ECOSYSTEM MANAGEMENT
IN THE NATIONAL PARK SERVICE

DISCUSSION DRAFT

VAIL AGENDA: RESOURCE STEWARDSHIP TEAM
ECOSYSTEM MANAGEMENT WORKING GROUP

SEPTEMBER 1994

NATIONAL PARK SERVICE
U.S. DEPARTMENT OF THE INTERIOR

United States Department of the Interior

NATIONAL PARK SERVICE
P.O. Box 37127
Washington, D.C. 20013-7127

IN REPLY REFER TO:

TAKE PRIDE IN AMERICA

DEC 21 1995

MEMORANDUM

To: National Leadership Council

From: Deputy Director

Subject: Ecosystem Management Workshop, Tucson, AZ

Following are two statements. The first is the Joint Agency Statement, written by the agency heads or their representatives in Tucson at the end of the workshop.

The second is the list of actions that I committed the NPS to do.

Joint Agency Statement
December 14, 1995

The participating federal agencies reaffirm their commitment to protect and manage their trust resources in service to the people. The agencies commit to work together and with others to enhance the health and welfare of the citizens of the United States by applying ecosystem management principles to the stewardship of natural and cultural resources. Our goal is to contribute to the economic, social, and environmental well-being of the Nation.

We are committed to:

- removing barriers to interagency cooperation
- strengthening science-management partnerships
- supporting local and regional stewardship, leadership, and initiative
- sharing information and decision-making
- participating- as requested- as partners, technical experts, and convener/facilitators to local and regional efforts
- coordinating joint planning and implementation of research and monitoring programs
- conducting cooperative training and continuing education programs

We recognize and endorse your initiatives in the field to collaborate to make ecosystem management a reality. We know where the action is.

MIKE DOMBECK
Bureau of Land Management

JIM McNEAL
US Geological Survey

RON PULLIAM
National Biological Service

JOHN REYNOLDS
US National Park Service

STEVE RIDEOUT
US Fish and Wildlife Service

JACK WARD THOMAS
US Forest Service

NPS Commitments to
Implement Ecosystem Management

(1) Complete our Ecosystem Management report and internal recommendations, which has been waiting for this meeting to conclude.

(2) Design performance measures in cooperation with other agencies as part of Government Performance Results Act.

(3) Improve training.

(4) Celebrate on-the-ground initiative.

(5) Improve our social science capability and integrate it into all program activities.

(6) Integrate partnershiping principles and techniques into park protection and ecosystem management activities.

(7) Continue and expand our sustainable practices program.

(8) Interpret ecosystem management results.

(9) Strengthen our role as a biologic and cultural reservoir against which to measure change and effects elsewhere in the ecosystem.

(10) Champion the exchange of knowledge freely throughout our society.

(11) Strengthen our use of WWW and other communication media as educational tools.

(12) Implement the recommendations of the two recent reports on Science in the Parks.

(13) With NBS and USGS improve delivery of management science to the parks.

(14) Continue to emphasize professionalization of our workforce and the tools available to them.

cc: Heather Huyck
Bruce Sheaffer
Destry Jarvis
Dave Barna
Kitty Roberts

"The ability of human communities to thrive over time must be a central element in ecosystem management. Indeed, the highest priority of this Administration in natural resource management is to demonstrate that environmental protection and sustainable economic activity are interdependent."

George T. Frampton, Jr.,
Assistant Secretary for Fish and Wildlife and Parks
U.S. Department of the Interior
before the Joint Hearings on Ecosystem Management.
September 20, 1994

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SUMMARY

The concept of *ecosystem management* benefits and suffers from its current political correctness. It has widespread acceptance but means distinctly different things to different people. What is universal, however, is that adoption of ecosystem management principles can better enable the National Park Service (NPS) to address the myriad profound problems and opportunities facing the NPS and its increasingly difficult mission. This working group has sought to give ecosystem management meaning within the mission of the NPS. The purpose of this report is to initiate the ecosystem management dialogue within the NPS (on a Servicewide basis within and outside the agency) and to identify some basic actions that can help the NPS move toward ecosystem-based approaches to management. However, the challenge to the NPS remains: to make adoption of ecosystem management meaningful and not simply in name only. Only with a strong leadership commitment can resource stewardship improve.

Ecosystem management is a collaborative approach to natural and cultural resource management that integrates scientific knowledge of ecological relationships with resource stewardship practices for the goal of sustainable ecological, cultural, and socioeconomic systems.

Ecosystem management is needed so that the NPS may evolve to meet the environmental, social, and economic challenges of the future and improve our resource stewardship capabilities. It is crucial that the NPS learn from others, while at the same time provide leadership through exemplary actions in this effort.

This report outlines nine principles of ecosystem management for the NPS. The following principles are defined, and action to implement these principles are listed.

Multiple boundaries and scale
Natural resources, biodiversity, and conservation biology
Cultural resources and traditions
Social, cultural, economic, and political factors
Information management/scientific basis for decisions
Partnerships
Interdisciplinary approach to management
Long-term ecosystem management focus
Adaptive and flexible management

This report concludes with a suggested framework for more broadly introducing ecosystem management into the NPS. Agencywide review and discussions should proceed immediately. Further actions include the use of an NPR Reinvention Laboratory, participation in ongoing interagency task forces, preparation of NPS special directives and revised management policies, and the establishment of intraagency and interagency bulletin board networks.

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INTRODUCTION

The National Park Service (NPS) is charged with the management of the nation's most precious natural and cultural resources, which are important symbols of our rich and diverse heritage. However, this mission has become exceedingly difficult to achieve. The portfolio of park resources has grown from primarily natural wonders to the present diverse array of natural, historic, cultural, and recreational areas. (The term "park" in this document includes *all* types of NPS units, including: national battlefields, seashores, monuments, parks, recreation areas, and preserves.) The demographic mix of visitors and visitor use characteristics are changing. The changing composition of NPS resources and the areas surrounding these resources have given rise to different expectations about what constitutes a national park experience. The ever-present tension between visitor needs and resource needs has been coupled by friction between management concepts from older natural and cultural parks and newer recreation-oriented parks. The NPS mission includes a strong education and assistance mandate through the authorization of several partnership programs to augment the original direct stewardship mandate. These assistance programs compete for resources with park-based programs and challenge ingrained concepts of the original mission. Additionally, the NPS is one member of the federal family of agencies that often work ineffectively, in isolation, and frequently at cross purposes. Finally, the most troublesome complication to NPS stewardship efforts is the increasing number and severity of human-induced threats to NPS resources. Widespread land development, increasing human population and global demand for natural resources, and changing dynamics of communities and economies place enormous stress on natural and cultural resources. On the other hand, NPS units and programs have an impact on the way of life in communities that have long-term associations with natural and cultural resources under the jurisdiction of the NPS. To confound these pressures and problems, budgets and staffing are expected to remain constant or shrink throughout the federal government.

The mission of the NPS is becoming more difficult to achieve every day and often, resource conditions are deteriorating. The NPS must adapt its management practices to confront these challenges to resource stewardship directly in the next century. Policies and management practices that were appropriate a decade ago may not be appropriate today. **This document introduces ecosystem management as an approach that can assist the NPS address new issues and problems in order to improve its stewardship.** An ecosystem approach to management will require actions to be targeted to root causes of problems whether they exist inside or outside park boundaries and encourages a flexible framework for NPS managers to confront new and profound problems. The NPS stewardship mandate cannot be met through introspective actions alone. Importantly, this does not mean that the NPS should seek directly to control more resources, but rather it should increasingly work in cooperation with partners to help manage resources of larger areas. This report recommends actions that serve as primary steps toward incorporating an ecosystem management approach into the management activities of the NPS. Existing policies will be combined with new ingredients to form an ecosystem management framework that can enable the NPS to better fulfill its mandate.

The increasing complexity of the NPS mission and the need to move toward an ecosystem approach to management has been identified as necessary by several important documents. The *National Performance Review* (NPR) presented a broad challenge to federal agencies to make government work better and cost less, and specifically recommended the implementation of ecosystem management in federal agencies as a proactive approach to ensuring a sustainable environment and economy. The *NPS Strategic Plan* states that moving toward ecosystem management is one of the most important actions for the NPS. This report responds directly to the NPR and the NPS Strategic Plan. Additionally, the NPS is working to gain OMB and Congressional approval on a Secretary of the Interior approved organizational restructuring proposal summarized in the July 1994 *Recommendation for Restructuring the National Park Service* (Restructuring document). The restructuring proposal may help foster ecosystem management in the field. However, it is recommended that the working group on restructuring use this report for guidance in further refinement of the restructuring plan.

WHAT IS ECOSYSTEM MANAGEMENT?

Ecosystem management is an awareness that resources and processes do not exist in isolation. Rather, living things exist in complex, interconnected systems within a broad landscape. **These interconnected communities of living things, including humans, together with the dynamic physical environment are termed *ecosystems*.** The interconnected nature of ecosystems necessitates that NPS managers shift from a primarily park- or resource-specific approach to a wider systems and process approach to management. This is true even for park units with resource-specific mandates, such as Everglades, Sequoia, or Saguaro. The condition of specific resources depends on the condition of the larger ecosystem. Ecosystem approaches to management can better address this basic fact.

Ecosystem management **is a long-term approach, with the goal to preserve, protect, and/or restore ecosystem integrity (composition, structure, and function) and also maintain sustainable societies and economies.** Important objectives and tasks to achieve this goal are delineated under "Key Principles of Ecosystem Management," below. Ecosystem approaches are driven by collaboratively developed and evolving visions of desired ecosystem conditions that integrate environmental, economic, social, and, cultural factors affecting a management unit defined primarily by ecological - not political - boundaries. The needs of human communities and their cultural and economic base should be blended with the dynamic, diverse, and complex natural environment. An ecosystem-based approach is not a panacea. Instead, it is a flexible and collaborative approach to management that encourages innovation and replaces single-issue management. Ecosystem approaches recognize that change is an integral component of ecosystems. Ecosystem conditions are monitored and evaluated in terms of ecosystem management goals, and this feedback refines future actions.

Importantly, the bifurcation of the world into human and natural spheres is a false dichotomy under ecosystem management. The sectioning of the planet into developed and natural zones caused by this dichotomy represents a defensive strategy and ultimately a losing venture. Assisting others in managing entire ecosystems may produce better results than directly controlling a small island in the ecosystem, largely devoid of humans, while ignoring the larger area. Moreover, resources, isolated and managed as remnants of the past, can escape neither human influences across park borders nor the fluctuations of the dynamic natural world.

Cultural Resources in Ecosystems

Generally, the term ecosystem management is associated with nonhuman biological systems. However, it should not be relegated only to the realm of these natural systems. There is a strong need to include cultural resource considerations in ecosystem management principles. Humans have been influencing ecosystems for thousands of years, and the preservation of cultural traditions and historic, archeological, and other cultural places is a goal valued by the American people. People with traditional association to resources and people who care about cultural resources are valid stakeholders in ecosystems. Natural factors pervade cultural resources, and cultural factors pervade natural resources. Often the natural and cultural factors are intricately connected, as is the case with many national battlefields. Additionally, many cultural areas are becoming increasingly important refuge areas for natural resources. Both

natural and cultural resource managers must look at larger areas to manage and interpret the resource fully, and they both must look to the larger natural, social, economic, historical, or cultural patterns and themes of which they are a part. **The NPS should reduce the barriers to ecosystem approaches that result from artificially separating cultural and natural resources and strive to replace them with collaborative planning, research, and resource management efforts that reflect the real-world integration of material, human, and natural features.** Cultural resources will be discussed in greater detail below under "Cultural Resources and Traditions."

WHY IS ECOSYSTEM MANAGEMENT NEEDED?

Adoption of an ecosystem approach to management in the NPS is critical for two reasons. **1) Current attitude and philosophy of the NPS need to evolve to meet the challenges of today and the future, and; 2) practical change is needed to realize improvements in NPS resource stewardship.**

Philosophical Change

Ecosystem management approaches can help existing attitudes and philosophy evolve. **The current philosophy of the NPS is steeped in a tradition that hampers its ability to confront the challenges of the next century.** National parks were first managed by the U.S. Army, which protected resources by establishing a boundary and restricting human use. Remnants of the military origin remain today: emphasis on direct resource control, separation of human factors from resources, and passive management techniques. In 1963, the noteworthy Leopold Report recommended that parks be managed as "vignettes of primitive America." While the report ushered in an era of improved resource management, the romantic edict was implemented in a manner that helped institutionalize and reinforce park-centric management and human separation. A careful reading of this report would suggest that this was not entirely desired. Although park management has often moved beyond vignettes, the dichotomy of human factors and nature remains strong, and most NPS emphasis is on managing resources within park boundaries. The Leopold report also strongly supported active management on the part of the NPS to achieve desired conditions, yet the NPS embraced more of a passive management philosophy. Notable exceptions exist, however, in many places, such as the active use of prescribed burning programs in the Everglades and Sequoia.

Today's parks are not - and cannot be - static vignettes of the past. **Humans have had an intricate impact on NPS resources, past and present; NPS parks are not self-regulating areas that need only be left alone.** Millions of visitors travel through parks every year; air pollution reduces visibility and deteriorates historic structures; airplanes invade park airspace; park wildlife is often tormented or tamed; and exotic species introduced by humans co-exist with native species. The reality is that parks are cultural statements and human constructs, which need tremendous attention, effort, and money to define and maintain.

Ecosystem approaches to management can help shift the philosophy and attitude toward improved resource stewardship. The emphasis will shift to educating and assisting others whose actions have an impact on ecosystem resources; human factors will be considered more frequently; and parks will not be viewed as self-regulating areas, but rather as human creations often in need of active management. Parks are not separate from society, they are created by society based on traditional associations and current values and are an integral part of the social, economic, and political fabric. A hands-off approach to management should be understood as only one *tool* of management to be used toward a desired end and one with appropriate and inappropriate usage. Accepting ecosystem management principles and philosophy entails evolving beyond the vignette goal. In its place, the NPS should adopt an ecosystem approach to management and face the challenge of resource stewardship in a social and economic context.

Practical Change

Ecosystem management is a pro-active approach to maintain resources *before* crises arise. **Present resource management is too often reactive and intuitive and too seldom pro-active and information based.** The growing lists of threatened and endangered species and historic sites highlight the shortcomings of this approach. Successful public and private ecosystem approaches to management will retard, and hopefully reverse, the growth of these lists by interpreting and reacting to trends before they become crises and by engaging in pro-active work to avoid pushing resources to the brink. This should be done cooperatively with other stakeholders to address environmental, economic, and social needs. While ecosystem approaches appear to complicate NPS decision-making, management in the long-term may be made easier.

Ecosystem management approaches have advantages over current management practices for several reasons. Natural processes and cultural themes transcend park boundaries and do not conform to political borders. The NPS cannot effectively manage natural and cultural resources within political boundaries when much of the resource, and factors affecting the resource, is external to the boundary. Human influences also transcend park boundaries including air and water pollution and habitat and cultural landscape fragmentation. Communication improves coordination and reduces conflict among stakeholders. Administrative savings can occur with agency coordination of common activities such as inventory, monitoring, and sharing of scientific data and methods. Cooperation will help to ensure that agencies are not working at cross purposes. Multiple long-term problems can be addressed simultaneously through ecosystem approaches, rather than piecemeal approaches to problems. Approaching problems independently is often counterproductive because a solution to one problem can exacerbate another. For example, managers should determine if key watersheds for anadromous fishery protection in the Pacific Northwest can also provide habitat for endangered spotted owls and marbled murrelets.

VISION FOR THE NATIONAL PARK SERVICE

The ecosystem vision for the NPS generally outlines how the NPS can approach the goal of ecosystem management - which is to preserve, protect, and/or restore ecosystem integrity (composition, structure, and function) - and also maintain sustainable cultures, societies and economies. The NPS should strive to have its actions become excellent examples of ecosystem management principles. NPS resource stewardship efforts can provide benchmarks of expert stewardship for other stakeholders. Parks can be models for sustainable development and operation and sustainable communities and can provide expert examples of how to manage human impacts while protecting resources. This expertise should be actively shared through education, assistance, and partnership efforts. **The ecosystem vision is for the NPS to lead by example through continuous improvement and excellence in direct stewardship efforts while actively assisting and educating other stakeholders to help them better manage resources for the goal of greater ecosystem integrity. It is also crucial that the NPS learn from science and from stewardship actions and examples of other stakeholders.** This vision brings resource education and assistance equal to direct resource management and embraces active stewardship to achieve results. To achieve this vision, the NPS should be a strong advocate for, and manager of, exemplary areas; a developer and proponent of sound national policy for environmental protection and natural and cultural resource stewardship; a provider of indispensable information and technical assistance to help others protect, or responsibly develop, their resources; and a student and facilitator of cooperative and collaborative approaches for managing ecosystems.

Working toward this vision entails incorporating ecosystem management concepts into all NPS functions. The achievement of this vision will be enhanced by adopting the principles discussed below and using them to guide management policy and action. Ecosystem approaches to management in the NPS will help to build on the strong points of current NPS management and replace outdated philosophies and practices. Managers will convey NPS resource values and goals to other stakeholders and will work to develop common goals to benefit all stakeholders while supporting the NPS mandate and resource needs. Ecosystem management principles provide the conceptual framework and shape our approach in both park management and partnership programs to policy and legislation, research, planning, resource stewardship, sustainable development and operations, visitor use, education programs, and technical assistance.

KEY PRINCIPLES OF ECOSYSTEM MANAGEMENT

In the aggregate, the principles discussed below can contribute to achieving the new NPS ecosystem goal of preserving, protecting, and/or restoring ecosystem integrity (composition, structure, and function) and also maintaining sustainable societies and economies. The principles are either objectives of this goal or tactics to help achieve the goal and are intended to guide management policy and action. The nine principles (in no specific order) are multiple boundaries and scale; natural resources, biodiversity, and conservation biology; cultural resources and traditions; social, cultural, economic, and political factors; information management/scientific basis for decisions; partnerships; interdisciplinary approach to management; long-term ecosystem management focus; and adaptive and flexible management.

Multiple Boundaries and Scale

WHAT: A common misconception is that ecosystem management entails solely drawing new maps and assigning new boundaries around broader ecological areas. This is not the case. **Ecosystems do not have permanent or absolute boundaries. Rather, multiple factors considered in multiple scales with multiple boundaries are necessary for ecosystem management.** Moreover, boundaries that differ between agencies should not be problematic. A fluid zone of cooperation should be more realistic and useful than a single ecosystem boundary. This fluid, ecosystem, area should incorporate multiple boundaries for processes such as wildlife habitat, watershed, flora ranges, cultural themes, and economic zones. The factors will differ for each ecosystem. Park managers must utilize a wealth of different natural, cultural, and social mapping tools for determining ecosystem areas, including the USFS National Hierarchical Framework of Ecological Units; USGS hydrology unit maps; Geographic Information System technology; and census or commerce data.

WHY: Debates to define a definitive ecosystem boundary are rarely constructive or useful. No single boundary is best for every issue and it is better to ask what combination of boundaries is best to tackle the problems at hand. For example, appropriate boundaries for water pollution will revolve around watersheds and aquifers while boundaries for wildlife management will involve the species habitat and migration routes. A single boundary may not capture the relevant areas. Moreover, there is no superior scale, temporal or spacial, for ecosystems. Ecosystem management has a hierarchical context that means smaller ecosystems are nested within increasingly larger ecosystems. The boundaries and scale of ecosystems should change and evolve in response to both human and natural events.

Note: The Restructuring Document proposes that "clusters" of parks with a single "system office" be grouped loosely along ecological lines. It is the opinion of this working group that the clusters should not be confused with workable ecosystems, and they do not always constitute logical areas for ecosystem assessment and planning. It is our understanding that the clusters are meant to be the basis for the sharing of resources and expertise within the NPS. However, within clusters and system offices, the further refinement of areas that are sensible for common planning, assessment and partnerships should occur as discussed above. Within the clusters this refinement should develop naturally, facilitated by parks and field or system offices, and will group parks with very similar attributes, threats, needs, and partners. A cluster, then, may

incorporate several ecosystems areas for planning, assessment, and partnerships. It is these areas within clusters that should be understood as ecosystems in this document. For example, while all the parks in the Gulf Coast cluster have some common threads, it is more relevant to consider the Everglades, Big Cypress, and Biscayne as a workable and sensible ecosystem for assessment, planning, and partnerships. In urban parks such as Boston National Historical Park, where several sites commemorate the Revolutionary War, it is more appropriate to consider Boston, Minute Man, Morristown, and Saratoga as a meaningful grouping rather than the entire New England-Adirondack cluster. Adding Independence and Colonial to this grouping would be more appropriate than Acadia or Cape Cod, despite proximity. **The present regions or proposed clusters should be understood as basic units for NPS resource sharing but only starting points for implementing effective ecosystem management.**

ACTIONS:

- Develop logical park groupings for joint planning, assessment, and partnership efforts.

- Encourage cross office cooperation and team development where regional or cluster/system office boundaries split ecosystems.

- Identify multiple ecosystem boundaries and scales tailored to environmental, cultural, social, and economic factors such as watershed and migratory routes.

Natural Resources, Biodiversity, and Conservation Biology

WHAT: **It is imperative that the NPS work to restore and/or maintain biological diversity (species, genetic, and ecosystem) and the ecological patterns and processes that maintain that diversity.** Viable populations of native species and natural-disturbance regimes should be maintained; native, extirpated species should be restored; and representations of ecosystems across a natural range of variation should be conserved. Physical science elements such as geology, climate, and hydrology must also be understood and incorporated into ecosystem assessment and planning. The overall objective is to maintain ecosystems that are resilient to short-term stresses and receptive to long-term evolutionary and ecological influences of change. In predominantly cultural areas, the biological and natural influences and processes should be understood, interpreted, and maintained. Close coordination with the National Biological Survey (NBS), USGS, and other partners is essential for biological and natural programs. There is no universal approach to arresting the decline of biodiversity, and in some instances simply setting aside land is adequate to protect biodiversity. In other situations, however, active management by humans is required. The NPS should avoid universal policy statements such as "Let nature take its course," which often produce untoward results. The goal must be clear: maintain biological and natural diversity. The strategy must be flexible: use any means necessary, including both passive and active management.

WHY: Our knowledge of interrelationships in the natural sciences is limited. Also, impacts from social, economic, and cultural factors on the natural world is also limited. Because of these facts, maintenance of biological diversity is crucial. All the pieces should be retained if

we are to maintain the system in the best way possible. The absence of a seemingly insignificant component of an ecosystem may have widespread repercussions on the greater ecosystem. Human management is imperfect, and as such, the NPS should avoid irreversible actions. The loss of biological diversity is irreversible and should be avoided. All species have the potential to have a direct benefit on humans, and, additionally, have intrinsic value that should be maintained. Moreover, stable populations of native species in their historic ranges helps to maintain and explain aspects of our national heritage.

NOTE: This working group acknowledges that at times the loss of biological diversity is unavoidable due to natural succession and extinction processes. Moreover, it is often difficult to separate anthropogenic from natural change. However, it is also the opinion of this group that the primary causes of species decline in recent years is direct human activities such as pollution and loss of habitat. Accordingly, the NPS should initially assume that species decline and loss of biodiversity are human-induced and immediately work to mitigate the problem while conducting intensive research to determine the exact cause.

ACTIONS:

- Fully fund and implement the inventory and monitoring program and coordinate with partners.

- Restore and augment, in cooperation with the newly formed National Biological Survey (NBS), the goals and capacities for natural resource research that existed in the NPS prior to the creation of the NBS. The research roles of the NPS and the NBS must be clarified. (Note: This echoes a recommendation from Science in the National Parks II.)

- Participate in the development of a standard nationwide and international classification system for biological and natural resources.

- Participate in and/or facilitate the development of common goals and strategies with partners concerning stewardship of biological and natural resources.

- Integrate ecosystem management principles into all natural programs and offices.

- Develop internal and external information sharing networks for exchange of ecological and managerial information.

- Broaden research efforts to encompass a wider, ecosystem, view.

- Restate existing policy in ecosystem management terms that NPS actions should not impair the long-term viability of the NPS resources.

- Implement the Stewardship Now for Parks Tomorrow initiative Servicewide, using the Resource Management Assessment Program (R-MAP).

- Use NPS expertise to help develop a sound position for the reauthorization of the Endangered Species Act and coordinate with the Fish and Wildlife Service (FWS) and the Department of the Interior (DOI) to improve the workability of the Act while clarifying its goals. (Note: This echoes a recommendation of the Land Use Policy Working Group.)

- Develop positions and participate in the formulation of national and international policy that has an impact on biological and natural resources such as mining reform, grazing reform, Clean Air Act and Clean Water Act, and other national or international environmental or economic policy issues. (Note: This echoes a recommendation of the Land Use Policy Working Group.)

Cultural Resources and Traditions

WHAT: As in the case of biodiversity, cultural resources and traditions should be maintained. The term "cultural resource" should be understood to include the diverse array of archeological, historical, and ethnographic resources. **This entails preserving and maintaining significant resources and advocating or assisting others to protect important archeological, historical, and ethnographic resources in their historic context.** Additionally, in parks with predominantly natural themes, the significant human influences and roles should be understood, explained, and maintained. Ecosystems encompass past and present human activities and associated cultural values. Both past and present societies have direct links to the natural world that are of great value. Note: The Ecosystem Management working group supports the recommendations of the Integrate Natural and Cultural Resource Management working group and the need to integrate the cultural and natural programs. This working group also supports the recommendations of the 1994 *Humanities and the National Parks Report.*

WHY: The Congress and the NPS have recognized the value in preserving and interpreting the Nation's diverse cultural heritage. Our historic places reveal every aspect of our country's pre-history, history, national origins, and development. Historic places help us understand who we are, as well as the meaning of our accomplishments and shortcomings. The NPS has a responsibility to all citizens to preserve important places and themes in our diverse heritage and explain them in their historic context.

ACTIONS:

- Integrate ecosystem management concepts into internal and assistance-based cultural programs and offices. Incorporate cultural traditions and their supporting natural and cultural values into ecosystem management strategies.

- Integrate anthropologists, archeologists, and historians into ecosystem management efforts.

- Complete the Resource Management Assessment Program (R-MAP) Cultural Addition effort.

- Fully fund and implement the cultural resource inventory and monitoring programs and coordinate with partners.

- Participate in regional heritage-planning initiatives at the park or system office level.

- Develop positions and participate in the formulation of national and international policy concerning cultural resources.

- Integrate natural and cultural resource management programs in park planning, resource management planning, and data sharing.

- Develop internal and external information-sharing networks for exchange of cultural and historical information.

Social, Cultural, Economic, and Political Factors

WHAT: The call for inclusion of social, cultural, economic, and political considerations into NPS management will elate some interest groups and frighten others. It is imperative to understand what is meant by this. The NPS operates in a social, cultural, economic, and political framework. Accordingly, NPS managers should be cognizant of the dynamics occurring around parks. This does not mean that NPS values will be subverted. Rather, the NPS should understand the needs, attitudes, and values of communities of people residing in ecosystems. Concurrently, the mission, needs, and goals of the NPS should be communicated to communities and businesses. With better understanding comes better cooperation. The NPS should be concerned with the economic well-being of surrounding communities because poverty is often closely linked with environmental degradation. Intimate knowledge of traditional resource use will allow NPS managers to respond to stakeholders in culturally appropriate ways. The political influences on NPS operations should be understood at all levels, and the NPS should develop better knowledge and skills to assert its professional positions during political activity on relevant issues. Note: The Ecosystem Management Working Group supports the more detailed recommendations of the Land Use Policy Working Group concerning increased effectiveness in Congressional and Legislative Affairs.

WHY: NPS resources are not separate and removed from society. Rather, they are an integral part of society. Social, economic, and political reality must be understood by park management. Economic and social needs of surrounding communities may be supported without compromising NPS values. Political actions help determine NPS activities and the NPS should use its expertise to educate elected officials at all levels.

ACTIONS:

- Initiate broader data collection to assess better the needs, attitudes, and values of local communities. This should include census data, Department of Commerce data, state and private economic data, intensive stakeholder surveys, and ethnographic assessments. Data should be coordinated between agencies and other partners to improve quality and access.

- Improve data collection about visitors to understand their needs, attitudes, and values better, and to understand better why they visit park units and what experiences they are looking for.

- Develop an ethnographic information base, in collaboration with traditional resource users, to help NPS managers understand the cultural dynamics that affect the resource goals and decisions of peoples with traditional associations with park resources.

- Develop the capacity of employees and partners to understand the social, economic, and political factors influencing ecosystem stakeholders and resources.

- Clarify legal obligations of managers under the Federal Advisory Committee Act (FACA) and other statutes.

- Improve relationships with elected officials at all levels to educate them about ecosystem management concepts, justify budgetary needs and priorities, and influence local and national environmental and resource stewardship policy development. (Note: This echoes a recommendation of the Land Use Policy Working Group.)

Information Management/Scientific Basis for Decisions

WHAT: **NPS management decisions should be grounded in the best scientific natural, cultural, economic, and social data available in order to gauge effectively the full impact of policy alternatives and to help choose the course of action that will best achieve ecosystem management goals.** The NPS should continually strive to improve its scientific knowledge, to improve its decision-making ability and ultimate resource stewardship. The NPS should make every effort to separate political considerations from research and ensure maximum academic freedom for research scientists. Management should utilize scientific information when available, sponsor research when needed, delay decisions when information is incomplete, and err on the side of the resource in the face of uncertainty. Three important components of scientific assessment are *inventory, monitoring,* and *research.* Inventory efforts aim to delineate precisely what resources are contained in an ecosystem. Monitoring efforts aim to determine trends in ecosystem inventory - that is, whether factors are increasing or decreasing, how rapidly, and what is the cause. Research evaluates these findings temporally and spatially in an effort to improve our understanding. Inventory and monitoring data should be used to refine goals, policies, and strategies for better management. NPS management should achieve a closer working relationship with the scientific community, especially in the field of conservation biology.

WHY: Ecosystems have complex dependencies and relationships. Actions often produce synergistic ripple effects throughout the greater ecosystem. Interpreting these ripple effects should help to create sound policy. While scientific assessment will not always provide a clear answer and absolve the NPS of the responsibility of making difficult decisions, it will clarify the options and make explicit the tradeoffs between courses of action. Scientific assessments can help explain ecosystem relationships, human-ecosystem interactions, and assess the sustainability

of management options. Inadequate monitoring and ignoring trends may lead to "train wrecks." In the Northwest, degraded riparian areas were ignored rather than restored, and the inaction contributed to the rapid decline in salmon stocks.

ACTIONS:

- As noted earlier, fully fund and implement the inventory and monitoring program; participate in the development of common natural and cultural resource classification systems and data bases with other agencies and partners; and coordinate research efforts with partners.

- Participate in the creation of a national network of global change, prototype monitoring, and National Science Foundation long-term Ecological Research (LTER) sites with other agencies.

- Devote more resources (personnel and dollars) to natural and cultural research and science in a manner that provides field level discretion for exact usage.

- Develop and clarify the NPS role in natural research and science with respect to the NBS, and work to establish a specific legislative mandate for science in the NPS. NPS research efforts should be closely coordinated with the NBS. (Note: This echoes a recommendation of Science in the Parks II.)

- Incorporate ecosystem management principles into Resource Management Plans (RMP), and convey the importance of these documents to superintendents, directors, managers, and scientists.

- Continue and augment the professionalism/careers initiative, and improve managerial, professional, and technical training.

- Create formal relationships between scientists and decision-makers at all levels.

Partnerships

WHAT: The NPS has complementary roles as a direct resource steward and as advisor to others through education and assistance programs. Both roles require active partnerships. Partnerships encompass two elements: formal partnership assistance programs such as heritage partnership programs (as defined in the Restructuring Document), and field-level partnerships, which are not necessarily served by a formal program. **Ecosystem management is best understood as shared responsibility, and the NPS should collaborate, communicate, cooperate, and coordinate with partners.** Partnerships should be pursued with all major players in each specific ecosystem, including other federal agencies, state and local governments, tribal entities, private interests, advocacy and interest groups, university and research groups, and the general public. Partners include critics. The NPS should actively develop ecosystem goals and work to achieve goals through consensus-building approaches. All stakeholders in a given ecosystem should participate in goal-setting and strategic planning to achieve the goals and should share

accountability and benefits. Partnership efforts should begin at the local level, with ample public meetings and participation-building efforts. Trust, openness, cooperation, and accountability takes time to develop, and the NPS should attempt to establish equity among partners.

Heritage partnership programs such as Rivers and Trails Conservation Assistance Program (RTCA) and the National Register Program should be closely integrated into ecosystem management efforts. The programs provide a grass-roots, participatory process, build local support networks, educate and train interested conservation advocates, foster communication and coordination within communities and regions, and identify and promote economic activity compatible with conservation. In the Mississippi Delta region, the Pontchartrain Rivers Program of RTCA is a locally driven effort to promote improved management of the many rivers that flow into the lake and is attempting to address pollution, development pressures, and wetland protection. The proposed legislation for an American Heritage Areas Partnership Program is an additional partnership program designed to help coordinate and conserve large landscapes and their cultural values and may aid ecosystem management efforts.

It is important to note that partnership efforts should be pursued for the purposes of furthering the broad NPS mission, vision, and specific ecosystem goals. Collaborative approaches should remain consistent with the mission of the NPS and resource needs. It is not expected that all partnership efforts will conclude in agreement or eliminate all conflicts. However, even if common ground cannot be reached, partnership efforts serve an important educational function and can build working relationships to foster future cooperation.

WHY: NPS resources and programs often constitute only a small fraction of larger ecosystems. The NPS through its parks and non-park programs is one member of a diverse group of stakeholders whose actions contribute to the changing condition of ecosystems. Accordingly, the NPS cannot effectively achieve ecosystem goals and further its mission in isolation. Cooperative approaches will help NPS managers to be cognizant of diverse interests and opinions, help reduce animosity between stakeholders, often eliminate duplication, and combine incomplete sets of information. This is especially necessary when tackling multi-jurisdictional resource issues. Independent initiatives often become disjointed, competitive, and ineffective. Cooperative long-term and goal-driven planning may avoid divisive "owls versus jobs" debates and related costly litigation. Partnerships also signal a needed attitudinal change within the NPS. The present focus on resource management will be complemented by emphasis on *assisting and influencing* resource decisions on a much larger scale outside direct NPS control.

ACTIONS:

- Develop a broad training program to assist managers in initiating and maintaining partnerships, including social learning, conflict management techniques, legal requirements of FACA and other statutes, and capacity to understand cultural values and traditions, including ethnography. Develop partnership training in conjunction with other agencies and partners.

- Integrate heritage partnership programs such as Rivers and Trails Conservation Program

and the National Register Program into ecosystem management efforts at the field level. These programs represent powerful tools for outreach, funding, and provide expertise to partners for better ecosystem management.

- Continue to seek Congressional passage of the proposed American Heritage Areas Partnership Program Act.

- Identify and contact all partners common to an ecosystem. Work toward developing joint ecosystem visions, goals, and strategies.

- Develop intraagency and interagency communication links such as bulletin boards and newsletters to disseminate information on partnership efforts, lessons, and contact persons.

- Provide funding at the field level to facilitate partnership development in a manner that retains field discretion for ultimate usage.

- Integrate ecosystem management concepts into all publications and brochures for external audiences. Incorporate environmental education programs into ecosystem management concepts.

Interdisciplinary Approach to Management

WHAT: NPS stewardship efforts should take an integrated approach, and there needs to be a critical mass of expertise at the field level to make ecosystem management work properly. **Rather than separating employees by discipline, varied disciplines should work together in teams toward specific objectives.** Optimal management should blend the expertise of biologists, historians, hydrologists, statisticians, botanists, economists, ecologists, engineers, sociologists, geologists, applied cultural anthropologists (ethnographers), archeologists, and other scientists, technicians, and professionals. Teams will work together to set priorities and objectives and to ensure consistent policy across disciplines. Each discipline will contribute special abilities and information that can improve the effectiveness of programs and partnerships.

WHY: Tasks are traditionally separated along functional lines with little, or untimely, internal coordination. This separation can often impair the ability to develop coherent and integrated long-term management strategies within the NPS and with other agencies and partners. An interdisciplinary approach can also simultaneously address the environmental, social, and economic impacts of NPS policy.

ACTIONS:

- Develop an organizational strategy that supports a team focus through formal and informal mechanisms to encourage interdisciplinary decision-making.

- Prepare all planning document and assistance activities with broad input from varied disciplines.

- Establish issue-based interdisciplinary teams to work toward specific goals, which may include interagency expertise. These teams should be organized to respond to long-term ecosystem goals delineated in planning documents.

- Develop broad ecosystem training programs with an interdisciplinary focus for all employees and partners.

- As noted previously, continue and augment the professionalism/careers initiative across the broad range of disciplines needed for ecosystem management. All working groups on employee futures should incorporate ecosystem management principles into their work products.

Long-Term Ecosystem Management Focus

WHAT: **Managers of NPS resources common to an ecosystem should cooperatively develop a long-term ecosystem vision and specific management objectives in conjunction with partners.** The vision should constitute the desired future condition of the ecosystem. The objectives should be specific, quantifiable, and measurable and should guide managerial action. Long-term objectives should be formulated before short-term objectives are identified, and managers should ensure that short-term actions are consistent with the long-term vision and objectives. Trends and patterns can be used to define resource objectives. The vision and objectives should balance the needs of resources with the needs of visitors to reach the goal of sustaining long-term ecosystem integrity.

WHY: Extended time frames allow us to consider cumulative effects. A series of logical short-term actions do not always produce an optimal long-term strategy. NPS resources and functioning ecosystems are to be maintained in perpetuity. Perpetuity will require a long management-assessment period.

ACTIONS:

- Produce all NPS tactical and planning documents consistent with ecosystem management principles and include a long-term vision statement.

- Participate in and facilitate the development of specific ecosystem vision statements and statements of common long-term objectives with partners.

- Evaluate and modify where necessary existing planning processes and procedures - especially Special Resource Studies (SRS), General Management Plans (GMP), and Resource Management Plans (RMP) - to support ecosystem management and sustainable development and operations.

- Design inventory and monitoring efforts to measure progress toward ecosystem vision and objectives.

Adaptive and Flexible Management

WHAT: **Ecosystem management can be best served by allowing innovative management approaches to be tailored to specific ecosystems.** All ecosystem areas have different stakeholders, problems, and requirements, and individualized approaches should be employed. Accordingly, the NPS should continually strive to disencumber and to empower the field manager to foster innovation. Decision-making should be decentralized, and authority to make decisions should be at the lowest appropriate level. Management can be viewed as a measured and information-based experiment. Practices should allow adaptation and evolution as experience grows and lessons are learned. Ecosystem management can help to foster a learning attitude within the agency.

Also, NPS managers should be evaluated primarily on the *results* of their work in relation to ecosystem objectives. Standards to gauge success or failure should be established, tied to specific ecosystem goals and should be explicit, quantifiable, and measurable. The manager will be challenged to be innovative - yet held accountable for results.

WHY: Empowered employees and their supervisors will find creative ways to address problems and to manage resources better. Rigid control of field managers stifles innovation and exacerbates inefficient use of NPS resources. Field managers should know the requirements of a situation best, and they should be allowed to tailor management to meet the specific resource needs. Flexibility is also needed, because the NPS may be a major stakeholder in one ecosystem and a minor stakeholder in another. Between ecosystems, the role of the NPS will vary greatly.

ACTIONS:

- Convene a working group to ensure that all NPS statutes and regulations reflect ecosystem management. Re-engineer regulations where cumbersome, with the intent of retaining the goals of the regulation but streamlining the process.

- Review and amend the NPS Management Policies and Guidelines to ensure compatibility with ecosystem management.

- Examine the current budget structure and identify and rectify budgetary constraints that hamper managers. Consider pilot projects to improve the connection between program performance and funding, similar to the "end-results budgeting" pilot program of the U.S. Forest Service.

- Develop comprehensive leadership training for all NPS managers.

- Develop evaluation systems for accountability and oversight of ecosystem management efforts at the field level based on ecosystem visions and objectives. Identify and monitor appropriate ecosystem indicators to gauge success. Reevaluate its recognition and award system for management to encourage innovation and reward managers for anticipating change and

avoiding crises while furthering the long-term ecosystem vision.

- Develop an ecosystem management communication network and bulletin board to disseminate locally developed lessons to other NPS managers.

CONCLUSION

Adoption of ecosystem management can help the NPS achieve its difficult mission and bring needed change to improve resource stewardship. This document represents just the beginning of a Servicewide discussion on ecosystem management and outlines some basic steps that can help to integrate ecosystem management fully in the NPS. The NPS should focus on the following actions over the next several months: (1) Formally review and debate this document at all levels of the organization, and use this effort to initiate work on the recently approved DOI-NPR Re-invention Laboratory to identify and change management and administrative processes that inhibit ecosystem management in the NPS. (2) Continue to participate in the DOI and Interagency task forces on ecosystem management. (3) Issue an NPS Special Directive that formally adopts ecosystem approaches to management in the NPS. (4) Formally assign ecosystem management responsibilities in the Washington office (WASO), in support offices, and in parks to facilitate the integration of ecosystem management principles into all aspects of NPS activities, especially restructuring. (5) Modify existing management policies, guidelines, and practices to reflect ecosystem management principles, with priority given to planning, training, and natural and cultural resource management. (6) Establish intraagency and interagency bulletin boards to network information on existing and future demonstration projects.

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APPENDIX A

ECOLOGICAL PRINCIPLES AND CONCEPTS OF ECOSYSTEM MANAGEMENT

Ecological Theory

As the National Park Service begins ecosystem management it must understand ecosystems and how they operate. We need to understand what an ecosystem is, how it functions, and how it responds to natural and human influences. Defining ecosystems, describing scale, and understanding ecosystem structure and function assist us in their management. What follows is a discussion of principles and concepts of ecosystem management.

Ecosystems

Ecosystems refer to a system formed by the interaction of a group of organisms and their environment. An ecosystem may be a pond or the entire globe. It can be natural or artificial. All ecosystems are comprised of components, structure, and processes. Components consists of plants, animals, soil, air, and water. Structure refers to spatial and temporal distribution. Processes are the flow or cycling of energy, materials, and nutrients through space and time. All components, structures, and processes have various functions that can change over time and space, from one ecosystem to another as well as within ecosystems.

Hierarchical Scales

Hierarchies of spatial scales can be described to manage ecosystems. Ecosystems are thought of as occurring in a certain geographic arrangement with ecosystems within larger ecosystems. The scale selected and the boundaries used for an ecosystem depend on the problem or question being addressed. Spatial scales range from microbial activity to the biosphere. The Earth can be divided into smaller areas of increasingly uniform ecological potentials. This provides a good way for organizing patterns that are caused by ecosystem processes at higher scales.

Structure and function are primarily controlled by energy, moisture, nutrient, and distribution gradients. These gradients are affected by climate, physiography, soils, hydrology, flora, and fauna. Ecosystems develop over time through a variety of interactive processes. Processes occurring on smaller spatial scales operate at higher frequencies, while processes occurring over larger spatial scales operate at lower frequencies. Abiotic factors are more influential at larger scales, while both biotic and abiotic factors occur at finer scales.

The Niche Concept

A niche is defined by all aspects of how a species interacts with its environment. Each species occupies a unique niche in the ecosystem. No two species occupy the same niche. Species have evolved unique niches to reduce direct competition and the risk of extinction.

Energy Flow and Nutrient Cycling

Energy flow and nutrient cycling follow food chains or food webs. These chains or webs describe the relationship among species and the flow of energy and nutrients from one to another. They are structured by trophic levels of primary producers to various levels of consumers. Food webs reflect structure and processes of ecosystems. Energy and nutrients are utilized and stored at various trophic levels. Their availability affects ecosystem productivity, and their net flux is a primary determinant in the sustainability of an ecosystem.

Succession

Ecosystems develop gradually over time and space and change in components, structures, processes, and their function in a variety of ways. This change is called "succession." There are two types of succession - primary and secondary. The amount of living biomass increases from early to middle stages of succession, reaching maximum levels in middle or late successional stages. Under undisturbed conditions, succession will continue to a climax condition. In some situations periodic fire prevents shade-tolerant but fire-susceptible species from dominating the system. Predictability and stability of conditions vary with the system and perhaps more importantly, with the level of resolution or detail and desires.

Predictability of successional patterns is variable depending on chance factors in early successional stages, environmental stability, and differential species longevity.

Disturbance

Natural ecosystems are in a constant state of change. Wildfire, insect outbreaks, air pollution, and natural resources management activities are agents of change. Some disturbances are natural and random. Others are a direct or indirect result of human impacts.

Many ecosystems have evolved with, and are dependent on, a wide variety of natural disturbances. Disturbances may be fire, drought, or flood and may be further characterized by distribution, frequency, return interval, rotation period, predictability, area or size, magnitude, intensity, severity, and synergism. Disturbances are an important aspect of species diversity and ecosystem stability. They affect species dominance and abundance and create environmental heterogeneity across landscapes both temporally and spatially.

Assessment and understanding of the full effects of all recognized agents of disturbance is necessary for effective management of ecosystems.

Resilience and Stability

Disturbance and ecosystem resilience and stability are related. Extreme events, such as fire, can influence ecosystem conditions and recovery periods. Stability is the degree to which an ecosystem's composition and structure can be disturbed and still maintain composition, structure, and function. Stable systems can absorb some degree of disturbance without major changes in condition. When *disturbance* significantly alters conditions, the ability of the ecosystem to recover is its *resilience*. Ecosystems are well adapted to common disturbances.

An ecosystem that is disturbed beyond its limits of stability and resilience will be forced into a state characterized by altered composition, structure, and functions, including altered succession. The ecosystem is different and may not return to predisturbance conditions for a long time, if ever.

Landscape Patterns

Disturbances and succession create a dynamic pattern of patches or mosaics on the landscape. A dynamic landscape equilibrium may occur despite the fact that components change over time. Creation of new patches is balanced by the maturation of older ones on a sustainable landscape. A stable ecosystem can occur if viewed at a larger spatial/temporal scale.

Stressed and Healthy Ecosystems

Stress is a force that pushes the functioning of a critical ecosystem beyond its threshold to resist or recover. Stress results from disturbance that is extreme or unique to the ecosystem's adaptations. Stress events can include pollution, introduction of exotic species, alteration of disturbance regimes such as fire, and catastrophic events such as earthquakes and climatic shifts. Stress may reduce species diversity, change natural succession, and/or delay the natural timeliness of ecosystem recovery. Stress normally occurs at the extremes of natural ranges of variability for disturbance events.

Stressed ecosystems may include decreases in productivity and rapid changes in species composition. To measure stress, we must identify indicators and acceptable ranges at appropriate temporal and spatial scales for each type of ecosystem within a bioregion. Evaluation of stress or its converse, health, should reflect the ecological structure and processes.

A healthy ecosystem is one without stress. Disturbance has not pushed the ecosystem beyond its ability to resist or recover. An ecosystem is healthy if it is relatively stable and sustainable. Stress and health are helpful in communicating qualitative objectives for ecosystem condition.

Biodiversity

Biodiversity is an important characteristic of ecosystems across all scales. Retention of the genetic resource that species contribute, and the functional roles that they play within ecosystems, is an increasing focus of conservation.

Conservation is focused on the protection of all species. Biodiversity includes the variety of organisms, their interconnections, and their associated ecological processes. Conservation of biodiversity is important at the genetic, species, and ecosystem levels of organization. Conservation of biodiversity strives to conserve the full range of diversity and processes within and among species and ecosystems.

The basis of all biodiversity is genetic diversity (all heritable biotic variation). Important factors influencing genetic diversity include gene flow, historical biogeographic events, population structure, population demographics, taxonomic uniqueness, intraspecies differentiation, and mating behavior. Genetic diversity may be changed by any human activity that affects population size, population fragmentation, or breeding systems.

The reasons for conserving biodiversity can be characterized as ecological, social, economic, and administrative. The ecological aspects of conservation of biodiversity is related to species viability and ecological stability and resilience. Social reasons include human values such as spiritual, recreational, and aesthetic and the economic values. Administrative reasons are derived from numerous legislative mandates (e.g., the Organic Act).

Natural Range of Variability

Ecosystems must be managed within the natural ranges of variability for key ecological elements. Key elements should reflect an ecosystem's function and integrity. Management to preserve, maintain, or restore function and integrity to within natural ranges will produce more natural conditions.

Preservation of biological diversity depends on managing ecological elements within the limits of the variation that has occurred over thousands of years. If the key ecological elements are within the range of conditions that the ecosystem has experienced and adapted to over evolutionary time, then those conditions will sustain the ecosystem as a whole. If key elements are within the natural range of variability, the system is sustainable.

HUMAN PRINCIPLES AND CONCEPTS OF ECOSYSTEM MANAGEMENT

Ecosystem management recognizes humans as part of ecosystems, and the pursuit of past, present, and future desires, needs, and values have influenced and will continue to influence ecosystems. Ecosystem management must include consideration of the physical, emotional, mental, and spiritual, social, and economic well-being of people and communities.

Human systems are made up of biological and cultural components. Cultural components are distinguished by ideas, behavior, and material expressions of humans. An ecosystem can be understood as an array of cultural landscapes, reflecting the nexus of nature and culture, past and present world views, and associated values regarding the relationship of human societies to their environment.

The human system is composed of different levels of organization, such as individuals, communities, and cultures, and it includes various societal or cultural institutions, such as political and economic components. Culture involves the expression and transmittal of world view, beliefs, attitudes, and values through which people orient themselves to one another and to the surrounding world. The community portion of culture involves ways in which relationships contribute cultural identity and social solidarity and, therefore, provide a common link to members of a group, organization, town, or society. The political component encompasses the social relations in which members of society define goals and objectives to courses of action. The economic component includes production, consumption, trade of goods and services, and the associated creation of income, employment, and wealth.

Cultural identity, continuity, and cultural survival, especially for indigenous peoples whose world view and belief systems are often more closely linked to the land, are dependent on continued access to and use of certain cultural landscapes that contain key resources and culturally important locations. All human systems - past and present as well as traditional communities and multinational entities - can be described relative to their components, structure, and processes much like ecological systems.

Ecosystem Relationships

Human populations are part of larger communities and ecosystems. While it is possible for humans to modify many of these systems, they cannot create them and are dependent on them as are any other organism (Odum, 1959). Many aspects of humans in ecosystems are the same as for the ecological aspects of ecosystems.

The structure of human systems includes the order of human populations and organizations, such as the structure of cultures, societies, economies, and their supporting physical infrastructure. Structure supports the functioning of human processes.

Human systems are bound together by the processes of communication of ideas, philosophies, traditions, experiences, knowledge, and technology; flows of energy and materials; production,

consumption and trade of goods and services; maintenance of international and domestic law and order; and complex social interactions.

Four aspects of diversity in human systems are applicable: (1) Diverse human systems have greater stability than those with less diversity. (2) The largest and most diverse economic and social systems can support the most specialized human activities and endeavors. (3) Human societies historically dealt with a more limited range of variability. (4) Humans manage the physical and biological environment by altering the density and distribution of preferred resources and competing resources.

Two aspects of sustainability in human systems are important: (1) Human systems are sustainable as long as change occurs at a rate and magnitude at which human systems can adapt. (2) When change occurs at a greater rate and magnitude than human systems are able to adjust to, one or more of the six basic elements break down or are radically modified.

Diversity and sustainability are two principles that apply directly to both human and ecological systems.

SUMMARY AND CONCLUSION

This discussion has presented principles and concepts central to understanding ecosystem management. The better we understand the components, structures, processes, and their functions in ecological and human systems and how they are affected by various disturbances, the better prepared we will be to develop responsible management strategies to conserve biodiversity and sustain ecosystems.

This discussion was summarized from "Draft Region 5 Ecosystem Management Guidebook, Volume I" of the USDA Forest Service.

APPENDIX B

This appendix has two main purposes. First, adoption of ecosystem management has implications for many functional areas in the NPS. These will be briefly summarized for illustrative purposes. Second, many other NPS working groups and initiatives are ongoing and often overlap with the ecosystem management discussion above. Wherever possible, the working group has addressed these other efforts and has identified compatibility or contravention with ecosystem management concepts of this report.

NPS MANAGEMENT POLICIES AND GUIDELINES

The NPS has issued and maintains the Management Policies manual and well over 80 NPS guidelines for park and program managers. The bulk of the Policies and Guidelines were written in the 1970s and 1980s. Adoption of ecosystem management will necessitate revising many of these documents. The Management Policies manual and several of the guidelines such as NPS-2, NPS-6, NPS-28, NPS-77 will need to be changed substantively to reflect and foster ecosystem management principles. Other guidelines not substantively changed by ecosystem management principles should be reread to examine the processes of the guideline.

Guidelines with cumbersome processes should be re-engineered to ease the burden on field managers without compromising the integrity of the guideline. Park superintendent surveys and interviews can help determine which guidelines are consuming precious managerial time and producing wasteful repetition or fruitless efforts. Guidelines and policies in need of substantive change should be reviewed immediately, with ecosystem management principles guiding the rewriting process. The Management Policies document should be kept as brief and clear as possible. Guidelines should seek to assist managers not to be a burden on them.

The Management Policies manual is a sound document that requires slight philosophical and practical alterations to foster ecosystem management. While the Management Policies acknowledge that parks need to look outside the boundaries, the overwhelming emphasis is still restricted to park boundaries and not ecosystems. On a practical level, the basic management concepts are still based on the management zones of parks and must be recast within the framework of ecosystem management. In addition, the sections of the policies manual are written in isolation, discourage integration between functions, and tacitly sanction functionally distinct disciplines. Ecosystem management principles should permeate the Management Policies.

VAIL AGENDA INITIATIVES

PROFESSIONALISM/CAREERS

As discussed above, ecosystem management will require an increasingly professional staff. Starting pay should be comparable to the market rate for such professionals in order to attract the best people. Tighter standards for hiring should be instituted so that only the best-qualified individuals are hired. There is a need in the NPS to have professional employees along the wealth of disciplines discussed above in the interdisciplinary approach to management. The professional needs will vary according to the specific elements of the ecosystem, and accordingly, the composition of the professional staff should vary from office to office. Professional support can be acquired through partnerships with universities and other educational groups. In addition to ongoing efforts with rangers, maintenance, and administrative careers, a working group on resource management careers was recently convened. All these efforts should consider and incorporate ecosystem management principles into their work products.

EDUCATION

Education is essential to disseminate ecosystem management principles and lessons to both internal and external audiences. Ecosystem management will necessitate changes to the education program in four ways. First, it will broaden the subject areas as the Parks as Classrooms program and Ties with Higher Education programs mature. Ecosystem management philosophy must be incorporated into all existing programs. Secondly, a specific ecosystem management education initiative is needed to help explain NPS management principles and values to both internal and external audiences. Third, the NPS should review all interpretive bulletins and publications and adapt them to reflect ecosystem management. Lastly, the NPS should develop model environmental education programs on ecosystem management principles.

PARTNERSHIPS

The necessity of partnership efforts has been discussed in detail above. There are several working groups investigating partnership topics under the Vail Agenda initiative. These groups should prepare their reports to the Director, NPS, under the broad ecosystem management framework provided in this writing.

RESOURCE STEWARDSHIP

Future efforts in RMPs must fully integrate the principles of ecosystem management, and specific analysis and resource plans should be constructed in the context of ecosystem management goals. RMP action plans may require park based implementation and cooperative efforts with other stakeholders in ecosystem partnerships. Day-to-day NPS ecosystem management efforts in NPS operation cannot fully succeed without ecosystem management in planning. The collective planning processes should provide continuity and consistency between Special Resources Studies, legislation, General Management Plans, and Resource Management Plans.

Natural Resources

Two recent and thoughtful documents have analyzed natural resource management in the NPS

and have provided a wealth of recommendations that should be adopted. The documents are Science and the National Parks II, and the Strategic Plan for Improving the Natural Resource Program of the National Park Service (NR Strategic Plan). The current report largely supports and is supported by the two efforts. This report provides the details on ecosystem management as an entire management concept, while the other two reports have more detailed information and recommendations concerning the natural resource programs of the NPS. Science and the National Parks II provides more detailed recommendations on professionalization, NPS and NBS linkages, and a legislative mandate for science in the NPS. This working group supports these more detailed recommendations. The Natural Resource Strategic Plan provides more specific recommendations for the use of science and research in resource management. This working group also supports these recommendations carried out in the context of ecosystem management.

Cultural Resources

A working group on a Cultural Resource Management Strategic Plan (CR Strategic Plan) has recommended that a cultural resources strategic plan be developed and relate directly to the NPS Strategic Plan. The working group envisions Natural Resource Programs and Partnership Programs having separate strategic plans also under the general guidance given by the NPS Strategic Plan. The working group on ecosystem management supports these recommendations, with the following cautionary comments. First, the strategic plans to be developed by all three areas (natural, cultural, and partnership) should be developed under the umbrella of ecosystem management concepts in this report. The strategic plans have the potential to assist managers greatly in implementing the various programs, but only if they coincide with the management framework of ecosystem management. Also, each of the three areas of strategic planning must incorporate the other two areas in their strategic plans. One of the most problematic elements of present NPS management is the artificial separation of the natural, cultural, and heritage partnership programs. The separation begets inconsistent policy and a failure to cooperate and coordinate. All three functional elements should be understood as tools to be used toward a common end; the exemplary management of ecosystems. The strategic plans, then, should address relationships with the other NPS elements and stress the interdisciplinary nature of ecosystem management.

Integration of Natural and Cultural Resources

The group on Integration of Natural and Cultural Resource Management directly addresses the artificial separation of programs (which also include partnership programs). The working group on ecosystem management supports the sentiments of the report of this group. Functional areas in great need of integration are resource management, planning, training, and education. These efforts will help create a more common language between natural and cultural personnel to facilitate cooperative work in the future.

TRAINING AND EMPLOYEE DEVELOPMENT

Many of the above recommendations concern training, which is a crucial ingredient to successful ecosystem management. Training should be augmented in three ways. First, ecosystem

management must be factored into the basic training package given to all employees. Second, specific ecosystem management training is essential for resource managers, and an ecosystem management training program should be initiated. To foster this program, ecosystem management training should be located at the proposed NPS Presidio Training Center in San Francisco. This would place the newest training program in the newest training center and will signal a new beginning for NPS resource management efforts. This training should be coordinated with other federal agencies and be open to all federal employees and other partners. Partnerships with other agencies, universities, and interested parties should be established so that courses, seminars, and symposiums may be offered throughout the country. Last, additional specific training programs currently offered to NPS professionals must incorporate ecosystem management principles.

PLANNING

Planning efforts in the NPS encompass two elements: planning for existing parks and planning for future park additions. Current planning efforts geared toward existing parks, GMPs, must be enhanced to reflect ecosystem management principles. This is especially important when planning park development and adjacent land studies. Adjacent land studies should expand the focus to the greater ecosystem and should work with the established parks in the greater ecosystem. Planning for future parks, SRSs, should work on two fronts. The NPS should continue to investigate the addition of areas of significant national interest under the framework of ecosystem management described herein. As well, however, the NPS should investigate the significance, suitability and feasibility of establishing parks in major ecosystems not yet represented by the NPS. Planners should accordingly investigate and emphasize areas not currently represented by the NPS, such as the prairie grasslands.

NPS planners and managers are currently involved in a comprehensive reevaluation of all aspects of park planning programs through a procedure termed "future search," which began in January 1994 with a planning futures workshop. The workshop resulted in the identification of 22 planning program strategies and action items designed to provide information and direction to future NPS planning activities. Several key goals relate directly to ecosystem management and sustainable development and operation. The recommendations as a whole should improve overall planning efforts. The Ecosystem Management Working Group supports the "future search" planning efforts and recommends that ecosystem management principles be fully incorporated in the recommendations of that working group. As stated earlier, NPS planning processes should provide continuity and consistency between all levels of planning.

HERITAGE PARTNERSHIP PROGRAMS

Heritage partnership programs, as termed by the Restructuring document, are often viewed as the stepchild of park-based natural and cultural resource programs. However, existing heritage partnership programs are receiving broad recognition for providing effective and accepted leadership in resolving resource and recreation issues outside NPS areas and represent a powerful tool to facilitate and advance ecosystem management concepts. Programs such as the Rivers and Trails Conservation Assistance Program, National Natural Landmarks and National Historic Landmarks Programs, and National Register Programs are primary vehicles to initiate

partnerships and provide funds and expertise for partners to manage resources better and to improve overall ecosystem conditions. The programs provide a grass-roots, participatory process, build local support networks, educate and train interested conservation advocates, foster communication and coordination within communities and regions, and identify and promote sustainable economic activity. Activities such as these are at the core of ecosystem management efforts.

Accordingly, the heritage partnership programs must be integrated with natural and cultural resource programs at the field level and be an integral tool for management in greater ecosystems. The Heritage Partnership programs should also fully reflect ecosystem management principles. The Ecosystem Management Working Group strongly recommends that current working groups on partnership-related subjects construct their recommendations to the Director under the broad framework of ecosystem management as delineated in this report.

COMPLIANCE

Both the 1969 National Environmental Policy Act (NEPA) and the 1966 National Historic Preservation Act (NHPA) to a large extent reflect ecosystem management principles. Both Acts require informed decision-making, the formulation of alternative solutions, broad public input, and the inclusion of social and economic information in analyses. However, NEPA and NHPA do not necessarily reflect all ecosystem management principles, for example, broad-scale, long-term, goal-driven planning. The acts are nevertheless compatible with ecosystem management, and compliance with them can be enhanced by incorporating ecosystem management concepts throughout the evaluation and planning process. In the ecosystem management format, compliance actions can be tailored to address more cumulative-effect questions in a broader geographic context, with the benefit in most cases of more comprehensive and useful data.

INTERNAL COMMUNICATION AND COORDINATION

As mentioned above, one of the primary needs of ecosystem management is a strong internal communication network. In order for ecosystem management to evolve and improve, the actions and lessons learned on the ground must be disseminated Servicewide, including current demonstration projects. An ecosystem management bulletin board should be created on the electronic mail system. The network should serve to communicate internal NPS ecosystem efforts, lessons, and results; external efforts, lessons, and results; and ecosystem literature/research developments. The Resource Stewardship and Partnerships Office in WASO should be the formal liaison. In that office, employees should be assigned the task of enhancing ecosystem management efforts across the nation and must encourage transferral of ideas and lessons. The network can be developed in conjunction with other federal agencies. More detailed description of programs and events can be captured in a monthly Ecosystem Newsletter, which will provide information about ecosystem efforts, lessons, and contacts. The Data Management working group under the Vail Agenda should incorporate ecosystem management and these recommendations into their final work project.

BUDGET

The lack of flexibility in the budgetary structure can often hamper resource stewardship efforts.

This funding ridgidity is both imposed on the NPS by Congress and created internally by NPS policies. Funds are often appropriated in discrete and specified allotments, such as for natural resources, cultural resources, or maintenance. This style of budgeting hampers ecosystem management efforts that cross functional lines and disciplines. The NPS should press for budget reforms that increase the importance of base budgets and other nonspecified allotments and reduce restrictive funding structures. Ecosystem management is fostered by providing spending flexibility.

MAN AND THE BIOSPHERE PROGRAM

The Man and the Biosphere Program of the United Nations Educational, Scientific, and Cultural Organization is based on the concept that it is possible to achieve a sustainable balance between the conservation of biological diversity, economic development, and maintenance of associated cultural values. Biosphere reserves are areas composed of different land and water uses where the validity of this concept is tested, refined, demonstrated, and implemented. The United States Biosphere Reserve Program (USBRP) is part of this international effort. Biosphere efforts represent the closest programs to ecosystem management in the nation. The USBRP projects stress local participation, assess large areas, merge biological and economic needs, and share lessons from the field. Some 29 NPS units are associated with the USBRP. This working group recommends increasing participation in MAB efforts and using the lessons learned to date in MAB projects to assist ecosystem management efforts.

APPENDIX C

JULY 1994 *RECOMMENDATION FOR RESTRUCTURING THE NATIONAL PARK SERVICE*

The working group on ecosystem management commends the efforts and results of the restructuring work group. The plan is sound and will help improve NPS resource stewardship by fostering ecosystem management. The restructuring effort should utilize the ecosystem management principles of this report as guides in their formulation. Modifications to the draft restructuring report are recommended to enhance ecosystem management and are delineated below.

GUIDING PRINCIPLES (p. 6)
Number 2: Change from "be resource based" to "be resource based by fostering and supporting ecosystem management"

TERMINOLOGY (p. 8)
Add: What is Ecosystem Management?

***Ecosystem management*, then, is a goal-driven, long-term approach to restoring and sustaining functioning ecosystems and their values.** It is based on collaboratively developed and evolving visions of desired ecosystem conditions that integrate biological, economic, and social factors affecting a management unit defined by ecological, not political boundaries. Ecosystem management blends the needs of human communities and their cultural and economic base with the dynamic, diverse, and complex environment. Ecosystem management is not a panacea. Instead, it is a collaborative and interdisciplinary approach to management that, most importantly, understands that NPS resource conditions depends on the conditions of the larger ecosystems. The complete implications of ecosystem management are delineated in the Vail Agenda - Report of the Ecosystem Management Working Group.

SYSTEMS SUPPORT OFFICES (pp. 18-20)
Add to p. 19 immediately before STEWARDSHIP TEAM:

The system office functions should be designed around interdisciplinary teams, which will incorporate an array of managers, social and natural scientists, and other professionals. Both the Resource Stewardship Team and the Partnership Team have wide responsibilities in ecosystem management and must adopt the interdisciplinary approach that best facilitates ecosystem management. Critically, these teams must develop formal and informal avenues for joint work and communication and coordination of duty.

FIELD DIRECTORATE (p. 23)
Add as the fourth paragraph under Field Director:

Primary function of the Field Directors are to follow ecosystem management principles in carrying out their responsibilities, to inform and advise WASO and Congress on ecosystem

management visions, principles, needs, and actions in their directorate, and to ensure that resources and information needed for ecosystem management are received at the field level.

NATIONAL PROGRAM CENTERS (pp. 25-26)
The paragraph below should be inserted as the third paragraph on p. 24:

All National Program Centers will organize their planning and operation around ecosystem management principles delineated in the Vail Agenda - Report on Ecosystem Management where appropriate. Ecosystem management will provide the broad framework under which the Program Centers will operate. This will be of primary importance to the Natural Resource Center; the Planning, Design, and Construction Center; the Cultural Preservation Centers; Harper's Ferry Center; and the Partnership Service Center. Also, communication and coordination between the separate Program Centers is essential.

NATIONAL PARK SERVICE, HEADQUARTERS OFFICE (pp. 29-32)
Insert in paragraph two on p. 30 under Director and Deputy Director:

The Deputy Director in support of the Director is the primary position in the NPS to guarantee that the agency follows the principles of ecosystem management.

FIELD OFFICE/FIELD UNIT CLUSTER BOUNDARIES (p. 35)
Add:
All park units with a single system office should not be considered as single ecosystems. The groupings do not always constitute logical areas for analysis and planning. The clusters should be the basis for the sharing of resources and expertise. Within clusters and system office, however, further refinement of areas that are sensible for common planning, assessment, and partnerships is critical. Within the clusters this refinement should develop naturally, facilitated by parks and system offices, and will group parks with very similar threats, needs, and partners. A cluster, then, may incorporate several ecosystems areas for planning, analysis, and partnerships. It is these areas within clusters that should be understood as ecosystems in this document. For example, while all the parks in the Gulf Coast cluster have some common threads, it is more relevant to consider the Everglades, Big Cypress, and Biscayne as a workable and sensible ecosystem for analysis, planning, and partnerships. In urban parks such as Boston National Historical Park, where several sites commemorate the Revolutionary War, it is more appropriate to consider Boston, Minute Man, Morristown, and Saratoga as a meaningful system. **The clusters should be understood as basic units for NPS resource sharing, but only as starting points for effective ecosystem management.**

APPENDIX D

SUGGESTED READING

Federal Government

Congressional Research Service: *Ecosystem Management: Federal Agency Activities*, April 19, 1994.

Department of Agriculture, Soil Conservation Service: *SCS Policy to Implement Ecosystem-Based Assistance*, Draft, April 28, 1994.

Department of Agriculture, U.S. Forest Service: *From Concepts to Clarity: The Next Steps,* February 24, 1994; *A National Framework; Ecosystem Management,* April 1994; *Taking an Ecological Approach to Management,* National Workshop Report, April 1992; *Forest Service Ecosystem Management Policies and Guidelines Summary,* May 18, 1994; *Eastside Forest Ecosystem Health Assessment Volume II,* April 1993; *National Hierarchical Framework of Ecological Units*, October 28, 1993.

Department of Defense: *Legacy Resource Management Program for Fiscal Year 1995.*

Department of the Interior: *Ecosystem Management in the Department of the Interior*, Draft, July 5, 1994.

Department of the Interior, Bureau of Land Management: *Ecosystem Management in the BLM: From Concept to Commitment,* December 14, 1993; *Maintaining Healthy Ecosystems,* Draft, March 1994; *Blueprint for Change*, Draft, June 27, 1994.

Department of the Interior, National Park Service: *Report to the CRS,* March 1994; *Ecosystem Management in the Western Region,* April 1994; *Ecosystem Management in the Rocky Mountain Region,* Draft; Pacific Northwest Region: *A Sustainable Ecosystems Approach to Reorganization of the NPS,* May 1994; *National Parks for the 21st Century: The Vail Agenda*, 1991; *Science and the National Parks II: Adapting to Change,* September 1993; *National Park Service Strategic Plan*, July 1994; *Humanities and the National Parks*, 1994.

Department of the Interior, U.S. Fish and Wildlife Service: *Ecosystem Approach to Fish and Wildlife Conservation*, March 1994; *National Implementation Guidance,* June 15, 1994; *Taking an Ecological Approach to Management,* National Workshop Report, April 1992.

Environmental Protection Agency: *Toward a Place-Driven Approach: The Edgewater Consensus on an EPA Strategy for Ecosystem Protection,* Draft, May 15, 1994.

Forest Ecosystem Management Assessment Team (FEMAT): *FEMAT Report.*

General Accounting Office: *Ecosystem Management* (GAO/RCED.94.111), August 1994.

Interagency Ecosystem Management Coordinating Group: *The Evolution of Ecosystem Management: An Overview of Common Themes and Activities,* June 1994; M*ultiple Boundaries For Assessment and Analysis,* June 1994; *Using Multiple Scales For Ecosystem Management,* June 1994, *Keywords and Definitions.*

Interagency Task Force on South Florida Ecosystem Restoration: *Interagency Agreement,* September 1993; *Working Group Meeting Report,* July 1993.

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California Department of Forestry and Fire Protection: *California's Coordinated Regional Strategy to Conserve Biological Diversity,* September 1991.

Center for the Study of the Environment: *Status and Future of Anadromous Fish of Western Oregon and Northern California: Rationale for a New Approach,* Botkin, Cummins, Dunne, Regier, Sobel, and Talbot, 1993.

Chase, Alston: Introduction: Our National Parks, *Outside Magazine*, June 1992.

Florida Department of Environmental Protection: *Beginning Ecosystem Management,* April 1994.

Forest Policy Center: *Modeling Sustainable Forest Ecosystems,* November 1992.

Foster, Charles H.W.: *Strands and Soundings: A Kennedy School Cape Cod Notebook,* Center for Science & International Affairs, John F. Kennedy School of Government, August 1993.

Greater Yellowstone Coalition: *Sustaining Greater Yellowstone, a Blueprint for the Future,* July 1994.

Grumbine, Edward R.: What Is Ecosystem Management? *Conservation Biology*, Volume 8, No. 1, March 1994.

Meyer, Stephen M.: The Final Act, *The New Republic*, August 15, 1994.

Moore, Burke, Cortner, and Wallace: *Principles of Ecosystem Management,* WRRC, January 1994.

Northern Forest Lands Council: *Finding Common Ground,* Draft, March 1994.

Sierra Club: 21 Ecoregions, *Sierra, The Magazine for the Sierra Club*, March/April 1994.

Sisto, Tony: Ecosystem Management: But Is It Science? *Ranger: The Journal of the Association of National Park Rangers*, Fall 1994, Vol. X, No. 4.

U.S. Man and the Biosphere Program: *A Strategic Plan for the U.S. Biosphere Reserve Program*, March 1994; *Action Plan for the U.S. Biosphere Reserve Program,* September 1993; *Central California Coast Biosphere Reserve,* October 1993; *Mammoth Cave Area Biosphere Reserve,* October 1993; *Southern Appalachian Biosphere Cooperative*, March 1994.

Wilderness Society: *An Unravelling Tapestry: Our Great Parks and the Natural Systems That Sustain Them.*

Wilson, Edward O.: *The Diversity of Life,* The Belknap Press of Harvard University Press, 1992.

Wood, Christopher: Ecosystem Management: Achieving the New Land Ethic; *Renewable Resources Journal*, Spring 1994.

February 3, 1995

To Bob McIntosh, NARO
From Dick Sellars, SWRO

Bob:

Thanks for your interest in my reviewing the Ecosystem Management document. I agree very much with the overall intent of the document and I think the effort is very worthwhile, a visionary blueprint of how things should work.

However, as I read it I naturally had in mind National Park Service history, including many plans and promises made over the years. Unfortunately, for natural resource management (much more, I think, than for cultural resource management) there is a long history of broken promises, particularly as regards the use of science in support of management. This fact fosters my somewhat pessimistic view of what may come of efforts such as this one on Ecosystem Management.

A few specific comments:

As the document says on page 1, ecosystem management means different things to different people, but the discussion of Ecological Principles and Concepts in Appendix A is a very good, succinct statement.

A comment on What is Ecosystem Management, p. 4: I see the use of the word "ecosystem" beginning to creep into NPS documents, mainly correspondence among scientists, by the mid-1960s. It was applied then mostly to parks, but NPS scientists had long been aware of the relationships with external phenomena. For example, this awareness was expressed in 1933 by George Wright, et al., in Fauna No. 1. In other words, the Ecosystem Management document (with the possible exception of its cultural aspects) is a more sophisticated, complex, 1990s expansion of ideas and concerns which NPS scientists have had for more than 60 years.

A fundamental problem which the Service faces as it undertakes this more formalized effort to develop ecosystem management is that, during those 60-plus years, it has failed to put its own house in order. The statement on page 6 that "the NPS is steeped in a tradition that hampers its ability to confront the challenges of the next century" is correct. For instance, since Fauna No. 1 the Park Service or external committees investigating national park management have time and again proclaimed the need to improve science and to inventory and monitor natural resources. (e.g., most recently, page 12 of the Ecosystem Management document, on fully funding and implementing inventory and monitoring; or page 15 on using the "best scientific...data;" or on page 16, under "Actions") An earlier and finely worded example of this came in the 1961 internal study, "Get the Facts and Put Them to Work" (a document that Conrad Wirth probably

thought would go nowhere, but that Howard Stagner used to persuade Stewart Udall to call for the Leopold and National Academy studies of 1963). It stated that the Park Service:

> must understand, much more completely than it now does, the natural characteristic of these properties, the nature of the normal processes at work within them, the unnatural forces imposed upon them, and, as well, the relationships of park visitors to the natural environments. If the Service is to protect and preserve, it must know <u>what</u> it is protecting, and what it must protect against. It is the function of research to get at the truth, to develop the fund of knowledge necessary for intelligent and effective management.

This was brought to the Service's attention in 1961--thirty-four years ago, and twenty-eight years after Fauna No. 1. To external critiques such as the Leopold and National Academy studies, the Service responded rhetorically and minimally, not substantively, and tried to go about business as usual. State of the Parks, urged on by high-minded Service employees going outside to Congressional contacts to bring pressure on the Service, helped change this somewhat, but not enough. Again, as we move toward ecosystem management our own house is not in order.

Another example is the Service's unenthusiastic compliance with cultural resource legislation. The document acknowledges on page 34 that the National Historic Preservation Act (and the National Environmental Policy Act) reflect ecosystem management principles, which is certainly true, as a significant part of NHPA's intent has always been to make federal agencies more a part of local communities and more attuned to the values of local people. The state historic preservation officers are in fact the people's designated representatives in these matters. Yet national park management has frequently resisted full-faith compliance with NHPA, and Section 106 is many times disparaged as too burdensome and too much of an interference. On page 8, the document states that the Park Service should "lead by example," and elaborates on this in the remainder of the paragraph. But the upshot of its response to NHPA is that an agency which sees itself as an environmental leader has from the first refused to give wholehearted support to this very important environmental legislation.

As I am sure you agree, our care for the resources under our direct management should be exemplary. Yet I very much suspect that a key target of the effort to "find creative ways to address problems" in park management (page 20) will be to diminish further the burdens of Section 106, one of the very means by which Congress sought to insure that environmental concerns of local (as well as state and national) populations are addressed--and by which the Park Service itself seeks to ensure the integrity of cultural resources. I am wary of the "creative" approach when it involves environmental law.

In this regard, I am skeptical of the efforts to de-centralize management. "Rigid control of park managers" (this is disingenuous--in a 22-year career I have seen little of that) may stifle innovation and exacerbate inefficient use of NPS resources, as the document states on page 20; but when control is used it is often to ensure a park's compliance with environmental legislation. We should be aware that "creative ways" can easily become the "superintendent's whim."

On page 32 and elsewhere, the document states the intention to resolve the "artificial separation" of cultural and natural programs. Except for attendance at the Vail conference, I have not been following closely what is going on is this regard, but I do indeed support the idea of close cooperation and understanding between cultural and natural resource staffs. We need more of that. We need to ensure that employees are not parochial, but understand and relate to concerns other than their particular professional interest. However, I do not believe that the separation is artificial. There is overlap, but, among other things, natural and cultural resources have different values, different sets of meanings to Americans, different dynamics, need different research approaches and different treatments, and require different professional expertise--say, for bison and elk management in Yellowstone, or structural deterioration at Old Faithful Inn or wherever. Cooperation and some degree of organizational integration are good ideas, but I would not push it much beyond that.

Similarly, on page 11, the document discusses clustering, using as one example Boston, Minuteman, Morristown, and Saratoga. I wonder how wise this is. While these parks share a common historical theme, they are worlds apart in their immediate environmental, social, and political situations--from rural upper New York state and partly rural New Jersey to the Boston metropolitan area. I am not sure that such a cluster would be to anyone's advantage. And it might be difficult for a small park like Saratoga to maintain cluster relationships with distant parks. When I think about it, we have perhaps for some time "clustered" the resources, without using that term--for instance, the parks' and regions' mutual concerns about urban pressures on resources, overpopulation of ungulates, natural regulation, preservation of earthworks, preservation of adobe or stone buildings, preservation of memorials, etc. We might better address such problems by improving both formal and informal networks such as we have used in the past.

I am going to stop here. I hope these comments are taken as altogether constructive, as they are intended.

Sincerely,
Dick Sellars