PINCHOT INSTITUTE
FOR CONSERVATION

Ensuring the Stewardship of the National Wilderness Preservation System

A Report to the

USDA Forest Service
Bureau of Land Management
US Fish and Wildlife Service
National Park Service
US Geological Survey

Pinchot Institute for Conservation
September 2001

About the Pinchot Institute for Conservation

Background

Recognized as a leader in forest conservation thought, policy and action, the Pinchot Institute for Conservation was dedicated in 1963 by President John F. Kennedy at Grey Towers National Historic Landmark (Milford, PA), the former home of conservation leader Gifford Pinchot. The Institute is an independent nonprofit organization that works collaboratively with all Americans – from federal and state policymakers to citizens in rural communities – to strengthen forest conservation by advancing sustainable forest management, developing conservation leaders, and providing science-based solutions to emerging natural resource issues. Each year, the Pinchot Institute conducts policy research and analysis; convenes and facilitates meetings, workshops, and symposiums; produces educational publications; and provides technical assistance on issues that affect national-level conservation policies and the management of our national forests and other natural resources.

Current Programs

The Institute's objectives – policy research and analysis, convening and facilitation, and leadership development – are realized annually through the following programs:

Community-Based Forest Stewardship

Restoring and maintaining forest ecosystems for multiple objectives requires a variety of continuing land treatments that can serve as a basis for stable employment and generate income in rural communities. Through technical assistance programs and training sessions, policymakers, federal and state land management agencies, and local practitioners work collaboratively to identify, address, and develop strategies on specific initiatives that sustain and improve the stewardship of such ecosystems.

Conservation Policy and Organizational Change

Much of the effort to date in sustainable forestry has focused on policy development, with far less attention devoted to the mechanisms by which these policies will be implemented. Through independent analysis and facilitation, the Institute develops approaches to natural resource management that integrate political organizational structures and long-established administrative processes with emerging conservation-oriented ideas and policies.

Conservation Leadership Development

Effective natural resource conservation begins with effective leaders. Through leadership workshops and professional development seminars that are based on participatory decision models offered at Grey Towers National Historic Landmark, the Institute helps beginning and mid-career professionals in public agencies, private organizations and conservation NGOs redefine the relationship between land management agencies and the communities they serve.

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EXECUTIVE SUMMARY

America has pioneered many important concepts regarding protection of lands and our national heritage. The passage of the Wilderness Act (PL 88-577) in 1964 created the **National Wilderness Preservation System**, and signaled a commitment to protect in perpetuity a portion of our landscape and its related human heritage. However, to accomplish this requires active stewardship in the face of population growth and environmental change. Active stewardship of the Wilderness System requires that the four Federal agencies that manage portions of the Wilderness System cooperate and collaborate.[1] It requires that they do the best that they can for the land within the limits of their technical and financial resources.

Wilderness management coordinators in the four Federal agencies recognize that improvements are needed in the stewardship of the Wilderness System to sustain it unimpaired into the new century. In 1999, they asked the **Pinchot Institute for Conservation** to empanel a diverse group of individuals from outside of government to examine our stewardship of Wilderness over the past 35 years and to recommend how we might be better stewards in the 21st century. This report speaks to the issues of stewarding the National Wilderness Preservation System of the United States, an idea that is truly American in origin, but that has caught the attention of people around the world. As this report is released, 37 years after the passage of the Wilderness Act, we find that the Wilderness System has grown from 10 million acres in 54 units to nearly 105 million acres in over 600 units. We find also that the National Wilderness Preservation System is more important to the American people than ever before.

The fundamental conclusion of this report is that there is **a need to forge an integrated and collaborative system across the four wilderness management agencies**. Given the importance of wilderness as part of a land use spectrum, its historical, scientific, recreational, philosophical, and spiritual significance, and the lack of a truly systematic approach to protecting and managing Wilderness, the report offers an agenda and specific recommendations to the Secretaries of Agriculture and Interior, the officials designated in the Wilderness Act as primarily responsible for guaranteeing an enduring resource of wilderness.

When an area is designated by Congress as Wilderness, there are myriad responsibilities to maintain and enhance the wilderness character. Many management actions are necessary simply to protect the resource from degradation. Yet the essential character of Wilderness is to be "untrammeled by man," and many scholars and managers regard "stewardship" as the most appropriate perspective for safeguarding these unique resources in the future. Therefore, this report emphasizes the term wilderness stewardship, rather than wilderness management. Stewardship implies working with Nature to perpetuate wilderness for the future, and any actions to be taken need to be considered from a diversity of philosophical, legal, and technical perspectives.

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[1] Portions of the National Wilderness Preservation System are managed by the National Park Service, Bureau of Land Management, and US Fish & Wildlife Service (all in the Department of the Interior), and the US Forest Service (in the US Department of Agriculture).

The Wilderness System is growing in size and complexity, and our understanding of the system is broadening. There are examples suggesting that this growing complexity is understood among the agencies' leaders in wilderness stewardship, but many other examples that suggest it is not. There are issues that exemplify some contemporary dilemmas of stewardship. One of these is ensuring both naturalness and wildness; another is recognizing that wilderness is not isolated from the surrounding landscape. Manipulating wilderness conditions is philosophically and practically problematic, and how we define minimum requirements is important in selecting actions and tools to use. The place of recreational use in the broader spectrum of wilderness values has not been made particularly clear. Agency organization and commitment to stewardship are needed for success, but in many instances they seem lacking. Effectively utilizing modern information technologies to maximize the value of Wilderness and minimize degradation is a major new opportunity. Each of these issues presents significant challenges for how we steward wilderness for the future.

To enable land management agencies to meet the challenges, some principles for stewardship would be very useful, and the following eight are offered for consideration:

- **Adhering to the Wilderness Act is a fundamental principle for wilderness stewardship in the US.**
- **US wilderness is to be treated as a system of wildernesses.**
- **Wildernesses are special places and are to be treated as special.**
- **Stewardship should be science-informed, logically planned, and publicly transparent.**
- **Non-degradation of wilderness fundamentally should guide stewardship activities.**
- **Preservation of wilderness character is a guiding idea of the Wilderness Act.**
- **Recognizing the wild in wilderness distinguishes wilderness from most other land classes.**
- **Accountability is basic to sound stewardship.**

In shaping the future for success in wilderness stewardship, there are several things that the wilderness agencies should do. Implementing these recommendations will assist the Secretaries and the agencies under their purview to better steward our wilderness resources.

- **The four wilderness agencies and their leaders must make a strong commitment to wilderness stewardship before the Wilderness System is lost.**
- **The four wilderness agencies must organize to maximize stewardship effectiveness and to develop a fully integrated stewardship system across the Wilderness System.**
- **Wilderness planning must be accelerated to help guide stewardship activities, to enhance opportunities for evaluation and accountability, and to increase the probability that the Wilderness System will be sustained.**

- **Science, education, and training programs should be enhanced and focused to provide information, professional expertise, and public support for wilderness stewardship.**
- **The four wilderness agencies should create wilderness stewardship positions and career opportunities at all levels and commit adequate financial resources for stewardship and support of wilderness.**
- **Accountability for the maintenance and sustainability of the Wilderness System must be embraced by the four wilderness agencies.**

It is possible to move forward and ensure a National Wilderness Preservation System for the future. It will require building an integrated, collaborative system across the two departments and the four wilderness agencies. To manage the wilderness as a system means that each area is a part of a whole, no matter which agency administers it. It means that all wildernesses are subject to a common set of guidelines, and thus requires that such guidelines be developed.

There exist today several system-oriented institutions that can be used to move administration and stewardship of wilderness toward becoming an integrated system. The relatively new Wilderness Policy Council of the four wilderness agencies and the US Geological Survey is one of these. It could be an important body for discussion of leading issues and for making recommendations to the agencies and the secretaries.

The **Wilderness Information Network** (www.wilderness.net) is a tool for compiling and disseminating information about wilderness over the Internet. It draws together the information developed by stewards of individual wildernesses, research by federal agencies, university professors and others, information disseminated in periodicals and other media, and information from groups that care about wilderness stewardship. The **Arthur Carhart National Wilderness Training Center** and the **Aldo Leopold Wilderness Research Institute** are interagency organizations designed to bridge the training and research needs of the four wilderness stewardship agencies.

Collaborative and cooperative activities among federal agencies in Alaska, also are instructive for illustrating possibilities. The Alaska Cooperative Planning Group, the Alaska Issues Group, the Alaska Land Manager's Forum, and the Alaska Public Lands Information Center all are institutions that demonstrate that integrative, collaborative stewardship might be possible.

Combining strong leadership from the Secretaries of Agriculture and the Interior, from the agency heads and their staffs, and the efforts of dedicated wilderness stewards and advocates, the potential exists for bringing all of the pieces together to ensure the continued integrity of the Wilderness System. To this end, **four specific recommendations are offered for consideration by the Secretaries and others responsible for ensuring a continuing resource of wilderness:**

- **The Secretaries should issue joint policies and regulations specifying common interpretations of law, and thus provide broad guidelines for the stewardship of wilderness.**
- **The Secretaries should devise an organizational structure to make stewardship happen across the agencies so that a high quality wilderness system is continued in perpetuity.**
- **The Secretaries should devise monitoring and evaluation systems to ensure that we know how well wildernesses are being stewarded, especially in the context of a system of wildernesses, and they should reinstitute regular reporting of the state of the system.**
- **The Secretaries should develop a means for informing the American people about the National Wilderness Preservation System and about their wilderness heritage.**

It is the view of this panel that implementing these recommendations, and the framework for action prescribed in this report, can lead to more effective stewardship and development of a National Wilderness Preservation System, and ensure that it continues to be a world treasure in centuries to come.

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PREFACE

The National Wilderness Preservation System has rapidly grown from the nine million acres designated by the Wilderness Act in 1964 to104 million acres of federal land today, well beyond the wildest dreams of early wilderness advocates. The Wilderness Act defines wilderness as "an area where the earth and its community of life are untrammeled by man, where man himself is a visitor who does not remain," but it gave little guidance as to how these lands were to be managed to protect the wilderness character for which they had been recognized. This has posed a major challenge to the four federal agencies charged with managing portions of the Wilderness System, and to their coordination among themselves to manage their respective segments as parts of a single system.

In July of 1999 the Pinchot Institute for Conservation was asked by representatives of these four federal land management agencies to begin a new study into the quality of management of the National Wilderness Preservation System. The agencies are the Forest Service of the Department of Agriculture and the National Park Service, Bureau of Land Management and the US Fish and Wildlife Service of the Department of the Interior. The purpose of the study was to examine the critical management issues facing the four agencies 35 years after the Wilderness Act of 1964, and to develop a common set of wilderness management priorities to ensure the future integrity of the National Wilderness Preservation System.

To accomplish the study, the Pinchot Institute formed an expert panel, subsequently known as the Wilderness Stewardship Panel. Each of the panelists brought significant experience and expertise to the task, and the panel reflected a diversity of values and perspectives regarding wilderness conservation and management. Perry Brown, Dean of the School of Forestry at the University of Montana was the chair of the panel. Other members were Bill Meadows, President of the Wilderness Society; Joe Sax, Professor of environmental regulation at the University of California at Berkeley; Norman L. Christensen Jr. founding Dean of the Nicholas School of the Environment at Duke University; Hanna J. Cortner Professor at Northern Arizona University; Deborah Williams, Executive Director of the Alaska Conservation Foundation; Former Secretary of the Interior Stewart Udall; Thomas C. Kiernan, President of the National Parks and Conservation Association; William Reffalt, retired Chief of Refuges at the National Fish and Wildlife Service; and George Siehl, a retired recreation specialist at the Congressional Research Service. The entire effort was coordinated and managed by James W. Giltmier, a Senior Fellow at the Pinchot Institute for Conservation.

Following several coordinating meetings and conference phone calls at the federal staff level, the panel held their first meeting in December of 1999 at Albuquerque, New Mexico. Subsequent meetings were held in Washington, DC, and Denver, Colorado. Members of the panel heard from federal employees at all levels including those who manage wilderness on the ground. They also heard from a broad spectrum of interest groups that have a stake in the wilderness system, including those who oppose wilderness designation altogether. In July, 2000 the panel participated in the National Wilderness Summit in Washington called by Forest Service Chief Mike Dombeck and facilitated by

the Pinchot Institute. From this summit, a new Wilderness Policy Council was created, consisting of senior executives from each of the four federal agencies whose task it will be to coordinate more closely than in the past on the management of the Wilderness System.

This report is a culmination of the work of the expert panel, which volunteered countless hours of effort over a period of more than a year to thoroughly identify and describe both the challenges and opportunities in wilderness management. These needs include: education, training and outreach; land inventory and monitoring; information management; resource protection; program management and coordination; and leadership. The report also advances specific policy recommendations aimed at addressing these needs. These recommendations are ambitious, but also well-considered and practical. They clearly demonstrate what needs to be done to protect these unique resources for the use and enjoyment of future generations, to increase our scientific understanding of the functioning of natural ecosystems, and to ensure that there will always be wild places "where the earth and its community of life are untrammeled by man."

V. Alaric Sample
President
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September 28, 2001

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I. INTRODUCTION

Wilderness stewardship has a Zen-like quality that asks us to work ingeniously so that nothing happens that would not happen if we were not there. This is in keeping with the ethic of restraint embodied in the 1964 Wilderness Act and its resolve that our civilization "not occupy and modify all areas of the United States and its possessions." If our benchmark is the verb *to modify*, it took 100 years—from George Perkins Marsh's use of that verb in his book *Man and Nature: The Earth As Modified By Human Action,* first published in 1864—for our culture to achieve, as a national policy, this posture of humility toward natural conditions that is explicit in the Wilderness Act. In designated wilderness we are not to manipulate nature, the more-than-human world, but to jealously safeguard their natural conditions and ecological processes.

It is not altogether surprising, then, that it has taken four decades since the passage of the Wilderness Act for the federal land-managing agencies to begin to get the knack of wilderness stewardship, which is the occasion for the work reported here.

It goes against the grain of our species to *not* do: we class ourselves as *Homo faber,* humankind the maker and doer. Freeman Tilden, who taught the art of interpretation of the values of protected public lands and heritage, dramatized this in what he called an un-illustrated lecture, "The Constructive Aspect of Inaction." For his audience of would-be viewers, Tilden carefully describes the slides he decided not to use to illustrate his lecture—whose point becomes that we humans, *Homo faber,* preserve things best through inaction. Even an old school New Englander like Tilden found it necessary to put a Zen-like twist on advocating the wisdom of humility when it comes to preservation, which is the task of stewardship-in-perpetuity called for by the Wilderness Act.

Aldo Leopold, in *A Sand County Almanac* and other writings, characterized this wisdom of humility toward the land in the vernacular, as "intelligent tinkering." Its first law, Leopold wrote, is to save all of the parts. On the mere remnant of our federal public lands legacy now represented by designated wilderness, the burden of wilderness stewardship is to save all the parts. The role of humility lies in recognizing, first, that we do not know all the parts, and second, that we do not understand their interrelationships and interpenetrating dynamisms. Nor may this be, as Wendell Berry maintains, a question of our simply not knowing *yet*. We may never fully know. We may never fully understand. Much of today's challenge with the role of fire in wildlands, for example, results from our having applied in the past the best knowledge and best practices that were our scientific and management knowledge then. So, too, it can be said with predators.

Looked at with increasingly sophisticated analytical tools, the complexity of forest soils seems to spiral inward until it begins to mirror the spiraling outward of the complexity imagined back to our home planet by the Hubble telescope. And soils are but one aspect of the biosphere.

We have traded in the word *holy* for *holistic,* as Wendell Berry observes, but the expansion of knowledge only increases the mystery. We know a great deal about the Earth, but in many ways we *understand* it no better as a biosphere than the biblical writers understood it as "a circle on the face of the deep." That we will—or even may—one day fully understand "natural

conditions" and "wilderness character" must remain, for now, an article of faith. Or witness, again, the roles of fire and predators in wildlands.

However cautiously, the Wilderness Act seems to suggest that what we as humans know is always bound by time and is true only provided that everything else we know is also true. This is the spirit of restraint born of humility with which wilderness stewardship should be undertaken.

One obstacle to the stewardship of wilderness has been the fact that federal agency cultures have rarely rewarded those within their ranks who have shown the courage of their best professional judgment to do nothing—however great their watchfulness and sensitivity. The workplace cliché of "building empires" encapsulates our culture's busy bias against what Tilden advocated as the virtues of inaction for preserving things of great value.

Yet it is important to remember how thoroughly infused the very spirit and language of the Wilderness Act are with the attitudes and thinking of employees of the federal land-managing agencies: Benton MacKaye, Bob Marshall, Arthur Carhart, Aldo Leopold, and Bernard Frank in the U.S. Forest Service; Olaus Murie, Rachael Carson, and Howard Zahniser in the U.S. Bureau of Biological Survey/U.S. Fish and Wildlife Service; George Collins, Lowell Sumner, and Adolph Murie in the National Park Service; and Marshall also in the Bureau of Indian Affairs.

We hope that this report appeals to the higher instincts of agency cultures of the US Department of Agriculture's (USDA) Forest Service, and the US Department of the Interior's (USDI) Fish and Wildlife Service, the National Park Service, and the Bureau of Land Management (included since 1976). We hope that it sparks the imaginations of a new generation of public servants. We hope that they will again arise within the ranks to chart the land ethic implicit in the Wilderness Act's call for restrained and humble stewardship. These are the hopes of this panel in offering this report.

II. CONTEMPORARY IMPERATIVE FOR THE WILDERNESS ACT AND ITS IMPLEMENTATION

This report speaks to the issues of stewarding the National Wilderness Preservation System of the United States, a system that is truly American in origin but has caught the attention of many people around the world. With wilderness seemingly more important than ever before, the tasks of the Wilderness Stewardship Panel of the Pinchot Institute for Conservation were to examine stewardship of the wilderness resource over the past 37 years and to suggest how the system might be better cared for in the 21st century.

Wilderness opens windows of understanding about the natural world. It may be seen in the future as one of the most important contributions that societies can make to the health of the global environment, and of humans. Wilderness is a place of spiritual self-discovery, giving each person who experiences it a better perspective of where he or she stands in a larger universe.

Today our burgeoning society has surrounded wilderness. In June of 2000 the Department of Housing and Urban Development reported that "Land is being consumed at twice the rate of population growth." Land use for single-family housing has been growing by 2.3 million acres a year since 1994, much of it for development on lots larger than one acre, the agency reported. Survival of the wilderness -- the places where nature's instincts prevail -- is dependent on the capacity of the American public to renew its commitment to the ideals of wilderness, and its willingness to ensure its preservation. Otherwise the encroachment of development and the trivializing of the wilderness concepts will lead to the dribbling away of all that we value as natural and wild.

In a recent national survey produced by Kenneth Cordell and his colleagues at the Southern Forest Experiment Station it was revealed that 42 percent of Americans rejected the notion that humans were meant to rule over nature; a sizeable majority said they at least generally disagreed with that notion. More than 52 percent indicated that the government has not put enough land into wilderness protection and most Americans suggest that environmental protection laws have not gone far enough. They say that regulation of natural resources -- air quality, protection of wild or natural areas, endangered species and wetlands -- is "just the right amount" or has "not gone far enough." Forty-nine percent say that there is too little spent on the environment. Yet, it has been reported that, until the recent infusion of money after the 2000 fire season, spending for federal natural resource programs, including public land protection and wilderness, was half of what it was in 1962 as a percentage of federal spending.

Why should we protect some federal lands? Seventy-eight percent said it was important to protect wildlife habitat. Seventy-three percent said it was important to preserve natural ecosystems. Seventy-three percent said it was important to protect air and water quality. Seventy-two percent said it was important to provide opportunities to experience peacefulness and the sounds of nature. Seventy percent said it was important to preserve culture and history.

By large margins respondents said people should be more concerned about how our public lands are used, and future generations should be as important as current ones in decision-making about public lands. Seventy-six percent said that people think public lands are valuable even if they do

not actually go there themselves, and 62 percent said that wildlife, plants and humans have equal rights to live and grow. Eighty-nine percent said it was all right to limit visitors to wildernesses if they became too crowded; and 95 percent said it was all right for the government to limit visitors if resources were being harmed by too much visitation.

Despite these sentiments of the American people, there is a lack of official attention to sound wilderness stewardship in America. There is a need make wilderness stewardship an important element of land management among the federal land management agencies and to help the public understand the National Wilderness Preservation System that has been created. Wilderness stewardship involves the regulation of human use and influence in order to preserve the quality, character and integrity of these protected lands. Wilderness stewards manage for future generations to assure that wilderness remains undisturbed for centuries. To meet these goals we need to aggressively focus attention on the goals and processes of stewardship.

We note the need to help people understand the Wilderness Preservation System that has been created. Wilderness stewardship lacks a well-organized national constituency. While polling shows that wilderness is highly valued, the lack of universal understanding and effective organization allows some in government and certain organized interests to attack wilderness and to garner support for repeal of the Wilderness Act.

American environmental pioneer Aldo Leopold wrote this about the values surrounding wilderness:

> Wilderness is one part of the "land organism." Wilderness plays a significant role in the overall health of ecosystems. Rare and endangered plant and animal species require habitats that are relatively undisturbed so gene pools can be sustained, adaptations made, and populations maintained. Many rare and endangered species are indicators of ecological health, or they may play key roles in the balance of the ecosystem. Natural disturbance, like floods or fires, maintain natural processes, systems and patterns. Few places are left where rivers flood, and trees are allowed to burn in natural cycles. Wildness is the heart of the "land organism."

The contemporary imperative for appropriate wilderness stewardship is to fulfill the purpose of the Wilderness Act of 1964, which aimed, "…to assure that an increasing population, accompanied by expanding settlement and growing mechanization, does not occupy and modify all areas within the United States, leaving no lands designated for preservation and protection in their natural condition."

This report was undertaken to focus attention on improving wilderness stewardship at the beginning of the 21st century. We have been stewards of a formal system of wilderness for nearly 40 years, yet there are those who observe that just now we are beginning to recognize our role as stewards. Just now we are beginning to ask questions that will lead to a true system of wilderness across the federal lands in the United States.

In the next section of this report we highlight some of the issues facing stewardship of our wilderness resources and address the advancement of the notion of stewardship in contrast to management. Following this we outline seven principles we believe should guide those charged

with administering the Wilderness Act and accountable for the sustainability of the National Wilderness Preservation System. This section is followed by six guidelines for ensuring success in wilderness stewardship as we enter the 21st century. The final section addresses the fundamental conclusion of this report, which is **the need to forge an integrated and collaborative system across the four federal wilderness management agencies**. In it we offer an agenda for the Secretaries of Agriculture and Interior and for the newly formed Wilderness Policy Council, which is a body composed of senior administrators of the four wilderness management agencies and senior research administrators of the USDA Forest Service Research Branch and the US Geological Survey. We also offer specific recommendations to the Secretaries of Interior and Agriculture, those officials designated in the Wilderness Act as primarily responsible for ensuring an enduring resource of wilderness, and to others charged with stewardship responsibilities.

III. WILDERNESS STEWARDSHIP

The Management Imperative

When a wilderness area is designated, myriad responsibilities to maintain and enhance the wilderness character are explicit. Management involves facilitating human use, caring for and restoring wilderness resources, developing sound plans based on clearly articulated objectives, monitoring, funding, managing public and business relations, and promoting the continued understanding of an area through research. Management of a wilderness is particularly challenging in that the purposes of such an area include being relatively uncontrolled. Any actions taken need to be understood from myriad philosophical, legal and technical perspectives.

As managers and others have contemplated the management of wilderness, an orientation toward stewardship, rather than management, has emerged as the perspective that best serves Wilderness. Stewarding the resource means ensuring its character and its continuance as wilderness, not just managing it for the goods, services, and opportunities that it provides.

The role of a Wilderness steward has changed considerably over the past 37 years and will continue to do so during the coming decades. The change is flowing on a course from simple to complex, technical to philosophical, and from individual to regional. The factors providing the context for wilderness stewardship include an increasingly complex system of social and biological values, rapid change, increased jurisdictional interest, and an ongoing struggle with the limits of appropriate levels of manipulation. Stewarding this resource is more than managing the resource; it is ensuring its existence through helping others understand and appreciate it and through ensuring its physical and philosophical protection.

The Wilderness System is Growing in Size and Organizational Complexity

Several factors have led to a need for the examination of the state of management in the National Wilderness Preservation System (NWPS). First, the system has grown over 1000 percent in size in its first 37 years. In 1964 there were fewer than 10 million acres allocated to 54 Forest Service units. As of 1999, roughly 4.5 percent of the United States (2.3 percent of the lower 48 states) was designated as Wilderness. The Bureau of Land Management (BLM), the United States Fish and Wildlife Service, the United States Forest Service (USFS), the National Park Service (NPS), in 628 discrete areas, administer the 104,739,168 acres of wilderness. There is designated wilderness in 44 States and over half of the NWPS (58,182,216 acres) is in the state of Alaska.

Rapid rate of growth of the number of areas and acres has led to several challenges for the four federal land management agencies. First, growth itself has consumed the time and attention of wilderness managers. In the exercise of looking forward to an expanding system, it is easy to neglect the estate at hand. Second, the sheer size and spread of responsibility across four agencies add obvious structural demands. For example, if all proposed Wilderness in the National Park Service is designated, the National Park Service will be over 80 percent wilderness. Eighteen percent of US Forest Service administered land currently is designated wilderness. Clearly, the scale of the system requires a substantial investment of resources and consideration, and crossing agency boundaries adds complexity to the interpretation of the Wilderness Act and its role within the respective agency missions. Third, as the system

expanded beyond traditional high mountain landscapes (especially with passage of the Eastern Wilderness Act in 1973 and the addition of the BLM as a wilderness administrator with passage of the Federal Land Policy and Management Act in 1976), stewardship has become more socially and ecologically complex. As a result, the identification of uniform wilderness values and management procedures has become more difficult.

Our Understanding of the System Is Broadening

We now have a much larger and more complex system than in its early days. It includes representation of many of the ecosystems of the country and it exists geographically spaced with several units located very near to urban centers. In addition, as the results of science and scholarship broaden our understanding of the roles and processes of wilderness, stewardship has necessarily become more complex. National wilderness research conferences in 1985 and 1999 each compiled hundreds of studies that document the unique values of wilderness. The roles of wilderness for values focused on biodiversity, recreation, social escape, spirituality, and education continue to grow, as does the value of wilderness to science. With this growth come increasing challenges for stewards to understand and appreciate the values over which they are charged, and to manage in ways that enhance realization of these values while stewarding wilderness into the future.

Embracing Complexity By Leadership Is In Question

For the National Wilderness Preservation System to meet its potential and to fulfill its roles in American society, those responsible for it must embrace the complexity described above. Wilderness and the system in which it is managed have grown from a frontier concept of the Progressive Era to a large and organizationally complex system that reflects our society's responsibility to conserve options for future generations. It is a formidable challenge to manage such a system and it requires enlightened leadership and commitment.

The functioning of such a complex system will encounter problems, but the resolution and minimization of those problems is a fundamental prerequisite to progress in the management of the National Wilderness Preservation System. Demonstrated improvement requires resources, time, investment in expertise, and visible leadership, particularly by the Secretaries of Agriculture and Interior who are statutorily charged with administration of the National Wilderness Preservation System.

The state of wilderness management was assessed and criticized in the 1985 Conference on Wilderness Management. In a 1989 evaluation, the Government Accounting Office recommended that the USFS develop baseline inventory information, evaluate administrative sites for their appropriateness, establish a national policy for outfitter and guide structures and facilities in wilderness, and compile information on the total funding and staffing needed to manage the United States Forest Service wildernesses in a way that will meet the objectives of the Wilderness Act. The 1995 Interagency Wilderness Strategic Plan represents a cooperative effort to manage the system and outlines 26 management strategies to do so.

In assessing of the implementation of this plan, there are some notable successes across agencies, some successes in one or more agency, some failures across agencies, and some complete failures. In terms of managing wilderness within the context of larger landscapes we find that

the agencies all have adopted the concept of ecosystem management for all public lands, including wilderness. However, the assessment points out that most agency wilderness management plans do not reflect an ecosystem approach to management.

> An ecosystem approach was taken in development of plans for the Muleshoe Ecosystem. The BLM, Coronado National Forest, Arizona Game and Fish Department, and Arizona Chapter of The Nature Conservancy created a single plan for management of the Muleshoe Ecosystem. This plan directs management of lands and resources for which each organization is responsible, including the adjacent BLM Redfield Canyon and Forest Service Galiuro wildernesses. In contrast, in the Fish and Wildlife Service few wilderness management plans have been updated or written since the 1970's and 1980's, and these first generation plans do not reflect an ecosystem approach to management. Likewise, the majority of Forest Service wildernesses are managed under first generation plans that do not consider wilderness in the context of ecosystem management.

In the area of administrative policy the 1995 Plan calls for maintaining strong and professional leadership in wilderness stewardship at all levels and requiring wilderness stewardship performance elements for those managing wilderness. While each of the agencies has Washington office leadership for wilderness, these leadership positions are not necessarily fully devoted to wilderness stewardship. The existence of wilderness leadership positions at lower levels of the organizations varies considerably and in all agencies there are no expected performance standards for wilderness stewardship.

> The BLM and Forest Service are best staffed by people with specific responsibilities for wilderness stewardship. Five BLM states have full time wilderness staff and in the remaining states there is an official with wilderness as a collateral duty. The Forest Service has wilderness staff in each region, and staff with wilderness responsibilities on many forests. In both agencies, however, the level of staffing has decreased in recent years with downsizing due to limited financial resources. Since the National Park Service specifies that all management employees have wilderness responsibilities, if wilderness exists in their unit, responsibility and accountability are diffused throughout the agency. In the NPS there are only three full-time wilderness managers. To help provide a focus for the agency, the NPS has formed a National Wilderness Steering Committee that includes an Associate Director, superintendents, and staff who deal with wilderness in parks. In the Fish and Wildlife Service there is a part-time (usually 5-10 percent of responsibilities) wilderness coordinator in each region and there is only one wilderness specialist at the field level in the whole agency.

These two examples from the assessment of the 1995 Wilderness Strategic Plan illustrate that there is concerted effort to move toward active wilderness stewardship, but that there is a long way to go. Even though progress is being made, this record has left many managers and scholars dissatisfied with the progress in conserving wilderness. The lack of progress is often attributed to agency cultures that view wilderness as a secondary priority and bureaucracies that do not invest in the human resources that will ensure its sound management and perpetuation.

Issues That Demonstrate Some Contemporary Dilemma's Of Stewardship

Wilderness occurs within both social and biological contexts. Over the past 37 years we have learned more about both contexts, and as society has evolved, in an increasingly technological and communicative world, challenges have emerged that confront our sense of what is and is not appropriate in our stewardship of wilderness. We now recognize several dilemmas in the management of wilderness resources, and given the ecological and geographic scope of the system, different issues emerge in different places. In the absence of a system-wide framework for the interpretation of the Wilderness Act or comprehensive regional and system-wide analysis, the potential for incremental site-by-site changes to significantly alter the system is very high. The following issues exemplify the confusion that marks much of today's stewardship dilemma.

Ensuring both naturalness and wildness. It has long been argued that wilderness provides the opportunity for natural processes to proceed relatively undisturbed by humans. To the extent that wilderness areas are untrammeled and relatively uninfluenced by industrial and technological events, this is likely true. Thus, naturalness is one attribute of wilderness. As Robert Marshall indicated, wilderness areas preserve, as nearly as possible, the essential features of the primitive environment. This primitive environment is one that has an attribute of naturalness; that is relatively unaffected by humans. Another attribute of the primitive environment is what might be conceptualized as wild. The primitive or wilderness environment is one where a person might experience a sense of wild. It is the place where Robert Marshall could encounter three grizzlies on the trail in the Arctic and fear for his life, or where one can look over the vast expanse of the valleys from the tops of the Adirondack peaks and visualize the wild and unregulated collage below. Does ensuring the continuation of naturalness ensure the continuation of wildness? Does wilderness offer opportunities for one or the other not offered in other places? Do the various agencies see both attributes within their responsibilities and cultures? Such questions need answers for the system and across the four federal wilderness agencies. The concepts of naturalness and wildness are ones being debated by wilderness stewards and others. In later sections of this report we identify principles for evaluating different answers to these questions, and we make recommendations about processes and institutions for answering them.

Wilderness is not isolated from the surrounding landscape. Wilderness occurs in a mosaic of other land uses. Some wildernesses occur as undisturbed islands surrounded by timber harvesting and others occur on the boundaries of urban areas and residential developments. Others are divided by major highways and are influenced by the access, noise, and pollution of highway use. Many of the most compelling threats to wilderness character flow from surrounding areas. Acid rain and noxious weeds, for example, originate outside of the wilderness and flow inward. What is won or lost in the war against noxious weeds? How aggressive should managers be in fighting these invasions? At what point does the concept of wildness need to give way to maintaining natural processes? Such questions suggest that wilderness cannot be viewed in isolation and that stewards of the resource must confront fairly difficult problems stemming from outside influences. The recognition of an ecosystem approach to management by the agencies, as noted above, is positive, but action must follow that recognition, and to date there has not been sufficient effort to deal with the larger context of wilderness and the myriad problems arising from it.

Manipulating wilderness conditions is philosophically and practically problematic. The negative effects of some previous management activities have been demonstrated and now we must decided how active managers should be in righting wrongs. For example, now that it is known that stocking of non-native fish has disturbed mountain lake ecosystems, should stocking continue with a different type of fish? Should stocking be discontinued? Should the stocked fish be destroyed to try and restore the ecosystem to a more "natural" set of conditions? When do the means of manipulation justify the ends of naturalness and how do we know? What is forsaken when fire is intentionally suppressed or when it is reintroduced into wilderness? Does it matter if a fire is allowed to burn at intensity levels that it might have before we began suppression activities? These are tough questions that need to be guided by our values toward maintaining wilderness character, not degrading wilderness, and keeping the wild in wilderness. How much and how, if deemed appropriate, we intervene in wilderness to restore or enhance its character will take a lot of thought, creativity, and leadership.

Each of the four wilderness management agencies allows fishing in wilderness, but they vary significantly in their policies as to how it is to be conducted and managed. Fish management policies administered by the states also vary from state to state. Therefore, fishing management requires a high level of cooperation between state and federal agencies. Goals and policies of the state agencies occasionally conflict with those of the federal government, resulting in tension, inconsistent management of fish populations and habitat, inconsistent regulations on fishing, and perhaps, ultimately, a loss of wilderness values.

When confronted with difficult questions of which species to stock in which lakes, whether or not to stock non-sustaining populations of fish, which method of stocking to use, and what constitutes "native," " exotic" and "naturalized" fish populations, the current tenuous relations between federal and state agencies becomes somewhat strained. This is exacerbated when the ecologic al values associated with natural, healthy aquatic ecosystems clash with recreational values. Naturalness dictates that although the fish might be native to the region, their populations should not be maintained in lakes where they did not occur naturally. Moreover, a strict definition of naturalness also requires that self-sustaining populations of introduced (naturalized) fish species should be removed. In some regions this would eliminate an estimated 80-95 percent of the fishery within wilderness lakes and streams.

Demand for sport fishing can create a tension between state fisheries biologists, who want to do the right thing ecologically but are sometimes influenced otherwise by their own state officials, and federal wilderness management agencies. The "right thing" often becomes a matter of which wilderness value takes precedence: ecological health or the wilderness fishing experience. A frustration for wilderness managers is that the wilderness fishing experience depends on two important components: the quality of fish populations and the wilderness itself. Managers express annoyance over having control over only one of these. To some degree they can control access to a site if recreation impacts become excessive. But, the quality of the resource still is a function of the fish and wildlife opportunities within the wilderness. Likewise, state fish and wildlife managers have control over the fish populations, but they must defer to the federal agencies who have control over the habitat and the fisheries' main predator—the people who fish. What this means is that manipulating wilderness conditions is often tough and fraught with controversy.

How we define minimum requirements and tools is important in selecting management actions and tools. Regarding the use of tools and other management aids in wilderness, agencies visualize the minimum requirements and tools necessary quite differently and this leads to considerable controversy and public confusion. Where one agency may hold fast to the use of crosscut saws, another may quickly use a chain saw to minimize the potential for additional impact. There is also widespread use of permanent structures for agency use and divergent perspectives about the use of motorized vehicles in restoration efforts. Agencies often rationalize their choices by pointing to legislation other than the Wilderness Act. Since there is no clear legal standing for this approach, this is a choice guided by agency culture and philosophy. One result is that it appears that we do not have a national wilderness preservation system and that degradation of wilderness character in all its social, physical, and biological aspects is not as important as management efficiency. This seems counter to the language and spirit of the Wilderness Act.

Wilderness offers unique opportunities for social and biological research, and every year managers receive hundreds of proposals for research and other scientific activities, such as monitoring, to be conducted in wilderness. These proposals run the gamut from relatively simple inventories of plants and animals with little or no impact to the use of motorized equipment such as chain saws or helicopters for collecting data and the installation of permanent plots and devices for collecting data. Wilderness poses unique constraints on research and other scientific activities, and managers often fail to consider the context, needs and constraints on one another. For example, scientists might not fully understand the philosophical basis of wilderness management and the impacts that their activities might cause. Wilderness managers might not fully understand the potential benefits of a proposed activity to society and to the broader system of natural areas nationwide. These different viewpoints, combined with the typically meager communication between scientists and managers, might result in frustration and lost opportunities for the advancement of both science and wilderness preservation. Exacerbating the problem is that there is no single process used by the four wilderness management agencies for comprehensively evaluating proposals for scientific activities within the National Wilderness Preservation System.

The place of recreational use in wilderness and public perception about it have not been made clear. Over the years, wilderness use has become more diverse in its inclusion of ethnic, age, and gender representation. And, it has become more diverse in the expectations users have of it. In addition, today's wilderness visitors have available an increasing array of technology to assist them in their wilderness adventures. Will these recreationists and those of tomorrow demand activities that are consistent with the values for which the wilderness system was established? To what extent might agencies accommodate new uses or the use of new technologies such as cell phones and other communication devices? What are the roles for agencies in public education about wilderness and its appropriate uses? How restrictive should agencies be in maintaining "outstanding opportunities for solitude or a primitive and unconfined type of recreation?" There are principles for wilderness stewardship that can help answer questions such as these. We offer such principles in the next section of this report, and we suggest that the agencies under the direction of the Secretaries of Agriculture and Interior collectively deal with these and related questions.

Agency organization and commitment are needed to ensure success, but overall they are lacking. In a recent survey of wilderness specialists working in areas with designated wilderness, the 372 respondents reported 149 discrete position titles. Only 17 percent of the specialists had the word wilderness in their title. On average, the specialists indicated they spend less than 30 percent of their time directly working on wilderness. While their average time working with wilderness is over eight years, there is considerable variation around this number. These results suggest that wilderness is generally a collateral duty, even for those who specialize in it. There also is a large range of experience within the ranks, with many people becoming specialists with little if any experience in wilderness. Will this collateral approach to managing wilderness ensure success? Are managers provided adequate training, preparation, career paths and support to manage wilderness to the specifications of the Wilderness Act? Do the agencies encourage collaborative efforts among themselves to develop a large enough critical mass of professionals to warrant the profile that wilderness management demands? The varying organizational approaches of the agencies also raise questions about commitment and effectiveness. Those responsible for wilderness in the Washington offices are at different levels and in different functional roles across the agencies. This also is true at local levels. Given that the agencies are stewards over more than 104 million acres of wilderness and that these acres sustain a high level of use, it is surprising that much of the system remains relatively intact given the paucity of human resources devoted to it.

Excelling in an information exchange environment is a new management challenge. The level of information associated with the inventory, monitoring, study and education related to the National Wilderness Preservation System is staggering. Current technology makes the assembly and synthesis of wilderness information possible within meaningful time frames. But with that possibility comes the expectation for this to occur and the very visible failure if it does not. The desire to see real data in support of ideals and opinions will intensify. Given the history of criticism of the amount of baseline and monitoring data associated with the National Wilderness Preservation System, the availability of these data is a concern. How might they best be provided? Who should have access to them? These and other questions require thought and response since ready access to information technologies have become a way of life in American culture. There is little doubt that they are necessary and must be provided.

Management To Stewardship

Wilderness and the system designed for its sustainability will continue to be a challenge. The compelling issues of today include those discussed in previous reviews of the system's management and illustrate the growing sophistication of our understanding of the role of management. At the heart of that understanding is that management is usually envisioned as the acts of directing, guiding, controlling and improving the natural outcomes of a set of processes. Wilderness, by its very definition as untrammeled will continue to defy that illusion of control. Thus, several scholars and "managers" have called for the use of stewardship as a more appropriate perspective for the future. Stewardship to them and to us implies working with nature to perpetuate wilderness for the future.

IV. PRINCIPLES FOR STEWARDSHIP

If the land management agencies responsible for ensuring a continuing resource of wilderness are to meet the challenges described previously, they need to agree on a set of stewardship principles. We believe the following principles are fundamental if our system of wilderness is to endure.

Adhering to the Wilderness Act is a fundamental principle for wilderness stewardship in the US.

The most fundamental principle in wilderness stewardship is adherence to the language and intent of the Wilderness Act. The act is the foundation for implementation of the American concept of wilderness as this concept has been articulated into a system of wilderness for present and future generations. To adhere to the Act is a positive statement that must be internalized by all that are responsible for stewardship of the resource of wilderness. The present state of different definitions, regulations, planning, and other stewardship issues between the four wilderness management agencies is not in accord with the Act. While for some issues the Act allows for varying interpretations, the Wilderness Act governs all wilderness essentially by the same standards, and thus provides the same direction for managers whether they are within a national park, wildlife refuge, BLM area, or national forest. In addition, use of equipment and adoption of particular policies and regulations that are managerially convenient, but not respecting of the special and untrammeled nature of wilderness also are not in accord with the Act. To adhere to the precepts and philosophy of the Wilderness Act is not an option; it is a requirement, and this law and other relevant laws, including the Eastern Wilderness Act and those laws establishing individual wildernesses, must be obeyed.

US wilderness is to be treated as a system of wildernesses.

Equally fundamental to wilderness stewardship is the concept of one wilderness system made up of lands and waters managed by four federal land management agencies. The Wilderness Act establishes this system, not four separate wilderness systems. This means that coordination and collaboration are essential among the four agencies. Implied is that a common set of definitions for wilderness and stewardship, for use and preservation, and for planning and management will be adopted and implemented in a collaborative fashion by the agencies. Implied is that when dealing with wilderness the agencies will adapt agency culture and ways of doing business to a wilderness- focused, collaborative mode. Also implied is that the resource of wilderness will be recognized in the context of other land uses and that it will be a system beyond the normal land use designations of individual agencies and traditions. Competition between agencies and the supremacy of individual agency cultures has no place in wilderness stewardship. Even with regional differences in physiography and American culture, wilderness is to be one system integrated into a whole.

Such a system need not be uniform in all respects from one region of the country to another. There clearly are population and physiographic differences in a country as vast as the United States, and the wilderness system is shaped by such differences. A significant challenge is determining which different approaches to wilderness stewardship might be appropriate and consistent with the objective of maintaining an enduring resource of wilderness for future generations. Agencies, especially, must always be mindful that day-to-day management actions

on one wilderness might set precedents that could affect wilderness stewardship throughout the system.

Wildernesses are special places and are to be treated as special.

To look at wilderness as just another land classification will not serve the potential of wilderness, nor will it ensure a sustainable national wilderness preservation system. As a special place, wilderness requires unique planning and stewardship, close attention to the condition of the resource and how it changes over time, and continuous monitoring and evaluation. It requires actions to enhance its ability to meet the wilderness values that it engenders.

Wilderness is distinguished from all other land classes since it represents a unique concept of wild naturalness. It is the wild and natural extreme in a total land use system. As such it must be recognized as special and requiring treatment not given other lands. Each wilderness is to be managed as a composite, as one resource, not a collection of individual pieces. The Wilderness Act indicates wilderness can serve multiple values and provide multiple benefits in human and spiritual experience, science, history, and land productivity. It is a special place for realizing these values and benefits.

Stewardship should be science informed, logically planned, and publicly transparent.

Science should inform wilderness stewardship as we learn more about ecological systems, individual species and their habitats, human behavior, and the successes and failures of various policies and management activities. Science can help us understand the nature of the system for which we are a steward. It can help in learning how to correct human-caused perturbations in such systems. It can help in understanding how systems might be used and enjoyed without destroying them. It can help in understanding how valuable wilderness is to people and how it might enhance their lives.

Using information derived from science and information obtained in other ways, we need to plan for the stewardship and use of wilderness. Given the pressure that humans put on wilderness and other natural resources, wilderness is unlikely to be sustained without careful thought and planning. We need to determine what is to be sustained, devise a program to sustain it, implement that program, and evaluate the effectiveness of implementation. Plans are compacts with the public about how lands are to be treated and what values are to be served. That many wildernesses have no plan devised for them is unconscionable for such a valuable resource.

This issue of public transparency applies to all facets of wilderness stewardship. Policies, plans and management activities; the findings from monitoring and evaluation; and research results need to be made available in publicly consumable forms.

Non-Degradation of wilderness fundamentally should guide stewardship activities.

A central concept of the Wilderness Act is non-degradation of wilderness. The concept is well articulated in *Wilderness Management* (Hendee, Stankey, and Lucas; 1990, Fulcrum Publishing; Golden, CO), and the description here draws heavily on their work.

Congress recognized wilderness as part of a land use spectrum ranging from the paved to the primeval. But even within the wilderness land use, a range of settings and conditions exist. Not

all wildernesses are identical in their primeval qualities. They vary in the degree to which naturalness has remained unspoiled, or to which opportunities for solitude remain undiminished by current, established uses. Such variations also occur within each wilderness. Expectations and definitions of wilderness change with the condition of the areas surrounding them. This relativity of wilderness was reflected in the debates over the act of 1975 that addressed Eastern Wilderness and whether or not lands in the east met the criteria for inclusion in the National Wilderness Preservation System.

The concept of non-degradation allows wilderness stewards to work toward a reasonably uniform standard for qualities such as naturalness, wildness, and solitude given the variation in conditions. This concept has generally been applied to wilderness stewardship for 37 years, but perhaps it is best known for its use in the management of air and water quality. Basically, the concept calls for the maintenance of existing environmental conditions if they equal or exceed minimum standards, and for the restoration of conditions that are below minimum levels. The objectives are to maintain currently high standards, to prevent further degradation, and to restore below-minimum conditions to acceptable levels.

As applied to wilderness, the non-degradation principle recognizes that the degree of solitude and the extent of biophysical impacts vary between individual wildernesses. The objectives in wilderness are to prevent degradation of current conditions in each wilderness and to restore substandard settings to minimum levels, rather than letting all areas deteriorate to a minimum standard. For example, wildernesses that possess only minimum levels of solitude or substantially altered biophysical conditions need not be the standard to which areas of higher quality will be allowed to descend. The near-pristine areas of the Intermountain West should not be allowed to decline to the level of impact found in some southern California wildernesses. Likewise, wilderness classification of heavily impacted areas in the eastern US does not mean that the biophysical conditions and solitude found in those areas should constitute an acceptable level for areas in the west. Under the non-degradation principle, the conditions prevailing in each area when it is classified establish the benchmark to be achieved by stewardship, unless conditions are deemed below standard and the objective is to restore them. Attempts to restore them, however, must be mindful of the requirement that these areas must remain untrammeled by humans.

Preservation of wilderness character is a guiding idea of the Wilderness Act.

In addition to its biophysical values—as a place *where the earth and its community of life are untrammeled by man*—wilderness serves as a reservoir of biological diversity, biological integrity, and environmental health. Wilderness also is a setting for compatible recreation, restoration, and inspiration, and a touchstone to our heritage as Americans and, more universally, as members in the community of life. The convergence of these diverse values (ecological, experiential, and symbolic) into one evocative and encompassing concept is the sum and substance of wilderness—and the source of its power to connect a variety of people to these remnant landscapes. Wilderness is a place of restraint, for managers as well as visitors.

One of the fundamental prescriptions of the Wilderness Act is preservation of wilderness character. According to the Act, wilderness character describes "*… an area of undeveloped … land retaining its primeval character and influence, without permanent improvements or human habitation, which is protected and managed so as to preserve its natural conditions …*" This

suggests a degree of naturalness to wilderness that might not be inherent in many other land classes, but more importantly it implies a degree of wildness that does not exist elsewhere. Efforts must be made to ensure the special nature of wilderness and to ensure that it is recognizable as such. Protecting threatened sites, eliminating damaging activities, applying the minimum regulations and tools that will preserve the wilderness character, and carefully managing human influences all are part of ensuring that wilderness character is preserved. As the Wilderness Act specifies,

> "…each agency administering any area as wilderness *shall be responsible for preserving the wilderness character* of the area, *and shall* so administer such area for such other purposes for which it may have been established as also to *preserve its wilderness character*." *(italics added)*

This sentence from the Wilderness Act also is the legal basis for the non-degradation principle described above.

Recognizing the wild in wilderness distinguishes wilderness from other land classes.

One of the truly distinguishing characteristics of wilderness is the wildness of places. Wilderness is a place where civilization is a stranger and where wildness prevails. It is a place that is uncultured and unmanaged by humans, where natural forces such as landslides and fires prevail on their terms. It is a place where humans can sense the untamed and the wild, and where survival challenges are apparent and desired. Protection of the natural wild, where nature is not controlled, is critical in ensuring that a place is wilderness. Such protection recognizes and celebrates the value of wild animals and plants, and of earth phenomena such as landslides, fires, and floods. It recognizes that humans are visitors to such places and that they should leave no trace so that wilderness remains wild and so that others can experience that wildness. Since wild is a fundamental characteristic of wilderness that is not attainable elsewhere, if there is a choice between emphasizing naturalness and wildness, stewards should err on the side of wildness.

Accountability is basic to sound stewardship.

Being accountable and responsible for actions is basic to being a steward. To acknowledge what has been done, to monitor in order to know what has influenced a resource, and to review the character of the wilderness are part of knowing whether or not stewardship is effective. This involves identifying those elements of the resource to monitor, making sure that they are monitored, and taking positive action based on what is learned to ensure the sustainability of resource character. With a resource as valuable and special as wilderness, monitoring, evaluation, and action play important roles in sustaining the resource. In addition, sharing what has been learned with others and being held accountable for stewardship are important for wilderness stewards to ensure trust and support for their stewardship of wilderness.

V. SHAPING THE FUTURE FOR SUCCESS

To meet the challenges of wilderness stewardship and to follow the principles set forth, there are several things that the wilderness agencies should do. Committing themselves to wilderness stewardship, having their leaders provide leadership and a climate for stewardship, making sure they are organized for effective stewardship, implementing a logical planning process, conducting the science necessary to understand wilderness and its stewardship, making sure that employees have the culture and training for stewardship, educating publics about wilderness and its stewardship, deploying personnel and financial resources necessary for the task, and embracing accountability are necessary to position the agencies for effective stewardship of a wilderness system in the future.

The four wilderness agencies and their leaders must make a strong commitment to wilderness stewardship before the wilderness system is lost.

To be successful in wilderness stewardship is going to take leadership on the part of the Secretaries of Agriculture and Interior, the agency heads, and their assistants. While support from the top does not make a successful stewardship program, it surely can facilitate one. It is especially important in agencies that are organized hierarchically, as are the American land management agencies. Without clear leadership and support from the Secretaries, the agency heads, and their staffs, the shaping of a wilderness system is unlikely. The requirement that wilderness stewardship is collaborative across agencies means that leaders must provide an atmosphere for collaborative behavior and the legitimacy to carry it out.

There must be serious acknowledgement of the unique value of wilderness to the federal estate, with agencies and their leaders understanding that it is related to other land uses under their care, and that it is vital to their overall missions. Within this acknowledgement, the agencies should adopt stewardship as the ethical foundation for administering the wilderness system.

Commitment also is needed throughout the organization, from top to bottom. This is commitment to wilderness stewardship that is consistent and sustained over time. With over 104 million acres of the nation's land designated as wilderness and large proportions of the land of any one agency in wilderness or wilderness study status, a commitment to wilderness stewardship is absolutely necessary. Such commitment must be real and visible to ensure credibility and support, and to ensure sustainability of wilderness.

The four wilderness agencies must organize to maximize stewardship effectiveness and to develop a fully integrated stewardship system across the wilderness system.

Being organized for both internal agency effectiveness and for interagency collaboration are necessary conditions for success. The importance of wilderness and the vast acres involved in the wilderness system demand that wilderness stewardship responsibilities be assigned to ensure success. Leadership for wilderness must be placed at a level in the organization to deal with both the extensive interagency policy that must be developed and with the internal direction that must be given. Leadership must be at a level to ensure that wilderness is recognized as a unique and important program of the agency and that an agency must be consistent and collaborative with the other wilderness agencies to ensure the existence of a wilderness system. Then, below this

leadership must be an organization committed to and prepared to carry out an effective program of wilderness stewardship.

In addition to a location and organization that are designed to carry out wilderness stewardship, extensive interagency collaboration and cooperation are necessary to have a wilderness system that is not the province of only one agency. Here the interagency Wilderness Policy Council, formed by the agencies in the year 2000, can be extremely important as a forum for leading discussions and making decisions about wilderness policy and stewardship. This body and the staff that supports it could play the critical role of leadership and arbitrator for the many wilderness issues that abound. These issues range from philosophical ones dealing with definition of wilderness and stewardship, to broad areas of concern such as fire or use policy, to specific management tools and practices for managing use and recovering damaged sites. To ensure that it can fulfill its promise, means must be sought to institutionalize the Council within the federal land management system.

Wilderness planning must be accelerated and plans prepared for the guidance of stewardship activities, to enhance opportunities for evaluation and accountability and to increase the probability that the wilderness system will be sustained.

Effective planning, implementation and monitoring are critical to success. They provide the road map for actions to be taken and the standard for measuring success. They provide the goals to be achieved, the specific actions to be taken, and the boundaries of what is acceptable in policy, regulation, and management action. They establish the baseline and performance measures so critical to accountability and to ensuring a sustainable system of wilderness.

Collaborative and concerted planning should be taken now more than ever because landscape changes are occurring so rapidly that inaction will lead to loss of wilderness resources. It is essential that wilderness plans be completed without delay. Progress toward implementation should be evaluated promptly and continuously. Wilderness plans are transparent contracts with the public as they offer evidence that wilderness resources will receive the care that citizens expect. They also provide an internal track for providing accountability at all levels. If planning and evaluation processes were set in place, many of the management challenges being faced today would be gone.

Planning must make accommodation for the enormous growth in the wilderness system over the past 37 years. Consideration of this growth must be reflected in the amount of time and attention that wilderness receives as a proportion of the planning activity of each agency.

A major failing of the present system is the absence of any planning by some agencies, and inadequate planning by the others. For most wildernesses the condition of the wilderness is not known in any specific terms, nor do we have information about changes that have taken place over the years. If there have been changes, there are few records describing what might have caused them. The absence of both inventorying and monitoring, and the planning between them, is an absence of wilderness stewardship, a condition that signals failure to many people that care about and support wilderness.

Every wilderness needs a stewardship plan for wilderness, whether or not the plan stands alone or is subsumed in larger plans for parks, forests, refuges, or other designations. To treat

wilderness as a composite, as one resource, requires planning for the whole. To ensure that wilderness is accorded the importance it deserves, and given that the Wilderness Act governs all federal wilderness no matter what agency is administering it, plans for individual wildernesses are necessary and should contain common principles across them. To subsume wilderness planning under agency specific plans designed for other purposes is to ignore both the intent and the system of wildernesses as defined in the Wilderness Act.

This planning must not occur in a vacuum, apart from either the regional context of an area or the wilderness planning of the other wilderness agencies. This is especially critical when dealing with common boundaries between agencies where wilderness might be on both sides of the boundary. It also is critical in devising means for each agency to obey the requirements of the Wilderness Act while recognizing the individual cultural imperatives of each agency.

Science, education and training programs should be enhanced and focused to provide information, professional expertise, and public support for wilderness stewardship.

To be effective in stewardship activities, an understanding of the object of stewardship is necessary. Science can help in this process by uncovering the nature of the resource and the processes by which it operates. Science also can aid in understanding the perceptions and behaviors of those who use and care about the resource and how they might impact it.

A strong science program should underpin our principles for stewardship and decisions that are made about appropriate policies, regulations, management actions, and other stewardship tools. Science should be a major tool in informing stewards about the state of the system and what might or might not be done, but it is not the only source of relevant information. Much greater effort needs to be expended to develop the scientific program that could underpin wilderness stewardship. Research programs of the Aldo Leopold Wilderness Research Institute, selected universities, and some other federal units such as the Forest Services' Southern Research Station and the newly established Cooperative Ecosystem Studies Units provide a base on which to build.

Likewise, education and training are important in ensuring success. A well-informed public that understands what wilderness is and is not is important in providing a mandate for wilderness and its stewardship. Agency managers and technicians who are equally well-informed and who are intellectually prepared and committed to wilderness are necessary for success since they are the people who must carry out sensitive stewardship responsibilities and ensure perpetuation of the system. Being informed implies the need for strong systems of education and training and of an open system of information about wilderness. Activities of the Arthur Carhart National Wilderness Training Center and of selected universities provide a base for the development of this strong system of education and training for managers and technicians. Still lacking is any significant effort to address the public need for information and understanding about wilderness.

The four wilderness agencies should create wilderness stewardship positions and career opportunities from top to bottom and deploy financial resources for the explicit stewardship and support of wilderness. The people hired for such positions must be committed to sustaining the wilderness system.

Success in stewardship will not be achieved without people and financial resources to do the work. Currently, most wilderness work is carried as a collateral duty by agency professionals and by seasonal technicians. In the agencies there are few personnel that have wilderness as their sole or even primary responsibility. Wilderness must become the primary responsibility of a cadre of professionals in each agency and a career path needs to be developed so that these professionals can receive due rewards for professional work. To steward over 104 million acres and to ensure that adequate protection is afforded this resource will take far more dedicated professionals and technicians than are currently engaged. In addition, the cadre of professionals engaged in research, education, training, and information management and dissemination must expand.

Financial resources likewise need to be deployed to wilderness stewardship. Wildernesses are not going to be sustained through benign neglect. Stewards must be employed to carry out programs of stewardship that ensure non-degradation of the resource, maintenance of wilderness character, adherence to the precepts of the Wilderness Act, and administration of a system of wildernesses. Those who are responsible for stewardship of the resource and those who support the stewardship system through research and other fields need to be supported to do high quality work. Given the many external influences impinging on wilderness, it is insufficient to draw a boundary around it and leave it alone. Wilderness needs to be embraced and cannot be left alone. Stewardship implies care and protection, and they require financial resources.

Accountability for the maintenance and sustainability of the wilderness system must be embraced by the four wilderness agencies.

Letting others know what management has done and how well goals have been achieved will help ensure support necessary for wilderness stewardship. Monitoring of stewardship activities, research programs, education and training activities, information management and information dissemination are necessary to know how the system is being protected and sustained. The standards for the system need to be known by others and performance against these standards needs to be shared. An annual reporting on the state of the system is a useful device for informing those that want to know about the state of the system, both its strengths and weaknesses, and it is required by the Wilderness Act. In addition, use of modern information tools such as the Wilderness Information Network accessible over the Internet are ideal for delivering information in a timely manner to those that care. Such systems need to be developed through true collaboration among the agencies, and to the extent practicable they should be managed for the agencies collectively.

Accountability should occur at the different levels that make up the stewardship system. Certainly individual accountability is important and might be carried out through position descriptions, performance appraisals, success in training and education activities, and appraisal of duties that are assigned and carried out. Individual stewards are members of agencies, and agencies have been given responsibility for carrying out the law. Thus, accountability for agency performance is important. In the case of wilderness there is a special responsibility to act in a collaborative and cooperative way with other agencies, and both individual agencies and the agencies collectively need to be held accountable for this interactive behavior. Finally, since there are different processes that might be used to achieve stewardship goals, or to formulate goals in the first place, monitoring and evaluation of these processes is necessary.

VI. RECOMMENDATIONS FOR ENSURING A NATIONAL WILDERNESS PRESERVATION SYSTEM

The overriding headline of this report is that we need to administer statutory wilderness as a system. The Wilderness Act calls for no less, but what does this mean? To manage wilderness as a system means that each area is part of a whole, no matter who administers it. It means that all wilderness is subject to a set of common guidelines, and such guidelines must be developed and administered. These guidelines should deal with topics such as the importance of wilderness and why we need to steward it, continuance of wilderness, preservation and enhancement of wilderness, use of wilderness, administration of wilderness, training of wilderness stewards, education for the public, and research to learn about wilderness and its importance and use. Finally, administering as a system means that the guidelines need to address the fact that when one deals with wilderness, agency and specific area uniqueness must be considered in the context of system-wide guidance. We acknowledge that there are cultural, legal, and operational differences between the wlderness stewardship agencies. We also acknowledge that there are differences between every pair of wildernesses. While these differences exist, the overlay of the National Wilderness Preservation System must assure broad uniformity among all wilderness areas. The place for individual differences is in the choice of specific stewardship policies and activities that clearly are nested within the system-wide guidelines.

Fairly recently several system-oriented institutions have been organized to move administration and stewardship of wilderness toward a wilderness system. The recent organization of the **Wilderness Policy Council** has potential to become of major significance. This council is composed of six members. Each federal wilderness stewardship agency (Forest Service, National Park Service, Bureau of Land Management, and Fish and Wildlife Service) has appointed one high-ranking land management administrator to the Council. In addition, there is one senior administrator from the Research Branch of the USDA Forest Service and one senior administrator from the US Geological Survey, the agency responsible for conducting research for the natural resources and environment agencies of the US Department of Interior.

The Council has the tasks of developing system-wide wilderness policy and of exchanging information about successes and failures in stewardship so that the agencies can learn from each other. If this Council takes its tasks seriously and if it is accorded the leadership status it needs to be an effective influence over individual agency culture and policy, it will have a major impact on securing a sustainable wilderness system for the nation. Its success will depend on the degree to which the four wilderness stewardship agencies and the members of the Council have the will to make the Council a leading voice and policy organization for wilderness stewardship. To the extent that the Council embraces its leadership potential, wilderness will be well served.

A second institution is the **Wilderness Information Network (WIN at www.wilderness.net),** supported by the four wilderness stewardship agencies but housed within the Wilderness Institute of The University of Montana-Missoula. This is a network of the modern age of information technology. It is being developed as the prime repository and linking network for information of all kinds about wilderness. It draws from the information developed by stewards of individual wildernesses; from the research that has been conducted by federal agencies, university professors, and others; from information disseminated in periodicals and other media; and from

groups such as The Wilderness Society and the Wilderness Policy Council to provide a comprehensive information base for wilderness stewardship, research, and advocacy.

In recognizing the need to do some of our wilderness business in a different way, interagency organizations have been developed for training and research. These are the **Arthur Carhart National Wilderness Training Center** and the **Aldo Leopold Wilderness Research Institute**, both located on the campus of The University of Montana-Missoula. Of the two, the Carhart Center is the most fully interagency, but that goal is common to the two organizations.

The Arthur Carhart National Wilderness Training Center trains federal and state land managers who have wilderness stewardship responsibilities. It also has developed school curricula on wilderness for primary and secondary education. The staff represents the four federal wilderness stewardship agencies, though initial base funding and staff support were provided by the USDA Forest Service. The Bureau of Land Management added support in 1994, the US Fish and Wildlife Service in 1995 and the National Park Service in 1996. An onsite director and a governing board, including the National Wilderness Coordinators for wilderness stewardship agencies, provide administration.

During the years of 1993-1999 the Carhart Center provided 35 training sessions to 1329 participants. They also worked on cooperative projects with the Aldo Leopold Wilderness Research Institute, The University of Montana, and several national and regional conservation programs. The Carhart staff has recognized expertise, and members frequently participate in national initiatives within their respective agencies. This organization represents a fledgling interagency cooperative that is fully embraced within the system and that also demonstrates the potential efficiency that arises from the organization of cumulative expertise across the agencies.

Four activities in Alaska also provide lessons for interagency collaboration and cooperation. Land management agencies in Alaska have developed effective, collaborative groups that might serve as models for the country. For almost 20 years the Alaska Office of the Secretary of Interior has convened and chaired the Alaska Cooperative Planning Group (ACPG). ACPG is composed of all of the Regional and State Directors of Interior Department agencies in Alaska. They meet once each month to address joint management issues through general meetings and committees. The Alaska Issue Group (AIG) in the remote west is a particularly important communications network. It fosters communication between field managers and officials in Washington, DC who address Alaska land management issues. AGI conducts a conference call twice per month. The Alaska Land Manager's Forum (ALMF) deals with inter-jurisdictional land management issues arising among federal agencies, state agencies, and native corporations. The ALMF brings together all of the major land managers on a face-to-face basis. Finally, the Alaska Public Lands Information Center (APLIC) combines the public information functions of all the public land management agencies into one full-service, information dissemination entity.

The Aldo Leopold Wilderness Research Institute evolved from the USDA Forest Service Intermountain Research Station's Wilderness Management Research Work Unit, and thus it had a beginning soon after the passage of the Wilderness Act even though its dedication as a research institute was in 1993. It coordinates and directs federal research on ecological and social topics of wilderness and other protected areas. The Institute operates under an interagency agreement among the four federal wilderness stewardship agencies and the US Geological Survey. Cooperative interagency activities include identification of research needs and priorities, development and conduct of research programs and projects, and the application of research findings to management programs and policy issues.

While the Institute is seen as an interagency organization, the Forest Service supports all positions except two, a zoologist position (US Geological Survey) and an application specialist jointly supported by the Fish and Wildlife Service and the Bureau of Land Management. To make it more fully interagency will require initial staffing support from the National Park Service and additional staffing support from each agency.

Likewise, research project support has been skewed toward the Forest Service, even though the Institute conducts research throughout the National Wilderness Preservation System. To the Forest Service support, the Bureau of Land Management has provided consistent but substantially less financial support. The US Fish and Wildlife Service began support for applications of research findings in 1999. The National Park Service has not provided support to the Institute. The USGS has no coordinated wilderness research program but is supporting the onsite Zoologist. To further complicate the interagency nature of the Institute, it is administratively located within the Rocky Mountain Research Station of the USDA Forest Service. Despite the difficulties in administrative organization and in funding, the Leopold Institute has fulfilled an important leadership function in coordination of wilderness research and communication through leadership roles in international, national and regional conferences and meetings.

These many different institutions -- the Policy Council, WIN, Arthur Carhart Center, Leopold Institute, and the collaborative arrangements in Alaska -- give promise for interagency cooperation and for the more complete development of a National Wilderness Preservation System. Combining strong leadership from the Secretaries of Agriculture and Interior, the

agency heads, and their staffs with the efforts of dedicated wilderness stewards and advocates, the potential exists for bringing all of the pieces together to ensure that a system of wilderness will exist. To this end, we offer several specific recommendations for consideration by the Secretaries and others responsible for ensuring a continuing resource of wilderness.

1. The Secretaries should issue joint policies and regulations specifying common interpretations of law, and thus provide broad guidelines for the stewardship of wilderness.

2. The Secretaries should devise an organizational structure to make stewardship happen across the agencies so that a high quality wilderness system is continued in perpetuity.

3. The Secretaries should devise monitoring and evaluation systems to ensure that we know how well wildernesses are being stewarded, especially in the context of a system of wildernesses, and they should reinstitute regular reporting on the state of the system.

4. The Secretaries should develop a means for informing the American people about the National Wilderness Preservation System and about their wilderness heritage.

While each of these is fairly self-explanatory in the context of what has been written previously in this report, we offer several more specific recommendations relating to each in the Appendix. In addition, we comment here on some of the organizational possibilities that the Secretaries might consider.

There are several organizational possibilities for stewarding our wilderness resource. One might be for the Secretaries to appoint a wilderness chief executive officer to assist them in carrying out their responsibilities and to lead a wilderness stewardship council composed of this CEO and the heads of the four wilderness stewardship agencies. A second might be for them to appoint a wilderness stewardship council that acts as their surrogate in directing the wilderness stewardship activities of the agencies. A third might be for the Secretaries to meet regularly to direct themselves the stewardship of the wilderness system. And, a forth might be for them to continue the existing organizational structure, assuming that the agency heads and their policy council can do the job that is needed. Recommendation two above calls for a review of options such as these so that the Secretaries can put into place the most effective organization for ensuring a wilderness preservation system as called for in the Wilderness Act of 1964.

The framework for action prescribed in this report is one that can lead to effective stewardship and development of a National Wilderness Preservation System. Recognizing the many good examples of wilderness stewardship that have been implemented over the past 37 years, we can adopt a set of principles for stewardship, implement actions that will shape the future for success, and work toward ensuring, especially under the direction of the Secretaries of Agriculture and the Interior, the existence of a truly integrated National Wilderness Preservation System. The result will be enhanced opportunity to ensure that the National Wilderness Preservation System continues as a national and world treasure in the Twenty First Century.

Appendix

Specific Recommendation for Consideration by the Secretaries of Agriculture and the Interior

There is a need to ensure that wilderness stewardship occurs in an environment of trust and cooperation.

- The Secretaries should meet at least semiannually to review and discuss important wilderness issues and thus set direction for stewardship of the over 104 million acres of the federal estate included in the National Wilderness Preservation System.

- Mediation among competing interests to arrive at consensus regarding policies and actions should be undertaken. The Secretaries and agency leaders need to be open to an exchange of ideas and view collaboration as both a positive activity and one that will ensure continuation of the system. They need to provide the framework and environment in which mediation can occur.

- Finding and capitalizing on the comparative advantages across agencies and realistically using the resources of the best agency to address any given situation should be the preferred mode of operation. Each agency does not need to build its own infrastructure for every issue.

- To the extent practicable, devising and promoting parallel and effective organization across the agencies for stewardship and for collaboration should be done. If there are not reasonably parallel organizations, collaboration among staff with similar responsibilities but dissimilar authority, will encounter difficulty.

For wilderness stewardship to be successful information about the system needs to be developed and disseminated.

- Preparation and publication of the statutorily required annual report on the state of the system needs to be re-instituted.

- Briefing packages need to be developed for administration appointees and Congress that allow them to be informed when they make wilderness decisions.

- A plan for public education and communication about wilderness needs to be formulated so that citizens from diverse demographic and ethnic groups have the information that allows them to be informed voters and participants in Wilderness decisions.

- The Arthur Carhart National Wilderness Training Center needs to be brought to an organizational, reporting, funding, and staffing level to ensure integrated interagency educational

and information dissemination for building a professional cadre of wilderness stewards and for educating various publics about Wilderness and its place in American land use.

- The Aldo Leopold Wilderness Research Institute needs to be brought to an organizational, reporting, funding, and staffing level to ensure integrated interagency research and scholarship for providing the knowledge base for informed and enlightened wilderness stewardship.

For effectiveness in interagency collaboration and cooperation, reconciliation of philosophy and culture between the four Wilderness stewardship agencies is necessary.

- Policy needs to be devised to resolve the tension between recreation use and wilderness conditions.

- Appropriate and common guidelines for visitor use management need to be specified.

- Minimum requirements and tool choice and decision processes need to be defined and specified.

- Baseline conditions need to be defined and inventoried so that non-degradation and enhancement of wilderness can be clearly addressed.

- Differences about what it means to restore wilderness need to be resolved.

- A common policy for dealing with fire needs to be promulgated and implemented.

- Common guidelines for dealing with Wilderness Study Areas need to be developed.

To know how well we have done and to evaluate the success of stewardship programs a program for evaluating success and accountability needs to be established.

- An annual agency director's conference on wilderness needs to occur to ensure that agency heads are fully informed on the state of wilderness affairs.

- An annual field stewards' conference is needed to learn current issues from field personnel.

- Reliable information on total funding and staffing needs to be developed and shared with the Secretaries and agency administrators.

- The state of Wilderness planning needs to be reviewed and a strategy devised for its acceleration.

- Meaningful feedback mechanisms for stewards on the ground need to be developed and promoted.

To ensure system-wide attention and behavior the Secretaries of Agriculture and the Interior and agency leaders need to become the focus for organizational reform.

- A strategy for the resolution of issues in leadership and commitment within and across the agencies needs to be developed.

- Policies and procedures for establishing a professional cadre of wilderness stewards need to be developed.

- The roles, functions and investments in the seasonal workforce need to be assessed and enhanced.

- The means to pool funds to achieve common purposes need to be promulgated and implemented, similar to the interagency fire center and the joint fire sciences program.

- Strategies for empowering wilderness stewards to engage in collaborative and interagency activity at all organizational levels need to be formulated.

MEMBERS OF THE WILDERNESS STEWARDSHIP PANEL

PERRY L. BROWN has been involved with wilderness studies his entire career as an academic and academic administrator. He has conducted research on users and resources of the Bridger, Fitzpatrick, and Popo Agie in Wyoming; Rawah, Indian Peaks, Flat Tops, Maroon-Bells-Snowmass, Powderhorn, and Weminuche in Colorado; John Muir and Ansel Adams in California; High Uintas of Utah; Lee Metcalf of Montana; and Boundary- Waters Canoe Area of Minnesota. He has assisted units of the Forest Service and the Bureau of Land Management with wilderness planning, and he served on the steering committees for the 1985 National Wilderness Research Conference in Fort Collins, Colorado and the 1989 conference, Managing America's Enduring Wilderness Resource in Minneapolis, Minnesota. In his current position as Dean of the School of Forestry at the University of Montana he has responsibility for the University's Wilderness Institute, and he was co-chair of the 1999 Wilderness Science Symposium held in Missoula, Montana. In his personal life he has hiked in all of the areas listed above, and many more. In Dan Dustin's book, *Wilderness in America: Personal Perspectives*, he has described Wilderness as leading to a "fountain of discoveries," a fountain that we can ill afford to turn off.

NORMAN L. CHRISTENSEN Jr. stepped down in June following eight years as the founding dean of the Nicholas School of the Environment at Duke University in order to return to teaching and research. Before he became dean he was chairman and professor of the Botany Department. He is a professor of biology and ecology whose scientific interests range from the Southeast Coastal Plains environment to radar mapping of forest ecosystems.

HANNA J. CORTNER is Professor of Renewable Natural resources at the University of Arizona. A political scientist, she teaches and does research in the area of natural resources policy and administration; her latest research centers on linkages between new ecosystem approaches to natural resource management and democratic governance. Throughout he 27-year career she has chaired or served on a number of blue ribbon or scientific advisory panels.

THOMAS C. KIERNAN is President of the National Parks and Conservation Association in Washington, D.C. since 1998 following three years as president of the Audubon Society of New Hampshire. He has worked with the Department of Environmental Quality of Oregon, the Environmental Protection Agency's Office of Air and Radiation. At EPA he won the Gold Medal Award for his role in achieving consensus with businesses and environmentalists on a $450 million pollution control project at Grand Canyon National Park. A national class slalom kayaker, he is a co-founder of the Rocky Mountain Outdoor Center in Colorado.

WILLIAM H. MEADOWS has been President of The Wilderness Society since 1996. He has worked on environmental issues for more than 30 years, serving in leadership positions for numerous environmental organizations in his home state of Tennessee. Prior

to assuming the presidency of the Wilderness Society, he directed the Centennial Campaign, a $100 million major gift fund-raising effort for the Sierra Club. He leads the organization that was the principal catalyst for the creation of the National Wilderness Preservation System. The organization has labored for years to add wilderness areas to the system. It has also worked with federal land management agencies to protect and better manage the nation's wilderness resources. He has continued that legacy by working effectively with congressional, agency and other conservation leaders.

WILLIAM REFFALT grew up in Colorado where vacations and most weekends meant scaling mountains, fording streams and sleeping under the stars. After graduating with honors from Colorado State University in Wildlife Management, he was employed by the U.S. Fish and Wildlife Service in several Western states. During more than 24 years with the Service he became involved with wilderness issues on several occasions, including eight years in charge of the team that developed and legislatively supported the more than 540-million acres of new refuges, and 18 million acres of designated refuge Wilderness that was enacted into the Alaska National Interest Lands Conservation Act of 1980. During that time he worked on a daily basis with teams from the National Park Service, the Forest Service, the Bureau of Land Management and the Bureau of Outdoor Recreation on their conservation system's that were also established in that monumental Alaska Act. In 1984 he left government service and began work with the Wilderness Society as Program Director for the National Parks and Alaska Lands. He retired in 1999. He has traveled extensively in Alaska and elsewhere, hiking and camping in many remote Wilderness locations. His retirement plans include annual excursions into America's incomparable Wilderness landscapes.

JOSEPH L. SAX is the James H. House and Hiram H. Hurd Professor at the University of California (Berkeley). He teaches courses on the public lands, water law, land use, and preservation policy. He has also taught and written extensively on the Takings Clause of the Constitution. During 1994-96 he was counselor to the Secretary of the Interior, and he is currently a consultant to the Department of the Interior. He is author of many articles and books on public land and water issues, including *Mountains Without Handrails: Reflections on the National Parks; Legal Control of Water Resources;* and *Defending the Environment*. His most recent book is *Playing Darts With a Rembrandt: Public and Private Rights in Cultural Treasures*.

GEORGE SIEHL is a long-term student of natural resource policy and management issues. He was the assistant to the President of the (then) National Parks Association where he first explored the legislative facet of resources management. This led to a 30-year interlude at the Congressional Research Service, Library of Congress, conducting research for and consulting with congressional members and staff on the full array of natural resources issues. He eventually specialized in park, recreation and wilderness concerns. He organized a two-year series of workshops on land management and protection for the Senate Energy and Natural Resources Committee which led to the establishment of the President's Commission on Americans Outdoors. He served as associate director for trends and forecasts of the Commission before returning to the Library. He later explored the interactions between national defense and natural

resources, attending the Industrial College of the Armed Forces. He then transferred from the Natural Resources Division of the Library to it Defense and Foreign Affairs Division to work on matters such as military base closings and military construction. Since his retirement in 1997 he has consulted independently, and has served as an adjunct staff member of the Institute for Defense Analyses working on defense/land managing agency joint stewardship.

STEWART UDALL was the Secretary of the Interior under Presidents John F. Kennedy and Lyndon B. Johnson. He is an accomplished attorney, lecturer and author. He is an Adjunct Professor of environmental humanism at Yale University. He was instrumental in helping to gain enactment of the Wilderness Act and the Wild and Scenic Rivers Act. He has served as an active member of the Board of Directors of Wilderness Watch since 1995. He lives in New Mexico.

DEBORAH WILLIAMS is a 20-year resident of Alaska who has enjoyed and experienced wilderness throughout the United States her entire life. While attending Harvard Law School she was the principal founder and co-editor in chief of the Harvard Environmental Law Review. Upon her graduation from Harvard she became professionally engaged in wilderness issues as an attorney for the Department of the Interior, both as a member of the Solicitor's Honors Program and then as primary attorney for the National Park Service and the U.S. Fish and Wildlife Service in Alaska. Between 1994 and 1998, as a Presidential appointee, she served as Interior Secretary Bruce Babbit's representative in Alaska, heading the Secretary's Alaska office. She ahs also written numerous law review articles and served on nonprofit boards engaged in wilderness and other natural resource issues. She is currently the Executive Director of the Alaska Conservation Foundation. Her greatest joy in life is backpacking with her family in wilderness.

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JAMES W. GILTMIER is a Senior Fellow of the Pinchot Institute for Conservation, where he served as Executive Director in 1989-1995. In his early career he was a newspaper and television journalist. From 1971 to 1981 he was a member of the professional staff of the U.S. Senate Committee on Agriculture, Nutrition and Forestry. His assignments with the committee included rural development, farm credit, soil and water conservation and forestry. He was involved in the enactment of the Rural Development Act of 1972, conservation credit segments of four farm bills, the Forest and Rangeland Renewable Resources Act of 1974, the National Forest Management Act of 1976 and the Resource Conservation Act of 1977, as well as emergency credit legislation. He has received the American Motors Conservation Award and is an honorary member of the Society of American Foresters. The Soil and Water Conservation Society, the Society for Range Management and the American Political Science Association have also honored him. He has worked for a Washington law firm on international agricultural trade and as a representative for the Tennessee Valley Authority.

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