



**National
Park
Service**

Natural Resources Strategic Plan

**PROFESSIONAL
DEVELOPMENT
PROGRAM**

This document contains the actions recommended by the Natural Resource Strategic Planning teams charged with performing evaluations and making recommendations on Organization, Natural Resource Roles and Functions, Professionalism, and Training and Development.

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SETTING THE STAGE: NATIONAL PARK SYSTEM VALUES

Each park in the National Park System was established because it contained a perceived public value. The legislative or executive action that designated each park was enacted on behalf of the public good. Each unit has been set aside because of a clearly defined value, a value placed on it by the American people. Value is, at least partially, a reflection of both scarcity and uniqueness. Many of our nation's last great remaining natural areas are protected within the boundaries of the national parks. The value of these areas increases many fold as the loss of natural landscapes and biological diversity outside of the parks continues to accelerate. Historic resources are valued because they teach us about past events, or inspire us, or remind us of our heroes or our struggles as a people. Collectively, the units of the National Park System provide a reflection of our national "self-identity."

As a society, we are becoming more knowledgeable about our relationship with the natural world. We place a value on protecting and maintaining a healthy relationship with the Earth—not necessarily from a moral or altruistic sense of right and wrong, but from an enlightened view of the fragility of our existence. We now value the natural resources found in the parks not only because they are beautiful or interesting, but because they are a part of the resource base essential to our survival. When we deny a potentially destructive public use of a park resource today, we are acting in the best interest of today's citizens and also those yet unborn.

The natural resource stewardship mission of the National Park Service has become progressively more critical in shaping the future of our society. At the same time, achieving the mission has become correspondingly more technically and politically complex. To achieve our natural resource stewardship mission, today and into the future, the primary focus of the organization must be on attaining *quality* within the organization. Other considerations are also important to achieving excellence, but quality must always be the cornerstone. The focus on quality is very important to organizational structure and function. Organizational excellence can only be attained when each and every employee is able to achieve excellence. The key to success for the National Park Service is no different than any other organization. We must focus our efforts on developing an organization that allows each employee to excel.

This document is intended to provide a framework to better develop our professional capabilities in the natural resource programs of the National Park Service.

■ TERMINOLOGY

What's in a word? Actually quite a bit. How we use a word is often a reflection of relevant perceptions. Terms used to define natural resource functions within National Park Service operations are included in the *Natural Resources Management Guideline*, NPS-77 (1991). These terms are listed below verbatim, or slightly paraphrased to shorten them.

Natural Resource Stewardship

The effective management of natural resources to ensure the integrity of the resource in perpetuity. This term is similar to resource management, but assumes that the management is carried out with the goal of maintaining a healthy, self-perpetuating, and ecologically complete park environment, with all of its ecosystem processes and components, for the long-term enjoyment and inspiration of the public.

Resource Management

The function by which the National Park Service strives to understand natural processes and human-induced effects; mitigates the existing and potential effects; monitors for ongoing or future trends; protects existing natural species, populations, communities, systems, and processes; and interprets these organisms, systems, and processes to the park visitor and the nation. Resource management is the umbrella function that includes the stated sub-functions of resource protection, mitigation, monitoring, and interpretation/education, but also includes management actions that fit neither of these categories, such as exercising legislative or legal authority to prevent a potentially harmful land use practice from occurring near the park boundary.

Research

Investigation aimed at the discovery and interpretation of facts, the revision of accepted theories in light of new facts, or the development of practical applications of such new theories.

Resource Protection

Prevention of overuse, vandalism, or destruction of natural resources by human causes, and the enforcement of laws and regulations affecting natural resource management. Protection includes ranger patrols required to protect park resources, special permitting, and enforcement of regulations and/or laws pertaining to fish and wildlife species, endangered species, agriculture, grazing, mineral management, air and water quality, etc. Resource protection actions depend on the integration of social science and human management knowledge and skills with natural resource knowledge.

Interpretation and Public Education

Communicating to park visitors the nature and significance of park resources and processes in order to increase the visitors' enjoyment and appreciation of the park. In addition, education programs target park neighbors and others outside the park in order to gain support for park protection and cooperative land use and management programs.

■ HISTORICAL PERSPECTIVE

Since the inception of the National Park Service, park rangers were the keepers of the peace and the protectors of the resources of the national parks. A few park biologists came to the larger parks starting in the late 1920s, but they were few in number. Uniformed park naturalists, known for their knowledge of the fauna and flora, conducted campfire programs and guided walks. From the 1920s to the mid-1960s, this organization served the parks fairly well. From the late 1960s on, however, escalating visitation was accompanied by increased crime, impact to resources, and a rapid expansion of facilities, as well as a critical need for professional emergency services such as criminal law enforcement, emergency medical, fire fighting, and search and rescue, and even more specialized skills such as hostage negotiation, crisis intervention, and drug interdiction.

The ranger operation in the parks grew and evolved to meet these challenges. Rangers became progressively more specialized in protection/emergency services operations. During this same period, needs for environmental education and interpretation intensified. The new Park Interpreter position was redefined from the Ranger Naturalist position description, which had an emphasis on natural history knowledge, to a position focused more on communication and education skills. During this period of rapid growth of the National Park System, the vast majority of human resources were focused on meeting the rapidly expanding need for serving the public.

During the 1970s, the struggling profession of park biologist nearly vanished. Responsibilities of the few existing park biologist positions focused on research. Rangers were recruited for their knowledge and skills in law enforcement and emergency services, and interpreters were hired for their communication skills. Required law enforcement training and numerous other courses were offered to rangers to enhance their emergency operations skills, while natural resource management training remained virtually nonexistent. To a large extent, the National Park Service failed to recruit additional staff who had an education in natural resources. Eventually the National Park Service was left with very little natural resource management capability.

In response to the *State of the Parks Report* of 1980, the Natural Resources Management Trainee Program was inaugurated in 1982 in a desperate effort to provide a quick fix for the problem. The program has been partly successful in meeting its objective. However, it has not entirely met the demands for stewardship of park resources in a modern world.

This Natural Resource Professional Development Program builds on previous actions. Unlike previous efforts, however, **this program** will substantially improve through systematic changes how we currently recruit, train, organize, and manage our workforce.

■ SUMMARY OF CRITICAL ACTIONS

The following actions make up the most urgent elements of a strategy to improve the natural resource management program of the National Park Service. Taken together, these steps will significantly improve efficiency and achieve excellence in the National Park Service's stewardship of its natural resources. The recommended actions and programs presented in this plan address the following elements.

The National Park Service must clearly define the *role and function* of all operational work groups that contribute to the natural resource stewardship portion of the mission.

The National Park Service must develop and implement an *organizational structure* at the park, regional, and Washington Office levels that best serves the stewardship of park resources, ensures program accountability, enhances communications, and provides for long-term continuity of natural resource programs.

The Service must advance an initiative that provides the *base funding* necessary to carry out natural resource programs with the degree of professionalism necessary for effective stewardship of park resources.

The Service must conduct a *position management review* of all natural resource positions and make needed changes to ensure proper classification and consistency throughout the National Park Service.

The National Park Service must implement in each region and throughout the Service a well-defined *employee recruitment program* for professional and technical natural resource positions.

The Service must implement a Servicewide program of *training and professional development* focused on enhancing and maintaining the professional qualifications necessary for all natural resource management staff.

■ SPECIFIC ACTION TIMETABLE

Action	Responsibility	Date
Define Role and Function	Directorate	11/93
Organization Changes	Directorate	3/94
Position Descriptions	A.D. Budget & Administration	1/94
Funding Initiative	A.D. Natural Resources	1/94
Position Management Review	A.D. Natural Resources	1/94
Automated Recruitment	A.D. Budget & Administration	4/94
Natural Resources Training Academy	A.D. Natural Resources	9/94
Advanced Training Program	A.D. Budget & Administration A.D. Natural Resources	9/94
Advanced Degree Program	A.D. Budget & Administration	9/94
Education/Grant Program	A.D. Budget & Administration	6/94
Continuing Education Program	A.D. Natural Resources	6/94

■ ROLES AND FUNCTIONS

All functional disciplines within the National Park Service organization contribute to achieving the natural resource stewardship mission. To achieve a harmonious sense of teamwork and the most cost effective organization, it is important to clearly articulate what the role and function of each major occupation within the workforce. All individuals can then understand their own roles and appreciate the roles of others. The following roles and functions for operational units are offered as guidelines.

DIRECTOR OF THE NATIONAL PARK SERVICE

The director is the leader of the principle government agency charged with the conservation and preservation of this country's natural and cultural heritage. The director is responsible for knowing and understanding the condition of the resources under the stewardship of the National Park Service and for directing efforts to maintain their integrity. The director develops Servicewide program strategies and seeks funding to initiate and support the effective stewardship of park resources, and decisions are founded on reliable scientific information.

REGIONAL DIRECTORS

The regional director is responsible for knowing and understanding the condition of the park resources within his/her region and for leadership in efforts to maintain their integrity. The regional director relies on superintendents as the key management officials to implement regional and Servicewide programs to conserve park resources. In selecting such key officials, s/he must ensure that candidates have the best mix of resource skills and leadership abilities to achieve excellence in park management. The regional director is the primary driving force in the development of a region-wide resource management program in order to ensure conservation of resources in every park. S/he must ensure that priorities for fiscal resources are objective and based on resource needs. S/he appoints appropriate staff to lead and coordinate key research and resources management programs, ensures coordination with other agencies, and provides service to meet parks' needs for specific areas of professional expertise.

SUPERINTENDENTS

The superintendent is the principal line official responsible for maintaining the integrity of park resources and insuring that the agency mission, national programs, and park purposes are carried out at the unit level. S/he must ensure that fiscal allocations and priorities address these responsibilities, but also identify shortfalls and seek funding to meet them. The superintendent is ultimately responsible for both knowing the condition of park resources and

for directing efforts to monitor, conserve, and sustain them. As such, s/he must be the primary driving force in development of comprehensive resource management plans in order to effect park programs. The superintendent must ensure that plans guiding management actions are based on reliable scientific information. S/he must coordinate with external interests to ensure communication on like programs and resources, even when they may be in conflict. The superintendent must create a working environment to attract highly skilled people and develop human resources already in place to foster their commitment to resource conservation. The superintendent is a leader. S/he must lead, must be committed to excellence, and must share his/her commitment with staff to perpetuate park resources.

**NATURAL
RESOURCE
MANAGERS**

Natural resource managers include a wide variety of professional disciplines in the natural and physical sciences including but not limited to general biologists, ecologists, entomologists, botanists, wildlife biologists, fisheries biologists, geologists, hydrologists, and soil scientists. Resource managers work at all levels of the National Park Service.

**NATURAL
RESOURCE
MANAGERS—
PARK LEVEL**

Natural resource managers at the park level are responsible for supporting the Superintendent in meeting the park goals relating to the National Park Service natural resource stewardship mission.

Leadership

Establishes and effectively leads a credible natural resource management program at the park level. Initiates policies and programs that will enhance natural resource stewardship in the park. Sets a tone of teamwork among park divisions, as well as with other agencies and the public, to enhance the effectiveness of the park's natural resource management program.

***Resource
Management
Planning***

Prepares and updates a comprehensive resource management plan for the park, as well as action plans to address particularly complex resource issues. In doing so, synthesizes research carried out in the park. The resource management plan defines detailed objectives for the park's resources, delineates long-term strategies for accomplishing those objectives, and presents a plan of action to implement them. Develops specific action plans to address particularly complex natural resource issues. Synthesizes results of relevant scientific studies, including those carried out elsewhere, in developing possible options and formulating management programs to address specific resource issues. Uses an interdisciplinary and interdivisional approach in developing

resource management and action plans, defining needs for monitoring, research, mitigation, interpretation, and enforcement to achieve the park's resource stewardship objectives.

Mitigation

Develops and implements action plans to mitigate threats or impacts to resources and to restore damaged resources. Works with others in developing and implementing programs to prevent resource impacts. Applies current scientific concepts and state-of-the-art techniques, as well as knowledge of laws, policies, guidelines, National Park Service programs, and other considerations, in formulating effective programs.

Monitoring

Analyzes existing inventory and monitoring data, determines the state of knowledge of various resources, and identifies significant gaps in information. Using scientifically valid protocols, designs and implements inventory and monitoring programs needed to document status and trends in the condition of park resources. Analyzes monitoring results, provides for effective data management, and otherwise carries out all of the park inventory and monitoring (I&M) program management responsibilities.

Research Oversight and Management

Identifies deficiencies in information about park resources, and develops strategies to obtain that information. Defines information and research needs; develops requests for proposals (RFPs); works with regional chief scientist to evaluate research proposals, including coordination of peer review as appropriate; oversees the progress of researchers to ensure that research efforts will address the park's information needs; and works with regional chief scientist to coordinate peer review of interim and final reports. Works closely with the regional chief scientist to ensure that research projects are carried out in response to identified needs and are effective in meeting those needs. Facilitates National Biological Survey and National Park Service research programs, and provides on-site liaison with National Biological Survey scientists who are stationed in parks or at Cooperative Research Units. Critically evaluates research implications for management, evaluating the validity of the results, recognizing the extent to which they can be generalized, and distinguishing fact from opinion or value-based judgment. Is responsible for assuring that all research conducted within the park adheres to high standards. Provides an effective interface between scientists and natural resource managers. Ensures that research results are readily available for management decision-making and planning.

At larger or more complex parks, this research program management function will be assigned to a specific position. This position requires a strong scientific background, an established reputation, scientific credibility, and an interest in the application of science in park management. A network with scientists from

universities, other agencies, and professional societies is maintained. To maintain expertise requires involvement in actually carrying out some level of research activity and publication of results.

<i>Resource Assessment</i>	Actively participates in park planning and facility design, evaluates the potential effects of proposed projects on natural resources, and works with design/planning team to develop approaches that minimize impacts. Ensures that compliance is carried out, and oversees the quality of compliance. Reviews the plans and compliance documents of other agencies in terms of the proposals' effects on park resources and ecosystem processes.
<i>Interaction With Others</i>	Represents the superintendent in matters pertaining to resource stewardship. Under direction of the superintendent, works with adjacent land management agencies and others in defining shared objectives and developing strategies to achieve those objectives. Maintains contact with scientists at universities and with scientists and resource management personnel of other agencies involved in activities relevant to park resource issues.
<i>Source of Expertise</i>	Provides scientific expertise for input into park management, synthesizing the results of various research studies, and incorporating state-of-the-art scientific concepts into resource management programs. Based on knowledge of ecological principles, as well as results of monitoring, identifies threats to park resources. Is the key source of natural resource information and facilitates dissemination and exchange of resource information.
<i>Data Management</i>	Maintains database on results of research, resource inventories, baseline studies, and monitoring in accordance with National Park Service standards. Oversees natural resource themes and applications of the park's Geographic Information System (GIS). Maintains research specimens and other natural history specimens in accordance with National Park Service collections management standards. Maintains natural resource library, including reports and publications resulting from research carried out in the park.
<i>Program Management</i>	Provides input to superintendent in defining goals and setting park priorities. Defines needs and seeks staff and funding to carry out the programs and projects detailed in the resource management plan. Prepares cooperative agreements, requests for proposals, and other documents necessary to carry out an effective natural resource management program. Prepares and submits annual reports on natural resource management and research activities. Tracks natural resource budgets. Supervises other natural resource management staff, including organization of workload and position management.

**NATURAL
RESOURCE
MANAGERS—
REGIONAL
LEVEL**

The role of natural resource management at the regional level is to (1) provide leadership to parks; (2) provide assistance to parks, including expertise not available on park staffs; (3) provide a strategic and multi-park perspective; (4) integrate the efforts of parks in the region, defining multi-park needs and increasing the effectiveness of parks' capabilities; (5) provide service to the Regional Director; and (6) manage natural resource management programs at the regional level.

Leadership

Sets the direction for natural resource management in the region, leading a credible and effective program of natural resource management throughout the region. Initiates new policies and programs that will enhance natural resource stewardship in the region. Sets a tone of teamwork between parks and the regional office, and works with other divisions as well as other agencies to enhance the effectiveness of natural resource stewardship.

Assistance to Parks

Communicates park resource management issues and program and project needs to the Regional Director and the WASO Associate Director of Natural Resources. Helps secure staff and funding for parks to implement natural resource programs. Provides assistance to parks in developing resource management plans and programs. Aids parks in staying abreast of current concepts and techniques. Helps parks in locating sources of needed scientific information and natural resource management expertise. Provides expertise, not available on park staffs, to aid in addressing specific resource issues. Works closely with the parks, the regional chief scientist, the National Biological Survey, and others to facilitate research and to incorporate research needs into resource management planning. Provides training and professional development for park staff. Establishes standards for park resource management programs, and conducts periodic program reviews. Provides guidance in preparation, reviews, and makes recommendations for approval of resource management plans, action plans, and complex or controversial environmental assessments and environmental impact statements. Maintains contact with scientists at universities, and with scientists and resource management personnel of other agencies, particularly those involved in activities relevant to multi-park resource issues in the region.

***Strategic and
Multi-Park
Perspective***

Formulates long-term strategies, from a regional perspective, incorporating consideration for long-term trends likely to affect parks' natural resources and natural resource programs. Identifies multi-park needs and develops strategies for funding, mitigation, policies, and other actions to address them. Reviews, compiles, and prioritizes staff and funding requests from parks. Reviews and initiates regulations related to natural resource issues such as mining, grazing, and consumptive uses. Reviews other agencies' plans, compliance documents,

and proposals for new policies and programs that could affect park resources and resource programs in the region.

***Multi-Park
Coordination***

Maintains awareness of parks' resource issues. Defines needs shared by multiple parks, and works with parks in developing cost-effective ways to address them. Identifies other opportunities for cost-effectiveness, such as sharing staff expertise among parks. Identifies situations in which decisions and activities in one park may set a precedent for others. Serves as a clearinghouse concerning natural resource management and related activities, among parks within the region, as well as those of other regions, the Washington Office, and other agencies relevant to park issues.

***Service to the
Regional Director***

Is the key source of natural resource information for the Regional Director. Incorporates park specific information, as well as state-of-the-art scientific concepts and a multi-park and strategic perspective, in providing briefings and making recommendations to the Regional Director on complex and controversial natural resource issues. Represents the Regional Director on working groups involving other regions, the Washington Office, and other agencies and organizations. Maintains data, including GIS database, that will aid the Regional Director in decision making.

***Program
Management***

Prepares region-wide cooperative agreements, memoranda of understanding, and other documents to aid the parks in carrying out an effective natural resource management program. Prepares and submits annual reports on natural resource management activities throughout the region. Provides oversight on funding disseminated to the parks for natural resource projects, professional development, and other activities. Supervises other natural resource management staff, including organization of workload and position management.

**NATURAL
RESOURCE
MANAGERS—
WASHINGTON
OFFICE LEVEL**

The role of natural resource management at the Washington Office level is to provide Servicewide leadership in the conservation of park resources, developing and implementing Servicewide strategies and programs, providing multi-regional coordination and assistance, and working to secure the staff and funding necessary for the field to effectively carry out their responsibilities.

Leadership

Establishes and effectively leads a credible natural resource management program Servicewide. Sets a tone of teamwork between parks, regional offices, and the Washington Office, as well as teamwork among Washington Office divisions, and works with other agencies and organizations to enhance the effectiveness of natural resource stewardship.

***Assistance to
Parks and Regions***

Works to secure staff and funding for the field to implement natural resource programs. Helps field areas in locating sources of needed expertise, and provides specialized expertise when the need does not warrant staffing in each region. Establishes standards for resource management programs, develops guidelines, and conducts periodic program reviews. Provides training and professional development to meet Servicewide needs.

***Strategic and
Servicewide
Perspective***

Defines long-term Servicewide strategies, incorporating consideration for long-term trends likely to affect parks' natural resources and natural resource programs. Defines Servicewide needs, and develops strategies for funding, mitigation, policies, and other actions to address them. Reviews, compiles, and prioritizes staff and funding requests from the field. Reviews the plans, compliance documents, and proposals for new policies and programs of other agencies with the potential to affect park resources and resource programs in the Service.

***Servicewide
Programs and
Policies***

Initiates new policies and programs that will enhance stewardship of natural resources throughout the Service. Works closely with the Senior Scientist, the National Biological Survey, and others to ensure that research programs are responsive to field resource management needs. Works with other agencies, professional societies, non-governmental organizations on a national level in developing new initiatives to meet park needs, provides for periodic review of regulations and pursues changes necessary to provide increased protection when warranted.

***Multi-Region
Coordination***

Provides leadership and coordination on multi-regional programs such as endangered species, integrated pest management, and the publications program. Serves as a clearinghouse concerning natural resource management and related activities among regions, the Washington Office, and other agencies relevant to major natural resource issues.

***Service to the
Director***

Is the key source of natural resource information for the Director. Incorporates park specific information, as well as state-of-the-art scientific concepts and a Servicewide and strategic perspective, when providing briefings and making recommendations to the Director on complex and controversial natural resource issues. Represents the Director in Congressional hearings and on working groups involving other agencies and organizations. Maintains data, including GIS database and program data, that will aid the Director in decision-making.

***Program
Management***

Prepares Servicewide cooperative agreements, memoranda of understanding, and other documents to aid the parks in carrying out an effective natural resource management program. Compiles annual reports on natural resource management activities throughout the Service. Provides oversight on natural resource funding disseminated to the parks and regions for natural resource projects, professional development, and other activities.

**CHIEF
SCIENTISTS—
REGIONAL
LEVEL**

The regional chief scientist is responsible for the development and overall quality control and direction of the research program carried out within the region. S/he maintains a vision of the needs for scientific information critical to park management, as well as broad regional and eco-regional needs, and facilitates the acquisition of that information. The regional chief scientists is responsible for establishing a sound working relationship with the research community and ensuring high standards for park research, including but not limited to the process of peer review.

Ensures that research needs are addressed in park resource management plans, and develops and implements strategies to meet those needs. Identifies research projects of a multi-park, inter-regional, or bio-regional scope. Ensures that research proposals are of high quality, efficient, effective, and achievable, and that research is carried out according to approved proposals. Works closely with park and regional natural resource managers to ensure that research projects are carried out in response to identified needs and are effective in meeting those needs. Assists the park in overseeing research by National Biological Survey scientists and others. Works with natural resource managers in coordinating peer review of research proposals and final reports.

The regional chief scientist serves as the principle liaison for the region with the National Biological Survey. Represents the parks' needs, and establishes and carries out an effective liaison process that ensures, to the greatest degree possible, that park biological research priorities are met. S/he works closely with counterparts in the Washington Office.

The regional chief scientist works cooperatively with the Regional Chief of Resource Management in the coordination with other agencies to identify and capitalize on opportunities for cooperative research. S/he develops and monitors cooperative and inter-agency agreements for research. The regional chief scientist and the Regional Chief of Resource Management work together to ensure that scientific information is transferred to the parks in a form that is useful and relevant to management.

The regional chief scientist prepares the annual research budget submissions for Washington Office sources of funding and special requests for research budget information.

**SENIOR
SCIENTIST—
WASHINGTON
OFFICE LEVEL**

The WASO Chief of Research is responsible for the overall quality of the research program carried out within the National Park Service. S/he understands and maintains a vision of the needs for credible scientific information critical to park management on a Servicewide or bio-regional level, and provides leadership in ensuring acquisition of that information. S/he may represent the Director at research meetings or at Congressional hearings requiring the presentation of research data.

Works with the Chief of Natural Resource Management to ensure that research information is available for park programs, resource management, planning, compliance, and development. Works closely with the Chief of Natural Resource Management to develop a national National Park Service research program plan that outlines both small- and large-scale research needs at national, ecosystem, and park-specific levels; in formulating budget initiatives for Servicewide programs; and in securing staff and funding to meet the needs of the field. Works cooperatively with the Chief of Natural Resource Management in coordination with other agencies—particularly the National Biological Survey—to identify and capitalize on opportunities for cooperative research.

Serves as the principal liaison for the Service with the National Biological Survey. Works closely with the National Biological Survey to ensure, to the greatest extent possible, that National Park Service research priorities are met, either by the National Biological Survey or through universities or other agencies.

Reviews research project proposals that address national or global issues for quality, credibility, efficiency, effectiveness, and achievability. Arranges for peer review of research proposals or publication products when needed to ensure quality control.

Works with the Associate Director and the Director to develop and administer a competitive grants program for Science in the National Parks; serves as liaison with the National Park Service Science Advisory Subcommittee of the Secretary's Advisory Board; and is responsible for helping the Director establish a mechanism to track National Park Service investment in the National Biological Survey.

S/he maintains credibility with the research community and establishes high standards for research which are applied Servicewide. Provides review and recommendations on the overall National Park Service science program with input from regional chief scientists, and may convene *ad hoc* committees to assist in this process.

OTHER DIVISIONS

Effective stewardship of park resources requires the involvement of all divisions, bringing their diverse talents and expertise to bear in working toward shared objectives. There are many opportunities for personnel of all divisions to participate in resource stewardship. Working in concert with the park's resource management staff, their efforts can result in a highly effective program of resource stewardship.

It is important that all field employees develop a "qualitative" sense of the resources. Sensitivity to the resource and to perceived threats, and prompt reporting to the resource management staff, is an essential tool in the park-wide program of resource stewardship. Often the field ranger, interpreter, or maintenance worker will notice a change, such as lower stream water flow or the presence of sick animals, that might otherwise go unnoticed. These observations become the early warning system, triggering investigation by the resource management staff.

It is imperative that all employees, and their supervisors, make a commitment commensurate with their resource stewardship capabilities and responsibilities. This includes a commitment of the time necessary to do the job, as well as time for any requisite training and refreshers.

Interpretation

The most serious threats to resource integrity are usually directly related to the activity of people. By conveying information to park visitors about the impacts they may inadvertently cause, interpretation is instrumental in preventing resource impacts. Interpretation and education programs are important in building public understanding of critical park issues and parks' resource stewardship programs. Outreach is important in conveying to the American public the value of park resources.

The National Park Service must continue to build a proactive natural resource interpretation and education program. Halting or controlling human activities that damage park resources depends on the will of the public to do so. In the long term, the effective education of the American people about the necessity to protect the environment and the relationship of the national parks to the regional ecosystem should be our highest priority. Failure to accomplish this

task will place the Service in the never ending role of enacting and enforcing controversial protection strategies, mitigating threats, and repairing resource damage. We will never get ahead of the damage curve.

The natural resource staff in parks must work closely with the interpretation division to provide the most current information about resources, threats, and needed corrective actions.

Resource Protection

Protection rangers have a vital role in the direct protection of park resources through the enforcement of laws and regulations and the management of human activities. Management of visitor use—whether through management of wilderness use, control of artificial food sources in bear habitat, or fishing regulations that target exotic fish species—is a critical component of resource protection. Development of new regulations, and refinement of existing ones, as well as the *Compendium of Superintendent's Orders*, are vital tools for the protection of park resources.

Rangers have primary responsibility for developing and implementing visitor use management plans, such as climbing management plans. Rangers also oversee backcountry permit systems and often special use permits and other permit systems which can be used as tools for resource protection. Effective implementation of these programs requires understanding of the effects of human activities on cultural and natural resources and ecological processes, the concept of limits of acceptable change (LAC) in resource conditions and visitor experiences, sociological issues related to visitor use management and resource protection, and options for managing visitor use patterns and resource impacts. Rangers should have a knowledge of these fields to work with resource managers in identifying research needs and develop the most effective applications of these principles to visitor use management.

Rangers may also be involved in the implementation of programs for specific portions of action plans, such as fisheries and exotic species management plans, that have been developed primarily by resource managers. For this to be successful, it is imperative that the protection staff make a commitment to the time requirements involved.

Rangers should continue to provide the leadership and direction for forest fire prevention and suppression programs in cooperation with the National Interagency Fire Center. Fire management plans should be prepared in consultation with natural resource managers who can provide needed information on ecological effects of fire in specific park environments.

Maintenance

The park maintenance division should be involved in the preparation and review of resource management plans that may affect maintenance operations. A good maintenance program is imperative for preventing and limiting resource impacts. For example, maintaining drainage structures on trails can not only keep the trail from washing out, but will also reduce the likelihood that visitors will walk off the trail to go around wet spots. Properly scheduled mowing can favor native grasses and protect ground-nesting birds. Diligent use of integrated pest management principles can prevent outbreaks of pests and, when they occur, use an approach to treat them that is most effective and environmentally sound and least hazardous to people. Maintenance staff may assist in carrying out resource mitigation and restoration activities such as planting vegetation, restoring original landforms, and eliminating exotic species.

Administration

The park administration division provides direct assistance to resource management budget tracking, personnel management, and procurement. Administrative staff assist resource managers in developing sound budget requests for the various funding sources, ensuring that requests are adequate to cover all expected costs for vehicles, personnel, travel, and other support. Administrative staff assist with classification and organizational issues, help ensure that recruitment efforts will yield well qualified applications, and otherwise provide professional administrative oversight for the resource management operation.

Planning and Design

Incorporating an understanding of ecosystem processes into park planning and facility design is essential to the National Park Service responsibility to be leaders in environmental stewardship. Designing in harmony with the environment can eliminate unnecessary impacts caused by the National Park Service. Scheduling natural resource inventories, and recognizing secondary and cumulative effects, are imperative. For example, sound planning and design can minimize not only the direct impacts of development on wildlife, but also limit indirect impacts on the other species and ecological processes with which they are inextricably linked. Recognizing the patterns of subsurface water flow can ensure that a new or redesigned road does not disrupt the flow, and result in a flooded area on one side of the road and desiccation on the other side. Good design can minimize future needs for energy consumption. Many other aspects of sustainability are only now being explored.

■ ORGANIZATION

The organization of human resources in the work place has been studied extensively. Over the past decade, dozens of books have been written that provide insight into how organizations function. One common conclusion is that organizational structure is an important element in achieving excellence. Organizational structure can either enhance the ability of people to work together effectively, or it can contain artificial roadblocks to success. The combination of well-trained and skilled employees, properly classified and arranged in a well-designed organizational structure that is nurtured and led by effective supervisors, is a winning combination.

There are several organizational philosophies. All weave together certain common threads. These threads form the basis for most modern organizational theory and practice. The format of the organization described here is based on principles common to these philosophies.

1. The organizational structure should group activities together that require similar worker skills and knowledge. These functional units have a necessary critical mass so that individual members can interact. The synergism produced in such a work group achieves results far greater than if the individuals were working alone. The force of these groups can then be focused on achieving excellence in their given field of work.
2. The organizational structure should avoid unnecessary layers, foster good communication both between divisions and up and down the structure, and be as consistent as possible between units. In this case, the units are the Washington Office, the regions, and the parks.
3. Organizational divisions should be distinctive, the roles and functions clearly defined and understood.
4. The organization should be structured and should function so that employees are empowered to make decisions at the lowest levels possible.

There is a well-founded viewpoint that it is the people in an organization that make it work, not the structure. However, good staff will produce even greater works when all of their attention can be given to the mission, rather than having part of their energy distracted by the task of developing strategies to overcome organizational quagmires. Good organizational structure should *enhance* the capabilities of the staff.

The NPS organization should continue to be structured in the three layers that currently exist: the Washington Office, the regional offices, and the park units. Although there is justification for some variance in organizational structure in the regions and parks, there is also a compelling need for a minimum level of consistency. (The following flowcharts indicate recommended organization at Washington Office, region, and park levels.)

**WASHINGTON
OFFICE**

Associate Director, Natural Resources

Office of the Senior Scientist

National Programs Office

Administrative Support

Assistant Director,
Natural Resource Management

Special
Designations
Office

Inventory &
Monitoring
Office

Air Resource
Management
Division

Water Resource
Management
Division

Biological
Resource
Management
Division

Earth Resource
Management
Division

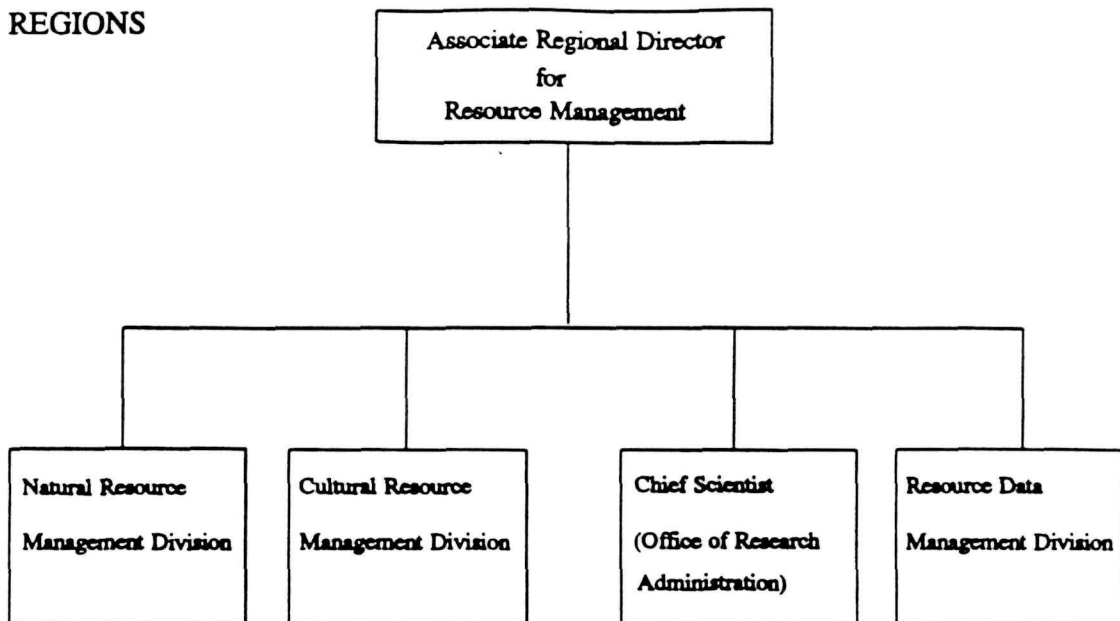
Assistant Director, Natural
Resource Data & Information

Data &
Information
Management
Division

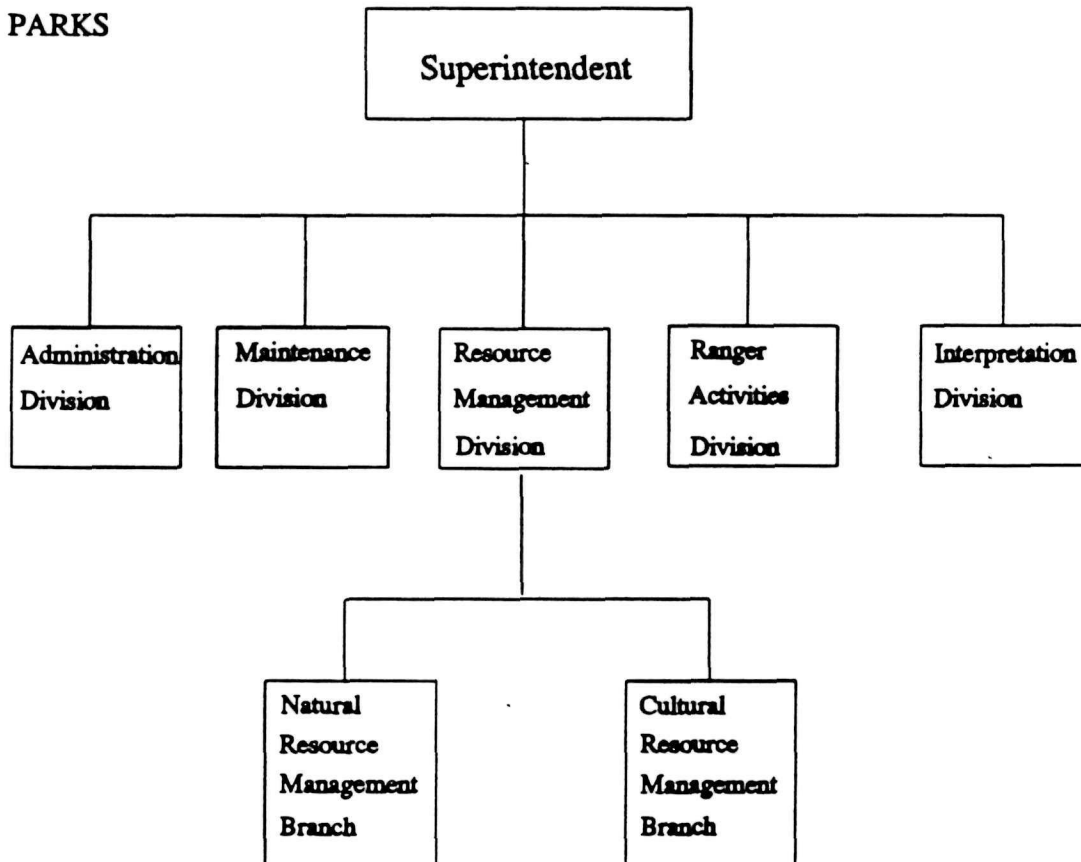
Applications
Development
& Operations
Division

Publications
Division

REGIONS



PARKS



The organizational structure should reflect the prominence of resource stewardship in the mission of the National Park Service. Natural resource expertise must be found, at increasing levels of competence, as high into the organizational structure as possible in order to provide effective leadership, program direction, and quality control. At a minimum, each regional office should have a Natural Resource Management Division whose chief reports to an appropriate Associate Regional Director. Division status gives natural resource management a "voice at the table" that is not otherwise possible.

The organization should also be structured to enhance integration of natural and cultural resource management. It would be beneficial for cultural resource management to be organized in a fashion similar to natural resources.

■ POSITION MANAGEMENT

At present, most National Park Service natural resource positions are classified as GS-401 General Biologists. Because this series does not require knowledge in any specific field, recruitment for positions classified in this series usually results in a register of eligibles with a wide variety of knowledge, skills, and abilities (KSAs). Although the ranking and rating process used by the selecting official should consider the applicant's response to the specific job KSAs, the register will likely include applicants with general rather than specific knowledge of key subject matter areas. This practice tends to result in a natural resource staff that knows a little about a wide variety of subjects. This strategy is often driven by a management perception that this allows for more program flexibility, something that has been viewed as desirable. Whether this trend truly increases flexibility is arguable. What we have learned is that such a policy based on flexibility and general knowledge falls short of the degree of depth and excellence required of our resource management programs. As a consequence, National Park Service natural resource managers often find themselves at a disadvantage when interacting with their peers in other agencies, or in defending an National Park Service position in the public arena.

This lack of agency depth in the resource management program has often resulted in an inappropriate reliance by superintendents on research staff to resolve management issues. Now that the biological resources research staff of the National Park Service is being transferred to the National Biological Survey, the need to deepen the level of expertise in the National Park Service is an even more urgent priority.

This does not **refute** the idea that resource managers in less complex parks often need to work in several resource fields. **What** it does point out is that it will be more effective to identify the primary professional discipline **needed** to address the key issues in each park, and classify and recruit for a high level of knowledge in **that** discipline. College graduates with an advanced degree focusing on one discipline also have significant knowledge of other natural resource subjects that will be adequate to address a wide variety of resource issues, particularly with assistance of experts on the regional office staff.

The first step in the process of changing to a position management policy focused on achieving quality through staff diversification is to evaluate the natural resource management staffing needs of the parks and regions. Assessment of the workload associated with key issues should be done through a process

such as the Resource Management Assessment Program (RMAP). RMAP is being developed, for Servicewide application, to objectively estimate each park's natural resource management workload. Elements of natural resource management programs, as identified in RMAP, are shown in Table 1 (following page). The RMAP process uses information on park resources and related factors to assess the FTEs of workload and associated recurrent funding needs for each element of a park's natural resource program. For each natural resource program element, the assessment uses a small number of factors as indicators of the workload, which could be carried out by permanent employees, seasonal employees, contract, or other means. *It is recommended that an initiative be developed, using results generated by RMAP, and advanced to provide the base funding necessary to carry out natural resource programs with the degree of professionalism necessary for effective stewardship of park resources.*

The KSAs for staff required to successfully address these issues must then be identified. The scope and difficulty of the issues of each park will determine the level of specialization necessary to achieve a quality natural resource management program. The full range of OPM series should be used to properly classify positions, with a focus on the most critical KSAs of each position.

In smaller units, the group of KSAs needed to achieve excellence in a few of the park's most critical long-term issues should be identified. An example for a small unit might be a historical park with a mix of resource issues, but whose most serious on-going issue focuses on managing vegetation to maintain the historic landscape. In this case, the top-priority position for the park might be a GS-430 Botanist, with an emphasis on plant ecology. The position description should include other duties that require knowledge of water quality, wildlife ecology, pest management and other topics, but the depth of knowledge required in these areas is less intense.

In the complex natural resource management organizations frequently needed in large parks, this classification policy will result in a division made up of program area specialists classified as terrestrial and aquatic ecologists, botanists, wildlife and fisheries biologists, geologists, hydrologists, paleontologists, and other positions that function as program managers for these primary issue areas.

One of the benefits of this policy will be an enhanced ability to recruit and retain the brightest and best of the applicant pool by offering professional positions with competitive grades that have a well-defined career ladder. It is recommended that the primary entry-level grade for natural resource management positions be GS-5, 7, or 9 with a target full-performance level at GS-11 (see *Responsibilities* below and Appendix A).

Note: The organizational title "Natural Resource Specialist" is a relic from the days when all operational field employees ~~where~~ rangers and some rangers specialized in law enforcement, interpretation, or resource management. What has been developing during the past decade is a new career in the National Park Service, which is not a ranger or an interpreter. This direction of position management should be maintained and strengthened.

TABLE 1
Elements of park natural resource management programs, as
identified in the Resource Management Assessment Program.

<p>Vegetation management and monitoring</p> <ul style="list-style-type: none"> Terrestrial plants Aquatic plants Threatened and endangered plants Alien plants Reintroduction of extirpated plants Prescribed burning Range management Hazardous trees Consumptive use management Agricultural use management <p>Animal management/monitoring</p> <ul style="list-style-type: none"> Terrestrial animals Aquatic animals Threatened and endangered animals Alien animals Reintroduction of extirpated animals Bear management Fisheries management Consumptive use management Fencing <p>Other resource management/monitoring</p> <ul style="list-style-type: none"> Water resources Air quality Cave management Mining and minerals Geothermal resources Paleontological resources Rehabilitation Integrated pest management 	<p>Ecosystem management/monitoring</p> <p>Research</p> <ul style="list-style-type: none"> Terrestrial/aquatic plants T&E vegetation Alien vegetation Fire Terrestrial/aquatic animals T&E animals Alien animals Hydrology Air Paleontological Geological Social science Oversight <p>Other activities</p> <ul style="list-style-type: none"> Planning GIS/data management Natural history <p>Collections</p> <ul style="list-style-type: none"> Natural resource library collections <p>Resource protection</p> <ul style="list-style-type: none"> Control of poaching Backcountry/frontcountry patrol Wilderness/backcountry permitting Rock climbing management
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■ PROFESSIONALISM

A *professional* can be defined as one with experience and competence who engages in a pursuit, study, science, or sport as a profession rather than as a pastime. It involves the possession and use of a certain level of qualifications to carry out this pursuit, and effort to maintain those qualifications.

The fully functional, journeyman level for natural resource management is defined as GS-11. Professional natural resource management positions are graded from the journeyman GS-11 level to GM-15. Positions below GS-11, other than technician positions, should be clearly defined as developmental. Resource management responsibilities at the GS-5 to GS-9 level also may be incorporated as part of multi-disciplinary positions.

Management of natural resource management personnel should be based on the concept of *specialists* and *integrators*. Specialists include positions such as wildlife biologist, hydrologist, aquatic ecologist, and botanist. Integrators function to integrate the efforts of a number of specialists into a program based on an ecosystem approach. Integrators focus on the linkages among disciplines. It is also the function of integrators to recognize gaps, when specialists not on the park or office staff need to be consulted.

RESPONSIBILITIES OF RESOURCE MANAGERS

The progression of responsibilities, knowledge requirements, and measures of professional performance are shown in Appendix A.

Natural resource management at the journeyman GS-11 level requires a combination of technical knowledge as well as knowledge of the purposes and programs of the National Park Service. A resource management program manager at this level applies knowledge of current scientific concepts, synthesizing them into a comprehensive resource management plan and more detailed resource action plans. The GS-11 resource manager designs and supervises field work, adapting appropriate methods to specific park situations. Results of research, carried out at the park or reported in the scientific literature are critically analyzed for their application to park issues. An M.S. degree in a natural resource field provides the necessary theoretical foundation, problem-solving capability, and knowledge of scientific methods and ecological concepts. Training and on-the-job experience are also necessary to provide knowledge of National Park Service purposes, policies, and programs.

Natural resource managers at higher grades work with issues of greater complexity, for which policy guidance or scientific foundation may be lacking or unclear. The natural resource management division chief integrates work of specialists into a cohesive program, ensuring that they maintain and apply up-to-date knowledge of current concepts and state-of-the-art techniques. Complex long-term strategic approaches are formulated and implemented, and

progressively more innovation is needed with increasing grade. At higher grades, the employee's work becomes critical to the success of resource management programs throughout a region or across the Service. Awareness of the philosophical basis of natural resource management becomes increasingly important. Management and leadership ability are critical. Employees at the highest grades are viewed by others as leaders and as sources of information, solutions to complex problems, and innovative approaches to improve programs.

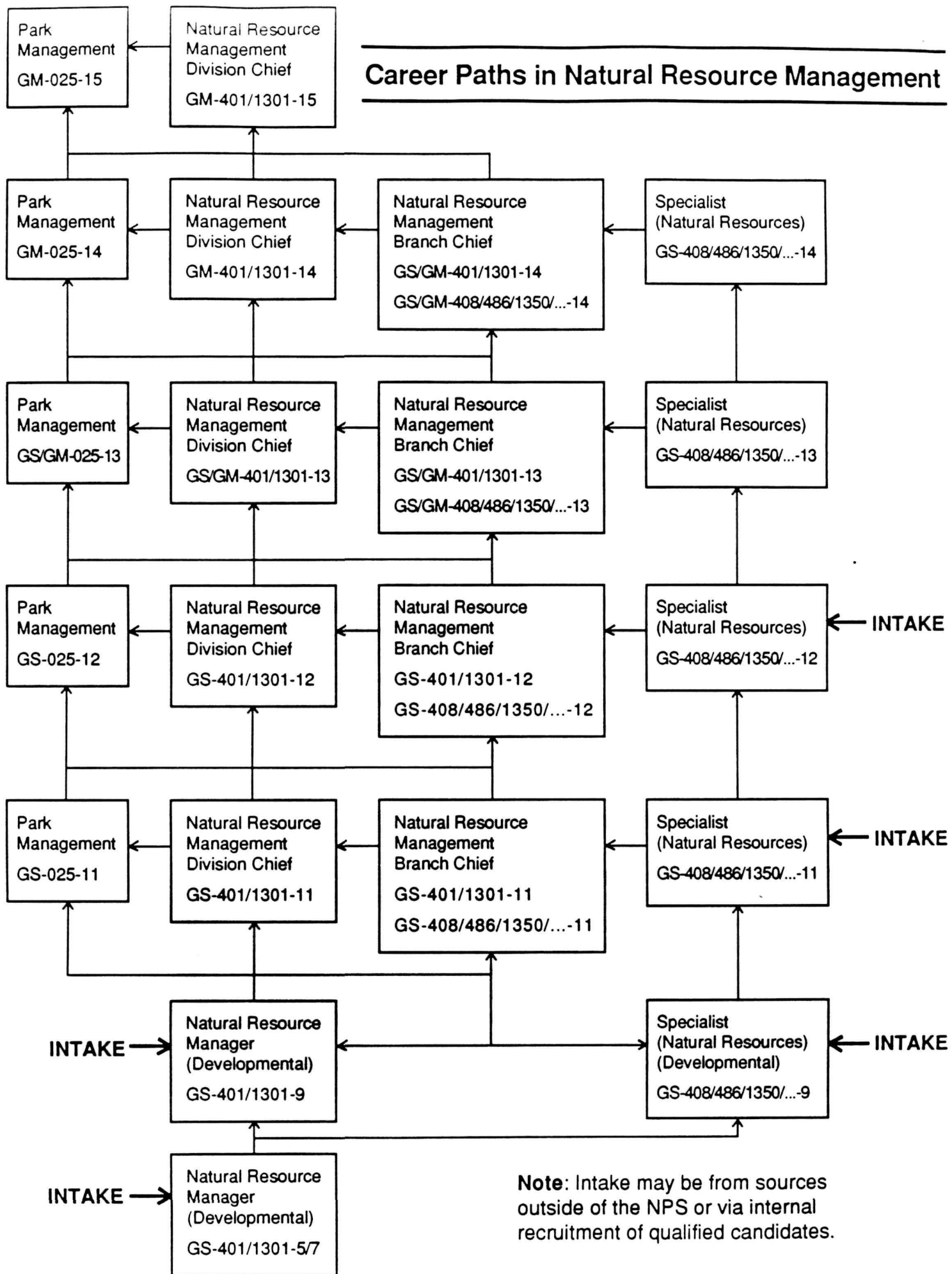
In contrast to the "integrator" positions described above, technical expertise is of utmost importance in "specialist" positions. Employees in specialist positions serve as critical sources of expertise for natural resource programs. Specialists carry out management-oriented studies in their areas of expertise and apply their expertise in developing action plans, recommendations for park management, and input into park plans, designs, and environmental assessments. Reports on findings are presented at scientific conferences and published in journals. With increasing grade, specialist positions involve issues of greater complexity and scope, and work is characterized by increasing innovation. An advanced degree is imperative, with a Ph.D. by the GS-13 level.

No single OPM job classification series applies directly to the natural resource management program manager position. GS-401 General Biologist is most commonly used, and graded by cross-referencing with other standards. Interdisciplinary position classifications are also possible. *To provide more guidance and enhance consistency in classifying and grading natural resource management program manager positions, it is recommended that boiler-plate position descriptions be developed and disseminated to supervisors and classifiers.*

■ CAREER LADDERS/CAREER MANAGEMENT

The flow chart on the following page illustrates the ideal career ladders and paths for all occupations with primary resource management responsibilities. Full-performance positions range in grade from GS-11 through GM-15. Positions at GS-5 through GS-9 are developmental positions, leading to the journeyman GS-11 level. The flowchart shows intake points for entry into a natural resource career. Intake points can occur at higher grades for specialist positions, where technical expertise, rather than a combination of technical expertise and management experience, is of paramount importance. Whenever possible, people who are recruited should already have the educational background that will be needed at their target grade and position. With increasing experience and training, employees can move up in grade or can make the transition from specialist to program management positions. Natural resource program management provides management experience and capability appropriate for a transition to park management positions.

Career Paths in Natural Resource Management



■ RECRUITMENT

The success of any agency or organization depends on its ability to continually improve the professional capability of its work force through the recruitment of highly knowledgeable and skilled employees. Current National Park Service recruitment practices for natural resource positions frequently result in very small lists of applicants who are frequently poorly matched with the most critical skill needs of the position. The National Park Service must recruit people with the highest level of knowledge possible. The agency should then build on this formal education through specialized training and developmental experiences. A high degree of scientific knowledge in specific subject matter areas is needed in the National Park Service today to meet the most critical natural resource demands of the parks and the Service.

An adequate pool of highly qualified candidates very interested in working for the National Park Service exists. Throughout the Service, however, there is a general lack of understanding of how to effectively use the OPM hiring authorities to recruit for vacancies. Natural resource management chiefs and their supervisors need recruitment and position management training to select and effectively use the recruitment method that best meets their needs. Well defined recruitment methods that include hiring authorities, advertisement, candidate targeting strategies, and vacancy announcement distribution should be developed.

Vacancies for all positions at GS-9 and below, and for some specialist positions at GS-11 and GS-12, should be announced through OPM "all source" announcements in order to attract the most qualified candidates available. (See intake levels in Career Path flowchart.) For vacancy announcements to reach the largest applicant pool, we must develop a method of notifying, in a timely manner, prospective candidates primarily located in other National Park Service areas, at universities, and in other agencies.

The goal of the recruitment program should be consistent recruitment of the most qualified candidates available for all vacancies. Care must be taken to consider the career opportunities of existing employees. However, the knowledge that all employees may be competing with non-agency candidates adds incentive for National Park Service employees to continue an aggressive program of self improvement. The National Park Service professional development program will also help facilitate such self improvement. All individuals who are in development-level natural resource management positions should have employee development plans that are designed to prepare the employee for his/her next career step. Regions should establish an active network concerning opportunities to advance through development levels and into journeyman-level positions.

Networking of the automated vacancy announcement system (AVADS) being adopted by the National Park Service with the existing INTERNET electronic communication system used by all universities and professional societies is critical. The interface with INTERNET could be managed on a regional basis, targeting universities in the region that have natural resource programs that meet current regional recruitment needs. The recruitment program should be structured to target universities and colleges with strong natural resource programs and cultural diversity in their student bodies. When a vacancy announcement for "all sources" recruitment is prepared, the regional personnel office will be able

automatically to send the announcement to all of the target universities and professional societies in their region. It should also be possible to use the INTERNET system to send vacancy announcements directly to other regions' INTERNET vacancy announcement system. The National Park Service should evaluate the INTERNET vacancy announcement system for the recruitment of rangers, interpreters, and administrative personnel. By using this automated system the National Park Service will be much more effective in recruiting highly qualified staff for entry-level and new natural positions.

Special effort must be made to diversify the cultural and ethnic backgrounds of the workforce. The methods given above should be used to increase the proportion of women in the workforce. However, these methods probably will not be effective in attracting qualified minority candidates, who are generally unaware of career opportunities in natural resources and in the National Park Service. To be successful in recruiting minorities, we must institute a "grow your own" approach. Through interpretive and outreach programs, minority groups can be made aware of the National Park Service and its natural resource career opportunities. The National Park Service also should develop a presence on selected campuses that have large minority populations, as the Service is doing at Haskell Indian Junior College. Outstanding students who are interested can be identified and enrolled as cooperative education students without competition. Candidates gain the academic background needed to be a professional in the Service while learning about park operations through on-the-job experience. A portion of all natural resource positions should be targeted for cooperative education agreements. Clear objectives should be defined and incorporated into each region's recruitment plan.

While some standard practices and protocols should be adopted at the Washington Office level, the specific elements of the Servicewide recruitment program would best be managed at the regional level to ensure maximum responsiveness to the parks. The development and initiation of this program, in concert with Personnel and EO divisions, is a key factor in the professional development strategy.

■ PROFESSIONAL DEVELOPMENT

TRAINING

Effective management of natural resources in the National Park System today requires a comprehensive training program that provides critically needed training not only for new entry-level resource professionals, but for mid-level, supervisory, and upper-level natural resource management personnel as well. The training portion of this professional development strategy includes the development of a basic training program for all professional natural resource positions and an advanced training program for supervisory and management positions. Although the focus of this strategy is for employees in the natural resource professional series positions, training must also be provided for park managers, park rangers, interpreters, and other employees whose primary duties are other than natural resource management.

***Natural Resource
Management
Academy***

An intensive four-week basic natural resource management training curriculum will be developed to replace the existing Natural Resource Management Trainee Program. The target group for this training will be National Park Service field personnel whose primary duties include professional-level natural resource management. *It is recommended that the four-week Natural Resource Management Academy be required training for all new professional natural resource management staff, regardless of classification series.*

The goal of the Natural Resource Management Academy will be to enhance the scholastic education of new employees with additional knowledge specific to the management of natural resource programs in the National Park Service. Although the curriculum will not include subject matter generally offered in university-level natural resource fields of study, the quality of training will be consistent with this level of study.

Tests will be prepared and administered for all curriculum modules. A minimum passing score of 80% will be required of all graduates of this academy. This battery of tests may be challenged by existing employees if an incumbent feels that s/he is already at the level of competency where this training is not needed. See Appendix B for a list of training topics and session objectives included in this curriculum.

***Advanced Natural
Resources Training
Courses***

Approximately fifteen to twenty 40-hour training courses will be developed. These courses will be offered according to an annual assessment of training needs identified through the EDP process, and will be funded by the Washington Office natural resources training account. *It is recommended that each natural resource employee be required to attend a minimum of one 40-hour advanced-level training course each year.*

The goal of these training courses is to provide specific advanced-level training in selected subject matter areas identified as needed Servicewide. As employees move from one park to another, they will often need additional advanced-level training to meet the specific needs of their new position. In other cases, employees encounter new threats to park resource integrity while in their current position, requiring the development of additional knowledge or skills in previously unfamiliar subjects. In these cases, additional formal training may be needed. These courses will also serve as refresher training, featuring the latest information and technology.

Credit will be given for these courses only if the student passes the course with a minimum passing test score of 80%. Additional courses may be taken by an employee at the benefitting park's expense. If similar training is

received elsewhere, the employee may challenge the test and receive credit. Refer to Appendix C for a list of suggested advanced-level training courses.

Some professional societies have professional certification programs. For example, the Society of American Foresters offers a "Continuing Forestry Education and Professional Development Recognition Program," which requires 150 contact hours of continuing education or professional development, distributed across certain subject categories, over a three-year period. *Employees in "specialist" positions should maintain certification, as available, by the society most relevant to their area of expertise.*

***Management/
Leadership
Development***

Few natural resource managers have received training above introductory levels in management and leadership. An affirmative program is needed to develop a cadre of upper-level managers who will become leaders in National Park Service natural resource management. The course should parallel the eleven-day course in "Management for Natural Resource Managers" offered by Pennsylvania State University.

Associated with this, it is recommended that each region make an affirmative effort to place their leading Chiefs of Natural Resource Management in "Acting" assignments when superintendentcies, assistant superintendentcies, and other management positions are vacant. Natural resource managers interested in management development should include such "acting" assignments in their employee development plans.

***Natural Resource
Stewardship for
Managers Workshop***

Superintendents and other managers have ultimate responsibility for maintaining the integrity of park resources. An understanding of current concepts, approaches, and philosophy of natural resource management is critical. Examples of topics on which up-to-date information is needed include approaches to landscape management across jurisdictions, conservation of rare ecosystems, and fundamental concepts of sustainability. *It is recommended that a 24-hour curriculum be developed each year, addressing state-of-the-art concepts in resource stewardship, and presented at a series of workshops attended by all superintendents, high-level natural resource program managers, and appropriate members of the Directorate and each Regional Directorate.*

***"Team Resource"
Training Course***

This course should be refined and offered as the basic introduction to natural resource management for non-resource management personnel. This course will satisfy the orientation requirement for such positions.

CONTINUING EDUCATION

It is generally recognized that the half-life of a college education is 7 to 10 years. In other words, half of what is learned in college is obsolete within that time. *It is recommended that a Servicewide continuing education program be developed that includes an advanced degree program and an education/training grant program.*

Advanced Degree Program

The National Park Service should develop an affirmative program to expedite the completion of advanced degree programs by employees who are in positions where a degree would contribute to professional-level performance. Such a program will help bring the professional caliber of National Park Service natural resource managers up to the needed level as quickly as possible. The goal of this program is to encourage and provide mechanisms for employees to return to school to obtain advanced degrees. To be successful, such a program should use Servicewide funding to minimize impact to the employee and the park. The program should be Servicewide in scope since extensive inter-regional coordination is essential. *A guideline for this program should be prepared and implemented as an integral part of the natural resource professional development program.*

Education/Grant Program

The goal of this program is to provide the most-cost effective mechanism to provide specifically targeted educational opportunities for all employees. This financial support will cover tuition, book, and transportation costs for university courses taken by employees as advanced training. This program would also be used to pay costs of training offered by other agencies. The grant program, operated at a level of \$40,000/year, would provide an average of thirty graduate-level courses per year for natural resource employees. This program would be particularly beneficial for providing training in subjects that are critical to only a limited number of employees. The program would be administered by the Washington Office, perhaps in conjunction with the Albright Fund. Prioritized grant applications would be received twice a year from the regional training coordinator. Grants will not be in cash but in the form of account expenditure authorizations. Employees will use existing procurement methods (such as purchase orders and travel authorizations) to pay for tuition, books, and travel.

PARTICIPATION IN PROFESSIONAL SOCIETIES

Active participation in professional societies by National Park Service employees, regardless of their specialty area, provides a wide variety of benefits to the Service. In the past the National Park Service has had a tendency to look only inward for new ideas and solutions to resource issues and management problems. The geographic isolation of many park employees has been compounded by an inherent social isolation attributed to many

employees' nearly religious dedication to the National Park Service mission. While this "green blood" mentality often resulted in a cohesive work force rich in camaraderie, it has proven to be an "Achilles heel" in our ability to adapt to rapidly evolving technology, scientific information, environmental and political conditions, and management concepts. Natural resource employees, in particular, need to mix with other professionals in their field. Benefits of participation in professional scientific conferences and workshops include:

- Providing exposure to new information and ideas, which may take considerable time to be published in journals.
- Exposure of natural resource managers to leading scientists and resource management personnel of other agencies, universities, and organizations involved in activities relevant to park resource issues.
- Developing contacts with people who are actively working in the field, with many key people in one place at the same time.
- Providing an opportunity for informal consultation and feedback concerning park issues.
- Representing the National Park Service and building credibility in the scientific community and with other agencies.
- Building understanding of the National Park Service by others, and increasing their awareness of opportunities to do work in parks and contribute to stewardship of park resources.

Natural resource employees should be strongly encouraged to actively participate in professional societies, including participation at meetings, publishing in journals, and holding office. Whenever possible, attendance at meetings of professional societies should be viewed as a type of training, the costs of which should be born by the agency. This involvement in the greater professional world should include participation in international as well as domestic activities. The classification of professional employees in the full range of OPM series will give the agency representation in most of the applied science organizations, such as the Society of American Foresters, the Ecological Society of America, the American Fisheries Society, and the Society for Conservation Biology, and the even more management-oriented organizations such as the Natural Areas Society, thereby greatly enhancing the image of the National Park Service as a truly professional natural resource management agency.

■ PERFORMANCE MANAGEMENT

Sample performance standards relating to different levels of responsibility can be found in Appendix D.

Natural resource managers must actively work to maintain their qualifications.

Acceptable performance is the responsibility of both the employee and the supervisor. In addition to ensuring that natural resource management personnel have the opportunity to maintain their professional expertise, supervisors are responsible for providing the support necessary to carry out their work in a professional manner.

A fundamental requirement for professional resource managers is ready access to journals and to library services. Access to library services should be facilitated by each regional office and the larger parks. This activity should include:

- Dissemination of Tables of Contents from current journals.
- Obtaining copies of scientific articles.
- Inter-library loan services.
- Literature searches.
- Access to agency publications, including reports by the Forest Service, Fish and Wildlife Service, and Army Corps of Engineers.

PERFORMANCE STANDARDS

It is often difficult for non-technical supervisors to evaluate the performance of subordinates in highly technical positions such as natural resource management. To provide assistance sample performance standards designed to foster professional performance are provided in Appendix D.

APPENDIX A

Outline of Responsibilities

The progression of natural resource management responsibilities, knowledge requirements, and general measures of performance are shown below. This outline is not intended to cover all natural resource management positions, but rather to provide enough guidance that the location of any position within this framework will be clear. It is intended to aid supervisors in defining responsibilities appropriate to each grade level, and thereby aid in workload and position management. Clear definition of the level of responsibility is essential to ensuring that the responsible employee is provided with the professional development and support necessary to carry a high quality program.

Management of natural resource management personnel should be based on the concept of *specialists* and *integrators*. Specialists include positions such as wildlife biologist, hydrologist, aquatic ecologist, and botanist. Integrators function to integrate the efforts of a number of specialists into a program based on an ecosystem approach. Integrators focus on the linkages among disciplines. It is also the function of integrators to recognize gaps, when specialists not on the park or office staff need to be consulted.

Educational and training levels given below are in addition to those required by the OPM X-118; they are desired levels that will help ensure a professional level of performance and are intended to provide guidance in developing KSAs and in recruiting and selection. It is recognized that, to some extent, experience can substitute for education; however, the foundation of knowledge and skills provided by experience is not equivalent to that provided by education.

The educational and training levels shown below also will be used in determining needs for professional development in natural resources.

The fully functional journeyman level for natural resource management is defined as GS-11. Positions below that level, other than technical positions, should be clearly defined as developmental. Discussion of responsibilities at the GS-5 to GS-9 levels is also intended to provide guidance in classifying the natural resource management responsibilities that may be carried out as part of a multi-disciplinary position.

GS-5

Natural Resource Management

This may be a full-time technician position or the entry level for a multi-graded developmental professional position. These natural resource management responsibilities also may be part of a multi-disciplinary position.

Typical work for a person in this position involves following a plan that someone else developed. The person is responsible for learning and performing the work. Protocols do not involve decision-making. If additional information is needed, the employee consults with the supervisor and other park staff.

The supervisor provides close technical supervision.

Education should be at least a B.S. degree in a natural resource field. If this is a developmental position, the employee should have the educational background needed for the target level of work. Training necessary for this work may last from less than a day to a few weeks.

Performance is evaluated based on completion of the task to specified standards, with information recorded accurately, completely, and in a usable manner.

**GS-7
Natural Resource
Management**

This may be a technician position or the entry level for a multi-graded developmental professional position. These natural resource management responsibilities also may be part of a multi-disciplinary position.

As at the GS-7 level, a person in this position follows a plan that someone else developed. However, the protocols allow some decision-making and judgment. Intensive involvement in the work is necessary to develop the judgment needed. If additional information is needed, the employee consults with supervisor and other park staff.

Technical supervision is provided through regular spot-checking by the supervisor.

Education should be at least a B.S. degree in a natural resource field. If this is a developmental position, the employee should have the educational background needed for the target level of work. Several weeks of training is also required. Knowledge of quality assurance protocols is critical.

Performance is evaluated based on completion of the task, with evidence of good judgment, consistency and precision among employees, and low error rate in measurements and record-keeping.

**GS-9
Natural Resource
Management
("Integrator")**

This may be a developmental or "operating level" natural resource management position, or it may be the entry level or developmental level of a multi-graded position whose target is journeyman level or above.

A person in this position develops simple resource management plans with input from others; uses manuals and procedures developed elsewhere, with very limited modification; independently carries out natural resource field work; and develops databases, analyzes data, interprets the data, and writes reports on the results.

This person relies on expertise of professionals in the regional office, and consults with higher level National Park Service natural resource managers in the regional office or other parks and occasionally with outside experts.

Technical supervision is provided through occasional spot checking by a journeyman or higher level natural resource manager.

Education should be at least a B.S. degree in a natural resource field. If this is a developmental position, the employee should have the educational background needed for the target level of work. Training should include the core natural resource management course, which includes National Park Service mandates, laws and regulations, policies, and programs (see *Professional Development* section of text).

Performance is evaluated based on incorporation of basic ecological and scientific principles, and consistency of plans and actions with National Park Service policies.

GS-9 Specialist

This is an entry level specialist, such as a wildlife biologist, botanist, or range specialist, who works in a small to medium-size park.

A person in this position develops simple field action plans within a relatively narrow specialty; uses manuals and procedures developed elsewhere, with very limited modification; independently carries out natural resource field work; develops databases; analyzes and interprets data; and prepares reports on the results.

This person relies on program direction and standards from the supervisor, and higher graded subject matter experts in the regional office, and outside the agency. Technical information is obtained from journals and other reference material.

Education should be at M.S. degree in the specialty area of the position. Training should include the core natural resource management course, which includes National Park Service mandates, laws and regulations, policies, and programs.

Performance is evaluated based on incorporation of basic ecological and scientific principles, and consistency of plans and actions with National Park Service policies.

**GS-11
Division Chief
("Integrator")**

This is the basic journeyman natural resource manager. This position may be the Chief of Natural Resource Management at a small park, and may supervise several permanent and seasonal positions.

A person in this position develops and updates the park resource management plan and other plans, and initiates new programs; synthesizes scientific information from a number of sources in developing plans and programs; critically analyzes research results for management implications; adapts appropriate methods to park situations; designs and supervises field work; and represents the park in developing joint programs with other agencies. Manuals and procedures appropriate to given situations do not always exist.

If additional technical information is needed, the employee consults scientific literature and scientists with expertise in relevant areas. The employee also consults with specialists and higher level natural resource managers in the regional office.

Education should be an M.S. degree in a natural resource field. In addition to the core course required at the GS-9 level, training and on-the-job experience are needed to provide more in-depth knowledge of National Park Service procedures and programs.

Performance is evaluated based on the employee's maintaining and applying knowledge of current scientific concepts, on problem solving capability, on use of state-of-the-art techniques in natural resource management, and through peer review of the program by higher level natural resource managers and possibly scientists.

**GS-11
Specialist**

This is a specialist, such as a wildlife biologist, aquatic ecologist, geologist, or hydrologist, who works for a higher-level natural resource management branch or division chief, usually at a medium to large park or in a regional office.

A person in this position prepares and implements action plans and applied management studies which draw on the employee's area of expertise; working with supervisor and regional staff, defines research needs, develops and/or reviews proposals, oversees research, and critically analyzes the management implications of research results; evaluates and synthesizes results from a number of studies in developing action plans, recommendations for park management, or input into park plans, designs, or environmental assessments.

If additional technical information is needed, consults scientific literature and scientists or other specialists with expertise in relevant areas.

Education should be an M.S. degree in area of expertise.

Performance is evaluated based on maintaining and applying knowledge of current scientific concepts.

**GS-12
Division Chief**

This position is typically a Chief of Natural Resource Management, supervising several permanent and seasonal employees, at a park of medium complexity.

In addition to responsibilities of the GS-11 level, the employee integrates the work of specialists into a cohesive program; provides leadership to the program and its personnel; identifies needs for new programs, and obtains staff and funding to implement them; works with superintendent to establish new park policies; and provides input into new regional policies and programs.

If additional technical information is needed, consults subordinate specialists, scientific literature, scientists, and counterparts in other parks, regions, and the Washington Office.

Education should be an M.S. degree in a natural resource field. In addition to training required at the GS-11 Division Chief level, training is needed in managerial skills.

Performance is evaluated based on leadership of an effective program in which employees maintain and apply current knowledge of scientific concepts and state-of-the-art techniques in natural resource management.

**GS-12
Branch Chief**

This position is chief of a branch focused on a specialty, such as wildlife biology, minerals management, or physical science, or a branch focused on a function, such as monitoring or compliance, in a division with a GS-13 Division Chief in a medium to large park or a regional office.

The employee is a specialist with expertise specific to the branch, as well as an integrator who integrates the work of a number of specialists into a cohesive effort.

If additional technical information is needed, the employee consults subordinate specialists, scientific literature, scientists, and counterparts in other parks, regions, and the Washington Office.

Education should be an M.S. degree in area of expertise. In addition to the core course required at the GS-9 level, training and on-the-job experience are needed to provide more in-depth knowledge of National Park Service procedures and programs. Training in managerial skills also is needed.

Performance is evaluated based on leadership of an effective program in which specialists maintain and apply current knowledge of scientific concepts and state-of-the-art techniques in natural resource management.

**GS-12
Specialist**

This is a specialist, such as a wildlife biologist, aquatic ecologist, geologist, or hydrologist, who works for a higher level natural resource management branch or division chief in a complex park, a regional office, or the Washington Office.

A person in this position prepares and implements action plans and applied-management studies which draw on the employee's area of expertise; defines research needs, develops and/or reviews proposals, oversees research, critically evaluates research results, and analyzes their implications for management; and evaluates and synthesizes results from a number of studies in developing action plans, recommendations for park management, or input into park plans, designs, or environmental assessments.

If additional technical information is needed, the employee consults scientific literature and scientists or other specialists with expertise in relevant areas.

Education should be at least an M.S. degree in area of expertise.

Performance is evaluated based on maintaining and applying knowledge of current scientific concepts and state-of-the-art techniques in natural resource management, and on quality of in-house publications.

**GS/GM-13
Division Chief**

This position is typically a Chief of moderately complex and/or broad programs, such as the Natural Resource Management Division in a park of medium to high complexity or a small region.

The employee develops and implements strategies to address complex issues; establishes new park or regional programs and direction; in consultation with the Superintendent or Regional Director, establishes new policies for unit (i.e., park or region); and provides input into policies and programs at the next higher level. In a region, serves as an advocate for the resource staff, working to secure the staff, funding, and information they need to effectively carry out their programs. In defining program direction, incorporates current concepts in science, philosophy, and ethics of natural resource management.

Education should be an M.S. degree in a natural resource field. In addition to training required at the GS-12 Division Chief level, greater management skill is needed, and additional training and on-the-job experience, to provide in-depth knowledge of National Park Service objectives, policies, and programs is critical.

Performance is evaluated based on management ability and on leadership of an effective program in which employees maintain and apply current knowledge of scientific concepts and advanced techniques in natural resource management. Is viewed by others as a source of information concerning new approaches or avenues to improve natural resource programs.

**GS-13
Specialist**

This position is similar to the GS-12 Specialist, but provides technical expertise for several complex parks, usually at the regional or Washington Office level. Even higher levels of needed expertise can warrant higher grades.

A person in this position prepares and implements action plans and applied management studies which draw on the employee's area of expertise; works with complex problems, for which there may be little or no precedent; defines research needs, develops and/or reviews proposals, oversees research, critically evaluates research results, and analyzes their implications for management; and evaluates and synthesizes results from a number of studies, which may often be contradictory, in developing action plans, recommendations for park management, or input into park plans, designs or environmental assessments. Work is characterized by innovation.

If additional technical information is needed, the employee consults scientific literature and scientists with expertise in relevant areas.

Education should be a Ph.D. in area of expertise.

Performance is evaluated based on well founded and effective innovation, including the innovative application of state-of-the-art scientific concepts or the effective resolution of conflicting data in complex natural resource management issues, and on quality of presentations at scientific conferences and in-house or journal publications.

**GM-14/15
Division Chief**

This position is typically the Chief of a highly complex and/or broad program, such as the Natural Resource Management Division in a medium to large region or the Washington Office.

The employee develops and implements strategies to address complex issues, involving a variety of interests and often conflicting factors; establishes new regional and Servicewide programs and direction, which are applied or used as models by others; establishes new policies and programs with broad scope and complexity; takes the lead in developing standards, such as for wildlife immobilization, and in obtaining funding or taking other steps to facilitate their implementation; and serves as an advocate for parks, working to secure the staff, funding, and information they need to effectively carry out their programs. In defining program direction, incorporates current and innovative concepts in science, and explores issues in the philosophy and ethics of natural resource management.

Education should be an M.S. degree in a natural resource field. In addition to training required at the GS-13 Division Chief level, greater management skill is needed, as well as more indepth knowledge of National Park Service and other agencies' objectives, policies, and programs.

Performance is evaluated based on management ability and on leadership, vision, and effectiveness in overseeing a program in which employees are leaders in innovation and application of complex scientific concepts and innovative techniques in natural resource management. Is viewed by others as a leader and a source of information concerning solutions to complex problems, as well as new approaches to improve natural resource programs.

APPENDIX B

Natural Resources Training Academy Curriculum Topics and Session Objectives

Natural Resource Policies and Guidelines

Introduce participants to National Park Service policies relative to natural resource management, including the history of policy formation and the relationship of policy to statutes, law, and regulation.

Discuss the development and use of National Park Service guidelines.

Illustrate how policy supports and is incorporated into the guiding principles and management philosophies of the National Park Service.

Illustrate various aspects of policy implementation in real life park situations with examples of controversial policy issues.

Role and Function of the National Park Service Organization

Introduce the organizational structure of the Department of the Interior, the National Park Service Directorate, and the role and function of the Washington Office administrative and technical support divisions, regional offices, Denver Service Center, Harpers Ferry Center, the two employee development centers, and the National Biological Survey.

Illustrate where various program areas are located in the hierarchy and emphasize the communication that must take place across division lines at all levels of the Service.

Discuss the process used to obtain services or information from the various centers and offices.

Discuss the evolving relationship of the resource management division's role and function to other park operations and the need for good communications and cooperation.

Introduction to Natural Resource Law and Regulations

Provide participants with a background of natural resource laws.

Explain the relationship of federal laws to regulations used to enforce laws and various agencies responsibilities.

Explain or indicate responsible steps for applying laws when resources are damaged or threatened.

Explain how laws were used in formulating *Management Policies* and *NPS-77, the Natural Resources Management Guideline*.

**The Management
and Supervision of
Field Operations**

Provide a thorough review of the information contained in NPS-77 as it relates to protection and management of natural resources.

Provide examples of the "tools" at the disposal of resource managers to monitor and manage natural resources.

Discuss the process of evaluating the condition of park resources, how to set operational priorities, and how to carry out basic field operations.

**Resource
Management
Planning**

Explain the levels and respective roles of planning in management of park resources.

Emphasize the importance of resource management plans in the management of natural and cultural resources.

Illustrate how ecological principles of conservation biology are included in resource management plans and specific resource action plans.

Explain the importance of resource management program planning versus project planning.

**Interagency
Coordination and
Public Relations**

Study the mission and policies of the other land managing agencies of the Departments of the Interior and Agriculture, and the Federal and state regulatory agencies.

Discuss the need for interagency and private sector involvement in National Park Service land management planning and decision making processes.

Discuss the relationship of the park's geographic location to the concept of ecosystem management.

Indicate the threats to park resources based on authorized activities occurring outside park boundaries or impacts of park management activities on adjoining landowners.

Demonstrate the importance of maintaining good public relations and effective communications with adjoining land owners despite the park's management objectives.

Environmental Law and Compliance

Explain the keystone laws as they relate to protection of natural resources, including NEPA, Section 106 of NHPA, Federal Water Pollution Control Act, Clean Air Act, E.O. 11990 Protection of Wetlands, Floodplain Management of 1977, Endangered Species Act of 1973, Federal Insecticide, Fungicide, and Rodenticide Act, etc.

Explain the relationship of the National Environment Policy Act (NEPA) as it relates to the park planning process and the management of natural resources.

Explain the process involved in applying NEPA steps in protecting resources outside park boundaries.

Provide examples of environmental and cultural compliance for day-to-day park operations as well as large development.

Indicate where compliance is necessary in addition to NEPA.

Natural Resource Program Administration

Demonstrate the importance of effective program development skills and the long-term benefits to the wise stewardship of natural resources.

Explain the steps involved with developing and managing a program budget and the budget cycle and process, and where resource management plans are involved in the budget process.

Explain the various fiscal management tools available to accomplish work such as cooperative agreements, purchase orders, contracts, interagency agreements, and the people to contact for help on the selection process. Also, where these tools are and are not appropriate.

**Incorporating
Cultural Resource
Issues into
Natural Resource
Management
Programs**

Illustrate the range of cultural resources within parks.

Explain or illustrate the relationship of cultural resource preservation to natural resource management.

Review the National Historic Preservation Act and the requirements of Section 106. Discuss the need and requirements of protecting cultural resources when engaged in natural resource management programs, and how the planning and compliance process can be integrated.

Discuss the organizational structure of National Park Service cultural resources management functions and the National Park Service relationship to the State Historic Preservation Officers.

**Human Use:
Impact Assessment/
Limits of Acceptable
Change (LAC)**

Define the role of social science in natural resource management.

Relate the affects on park management from visitor expectations and an increase in special use demands.

Describe how principles of social science are an integral function of park resource planning documents for the proper stewardship of park resources.

Explain the relationship of social science to other divisions or programs at the park.

Illustrate the importance of monitoring visitor activities and their impact on resources. Demonstrate how to use monitoring results to formulate management and mitigation activities.

APPENDIX C

Advanced Training Courses in Natural Resources Management for the National Park Service Professional Development Program

The following courses are recommended to be included in the natural resource management training component of the professional development strategy.

- Air Quality Management
- Managing Water Resources
- Applications of GIS in Natural Resource Programs
- Managing Mining and Mineral Resources
- Cave Management
- Restoration Ecology Seminar
- Managing for Natural Processes; Policy Analysis
- Monitoring Natural Resources
- Developing and Maintaining Natural Resource Inventories
- Advanced NEPA compliance; The EIS Process
- Arid Lands Management Seminar
- Marine/Coastal Resources Management
- Anthropological/Archeological Considerations in Natural Resource Planning and Management
- Managing **Wilderness** Resources
- Managing **Natural** Resources in a Regional Context (Ecosystem Management)
- Managing Complex Databases in the National Park Service
- Managing and Protecting Paleontological Resources

APPENDIX D

Sample Performance Standards

These performance standards are designed to foster professional performance of natural resource management responsibilities, and are intended to provide guidance to supervisors in developing standards specific to a given position.

The following are considered indicators of performance at an acceptable level.

SUPERINTENDENTS, REGIONAL DIRECTORS, AND OTHER MANAGERS

Inventory and monitoring program is maintained and has measurably increased knowledge of park resources.

Information resulting from inventory, monitoring, and research program is used in making park management and planning decisions.

Partnerships with adjacent landowners, local governments, other state and federal agencies, and legislative staff are initiated or maintained and contribute measurably to conserving the integrity of park ecosystems.

Reviews resource management issues and future and potential threats, and actively pursues funding and/or research strategies that lead to resolution and/or mitigation of the issue.

Reviews activities adjacent to or within a sphere of influence of the park, and provides comments on formal documents and plans that may affect park resources. Initiates response to potential threats by forming partnerships, collecting impact data, or, if necessary, proposing mitigation actions.

Natural resource staff have adequate support to maintain up-to-date knowledge of park resources through activities such as attendance at professional conferences and workshops, frequent contacts with the scientific community, advanced training, subscriptions to scientific journals, and ready access to library services.

The natural resource program is staffed and funded and personnel resources are managed in such a way that the full spectrum of significant resource issues are properly addressed by personnel with expertise appropriate to the issue. The result is protection of park resources and ecological processes from impairment.

Priorities for fiscal resources are based on the imminence and potential severity of resource threats, as well as strategic planning to anticipate future resource needs and, where possible, preclude impacts.

The park's resource management plan is up-to-date. Project statements address the full spectrum of resources, are scientifically well-founded, and are based on a coherent strategy targeted toward accomplishing defined resource objectives.

Research, inventory, and monitoring needs are anticipated, and work is undertaken, in advance of the need for information. Park management and planning decisions are founded on credible scientific information.

A tone of teamwork among divisions is fostered. All employees recognize the importance of their role in resource stewardship, and all work in concert to accomplish mutual resource stewardship objectives.

Interpretation, education, and outreach programs are implemented, and are effective in building public understanding of critical resource issues, including the overarching value of conserving ecosystems and biological diversity.

Visitor use is managed as the key means of protecting park ecosystems from impairment.

Park plans and facility designs incorporate in-depth information on natural resources and ecological processes, including secondary, indirect, and cumulative effects. Natural resource personnel are full members of planning teams and participate in the planning and design process from the earliest stages. Natural resource studies are programmed and carried out in a timely manner, so information is available for use in planning and design.

All projects that have potential for impact to park resources are fully evaluated through the compliance process of NEPA, NHPA, the Endangered Species Act, the Clean Air Act, and other laws designed to protect the resources and involve the public in park stewardship.

Maintenance programs are carried out in a manner that contributes to resource stewardship. For example, mowing is scheduled and carried out in a manner that protects native species and ecosystem processes. Pest management focuses on action to prevent pest problems and, when use of a biocide is necessary, National Park Service IPM procedures are consistently followed. Effort is made to protect wetlands and the groundwater flow on which they depend.

Conditions are attached to special use permits, commercial use licenses, concession contracts, film permits, and other instruments, with the specific intent of aiding resource stewardship. Incompatible activities are consistently denied or referred to adjacent areas that can withstand the effects.

Backcountry use is managed and maintenance is carried out in such a way that resource conditions are stable or improving. Resource conditions are monitored in a scientifically valid manner that yields credible data on conditions and trends throughout the park backcountry.

In park areas with designated wilderness or proposed wilderness, wilderness values such as solitude are preserved through a program of measurable objectives and monitoring.

Development and day-use are managed in such a way that the area of impact is not slowly spreading, but is contained within a given well-planned area. Impacts from development and day-use are mitigated through the use of native materials.

The condition of park resources, including the integrity of ecosystem processes, is documented and is steady or improving.

NATURAL RESOURCE MANAGERS

Resource management plan is based on clearly defined resource objectives and long-term strategies to work toward those objectives. Project statements are clearly tied to implementing the long-term strategies. Detailed action plans are developed for particularly complex issues. Action plans/project statements are based on valid ecological concepts and data, are consistent with National Park Service policies, address the full spectrum of resources, anticipate potential threats, and address the causes of impacts.

Relevant scientific literature is thoroughly reviewed, analyzed for its applicability, and synthesized to form the initial foundation for response to natural resource issues that arise.

The resource management plan, all resource action plans, and all research requests and proposals are based on a thorough review of current scientific knowledge on the topic.

In reviewing scientific literature, incumbent is consistently able to distinguish between valid factual information and value-based opinion.

Recognizes when other specialists need to be brought in to help resolve specific resource issues. When needed, arranges technical workshops to bring together experts in a variety of related disciplines to work on particularly complex resource problems.

Effectively involves other park programs, the regional office, and specialists from a variety of disciplines in developing strategies and project statements in the resource management plan and specific action plans.

The resource management plan is kept up-to-date in accordance with National Park Service guidelines.

Unfunded project needs and long-term program needs are accurately identified in the resource management plan.

Priorities are based on the imminence and potential severity of resource threats, as well as strategic planning to anticipate future resource needs and, where possible, preclude impacts. Works with the superintendent in formulating and implementing a strategy which is successful in meeting the highest-priority needs.

Maintains up-to-date knowledge of the most important current scientific findings and concepts relevant to the park's natural resources. This may be accomplished through regular review of literature, consultation with university scientists, attendance at scientific conferences and workshops, and other professional activities.

Attends refresher training in accordance with National Park Service standards, including at least one advanced-level training course and one professional conference per year.

Maintains up-to-date knowledge of laws, policies, and guidelines relevant to park resource issues.

Superintendent is consistently kept informed of most significant issues and new developments concerning park resources.

Provides technical advice and policy guidance to the superintendent on all issues related to the park's natural resources. Briefings and analyses of resource issues are provided to aid the superintendent in decision-making. These documents are based on current scientific information and ecological concepts, as well as sound judgment based on incumbent's expertise.

Incumbent's advice to the superintendent includes consideration of National Park Service policies and mandates, scientific information, the political environment, and other management considerations. Advice is usually technically well-founded, feasible, and consistent with National Park Service policies, standards, and regulations, and results in clear benefit to park resources.

Participates in development of regional programs and policies concerning natural resource management, providing input concerning park needs that results in benefit to all parks.

Mitigation activities are carried out as experimental management, conducted in accordance with well-founded plans that define objectives, scientifically based methods, involvement of other park programs, expected results, and follow-up monitoring.

Uses state-of-the-art techniques in efforts to reverse impacts, restore degraded resources, and reestablish natural ecosystem processes. Mitigation actions developed by incumbent are clearly based on valid ecological concepts and scientific data; are consistent with National Park Service policies; incorporate current laws, regulations, and policies; address the full spectrum of resources; anticipate potential threats; address the causes of impacts; and have the greatest long-term benefit in effectively mitigating impacts.

Mitigation actions involve all appropriate park programs, working together to achieve the objectives.

Maintains awareness of activities in adjacent areas with the potential to affect park ecosystems. Anticipates potential future threats and effectively works with others to prevent them.

Long-term inventory and monitoring needs are identified, and the program is developed and implemented, resulting in measurable increase in knowledge of the status and trends in resource conditions.

The inventory and monitoring program is based on scientifically valid protocols.

Needs for information are anticipated, and funding is obtained and resource surveys are initiated so the information is available when needed.

Information resulting from inventory and monitoring is made available for use in park management and planning decisions.

Identifies deficiencies in information about park resources. Research needs and priorities are defined in an approved resource management plan.

Develops strategies that are successful in obtaining the highest-priority research.

An active relationship is maintained with the regional chief scientist, universities, and others in the scientific community. Works with regional chief scientist to ensure that the National Biological Survey, universities, and others are aware of and responsive to the park's research needs.

Needs for information are anticipated, and funding is obtained and research is initiated so the information will be available when needed.

Incumbent defines research problems; prepares research requests, funding proposals, and other documents; and evaluates research requests. Incumbent's work results in research that yields scientifically credible information and effectively addresses the park's highest-priority needs.

As a result of incumbent's oversight, research is consistently carried out in a manner consistent with park and Servicewide policies, minimizing unnecessary impact on resources.

Incumbent analyzes research results for applicability to specific park issues and incorporates appropriate results into resource management programs.

Partnerships are established or maintained with colleges, universities, agencies, and others, resulting in an increase in the amount and more cost-effectiveness of research addressing park needs.

Incumbent actively participates in park planning and design projects. Works with others in developing approaches and strategies that contribute to the well-being of park resources. Incumbent's input contributes measurably to minimizing resource impacts and/or the need for follow-up corrective action.

Natural resource studies are programmed and carried out in a timely manner, so information is available to serve as a basis for planning and design.

Incumbent's efforts help ensure that all park activities meet compliance requirements.

Environmental assessments prepared by incumbent thoroughly and accurately assess the short- and long-term effects, including indirect effects, of proposed

actions and alternatives. Effects on ecosystem processes and linkages, as well as rare, sensitive, and keystone species and other resources, are addressed.

Reviews and comments on resource-related aspects of draft management plans, environmental assessments, and development plans prepared by others. Incumbent's input contributes to adoption of approaches and strategies that help conserve park resources.

Represents the superintendent on interagency groups involved in natural resource issues, such as working groups addressing resource issues that cross jurisdictional boundaries. Works effectively with others in identifying shared objectives, developing of cooperative strategies, and, ultimately, enhancing stewardship of park resources.

Establishes partnerships with other agencies and organizations, coordinating efforts in related resource management and research programs, enhancing cost-effectiveness, and obtaining contributions in work, funding, or other aspects.

Communicates information on park resources and natural resource management programs to interpreters, and works with them to identify issues on which interpretation can contribute to resource stewardship. Incumbent's work with the park's public information and interpretive programs contributes to public understanding and support concerning critical resource issues.

Communicates regularly with other divisions to help ensure that all staff members are well-informed of current resource issues and on-going or planned activities. Involves other program areas in natural resource management activities, measurably enhancing the effectiveness of these programs.

Maintains regular contact with counterparts in the regional office to enhance coordination and awareness of park issues.

Maintains contact with scientists at universities, and with scientists and resource management personnel of other agencies.

Data resulting from research, resource inventories, baseline studies, and monitoring are incorporated into a database in accordance with accepted National Park Service standards. Data meet National Park Service standards for quality assurance and quality control. Databases are maintained in a manner that ensures the long-term integrity of data.

Data are readily retrievable for use in park management and planning.

Ensures that data generated by research, as well as land surveys and other activities, are compatible with GIS.

Makes measurable progress in developing a fully operational GIS in the park in accordance with a systematic GIS needs assessment.

The park GIS program is responsive in providing natural resource information needed in park management and decision-making. All appropriate data are digitized and incorporated into the park's GIS database, ensuring that data meet accepted standards for quality and documentation.

The park's GIS program is linked with GIS databases of adjacent agencies. Works with adjacent land management agencies to enhance compatibility of GIS data across jurisdictional boundaries and access to shared data.

Maintains library database on reports and publications resulting from research carried out in the park.