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ECOSYSTEM MANAGEMENT: SUSTAINING THE NATION'S NATURAL RESOURCES TRUST

MAJORITY STAFF REPORT

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OF THE

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U.S. House of Representatives
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April 30, 1994

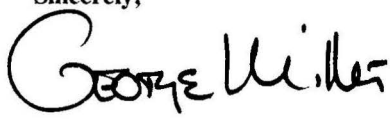
MEMORANDUM OF TRANSMITTAL

COMMITTEE ON NATURAL RESOURCES,
U.S. HOUSE OF REPRESENTATIVES,
WASHINGTON, DC.

To Members of the
Committee on Natural Resources
of the U.S. House of Representatives

The following Majority Staff Report entitled, "Ecosystem Management: Sustaining the Nation's Natural Resources Trust," is hereby made available to all members of the Committee.

Sincerely,



GEORGE MILLER
Chairman

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FOREWORD

Few areas of public policy have become as prominent, or as contentious, in recent years as the issue of the proper management of natural resources. Loggers, fishermen, environmentalists, urban dwellers, power users, Native American interests, farmers and ranchers, and others have all conflicted with one other and with the government over the use and management of these resources. Government agencies—with differing, overlapping, and sometimes conflicting mandates, constituencies, and management—disagree with each other over the management of these resources.

The losers in these conflicts are the resources themselves as well as the people of this country who value and depend on them.

The House Committee on Natural Resources has given a high priority to an initiative designed to reassess the way the government protects, maintains, sustains, and manages the natural resources of this country. We must ask ourselves whether the structures, institutions, and practices of the past are appropriate to the needs of the present—and to the even greater demands of the future.

Too often, the answer to that question is "no." Too often, Federal policy (and State and local policy, too, as well as the practices of private interests who use the public's resources) are unhelpful and unenlightened. Too often, these policies and practices obstruct good resource management instead of facilitating or rewarding it.

Our Nation must find new ways of addressing these challenges, especially in the rapidly growing western United States—an area marked by a declining emphasis on resource extraction as the primary economic base, a rapidly growing population with modern demands on the resources (such as recreation), and communities attempting to adjust to vastly altered circumstances.

One of the most promising new approaches to resource management is to manage, not along the narrow lines drawn up by legislators and cartographers years ago, but on a more scientific basis known as **ecosystem management**. Although the subject of much discussion and dispute, we intend this term fundamentally to mean the management of resources in a coordinated and integrated manner in an area defined by its biological and ecological boundaries. While some question aspects of our definition, it is worth noting that all sides—conservationists, State and local governments, sportsmen, and business people—agree that it allows us to broaden the narrow, fragmented approach that has characterized much of the Federal Government's past stewardship of public lands.

Ecosystem management means that decisions about the use and management of natural resources will be based on science, not politics, to the maximum extent possible. The Federal Government will manage its lands in a broad-based, coordinated manner to avoid crises like those occurring in dozens of areas around the United States, such as the timber dispute over spotted owl habitat in the Pacific Northwest and the continuing decline of the Everglades in Florida, including the loss of commercial fisheries in Florida Bay.

Now is the appropriate time to embrace ecosystem management on a government-wide basis. As the Federal budget for natural resources shrinks,

we must become more efficient. We must streamline the management of those resources by eliminating duplicate functions among the agencies and bureaus, consolidating overlapping management responsibilities, and perhaps most helpful, identifying and resolving interdepartmental disputes that leave both administrators and the private sector confused and frustrated.

The Clinton Administration has wisely endorsed the ecosystem management approach by proposing four ecosystem pilot projects in the Fiscal Year 1995 budget. Vice President Al Gore endorsed and encouraged ecosystem management as part of the National Performance Review, and the White House Office of Environmental Policy is working on an expanded ecosystem management approach for the Federal Government.

At the beginning of the 103d Congress, the Committee on Natural Resources initiated an extensive review of the ecosystem management approach as a means of improving the management of our Nation's diverse resources. Two workshops and one field hearing were held. In addition, committee members and staff participated in several conferences on ecosystem management sponsored by outside organizations.

This report is a compilation of the findings and conclusions that emerged from those events. As the committee continues to monitor the progress the Administration is making in implementing ecosystem management and contemplates legislation to facilitate ecosystem management, this report should serve as useful background.

I want to thank all of those who assisted the committee in planning and conducting the meetings and hearing that served as the basis for this report. Their generous assistance and candid comments have made it possible for both members and staff of the committee to gain far greater insights into every facet of ecosystem management.

My appreciation also goes to Tom Marshall, the principal author of this report. He undertook the difficult task of synthesizing and condensing the discussions from the various events into this report. Tom carried out this work while on a eight-month assignment to the Committee on Natural Resources as a Legislative Fellow.

The findings and conclusions derived from each event are those of the Chair and the majority staff.

Sincerely,

GEORGE MILLER, *Chair*

SUMMARY OF FINDINGS

Ecosystem management is generally viewed as management that promotes ecological, economic, and social sustainability by:

- managing across whole landscapes, watersheds, or regions and taking into account ecological time frames;
- promoting sustainable economic development and communities;
- maintaining biological diversity and essential ecosystem processes;
- utilizing cooperative institutional arrangements (interagency and Federal/non-Federal);
- integrating science and management;
- generating meaningful stakeholder and public involvement and facilitating collective decisionmaking; and,
- adapting management over time based on conscious experimentation and routine monitoring.

Ecologically healthy public lands and natural resources contribute directly to local and regional economic health (community and regional sustainability), and economic declines have been tied to ecological declines in such areas as the Everglades National Park and the Florida Bay.

Because Federal lands and natural resources are interconnected and interdependent parts of larger ecosystems in which the Federal land boundaries do not generally correspond to ecosystem boundaries, the Federal lands and resources are rarely self-sustaining.

Maintaining the health of the ecosystems of which Federal lands and natural resources are a part is an effective and efficient way to sustain their long-term productivity, genetic resources, biological diversity, ecosystem goods and services, and provide for local and regional economic stability.

Involvement of non-Federal entities (State, local and tribal governments and private citizens) is a crucial component of ecosystem planning and management; improved incentives and opportunities for the involvement of non-Federal interests in ecosystems management should be explored.

Management that restores and maintains ecosystem health is likely to prevent species from becoming endangered and facilitate recovery of already-

endangered species in ways that are less costly and more flexible than species-by-species strategies.

The health of the ecosystem should be evaluated on a multiple geographic scale in which landscape- and watershed-scale perspectives are considered as well as large, regional-scale perspectives.

Data gathering and data management are not adequately coordinated among Federal agencies or with non-Federal entities.

Laws governing Federal natural resources management do not direct Federal agencies to maintain the ecological integrity of Federal lands and natural resources or the health of the ecosystems of which they are a part.

Laws governing Federal actions protecting and affecting ecosystems create fragmented substantive and procedural approaches to environmental management.

The voluntary nature of ecosystem management initiatives results in minimal Federal agency accountability.

Current institutional structures inhibit creative and cooperative ecosystem management.

Current budgeting practices create serious impediments to integrated, interagency, and intergovernmental ecosystem management.

Although virtually all Federal environment and natural resources agencies have adopted nonbinding, general statements of policy on ecosystem management within the last two years, the policy statements were issued separately by individual agencies, and refinements to such policies are made without coordinating with other Federal agencies or non-Federal entities.

A significant number of the experienced scientists and natural resources professionals who participated in the committee's year-long Ecosystem Initiative stated that, in order for ecosystem management policies to improve, management on the ground, the Administration, and/or Congress will need to exert strong leadership and establish a clear, enforceable policy direction.

I. INTRODUCTION

> [W]e have these grand assets that the people of this country made a decision to preserve for their use and for enjoyment by the people of this country and by people around the world who come to visit those assets. In each case, those national parks sit in a very threatened ecosystem because of the changes that have taken place since the time that we dedicated that park and made those decisions. . . . It is the obligation of the Federal Government to defend those parks. . . . We are not prepared to de-designate, if you will, the Everglades, Yellowstone or Yosemite. . . .
>
> This is a recognition of an ongoing trust relationship, a fiduciary relationship to the people of this country for the investment and the decisions they have made about these world-class resources and all that they mean to the communities surrounding them in terms of the economic engines that they have become . . . .[1]

As trustees not only of our national parks, but also another 600 million acres of Federal lands and a considerable portion of our water resources, Federal agencies are responsible for ensuring that our children inherit a "natural resources trust" with assets as valuable and productive as they are today.

The "income" from our public lands and resources, meanwhile, provides a steady stream of benefits—including recreational opportunities, timber, water, minerals, livestock forage, and spiritual renewal.

Although this income is significant, sound long-term stewardship of the trust is paramount if it is to retain its value and continue generating income over time. Notwithstanding, increasing visitation levels and external threats are taking a serious toll on many of our national parks.[2] Intensive resource extraction permitted—and arguably promoted—by the Forest Service and Bureau of Land Management (BLM), moreover, is causing potentially

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[1] Introductory remarks of Committee on Natural Resources Chair George Miller, *Joint Oversight Hearing on Efforts To Protect and Restore the Everglades Ecosystem With Special Emphasis on Florida Bay* ("Hearing"), Serial No. 103-42, Committee on Natural Resources, p. 14 (1993).

[2] From 1984-1993, total visitor use of the national parks increased from 248,785,509 to 273,120,925. Examples of specific park visitation increases in this time period include: Big Cypress National Park (NP) from 0 to 234,830; Everglades NP from 628,658 to 973,706; Grand Canyon NP from 2,173,584 to 4,575,602; Rocky Mountain NP from 2,231,448 to 2,780,342; Yellowstone NP from 2,222,027 to 2,912,193; and Yosemite NP from 2,738,467 to 3,839,645.

See also, *National Park Service: Activities Outside Park Borders Have Caused Damage to Resources and Will Likely Cause More* (GAO/RCED-94-59, January 3, 1994).

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irreversible degradation of the Nation's "multiple-use" lands.[3] Watersheds and waterways have been polluted, diverted, and dammed by Federal agencies, causing the loss of whole fisheries. Wildlife habitat have been fragmented and are shrinking.

We have begun, in effect, to deplete the assets in our natural resources trust rather than to live off its income. As a result, we squarely face the prospect of passing on to the next generation of Americans a diminished legacy of natural wonders, lands, and river systems. Even today, painful social and economic "train wrecks" occur because of mismanagement of public natural resources. Logging on public lands in the Pacific Northwest has been at a virtual standstill for years, halted by Federal court injunctions of unprecedented scope. One of the judges enjoining the timber sales has characterized the Federal agencies' violation of resource laws as "systematic and deliberate." Local timber-dependent communities in that region and elsewhere have suffered.

The long-delayed transition to more careful forest management policies is now difficult and costly. Ironically, taxpayer dollars continue to subsidize activities that many scientists believe damage the natural systems upon which the health of our public land and water resources depend. Taxpayers are then charged a second time when expensive environmental restoration is necessary.[4]

Not surprisingly, a consensus is emerging that Federal natural resources managers need to change the way they do business. One promising new paradigm, "ecosystem management," has already been embraced by a number of States and local governments, Indian tribes, community and civic groups, industry, and environmental groups.[5] It is now taking hold at the Federal level. A working definition of ecosystem management was recently adopted at a consensus-building forum involving a wide range of public and private interests:

> Ecosystem management is an approach to environmental management that:
> (1) is at a scale that is compatible with natural processes;
> (2) is cognizant of nature's time frames;
> (3) recognizes social and economic viability within functioning ecosystems; and
> (4) is realized through effective partnerships among private, local, state, tribal, and federal interests.
>
> With a goal of: preserving, restoring, or where those are not possible, simulating ecosystem integrity as defined by composition, structure, and

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[3] A recent majority report of the Committee on Natural Resources documented large-scale toxic pollution on Forest Service, BLM, and other public lands. See *Deep Pockets: Taxpayer Liability for Environmental Contamination*, Committee Print No. 2, 103d Congress. Numerous native plant and animal species dependent on healthy public lands now face extinction—BLM alone has 191 federally listed threatened and endangered species on its holdings, with over 1,000 additional species that are formal candidates for listing. *Ecosystem Management at the BLM: From Concept to Commitment.*

[4] Elizabeth Losos, *A Living Landscape, Vol. III: Taxpayers' Double Burden*, The Wilderness Society.

[5] See, e.g., *Proceedings from the Congressional Research Service's Seminar On Ecosystem Management*, March 24-25, 1994 (forthcoming).

function that also maintain the possibility of sustainable societies and economies.[6]

Management that seeks to sustain ecosystem integrity over time gets income from the land without depleting its productive assets. Although scientists have advocated this approach for years, the foundations of our present natural resources management framework—its laws, institutions, and conceptual underpinnings—were developed decades ago and do not reflect the idea of sustaining ecosystems in order to preserve the long-term potential of our natural resources. Given the breadth of early support for ecosystem-based management, the Committee on Natural Resources developed an Ecosystems Initiative in April 1993. The purpose of the initiative was to deepen committee members' understanding of ecosystem management theory and practice, to work with the Administration as it adopts new policies under existing law, and to identify legal and institutional barriers that might prevent effective implementation of ecosystem management.

While the importance of maintaining healthy ecosystems is by no means limited to their value in sustaining the public lands, the Ecosystems Initiative focused its efforts on the implementation of ecosystem management in the Forest Service, BLM, and the National Park Service. These agencies are the trustees of some of the largest parcels of Federal lands and could, therefore, readily contribute to large-scale endeavors necessary to sustain entire ecosystems.

As part of the Ecosystems Initiative, the committee conducted two workshops, a field hearing, and several site visits. Committee members also attended related conferences held by outside organizations.

- The first committee workshop, held in Montana, involved a day-long discussion between members and prominent scientists of the concepts underlying ecosystem functioning and the scientists' views on the emergence of ecosystem management policies.
- A field hearing in the Greater Everglades Ecosystem was designed for members to learn about the initial stages of a Federal undertaking in South Florida to restore a 17,000 square-mile regional ecosystem that has an urban population of 5 million and 1,500 miles of flood-control canals and dikes.
- The third and final event of the Ecosystems Initiative brought members together with seasoned natural resources managers and legal scholars in Colorado to assess the legal and institutional barriers to ecosystem management.

This report summarizes the findings and basic background gathered from the Ecosystems Initiative. It includes information collected informally from scientists, State and Federal agencies, and nongovernmental organizations. The report makes a number of recommendations based on its findings, with

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[6] The Keystone Center, "National Ecosystem Management Forum," Meeting Summary, pp. 8–9, November 16–17, 1993. An ecosystem is "[a] unit comprising interacting organisms together with their environment (e.g., marsh, watershed and lake ecosystems)." *Forest Ecosystem Management: An Ecological, Economic, and Social Assessment*, p. IX-10, Report of the Federal Ecosystem Management Assessment Team (FEMAT), July 1993. Ecosystems exist at different geographical scales. The FEMAT, for example, recommended that ecosystem management consider watershed (10–200 square miles), river basin or physiographic province (1,000–10,000 square miles), and regional (10,000–20,000 square mile) scales. Ibid. at p. VIII-14 to VIII-16.

a view toward highlighting issues that the Administration and Congress will likely face as they turn to more scientific, collaborative, and preventive approaches to Federal stewardship of our public natural resources.

II. DISCUSSION

A. MONTANA WORKSHOP: THE SCIENTISTS' VIEW

1. BACKGROUND

The committee's first workshop took place on May 16, 1993, at the Black Butte Ranch near Bozeman, Montana. The workshop engaged committee members and experienced scientists in a wide-ranging discussion of ecosystem management basics, the merits of the approach, and obstacles to its effective implementation. Members of Congress participating included Representatives Peter DeFazio, Larry LaRocco, Karen Shepherd, and Chair George Miller. The group of scientists represented a diverse range of interests and expertise within the scientific community. Although the discussion at the workshop focused on the Greater Yellowstone Ecosystem and Northern Rockies, the scientists identified broad concerns relevant to public land management throughout the country.[7]

Two-thirds of the 18,000-square-mile Greater Yellowstone Ecosystem is owned by the Federal Government: 2.5 million acres in Yellowstone and Grand Teton National Parks, over 9 million acres in seven national forests (nearly 1 million acres are designated as wilderness), and 1 million acres managed by the U.S. Fish and Wildlife Service (FWS) and the BLM. Over 6 million acres are State, tribal, and private lands. The largely intact regional ecosystem includes parts of three states—Wyoming, Idaho, and Montana—and is world-renowned for its geothermal, wildlife, and scenic values. Federal land management activities in the area include selling timber; permitting livestock grazing; permitting mining, oil, and gas development; managing recreation, fish, and wildlife; and recovering endangered species, including wide-ranging grizzly bears and wolves. The integrity of the ecosystem is threatened by, among other things, clearcutting up to the boundaries of Yellowstone National Park, proposed mining just north of Yellowstone National Park, and wildlife migration corridors cut off by development.

A summary of the findings from the workshop is set forth below.

2. FINDINGS

a. Ecosystem Management Makes Scientific Sense. The workshop identified piecemeal, uncoordinated administration of the public lands as a serious management defect from a scientific standpoint. Generally speaking, national parks, forests, and other public lands are managed as if they existed in isolation from one another, even when they are interconnected and interdependent parts of the same ecosystem. Ecosystem management, in theory, helps correct this defect by integrating Federal management around the well-being of the entire ecosystem upon which the public lands depend in the long run.

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[7] See Appendix 1 for a list of participants in the committee's Ecosystem Initiative.

The Greater Yellowstone Ecosystem—a vast jigsaw puzzle of Federal and non-Federal lands—illustrates the nature of the adjustments necessary to move to ecosystem-based management. The boundaries of Federal properties reflect political boundaries, not the functional limits of natural systems. An ecosystem-management perspective would treat the public lands in the Greater Yellowstone as component parts of an integrated regional system. An ecosystem approach would also focus managers on a shared goal: maintaining the health and sustainability of the ecosystem. Ecosystem management is not an attempt to expand Federal jurisdiction, rather it is an attempt to manage the various Federal natural resources programs in a coordinated, and not contradictory, manner and foster greater cooperation between the Federal managers and the managers and owners of non-Federal lands.

The discussion also highlighted the urgency of moving to a more scientific approach to land management. The margin for error that in the past allowed natural systems to rebound after intensive natural resources extraction or naturally occurring major events such as drought, insect infestations, and fires, is no longer available according to the scientists. The dramatic rise in the number of endangered species and candidates for future listings, concerns about the health of forests and rangelands, reforestation failures, and other indicators of increasingly fragile natural systems demonstrate the need for significant management changes. Human stresses on ecosystems have now reached the point where, as the Interagency Scientific Panel on Late-Successional/Old-Growth Forests once concluded, "There is no free lunch."

b. Agencies Are Reluctant to Cooperate With Each Other and With Non-Federal Landowners. Many scientists expressed frustration with Federal agencies' tendency not to work together within their different missions and cultures to maintain the integrity of the regional ecosystem. Similarly, given that management improvements in one part of the ecosystem may be of little consequence if management nullifies its effect elsewhere in the same system, participants agreed that Federal agencies should explore opportunities for expanding cooperative efforts with non-Federal landowners. This could include increased outreach, information sharing, technical assistance, cooperative monitoring and analysis, and improved targeting of grant and assistance programs. The scientists also generally agreed that developing new, additional incentives for non-Federal participation in ecosystem management efforts is important.

c. Ecosystem Management Goes Beyond Preservation vs. Production. The scientists stressed that ecosystem management is not a synonym for "locking up" lands now managed for multiple uses.[8] Rather, it is a more scientific means for understanding the long-term potential of the land, which assists policymakers in meeting human needs while preserving a wider range of long-term options and values. Management that ignores ecosystem boundaries or that tries to preserve isolated parcels of land, neglects the possibility that ecological functioning on adjacent lands essential to sustaining the isolated parcel may be impaired.

Although wilderness areas can be important components of ecosystem management, there was general agreement that maintaining ecosystem integrity across whole landscapes will frequently involve active management.

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[8] The BLM and National Forest Service manage their lands under a "multiple-use, sustained-yield" policy, which mandates a combination of diverse uses—including recreation, range, timber, minerals, and wildlife—that maintain long-term, high-level production of renewable resources without permanently impairing the land's productivity and environmental quality. See, e.g., 16 U.S.C. § 528–531.

The participants pointed out, however, that an ecosystem perspective reveals that certain areas, such as low-elevation lands and other productive forestlands, are not adequately represented in the Federal Wilderness System.

Several participants emphasized that even as management goals are broadened beyond short-term commodity production and wilderness values, supporting stable human communities should remain a significant part of ecosystem management.

d. New Approaches Should Not Be Discretionary. A number of the participants believed that the Federal lands provide the best opportunity for instituting effective ecosystem management policies. There was general agreement among the scientists, however, that for the policy shift to ecosystem management to be successful, clearer goals and directions than those currently articulated will need to be provided to Federal managers on the ground. There was general agreement that nonbinding policies will assure, for the most part, the continuation of "business as usual" within and among the Federal land management agencies. Finally, the discussions revealed a widely shared view that strong leadership from the highest levels in the government is a necessary prerequisite for ecosystem management to make any kind of substantial difference.

e. Science Must Be Integrated Consistently Into Management. The scientists emphasized that the link between scientists (both within and outside the Federal agencies) and managers must be clear, direct, and strong. The role of science in management decisions, the group generally concurred, is ill-defined and should be formalized. To improve existing knowledge and steer management over time, the scientists stressed that experimental approaches and continual monitoring should be an integral part of ecosystem management. The agencies should also build in flexibility or otherwise anticipate the need to manage on the basis of new information.

f. Agencies Should Develop Joint or Compatible Data Bases. The consensus among the scientists was that data bases concerning natural resources and processes are inadequate in or uneven among some regions. Where good data are available, data from one agency is often in a form that is not complementary or coordinated with that of another agency. The group also recommended that the basic science for ecosystem management be augmented.[9]

g. Institutional and Budgetary Reforms are Necessary to Remove Obstacles to Ecosystem Management. The scientists generally agreed that ecosystem management policies should be accompanied by institutional reforms. Possible reforms include the consolidation or adoption of land management units that reflect ecological boundaries. Ecosystems are carved up not only by mixed land-ownership patterns, but by different units of the same agency. The scientists also emphasized that restrictions or limitations in agency budgets pose an impediment to integrated ecosystem-based approaches on both an interagency and intragency basis. For example, they pointed out, some of the agency budget processes are based upon commodity production. Accordingly, budget reform as part of the evolution toward ecosystem management is deemed important.

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[9] Similarly, the National Research Council concluded in a report on the new National Biological Survey that organizing existing information, making it more readily available, and coordinating future data collection and exchange are imperative if existing knowledge is to be used effectively. *A Biological Survey for the Nation*, National Research Council, October 5, 1993. Finally, it should be noted that the U.S. Geological Survey is coordinating an ongoing effort to make the Geographic Information System consistent across agency lines, which is an important step toward creating compatible data bases.

B. SOUTH FLORIDA ECOSYSTEM HEARING: THE ENVIRONMENT AND ECONOMIES AT RISK

1. BACKGROUND

The second event of the committee's Ecosystems Initiative examined the status of efforts to manage natural resources trust assets within the Greater Everglades Ecosystem, home to three national parks, a national preserve, six national wildlife refuges, and the Florida Keys Marine Sanctuary. On July 31, 1993, the committee's Subcommittee on National Parks, Forests and Public Lands and Subcommittee on Oversight and Investigations held a joint oversight hearing in Key Colony Beach, Florida, with the Subcommittee on Environment and Natural Resources of the Committee on Merchant Marine and Fisheries. The hearing was designed to place special emphasis on the Florida Bay. A temporary breakthrough in a lawsuit over Everglades water quality attracted additional attention.

The Greater Everglades Ecosystem is approximately 200 miles long, stretching from the headwaters of the Kissimmee River below Disney World to the coral reefs off the Florida Keys. Florida Bay lies between the Keys and the southern end of mainland Florida. The world-renowned Everglades sawgrass marshes are half their historical size due to agricultural development and urbanization. The ecological health of what remains, found mainly within Everglades National Park, has declined over time due to the continued disruption of an essential ecosystem process that sustains the park—the seasonal flow of water from the north (Lake Okeechobee) through the Everglades down into Florida Bay. A massive system of dikes and canals built by the U.S. Army Corps of Engineers for controlling floods and augmenting water supplies in the region now chokes off the park's historic nourishment. The flood-control works divert an estimated 2.5 million acre-feet of water a year into the Atlantic Ocean.

Much of the water that does make it into the park is the polluted runoff from sugarcane farms. This pollution is further impairing the park's ecology by changing the dominant plant community to pollution-tolerant cattails. This erosion of the ecosystem's historic characteristics reduces the habitat of native plant and animal diversity unique to the Everglades.

The Federal Government filed suit in 1988 against the State of Florida for failure to enforce State water quality standards against the farmers. A 1991 settlement established pollution restrictions for water entering the park and the Loxahatchee National Wildlife Refuge, and required construction of filtering marshes below the Everglades Agricultural Area (EAA) as well as on-farm pollution reductions.

Some 60 lawsuits have been filed in State court by agricultural interests to block implementation of the Federal court settlement.[10] Shortly before the committee's field hearing, the Federal Government, State government, and the two largest agricultural interests agreed to a statement of principles as a first step toward settling the State court challenges. The principles called for increasing the area of filtering marshes and changing the timing and quantity of water flowing from the EAA to mimic more closely historic flows in the ecosystem. At the time, it was anticipated that these and related restoration efforts would be part of an agricultural industry, Federal, and State government plan estimated to cost $465 million.

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[10] Hearing at p. 17.

In January 1994, the Federal Government reached an agreement with Flo-Sun (one of the major sugar producers) to pay $100 million over the next 20 years to help finance cleanup activities. The company also agreed to refrain from further litigation blocking the earlier agreement. Litigation by other affected parties continued. Recent action by the Florida State Legislature regarding the financing and other arrangements for the cleanup may have the effect of superseding most litigation.

Farther south in the Greater Everglades Ecosystem, the southern portion of Everglades National Park, encompassing most of Florida Bay, has undergone changes that scientists have described as catastrophic. The biological diversity, productivity, and stability of Florida Bay has deteriorated rapidly. Since 1987, 55 square miles of seagrass have died and microscopic algae blooms have turned spectacularly clear waters dark green. The algae blooms at the time of the hearing covered 600 square miles of the 1,000-square-mile bay. Populations of water birds and juveniles of many fish species appear to have dropped. Florida Bay is the principal nursery for the largest commercial and sport-fishing fisheries of Florida. The number of pink shrimp caught after maturing in Florida Bay is near a 30-year low, a die-off of sponges threatens a major decline in spiny lobsters, and mangroves are dying at an alarming rate. The ecological dysfunction in the bay, finally, threatens interconnected portions of the regional ecosystem, including the coral reefs through which bay waters circulate.

Florida Lieutenant Governor Buddy MacKay testified first at the day-long hearing, followed by four panels that included scientists, community and business representatives, environmental groups, agriculture and tribal representatives, and State and Federal officials. Seven members of Congress participated in the hearing: Representatives Bruce Vento, Larry LaRocco, Carlos Romero-Barceló, Peter Deutsch, Carrie Meek, Clay Shaw, and Chair George Miller. Members were joined by Senator Daryl Jones of the Florida State Legislature. Findings from the hearing relevant to the committee's Ecosystem Initiative are set out below.

2. FINDINGS

a. The Natural Resources Trust Contributes to Regional Economic Health. Witnesses at the hearing highlighted that the natural values, productivity, and health of the Greater Everglades Ecosystem are an integral part of South Florida's economy. The Honorable Jack London, Mayor of Monroe County, testified:

> Today, you will hear from commercial and recreational fishermen, business people, dive shop operators, hotel/motel owners, and others whose livelihoods depend on an uncontaminated marine environment. . . . To the citizens of the Keys, the bay is more than a magic place, it is a critical component of the greater ecosystem which provides tens of thousands of jobs . . . .[11]

Although tourism alone translates to $2 billion a year for the Keys, the hearing identified other large economic sectors that rely on a healthy natural ecosystem. Real estate sales alone in Monroe County, Florida, exceed $250 million annually, and mortgage-loan closings are presently worth over $400

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[11] Hearing at p. 42.

million.[12] The commercial and recreational fishing industry in the region generates more than a $100 million in annual revenue.[13]

Based on renewable resources, this portion of the region's economy is sustainable in the long-term; it is, however, directly dependent on the health of the ecosystem that produces and sustains the natural resources. The consequences of an impaired ecosystem are not limited to the Keys or to the tourism and natural resources sectors. The ecosystem's urban population to the east, for example, depends on drinking water from the Biscayne Aquifer, an underground component of the ecosystem no longer recharged naturally as in the past. This forces the urban population to import drinking water during droughts.

b. Efforts To Address Environmental Problems in the Region Must Be Formulated On An Ecosystem Basis To Be Effective. The scientists at the hearing consistently stressed that the Greater Everglades Ecosystem is an interconnected, interdependent landscape and seascape that together form a functioning ecosystem. Dr. Ron Jones explained it simply:

> One of the things people need to understand when they examine the Everglades is that it is a very complete and intact system, and what we do very, very far to the north affects many things that occur all the way down here in Florida Bay.[14]

State and Federal policymakers' testimony endorsed this view. Lieutenant Governor Buddy MacKay, for example, recounted two decades of involvement in piecemeal State and Federal responses to seemingly isolated problems, concluding:

> [I]n summary, we have been developing partial solutions. We have been struggling to get our vision and our understanding of the problem to be as complete as it needs to be to deal with this entire system . . . . The lessons are we have got to move faster—we have got to stay together.[15]

A scientific assessment of the status of Florida Bay completed after the hearing provides a clear illustration of the importance of taking an ecosystem-wide perspective:

> A restoration activity which may offer some benefits to the Bay ecosystem, such as "reopening" channels through the Keys [to restore historic water circulation rates] may have deleterious effects on patch and barrier reefs within the Sanctuary if the transport of harmful algal blooms or water of high nutrient content and excessively high or low salinity offshore is increased.[16]

Although a comprehensive, fully integrated plan for the ecosystem is not yet in place, interagency efforts are under way to develop a coordinated ecosystem restoration plan. [See section "h" below.]

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[12] Hearing at p. 52.

[13] Hearing at p. 188.

[14] Hearing at p. 29.

[15] Hearing at pp. 18-19.

[16] *Federal Objectives for South Florida Restoration*, A Report of the Science Subgroup of the Interagency Working Group ("Report"), November 15, 1993, at pp. 16-17.

c. Ecological Restoration After Problems Have Developed Is Expensive, Slow, and Contentious. The hearing demonstrated that the economic and social consequences of restoring a degraded ecosystem can be quite high. The cost of restoration already planned for the Greater Everglades Ecosystem exceeds a billion dollars. This cost, moreover, reflects restoration activities developed without a comprehensive, integrated plan. In the upper watershed, the Army Corps of Engineers will spend five times more to restore the Kissimmee River than it spent to turn the river into a concrete canal 30 years ago.[17] In the central watershed, the half-billion-dollar pollution prevention effort to protect Everglades National Park is slated to take 11 years, at a minimum.[18] Estimates of the cost of delaying the start of its implementation have been placed at almost $3 million a year.[19] The effort, moreover, is only designed to meet interim standards that will become more stringent over time.

Enforcement of existing laws through litigation, though sometimes necessary to ensure that difficult policy decisions are made, has proven an expensive, time-consuming tool where, as in South Florida, some major interests are vested in maintaining the status quo.[20] Beyond the millions of public dollars spent on the lawsuit, personnel who might otherwise work on restoration activities were tied up in court. For example, State officials at one point were scheduled six hours a day, five days a week, for nine straight months of legal depositions.[21]

Finally, even when ecological priorities are clear, environmental restoration can be highly controversial. Although there is general consensus among scientists and lawmakers in South Florida about the desirability of purchasing and flooding land in the East Everglades to mimic historic fresh-water flows into Florida Bay, some current landowners are unwilling to sell their land.

d. Ecosystem Management Provides an Opportunity to Improve the Fiscal Soundness of Ecosystem Restoration Efforts. In addition to the billion dollars committed to South Florida Ecosystem restoration, billions more are being spent on environmental restoration elsewhere in the country.[22] As in South Florida, these efforts were developed before comprehensive, interagency ecosystem restoration plans were developed.

Thomas Martin, on behalf of the Everglades Coalition, a group of 28 environmental and conservation organizations, suggested at the hearing that Congress or the Administration put together an integrated, cross-agency budget for Greater Everglades Ecosystem restoration on a regular basis. In this manner, restoration expenditures, agency responsibilities, activities funded, progress made, and whether expenditures were spent based on ecological priorities could be tracked for the first time.[23]

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[17] Hearing at p. 17.

[18] *Everglades Restoration Issues*, U.S. Department of the Interior, July 1993.

[19] Ibid.

[20] At the hearing, Congressman Shaw, for example, stated: "I think this panel knows that if [former U.S. Attorney] Mr. Lehtinen had not taken the courageous step some years ago in bringing this lawsuit, which was controversial at birth and remains very controversial today, nothing would have been done." Hearing at p. 12.

[21] Hearing at p. 17.

[22] For example, expenditures for the Great Lakes, Chesapeake Bay, and Prince William Sound are an estimated $9 billion, $1.1 billion, and $1 billion, respectively.

[23] Hearing at p. 70.

e. "Environment vs. Jobs" Tradeoffs In the Region Are "Jobs vs. Jobs" Tradeoffs. P.L. 103–219, amending the Everglades National Park Protection and Expansion Act of 1989, authorizes the Federal Government to contribute funds to the acquisition of lands in the East Everglades so that they may be flooded as a first step toward stabilizing Florida Bay. General agreement has been reached that it is necessary to flood lands in the East Everglades that are being farmed, giving rise to a seeming tradeoff between protecting the bay and maintaining farm jobs. The legal challenge to force agriculture to stop polluting the Everglades National Park creates the appearance of a similar tradeoff: protecting the park vs. maintaining farm jobs. Nevertheless, as a report by the Congressional Research Service issued prior to the hearing emphasizes:

> It should be stressed at the outset that *the debate is not jobs versus environment or birds versus farmers*. The choices are more difficult: agricultural jobs versus fishing and tourism jobs; abundant water as currently delivered versus safe, long-term, salt-free water supplies; restoration of water flows versus protection of some areas from flooding . . . and so on.[24] (Emphasis in text.)

Even viewed in terms of jobs vs. jobs, substantial public subsidies have promoted ecologically harmful farming practices over more sustainable jobs and natural values. Both the East Everglades farmers, in the form of flood control, and the sugarcane growers, in the form of price supports, receive substantial public assistance. Sugarcane growers have also failed to pay for cleaning up their pollution for years. Looking at the Greater Everglades Ecosystem as a whole, rather than in a piecemeal fashion, enables policymakers to understand that activities within the Everglades Agricultural Area, for example, have economic and employment consequences in the Keys. Similarly, this approach helps policymakers understand the importance of East Everglades agricultural lands to the restoration of Florida Bay and employment in the Keys.

f. The Public Trust Is Not Being Adequately Protected By Federal Agencies. The Department of the Interior, charged by law with conserving the Everglades National Park so as to leave it "unimpaired for the enjoyment of future generations," testified that the park is dying.[25] Interior officials have known for more than 25 years that Army Corps of Engineers water-management policies disrupt the natural processes upon which the health of the park depends. Yet the park has few, if any, effective tools to require even a Federal agency to stop degrading the park.[26] The Corps, for its part, is responsible for a project that has among its explicitly authorized purposes "preservation of Everglades National Park" and "flood control"—potentially conflicting purposes both for the Corps to reckon with on its own as well as for a Federal agency with a fiduciary duty to protect the park.[27]

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[24] Hearing at p. 211.

[25] 16 U.S.C. § 1; Hearing at p. 131.

[26] See, e.g., Robert Keiter, "Taking Account of the Ecosystem On the Public Domain: Law and Ecology in the Greater Yellowstone Region," *Univ. of Colorado L. Rev.*, Vol. 60:923–1007 (1989); Sax and Keiter, "Glacier National Park and Its Neighbors: A Study of Federal Interagency Relations," *Ecology Law Quarterly*, Vol. 14:207–263 (1987).

[27] Hearing at p. 187.

In a situation of ambiguous laws and responsibilities, the agencies are left to work out their differences voluntarily at their discretion, with little or no accountability. Despite authority granting the Corps authority to protect the park, so far the Corps has made only nominal changes to its system. The Corps, in response to Congress' most recent direction in the Water Resources Development Act of 1992, is now studying the feasibility and advisability of making changes to, among other things, protect water quality. The studies are estimated to take five years. Upon completion, the Corps will report to Congress with its recommendations. In spite of a multitude of existing laws and its verbal testimony to the contrary, the Corps' written testimony at the hearing asserts that "[a]dditional authority will probably be required to implement many of the proposed [restoration] projects." [28]

g. Fragmented Management Responsibilities Reduce Public Accountability. Tom Martin, on behalf of the Everglades Coalition, also contended that the diffused responsibilities for the health of the Greater Everglades Ecosystem among numerous Federal agencies in the region reduces public accountability and renders effective public oversight of agencies' actions difficult. Martin also proposed that interagency, ecosystem-wide cooperation be mandated in law and that one agency be held legally responsible for ecosystem restoration in the Everglades. He recommended that this lead agency have the power to resolve disputes among Federal agencies. To further increase public accountability, he proposed that Congress require annual, coordinated ecosystem restoration plans along with progress reports. The reports would be tied to congressional budget cycles, so that Congress would be more aware of funding needs for restoration and could be sure that Federal agencies are working together efficiently on shared priorities.

h. Federal Ecosystem Cooperation Is Proceeding On A Regional Scale Under A Voluntary Memorandum of Understanding (MOU). On September 23, 1993, shortly after the Committee on Natural Resources hearing, five Federal departments and the EPA—representing ten Federal agencies—signed an Interagency Agreement on South Florida Ecosystem Restoration.[29] Explicitly recognizing the need to work with the State of Florida, the South Florida Water Management District, and tribal and local governments, the agreement sets up a Federal interagency task force to "coordinate the development of consistent policies, strategies, plans, programs, and priorities for addressing the environmental concerns of the South Florida Ecosystem."

A working group of the task force is to meet at least quarterly. The group, among other things, is to "[d]evelop an integrated financial plan, which includes the coordination of Federal funding requirements, in conjunction with State and local funding and funding from private sources." Meetings are open to the public and an opportunity for public comment is provided at each meeting. To address interagency disagreements, the group is to "facilitate the expeditious resolution of issues by quickly elevating them to the [higher level] Task Force."

While this is an important step toward ecosystem management in the Greater Everglades Ecosystem, the agencies ultimately remain largely unaccountable to the public. The voluntary, unenforceable nature of the

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[28] Hearing at p. 151.

[29] The participating agencies are the National Park Service, the Fish and Wildlife Service, the U.S. Geological Survey, the National Biological Survey, the Bureau of Indian Affairs, the National Oceanic and Atmospheric Administration, the Soil Conservation Service, the U.S. Attorney for the Southern District of Florida, the EPA, and the Army Corps of Engineers. See MOU, Sept 23, 1993.

arrangement appears to leave unaddressed concerns expressed at the hearing that comprehensive Federal efforts in the region will slow down once the litigation is resolved.[30]

i. Preliminary Federal Restoration Objectives Have Been Developed for the Region and Subregions. On November 15, 1993, a science subgroup of the Federal interagency task force completed a report entitled *Federal Objectives for South Florida Restoration.* The report defines the following vision for ecosystem restoration:

> [W]hat is sought is a partnership between man and nature in developing a healthy economy within a fragile, but highly supportive ecosystem. Sustainable ecosystems integrating economic and ecologic processes is the restoration target for the overall South Florida Ecosystem . . . .
>
> The idealized goal for the natural areas of South Florida is to restore to predrainage conditions the landscape-scale hydrologic and ecologic structure and function in order to reinstate ecosystem integrity and sustainable biodiversity. The goal is an ecosystem that is resilient to both chronic stresses and catastrophic events with as little human intervention as possible.[31]

More specific restoration objectives and measurable success criteria were formulated for the entire region as well as nine subregions. Three options were developed for the restoration of the hydrologic system, differing as to the amount of land area required for restoration and the risk involved to the sustainability of the ecosystem.[32]

At the regional level, success is defined by 16 criteria, including reinstatement of natural hydrology, increase of native landscape diversity, increase of native faunal diversity, and reappearance of missing vegetative landscapes. For each subregion, ecological characteristics are described, restoration objectives are established, and success criteria are defined. The report emphasizes that each subregion management unit is part of an integrated regional ecosystem approach: "*[a]n important lesson from history is that, in this ecosystem, any successful restoration plan developed must encompass the whole regional system, not geographic areas in isolation.*"[33] (Emphasis in text.)

The report was distributed for public review and will eventually be the basis for recommendations by the Federal interagency task force to the Corps for a comprehensive, preliminary study to determine whether it is advisable

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[30] Hearing at pp. 170 and 176.

[31] Report at p. 19.

[32] *Federal Objectives for South Florida Restoration* at p. 23 explains these options as follows:

> The "unconstrained," which recognizes and accepts the economic and social structure of South Florida but makes repairs to the hydrologic system even on developed urban lands, provides the greatest chance of success in restoring the South Florida Ecosystem. The "minimum" involves the most risk [although it is designed to result in a sustainable ecosystem] because it minimally addresses losses of wetlands, hydrologic function, and habitat heterogeneity. In between are many possible increments that can increase the success potential of the restoration effort, one of which is outlined in this document.

[33] Report in Introduction, p. 1.

to modify its flood-control project to improve environmental quality and protect the Biscayne Aquifer and urban water supply.

C. COLORADO WORKSHOP: LEGAL AND INSTITUTIONAL BARRIERS TO ECOSYSTEM MANAGEMENT

1. BACKGROUND

The committee's final Ecosystem Initiative event brought together former public land managers, natural resources legal scholars, a cross section of current leadership of the Department of the Interior, and Members of Congress for a workshop on the legal and institutional barriers to ecosystem management.[34] Prior to the workshop, committee members and staff received extensive briefings on a two-day field trip through the northern Colorado Rockies while observing ecosystem management implementation on the ground. Four members participated in the September 19 workshop, Representatives Karen Shepherd, Larry LaRocco, David Skaggs, and Chair George Miller. Findings from the discussions are set out below.

2. FINDINGS

a. Ecosystem Management Has a Set of Core General Principles. Through the course of the workshop, participants generally agreed on a number of core ecosystem management principles:

- managing across whole landscapes or watersheds taking into account ecological time frames;[35]
- maintaining biological diversity and essential ecological processes;
- encouraging sustainable economic development and social well-being;
- utilizing cooperative institutional arrangements (interagency and Federal/non-Federal);
- integrating science into management;
- improving opportunities for public and stakeholder involvement and facilitating collective decisionmaking;
- working toward a goal of ecological, socioeconomic, and cultural sustainability; and
- adapting management over time based on conscious experimentation and routine monitoring.

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[34] On March 8, 1993, Chair Charlie Rose of the Subcommittee on Specialty Crops and Forestry of the Committee on Agriculture and Chair George Miller of the Committee on Natural Resources asked the General Accounting Office to conduct a detailed examination of the status of Federal agency ecosystem management efforts and to identify the institutional and legal impediments that stand in the way of coordinated ecosystem protection and management. The report is expected in 1994.

[35] An example of management that considers ecological time frames can be found in the FEMAT report, where management options were designed to ensure for a century or more ecosystem persistence and viable populations of plant, animal, and fungi species associated with the ecosystem. Such a time frame is chosen to reflect the length of time over which important ecological changes occur.

b. Current Law Poses Obstacles to Effective Implementation of Ecosystem Management. The legal experts in the group agreed, for the most part, that Federal agencies have discretionary authority to implement ecosystem management under existing law.[36] At the same time, there was a consensus that maintaining healthy ecosystems is not affirmatively required by existing law. A number of the participants believed that, unless binding minimum standards for ecosystem management are set by law or regulation, significant and systematic improvements under new policies are unlikely.

There was a general recognition that some statutes, such as the National Forest Management Act and the Endangered Species Act, provide a foothold for the agencies to move toward ecosystem management. The application of these laws, however, may not coincide with the natural boundaries of the ecosystem. They may be applied on a limited basis, e.g., a species-by-species basis rather than in a more comprehensive and proactive manner; and the interpretation and implementation of these laws "on the ground" may vary widely from one area to another.

The group identified other barriers to ecosystem management. Substantive laws outside the land management framework, such as hard rock mining laws or some appropriations riders, allow activities that can result in the ecological impairment of public lands. Concerns were expressed that procedural laws may also limit agencies' flexibility. Some believed that issues regarding the applicability of the Federal Advisory Committee Act will prove difficult to manage. Management units set by statute, planning processes, and time constraints were also highlighted as potential obstacles to implementing ecosystem management.

Moreover, several participants believed that agencies may lack important ecosystem management tools. For example, land exchanges between Federal agencies and non-Federal landowners were identified as cumbersome, inhibiting consolidation of ownership patterns that could facilitate ecosystem management. Similarly, the ability to adjust management in a timely fashion based upon monitoring results may be constrained by slow agency planning, environmental review, and decisionmaking processes. Finally, it was suggested that agencies should review their existing regulations to identify opportunities to promote ecosystem management or at least remove impediments.[37]

Participants, for the most part, believed it was important for the Federal agencies to review existing laws to determine the legal barriers to ecosystem management and that such a review should include more than the natural resources management agencies, but include those whose activities affect the

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[36] Note, however, that the *Task Force Report on Sustaining Long-term Forest Health and Productivity*, p. xiv (1993) of the Society of American Foresters (SAF) finds "traditional sustained-yield management insufficient if we are to achieve the long-term productivity of all forest values, at the landscape level. . ." because, among other things, it does not ensure ecosystem integrity. See also, *Multiple Use and Sustained Yield: Changing Philosophies For Federal Land Management?*, The Proceedings and Summary of A Congressional Research Service Workshop (March 5 and 6, 1992).

[37] The FEMAT report, for example, recommended that:

> The federal forest management agencies in collaboration with regulatory agencies and public and private interests should develop a planning process that addresses the contemporary requirements of ecosystem management, multiple scales, public participation, current law, non-Federal land relationships, adaptive management, impartial review, and multi-agency oversight. *Forest Ecosystem Management* at p. VIII-40.

condition of lands and waters under the jurisdiction of the Federal Government.

c. Powerful Budgetary and Other Incentives Cut Against Ecosystem Approaches. Although several participants believed that tight budgets will bring agencies together in an effort to share resources and avoid duplication of effort, many agreed that the BLM and Forest Service budgets currently encourage commodity production over ecosystem health and other noncommodity values. Written and unwritten policies tying promotions to commodity production were identified as another area of concern. Moreover, existing law allocates receipts from commodity extraction to local communities, creating significant pressure against shifting management from output targets to restoring the ecological health of land.

Where funding is allocated for noncommodity values, it is allocated to specific programs and functions with little reprogramming flexibility. Agencies face difficulties, as a result, pooling resources within and outside their agencies to work on integrated, multidisciplinary projects. Given these disincentives, participants stressed that budget reform could be a critical success factor influencing how effective ecosystem management policies can be.

d. Supporting State and Local, Tribal, and Private Landowner Involvement in Ecosystem Management Is Critical. A general consensus was reached at the workshop that Federal agency efforts to work with private landowners and non-Federal entities will be essential if agencies are to manage large ecosystems on a sustainable basis. They also agreed that current agency outreach programs are deficient. The participants believed that Federal agencies and the Congress should improve and expand such programs, emphasizing the need to support "bottom up" initiatives started by States, grassroots groups, and others. At the same time, many of the participants agreed that non-Federal participation in cooperative efforts should remain voluntary in nature and that positive incentives rather than regulatory approaches should be encouraged. It was also stated that agencies should be more aggressive in identifying Federal programs and other assistance that can be made available to communities which are moving out of resources-based economies.

e. Agencies Should Look for Opportunities to Reorganize Offices and Programs Along Ecological Lines. Several participants highlighted agency restructuring due to budget constraints and implementation of National Performance Review recommendations create a window of opportunity for agencies to make institutional changes to support ecosystem-based management. Examples discussed included shifting from existing administrative units and regional boundaries to more ecological ones. Institutional streamlining would begin to address the concerns of some at the workshop that a policy that increases cooperation within and among Federal agencies must reckon with increased transaction costs associated with cooperative planning and decisionmaking.

f. Federal Agencies Should Reexamine Their Role In Land Management Decisionmaking. Workshop participants discussed at length the particular role that Federal managers should play in the ecosystem management process. Agencies are currently subject to competing demands and typically seek to "balance" them. This encourages competing interests to take extreme positions, leaves few satisfied in the end, and encourages recourse to the political process to influence agency decisions. Agencies serve as referees in a "lose-lose" situation.

A number of participants strongly believed that agencies could reduce conflicts through more collaborative approaches. They suggested that Federal personnel act as "integrators" and create processes that solicit and empower the public and stakeholders to work out more collective decisions. One

workshop participant expressed this concept as a rule of thumb: "Empower Stakeholders—Disempower Tyrants." Negotiated rulemakings in which Federal agency employees participate as equals in the development of a regulation and sign on to any ultimate agreement, were offered as a useful model for ecosystem management processes.

In discussing this issue, several participants emphasized, however, that minimum standards and guidelines established at the national level must create "sideboards" for more local, collaborative approaches. In the case of irreconcilable conflicts, some took the position that national interests should win over local interests.

g. Federal Agencies Should Establish Clear Ecosystem Management Goals and Procedures That Allow For Flexible Implementation and Decentralized Decisionmaking. Given the competing demands on Federal personnel, participants generally agreed that ecosystem management policies need to provide clear, practical guidance. Once overarching goals are set, however, many stressed the importance of ceding as much implementation authority as possible to managers in the field. Greater authority in agency field offices would allow Federal employees to work more effectively with non-Federal players and in collective decisionmaking processes. The effectiveness and credibility of Federal personnel participating in cooperative efforts, it was argued, turns on having the authority to make and keep commitments. This delegation of power was viewed as particularly crucial in areas with mixed land ownership. Unlike the ecosystem-based planning and procedures now in place in the Pacific Northwest, most Federal initiatives cannot hope to rely on strategies that ignore non-Federal land management.

The significance of this issue was reinforced by the historical perspective offered by a participant who reviewed lessons from cooperative river basin planning that was tried a number of years ago. The participant concluded that the unwillingness of the executive branch, Congress, and the States to cede power to regional decisionmakers accounted for its eventual abandonment. This pointed to the fact that a high degree of cooperation is a necessary but not sufficient factor that should be supplemented with delegation of authority.

h. Agencies Should Increase the Integration of Economic and Social Concerns Into Agency Planning and Activities. A consistent theme throughout the workshop was that ecosystem-based management of the Federal lands should support sustainable economies and communities. Several participants emphasized that cultural sustainability must also be an explicit aim; cultural values form the foundation of stable communities that appreciate the importance of a healthy natural resources base and sound stewardship. The point was also raised again that agencies should provide support and technical assistance to communities that seek to diversify their economies and make the transition away from unsustainable activities.

The Forest Service, in part through access to other Department of Agriculture programs, is able to provide some support to help communities diversify their economies. Other agencies have some capabilities in this area, but it was felt that programs, authorities and funding for this work in the Federal natural resources agencies were insufficient. The workshop participants generally agreed that the agencies and Congress could benefit from a review of existing programs to determine how well they fit with ecosystem management and ensure that agencies have the means to address the socioeconomic dimensions of ecosystem management in a coordinated manner.

i. Ecosystem Management Should Reduce Endangered Species-Related Conflicts. Agencies currently protect the thousands of plant and animal species associated with the public lands, by and large, through an individual-species focus. By maintaining the health of whole ecosystems, however, not only is the capacity of ecosystems to produce goods and services over the

long term protected, but the basic requirements for sustaining biological diversity are fulfilled.

The workshop participants generally agreed that one driving force behind ecosystem approaches is to address Endangered Species Act requirements in as efficient a manner as possible. The participants, for the most part, believed that moving to ecosystem management offers not only a scientifically sound way to prevent species extinction, but also a way to prevent species from becoming endangered in the first place. In this manner, ecosystem management should reduce the risk, expense, and rigid management intrinsic to addressing species survival once they are in danger of extinction. Thus, ecosystem management should be a useful prevention tool despite its having been utilized to date in a reactive manner. One participant stressed that conserving species should not be viewed as a constraint on outputs but prudent management of our natural capital.

j. There Are a Number of Appropriate Ways for Congress to Address Ecosystem Management in Law.[38] Most of the participants agreed that, in addition to the option of closely monitoring executive branch implementation of ecosystem management policies over the near term, Congress should consider codifying or promoting its implementation in new, straightforward ways.

At this point, a number of the participants agreed that Congress should not attempt to create highly detailed substantive standards for land management agencies. The participants also believed that Congress should avoid creating any significant new procedural requirements unless it streamlines existing processes. With that in mind, the following basic alternatives for Congress were generated over the course of the workshop discussions:

- Supplement existing land management authorities with a short amendment establishing an enforceable, substantive ecosystem management mandate and minimal procedural changes.
- Authorize a number of large-scale ecosystem management efforts throughout the country and/or where requested by States.

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[38] The Acting Chief of the Forest Service and the Director of the BLM testified before the Senate Subcommittee on Agricultural Research, Conservation, Forestry and General Legislation on November 6, 1993, regarding the need for additional legislation to implement ecosystem management. David Unger, Acting Chief, stated:

> We are looking at several areas where we may need to change our current policies to implement fully ecosystem management. There may be areas where changes in our existing statutory framework would be desirable. We do know that we will need to change our regulations to streamline our land management planning process and to base it upon ecosystem management principles. We expect to propose these regulatory changes in early 1994.

Jim Baca, then Director of BLM, testified:

> I believe the BLM presently has the authority to do [ecosystem management] without further legislation, although amendments to existing law could enhance the BLM's management capabilities.

Finally, Jack Ward Thomas, the Chief of the Forest Service, stated at forest reform hearings held by the Committee on Natural Resources on February 3, 1994, that:

> Ecosystem management is a holistic approach to natural resource management, moving beyond a compartmentalized approach focusing on the individual parts of the forest. It is an approach that steps back from the forest stand and focuses on the forest landscape and its position in the larger environment in order to integrate the human, biological, and physical dimensions of natural resource management. Its purpose is to achieve sustainability of all resources.

- Pass an act to protect threatened ecosystems nationwide.[39]
- Inventory and remove the most significant statutory barriers to ecosystem management and increase the tools available to agencies to practice ecosystem management.
- Incorporate ecosystem management principles into individual laws as they are reauthorized or into new bills as they are drafted.

[39] This approach could be used to protect intact ecosystems of national significance as well as threatened systems.

III. CONCLUSIONS AND RECOMMENDATIONS

With regard to the non-Federal "stakeholders"—the communities, individuals, tribal and other governments, and the general taxpayers—key points raised include:

- involve the stakeholders early in the process of developing and implementing ecosystem management plans;
- identify Federal assistance—technical, economic, other—to assist communities and individuals to more effectively respond to altered resource conditions;
- build stronger partnerships and better communication between the stakeholders and the Federal agencies; and
- identify and develop incentives for landowners and others, rather than relying upon a regulatory framework, to encourage cooperative ecosystem management across broad landscapes.

Concerns repeatedly raised about the Federal role include:

- nonexistent, uneven, or discretionary nature of Federal interagency cooperation;
- little or no systematic Federal action to share technical expertise or work cooperatively with non-Federal entities and individuals in mixed-ownership ecosystems;
- the lack of minimum standards or guidance to protect the Federal interest or the public trust;
- the lack of accountability inherent in the present discretionary approach by the Federal agencies; and
- the hurdles posed by a multitude of institutional and legal barriers to ecosystem approaches make implementation of voluntary strategies all the more difficult.

A. RECOMMENDATIONS FOR THE ADMINISTRATION

- The Administration has launched a pilot program for ecosystem management, which is reflected in their Fiscal Year 1995 budget submission. The pilot ecosystems include the Pacific Northwest forests, the Everglades, Prince William Sound, and the Anacostia River. This is an important step in the right direction. The Administration's policy, however, should be strengthened.

- The Administration should establish an executive-wide policy to promote the restoration and maintenance of the productivity and ecological integrity of the American landscape. Although the policy should apply to all Federal agencies that significantly affect the environment, to improve Federal care for the Nation's public land and natural resources assets, encourage and protect sustainable economic development and the social and cultural well-being of affected communities, and provide guidance for future action by the Administration and the Congress, the policy should include at least the following:

  - Federal agencies should propose regulatory revisions that include a goal of restoring and maintaining the long-term ecological integrity and productivity of public lands, natural resources, and the ecosystems upon which they depend, to the extent permitted by existing law.

  - Agencies should propose binding regulations to achieve this goal, including consistent ecosystem planning processes, coordinated public participation opportunities, multiple-scale management units, impartial review, multi-agency oversight, and clear accountability. The proposed regulations should be developed with a view toward streamlining existing processes, reducing Federal overlap and conflicts, and increasing collaboration among Federal agencies. The regulations should be developed in consultation with non-Federal scientists and governments.

  - Federal land management agencies should, to the extent authorized by law, support non-Federal ecosystem management efforts and initiate new, cooperative, and voluntary ecosystem management initiatives with State and local governments, tribes, and private landowners.

  - Federal land management agencies should make support for sustainable economic development and communities an integral part of their ecosystem management activities. Agencies should assess their authority to provide such support, and if it is insufficient, seek new authority.

  - Federal land management agencies should, to the extent authorized by existing law, substantially increase efforts to cooperate on a voluntary basis with non-Federal entities and individuals in pursuing ecosystem management opportunities. Agencies should identify what additional authorities may be required to facilitate or encourage this cooperation.

- Federal agencies should identify activities to restore ecosystems, such as the watershed restoration component of the President's Forest Plan. To the extent authorized by law, the agencies should pursue these activities with the dual objective of restoring the ecosystem and providing jobs. Agencies should identify any additional authorities needed to carry out restoration work.

- All Federal agencies should be directed to avoid planning, authorizing, funding, or carrying out actions that may impair the long-term ecological integrity of the public lands and the ecosystems upon which they depend.

▶ Federal agencies should report to Congress by March 1, 1995, on the specific legal, institutional, budgetary, and other impediments encountered in continuing efforts to promote ecological, economic, and social sustainability in the Pacific Northwest, South Florida, Prince William Sound, the Anacostia River, and other areas which may be included in the Administration's pilot ecosystem management project.

▶ As part of the Administration's pilot program, the Federal natural resources agencies should conduct a comprehensive review of existing law and make recommendations to Congress for statutory revisions necessary to:

- integrate ecosystem management principles into resources management;

- provide adequate assistance to communities to make transitions necessitated by ecosystem management;

- provide incentives to non-Federal stakeholders to manage their resources in a manner compatible with the ecosystem management plans on Federal lands; and

- ensure stewardship of public natural resources assets that maintains the long-term productive and other potential of the public lands.

B. RECOMMENDATIONS FOR THE CONGRESS

▶ Congress should closely oversee the evolution of Federal ecosystem management policies within the executive branch to ensure that ecosystem management policies are scientifically sound, enforceable, consistent across agencies where appropriate, and administered efficiently, cooperatively, and effectively.

▶ Congress should work closely with land management agencies to reform their budgets to support ecosystem management. To ensure that Federal expenditures for environmental restoration are ecologically and fiscally sound, the Administration should make detailed interagency budget submissions based upon coordinated ecosystem management plans where large-scale restoration efforts involve significant expenditures of Federal funds.

- Congress should explore alternative ways to supplement Federal land management agency authorities with an enforceable requirement to promote the long-term ecological integrity of the public lands and the ecosystems upon which they depend. Additionally, Congress should work with the Administration to address the legal and institutional barriers identified in this report and by the Administration as part of their pilot ecosystem program.

- Congress should explore how to modify existing programs or create new programs, as appropriate, to support sustainable economic development and communities as part of Federal and non-Federal ecosystem management processes.

- Congress should explore alternatives to increase substantially the level of cooperation, communication, and coordination between Federal agencies and the non-Federal community within the same ecosystem.

- Congress should support measures to encourage and augment efforts to restore ecosystems. Efforts are under way to restore watersheds in the Pacific Northwest as a means of protecting riparian areas, rescuing salmon and other fish stocks which are at risk of endangerment, and providing jobs in the forests. Encouraging ecologically sound restoration activities should be a priority for the Congress and the Administration.

APPENDIX 1

ECOSYSTEM INITIATIVE EVENT PARTICIPANTS

1. **Montana Workshop**

— Dr. Jack Stanford, Flathead Biological Station, Polson, Montana
— Dr. Wayne Minshell, Ecology Department, Idaho State University, Pocatello, Idaho
— Mark Shaffer, The Wilderness Society, Washington, D.C.
— Andy Hansen, Biology Department, Montana Sate University, Bozeman, Montana
— Dr. Wendell Hahn, Regional Ecologist, U.S. Forest Service, Missoula, Montana
— Dr. Reed Noss, Oregon State University, Corvallis, Oregon
— Duncan Patten, Arizona State University, Tempe, Arizona

2. **South Florida Hearing**

— The Honorable Buddy McKay, Florida Lieutenant Governor

Panel 1

— Dr. John Hunt, Florida Marine Research Institute
— Dr. Ron Jones, Department of Biological Sciences, Florida International University

Panel 2

— Hon. Jack London, Mayor, Monroe County, Florida
— Scott Marr, Florida Keys Federation of Chambers of Commerce, Key Largo, Florida
— Capt. Mike Collins, Florida Keys Guide Association, Islamorada, Florida
— Karen L. Lee, Republic Security Bank, Islamorada, Florida
— Christian Fleisher, past President, Upper Keys Hotel/Motel Association, Islamorada, Florida
— Karl Lessard, President, Monroe County Commercial Fishermen, Marathon, Florida

Panel 3

— Thomas D. Martin, Chair, The Everglades Coalition
— James Humble, Vice President and Chief Executive Officer, South Dade Land Corp., and Chair, Key Lime/Avocado Administrative Committee
— George Barley, Chair, Florida Keys National Marine Sanctuary Advisory Council
— Dexter Lehtinen, General Counsel, Miccosukee Tribe of Indians, Miami, Florida

Panel 4

— Bonnie Cohen, Assistant Secretary for Policy, Management, and Budget, Department of the Interior
— Brooks Yeager, Director, Office of Policy Analysis, Department of the Interior
— Dick Ring, Superintendent, Florida Everglades National Park
— Col. Terrence C. Salt, Commander, Jacksonville District, U.S. Army Corps of Engineers
— Billy Causey, Manager, Florida Keys National Marine Sanctuary
— Tom MacVicar, Deputy Executive Director, South Florida Water Management District

3. **Colorado Workshop**

— Jim Ruch, Grand Canyon Trust, former California State Director, BLM
— Prof. Bob Keiter, University of Utah School of Law
— Prof. Charles Wilkinson, University of Colorado School of Law
— Prof. David Getches, University of Colorado School of Law
— Michael Brennan, Esq., Holland and Hart, former Assistant to the Director, Fish and Wildlife Service
— Frank Gregg, University of Arizona, former State Director, BLM
— Jim Baca, Director, U.S. Bureau of Land Management
— Dan Beard, Commissioner, U.S. Bureau of Reclamation
— Jo Clark, Director of Programs, Western Governor's Association
— John Leshy, Solicitor, U.S. Department of Interior
— Sarah Bates, Assistant Director, Natural Resources Law Center, University of Colorado School of Law
— Larry MacDonnell, Director, Natural Resources Law Center, University of Colorado

APPENDIX 2

SELECTED ECOSYSTEM MANAGEMENT REFERENCES

- Society of American Foresters, *Task Force Report on Sustaining Long-term Forest Health and Productivity*, January 1993.

- American Forest and Paper Association, *Recommendations on Ecosystem Management*.

- *Eastside Forest Ecosystem Health Assessment*, Vols. 1 and 2, "Executive Summary" and "Ecosystem Management: Principles and Applications," April 1993.

- *An Ecosystem Approach to the Conservation of Fish and Wildlife*, U.S. Fish and Wildlife Service, March 1994.

- *Ecosystem Management: Federal Agency Activities*, Congressional Research Service (Report 94-339 ENR), April 1994.

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