	27,000
SER	TN	Great Smoky Mountains NP	Replace Autotitrator (NP5000040501) and Autosampler	25,000
SER	TN	Great Smoky Mountains NP	Determine Impacts of Ramp Collection	25,000
TOTAL				\$1,399,300

Appendices: Appendix F

Allocation of Water Quality Vital Signs Monitoring Funding, FY 2002

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 and Cascades	Pacific West	7	82
San Francisco Bay	Pacific West	6	70
Mediterranean Coast	Pacific West	3	76
Total: 2002 Network Monitoring	7 NPS Regions	103	941
Cooperative Agreement, Colorado State University: Data Management			230
Contract: Gold System (data migration)			34
Program Admin., Support, Technical Guidance			61
Travel (WRD)			9
GRAND TOTAL			1,275

Appendices: Appendix G

Water Resource Protection Projects FY 2002

Park	Region	Project Title(s)	Funding \$(000)	
ALL	ALL	Support to the Office of the Solicitor	160.4	
MT Parks	IMR	Implementation of the Montana-NPS Compact	2.7	
CAVE	IMR	Hydrologic Data Collection at Lake of the White Rose	3.0	
LAME	PWR	Spring Flow Monitoring, Participation in Cooperative Aquifer Stress Test	408.1*	
BLCA	IMR	Participation in the Adjudication of Colorado Water Division	434.0	
BUFF	MWR	Investigation of Hydrology and Water Related Values1	46.0**	
DEVA	PWR	Devil's Hole and Spring Flow Monitoring and Groundwater Study	223.0*	
AZ Parks	IMR	Participation in the Adjudication of the Little Colorado River Basin in Arizona	22.9	
GRBA	PWR	Assessment of Park Hydrogeology	40.0**	
GRCA	IMR	Hydrologic Investigation, Spring Protection	271.0**	
MEVE	IMR	Implementation of Water Rights Decree	5.5	
OBRI	SER	Stream Flow Monitoring, Surface Hydrology Study	50.0**	
UT Parks	IMR	Participation in the Adjudication of Various Areas in Utah	13.0	
YELL	IMR	Implement Reese Creek Water Rights Agreement	25.4	
ALL	ALL	Technical and Administrative Support to All Projects	112.2*	
Total for Water Resource Protection Projects			1,400.0	

* Projects that were enlarged because of the \$ 823,000 increase in funding.

** Projects that were conducted because of the \$ 823,000 increase in funding.

Water Resources Division Competitive Projects Continuing Projects, FY 2002

Park	Region	Project Title(s)	Funding \$(000)	
			FY02	FY03
GRTE	IMR	Baseline Water Quality Parameters/Land Use Characteristics of Five Snake Headwater Tributaries	24.90	24.90
ISRO	MWR	Develop Water Resource Management Plan	25.00	25.00
SACN	MWR	Historical Trends in Phosphorous Loading from Permitted Point Source Discharges	25.00	25.00
LAVO	PWR	Restoration of Drakesbad Meadow	25.00	25.00
REDW	PWR	Evaluate Watershed and Stream Channel Conditions Related to Disturbance History and Coho Habitat in Mill Creek	27.30	20.70
CATO	NCR	Evaluate Water Quality for all Park Streams	17.00	14.00
ACAD	NER	Assess Current and Historic Atmospheric Deposition of Toxic Contaminants	49.50	0.00
CACO	NER	Management of Dune Slack Wetlands	19.00	12.00
DEWA	NER	Develop Groundwater Monitoring	41.00	0.00
MOJA	PWR	Perform Baseline Hydrologic and Biologic Inventory of Wetlands	25.00	25.00
OLYM	PWR	Analyze Channel Dynamics on the Hoh and Quinault Rivers to Protect Fish and Aquatic Resources	35.00	15.00
PORE	PWR	Hydrologic and Ecological Impacts of Commercial Oyster Farming on the Biota of Drakes Estero	25.00	25.00

Appendices: Appendix G

Water Resources Division Competitive Projects Completed in FY 2002

Project Title	Funding\$(000s) FY 02
Effect of Climate Change in Increasing Nutrient and Carbon Availability to Arctic Aquatic Ecosystems, Noatak National Preserve	25,000
Runoff Components of the Tlikakila Wild River, Lake Clark National Park and Preserve, Alaska	20,000
Complete National Wetland Inventory Mapping at Lake Clark National Park and Preserve: Phase III	50,000
Identify and Map Perennial Water Sources and Riparian Areas within the Rincon Mountain District of Saguaro National Park	18,600
Develop Comprehensive Restoration Plan for Agua Fria Creek, El Malpais National Monument	16,000
Spring and Wetland Restoration in Great Basin National Park	23,750
Identify Sources of Methyl Mercury in the St. Croix National Scenic Riverway	25,000
Delineate and Characterize Karst Groundwater Recharge Zone at Buffalo National River, Arkansas	25,000
An Assessment Program to Evaluate the Long-Term Effects on Wetland Changes for Large Lakes at Voyageurs National Park	25,000
Enhanced Wetlands Inventory, Delineation, and Mapping; Harpers Ferry National Historical Park	13,000
Potomac Gorge Wetland Inventory, Mapping, and Descriptions; George Washington Memorial Parkway	50,000
Evaluate the Impact of Vehicle Traffic on Water Quality at Acadia National Park	49,900
Wetlands Mapping, Boston Harbor Islands National Park Area	9,000
Monitor Water Quality of Willow Creek, Whiskeytown National Recreation Area	7,000
Large-Scale Groundwater Tracer Test, Hagerman Fossil Beds National Monument (HAFO)	45,100
Quantify and Analyze Drawdown Effects from Idaho Power Operations to Shoreline Slope Stability Problems, Hagerman Fossil Beds National Monument (HAFO)	18,000
Develop Data Management Program for Crater Lake Long-Term Limnological Monitoring Program	27,900

Other Projects

Project Title: Evaluation of barriers to the upstream movement of nonnative brook char in Rocky Mountain National Park.

Project Description: This project was completed as a cooperative academic program for fisheries. Because of the limited professional fishery expertise within the National Park Service, this program uses a small amount of WRD base funding to further develop and increase cooperative relationships between the academic community and the NPS fisheries program.

FY 2002 funds (\$17,000) supported the project

Appendices: Appendix H

USGS Biological Resources Discipline Park-Oriented Biological Support, Summary of Progress Made in Fiscal Year 2002

Title of Project

Integrating beaver, water, and willow in the Savanna model at Rocky Mountain National Park

FY 2002 Progress

Produced a draft sub-model that integrates willow community response to cutting of willows by both elk and beaver and the impact on beaver populations caused by the effect different densities of elk have on the willow community.

Ecological integrity of McDonald Watershed, Glacier National Park: Biotic indicators of water quality impairment at the reconstruction of Going-to-the-Sun Road

Completed data collection regarding Going-to-the-Sun Road reconstruction environmental issues - sediment sources and routing; spatially explicit diversity, distribution and abundance of biota. Initiated analyses to establish reference-conditions based on reference sites that characterize the biological condition of the watershed.

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: Implications for conservation strategies

Expanded study to 6 parks and sampled a total of 81 ponds. Isolated 15 polymorphic loci for each species, results show high genetic diversity and considerable differentiation among populations. Submitted two manuscripts to Molecular Ecology Notes.

A decision support system for the Saint Croix National Scenic River

Entered data on unionid mussels, rare plants, and rare animals and created a combined data set that contains over 15,000 rows of data. Consulted with park staff about format and then created a system that permits easy data entry while ensuring accuracy and consistency. Plan to complete final decision support system by December 2002.

Determine wind erosion rates to support protection of natural and cultural resources at Bandelier National Monument, New Mexico

Consulted with park and Los Alamos National Lab regarding detailed methodologies and equipment. Ordered and received equipment. Plan to install equipment in the field in October 2002 and then initiate field monitoring.

Develop and populate an avifauna database at Mesa Verde National Park

Not scheduled to start in 2002. Will begin work in 2003.

Development of a model to evaluate impacts of fuels-reduction/prescribed fire in Pinyon-Juniper habitats on avian communities within Colorado Plateau national parks

Conducted extensive literature search on influence of fire on avian communities in pinyon-juniper habitats. Coordinated with 6 parks and 2 interagency coordination groups. Compiled vegetation data themes from 8 parks. Prepared proposal to seek additional funds to augment the proposed work.

Research in support of endangered Kemp's ridley sea turtles at Padre Island National Seashore

Documented 38 Kemp's ridley turtle nests along the Texas coast. Nesting turtles included 2 associated with an experiment to establish a secondary nesting colony and 3 that were other head-started turtles. Hatchling emergence was about 67%. Collected blood and tissue samples for later DNA analyses.

Appendices: Appendix H

USGS Biological Resources Discipline Park-Oriented Biological Support, Summary of Progress Made in Fiscal Year 2002

Title of Project

Estimating black bear abundance in Great Smoky Mountains National Park using DNA extracted from hair samples

FY 2002 Progress

Focused on combining individual-based modeling of bear movements with GIS simulations of hair-trap placement strategies to develop an optimal field design to use for sampling black bear DNA in the 2003 field season. Analyzed scenarios of bear densities, trap density, trap placement, and sampling duration to determine optimal sampling regimes that minimize methodological biases and maximize statistical power.

Testing and evaluation of remote sensing methods for estimating refuge characteristics of karst wetlands

Conducted planning meetings and a site visit to establish specific methodologies. Plan to complete all project work by September 2003.

Distribution, population dynamics, and herbivory impacts of a pioneering elk herd on Chaco Culture National Historic Park

Developed detailed study plan and worked with park to conduct necessary environmental review. Obtained approval for use of helicopter survey method and completed first elk composition survey.

Effects of suspended load on stream biota

Initiated stream surveys and specimen collection from four creeks. Differences among streams found in 2002 will require conducting riparian and floodplain assessments in 2003. Will collect additional field samples and analyze all samples in 2003.

The importance of Walnut Canyon National Monument as habitat for cougars (*Puma concolor*) in an urban interface environment

Obtained partnership commitments from three partners and consulted on detailed capture methods and human dimension study design. Procured radio-collars and immobilization drugs and arranged for capture assistance from partners. Assembled a necessary GIS for the study area. Plan to capture and collar cougars in winter 2002-2003 and to monitor cougar activities with radio-collars and tracking through snow.

Bighorn sheep in Great Basin National Park: An assessment of population status, limiting factors, and potential enhancement alternatives

Coordinated with federal, state, and bighorn sheep advocacy groups; organized technical committee; assembled electronic data; and ran first test of the habitat suitability model. Prepared plans for winter 2002-2003 field work and subsequent revision and review of the model.

Gaining baseline data on state-listed lake sturgeon (*Acipenser fulvescens*) and their spawning habitat across the international boundary between Minnesota and Ontario

Obtained necessary permits, initiated assessment netting of fish, and tagged 67 fish with disk tags. Procured acoustic/radio tags and receiving equipment and surgically implanted acoustic/radio tags in 13 fish. Plan to monitor tagged fish through two spawning seasons.

Appendices: Appendix H

USGS Biological Resources Discipline Park-Oriented Biological Support, Summary of Progress Made in Fiscal Year 2002

Title of Project

Technical assistance in determining size and composition of nonnative and native ungulate populations at Point Reyes National Seashore

Vegetation classification and mapping tools for national parks: demonstration products for Voyageurs National Park

Baseline monitoring of floodplain vegetation and geomorphology before dam removal, Elwha River, Olympic National Park

Protecting ecological resources at Acadia National Park through landscape scale conservation and easement planning

Water developments in Theodore Roosevelt National Park, North Dakota; Implications for ungulates and herbivores[LaDF1]

Impact of stocking non-indigenous salmonids on a federally-endangered mussel within the Delaware Water Gap National Recreation Area

Evaluating the impacts of white tailed deer (*Odocoileus virginicus*) on vegetation within Pea Ridge National Military Park

Development of parasite risk assessment and control strategies for captive breeding of island fox (*Urocyon littoralis*) at Channel Islands NP

Habitat requirements of the endangered California freshwater shrimp (*Syncaris pacifica*) in streams on the Point Reyes National Seashore and Golden Gate National Recreation Area

Assessing the risk of aerially borne pesticides to declining amphibian species in the national parks of the Sierra Nevada Mountains, California

FY 2002 Progress

Project initiated. Capture and radio-collaring of ungulates scheduled for December 2002 and censusing scheduled for January and February 2003.

Developed cooperative agreement with NatureServe and initiated planning for implementation.

Initiated interagency coordination, conducted site visits, and identified possible vegetation sampling stations. Plan to sample vegetation in FY 2003.

Initiated inventory of land-use and related data and obtained selected spatial data layers for Mt. Desert Island.

Not scheduled to start in 2002. Will begin work in Spring 2003.

Developed a baseline inventory by conducting a continuous snorkel survey of approximately 50 miles of the mainstem Delaware River. Found eight mussel species.

Established 53 deer browse survey plots and collected baseline data. Plan to construct deer exclosures on 20 plots during fall and winter 2002-2003 and collect vegetation data from all plots during 2003.

Held fox parasite workshop to assess parasite risks for captive fox populations, develop a parasite monitoring plan for each captive facility, determine parasite control methods, and identify action threshold levels. Ordered equipment and initiated development of standard procedures.

Coordinated with park and municipal water district personnel regarding study objectives, design, and sampling methods. Practiced capture methods in the field and determined logistical needs. Requested necessary Endangered Species Act Section 7 consultation. Developed schedule for field work to start probably in January 2003.

Not scheduled to start in 2002. Will begin work in 2003.

Appendices: Appendix H

USGS Biological Resources Discipline Park-Oriented Biological Support, Summary of Progress Made in Fiscal Year 2002

Title of Project

Evaluation of canid scents as a management tool to reduce mammal predation on piping plover nests in coastal barrier parks

FY 2002 Progress

At NPS request, added a fifth site to the project and established sampling stations at all sites. Plan to conduct field work between November 2002 and April 2003.

Appendices: Appendix I

Projects and Activities Supported with Natural Resource Challenge Funding Allocated for Cooperative Ecosystem Studies Units (CESUs)

(Each CESU receives a total of \$155,00, which also covers salary/benefits and administrative costs for some CESU positions—see explanation in chapter: Action Plan Focus, Accomplishments, and Financial Summaries)

INTERMOUNTAIN REGION

Colorado Plateau CESU

Park	Project Title	Cost (\$)	R, TA, E	Total(\$)
GRCA	Mountain Lions and Human Interactions ¹	5,000	R	
NAVA	Cultural Uses and Traditional Management of Plants in Shonto Region	13,700	R	
GRCA	Regional Economic Impacts of Grand Canyon River Runners	14,000	R	
PEFO	Revised Geologic Assessment of the Sonsela Sandstone Member	13,700	R	
GLCA, LAME	Efficacy of Tamarisk Control in the Southwest	15,000	R	
COLM	Inventory of Nonnative Plants and Development of Long-Term Strategies	15,000	TA	
COLM, MEVE, ZION	Inventory of Past Pinyon-Juniper Management Treatments on NPS Lands on the Colorado Plateau	10,000	TA	
TICA	Controlling Invasive Plants	9,700	TA	
CARE, GRCA, MEVE, WUPA	Haskell Indian Nations College Fieldwork	10,000	E	
MEVE	Ft. Lewis College Internship	3,000	E	
				119,100

Desert Southwest CESU

Park	Project Title	Cost (\$)	R, TA, E	Total(\$)
BIBE	Mapping and Baseline Studies of Invasive Buffelgrass	7,000	R	
CHIR	Population Status of Chiricahua Fox Squirrel	10,000	R	
MOCA	Assessing Bat Use of Cliff Dwellings and Caves	9,500	R	
ORPI	Determine Foraging and Roosting Areas for Mastiff Bats	4,600	R	
PAIS	Grassland Bird Wintering Ecology on the Gulf Coast	10,000	R	
SAGUA	Collaborative Effort to Monitor Groundwater Levels	9,700	R	
SAGU	Conservation Genetics of Tiger Rattlesnakes	11,500	R	
TONT	Assessing Bat Use of Cliff Dwellings and Cave	10,000	R	
[Univ. of Arizona]	Desert Southwest Assistant Research Scientist Position	20,300	R	
BIBE	Nine Point Draw Watershed Restoration Soil Analysis	1,000	TA	
PAIS	Editing and Printing of Shoreline Trash Study	5,300	TA	
SAGU	Identify and Map Water Sources and Riparian Areas	9,700	TA	
MULTI	Production of Desert Southwest CESU Brochure	2,300	TA	
[Univ. of Arizona]	Historic Smith House	8,600	TA	
MULTI	Mission Parks Initiative	6,800	TA	
GICL	Initiate a Biological Inventory and Interpretive Program	10,000	E	
MULTI	Field Guide to Invasive Plants of Sonoran Desert	2,000	E	
MULTI	Park Flight Program Grantees Workshop	5,800	E	
				144,100

Appendices: Appendix I

Projects and Activities Supported with Natural Resource Challenge Funding Allocated for Cooperative Ecosystem Studies Units (CESUs)

Rocky Mountains CESU

Park	Project Title	Cost (\$)	R, TA, E	Total(\$)
BLCA	Determine Bighorn Sheep Lamb Productivity	10,000	R	
GLAC	Survey Canada Lynx Populations in Glacier National Park	10,000	R	
GLAC	Biology of the Rocky Mountain Capshell in Lost Lake	10,000	R	
YELL	Wolverine Research in Yellowstone	10,000	R	
YELL	Snowshoe Hare Distribution and Abundance	5,750	R	
YELL	Populations of Tubificid Worms, related to Whirling Disease	10,000	R	
ROMO	Nitrogen and Pesticides in Deposition	10,000	R	
GRSA	Faults and Seismic Hazard Mapping	9,450	R	
GRTE	High-Elevation Lake Sensitivity to Deposition	10,000	R	
LIBI	Historical Vegetation Assessment	3,100	R	
MULTI	Weed Mapping in IMR Parks	10,150	R	
BEOL	Hydrology and Flooding in Bent's Old Fort	4,990	TA	
BICA	Integrated Weed Management Plan for North District	7,010	TA	
BLCA	Sage Grouse Intern	2,400	TA	
FLFO	Natural Resource Management Interns	2,550	TA	
GRKO	Weed Control in Irrigated Pastures	5,000	TA	
GRTE	Weed Control along the Gros Ventre	4,000	TA	
FLFO	Training a Ranger to Survey Scarred Trees	460	E	
GRTE	Support for Noxious Weed Environmental Educators	2,500	E	
GLAC	Instruction in Identification of Mycorrhizal Fungi	2,500	E	
GLAC	Wildlife Intern from Salish Kootenai College	6,020	E	
GLACS	tudent Presentation at ESA on Restoration Ecology	500	E	
BEOL	Training Staff in Arc View and Arc Explorer	2,500	E	
GRKO	Natural Resource Course in Range Management	2,870	E	
GRKO	Curriculum Development and Teacher Training	2,500	E	
MULTI	Video on Yellowstone Cutthroat Trout	2,000	E	

146,250

MIDWEST REGION

Great Plains CESU

Park	Project Title	Cost (\$)	R, TA, E	Total(\$)
TAGR	Monitoring Project at Tallgrass Prairie National Preserve	24,000	T	
MULTI	Developing a Research and Technical Assistance Needs Catalog for National Parks in the Great Plains	5,000	E	

29,000

Appendices: Appendix I

Projects and Activities Supported with Natural Resource Challenge Funding Allocated for Cooperative Ecosystem Studies Units (CESUs)

NATIONAL CAPITAL REGION

Chesapeake Watershed CESU

Park	Project Title	Cost (\$)	R, TA, E	Total(\$)
GWMP	Research Supporting and Evaluating the Restoration of Dyke Marsh	55,578	R	
ALL	Protecting Resources in the National Capital Region by Detecting Air Quality Effects	99,422	R	155,000

North Atlantic Coast CESU

Park	Project Title	Cost (\$)	R, TA, E	Total(\$)
ASIS	Analysis of Benthic Invertebrate Occurrence, Community Structure, and Correlation with Grass Beds[LaDF3] at Assateague Island National Seashore	9,750	R	
CACO	Radiometric Dating of a Sediment Core from Town Cove, Cape Cod National Seashore	2,070	R	
[not listed]	Creation of GIS-Based Automated Shoreline Analysis Toolbox	22,479	R	
BOHA	Analysis of Shoreline Processes, Boston Harbor Islands National Recreation Area	14,409	R	
Coastal Parks	Marine Protected Areas and Northeast Coastal Parks: Analysis of Issues and a Workshop	25,738	TA	
Coastal Parks	Technical Assistance in website Development And Enhancement for Coastal Parks	29,011	TA	
Northeast Parks	Coastal Process Technical Assistance for Northeast Parks	5,000	TA	
GATE	Assess Landfill Issues at Gateway National Recreation Area	2,500	TA	110,957

PACIFIC WEST REGION

Great Basin CESU

Park	Project Title	Cost (\$)	R, TA, E	Total(\$)
JOTR	Long-term Effects of Drought and Rodent Predation On Joshua Trees	5,800	R	
MOJA	Desert Bighorn Sheep Habitat Assessment of Old Dad Mountain	20,100	R	
GRBA	Evaluation of Existing and Future Air Quality Monitoring at Great Basin National Park	28,600	TA	
PGSO	Support for the Great Basin CESU	3,500	TA	58,000

Appendices: Appendix I

Projects and Activities Supported with Natural Resource Challenge Funding Allocated for Cooperative Ecosystem Studies Units (CESUs) Pacific Northwest CESU

Park	Project Title	Cost (\$)	R, TA, E	Total(\$)
MULTI	Native Americans and the Pacific Northwest Environment: An Interdisciplinary Study of Indigenous Agriculture and Environmental Management	30,000	R	
CURE	Determine Lamb Productivity and Survival in a Reintroduced Bighorn Sheep Herd	500	R	
MORA	Review and Evaluation of Travel Simulation Models for Planning and Management of Mount Rainier National Park	15,000	R	
MULTI	Review and Recommendations of Methods Suitable for Development of Synthetic Hydrographs for Un-Gauged Basins with National Parks of the North Coast and Cascades	7,400	R	
OLYM	Landscape Analysis of Black Bear Distribution Patterns in Olympic National Park	1,000	R	
MULTI	Society and National Parks in the 21st Century: A Dialogue	8,700	E	
CCSO	Parks as Outdoor Labs: The Debut Newsletter of the North Coast and Cascade Learning Network	2,000	E	
CCSO	PNW Cooperative Ecosystem Studies Unit Program Support (supports creation of a CESU electronic newsletter, maintenance of NPS website, charges for peer review, small technical assistance efforts, limited literature reviews and administrative assistance at the University of Washington)	20,600	TA	
				\$84,300

SOUTHEAST REGION

South Florida/Caribbean CESU

Park	Project Title	Cost (\$)	R, TA, E	Total(\$)
GUIS 27,731	Santa Rosa Beach Mouse Use of a Hurricane Fragmented Landscape	27,731	R	

Southern Appalachian Mountains CESU

Park	Project Title	Cost (\$)	R, TA, E	Total(\$)
CHCH	Battlefield Bat Survey	4,900	R	
MACA	Restoring Butternut (<i>Juglans cinerea</i>)	15,000 ¹	R	
ANJO	Oral History Interviews	3,910	T	
TIMU	Gopher Tortoise Management Plan	14,862	T	
COSW	Map of Carolina Bogmint	17,439	T	
SERO	Southern Appalachian Mountains CESU Workshop	478	E	
				56,589

1 \$15,000 of total project cost of \$42,819 from CESU NRC Funds

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