Ecosystem Management in the United States
An Assessment of Current Experience

Steven L. Yaffee
Ali F. Phillips
Irene C. Frentz
Paul W. Hardy
Sussanne M. Maleki
Barbara E. Thorpe

THE UNIVERSITY OF MICHIGAN ♦ THE WILDERNESS SOCIETY
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Project Director: Steven L. Yaffee
Team Leaders: Irene C. Frentz
              Ali F. Phillips
Team Members: Paul W. Hardy
              Sussanne M. Maleki
              Barbara E. Thorpe

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School of Natural Resources & Environment
The University of Michigan
Ann Arbor, Michigan

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The School of Natural Resources & Environment at The University of Michigan (SNRE) is a research-oriented professional school focusing on the development of policies and management programs that promote the conservation, protection and sustained use of natural resources, and on the training of practitioners and researchers that seek these ends. Research at SNRE focuses on five thematic areas. One of these areas, "Ecosystems: Conservation, Management, Restoration," includes work underway in topics ranging from landscape ecosystem classification and prairie restoration to endangered species policy and dispute resolution.

Master's degree students at SNRE are required to complete a group project as their capstone experience. ECOSYSTEM MANAGEMENT IN THE UNITED STATES: AN ASSESSMENT OF CURRENT EXPERIENCE began as a master's project, with five graduate students participating as a research team supervised by a faculty member. The master's project work catalogued and assessed the experience evident at 77 sites (subsequently expanded to 105 sites for this report). A master's project report was produced in June 1995. It contains a lengthy assessment of the experience at those sites. Copies of the report are available from SNRE at a cost of $25 (includes shipping). For more information about the master's project report or SNRE, or if you have comments or questions about the research, please contact Dr. Steven L. Yaffee, SNRE, The University of Michigan, Ann Arbor, MI 48109-1115. Internet address: yaffee@umich.edu

The idea of developing a catalog and assessment of the current experience with ecosystem management originated through conversations with staff of The Wilderness Society (TWS). TWS subsequently funded a portion of the costs of both the master's project and the second phase of research expanding two electronic databases and the analyses. TWS staff also provided considerable guidance to the research team throughout the year-long project. Besides this inventory and assessment, the databases are available through TWS: one contains a list of the 619 sites, including project name, location and contact information; the other contains an extensive matrix of information about the 105 catalogued sites. Both can be searched through interactive software. For more information about these databases, please contact Spencer Phillips at TWS, Resource Policy and Economics Department, 900 17th Street, Washington, D.C. 20006.

* * *

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ASSESSMENT
INTRODUCTION

In the past two decades, increasing dissatisfaction with traditional resource management approaches coupled with the development of new scientific information about ecosystems has led to a search for new management strategies. Many people have argued that traditional approaches ignore important interconnections between geographic areas, such as when sedimentation or the introduction of invasive species on one land unit result in problems on an adjacent area. Land management approaches have often been overly focused on short-term goals such as commodity production at the expense of long-term ecological health, and have resulted in landscapes that are neither economically productive nor ecologically sound.

Management activities have often been inefficient, as agencies and other groups operated in ignorance of each other's efforts. Sometimes this situation has resulted in efforts that are duplicative or conflicting; at other times, the benefits that can come from management partnerships have been lost. Traditional approaches have often neglected the diversity of human interests in the management of natural resources and have resulted in conflict-laden impasses, such as when interest groups and agencies battled to a standstill in the spotted owl dispute in the Pacific Northwest. Issues such as management of salmon stocks in the Northwest, the Everglades in the Southeast, and the Yellowstone region in the Rocky Mountains seem to cry out for a different approach.

Ecosystem management has been proposed as a new approach to resource management, and a body of literature has developed describing various ideas about the appropriate goals and methods of such an approach. Most authors emphasize a land management approach that incorporates an understanding of ecological systems, considers extended time and spatial scales, and highlights the interconnections between landscapes, ecological processes, and humans and other organisms. Summarizing much of this literature, Edward Grumbine set forth a definition of ecosystem management:

Ecosystem management integrates scientific knowledge of ecological relationships within a complex sociopolitical and value framework toward the general goal of protecting native ecosystem integrity over the long-term.

Many government agencies have picked up on the evolving concept of ecosystem management and have developed definitions to guide their land management activities. For example, U.S. Forest Service Chief Jack Ward Thomas describes ecosystem management as:

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, bio

1 For citations to several key pieces of this literature, see the "Resources" section included with this document.
logical and physical dimensions of natural resource management. Its purpose is to achieve sustainability of all resources.\(^3\)

While there is an ongoing debate about the goals and practices of ecosystem management, practitioners are actively testing new land management approaches. By building on this experience, policy makers and practitioners can improve the practice of resource management on both public and private lands, and in the process, help to create landscapes and patterns of development that are sustainable economically and ecologically.

Recognizing the need to accumulate ideas from ground-level experience, a research team at The University of Michigan’s School of Natural Resources and Environment, acting with the financial support of The Wilderness Society, set out to complete an assessment of the current experience with ecosystem management. The overall scope of the project was to catalog activities underway across the United States and analyze the experience of people involved. This overview provides a brief assessment of what the team learned.

In conducting the research, the team first identified a set of 619 sites where ecosystem management was being carried out. A broad set of selection criteria was applied to be as inclusive as possible. Sites were included if they sought to extend management across property or political boundaries to incorporate ecological boundaries, or if they sought to shift management priorities away from a single resource or species emphasis to considerations of ecosystem processes and the

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landscape as a whole. Hence, many of these projects are not textbook cases of ecosystem management (assuming there is one textbook definition). Rather, they incorporate elements of ecosystem-based approaches to land management in a significant way. The team "beat the bushes" broadly to identify candidate sites, through letters and telephone calls to a host of public and private agencies and institutions, and review of a variety of documents.

The 619 candidate sites identified through this process are remarkably diverse and are located throughout the United States. The sites include projects in every state, with the number of projects per state ranging from 1 to 53. Some states are ecosystem management "hot-spots," either as a result of an intensive agency focus on ecosystem management, or due to the variety and uniqueness of ecosystems found in the state. Examples of such states are California and Colorado, with more than 50 projects reported in each. Considerable activity was also evident in Washington (37 projects) and Minnesota (34 projects). Between 21 and 29 projects were identified as underway in an additional eight states (Florida, Michigan, Missouri, New Mexico, New York, Oregon, Pennsylvania and Wisconsin.)

From these 619 candidate sites, 105 sites were chosen for analysis, considering their regional distribution and the types of agencies and groups involved in them. For each of these sites, telephone interviews and mail surveys produced descriptive and evaluative information that was used in writing this assessment and site descriptions. To the maximum extent possible, the assessments of individuals involved in these projects were used as the basis for evaluation, and the assessment draws heavily on their words and insights. Their words are compelling, for they provide glimpses of success -- both small and large -- that lead many of the people involved in these projects to be optimistic about the promise of ecosystem-based approaches to resource management.

The balance of this assessment summarizes the participants' experiences to date with ecosystem management. It is organized according to the following seven questions:

**Questions Addressed in the Assessment**

A. What Characterizes the Ecosystem Management Project Areas?
B. What Are the Characteristics of the Projects?
C. Why Were the Projects Started?
D. What Have the Projects Produced?
E. What Has Helped the Projects to Move Forward?
F. What Obstacles Have the Projects Faced?
G. What Do These Experiences Suggest for Future Ecosystem Management Efforts?

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4While the database contains 105 sites, respondents occasionally did not respond to certain questions. Hence, the number of observations ("N") that is included in a particular element of the analysis is often fewer than 105, and is indicated on the graphs.
A. WHAT CHARACTERIZES THE ECOSYSTEM MANAGEMENT PROJECT AREAS?

1. The natural features of the project areas are highly diverse, reflecting the variety of ecosystems in the United States.

Considerable variation in landforms and vegetation were evident in the project areas. Even projects located in the same state may display substantially different ecosystem characteristics. In addition to physiographic and vegetational differences, project areas also varied greatly in other ways, ranging from large scale, rural, sparsely populated sites with few owners (for example, as is evident at the Mesa Creek Coordinated Resource Management Plan area in Colorado) to smaller scale, urbanized, densely populated, fragmented sites with multiple ownerships (such as the Albany Pine Bush in New York).
2. Federally-listed threatened or endangered species are present in most project areas.

Eighty-one percent of the projects reported the presence of federally-listed threatened or endangered species. Commonly mentioned examples include the bald eagle (*Haliaeetus leucocephalus*), peregrine falcon (*Falco peregrinus anatum*), gray wolf (*Canis lupus*), interior least tern (*Sterna antillarum*), and piping plover (*Charadrius melodus*). Some of the threatened or endangered species are endemic to particular areas, and therefore were only reported by one or a few projects. For example, threatened or endangered species present in project areas in Hawaii, including the pendant Kihi fern (*Adenophorus periens*) and Molokai creeper (*Parareomyza flammea*), do not occur outside of this state.

3. Ecosystem management is taking place on both public and private lands.

In the East and Midwest, more projects are located on private lands, whereas in the West more projects are located on public lands.

Fifty-nine percent of the projects in the Northeast, Southeast, and Midwest involve predominantly privately-owned lands; 22% involve predominantly publicly-owned lands. This pattern stands in sharp contrast with the Northwest and Southwest, where only 11% of the project areas are privately owned, and 47% are publicly owned. However, this difference is understandable when viewed in light of the overall landownership patterns in both areas. Federal land holdings, especially those managed by the U.S. Forest Service (USFS) and the Bureau of Land Management (BLM), are much more extensive in the Northwest and Southwest than in other parts of the country.

### Land Ownership Patterns

![Land Ownership Patterns](image)

5The map on page 4 depicts how states are allocated into the regions used in the rest of this assessment.
4. Nearly all project areas are experiencing one or more anthropogenic ecosystem stresses. While the importance of many stresses varies by region, differences generally can be attributed to regional differences in land use patterns.

Respondents were asked to rank a list of 14 stresses to the ecosystem on a 1 to 5 scale, where 1 indicated "not a stress" and 5 a "severe stress." A stress was considered to be significant to the ecosystem and project area if rated 4 or 5. The figures on the following two pages show the percentage of projects that ranked a particular stress as significant.

Although some stresses were clearly more commonly reported as significant than others (e.g., hydrologic alteration was rated as a 4 or 5 by 42% of the projects, whereas overfishing, overhunting, or overcollecting was only rated as a 4 or 5 by 13% of the projects) there was no clear winner of the title "worst stress." However, some interesting trends may be observed by considering regional patterns. A few stresses, including disruption of the fire regime, seemed equally important throughout the country. On the other hand, some stresses were clearly more significant in certain areas of the country. In most cases, these patterns most likely reflect differences in regional land use, since most of these stresses are induced by human activities. Hence, grazing and range management was most commonly mentioned as a significant stress in the Southwest, the region of the country where range management is most prevalent. Similarly, forest management was most often mentioned as a significant stress in the Northwest, and agricultural practices and land conversion for agricultural purposes were more frequently rated as significant stresses in the Southeast and Midwest.

**Ecosystem Stresses Exhibited at Project Areas:**
Percentage of Projects Rating Stresses at Project Areas as Significant
(presented in descending order of overall percentage)
Ecosystem Stresses -- continued

**Exotic Species**

- All (n=90)
- NE (n=17)
- SE (n=13)
- MW (n=28)
- NW (n=13)
- SW (n=19)

**Agricultural Practices**

- All (n=91)
- NE (n=17)
- SE (n=13)
- MW (n=27)
- NW (n=15)
- SW (n=19)

**Roads or Other Infrastructure**

- All (n=90)
- NE (n=17)
- SE (n=13)
- MW (n=27)
- NW (n=14)
- SW (n=19)

**Disruption of Fire Regime**

- All (n=91)
- NE (n=17)
- SE (n=13)
- MW (n=28)
- NW (n=14)
- SW (n=19)

**Non-Point Source Pollution**

- All (n=91)
- NE (n=17)
- SE (n=13)
- MW (n=28)
- NW (n=14)
- SW (n=19)

**Grazing and Range Management**

- All (n=89)
- NE (n=16)
- SE (n=13)
- MW (n=27)
- NW (n=14)
- SW (n=19)
Ecosystem Stresses -- continued

**Forest Management**
- All (n=90): 71%
- NE (n=17): 23%
- SE (n=13): 6%
- MW (n=27): 15%
- NW (n=14): 11%
- SW (n=19): 26%

**Land Conversion to Agricultural Uses**
- All (n=89): 19%
- NE (n=17): 0%
- SE (n=13): 31%
- MW (n=27): 33%
- NW (n=14): 7%
- SW (n=18): 17%

**Recreation**
- All (n=89): 32%
- NE (n=17): 18%
- SE (n=13): 18%
- MW (n=27): 8%
- NW (n=13): 15%
- SW (n=19): 15%

**Point Source Pollution**
- All (n=88): 42%
- NE (n=17): 18%
- SE (n=12): 24%
- MW (n=26): 42%
- NW (n=14): 12%
- SW (n=19): 7%

**Mining**
- All (n=89): 32%
- NE (n=17): 18%
- SE (n=13): 8%
- MW (n=27): 11%
- NW (n=13): 15%
- SW (n=19): 17%

**Overfishing, Overhunting, or Overcollecting**
- All (n=90): 29%
- NE (n=17): 13%
- SE (n=13): 12%
- MW (n=27): 31%
- NW (n=14): 4%
- SW (n=19): 5%
B. WHAT ARE THE CHARACTERISTICS OF THE PROJECTS?

1. Most ecosystem management projects are relatively young, and are either in the planning or early implementation phase.

Although principles of ecosystem management have been discussed for several decades, most ecosystem management projects in the inventory started only recently, primarily within the last five years. As of early 1995, more than one-third of the projects were still in the planning stage. Approximately two-thirds of the projects had initiated at least some implementation activities.

<table>
<thead>
<tr>
<th>Year</th>
<th>Projects (n=99)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1976-1980</td>
<td>1%</td>
</tr>
<tr>
<td>1981-1985</td>
<td>11%</td>
</tr>
<tr>
<td>1986-1990</td>
<td>29%</td>
</tr>
<tr>
<td>1991-1995</td>
<td>59%</td>
</tr>
</tbody>
</table>

2. To date, ecosystem management projects have been initiated primarily by federal and state agencies, and The Nature Conservancy.

The way in which a project is started often has a significant impact on how the project unfolds, and these differences in start-up often reflect the varying missions and styles of the organizations that initiated the projects. In the sample of sites included in this analysis, federal agencies initiated the largest portion of projects, followed closely by state agencies and then non-profit organizations. This pattern was found throughout the country. Of all federal agencies that initiated projects, the USFS and the U.S. Fish and Wildlife Service (FWS) initiated the largest number of projects, followed by the BLM and the U.S. Environmental Protection Agency (EPA). Not surprisingly, projects initiated by the USFS and BLM tended to occur at a higher frequency in the West, whereas projects started by the FWS were more common in the East and Midwest. Other federal agencies that initiated projects include the National Park Service, Natural Resources Conservation Service (formerly Soil Conservation Service), Army Corps of Engineers, Geological Survey, National Biological Service, and Tennessee Valley Authority. While state natural resources agencies initiated most of the state-led programs, other state offices initiating projects included transportation and planning departments, and governors’ offices. The Nature Conservancy (TNC) initiated the vast majority of projects started by non-profit organizations, reflecting the land stewardship emphasis of this organization.

Many projects were initiated by more than one agency or organization. Therefore, percentages in the following graphs usually add up to more than 100%.
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Initiating Institution by Region

Federal Initiating Agencies by Region

Forest Service  Fish & Wildlife Service  Bureau of Land Management  Environmental Protection Agency
3. A full range of agencies and organizations become involved in ecosystem management projects later in the planning process or during implementation. As a result, the number and diversity of involved groups go far beyond those of the initiating organizations.

Public agencies from all levels of government (federal, state, regional, local, tribal) were involved in ecosystem management projects. In addition, participants included private landowners, non-profit organizations, industry, universities, and citizens. Levels of participation and involvement varied from organization to organization and from project to project. The median number of groups involved in a project was 11, with 82% of the projects involving more than 5 groups. Eighteen percent of the projects reported more than 20 involved groups, with 4 projects reporting more than 100.

**Agencies and Organizations Involved in the Projects**

The range of agencies and interests involved in projects was wider than that of groups that had initiated projects. Nevertheless, the patterns of involvement -- that is, which agencies and organizations were most commonly involved, and where -- were roughly the same. The FWS and the USFS were the most commonly involved federal agencies, followed by the BLM, Natural Resources Conservation Service, National Park Service, Environmental Protection Agency, Army Corps of Engineers, and, to a lesser extent, other federal agencies. Of the set of national and local non-profit groups that became involved in projects, TNC participated most frequently. While few industrial or user groups initiated efforts, representatives from a variety of industrial sectors took part in projects once they were underway. Forest products companies were involved in 21 efforts, followed by mining interests at 12 sites. Other industries represented are agriculture and grazing, recreation, commercial fishing, real estate and utilities.
4. An important goal of most ecosystem management projects was protecting, preserving or restoring the ecosystem. In some instances, intermediate stages in the process to achieve these goals became goals themselves, including obtaining stakeholder support and providing education and outreach.

The five most commonly reported project goals were ecosystem protection or preservation, ecosystem restoration, obtaining stakeholder support, maintaining or improving the local or regional economy, and providing guidelines for ecosystem management. Protection or preservation of the ecosystem was by far the most commonly reported project goal. Preservation-oriented goals included increasing biodiversity, protecting the ecosystem against anthropogenic threats, and stabilizing or increasing a population of a sensitive or rare species. For instance, among the goals of the Georgia Mountain project in northeastern Alabama are the maintenance and enhancement of biodiversity at a variety of scales (e.g., species, community, landscape), as well as the protection of rare or unique species and populations. Similarly, the primary goal of the East Fork Management Plan for the Wind River Ecosystem in northwestern Wyoming is to perpetuate the region's wildlife by preserving habitat.

**Project Goals**

![Project Goals Graph]

The goal of ecosystem preservation is closely linked to ecosystem restoration, which includes restoring ecosystem processes and components and improving water quality. An example is provided by the Indiana Grand Kankakee Marsh project. Its 10-year project goal is the restoration and protection of 26,500 acres of wetlands and associated uplands in the watershed. Similarly, the goals of the Camp Johnson Sandplain Restoration project in Vermont are to restore and maintain a mosaic of old growth, presettlement white pine-oak forest, and pitch pine-oak-heath woodland.

Obtaining stakeholder support was reported as an important goal of many projects. Stakeholder support may be obtained through the formation of partnerships with all organizations and individuals with an interest in the ecosystem. Support from stakeholders is especially important if the project area is large, and the stakeholders are many. A good example is provided by the Blue Mountains Natural Resources Institute in Oregon, which has 83 partners to date from such diverse interests as county commissions, chambers of commerce, colleges, private landowners, federal and state agencies, tribal governments,
unions, schools and courts. The partners in this project help determine project direction, and assist with funding and project implementation.

*Maintaining or improving the local or regional economy* was especially important in the Northwest and Southwest, where many economies are resource-based. As explained by a respondent from Alaska:

I think that you have to spend some time in the political arena to cover the social and economic ends of this too. I think we can make a good argument for [the project] biologically, but the reality is that there has to be some social acceptance for it or it won’t fly.

Since many ecosystem management projects are relatively young, many sought to develop guidelines for planning or implementing projects. For example, some sites listed the development of an ecosystem management plan as a major goal, while others sought to develop a regional framework within which smaller ecosystem management projects can be designed and implemented. For example, the Gulf of Maine River Ecosystem project in several northeastern states provides a regional framework for coordination of local efforts, and the Northern Lower Peninsula project in Michigan is developing a Resource Conservation Guidelines document to provide vision and guiding principles for future planning efforts in the region.

5. The two most commonly reported strategies for achieving these goals are research and obtaining stakeholder involvement. These strategies are indicative of the young age of many of the projects. Developing an understanding of ecosystem structure and function and fostering cooperation among the multitude of stakeholders in an ecosystem provide a foundation on which ecosystem management projects are built.

In order to achieve their goals, project managers must design and implement numerous strategies. The six most commonly reported strategies are research, stakeholder involvement, ecosystem restoration, promotion of compatible human land uses, education and outreach, and land protection through set-asides.

*Research* was the most frequently reported strategy and can be part of all stages of a project. Research helps a natural resource manager to determine which issues -- biological, social, and economic -- he or she faces. In addition, in order to manage an ecosystem, a manager needs to be aware of the type of ecosystems that are under his or her management, and of the components of these ecosystems. Thus, inventorying was an important component of research, including the identification of natural areas and their components, and prioritizing these areas for protection. Inventory work was a strategy reported by 38 sites, and included not only ecological factors, but social and economic indicators as well. In several cases, inventories are being used as a "reliable" assessment of an area's problems, to be used by all stakeholders in fashioning remedial actions. In order to determine if management practices have the desired effect on the ecosystem, monitoring is another commonly used research strategy.
Involving stakeholders was another frequently mentioned strategy. Since ecosystems almost always cross landownership boundaries, a variety of landowners may need to coordinate their land management activities. Even in the case of public lands where a single agency is the "landowner," many people other than the land management agency use the ecosystem for a variety of purposes. Many respondents noted that it was imperative for the success of ecosystem management projects that all these stakeholders be involved in the development and implementation of project activities. For example, during the development of the Ruby Canyon and Black Ridge Ecosystem Management Plan in Colorado, the BLM was provided with many valuable insights by an ad hoc committee consisting of representatives of user groups, local, state and federal agencies, grazing interests, and community representatives. Other stakeholder involvement strategies ranged from open houses to federally-chartered advisory committees.

Ecosystem restoration strategies involved restoring ecosystem composition and function. Common examples were the restoration of the fire regime, reforestation, wetland restoration, and control of non-native plants. For example, fire has been reintroduced in the Stegall Mountain project area in Missouri in order to restore its igneous glades and oak savannas. A bison herd has been reintroduced on the Tallgrass Prairie Preserve in Oklahoma in an effort to mimic natural grazing processes, and on the Patrick Marsh site in Wisconsin, drainage pumps have been removed to allow a historic marsh to reclaim the corn field that had taken its place.

Promotion of human land uses compatible with ecosystem function and structure included the use of innovative agricultural techniques (e.g., conservation tillage and range improvements), erosion reduction strategies, timber management strategies, and management of recreational activities. For instance, conservation tillage is promoted in the Fish Creek
Project in Indiana and Ohio by financially assisting farmers in purchasing their first piece of conservation tillage equipment.

*Education and outreach* strategies are somewhat related to stakeholder involvement strategies. Instilling stakeholders (including the general public) with an awareness of and respect for an ecosystem as well as an understanding of the ecosystem management project may be needed to ensure their participation in the project. Methods included sending newsletters to landowners, holding open houses, and having project staff present their ideas at meetings of stakeholder groups.

*Setting aside land for protection* consisted primarily of either purchasing land for preserves or securing voluntary easements which restricted harmful land use practices. In a few cases, cooperative land management agreements were arranged, where a public or private conservation organization would oversee or cooperatively manage another landowner’s property. For example, Kansas State University’s Department of Biology manages the TNC-owned Konza Prairie Research Natural Area. Similarly, in the Nipomo Dunes area of central California, TNC holds a 25-year lease on lands owned by the Santa Barbara County Parks Department and has an agreement with the California State Parks Department to manage state-owned property as a natural area.
C. WHY WERE THE PROJECTS STARTED?

Ecosystem management projects are initiated for a variety of reasons, and respondents identified more than one reason for most projects. While pre-existing agency programs clearly provided an opportunity for interested parties to move forward, many stakeholders were propelled forward by a concern that the character of unique ecological areas was being degraded. A sense of crisis was not always present at these sites; nevertheless, a strong shared sense of concern often translated into public pressure for managers to act in new ways.

Factors Motivating Project Initiation

1. Agency policies and programs geared towards ecosystem management provided the incentive for the start-up of more than half the projects.

Fifty-two percent of the projects reported being motivated by agency policies and programs. Not surprisingly, agency programs were much more important for state and federal agencies than for non-profit organizations. In some instances, ecosystem management has been adopted by agencies as an overarching management paradigm to be incorporated into most agency activities. In other cases, agency policy requires the development of specific ecosystem management plans. Respondents indicated that the USFS’s New Perspectives Program, the National Estuary Program administered by the EPA, and the North American Waterfowl Management Program administered by the FWS have provided incentives for the initiation of ecosystem management projects.

2. The uniqueness of many ecosystems has compelled agencies and non-profit organizations to launch ecosystem management projects.

Throughout the country, people have come to recognize the uniqueness of many ecosystems and the need for their protection. The uniqueness of the project area motivated the start-up of 47% of the ecosystem management projects. Examples of such projects include the Lajas Valley Lagoon System in Puerto Rico and the Albany Pine Bush in New York, and virtually all projects initiated by TNC. Sometimes
the presence of threatened or endangered species contributes to the uniqueness of a project area. Indeed, in some cases, the project area contains the primary remaining populations of a species, as in the case of the Catalina Island mountain mahogany, a plant proposed for federal listing, and found only on the Santa Catalina Island project site in California.

3. A number of projects have been started to mitigate the effects of human-caused stresses and to respond to the threat of further damage.

Many ecosystems are threatened by human activities, such as urban and industrial development, resource extraction (including timber management, mining, and grazing), and recreation. A third of the projects in our inventory were motivated by such threats. For instance, a proposed airport was the impetus for the eventual completion of a Comprehensive Management Plan for New Jersey's Pine Barrens. Increasing recreational pressures of a variety of kinds (ranging from hikers and mountain bikers to river floaters and off-road vehicle users) were important factors in the development of the Ruby Canyon and Black Ridge Ecosystem Management Plan in Colorado.

4. Institutions and individuals are starting to discover that they share interests in the ecosystem with other stakeholders, either by perceiving joint opportunities or facing common problems. This realization has led stakeholders to search for different ways to coordinate and collaborate on land management efforts.

One quarter of the projects were started because of shared goals and interests of the stakeholders. A good example is the Northern Lower Peninsula project in Michigan, where the Michigan Department of Natural Resources and the USFS recognized that lands under their jurisdiction often share administrative and ecological boundaries. As one Michigan DNR respondent explained:

[W]e were aware that some of the same ecosystems that the U.S. Forest Service is involved with are the same ones we’re involved with. Sometimes our land shares mutual boundaries, and [in other cases] we’re very close to each other. It would certainly be an obvious kind of conclusion that one would make, I would think, that maybe we should work together in our planning.

5. Public pressure and interest have led to citizen-initiated projects, and have spurred agencies to alter traditional management approaches.

Public pressure or interest was responsible for the initiation of a quarter of the projects. Public concern for the protection of ecosystems, as well as for the protection of natural resource-based economies, may result in citizen initiatives or in citizen pressure on agencies to take action. For instance, in northeastern Oregon and southeastern Washington, citizens were concerned that the USFS was not researching natural resource problems relevant to local needs and concerns. These citizens subsequently were instrumental in the formation of the Blue Mountains Natural Resources Institute. Another example from Oregon is the Applegate Partnership, initiated by two community residents in response to shared concern for the degrading resource base in the Applegate River watershed. Since the communities in southwestern Oregon are resource-dependent, long term health of forest resources was seen to be in the interest of many different groups in the region.
D. **What Have the Projects Produced?**

1. Many outcomes were described by respondents to illustrate the successful effects of their projects. At this stage of most projects, success tended to be measured in process terms rather than by specific ecological results.

   Rather than impose a specific definition of success for ecosystem management projects, the research team asked participants to describe the success of the projects in their own terms. In response, virtually every project respondent cited specific positive outcomes. These outcomes are presented here as proxies for evaluating success, since they incorporate several possible measuring sticks for success: the realization of goals, the effective implementation of strategies, putting activities in place that are likely to lead to successful ecosystem management in the future, and other desirable results whether anticipated or not.
While a third of the projects reported specific ecological results, the five outcomes cited most frequently can be viewed as procedural in nature. Achieving better communication, developing a management plan and/or new approaches to management, creating new decisionmaking structures, and initiating restoration activities do not of themselves immediately improve the ecological situation on the ground, though they do yield other important benefits at project areas. Rather, they establish relationships and management approaches that will hopefully lead to successful ecological results sometime in the future. This finding is partly a result of the relative youth of many of the projects, and the fact that ecological results often take years to be observed. It appears that small successes at improving the process of management will motivate larger successes that can be measured in ecological terms in the future.

At the same time, these process improvements are important in and of themselves. Many respondents seemed exhilarated by the successful formation of partnerships and glimpses of a style of management that can yield enthusiasm and support by the public. Ecosystem management is fundamentally a long-term process of human interaction and decisionmaking that yields improved ecosystem health along the way. The data from this assessment of the early experience with ecosystem-based approaches to land management suggests that important process changes are underway.

2. Increased communication and cooperation, among and between the public and private sectors, was the most commonly-reported outcome of ecosystem management projects.

Three quarters of the project respondents cited increased and improved communication and cooperation as an important outcome of their projects. A large portion of respondents cited improvements in inter-agency relations at all levels of government, including improved relationships between two or more federal agencies, state and federal agencies, or local and state governments. Another large segment reported improvements between public agencies and the private sector, including non-governmental organizations, private landowners, the business community, and the general public. Improvements in communication between stakeholders in the private sector were also evident, as landowners and resource users within a project area began to talk to one another in new ways.

A number of projects also resulted in improved communication and cooperation within agencies, in part due to efforts to educate employees about the activities of different offices within the same agency. For example, a FWS employee involved in the Gulf of Maine Rivers project noted:

An immediate success is that [FWS] offices are communicating and there is a greater understanding of each other. This will reduce the duplication of effort and will help with resource sharing.

3. Management plans were described as essential tools for enunciating the goals and strategies of ecosystem management, and for providing guidance to a variety of participating agencies and groups as they implemented their own projects.

The development of management plans, including draft and final versions, was the second most commonly-reported outcome. A number of these management plans were developed by multiple stakeholders, often through open public forums using a consensus-based approach. Management plans at 22 sites were described as internal documents, in that
they were developed by one institution with a minimum or absence of outside input. In many cases, these were meant simply as internal guiding documents, and not part of a broader public process. One FWS respondent explained that his agency needed to look inward before embarking on ecosystem management:

> We are trying to decide how to run our own ship before we bring in others. In some ways, this is internal FWS decisionmaking about our own priorities, and we don't need to involve the other parties initially.

Some project areas had multiple management plans, with each institution developing a plan for lands under its jurisdiction. In the absence of a single, overarching document for the project area, it was unclear if these plans were unified in their approach, although these were generally described by respondents as having an ecosystem focus.

4. Decisionmaking structures set up specifically for these projects play central roles in undertaking ecosystem management efforts.

The creation of partnerships, management committees, and task forces was the third most frequently cited outcome, with 56% of the sites reporting some type of coordinating body. These decisionmaking structures were seen as central to the ecosystem management efforts, and were used to reach consensus among stakeholders, develop management plans, identify tasks, and serve as communication tools, among others. They ranged from formal, federally-chartered advisory committees to unofficial, loose-knit partnerships between stakeholders.

The vast majority of these decisionmaking bodies appeared to cross agency and institution boundaries, being far more inclusive of multiple stakeholders in the decisionmaking process than has been the case traditionally. Only a small portion appeared to be purely internal management teams (e.g., intra-agency management teams). In these cases, stakeholder and public involvement may be limited to public comment and response procedures, or simply informal consultations.

Several projects had multiple committees, addressing different functions such as research, outreach, and funding. For example, the National Estuary Program (NEP) committees are structured around groups of stakeholders: The Corpus Christi Bay NEP in Texas has Policy, Management, Citizen, Local Government, and Scientific/Technical advisory committees that carry out the work of the effort.

Generally, the larger the project area or number of stakeholders, the greater the likelihood of finding partnerships or other decisionmaking bodies. Only one-third of projects under 50,000 acres had multi-party decisionmaking bodies in place, while three-quarters of those over 1 million acres had such structures. For example, in the case of the Indiana Grand Kankakee Marsh Restoration Project, it was recognized that no one agency could singlehandedly accomplish all of the project’s goals. At the same time, it was understood that potential cooperators have their own agendas that need to be addressed in a collective effort. In this instance, the partnering concept was used to gain more cooperators, drawing strength from the activities of multiple groups who are primarily involved to pursue their own interests:

>[Our] approach taps into the interests of large numbers of people and lots of groups. The groups themselves ... may only focus on one particular aspect. They may be a water quality organization. They may be interested in endangered species, or protecting rare habitats. But ... focusing in on the ecosystem itself and restoring the historic habitats of the ecosystem ... tends to bring those diverse partnerships together.
And they all see something in it for themselves, for their organizations, or for them individually.

5. Many respondents reported changes in their approach to land management as significant outcomes.

Fifty percent of the respondents reported changes in management philosophy, including shifting emphasis from single to multiple species or outputs, emphasizing landscape level designs, incorporating holistic approaches, or generally focusing on ecosystem considerations in management decisions. For example, the Plainfields Project in Massachusetts seeks to incorporate more landscape-level knowledge, instead of knowledge restricted by artificial administrative boundaries. As noted by one respondent: "The purpose is to not do things in a vacuum. [We are looking] at the bigger picture in order to optimize the ecological and economic value."

At this stage, some of these changes are still at the conceptual level while others have caused changes in specific management activities. What is important is that these changes in management approach stand in contrast to previous or traditional approaches. For example, shifting away from a traditional buy-and-protect strategy for land preservation is emerging as an important consideration for land managers. Several TNC respondents stated that their organization can no longer achieve conservation goals by simply purchasing a piece of land and putting a fence around it. In the case of the Virginia Coast Bioreserve, TNC’s approach is:

[To look] beyond simply identifying, buying and protecting a parcel to a much broader ecosystem thinking ... You need to get out into the community, listen to them and find common goals rather than focusing on the differences ... Otherwise, you end up with little preserves with who knows what surrounding them ... You are setting yourself up for disaster ... Everything that goes on in the buffer has an impact.

6. A wide range of on-the-ground restoration activities are resulting from the implementation of ecosystem management projects, and some are showing early results.

Almost half of the respondents cited ongoing ecosystem restoration activities as important outcomes of their projects, and ecological results have been achieved at a third of the project sites. Restoring the fire regime, reintroduction of native plants and animals, and restoration of hydrology are a few examples of activities designed to restore natural ecosystem processes. Other types of restoration efforts seek to control anthropogenic stresses, such as removing exotic species or controlling water pollution. In most situations, restoration has been limited to selected portions of a project area. For example, restoration of the fire regime on the Albany Pine Bush project area in upstate New York is quite limited at this stage for a variety of ecological and social reasons.
E. WHAT HAS HELPED THE PROJECTS TO MOVE FORWARD?

The 105 sites in the inventory differ from each other in many ways, and they have progressed largely by building on the supportive aspects of their local setting. Each area has unique resources to draw on as well as unique problems to deal with, and the most successful sites found ways to mobilize those resources in response to site-level problems. In aggregate, though, a set of common factors appear to facilitate projects. The support of stakeholders, public agencies, and the general public often allowed initiating organizations to proceed, and contributed to the willingness of many groups to collaborate on project activities. Having resources available to support the projects and individuals who were dedicated to carrying out the projects were also critical. At the same time, the character of certain areas and projects also affected the ability of involved agencies and groups to carry them out.

<table>
<thead>
<tr>
<th>Factors Facilitating Progress</th>
<th>% of Projects</th>
</tr>
</thead>
<tbody>
<tr>
<td>Collaboration</td>
<td>61%</td>
</tr>
<tr>
<td>Public Support</td>
<td>59%</td>
</tr>
<tr>
<td>Agency Support</td>
<td>55%</td>
</tr>
<tr>
<td>Availability of Resources</td>
<td>50%</td>
</tr>
<tr>
<td>Dedication of Individuals</td>
<td>45%</td>
</tr>
<tr>
<td>Character of Mgt. Plan</td>
<td>34%</td>
</tr>
<tr>
<td>Character of Mgt. Area</td>
<td>27%</td>
</tr>
<tr>
<td>Attitude of Stakeholders</td>
<td>24%</td>
</tr>
<tr>
<td>Political Support</td>
<td>21%</td>
</tr>
</tbody>
</table>

1. Collaboration was highlighted by respondents more than any other variable as critical to their projects’ progress.

It is clear that the collaborative efforts of people coming together to create new solutions for managing resources are a vital component of many ecosystem management projects. As one site respondent from the Indiana Grand Kankakee Marsh Restoration Project explained, "The strength of the many is greater than the strength of the individual organization." Collaboration within and between public agencies, private landowners, non-governmental organizations, businesses, and the general
public was an important mechanism for increasing cooperation and communication, fostering trust and understanding between participants, and allowing a greater set of interests to be met. In some cases, such efforts have contributed greatly to changing public opinion about government agencies and developing positive relationships among stakeholders. Increases in interagency cooperation were notable, with several respondents reporting a decline in turf battles between agencies. In many cases, agencies displayed greater flexibility and made impressive strides towards coordinating planning and management with other agencies and stakeholders.

Collaborative approaches produced benefits through several mechanisms. Many efforts used a consensus-based process, which allowed participants to have an equal voice in the decisionmaking process. Such processes fostered greater ownership of decisions and allowed for common ground between interests to be forged. In addition, the ability of participants to share funding responsibilities and pool resources allowed for greater progress on ecosystem management projects by reducing duplication of efforts, creating more funding opportunities, and using limited resources more efficiently. One respondent stated that "a recognition ... among government agencies [that] no single agency can accomplish the task [alone]" was vital to efforts to protect the last remaining wetlands in their region.

2. Public support is important to most ecosystem management efforts and is promoted through stakeholder involvement and community-based initiatives.

Gaining public support was an important factor for 59% of the ecosystem management projects. Many respondents emphasized the importance of identifying all stakeholder groups and involving them in planning and management decisions from a project's inception. Others explained how more conventional efforts had been obstructed by the opposition of stakeholders who, being excluded from the decisionmaking process, felt that their interests were not well represented in management plans.

In regions where a large proportion of the land is privately owned, ecosystem restoration or protection efforts have only progressed with the support and participation of private landowners. One such example is provided by the Wildlife Habitat Improvement Group in southern Vermont, which relies on a voluntary consortium of private landowners to coordinate woodlands management across ownership boundaries in order to enhance wildlife habitat. A major reason for landowner support for this effort has been the stability in landownership over many generations. Due to the rural character of the area, landowners already have a tradition of communicating with their neighbors, and thus know their land and their neighbors well.

Projects that have roots in the local community were better received than those perceived as top-down agency directives or outsider initiatives. Gaining support from local community leaders and hiring project personnel from within the community were both cited repeatedly as important contributing factors. One respondent from a rural project area in the South explained: "The fact that I was a local boy, grew up here, knew lots of folks, and the fact that I didn't have a government uniform on, made all the difference in the world." A respondent from the Molokai Preserves in Hawaii described the importance of being accepted by the community:

If you want [support] from the community, you have to hire people from the community, someone who knows the community and thinks like the community. ... I was born and raised here, and this helped get a foothold here, because people are cautious when new groups come in.
3. **Ecosystem management projects benefit from public agency support at all levels of government (federal, state, local) and at all levels within those institutions, from field staff to top administrators.**

Respondents from fifty-five percent of the sites reported agency support as important to their progress. The development of federal policies and programs supportive of ecosystem management has enabled managers to implement ecosystem-scale projects. As discussed in the previous section about factors promoting the start of projects, FWS, USFS and EPA programs in particular have provided the authorization, flexibility, funding, and technical assistance necessary to support non-traditional resource management activities.

State programs have also provided assistance to projects. For instance, the Hawaii Department of Land and Natural Resources' Division of Forestry and Wildlife has established a Natural Areas Partnership program to provide matching funds for the management of private lands that are permanently dedicated to conservation. Two projects in this study benefit from that program: Molokai Preserves, coordinated by TNC, and Pu'u Kukui, involving lands owned by the Maui Land and Pineapple Company.

While programs help facilitate on-the-ground progress, it is also important that support for ecosystem management initiatives be infused throughout agencies. Many respondents noted that the concurrence and enthusiasm of higher-level administrators were instrumental to the progress of their projects. At times, this support resulted from the creation of new agency policies that were supported by top administrators. In cases where no agency-wide ecosystem management policy existed, pilot projects received internal support which allowed project leaders greater latitude in designing innovative programs.

4. **The availability of resources allowed many projects to move forward.**

Many different kinds of resources are needed to mount projects, including human resources, funding, time and equipment. Fifty percent of the respondents credited the availability of resources as critical to the success of their projects. Funding was cited as the most important resources-related factor facilitating progress. It was the initial funding of many of these projects that got them off the ground by making it possible to hire personnel, acquire lands, collect data, or invest in the technology for ecosystem management activities. Several sites reported benefits from having an adequate number of staff members, the expertise and technical capability of field personnel, and the presence of full-time researchers and project managers whose responsibilities are to the project alone. In several cases, especially the National Estuary Programs supported by the EPA in cooperation with state agencies, separate project offices were established, which allowed staff, equipment, and expertise to be dedicated exclusively to the efforts.

Physical resources such as equipment were also reported as important to project progress. Specifically, several respondents felt that the availability of geographic information system (GIS) technology greatly expanded their management capabilities. In some cases, GIS allowed managers to undertake more comprehensive ecosystem-based analyses and create integrated management designs. In others, it was beneficial simply by promoting the standardization of data and allowing more rapid exchange of information between groups.

5. **Dedicated, energetic, and capable individuals are often central to a project's progress.**
Forty-five percent of the respondents noted the importance of having motivated, dedicated individuals to creating and maintaining momentum on projects. Project leaders, community leaders, agency field staff, natural resource managers, landowners, and elected officials all played this role in various projects, often keeping ecosystem management projects alive despite a lack of resources, political or public support, or agency direction. These individuals served as a source of motivation for change and fostered stakeholder trust and support for the goals of ecosystem management projects.

What characterized these individuals? They understood the benefits that innovation provided to the projects and the importance of garnering broad stakeholder support. At the same time, they often tried to downplay their own contributions so as not to dominate the process and demotivate other partners. Often they were willing to take risks and engage in entrepreneurial behavior within their organizations. They were not "superhuman." Rather, they put a lot of energy into moving the projects forward. One respondent in the Northwest summarized the opinion of a number of our respondents: "It always boils down to key talented people [who] are willing to invest themselves over and beyond the call of duty."
Natural resource and environmental management is intrinsically difficult since it involves multiple interests and values, often intangible benefits, and long time scales. Ecosystem-based approaches to land management exacerbate some of these problems by requiring the active involvement of numerous stakeholders, an enhanced focus on ecosystem integrity, and a robust understanding of ecosystem components and processes. Ecosystem management is viewed by many agencies and groups as a new and uncertain approach to management, which can be perceived as threatening to longstanding agency norms and stakeholder interests. At the same time, ecosystem management faces the same set of problems encountered by any project, including limited time, funds and expertise. Respondents highlighted five common obstacles: opposition from both public and private sources, constrained resources, problematic agency attitudes and procedures, scientific uncertainty, and inadequate or ineffective stakeholder involvement. Less frequently cited obstacles included ecological problems (e.g., ecological problems are too great to overcome), continued development pressures, and problems associated with fragmented landownership.

1. Opposition to the concept of ecosystem management and to individual projects originated from the general public, political circles, and private interests.

Opposition towards the concept of ecosystem management, a particular site effort, or government in general was the most frequently reported obstacle to a project’s progress. Resistance from the general public was common, resulting from misperceptions about what ecosystem management entails or simple skepticism in the face of significant changes in land management. As one site contact from the Northeast Chi-
chagof Island effort in Alaska noted, “There’s a lot of misconception out there over what [ecosystem management] is, what it means, what it can do.” At some sites, these generalized fears about ecosystem management translated into project-level opposition. Commenting on the Block Island Refuge project in Maine, one respondent noted that there was “skepticism by some local citizens on the effect of land protection on local tax rolls. There is a belief that it hurts the local economy.” Past experience with government regulations or programs helped to fuel these negative attitudes on the part of the general public. According to one site respondent: “The public feels they’ve been duped a number of times [by the USFS] and that’s why this ecosystem management effort that we’re into right now has got such a challenge socially.”

Political opposition, including outright opposition by politicians at all levels of government, also figured prominently in site-level problems. Several practitioners commented that the political climate created by the 104th Congress generated an overarching sense of uncertainty about the future of ecosystem-based approaches to land management. Many expressed concerns that existing programs or continued funding were no longer as “safe” as they had been, and that hopes for securing additional authority or appropriations under the heading of a new and often controversial management paradigm would be slim at best.

Opposition by landowners, industry, property rights advocates and environmentalists was also highlighted as an obstacle to ecosystem management projects. Landowner opposition was manifested as a generalized distrust of government as well as a cynicism about why agencies were undertaking ecosystem management. Landowners often feared that government participation in a project would lead to additional government regulations or infringement on perceived private property rights. Although landowner participation on most projects is strictly voluntary, it can be difficult to convince the public that the state or federal agencies are not involved for regulatory purposes, as a respondent from a project in Colorado explained:

[There is a] fear that the feds have an ulterior motive ... to discover threatened and endangered species to shut down operations. ... People outside the project (area landowners, local commissioners, etc.) still are wary that ecosystem management is an attempt by government agencies to control private lands.

2. Limited resources -- human resources, funding, equipment, time -- was a common problem for both public and private ecosystem management efforts.

The shortage or absence of adequate resources was reported by 44% of project respondents, with the vast majority pointing to funding shortages as a problem for both public and private efforts. Funding shortages were seen as barriers to many site-level activities, ranging from inventory work and ecological research to restoration and land acquisition. Since ecosystem management often achieves ecological results through efforts sustained over many years, respondents also feared that a lack of long-term funding would hamper their ability to achieve results.

There are several reasons for difficulties in obtaining funds. A number of projects reported problems in planning for long-term land management such as ecosystem management when funding processes operate on short-term, yearly cycles. In addition, ecosystem management does not fit into the appropriations structure of most governments. Legislatures at all levels traditionally allocate funding based on line items, program boundaries, or wholly within a specific agency, whereas ecosystem management cuts across line items and administrative boundaries. In general, this management-funding conflict has
What Obstacles Have the Projects Faced?

not been resolved, and is frustrating for many project coordinators, as the following respondent on a federally-led project indicated:

You go into the budget exercise in Washington asking for money on a program basis but you're asking managers of the ecosystems to manage everything as 'ecosystem management.' It is very confusing right now. I think they are doing that because the political arena won't allow funding without programs. ... I think if they went in [asking for] ecosystems appropriations, they would be worse off.

In addition, one respondent noted that being innovative is a two-edged sword when it comes to obtaining financial support from agencies:

One of the frustrating things was [that] we were light years ahead of other districts, other forests ... when we submitted our request for funding for activities. These are 'go' projects. They had already been through the analysis steps, the community supported them, and they were good activities, good actions, good things that need to happen out there. We are competing with proposed actions by other districts, by other forests, with more traditional projects. As a result, we often lost.

A lack of personnel and time was specified by another large segment of respondents. Several reported that their project duties were only one set of responsibilities competing for their time. Several efforts, often defined as pilot projects, were being led by a single individual, whose high motivation nevertheless could not compensate for an overwhelming work load.

3. Agency-related problems, including lack of coordination, "turf" wars, and conflicting value systems, result from longstanding institutional norms and philosophies.

Problems associated with agencies were reported by 31% of the site respondents, with the largest portion describing institutional obstacles including a lack of interagency coordination and cooperation and administrative red tape. In many cases, these issues were unavoidable given the need to involve all affected stakeholders, and the resulting complexities of multiple decisionmaking layers. In other cases, respondents explained how difficulties in communicating or coordinating with personnel from other agencies was due to the absence of interagency relationships. As the respondent from the Elliott State Forest Management Plan in Oregon explained, "For the first six to nine months of the development of the plan, it was mainly ... working our way through figuring out how to work together."

In several instances, federal policies constrained project activities. For example, the Federal Advisory Committee Act (FACA) was seen as a significant barrier to communication and coordination between federal agencies and other stakeholders. According to one respondent from Utah:

FACA is a big stumbling block affecting things all over the country. ... You will find groups all over the country who are trying to get around it, trying to get into compliance or restricting themselves to discussion only.

Other problems were rooted in the agencies' values and historical behaviors. For example, jurisdictional conflicts between agencies were the source of several problems, despite the good intentions of individuals within those agencies or project coordinators. "Maintenance of turf wars that have been in existence for 30 years" was the way one respondent described a pattern of interagency behavior that was a source of problems evident at many sites. At other times, conflicts between agency programs led to problems,
such as when one agency's cropland incentive program conflicted with another agency's conservation programs.

Many respondents cited problems associated with staff and their values on a more personal level. Commonly cited were conflicting value systems, in which an individual's (and an organization's) professional philosophy was in conflict with new land management approaches associated with ecosystem management. Agency staff members are often not accustomed to increased levels of public involvement, not trained in organizational management, and not in possession of the scientific knowledge required to understand and manage ecosystems. In other cases, staff from different agencies and organizations have vastly different management philosophies, which can then be difficult to merge into one project's goals and strategies.

4. **Scientific uncertainty was cited as a problem associated with ecosystem management in general and at a site-specific level.**

Twenty-four percent of the sites noted problems relating to scientific uncertainty. Some of these problems were the result of conceptual difficulties with ecosystem management. For example, many respondents explained how the lack of a single, agreed-upon definition of ecosystem management led to difficulties in communicating the concept or a particular project to the public. An unclear definition can also lead to confusion among partners and can make funding requests difficult to justify. It can also allow reticent agencies to use the existence of uncertainty as an excuse for not taking action. Many respondents also reported insufficient scientific information about a particular project area as a problem. The absence of baseline data or an insufficient monitoring program were common.

5. **Problems associated with stakeholder participation included insufficient levels of involvement, as well as inadequate communication and coordination between stakeholders.**

A wide variety of problems relating to stakeholder involvement was reported by a quarter of the respondents. Fragmented landscapes, owned by multiple public and private parties, made it difficult to work effectively at the ecosystem level. Project staff also had difficulty identifying affected landowners and getting them involved in the effort. Distrust by stakeholders of each other, and the inherent difficulties of consensus-building across a diversity of interests, were also seen as problematic in helping a project progress.
G. WHAT DO THESE EXPERIENCES SUGGEST FOR FUTURE ECOSYSTEM MANAGEMENT PROJECTS?

Respondents had numerous pieces of advice for others contemplating ecosystem management projects. Most advice focused on the process of management: who should be involved, how planning should be approached, and what kinds of support are required to mount successful projects. Many highlighted the need to involve stakeholders in an effective process as critical to the success of such efforts. Broadening the philosophy and scope of planning strategies and ensuring an adequate level of scientific information were similarly seen as important. Finally, finding ways to meet the internal organizational needs of projects -- ensuring adequate resources and agency support -- was also viewed as important.

Advice Offered by Project Respondents

<table>
<thead>
<tr>
<th>STAKEHOLDER INVOLVEMENT</th>
<th>% of Projects (n=90)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Involve all stakeholders, and involve them early</td>
<td>41%</td>
</tr>
<tr>
<td>Set clear goals &amp; build public awareness</td>
<td>28%</td>
</tr>
<tr>
<td>Work by consensus &amp; honesty</td>
<td>23%</td>
</tr>
<tr>
<td>Use a collaborative process</td>
<td>16%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>PLANNING STRATEGIES</th>
<th>% of Projects (n=90)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Approach land management from broader scale</td>
<td>38%</td>
</tr>
<tr>
<td>Science must be part of decision-making</td>
<td>8%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>INTERNAL NEEDS</th>
<th>% of Projects (n=90)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ensure adequate resources are available</td>
<td>18%</td>
</tr>
<tr>
<td>Agency support must be secured</td>
<td>6%</td>
</tr>
</tbody>
</table>

1. All stakeholders should be involved in the project’s process, and involved early.

Involving stakeholders in project planning and decisionmaking was cited by 41% of the project respondents. The largest portion of this group emphasized that all stakeholders, or as many as possible, should be brought into the process. Speaking about the importance of actively seeking representation of all interests, the respondent from the Owl Mountain Partnership in Colorado suggested simply that project managers “beat the brush to find out who has an interest in the project and get them involved.”
Site contacts also advised that stakeholders be brought into project planning during the early stages of a process. In their view, stakeholders who were involved from the beginning would help shape the final management plan so that it dealt with the appropriate set of problems and needs. They would also develop a sense of ownership for the efforts. One respondent from the San Pedro River project in southeastern Arizona commented, “The more people who feel ownership in the process and have bought into the project, the longer the project will last.” Stakeholders brought in after the planning process is underway may not understand or agree with the ideas that had been developed already. For many respondents, the critical issue was not how much input the project should receive, but rather when that input is received. As a ranger from the Trail Creek effort in Idaho explained, “The bottom line is you’re going to get [input] one way or another anyway. I’d much rather have it up front to begin with, as opposed to having [people later] question the process that you used.”

2. Use a clear, open, and collaborative process.

Over half of the respondents offered a variety of suggestions on how to effectively involve stakeholders. The largest portion stressed the importance of having clear and well-defined goals, communicating regularly and effectively with stakeholders, and building public awareness and support for the project. Repeatedly, respondents stated that a project should have a clear direction, especially in terms of goals, objectives, and desired outcomes. Clear objectives and approaches were seen as particularly important given the complexity of ecosystem management projects. Respondents felt that fuzzy objectives and strategies tended to reinforce public skepticism of ecosystem management approaches, and made cooperation between diverse interests more difficult. To assure clarity, some respondents felt that it was important to have formal mission statements or plans; others felt that attempts to clarify project approaches less formally were adequate. Overall, though, respondents agreed with the respondent from the Colorado State Forest project: "Maintain a strong and clear perspective of what you're trying to achieve."

Respondents also felt that the process for involving stakeholders should operate by consensus, have an open and honest approach, and consider local needs. "Be open" and "Don't have a hidden agenda" were typical responses. Several respondents suggested that working by consensus and encouraging cooperation were ways to ensure constructive stakeholder involvement. Similarly, respondents viewed understanding the local community’s needs as important to the ultimate success of a project, as a participant in the Verde River Greenway Project in Arizona explained:

You have to incorporate the wants and need of the people in the community. You can't just come in as an outsider and impose your own ideas and values on the area and the people. You have to try to work with the people, because they are the ones who will ultimately protect the resource.

A few comments related to the approach a project leader should take with regards to working with others in a collaborative fashion: "Leave your ego at the door," "Be persistent," and "Be prepared to spend lots of time with lots of people."

Finally, a series of comments pointed specifically to the need to set up decisionmaking bodies, such as committees, working groups, or “partnerships, partnerships, partnerships” as one respondent from Virginia stated emphatically. Some felt that organizing stakeholders and interests into a cohesive group was a means of ensuring consistent representation and participation. Partnerships were recommended as a way of sharing resources and gaining greater feedback and opinion on issues.
3. **Land management approaches should incorporate broader, more holistic concepts and philosophies, including larger geographic scales and longer time periods.** They must also include adequate scientific knowledge about the ecological and human components of ecosystems so as to inform decisionmaking appropriately.

Respondents indicated that the geographic and temporal scale of land management activities are important for ecosystem management projects. While many respondents called for taking a regional perspective or taking into account the project area’s larger ecological context, several suggested considering the hierarchical nature of ecosystems in evaluating project activities. A resource manager from the Upper Huerfano Ecosystem Project in Colorado explains: “You need to look at the landscape at different scales that are appropriate in answering different management questions -- you need to look at the scale that is appropriate for that question.” Managers similarly noted that projects need to incorporate long-term concerns, since changes to ecological systems can take decades. For example, a resource manager from the San Pedro River project stated that “long-term commitment is required in projects like these where issues are complex and continually changing.”

A third of the project respondents emphasized the important role of scientific information in ecosystem management efforts. Most of these comments stressed the importance of having adequate quantity and quality of scientific information, and finding ways to integrate that information into the decisionmaking process. Developing baseline data, instituting and maintaining monitoring programs, and involving experts were all seen as important activities. Indeed, obtaining reliable data was of utmost importance to many project leaders, and worth going to considerable lengths to acquire. As one responded indicated, “Use the best science available, and if it is not available, go out and get it, pay for it, because your plan has to make sense ecologically.”

One set of respondents emphasized the importance of having information about the human components of ecosystems as well. Developing information about human needs and constraints is a critical components of the data collection portion of an ecosystem management project. As a respondent from the Owl Mountain Partnership in Colorado observed:

> You can’t only look at [ecosystem management] in terms of what it can do for native plant and animal species. From the standpoint of sustainability, people have to be strongly involved. If we want to protect open spaces, we have to make sure that the agricultural sector can afford to make a living off that land. If they can’t, they’ll have to subdivide.

4. **Adequate resources, such as funding and staff, and support of agency management, are important to the continued success of a project.**

Advice relating to resources and internal support was offered by a fifth of the site contacts. Most offered comments about the need to line up adequate funding and personnel. Some of the comments about funding centered on project managers determining needs and likely shortfalls accurately, and finding creative ways to meet those needs. Others commented on the importance of having a funding process that can assure multi-year funding for long-term projects, and that can deal with efforts that involve multiple agencies and that do not conform to traditional program planning categories.

Respondents also emphasized the need to have consistent, well-trained staff involved in ecosystem management efforts. For example, a respondent from a western project stated
that, "The process of ecosystem planning is a full-time, 100% process that requires a full-time ecosystem planning staff. Otherwise it won't work." Some respondents noted the importance of having staff with particular skills. A respondent from the Rainwater Basin Joint Venture in Nebraska argued that it was important to "Hire a coordinator with an ability to work with people rather than a specific technical ability." A few site contacts specifically advised hiring personnel who were trained in the latest technologies including geographic information systems.

A number of site contacts also noted that the support of supervisors and upper level management is crucial for the success of ecosystem management projects. Upper level managers and agency directors must support ecosystem management if a natural resource manager is to receive the resources, political support, and authority to undertake projects that are often viewed as unusual or risky from the standpoint of established agency programs. Many project managers felt that they had to go out on a limb to promote their projects, and hoped that future efforts would be supported more broadly by agency management.
CONCLUSIONS

1. Many experiments in ecosystem management are underway across the United States. Some employ strategies that are new and different, while others employ "off-the-shelf" ideas that have not been possible to implement in the past. Participants in these projects are excited about the promise of these approaches to achieving sustainable resource management in the future.

If anything stands out from the inventory and assessment, it is that lots of efforts to define and implement ecosystem management are underway in all regions of the United States, and the early experience with these efforts is very positive. While the catalog includes 105 sites, we easily could have included several times that number from the larger set of sites that were identified in the course of the study. Most of these sites are not textbook cases of ecosystem management, in that they rarely succeed at managing on an ecosystem-scale, and do not include all elements of an ecosystem management process. Rather, most are moving in that direction, by looking outward to the regional scale, expanding the scope of issues and interests involved in making decisions, and grounding decisionmaking in a more complex level of understanding about landscape components and processes.

Having spoken with many individuals from all sectors of society, it is hard not to be optimistic about the future of ecosystem-based approaches to land management. People are excited about what is happening on-the-ground; some are exhilarated by their successes. There is a shared sense of promise about these approaches, and an energy that comes from being creative and acting in ways that are simply different from those in the past. As a fuzzy symbol of change more than an exact set of standards and guidelines, ecosystem management is helping to break the inertia evident in the past fifty years of resource management in the United States, and is allowing individuals and groups to try out strategies not possible in the recent past. Many of these strategies are not new. Rather, the seeds of good ideas that have been with us for some time are being allowed to bear fruit for the first time.

Often the successes are quite small, but they are important. Having a rancher and environmentalist talk to one another, or two agencies share information, seem like small steps forward, but in many places they are important steps that confound conventional wisdom. And some of these small steps promise larger successes in the future. Establishing relationships and trust, building understanding, and generating information can provide a foundation for real progress in building communities that are sustainable ecologically and economically.

2. Progress in ecosystem management is not confined to the activities of the federal government or any one agency. Instead, many different groups are playing important roles in ecosystem management, including numerous federal and state agencies, and nongovernmental groups of all kinds. Both institutions and individuals are important to achieving success on the ground.

The high level of variation evident in the inventory of current experience bodes well for the future of ecosystem management. Just as a monoculture can be problem-
atic ecologically, so can a monoculture of ideas. Fortunately, several federal agencies, numerous state agencies, and several nongovernmental organizations are active in the development of ecosystem management approaches. Different styles are evident in the ways that these institutions approach work on the ground, and as a result, there is a rich set of experience on which future efforts can draw. In addition, since ecosystem management is not the sole "turf" of any one agency or group, it is more likely to survive top-down changes in the direction of any agency.

Since much of the rhetoric associated with ecosystem management in recent years has come from federal officials, we were surprised by how much activity is underway at the state level. State agencies are being innovative. Projects like the Northern Delaware Wetlands Rehabilitation Program and the Colorado State Forest Ecosystem Planning Project evidence a great deal of creativity in which the state agencies are playing lead roles in restoring and protecting critical areas. Several states are attempting to use ecosystem management as a philosophy underlying their overall approach to state resource management. For example, in New Hampshire, new forest plans are being drafted that incorporate ecological ideas, rather than looking at forest resources largely as a source of commodity production. In Missouri, two state departments are leading a state-wide coordinated resource management planning effort that involves several state and federal agencies, and in Washington, the Department of Fish and Wildlife is developing new management plans for all of its lands.

It is reassuring to know that ecosystem management is under development across different levels of government. Even though the term ecosystem management has been deemed "dead on arrival" on Capitol Hill, it is alive and well in many other places in the country. A shift in power from the federal to the state governments may undercut some of the incentives and resources promoting ecosystem-based approaches, but it will not destroy a considerable interest in these approaches on the part of many state and nongovernment interests.

People generally are trying out ecosystem-based approaches to land management not because of a top-down mandate or because it is trendy. Rather, they are trying to deal with real problems at the ground level -- problems whose resolution requires more information and collaboration, and a greater consideration of larger spatial and temporal scales. These problems will not go away of themselves, and the ideas underlying ecosystem management -- knowing the land well, and knowing and working with the neighbors -- make a lot of sense as ways to solve these problems. In addition, the opportunities that ecosystem management approaches provide to invest resources as efficiently as possible, by cutting down duplication and fostering resource-sharing arrangements, make them very appropriate for tight fiscal times. As a result, ecosystem management will be a continuing theme underlying land management in this country regardless of temporary shifts in direction emanating from the U.S. Congress or other centers of power.

The power of individual achievements evident in these projects is also reassuring. Dedicated, energetic individuals have accomplished a great deal, often in spite of institutional structures that have hampered their efforts. To individual managers, the message is clear: Innovative, creative approaches can bear fruit, in spite of how difficult they can appear. To the rest of us, the meaning is equally clear: The future of ecosystem management lies in the collected efforts of many, many individuals on the ground, and they can succeed in spite of a lot of institutional resistance.

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3. Implementing ecosystem management is challenging, since it involves collaboration, complex systems, problematic policies, and a skeptical public.

Our overall sense of optimism about the future of ecosystem management in the United States does not diminish the reality that accomplishing effective ecosystem-scale management is difficult for many reasons. By requiring more collaborative work across diverse stakeholders with often conflicting interests, ecosystem-based approaches to land management run head-on into the problems associated with human interrelationships and group decisionmaking. Stakeholders who may view each other with hostility are not easily molded into a cohesive decisionmaking group. In addition, collaborative approaches require agencies to set aside some traditional notions, including a sense that they are the all-knowing technical experts whose job is to come up with the right answers. Collaborative approaches are often time-consuming, involving many meetings, that seemingly produce benefits only in the long-term.

The increased level of understanding needed to implement ecosystem management approaches is also challenging. Many of our respondents noted the importance of getting good science. The nascent level of understanding of many ecosystem processes and stresses means that most projects need to start by investing in research and inventory work. Many need to organize data through geographic information and other data systems. Simply combining existing information sources requires standardizing data sets that were gathered through varying methods and with different purposes in mind. All of this takes time, money, and effort, which to some groups feels like it delays necessary protection and restoration work. In addition, generating the information required for ecosystem management requires scientists to share ideas with other scientists, and scientists and managers to talk to each another, both of which have been problematic in the past.

Many current policies make it difficult to practice effective ecosystem management. Participation in numerous land management planning processes, initiated by different federal and state agencies, consumes the limited time and resources available to nongovernmental stakeholders. Multiple, independent planning processes often make it difficult to take a larger-scale perspective. Governmental budgeting processes that can only assure funding for one- or two-year project cycles (and require results in the short-term to justify continued funding) make it difficult to implement programs that will yield tangible benefits over long time periods. Policies governing the administrative procedures of agencies have also been problematic. One example is the USFS's norm of regularly transferring personnel from location to location to facilitate career development. Moving staff members breaks the ground-level relationships needed for effective collaborative management. The Federal Advisory Committee Act, which structures the relationship between federal employees and nongovernmental groups, makes the formation of collaborative groups burdensome.

Finally, many groups of the public are anxious about ecosystem management and its effect on private property rights. This reaction partly comes from a lack of understanding of ecosystems and a fear that management strategies will constrain human uses considerably. It also results from a perception described repeatedly by our respondents that government agencies have been heavy-handed in the past, and hence are not to be trusted in the future. Public anxiety has also been fanned by the current political atmosphere in which government has been set up as a scapegoat for many ills. Project managers were afraid that public misperceptions of ecosystem management and local hostility to it were likely to get worse in the short-term. They also greatly feared cuts in federal programs that provide some of the
resources and tools employed in these efforts. Programs such as the USDA Conservation Reserve and other Farm Bill programs and EPA's Clean Lakes Project assisted a number of the efforts in this assessment.

4. People are succeeding in spite of these problems.

Many projects are moving forward in spite of these concerns. Indeed, many of our respondents wanted to emphasize to others that it was important not to be stopped by perceptions that these issues were overwhelming. Projects have been able to work with the loose-knit decisionmaking structures commonly associated with collaborative efforts. Agency officials have had to be careful to avoid acting and being seen as the heavy-handed government. One respondent noted the importance of "not wearing a government uniform" to meetings. Everyone has had to be careful to listen to and acknowledge the legitimate arguments of different stakeholders. They have also had to share credit for successes and ensure that each involved group maintains some level of ownership of the projects.

Groups have been successful at dealing with the complexity of ecological and social systems, in part by focusing on small pieces of the larger puzzles, and by managing adaptively: undertaking activities experimentally while investing in information that determines whether the strategies are effective over time. Many respondents noted the usefulness of geographic information system technology as a means of organizing and combining information. The creation of collaborative management groups has also allowed for the sharing of information among scientists, and between scientists and managers, in ways that have been highly productive.

Individuals have been successful at finding their way around problematic governmental policies. Often it has taken people who are willing to act as entrepreneurs, pushing projects forward on the strength of their efforts and personality, while finding ways to cut through red tape and get around the constraints caused by traditional ways of doing things. Projects have leveraged funding and staffing in unique and creative ways. Many have simply ignored certain policies such as FACA hoping that the obvious benefits of their approaches will hold them harmless from any repercussions.

At the site level, public fears and hostility have not been the overwhelming barrier many project managers feared. Indeed, a number of respondents expressed a sense of relief that their fears of outright opposition to their efforts from local property rights groups were not realized. While there is an initial sense of mistrust between groups, it does not take too much to break the stereotypes. When government officials stop acting as the outside authority out to guide wayward children, and instead play a facilitative and technical advisor role, the public appears willing to put its mistrust aside. Many respondents noted that their fears about what might happen were much worse than what actually happened. Indeed, in many cases project participants were surprised and elated by their successes. According to one respondent:

I didn't think there was any way in the world we'd ever get anything done [in the Steering Committee] without killing somebody. And we never even had a good fist fight. We had some shouting matches and a little bit of arguing. But it seems like the process brought everyone to the table with a little more open mind. We managed to work around problems.

5. These early successes can be enhanced by increasing the understanding and skills of the people involved in ecosystem management projects, and
renewing policies and programs that influence the environment in which ecosystem management projects take place.

Acknowledging the importance of individual accomplishments does not diminish the need to have institutional structures and policies that are supportive of individual efforts. Indeed, constantly asking people to swim upstream will tend to burn out good people. There is a clear need for personnel training and public education, and programs that provide resources, information, and incentives to on-the-ground managers.

Training and Education -- Ecosystem management clearly asks more of both agency staff members and the public than was needed in traditional management approaches. Understanding the complexity of ecological and social systems requires an expanded level of knowledge of both of these systems. Agency staff members need to receive continuing education as the science of ecosystems and ecosystem management develops. Techniques such as gap analysis and geographic information systems need to be absorbed, along with approaches to economic development and social impact assessment. Specialists are needed, but they need to be educated about the broader context of their expertise: how their knowledge draws on and relates to that of others. Intermediaries are also needed who can provide the critical interface between the host of disciplines and groups that need to participate in ecosystem-based approaches. Educational outreach is also needed to inform and motivate groups in the general public. All involved parties need better "people" skills. As decisionmaking and information networks become more collaborative, the ability to communicate, listen, respect others' opinions, and learn from past failures becomes very important.

Policies and Programs -- There is also a critical need to reinvest in a set of federal and state policies and programs that provide resources, information, and incentives to managers and other stakeholders involved in ecosystem management efforts. The existence of preexisting policies and programs was an important source of motivation for projects to be started, and a highly-ranked factor contributing to the success of those projects. It would be wrong to assume that these programs can succeed on the force of personality alone. The important public benefits that can result from ecosystem management activities justify spending scarce public resources on these efforts, and maintaining the incentives for participation provided by other regulatory programs.

Most of the projects in our inventory benefitted from public investments of funds or people in one way or the other. Even projects with no federal or state partner often benefitted from tax credits realized through donations of land or easements. Federal support -- either dollars spent on project activities or on staff members -- has served as an important catalyst in many efforts. Government has an important role to play as a source of information and technical assistance. It represents a set of larger-scale concerns (both geographic and temporal) that are important to effective decisionmaking. Government programs have also been a significant incentive to stakeholders to come to the ecosystem management table. Having the regulatory provisions of the Endangered Species Act and the National Forest Management Act in the background has encouraged key stakeholders to get involved; their initial anxieties and hostilities diminished as they got further involved. There is an important role for authorities to play in identifying long-term societal goals, giving diverse groups of the public an incentive to pursue them through collaborative mechanisms, and monitoring performance over time. In most of our cases, these roles have been played by governmental institutions.
6. Ecosystem management is both a process and a set of goals, and both need to be considered as practitioners and policy makers move forward.

The image of ecosystem management that emerges from the activities at our sites is a process-oriented one. Ecosystem management is a long-term process of understanding and decisionmaking that requires the involvement of multiple sources of expertise and numerous stakeholders. It is also a process of organizational change, in which agencies and groups need to act in ways that have not been traditional. Finally, it is a process of ecological restoration in which actions accumulate over long periods of time to recreate critical natural system components and processes.

Based on our assessment of the experience at 105 sites, the overall message to practitioners about the process of ecosystem management is to “know your land, and know your neighbors.” At one level, this simple message is time-honored: the New England farmer and the Colorado rancher have always had to understand the character of their lands and had to cooperate with adjacent landowners. But the meaning of the message, and what it takes to implement it, are more complex today. The knowledge it takes to truly understand the landscape, and the set of interests that are affected by the outcomes of land management, are much greater than was the case in the early days of American development history.

Some of the smaller messages to practitioners engaged in the process of ecosystem management read like the litany of advice that grandmothers have given since the beginning of human civilizations: don’t be arrogant; be proud of accomplishments but share credit for them; learn from mistakes and change direction accordingly; be honest; listen; be patient and persistent; have respect for all opinions; and know that what you do affects others. These are fundamental rules of interpersonal behavior, and they underscore the sense of those involved in ecosystem management projects that ecosystem management is fundamentally a process of knowing, acting, and changing.

At the same time, ecosystem management is not management towards any end. Rather, it seeks to protect and restore the ecological integrity of landscapes while building sustainable economies and effective organizational and decisionmaking structures. Ecosystem management projects need to maintain a process-orientation while not losing sight of these overall goals. From this assessment of the early experience with ecosystem-based approaches to land management, it appears that managers and stakeholders are being successful at walking this line, sometimes against great odds. Even if the phrase “ecosystem management” goes out of favor as political officials and agencies change, the innovative approaches to resource management that have developed under this label are likely to persist. Collaboration across landownership and interests and shifts in management approaches are occurring primarily because they make sense to the individuals involved in them. Learning from their experiences can help us move progressively towards a sustainable future. This assessment can provide a baseline for the future, and the catalog of sites can provide practitioners with images to emulate.
SUMMARY INFORMATION ON 105 SELECTED ECOSYSTEM MANAGEMENT PROJECTS
MAP & INDEX OF 105 SELECTED PROJECTS FEATURED IN CATALOG

Project description page numbers, and key to ID numbers on map:

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1 Locations are approximate and do not reflect scale of project area.

2 Projects are identified with identification numbers ("ID") in this index and in the Project Contact Information (p. 291); these ID numbers are also used in the electronic databases described on page ii.
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## STATE-BY-STATE LISTING OF 105 PROJECTS FEATURED IN CATALOG
(Projects that are in multiple states are listed under each state)

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- P038 Gulf of Mexico Program

**Alaska**

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- P066 Northeast Chichagof Island
- P080 Prince William Sound - Copper River Ecosystem Initiative

**Arizona**

- P052 Malpai Borderlands Initiative
- P086 San Pedro River
- P101 Verde River Greenway

**Arkansas**

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- P072 Ouachita National Forest

**California**

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- P024 Dos Palmas Oasis
- P036 Guadalupe-Nipomo Dunes Preserve
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**Colorado**

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- P056 Mesa Creek Coordinated Resource Management Plan
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- P084 Ruby Canyon and Black Ridge Ecosystem Management Plan
- P085 San Luis Valley Comprehensive Ecosystem Management Plan
- P098 Trout Mountain Roadless Area
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**Connecticut**

- P096 Tidelands of the Connecticut River
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**Delaware**

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- P067 Northern Delaware Wetlands Rehabilitation Program

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- P017 Chesapeake Bay Program

**Florida**

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- P051 Lower St. Johns River Ecosystem Management Area
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**Georgia**

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- P055 McPherson Ecosystem Enhancement Project
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**Illinois**

- P011 Cache River Wetlands
- P019 Chicago Region Biodiversity Council
- P027 Ecosystem Charter for the Great Lakes-St. Lawrence Basin
- P070 Ohio River Valley Ecosystem
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## Ecosystem Management in the United States: An Assessment of Current Experience

### Project Partners

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# AGE OF ECOSYSTEM MANAGEMENT PROJECTS

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<td>Owl Mountain Partnership</td>
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<td>Phalen Chain of Lakes Watershed Project</td>
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<td>Snake River Corridor Project</td>
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<td>Negrito Project</td>
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<td>Barataria-Terrebonne National Estuary Program</td>
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<td>Patrick Marsh Wetland Mitigation Bank Site</td>
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<td>Albany Pine Bush</td>
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<td>Malpai Borderlands Initiative</td>
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<td>Nebraska Sandhills Ecosystem</td>
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<td>Prince/El Dorado Desert Wildlife Management Area</td>
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<td>San Luis Valley Comprehensive Ecosystem Management Plan</td>
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<td>Fish Creek Watershed Project</td>
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<td>Guadalupe-Nipomo Dunes Preserve</td>
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<td>ACE Basin</td>
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<td>Prairie Pothole Joint Venture</td>
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<td>Pu’u Kukui Watershed Management Area</td>
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<td>Butte Valley Basin</td>
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<td>Greater Yellowstone Ecosystem</td>
<td>1986</td>
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<tr>
<td>Upper Farmington River Management Plan</td>
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<td>Verde River Greenway</td>
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<td>Escanaba River State Forest</td>
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<td>Marys River Riparian/Aquatic Restoration Project</td>
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<td>Wildlife Habitat Improvement Group</td>
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<td>Clinch Valley Bioreserve</td>
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<td>East Fork Management Plan</td>
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<td>Molokai Preserves</td>
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<td>Block Island Refuge</td>
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<td>Big Darby Creek Partnership, Cache River Wetlands</td>
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**LAND OWNERSHIP PATTERNS OF ECOSYSTEM MANAGEMENT PROJECT AREAS**

| **ENTIRELY PUBLIC LAND** | Ohio River Valley Ecosystem  
Allegan State Game Area  
Bitteroot Ecosystem Management Research Project  
Camp Johnson Sandplain Restoration  
Chequamegon National Forest Landscape Analysis & Design  
Colorado State Forest Ecosystem Planning Project  
Congaree River Corridor Water Quality Planning Assessment  
East Fork Management Plan  
Elliott State Forest Management Plan  
Escanaba River State Forest  
Konza Prairie Research Natural Area  
Marathon County Forests  
McPherson Ecosystem Enhancement Project  
Minnesota Peatlands  
Negrito Project  
Patrick Marsh Wetland Mitigation Bank Site  
Robbie Run Study Area  
Trail Creek Ecosystem Analysis  
Trout Mountain Roadless Area  
**PREDOMINANTLY PUBLIC LAND**  
Butte Valley Basin  
Canyon Country Partnership  
Chattooga River Project  
Florida Bay Ecosystem Management Area  
Greater Yellowstone Ecosystem  
Green Valley State Park Ecosystem Management Plan  
Mesa Creek Coordinated Resource Management Plan  
Northeast Chichagof Island  
Ouachita National Forest  
Puente/El Dorado Desert Wildlife Management Area  
Prince William Sound - Copper River Ecosystem Initiative  
Ruby Canyon and Black Ridge Ecosystem Management Plan  
Stegall Mountain Natural Area  
Verde River Greenway  
**MIXED PUBLIC AND PRIVATE LANDS**  
Albany Pine Bush  
Applegate Partnership  
Blue Mountains Natural Resources Institute  
Chesapeake Bay Program  
Cheyenne Bottoms Wildlife Area  
Clinch Valley Bioreserve  
Dos Palmas Oasis  
Eastern Upper Peninsula Ecosystem Management Consortium  
Ecosystem Charter for the Great Lakes-St. Lawrence Basin  
Guadalupe-Nipomo Dunes Reserve  
Integrated Landscape Management for Fish and Wildlife  
Interior Columbia Basin Ecosystem Management Project  
Kenai River Watershed Project  
Malpai Borderlands Initiative  
Molokai Preserves  
New Hampshire Forest Resources Plan  
New Jersey Pinelands  
Northern Delaware Wetlands Rehabilitation Program  
Northern Lower Michigan Ecosystem Management Project  
**ENTIRELY PRIVATE LAND**  
Fish Creek Watershed Project  
Oklahoma Tallgrass Prairie Preserve  
Pu'u Kukui Watershed Management Area  
Rainwater Basin Joint Venture  
Santa Catalina Island Ecological Restoration Program  
Virginia Coast Reserve  
Wildlife Habitat Improvement Group  

---
### SIZE OF ECOSYSTEM MANAGEMENT PROJECT AREAS

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<th>Size (acres)</th>
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<tr>
<td>250,001 TO 1,000,000 acres</td>
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<td>OVER 1,000,000 acres</td>
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#### UP TO 50,000 ACRES

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<td>3,897</td>
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<td>5,387</td>
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#### 250,001 TO 1,000,000 ACRES

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<td>146,224</td>
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<td>Florida Bay Ecosystem Management Area</td>
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#### OVER 1,000,000 ACRES

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<td>San Luis Valley Comprehensive Ecosystem Management Plan</td>
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<td>Rainwater Basin Joint Venture</td>
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<td>Lower Rio Grande Ecosystem Plan</td>
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<td>Eastern Upper Peninsula Ecosystem Management Consortium</td>
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<td>New Hampshire Forest Resources Plan</td>
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<td>Ecosystem Management in the United States: An Assessment of Current Experience</td>
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**Over 1,000,000 acres--continued**

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**OTHER**

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# Significant Anthropogenic Stresses Reported on Project Areas

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<td>Albany Pine Bush</td>
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<tr>
<td>Applegate Partnership</td>
<td>♦♦♦♦</td>
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## Ecosystem Management in the United States: An Assessment of Current Experience

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DESCRIPTIONS OF 105 SELECTED ECO SYSTEM MANAGEMENT PROJECTS

(For index of projects with page numbers, see page 48. Map locations are approximate and do not reflect scale of project area.)
**PROJECT AREA DESCRIPTION**

The lower watersheds of the Ashepoo, Combahee, and Edisto rivers collectively make up the ACE Basin ecosystem, extending roughly from Interstate 95 to St. Helena Sound estuary and the Atlantic Coast. This coastal region consists of southern pine and hardwood uplands, bottomland forested wetlands (including tupelo gum, cypress, sweetgum, and maple), and fresh-water, salt-water, and brackish marshes. The extended ecosystem includes the estuary, beaches, and barrier islands. Over 130 species of birds and 17 wading bird rookeries are found in this sparsely-populated, largely undeveloped area. Several federally- and state-listed threatened and endangered species reside in the Basin, including the wood stork, loggerhead turtle, and two plants, pondberry and Canby dropwort.

The ACE Basin was once extensively cleared, first for pine lumber and poles supplied to the port of Charleston for export in the 1600s. Later, tidal forested wetlands were cleared for large rice plantations in the 1700s. Following the collapse of rice farming during the Civil War, many failed plantations were bought by wealthy northern industrialists for hunting reserves, who kept them undivided, maintaining their flooded rice fields for waterfowl and the upland habitat for deer and turkey. Other plantation lands reverted to bottomland hardwoods.

Today, timber, hunting, and commercial and recreational fishing are the dominant human uses. Ownership today is primarily private, with several large industrial forest landowners and many former plantations in largely intact condition. Public lands include the ACE Basin National Wildlife Refuge (NWR), two state Wildlife Management Areas (WMA), and the National Estuarine Research Reserve.

**ECOSYSTEM STRESSES**

Stresses associated with the extensive clearing in the 1600s and 1700s are unknown. However, the area is now ecologically stable, whether in plantations or natural forests. Current uses of the land appear to cause only minimal stress to the system. Resort development, and to a lesser degree roads, pose the greatest potential threats, due to an expanding population base and demand for housing from Charleston only 40 miles away.

**PROJECT DESCRIPTION**

In 1988, an ACE Basin Task Force was formed through the cooperative efforts of The Nature Conservancy (TNC), Ducks Unlimited/Wetlands America, the South Carolina Department of Natural Resources (SC DNR), the U.S. Fish & Wildlife Service (FWS), and private landowners, who recognized the values in protecting this relatively undeveloped ecosystem. Another catalyst of the effort was the development of the North American Waterfowl Management Plan in 1986, whose Atlantic Coast Joint Initiative includes the ACE Basin. Westvaco Corporation, the largest of the landowners, supported the Task Force in July 1991 with a Memorandum of Understanding outlining forestry practices on their 15,500 acres within the Basin. The ACE is part of TNC’s “Last Great Places” campaign.

The effort is focused principally on
safeguarding the ecosystem against urban development. The plan’s goals are to a) protect 200,000 acres by the end of the century through conservation easements, cooperative management agreements (such as Westvaco’s), and outright purchases; (the initial goal was 90,000 acres;) b) assist landowners with resource management; and c) preserve compatible traditional land management practices which have effectively become part of the ecosystem’s integrity. No monitoring is specified in the management plan, although some individual institutions are including monitoring as part of their management efforts.

The Task Force consists of one representative of each member organization and is chaired by a private landowner representative. Additional staff from the member organizations provide biological, legal, and public relations expertise. The Task Force is managed on an informal basis with decisions reached through general consensus.

**Present Status & Outlook**

A management plan for the ACE Basin was developed by the Task Force in 1989, including the goals and strategies listed above. Over 50% of initial protection goals (90,000 acres) have been achieved, with 35,000 acres acquired by federal and state agencies, and more than 30,000 acres in conservation easements as well as Westvaco’s lands and previously protected sites. As a result, the protection goal has been increased to 200,000 acres. The federal ACE Basin NWR (11,000 acres to date) and the state’s Donnelley WMA (8,000 acres) are newly created; the existing Bear Island WMA has been expanded to 12,000 acres. In addition, the newly-created National Estuarine Research Reserve includes coastal islands totaling approximately 12,000 acres and is administered by SC DNR with oversight from the National Oceanic and Atmospheric Administration.

In 1995, TNC and several local community institutions have initiated a strategic planning process to develop a vision for achieving economic growth compatible with long-term conservation of the Basin’s natural resources.

Much remains to be done beyond land acquisition, especially with private landowner education and assistance, and improving public awareness in general.

**Factors Facilitating Progress**

Perhaps the greatest asset to this effort is the Basin’s undeveloped, relatively stable ecological condition. Broad-scale cooperation, vision, and commitment across public and private institutions is the primary reason this effort has moved ahead. Political support from the state’s Senate delegation has resulted in the availability of federal land acquisition funds.

**Obstacles to Progress**

Lack of awareness by the local public, who are concerned that land will be “locked up,” traditional uses eliminated, and economic opportunities lost, appear to be the greatest obstacle to this effort’s progress. The threat of resort development is still significant, as many critical tracts remain unprotected.

**Contact Information:**

**Mr. Mike Prevost**

Ace Basin Bioreserve Project Director

The Nature Conservancy

P. O. Box 848

8675 Willtown Road

Hollywood, SC 29449

(803) 889-2427

Fax: (803) 889-3282
**ALBANY PINE BUSH**

**PROJECT AREA DESCRIPTION**
The Albany Pine Bush barrens once stretched across 25,000 acres, largely between Schenectady and Albany. The historical ecosystem is believed to have corresponded with the distribution of sandy soils deposited on the floor of glacial Lake Albany. The Albany Pine Bush (APB) consists of gently rolling sand dunes running southwest-northeast, with dunes ranging from under 20 feet to 60 feet high, the highest reaching 300 feet. Ravines up to 100 feet deep and containing ground water runoff cut into parts of the ecosystem.

Seven different vegetative community types have been identified in the Pine Bush Preserve, including pitch pine-scrub oak barrens, vernal ponds, successional southern hardwood and northern hardwood forests, Appalachian oak-pine forest, red maple hardwood swamps, and shallow emergent marshes, among others. The area contains one federally-listed endangered species, the Karner blue butterfly, and more than two dozen state-listed rare plants, reptiles, and amphibians, including the hognose snake and Jefferson/spotted salamander.

Current uses of the ecosystem are many and varied, including urban, commercial and residential development, agriculture, open space, and public and private preserves. The present-day Pine Bush Preserve encompasses 2,200 acres on the western edge of Albany.

**ECOSYSTEM STRESSES**
Because of its location in a metropolitan area and its sandy soil texture, considered ideal for construction, the most significant stress to the landscape is land conversion to urban uses, causing habitat destruction. Fire suppression is another significant stress, disrupting natural vegetative processes; at least two of the natural vegetative communities are known to be fire-dependent. Associated roads and other infrastructure have caused severe fragmentation, also making prescribed fire management more difficult. Finally, non-point source pollution from urban nutrient and pesticide runoff and point source pollution from a chemical waste site pose threats to the underlying aquifer.

**PROJECT DESCRIPTION**
Efforts to protect the Pine Bush began in the 1960s by a group of local citizens who formed the Friends of the Pine Bush, now known as Save the Pine Bush, Inc. With the assistance of The Nature Conservancy (TNC), early efforts led to the first land acquisition of several hundred acres for a preserve in the 1970s by the Town of Guilderland and the New York State Department of Environmental Conservation (NYSDEC).

Over the ensuing years, Save the Pine Bush sued developers and the City of Albany on several occasions, halting development on several sites that were then acquired for protection. One case against Albany in 1987 resulted in the city funding the first three years of research and management of the APB Preserve, allowing the first staff person to be hired. In 1988, the state legislature created the Albany Pine Bush Preserve Commission and charged it with overseeing and ensuring protection and management of the Preserve. The goals of the APB Preserve and Commission...
are to: 1) protect the fragile ecology of the Pine Bush by protecting appropriate lands, managing the Preserve, and allowing appropriate uses; and 2) provide an educational and recreational resource for the public. Specific strategies for achieving these goals include: land acquisition, easements, and cooperative management agreements, with the objective of protecting 4,000+ acres total in the Preserve; on-the-ground management (prescribed fire, weedy/exotic plant control through fire, and chemical and mechanical means); research and monitoring; public education; trail system development; and decision-maker/public awareness efforts.

As the decision-making body for the APB Preserve, the Commission consists of senior figures from six land-owning institutions (TNC, Towns of Colonie and Guilderland, City of Albany, NYSDEC, New York State Office of Parks & Recreation), and three private citizens. A Technical Committee, which assists the Commission, consists of representatives from the six organizations, along with occasional, non-permanent ex-officio members. The organizations provide in-kind services to operate the Preserve; for example, TNC pays the salaries of the Preserve’s staff.

**PRESENT STATUS & OUTLOOK**

Since the 1970s, 2,200 acres have been protected through acquisitions and easements, at a cost of over $25 million. Restoration activities began in 1991 with controlled burns on a limited scale. Today, burning is more extensive, and herbicide and mechanical control techniques are being used on black locust and aspen, species that are native by encroaching in inappropriate places. In May 1995, the Commission released a draft protection plan for the Preserve, for which public comments are now being received. In November 1994, a full-time Preserve Steward was hired, whose primary responsibilities thus far have been to develop a trail system, post boundaries, and make the Preserve more recognizable. Finally, the public is much more aware of the Preserve and its programs, which may benefit efforts to manage recreation on the Preserve.

**Factors Facilitating Progress**

Public support, and the protection efforts of Save the Pine Bush and TNC, have been credited with helping this effort progress. Funding from the state and TNC has also been instrumental. Finally, the proximity of the APB to universities, schools, and volunteers has benefited the effort.

**Obstacles to Progress**

A shortage of funding for land acquisition, program operations, research, and monitoring is a continuing problem. The ability to conduct controlled burns is limited by air quality problems prevalent in the northeast U.S. and by citizen complaints.

**Contact Information:**

Ms. Stephanie Gebauer  
The Nature Conservancy  
Albany Pine Bush  
1653 Central Avenue  
Albany, NY 12205  
(518) 464-6496  
Fax: (518) 464-6761
**ALLEGAN STATE GAME AREA**

**PROJECT AREA DESCRIPTION**

Several ecosystems are represented in the Allegan State Game Area (ASGA). Half of the ASGA is characterized by dry-mesic northern forest, dominated by oak and white pine. Another 15,000 acres is dry-mesic southern forest (oak-hickory). In addition, the ASGA supports oak barrens, dry-sand prairie, and small coastal plain marshes. The ASGA is home to 10 federally-listed threatened and endangered species and 65 state-listed species. An example of the former is the Karner blue butterfly. Another federally-listed species, the peregrine falcon, migrates through the area.

The ASGA is primarily used for wildlife and timber management. Hunting is the most important recreational use. Other uses include fishing, berry picking, mushroom collecting, wildlife viewing, and snowmobiling.

**ECOSYSTEM STRESSES**

History has left its mark on the ASGA. Logging of white pine and hardwoods around the turn of the century was followed by repeated, uncontrolled fires. Unusually dense stands of white and black oak resulted, persisting through a subsequent period of fire suppression. Fire suppression has also stressed other ecosystems in the ASGA.

During the early logging era, an extensive road system was developed in the ASGA. Many of these roads still exist today. However, since they pose a stress to the area, several have been closed recently.

Another stress is the occurrence of exotic pests like gypsy moth, pine shoot beetle, and Japanese beetle. In addition, the large number of non-indigenous species has led to a restructuring of plant communities and to the local disappearance of some prairie species.

**PROJECT DESCRIPTION**

In order to comply with funding requirements, the Wildlife Division of the Michigan Department of Natural Resources is required to manage the ASGA using a comprehensive management plan. Master plans are reviewed at least once every 10 years. Review of the 1978 plan and subsequent planning resulted in the current plan whose implementation started in 1994.

One of the goals of the current plan is to manage wildlife in concert with management of plant communities and ecosystems. To reach this goal, the following steps were undertaken. During the planning period, the entire ASGA was inventoried for forest types, unique plant and animal species, unique plant communities, presettlement vegetation types, and historical and archaeological sites. Furthermore, most plant species, amphibians, reptiles, mammals, and fish were identified. Based on these extensive inventories, the Wildlife Division determined to which communities forest stands as well as key species belong.

Management techniques vary based on the type of plant community. Once every five years, a stand will be reviewed, and if needed, specific management practices applied. Open areas may be maintained using prescribed burns, cuttings, and conventional tilling. Forests may be managed using clearcutting, shelterwood harvesting, selection harvests, or “doing nothing” in areas set aside as potential old growth.
Many agencies and organizations have been instrumental in the development of the management plan, as well as in its implementation. Although the Wildlife Division manages the ASGA, and is thus the lead agency, others such as the Michigan Natural Features Inventory, Michigan State University, U.S. Forest Service, and various Michigan Department of Natural Resources Divisions have been involved. Public input was solicited also.

**PRESENT STATUS & OUTLOOK**

During 1994, 20% of all stands were reviewed for needed treatments. Several prescribed burns have already been carried out and have led to an increase in the Karner blue butterfly population. The effects of management techniques on other wildlife has been observed already, or will be apparent soon.

**Factors Facilitating Progress**

The long-term planning process and the ability to set long-term goals has been beneficial. The combination of using a “top down” (plant community or ecosystem) approach to management as well as a “bottom up” (stand) approach works well. Development of an ecosystem-based plan has taken time. It has been very helpful that supervisors have allowed staff to take that time, rather than pressing for a less comprehensive plan based on outputs.

**Obstacles to Progress**

The planning process was slowed by the need for many meetings and correspondence. Such communication was needed for several reasons. For instance, some upper level staff were reluctant to direct management to anything other than game management. In addition, politicians continually needed to be updated. Another problem was a highly emotional conflict between some stakeholders with opposing views. The public has not always responded favorably to the plan. In some cases, this can be attributed to incorrect perceptions. In other cases, a proposed change in the status quo has been perceived as threatening certain recreational uses of the ASGA.

The outbreaks of pests and diseases, such as gypsy moth and red pine diseases, have necessitated a rethinking of some management techniques.

**Contact information:**

Mr. John Lerg
Wildlife Biologist
Michigan Department of Natural Resources
Allegan State Game Area
4590 118th Avenue
Allegan, MI 49010
(616) 673-2430
APPLEGATE PARTNERSHIP

PROJECT AREA DESCRIPTION
The Siskiyou Mountains are the dominant landform in the project area. The Siskiyou chain runs east-west across southern Oregon and northern California, connecting the Oregon Coast Range to the Cascades and the Sierras. Elevation ranges from 700 to 7,000 feet. The area’s micro-climates include high alpine to nearly desert conditions. Accordingly, rainfall in the Applegate varies from 17 to 40 inches per year. The Siskiyous represent an important biological bridge in the Pacific Northwest, resulting in one of the most diverse areas in the U.S. In addition to the Siskiyou salamander, the Applegate counts one of the largest spotted owl populations in the country among its federally-listed threatened and endangered species.

During the Ice Age, the southerly glacial flow stopped at the Applegate River watershed. The watershed’s boundaries are also the project’s boundaries. Within the project area, grazing and extensive recreational uses occur alongside late successional old growth reserves. The lowlands are largely dedicated to agricultural production while timber production occurs in the uplands. Nearly 10% of the watershed is owned by large industrial forest concerns. The remainder includes 35% owned by the U.S. Forest Service (USFS), 35% by the Bureau of Land Management (BLM), and 20% by other private landowners. Nearly 12,000 people live in the Applegate. A number of towns and communities, none incorporated, are located there.

ECOSYSTEM STRESSES
Mining has had a dramatic effect on the ecosystem since pre-settlement times. Although there is very little current mining activity, large portions of the landscape were burnt in the 1800s to facilitate access to minerals. Past logging, road construction, fire suppression, and development have greatly altered this area. However, the northern spotted owl injunction stopped virtually all logging on USFS and BLM lands, and clearcutting has been replaced by selective thinning. Land conversion to residential use represents a significant threat to the three counties in the Applegate. Surrounding urban areas view the Applegate as a place for upscale residential development and are pressuring local county commissioners to rezone the watershed’s lands from agricultural use to rural residential use. Although some residents own land on a speculative basis, most residents in the Applegate are fighting the rezoning efforts.

PROJECT DESCRIPTION
Concerned about preserving the environment and traditional economic lifestyles in the rural community, two individuals, one a resident of the area and an environmentalist, the other the owner of an aerial forestry management company, pulled together a group of 60 residents three years ago. The group was drawn together by the common desire to prevent degradation to the Applegate’s natural resource base, which was also the economic base for many of the region’s jobs. Members of the Sierra Club, Audubon Society, ranchers, farmers, Farm Bureau, loggers, community groups, and USFS and BLM officials attended the meeting. The group nominated 18 people to decide upon which nine of their group would
constitute a new Board. Among the criteria for Board selection were ‘leaving baggage from your organization behind’ and committing time to make the project work.

The goal of the partnership is to reestablish the health of the forest and watershed through a cooperative community effort, using natural resource principles that promote ecosystem health and natural diversity. Each meeting of the partners is open to the public, is convened by a facilitator (which is rotated weekly), and often includes fields trips. An overall assessment of the condition of watershed, the ecosystem’s components, and natural processes is currently underway. Individual landowners decide how management of their lands fit within the stated goal. Ongoing projects include: restoration and recovery of riparian areas, tree plantings, road reconstruction or removal, selective thinning, fuels reduction, reintroduction of fire, and encouraging small landowners and the timber industry to voluntarily adopt practices that promote long-term ecological and economic health.

**PRESENT STATUS & OUTLOOK**

Three years later, the group of concerned residents continues to meet weekly. Although attendance varies, enthusiasm for the project and its goals has not died down. An effort to reduce the meetings to twice a month was made and then discarded after participants missed the weekly dialogue. As a result of the project, there is less competition for resources and less antagonism in the Applegate. Relationships have developed between previous adversaries and have contributed to resolutions and problem-solving which extend beyond the Applegate. More direct communication on ecological and economic issues occurs between the region’s residents, and many landowners are integrating their management activities into the Applegate framework.

**Factors Facilitating Progress**

Face-to-face communication was cited as an important ingredient to progress. The meetings play an important role in fostering community spirit and support. Through the project, residents solve their problems the “old way” -- by sitting down, talking about them, and working together to find common solutions. While the meetings are sometimes intense and emotional, the shared commitment to the community’s well-being keeps participants returning weekly. Professional facilitation assisted in the beginning, as well as conflict resolution training (still ongoing). Shared leadership, open access to information, and field trips also contributed positively.

**Obstacles to Progress**

The Federal Advisory Committee Act (FACA) presented a significant obstacle. USFS and BLM representatives have made an important contribution to the group. Community access and expanded dialogue with federal personnel is necessary, given the large percentage of the land in the project area under federal ownership. Although the representatives still attend the group’s regular meetings, exchange information, and provide support for its projects, FACA requires additional sensitivity when discussing projects on federal lands. (For instance, federal officials share information and discuss projects, but leave the meetings at the time the Partnership wants to develop a formal recommendation about a federal action.) During the first year start-up phase, extensive education within the community was needed to get all group members to stay on board.

**Contact information:**

Applegate Partnership
Grants Pass, OR
**Barataria-Terrebonne National Estuary Program**

**Project Area Description**
Consisting of two adjacent river basins, the project area is generally bounded on the North and East by the Mississippi River, on the West by the Atchafalaya Basin floodway levee, and the South by the Gulf of Mexico. The basins are divided by Bayou Lafourche, a major transportation artery that once served as a main channel of the Mississippi River. The entire project area lies with the Mississippi deltaic plain and is characterized by very little topographical relief. The basins consist of large tracts of fresh, brackish, and salt water marshes and shallow open bays. South Louisiana contains 40% of the coastal wetlands in the lower 48 states.

Originally, much of the area consisted of forested wetlands. Currently, agriculture (sugar cane primarily) is the predominant land use, with limited cattle grazing and oil and gas development. Urban expansion has primarily occurred on old abandoned distributary ridges of the Mississippi, the only areas that do not flood frequently.

**Ecosystem Stresses**
Hydrologic disruption is the primary stress to the ecosystem, especially since the great Mississippi flood of 1927, after which extensive levees were built along the river. These levees have led to a loss of sediment, nutrients, and freshwater that annually nourished the bottomland forests and marshes. The region has experienced an 80% loss of its original wetlands, which is continuing at the rate of approximately 21 square miles per year. The loss in habitat has significantly altered or eliminated living resources in the basins. Numerous canals for oil and gas well access, transportation, and drainage have reduced sheet flow. Finally, water quality degradation -- eutrophication to toxics pollution -- has resulted from agricultural, urban, oil and gas, and sewage run-off.

**Project Description**
This effort is one of 21 National Estuary Programs (NEPs), a nationwide program authorized by the Clean Water Act. Because of its important aquatic biodiversity, the Louisiana Governor submitted a nomination to the Environmental Protection Agency (EPA) in 1989 for the “BT” to be an NEP site. Following its acceptance, the program officially began in late 1991. It will last five years. Its goals (as for all NEPs) are to: 1) identify ecosystem problems; 2) characterize the problems by identifying data gaps, research needs, and status and trends; and 3) produce a management plan. Implementation will then follow for 20-40 years, to be assumed by the state. The effort is coordinated by the Louisiana Department of Environmental Quality, with EPA providing 75% of the funds and the state providing the remainder.

In order to include as many stakeholders and planning aspects as possible, five committees have been established. Two committees -- Policy, Management -- have primary control of the process. The other three committees -- Science & Technology, Citizen Advisory, Local Government -- make recommendations to the Management Committee. The latter three committees serve a two-way function, educating their constituents on the need and progress of this effort and representing constituent interests to the agencies. In all, over 100 partici-
BARATARIA-TERREBONNE NATIONAL ESTUARY PROGRAM -- continued

Pants are included on the committees, including: government officials, from parish-level to agency heads; academicians; landowners; sugar and cattle growers; representatives from levee boards, planning committees, environmental organizations, and the oil and gas industry.

PRESENT STATUS & OUTLOOK
The first phases of the effort (identifying and characterizing stresses) are nearly complete, and a draft Comprehensive Conservation Management Plan is due in the Fall of 1995.

Factors Facilitating Progress
The committee structure has been a significant benefit: committees and their members have worked well together. The committee function has extended beyond simply serving as sounding boards for conflicting interests. Being inclusive of all interests from the program’s inception has helped foster respect among stakeholders, with the effort benefiting from significant stakeholder support as a result. Another benefit has been the small size of the coordinating office -- nine staff -- allowing for reduced “red tape” and greater flexibility and assistance among personnel in carrying out their responsibilities. Finally, the program’s coordinators consider this effort to be far more open than other state or federal projects, with greater representation from local government and citizens, both of whom traditionally have not been included in planning processes.

Obstacles to Progress
While essential to the effort’s progress, the five committees present another layer of bureaucracy in a planning process, leading to coordination issues between committees and with EPA, for example. Identifying the program’s needs has taken longer than anticipated. Consequently, some deadlines approved by EPA at the project’s inception have been difficult to meet and are perhaps inflexible because they are difficult to change or no longer appropriate.

In the future, funding will be a limiting factor, primarily because there is no federal funding guaranteed by EPA beyond the planning phases. Implementation and securing funding invariably must be assumed by the state. Whereas specific project funds are potentially available under different statutes (e.g., water treatment facilities under the Clean Water Act), securing those funds is a long process that does not necessarily consider broader project needs. To a great degree, the program’s continuation will depend on the state’s legislature, which may only consider the program on a year-to-year basis. Conflict between stakeholders may arise with the development of specific management strategies, when all stakeholders may have to make compromises. Finally, conflicting agency goals and mandates have been cited as another obstacle.

Contact information:
Mr. Richard DeMay
Science and Technology Coordinator
Baratara Terrebonne National Estuary Program
P.O. Box 2663
Thibodaux, LA 70310
(800) 259-0869; (504) 447-0868
Fax: (504) 447-0870
**BIG DARBY CREEK PARTNERSHIP**

**PROJECT AREA DESCRIPTION**

Big Darby Creek, an 82-mile-long stream, is the most diverse aquatic system of its size in the Midwest. Eighty percent of its 580-square-mile watershed consists of farm land. However, portions of the riparian corridor are covered by hardwoods such as buckeye, sycamore, silver maple, and box-elder. On slopes and bluffs along the stream, remnant prairie species can be found. The creek is home to 86 species of fish and 40 species of mollusks, including the federally-listed endangered Scioto madtom (a fish), Northern riffle shell and the Northern club shell, and several state-listed species. Eighty-two miles of Big Darby Creek and its major tributary, Little Darby Creek, have been designated as a National as well as State Scenic River.

**ECOSYSTEM STRESSES**

Due to the rural character of the Big Darby Creek watershed, the creek has not been subjected to large amounts of industrial or municipal waste, and therefore has retained a natural balance of aquatic species. Nevertheless, a major stress on the ecosystem has been non-point source pollution resulting from traditional farming practices. A decrease in water quality has resulted from sediment originating from agricultural fields, and deforestation. Decreasing water quality has posed a threat to the inhabitants of the stream. The continuous westward expansion of the City of Columbus and its suburban communities poses an additional, growing threat, as it leads to increasing erosion levels from construction sites and increased storm water runoff.

**PROJECT DESCRIPTION**

The uniqueness of the Big Darby Creek has been recognized by many individuals and organizations in the region. Around 1989, their joint concerns and activities led to the formation of the Big Darby Creek Partnership, which consists of more than 40 private and public organizations. Partners include the Ohio Department of Natural Resources, The Nature Conservancy, Operation Future Association, U.S. Environmental Protection Agency, Ohio State University Extension, and many others.

Although the partnership is a loose-knit organization without an official mission document, the partners recognize that the overarching goal of their efforts is to ensure the long-term ecological health of the Big Darby Creek watershed. Each partnering agency or organization maintains its own specific goals and strategies. For example, strategies employed by the Scenic River Division in the Ohio Department of Natural Resources and Operation Future Association include reforestation of the riparian corridor, innovative zoning schemes, encouragement of alternative agricultural practices, and conservation easements through purchases and donations. The Nature Conservancy also uses conservation techniques such as conservation easements and land acquisition, in addition to voluntary landowner agreements. These strategies do not only intend to preserve this unique riverine habitat, but they also seek to accommodate human uses within this ecosystem.

The Scenic River Division, the Ohio Environmental Protection Agency, the local Soil and Water Conservation District, and the City of Columbus monitor the watershed using fish surveys, macroinvertebrates surveys,
BIG DARBY CREEK PARTNERSHIP -- continued

water quality, change in farming practices, among others, to evaluate the effectiveness of management strategies.

PRESENT STATUS & OUTLOOK
Although the partnership is relatively young, it has succeeded in bringing together a large number of organizations for the sake of preserving the watershed. It is still too early in the project to know if populations of sensitive species are increasing in the Big Darby, but an endangered species is now found in a tributary (Little Darby) where it was never found before. Also, the use of no-till agricultural techniques has increased by more than 50% in the watershed, thereby decreasing sedimentation into the creek.

Factors Facilitating Progress
Some of the project’s success may be attributed to the fact that Big Darby Creek was well-studied years before it was designated as a Scenic River and became the focus of this partnership. The availability of this information and the interests of private citizens and organizations have contributed greatly to this project. In addition, the partners share their views with and learn from each other, improving understanding and cooperation that benefits Big Darby Creek.

Obstacles to Progress
Most of the watershed is held in private ownership, and some townships have not passed protective zoning. However, with the continuing education of landowners in particular and the public in general, there has been an increasing understanding and acceptance of efforts aimed at protecting Big Darby Creek.

Contact information:
Mr. Stuart Lewis
Assistant Chief
Ohio Department of Natural Resources
1889 Fountain Square
Columbus, OH 43224
(614) 265-6453
**Bitterroot Ecosystem Management Research Project**

**Project Area Description**
Steep east-west canyons carve this area along the Idaho-Montana border. Douglas-fir and western larch grow along the flatiron faces of the Bitterroot Range that look east over Missoula. However, most of the forest cover consists of lodgepole pine, Engelmann spruce, and Douglas- and grand fir. Alpine larch is present at higher elevations of the north facing slopes. It is not suspected that the area hosts any federally- or state-listed endangered species.

The initial 40,000-acre project site is defined by the borders of the Stevensville West-central Integrated Resource Analysis Unit. The area is bounded by the ridge between Silverthorn and Sherritt Creek, extending south to encompass the entire Gash Creek watershed. All of the land is owned by the U.S. Forest Service (USFS). More than half is designated as wilderness.

**Ecosystem Stresses**
The 15-year fire regime which favored the growth of ponderosa pine and western larch has been actively suppressed throughout the nearly 100 years of USFS ownership. The logging of most of the high value pine and larch timber has led to further changes in stand structure and species composition. As a result, thick stands of Douglas-fir and grand fir now stress the ecosystem for nutrients and water. The current composition is especially susceptible to fire, insects, and disease. West winds create a high potential for fire to come ripping out of the wilderness area in the mid to late summer and threaten recently constructed subdivisions nestled near the National Forest.

Finally, eastern brook trout have been introduced and breed with native bull trout. Bull trout is difficult to find in areas where it used to be abundant.

**Project Description**
The Forestry Science Laboratory in Missoula started this project in early 1994 in order to assist the USFS in its goal of restoring forest health. The research team is seeking to restore the dominance of ponderosa pine and western larch which would be less susceptible to fire, insect, and disease, highly conducive to wildlife populations, and an important contribution to the region’s economic base.

The five-year research project employs several strategies, including applying models of vegetation management that plot succession, comparing riparian areas in different stages of succession to determine their influence on bird nesting patterns, and replanting ponderosa pine and western larch. Also, the Forest Service will conduct prescribed burns in an attempt to mimic the natural fire regime to support the regeneration of pine and larch stands. The specific factors that will be monitored and evaluated have not yet been established.

**Present Status & Outlook**
Several cooperative agreements focused on scientific research have been signed with University of Montana scientists. Project decisions rest with the USFS District Ranger, yet many environmental groups and "wise use" groups rou-
Bitterroot Ecosystem Management Research Project -- continued

...tinely participate in public involvement processes. The Forest Service will also use focus group analysis to better understand local sentiments. The focus group analysis involves Forest Service staff and cooperators attending the regular meetings of stakeholder groups in and around the Bitterroot Valley.

Factors Facilitating Progress
Agency support for the application of ecosystem-based approaches is credited with allowing the project to move ahead. The research team’s progress has been enhanced by applying technology to management activities. Scientific information concerning forest health and resources had been fragmented and dispersed throughout several Forest Service offices. The information, now centralized in the laboratory’s GIS database, is being used in successful modeling efforts. The assembled scientific team is confident in its ability to convert the forest. Key personnel on the science and management team are likely to stay in place throughout important phases of the project, allowing for progress to continue on schedule.

Obstacles to Progress
The complex social systems in the Bitterroot Valley provide a challenging backdrop for the USFS’s research activities. Resentment towards USFS lingers in the valley from the controversies over clear cutting in the 1960s and 1970s. Furthermore, a strong presence of home rule advocates could inhibit the work of the research scientists. Within the forest products industry, there is concern that ecosystem management will lead to a significant drop in available timber. There was concern in early 1995 that Congress would rescind several million dollars in USFS research funds, thus jeopardizing the ability of this project to continue.

Contact information:
Dr. Clint Carlson
Team Leader
USDA Forest Service
Forestry Science Laboratory
PO Box 8089
Missoula, MT  59807
(406) 329-3485
Fax: (406) 543-2663
**Block Island Refuge**

**Project Area Description**
This project area encompasses the entire land area of the island. The island consists of glacial till, and is morainal and undulating in topography. This relatively small island contains a great deal of habitat diversity including beaches, dunes, bluffs, wetlands, marshes and grasslands, a large salt water pond at the center of the island, and perched wetlands and kettle hole ponds interspersed throughout. The vegetative cover includes maritime shrublands and grasslands. Federally-listed threatened and endangered species include the American burying beetle; Block Island is one of only three known sites for this species. Currently, half of the island is undeveloped, a quarter is in conservation status, and a quarter has already been developed.

**Ecosystem Stresses**
The biggest threat to the ecosystem is residential development and the conversion of grasslands to lawns with little ecological diversity. A second threat is the seasonal human disturbance to beach communities.

**Project Description**
Island residents have a history of conservation ethics. The project is rooted in the 1970s when a cherished piece of land was threatened by development. A community group, the Block Island Conservancy, was created to raise money to buy this parcel. At this point The Nature Conservancy (TNC) and the State Department of Environmental Management became involved. The Block Island Land Trust was formed by residents to counter development, which was outpacing preservation in the 1980s. This Trust lobbied the state legislature to fund the group through a tax on real estate.

The goals of the project are preservation and enhancement of the ecological values of the island. The strategies to meet this goal focus on restoration of grasslands and aggressive land acquisition. An emphasis is also placed on environmental education, as well as education to help landowners understand tax laws so they will donate land to conservation easements. A longer-term goal is the reintroduction of native species that have been extirpated from the island. A second future goal is to make the economy of the island less dependent on development and more dependent on sustainable activities.

**Present Status & Outlook**
A proactive land acquisition program has been adopted by TNC. The U.S. Fish and Wildlife Service has formed a partnership with TNC to aid in preservation efforts.

Although it is too early too gauge the results of the outreach and education programs, the restoration of grasslands has already caused several species to recolonize. In order to measure progress in this area, the burying beetle, breeding birds and rare plants are monitored. The land acquisition program has also been very successful with 300-400 additional acres preserved over the last four years.

**Factors Facilitating Progress**
The degree of cooperation and support at all levels of the community has been extraordinarily helpful. The tangibility of the threat of development has been a
motivating factor for people to become involved. This was especially true during the 1980s when the pace of development on the island was extremely high. Also, a recent comprehensive town plan indicated that the number of new houses allowed under current zoning could double the number of existing houses. This has provided more incentive to protect the island from development.

**Obstacles to Progress**

There are many deserving causes for private generosity on Block Island, which makes fundraising challenging. Ensuring future funding to protect additional habitats is critical to continued progress. Since land preservation is tied to local economies, the former can be highly controversial; the politics involved with preservation can be a disincentive for community involvement.

Creating innovative strategies to deal with the seasonal disturbances is also a challenge.

**Contact information:**

Mr. Chris Littlefield  
Bioreserve Manager  
The Nature Conservancy  
Block Island Refuge  
PO Box 1287  
Block Island, RI 02807  
(401) 466-2129
Blue Mountains Natural Resources Institute

Project Area Description
The Blue Mountains ecoprovince is generally mountainous with fairly large, flat valleys. In pre-settlement times, fire-adapted species such as ponderosa pine, and to some extent lodgepole pine and western larch, dominated the forests in this ecoprovince. As a result of fire suppression and selective logging, large numbers of Douglas-fir and white fir have become established in relatively dry areas to which they are not well adapted. The project area also includes range and crop land. The Blue Mountains provide vital habitat for many wildlife and fish species, including the Snake River chinook salmon, which is federally-listed as threatened.

More than 40% of the land is federally owned, 10% of which is designated as Wilderness or National Recreation Area. The remainder of the land is mostly privately owned. The most prevalent land uses are timber management, outdoor recreation (including hunting), cattle grazing, and farming.

Ecosystem Stresses
Forests in the area have recently suffered from an insect and pest epidemic, due to the susceptibility of Douglas-fir and white fir to insects and disease. Fire suppression has led to unprecedented levels of fuel build-up, which could potentially lead to a catastrophic forest fire. Dams on the Columbia and Snake River have severely affected salmon populations. Salmon populations are also negatively affected by a temperature increase in some streams, due to a reduction of shade and other factors. Grazing, logging, and roads contribute to erosion and stream sedimentation.

Project Description
In 1989, several citizens voiced concerns that the U.S. Forest Service (USFS) was not researching local problems and that the best scientific information was not being used. The citizens were concerned that disputes over forest management would develop into region-wide conflicts. In addition, the forests were plagued by insect and disease problems. In response to these concerns, the Blue Mountains Natural Resources Institute (BMNRI) was formed by the USFS in a partnership with a wide range of stakeholders. The goal of the BMNRI is to enhance the long-term economic and social benefits derived from the area’s natural resources in a sustainable and ecologically sensitive manner. In order to reach this goal, the BMNRI sponsors, facilitates, and encourages research on ecological, economic, and social issues. It also promotes outreach, including technology transfer, education, demonstration of innovative management strategies, and facilitation of cooperation of the various stakeholders in the area.

BMNRI’s policies and direction are guided by the recommendations of a Board of Directors, which is composed of individuals representing federal, state, local and tribal agencies, as well as private landowners, industry, environmental interests, and civic groups. The Board is a federally-chartered Advisory Committee. In addition, BMNRI has 83 partners. A partner is an organization that agrees with BMNRI’s mission, is willing to lend support to accomplishing the
goals that the partner has in common with BMNRI, and agrees that cooperation is key to resolving critical resource issues.

PRESENT STATUS & OUTLOOK
The increased level of communication and cooperation among diverse interests, and an increased level of integrated research projects have been some of the important results of this project. A level of trust has developed among the people who live in the region that is not found elsewhere in Oregon and Washington.

Factors Facilitating Progress
The local initiation of the project and the will to succeed have helped the project proceed. The willingness of people to work together to solve issues has been very helpful. In addition, BMNRI maintains credibility by basing its positions on science. The flexibility of BMNRI’s programs and the quality of its products and projects are other positive factors.

Obstacles to Progress
The process for the Board of Directors to obtain Federal Advisory Committee status took four years, a lengthy process that was very discouraging and distracting to the Board members. Initially, some administrative problems existed, but those have been overcome. Inadequate staff and funding are other obstacles.

Implementation of projects on federal lands are delayed because of a lengthy approval process.

Contact information:
Ms. Lynn Starr
Blue Mountains Natural Resources Institute
1401 Gekeler Lane
La Grande, OR 97850
(503) 962-6529
Fax: (503) 962-6504
**Butte Valley Basin**

**Location:**
Northern California

**Project size:**
32,625 acres

**Initiators:**
U.S. Forest Service, California Department of Fish & Game

### Project Area Description
Just south of the Oregon border, the Butte Valley basin lies upon an ancient lake bed, whose sandy terraces, dunes, and lakeshore support communities of salt shrub, perennial bunchgrasses, intermountain sage steppe, and juniper woodlands. The basin ecosystem provides habitat for the bald eagle, Swainson’s hawk (a state-listed threatened species), and burrowing owl (a state-listed sensitive species). The basin also supports many waterfowl species. Since the early 1900s, this basin was severely de-watered for agricultural purposes. After the drought of the 1930s, the federal government bought the basin’s submarginal farmlands in order to stabilize them. Currently, the most prevalent land uses include livestock grazing, wildlife viewing, waterfowl hunting, and agriculture. Land ownership is mixed federal, state, and private.

### Ecosystem Stresses
Early in the century, dikes and ditches were built to drain wetlands and irrigate farmland. In 1968, structures were built to pump flood water to the Klamath River. These water projects lowered the water table considerably, causing the loss of wetland and riparian habitats as well as native grasses. Crested wheatgrass, introduced in the 1950s to stabilize the soil, has thrived in these droughty soils where native grasses can no longer grow. Fire suppression has been a problem for the regeneration of the sage steppe and juniper woodland communities. Finally, overgrazing throughout the century has proven to be a stress to the basin ecosystem.

### Project Description
In 1991, the federally-owned lands were designated as the Butte Valley National Grassland. Five years earlier, the U.S. Forest Service (USFS) had begun a coordinated resource management planning process to restore traditional waterfowl and wetland habitats in the area. Recognizing their common interest in wetland restoration, the Klamath National Forest and the California Department of Fish and Game have combined their planning efforts in the Butte Valley. Also involved in the planning process are Ducks Unlimited, Butte Valley Resource Conservation District, and participating private landowners and grazing permittees. Implementation of the wetland restoration projects have been underway since 1992. Future project efforts will focus on development of a comprehensive restoration and management plan for the grasslands.

The current goals of the project are: to restore and maintain Butte Valley’s native grassland and wetland ecosystems; to restore and maintain the productivity of native rangeland vegetation for livestock and wildlife; to optimize storage and use of water for wetland restoration and increased groundwater levels by confining excess water to the basin rather than pumping it to the Klamath River; and to provide an ecological approach to multiple use management.

### Present Status & Outlook
Many of the project goals outlined above have already been met. By 1993, water control structures designed by the project team had provided enough water for results of wetland restoration efforts to be observed. Wetland programs will continue until 1995. But more work needs to be done for the
grasslands. Reintroducing fire, limiting grazing, and testing alternative grazing treatments will be needed to restore upland vegetation. Experimental seeding programs have attempted to reestablish native grasses. Prescribed burning has been applied in some of the sage communities. Hopefully, smaller projects such as these will soon be part of a larger comprehensive plan for the grasslands.

Factors Facilitating Progress
The collection of recent, accurate baseline data on the biological and physical components of the basin ecosystem, incorporated into a comprehensive, integrated database and GIS, has allowed the planning team to use a landscape-based analysis and design process. Furthermore, adequate monitoring programs have been in place to evaluate current restoration projects. Adequate funding provided equally by the state of California, Ducks Unlimited, and the Forest Service has been available. Finally, there has been strong public participation and input in determining the desired future conditions for Butte Valley that the project hopes to achieve.

Obstacles to Progress
Despite this public participation, there have been misconceptions about what the project is trying to accomplish. Furthermore, the prevailing local attitude maintains that groundwater is for growing crops, while providing for waterfowl is an inappropriate use of water. Efforts to educate the public on the project have relieved some of this opposition, but public skepticism remains.

Contact information:
Mr. Jim Stout
Resource Officer
USDA Forest Service
Klamath National Forest
Goosenest Ranger District
37805 Highway 97
Macdoel, CA 96058
(916) 398-4391
Fax: (916) 398-4599
CACHE RIVER WETLANDS

PROJECT AREA DESCRIPTION
The Cache River is a 110-mile-long river in southern Illinois, which drains an area of 470,000 acres. The Cache River Wetlands project focuses on the wetlands corridor along the lower 50 miles of the river. The wetlands are characterized by bottomland hardwood forests (oak-hickory) and bald cypress-tupelo swamps, and are interspersed with low, oak dominated hills.

The area supports a remarkable diversity of plant and animal species. Federally-listed threatened and endangered species that can be found in the project area include the gray bat, the Indiana bat, the interior least tern, and bald eagle. In addition, more than 60 state-listed species occur in the area. The wetlands are a major stop-over for migratory neotropical songbirds as well as for migratory waterfowl. The area is also graced by the presence of many raptors, a heron rookery, bobcats and river otters. Farming and timber management are important land uses in the surrounding watershed.

ECOSYSTEM STRESSES
As late as the turn of the century, the area remained almost entirely wooded. However, logging began as the area was settled, followed by agriculture. With the onset of agriculture, drainage projects started which continued until the seventies. Today, only approximately 20% of the original Cache River wetlands remain. The extensive drainage network and the lack of forest cover has led to rapid run-off of rain water, and has resulted in major stream bank erosion. The eroded materials subsequently settle in the wetlands, reducing water quality and smothering swamps.

Another stress is the fragmentation of the remaining forest. Animal populations that cannot travel between forest patches may become genetically isolated. In addition, fragmented forests have too many edges, leading to parasitism and predation of the nests of migratory neotropical birds.

PROJECT DESCRIPTION
Recognizing the natural values of the Cache River Wetlands 20 years ago, The Nature Conservancy (TNC) and the Illinois Department of Conservation (IDOC) started buying the land that is now known as the Cache River State Natural Area. After the passage of the North American Wetlands Conservation Act, the Cypress Creek National Wildlife Refuge was established in 1991. Shortly thereafter, the Cache River Wetlands Joint Venture Partnership was formed to manage the Wetlands. This partnership consists of TNC, IDOC, the U.S. Fish and Wildlife Service (FWS), and Ducks Unlimited. Together, the partners have acquired more than half of the 60,000 acres targeted by the project. In 1993 the Cache River Consortium was established, which is a larger advisory body that comprises the four partners and several state and federal agencies.

In order to "knit the ecosystem back together," the partnership uses several strategies which focus on restoration and water resource planning. To restore the bottomland hardwood forests TNC uses a mechanized tree planting operation. Five tons of the native hardwood nuts and acorns that have been planted were collected by local Boy Scouts. FWS has employed the services of prison crews to plant tree seedlings.
Hydrologic restoration is carried out through plugging ditches, building dams and other methods to flood old farm lands. The U.S. Army Corps of Engineers has just started a three year, $1.3 million feasibility study to evaluate a number of measures planned to mimic natural hydrologic processes. In addition to restorative efforts, the U.S. Environmental Protection Agency has funded a Water Resource Planning Initiative. Its aim is to identify areas where erosion is a problem and to develop solutions to mitigate this problem. The Initiative is made up of 25 land owners throughout the watershed, and is cosponsored by the Natural Resources Conservation Service and TNC.

**Present Status & Outlook**

It is still too early to determine if any of the goals of the project have been realized. However, 37,000 acres have been acquired, of which 2,500 have been reforested. In addition, hydrologic restoration and a water quality monitoring program has begun.

**Factors Facilitating Progress**

Factors contributing to the project’s progress are the significance of the natural area, good planning, strong Congressional support, a dedicated local support group and a strong interest and commitment of all involved agencies and organizations.

**Obstacles to Progress**

Land is only acquired from willing sellers. As a result, the partnership has not been able to obtain some large key parcels. In addition, some concerns exist regarding the ongoing flow of appropriations from Congress through the Land and Water Conservation Fund. These funds are needed for continued acquisition of lands by the FWS.

**Contact Information:**

Mr. John Penberthy  
Project Manager  
The Nature Conservancy  
Cache River Office  
Route 1, Box 53E  
Ullin, IL 62992  
(618) 634-2524  
Fax: (618) 634-9656  
E-mail: cachebio@aol.com
CACHE/LOWER WHITE RIVERS ECOSYSTEM MANAGEMENT PLAN

PROJECT AREA DESCRIPTION
Comprising 12% of the Mississippi Alluvial Valley (MAV), the Lower White River watershed, including the Cache River, a tributary, was once part of a vast hardwood-forested wetland complex.

While the ecosystem is very flat, its topography is complemented by a complex and dynamic hydromorphologic system of rivers and bayous, braided stream terraces, meander belts, back swamps, and elevated terraces. The area is vital to waterfowl migration, breeding, and wintering, and boasts one of the largest populations of black bears in the South. The wetlands that remain are nationally and internationally recognized for their value, not only to commercial and recreational fisheries, but to the region’s 52 mammal species, 232 birds, 95 fish, and 48 reptiles and amphibians. The region includes 5 federally-listed threatened or endangered species: interior least tern, bald eagle, pallid sturgeon, and fat pocketbook and pink mucket mussels.

Today, most of the area is in row-crop agriculture. The watershed contains the largest remaining hardwood-forested wetland complex on any Mississippi River tributary in the MAV: 350,000 mostly contiguous acres, of which 229,000 acres are in public ownership (two National Wildlife Refuges, four State Management Areas).

ECOSYSTEM STRESSES
Large-scale habitat destruction is the primary stress, with over 85% of the ecosystem having been converted to agriculture. Associated stresses include disruption of hydrological and sedimentation processes, water quality degradation, and biodiversity loss, although the latter is difficult to estimate due to a lack of baseline data as a result of the extensive habitat conversion. Several species are known to have been extirpated from the region, including Bachman’s warbler, Carolina parakeet, ivory-billed woodpecker, mountain lion, and red wolf.

PROJECT DESCRIPTION
The Arkansas-Idaho Land Exchange Act of 1992 mandated that a Comprehensive Management Plan (CMP) be drawn up by the U.S. Fish & Wildlife Service (FWS) for the newly-expanded White and Cache Rivers National Wildlife Refuges. Subsequently, the CMP effort was expanded to include an ecosystem management framework for the watershed, drawing in various other stakeholders, including several conservation and land preservation organizations and various state agencies.

A planning review team was formed to draw up the CMP, which contains three goals: 1) restoration & conservation of wetland ecosystem functions in the remaining forested-wetland complex; 2) partial restoration of ecosystem function on private lands, towards sustainable use; and 3) provide and encourage, where appropriate, public use opportunities which are compatible with restoration and conservation efforts of ecosystem functions. Fourteen strategies have been drawn up to fulfill these goals, in areas ranging from hydrologic function to cultural resources.

PRESENT STATUS & OUTLOOK
The CMP was finalized in early 1995.
Formalizing the unofficial inter-agency team is another goal. While some pilot projects have been identified, drawing up specific plans to accomplish the goals and objectives is the largest and most important next step. No coordinated implementation has occurred at this point.

Factors Facilitating Progress
Interagency cooperation, even though only at a relatively informal level thus far, has been the primary benefit to this effort and a result from this effort. Despite the need for further education on ecosystem management, the interagency team participants were nevertheless familiar with the ecosystem management approach. Their familiarity covered a broad range of concepts, but it was nevertheless sufficient to allow the CMP development to progress. Finally, strong leadership from the project leader, and support from conservation organizations, the Congressional delegation, and federal and state agencies, have been cited as positive influences.

Obstacles to Progress
Stakeholder involvement has been incomplete, particularly from the farming community, but also from the state Soil & Water Conservation Commission. FWS expects to make a greater effort to identify community leaders among the largely unorganized and unrepresented farmers for future activities on the effort. Federal reorganizations and downsizing, and conflicts between traditional FWS goals and ecosystem management goals, are additional concerns. The lack of any major university in the Cache and Lower White Rivers region has resulted in a lack of biological data on the region. Finally, funding continuity is a concern, due to state and federal cutbacks, and difficulties in raising funds for the effort when so little data is available on the ecosystem.

Education of project partners, including personnel within FWS, has been identified as an important need.

Contact information:
Dr. Scott Yaich
Wildlife Management Biologist
U.S. Fish & Wildlife Service
Wildlife & Habitat Management Office
PO Box 396
St. Charles, AR 72140
(501) 282-3213
Fax: (501) 282-3391
**CAMP JOHNSON SANDPLAIN RESTORATION**

**PROJECT AREA DESCRIPTION**

The Camp Johnson Sandplain consists of mostly level delta terraces dissected by erosional streams. These terraces are composed of deltaic sand deposits of the glacially-swollen Winooski River delta near Lake Champlain. Vegetation is characteristic of a pine-oak-heath sand plain community, including black, white, and red oak, red maple, white pine, pitch pine, huckleberry, teaberry, sheep laurel, beaked hazelnut, and wild sarsaparilla. In presettlement times, this area was subject to periodic fires. The area is home to several state-listed threatened species: mountain rice-grass, large whorled pogonia, blunt-leaved milkweed, low bindweed, and harsh sunflower.

The entire restoration area is on military land owned by the U.S. Air Force and managed by the Vermont Military Department. The forested area is used for limited infantry training and orienteering. Land adjacent to the military base is either town park land or privately owned.

**ECOSYSTEM STRESSES**

Fire suppression has interfered with the regeneration of some tree species in the community, especially pitch pine. However, controlled burning has been initiated. An additional stress is the development of private land adjacent to the base, which further fragments the ecosystem. An existing unimproved road is a stress to a minor degree, since it permits military tanks to access the forest and cause damage.

**PROJECT DESCRIPTION**

This project was initiated in 1990 by Vermont’s Nongame and Natural Heritage Program (NNHP). NNHP realized that in the state, the threatened pine-oak-heath sand plain community was best represented at Camp Johnson. The Vermont Military Department was willing to work with NNHP, following in the footsteps of the (federal) Department of Defense who had earlier started to work with The Nature Conservancy on ecological diversity issues pertaining to military lands. In 1991, a Memo of Understanding was signed by the NNHP and the Vermont Military Department regarding the management of this forest. During the following two years, a steering committee was set up, including NNHP, the Vermont Military Department, The University of Vermont, and the Town of Colchester, providing advice on project goals and strategies.

The goal of the project is to restore and maintain a mosaic of old growth, presettlement white pine-oak forest and pitch pine-oak-heath woodland. Strategies designed to meet these goals include: 1) conduct rare plant and invertebrate inventories of all intact sandplain forest; 2) delineate management units for mature forest and early successional woodland; 3) prepare a detailed site base map for the restoration area; 4) develop fire management plans for early successional units; 5) establish monitoring plots in all study area management units to collect baseline and long-term measurements of vegetation, soils, and other pertinent biotic and physical habitat parameters; monitoring will provide useful information concerning changes in this community in different successional stages over time; and, 6) collect pitch pine seeds from the site as well as other nearby sites in order to
**Camp Johnson Sandplain Restoration -- continued**

determine genetic variation both within and among the populations, and to attempt germination.

**Present Status & Outlook**

Project and restoration activities have been made possible through a five-year grant from the Legacy Funding Program of the Department of Defense. Activities that have taken place so far include rare plant, butterfly, and beetle inventories, delineation of management units, a prescribed burn, establishment of monitoring plots, and collection of pitch pine seeds from three different sites.

Factors Facilitating Progress

A realization among those involved that this is the best remaining example in the state of what was once a much more common vegetative community, and a commitment to attempt to restore and preserve it, has helped this project proceed. Cooperation and communication between the Vermont Military Department and other cooperators have been very advantageous. The latter has also provided additional financial support. The assistance of the Vermont Department of Forests, Parks and Recreation with the prescribed burn, and the collaboration of the University of Vermont on the invertebrate inventory and pitch pine seed studies have also been helpful to the project. In addition, the support of the Colchester Department of Parks and Recreation, and the collaboration of the University of Vermont on the invertebrate inventory and pitch pine seed studies have also been helpful to the project. In addition, the support of the Colchester Department of Parks and Recreation, and the collaboration of the University of Vermont on the invertebrate inventory and pitch pine seed studies have also been helpful to the project.

Obstacles to Progress

It has been challenging to convince all the parties involved, especially the Town of Colchester, that, despite being highly degraded and not comparable with other sandplain communities out of state, the sandplain community at Camp Johnson is the best remaining example in the state and is therefore highly significant. The Town of Colchester would like to develop a portion of the base and has plans to construct a road through the base and the sandplain community.

**Contact Information:**

Mr. Robert Popp
Nongame and Natural Heritage Program
103 S. Main Street
Waterbury, VT 05671-0501
(802) 241-3718
CANYON COUNTRY PARTNERSHIP

PROJECT AREA DESCRIPTION
The regional geologic features of the Interior Colorado Plateau create a unique landscape of sandstone canyons, mesas, buttes, spires, cliffs, arches, and shale badlands. Within this region are three mountain ranges. At lower elevations, large open tracts of desert shrub and grassland vegetation can be found, including bunchgrasses, blackbrush, and salt desert shrub. One of the most important features at these elevations is cryptobiotic crust, a living ground layer which protects the highly erodible soil surface and acts as a natural fertilizer through nitrogen fixation. At higher elevations, dominant vegetation includes sagebrush and pinyon-juniper communities, Gambel oak, Douglas-fir, blue spruce, aspen and ponderosa pine forests, and sub-alpine forests of Engelmann spruce and fir. The highest mountain peaks support alpine tundra vegetation.

There is a high rate of endemism within the Plateau, with some very rare plants growing in narrowly restricted habitats. There are several federally-listed threatened and endangered plant and animal species in the region, including Jones cycladenia, bald eagle, and peregrine falcon. The Colorado River contains several federally-listed threatened or endangered fishes, such as the bonytail chub, Colorado squawfish, and razor-back sucker.

ECOSYSTEM STRESSES
Disturbances of the Plateau’s sensitive ground surfaces by livestock and recreational use have led to increased soil erosion, disrupted nutrient cycling, and increased salinity of the Colorado River. Dramatically increased recreational activity has been particularly problematic in remote areas that were once difficult to access. Areas untouched by livestock for 200 years are now susceptible to serious damage within three months by uncontrolled recreation. Furthermore, overgrazing, exotic plants (such as cheatgrass and tamarisk) and fire suppression have altered the region’s natural vegetative community composition. Historic mining activity and present-day oil and gas exploration and drilling have also left a mark on the land. Finally, increasing residential development has led to habitat disruption and fragmentation.

PROJECT DESCRIPTION
In 1993, under the Bureau of Land Management’s (BLM) new direction towards ecosystem management, the agency embarked on a large-scale resource management plan for the Colorado Plateau region. To better understand the principles of ecosystem management and to identify those who should be involved in its planning, the BLM held an ecosystem management conference in May 1993. During this conference, local natural resource managers and sectors of the public realized that the cumulative impacts of increased recreation and other activities on this fragile landscape could have serious ecological as well as economic ramifications.

As a result of this conference, the Canyon Country Partnership was formed in 1994. The Partnership Forum consists of representatives from the BLM, National Park Service, U.S. Forest Service, Utah Division of Wildlife, Utah Division of State Parks and Recreation, State Trust Lands, and local government representatives from Grand, Carbon, San
CANYON COUNTRY PARTNERSHIP -- continued

Juan, and Emery counties. Subcommittees in the Partnership deal separately with scientific issues and data issues including GIS, data sharing, and data standardization between land managers. The public is involved through issue committees to work on strategies with the Forum on issues such as recreation.

The Partnership is an interagency, grassroots initiative which grew out of the vision and efforts of local agency managers. The goals of the Partnership are two-fold: 1) collaboration among members of the Partnership, including the sharing of information and resources so that management decisions can be made with an understanding of potential impacts to adjacent lands; and 2) sustainable land management, i.e., preserving ecosystem functions while providing products that society needs and desires.

PRESENT STATUS & OUTLOOK
Since 1994, the Partnership has mostly worked on fostering cooperative relationships between members and seeking funding for scientific research.

Factors Facilitating Progress
Collaboration continues to grow between members of the Forum, despite concerns listed below.

Obstacles to Progress
The project has proceeded slowly thus far, for several reasons. First, the lack of institutional funding and support for the collection of scientific data (both ecological and socio-economic) has been a barrier for sustainable land management planning efforts. Second, there has been a fair amount of skepticism on the part of local residents and officials concerning the federal government’s role in the Partnership. Finally, FACA has been a stumbling block for collaborative efforts. As a result, the Partnership has amended its charter so that, rather than reaching consensus, the Forum now only functions as a discussion group.

Contact information:
Mr. Joel Tuhy
Colorado Plateau Public Lands Director
The Nature Conservancy
PO Box 1329
Moab, UT 84532
(801) 259-4629; (801) 259-2551
Fax: (801) 259-2677
**CHATTOOGA RIVER PROJECT**

**PROJECT AREA DESCRIPTION**
This river basin is primarily in public ownership, with the actual project area comprised of three National Forests: the Sumter, Chattahoochee, and Nantahala. The ecosystem, located at the interface of the piedmont and southern Appalachian divisions, is primarily mountainous, with elevations ranging from under 1000 feet to over 4800 feet. The forests are predominantly mixed hardwood with some pine, the latter mostly planted in this century. The region is considered unique from an ecological perspective; for example, the habitat boundaries of many northern and southern species are located in this region.

The Chattooga basin is home to approximately a dozen federally-listed threatened and endangered species, including the small-whorled pogonia, persistent trillium, peregrine falcon, and several bats, and over 100 proposed or sensitive species. In addition, the Chattooga is prime black bear habitat. The Chattooga River is a federally-designated Wild and Scenic River (W&SR) and is considered the “crown jewel” of the eastern W&SR system. Current uses of the land are resource extraction (timber, grazing, historic mining), recreation (rafting, hunting, sightseeing), urban and rural settlement, and wilderness or other reserves.

**ECOSYSTEM STRESSES**
Timber management (on both public and private lands), disturbance of fire regime, and land conversion to urban use are the most significant stresses. Water and air pollution, potential increases in recreation due to the 1996 Olympics in Atlanta (only 2 1/2 hours away), localized water development, exotic species invasion (kudzu), and fragmentation due to continued development pressures are other existing or potential stresses.

**PROJECT DESCRIPTION**
The effort has its roots in the U.S. Forest Service’s (USFS) New Perspectives program. In the fall of 1991, the USFS was requested by environmental interests to consider the Chattooga as a program site due to its unique ecological qualities. (One group even submitted an ecosystem management plan for the Forest.) The following summer, Ecosystem Management was announced as a new Forest Service program, with the USFS Southern Region selecting the Chattooga as a pilot area.

The project, designed to last three years ending in September 1995, is primarily information and data-oriented. Its stated goal is to develop an integrated and ecological approach to managing the Chattooga watershed, which involves coordinating across state boundaries, three National Forests, and multiple Ranger Districts. Meeting public demands for forest uses within the context of sustainability and collaborating with Forest Service researchers are additional goals. Strategies to attain these goals include: 1) identifying and developing strategies for water quality problems; 2) inventorying and classifying the ecosystem and its biodiversity, using geographic information systems (GIS) technology; 3) addressing land ownership issues (inholdings primarily); 4) increasing public involvement; and 5) developing plans to move into implementation (e.g., modifying Forest plans). No actual land management
Implementation is included in this effort.

Operating solely as an internal Forest Service effort, the project is guided by a Board of Directors (3 Forest Supervisors, 3 District Rangers, 1 Researcher) who receive recommendations from six working groups that focus on the following issues: water quality, ecosystem classification, GIS, biodiversity, land acquisition, and developing desired conditions and public involvement. These entities will disband at the end of the project, although a USFS Research Advisory Committee is expected to review all management proposals within the watershed for an additional year.

While these groups are staffed solely by Forest Service personnel, involvement has occurred from non-governmental organizations, private consultants, a local rafting outfitter, the City of Clayton, Georgia, and USDA Natural Resources Conservation Service. For example, the project has incorporated outside researchers through contract and cost-share agreements with five universities and several other researchers. Over 130 interviews have been conducted with members of the public in an effort to assess the public view of desired future conditions. Public involvement has resulted in more research being focused on biodiversity.

Present Status & Outlook
The effort is producing several products, including a ecological classification guidebook and a GIS database of the area. Ecologically, clearcutting has been vastly reduced in the region, and a small number of restoration efforts have begun. Overall, the traditional favoritism towards pine is being reduced in favor of native hardwood species. Cooperation between the three states has improved. For example, prescribed burns now cross state boundaries, an impossibility prior to the effort’s inception. The Forest plans for all three National Forests will need to be amended to reflect recommendations from the project, develop consistency, and achieve ecosystem management goals. At the district level, the project is supporting landscape-level analyses that use GIS and classification, and information on biodiversity and water quality.

Factors Facilitating Progress
Because of its status as a pilot project, funding was relatively secure, and aided in this effort’s progress, although the funding level was not as high as desired. The top-level directive and de-facto permission to proceed with such an effort, i.e., a change in traditional Forest Service practices, were also instrumental.

Obstacles to Progress
Internal ‘red tape’ has been an obstacle. Primarily because this effort reflects a ‘new way of doing business,’ coordination among the three Forests has been problematic, especially in personnel, procurement, and budgeting, both internally and with other federal agencies. Internal resistance has been significant, with a high amount of internal education required to bring personnel on board. A greater role for research was identified as an area for improvement.

Achieving consistency in the amended Forest plans is another concern as the plans will be modified by separate processes, without a guarantee of uniformity or even of incorporating project recommendations. Finally, the effort stops short of implementation; follow-through is not guaranteed, although steps are underway to transfer and implement the project’s tools and information to Forest districts.

Some observers have stated that Congressional pressure to meet timber goals make it difficult for natural resource managers to effectively undertake ecosystem management, despite genuine efforts to do so.

Contact Information:
Mr. David Meriwether
USDA Forest Service
R-8
1720 Peachtree Rd. NW
Atlanta, GA 30367
CHEQUAMEGON NATIONAL FOREST LANDSCAPE ANALYSIS & DESIGN

PROJECT AREA DESCRIPTION
The Chequamegon National Forest displays a mosaic of glacial features such as clay, sand and loess plains, outwash, and moraines. In presettlement times, northern hardwood forests could be found on richer soils, whereas jack pine barrens and red and white pine forests were found on poorer soils. Peatland complexes were also common. Around the turn of the century, heavy logging and the fires associated with logging took a heavy toll on the area’s forests. As a result, many mesic sites are currently occupied by sugar maple forests, and the drier sites now support aspen and pine plantations. The forest is home to six federally-listed threatened and endangered species, including Fassett’s loco weed, gray wolf, and American burrowing beetle. The forest also supports some 85 state-listed species. The forest is managed by the U.S. Forest Service for multiple uses and benefits including timber and wildlife management, mining of metal ores, recreation, and wilderness.

ECOSYSTEM STRESSES
Pine barrens (listed as globally imperiled) have become overgrown because of intense pine planting programs in the 1930s and fire suppression programs since that time. Fire suppression has also reduced the natural regeneration of red and white pine, and may have changed peatland ecosystems.

Timber management and logging also affect natural ecosystems, resulting in some of the forest being managed for early successional species such as aspen, paper birch, balsam fir and jack pine. These species are important natural resources for the pulp and paper based regional economy.

Roads, trails, and the development of second homes on privately-owned holdings can result in fragmentation of the forest and increased human presence in more areas of the forest. Species sensitive to human presence, such as the loon, bald eagle, wolf, and bobcat, can be affected.

PROJECT DESCRIPTION
The 1986 Forest Plan for the Chequamegon National Forest included an extensive economic and recreational analysis, but lacked a forest-wide ecological assessment. Old growth identified for 3 to 5% of the forest was not representative of the forest as a whole. In response, the Ecosystem Group within the National Forest initiated a Landscape Analysis and Design Project in 1992. The ultimate goal of this Project is to design a network that includes the full range of ecosystem diversity in the forest, and that protects remnants as well as the best examples of those ecosystems. Reserves will consist of a core and a buffer area. Modified management will be proposed for the areas surrounding the reserves. The network design will be based on a field inventory, and evaluation of natural areas in the forest, combined with a spatial analysis of these areas. The Nature Conservancy (TNC) and the Wisconsin Department of Natural Resources Natural Heritage Section have provided scientific expertise. TNC has also provided financial support.

The resulting reserve network design and several alternatives will be factored into the proposals for the revised Forest Plan, which is expected to be completed.
in 1998 after an extensive public comment period. Reserve management strategies, such as prescribed burns and cessation of timber harvests, will be suggested.

**Present Status & Outlook**
Over the last two and a half years, an ecologist has conducted a field inventory, using multiple tools such as a timber database, high-altitude photos, and an ecological classification system. Maps have been developed for the natural areas in the forest. A geographic information system (GIS) is under development, and will provide the tool for spatial analysis. Currently, approximately 100,000 acres have been identified as high-quality examples of the forest's ecosystems. These areas have been temporarily deferred from timber management or other intensive activity.

**Factors Facilitating Progress**
The endorsement of the project by Jerry Franklin, a well-known and well-respected ecologist, has resulted in much support within the Chequamegon National Forest. In addition, the involvement of TNC has provided the project with scientific credibility to the environmental community. The development of public relations and marketing of the project have proven invaluable in gaining support as well. The project was awarded the U.S. Department of Agriculture Honor Award for Environmental Protection.

**Obstacles to Progress**
Not all Chequamegon National Forest personnel agree on the concept of a reserve system. Value systems are sometimes conflicting.

Funding may become a problem. This project is already functioning on a very low budget, and any further budget cuts may bring the project to a halt.

The revised Forest Plan must consider social and economic, as well as ecological, factors. Therefore, the pure scientific basis of any reserve system may be altered to address non-ecological issues and considerations.

**Contact Information:**
Ms. Linda Parker  
Ecologist  
USDA Forest Service  
Chequamegon National Forest  
1170 4th Avenue  
Park Falls, WI 54552  
(715) 762-5169
CHESAPEAKE BAY PROGRAM

PROJECT AREA DESCRIPTION
Considered the largest and most productive estuary in the United States, the Chesapeake Bay is 195 miles long, has 1,750 of navigable shoreline, and more than 40 significant rivers and countless streams feeding into it. Created when the Susquehanna River valley was flooded following the last ice age, the Bay contains a range of aquatic environments, from freshwater to nearly full-strength saltwater. Today, the Bay supports 300 species of fish, 45 shellfish, and 2,700 plants, in addition to many eastern land animals. Its vast watershed stretches from central New York, through central Pennsylvania, virtually all of Maryland, and Washington, D.C., to eastern West Virginia, the northern two-thirds of Virginia, and western Delaware. Its topography and vegetation range from the mixed hardwood Appalachian Mountains to 1.2 million acres of wetlands and beaches. Numerous federal and state-listed threatened and endangered species are present.

Human uses of the watershed are many, predominantly farming, significant urban and rural development, industry, and recreation, among others. Major cities are Washington, D.C., Baltimore and Annapolis, MD, Richmond, VA, and Harrisburg, PA.

ECOSYSTEM STRESSES
Much of the land surrounding the Bay has been converted to agriculture and urban development. Nutrient runoff into the Bay, from agricultural and urban non-point sources, is the stress of greatest concern. Nutrient over-enrichment inhibits the growth of submerged aquatic vegetation which provides critical habitat in shallow areas. In deeper areas, excess nutrients rob the water of oxygen, killing fish, shellfish, and other aquatic life. Other significant stresses include: pesticide runoff, continuing land conversion for rural settlement and other urban uses, causing habitat destruction, erosion, and associated non-point source pollution; point source pollution from sewage, industries, and shipping traffic; overfishing of the Bay’s resources; and hydrologic alteration due to loss of forest and plant cover, and river and stream impoundments.

PROJECT DESCRIPTION
Three years after Hurricane Agnes devastated the mid-Atlantic states in 1972 and raised consciousness about the fragility and importance of the Bay, Congress directed the U.S. Environmental Protection Agency (EPA) to conduct a five-year, $25-million study of the Chesapeake Bay, its resources, uses, and stresses. Five years later, the Chesapeake Bay Commission (CBC), a tri-state body with representatives from Maryland, Virginia, and Pennsylvania, was formed to coordinate approaches to state legislation regarding the Bay. In 1983, EPA issued its report, identifying 10 areas of environmental concern. Three areas, nutrient enrichment, toxic substances, and declines in submerged aquatic vegetation, were given priority because little research had been devoted to these. Other concerns range from wetland alteration to shellfish closures.

As a result of the report and pressure from citizen environmental groups, the first Chesapeake Bay Agreement was signed between EPA, the three states and Washington, D.C., and the CBC, officially creating the Chesapeake Bay
CHESAPEAKE BAY PROGRAM -- continued

Program. The program’s mission was to develop and implement cooperative plans to improved and protect water quality and living resources in the Bay. An Executive Council was created to endorse policy initiatives and promote implementation efforts.

Over the ensuing nine years, multiple committees were set up to address various tasks and issues facing the Bay, the program, and stakeholders in general. A second Bay Agreement was signed in 1987 and amended in 1992 to reaffirm its goals and set forth specific action plans. Each of six issue areas laid out in the 1987 agreement (living resources, water quality, population growth, public education and participation, public access, and governance) has a four-tiered hierarchy of goals, objectives, commitments, and targets. The states, and to a lesser degree the federal government, are responsible for implementation.

An extensive monitoring program is included in the program, focusing initially on submerged aquatic vegetation as a primary biological measure of progress in restoring the Bay, but now including the status of all living resources as measures in achieving program goals.

PRESENT STATUS & OUTLOOK
The Chesapeake Bay Program is now in its second decade and well into implementation. An administrative structure has developed over the last 12 years, resulting in over 50 committees, subcommittees, advisory committees, work groups, and task forces. Research has been a primary focus of the program's efforts, although on-the-ground restoration has commenced and state legislation has been enacted on several fronts to help protect and restore the Bay. More broadly, there has been widespread acceptance by the public and political entities that the Bay watershed functions as an integrated system.

More recently, the focus of clean-up efforts has shifted to the Bay's tributaries. Maryland, Pennsylvania, and Virginia have developed Tributary Strategies, with Maryland having appointed implementation teams for each of its 10 sub-basins. For example, Maryland and Virginia developed their strategies through a multi-year, “bottom up,” public process, involving a series of meetings to first inform the public and stakeholders about the issues, and then to develop specific strategies.

Factors Facilitating Progress
The voluntary nature of the program has been credited with encouraging participation and commitment at the political and administrative levels, especially from high-level agency decision-makers. A solid administrative structure with wide representation has also aided the process. Funding from state and federal sources has been quite good, and research efforts have been very thorough; early emphasis on monitoring and research have been key. Participation from many sectors -- government to citizens groups -- has been instrumental in moving the program ahead and keeping it true to its intentions.

Obstacles to Progress
Differences in administrative structures between the states has hindered program acceptance and progress. While commendable in their detail, goals and objectives were initially considered hard to quantify, thus making measures of success hard to illustrate. Growing population pressures and development will continue to stress the Bay watershed: for example, certain commercial-sought fish and crustaceans continue to decline. Funding of clean-up efforts, at all levels and sectors, continues to be a concern, as funding is not guaranteed beyond year-to-year appropriations and special grants. Finally, it is unclear how new, more conservative gubernatorial administrations in Pennsylvania and Virginia will affect the program’s future.

Contact information:
Maryland Department of Natural Resources
Annapolis, MD
CHEYENNE BOTTOMS WILDLIFE AREA

PROJECT AREA DESCRIPTION
The Cheyenne Bottoms basin has long been recognized as an area of great diversity, especially of birds, with over 320 species counted in recent years. It is one of the last major wetland systems in Kansas, and is a stopping point for many migratory shorebirds and waterfowl, including all five species of sandpipers. This flat elliptical basin is a palustrine emergent marsh characterized by cattail and bulrush. The surrounding uplands are dominated by marsh saltgrass, western wheatgrass, prairie cordgrass, and spikerush communities. Six federally-listed threatened and endangered species can be found there, all birds: whooping crane, bald eagle, piping plover, snowy plover, peregrine falcon, and least tern. State-listed species include the white-tailed ibis and the eastern spotted skunk. The area is officially listed as one of only 11 Western Hemisphere Shorebird Reserves, and has been designated as a "Wetland of International Importance" under the Treaty on Wetlands of International Importance.

Twenty thousand acres of the basin are owned by the State Department of Wildlife and Parks (DWP), an additional 7,000 acres are owned by The Nature Conservancy (TNC), and the remaining 14,000 acres are in private ownership. The State and TNC lands are managed for wildlife, primarily migratory water birds. Private lands are in agriculture, primarily grazing, alfalfa, wheat, and sorghum.

ECOSYSTEM STRESSES
Lack of water has long been a stress to the Bottoms, especially in the last 50 years with increases in agriculture, and even more so since the 1960s with the advent of center pivot irrigation in western Kansas. Irrigation has lowered water tables in Wet Walnut Creek and Arkansas River drainages to the point of ending base flows (85-90% reduction in flows). Increasing agricultural and municipal water pressures, and existing and proposed flood control structures in the Wet Walnut drainage are future threats.

Fire suppression has resulted from farming and the presence of homes in the Basin which does not allow for extensive upland burning programs to be conducted.

PROJECT DESCRIPTION
In the late 1940s, and following 20 years of efforts by conservationists and the State to create a National Wildlife Refuge, the State purchased the bulk of the 20,000 acres it now owns in Cheyenne Bottoms. During the 1950s, dikes, dams, and an inlet system were built to conserve water and provide more waterfowl hunting opportunities. By the late 1980s, agricultural groundwater pumping was preventing water from entering the Bottoms, by law the State’s right under its status as a "senior" water rights holder. In 1990, the State Division of Water Resource declared an Intensive Groundwater Use Control Area (IGUCA) in Wet Walnut Creek, effectively reducing the amount of water that "junior" water right holders could pump (up to 67%). The purpose was to reduce water removal so that the aquifer would rise, allowing base flows to return. The IGUCA went into effect in January 1992.

At the same time, the State has been
undertaking an 18 million dollar renovation effort since 1989 to improve water management capability in the face of still-declining water availability.

In 1991, TNC purchased major tracts adjacent to the wildlife area. Since then, the State and TNC have coordinated management efforts, although each has developed separate management plans for their lands. DWP’s management plan was developed in the early 1990s with input from two public meetings and using results of work performed by engineering consultants on the renovation effort. An Advisory Panel, consisting of eight citizens, was created in 1994 to make recommendations to the Area manager, who ultimately decides on all land management decisions.

The plan’s goals are to provide migratory and nesting habitat for waterfowl and shorebirds, as well as public recreation opportunities which do not interfere with the habitat goals. Specific on-the-ground strategies include storing water when available, vegetation control using mechanical means or burning, and dike and dam manipulation, among others.

Monitoring of vegetation control results and bird and invertebrate habitat use levels are included in the plan.

**PRESENT STATUS & OUTLOOK**

The IGUCA is still in effect on Wet Walnut Creek and its effect will be evaluated at the end of the five-year review period in 1997. The renovation effort is expected to be completed in 1997. The Advisory Panel is being expanded to nine members and will be filled by representatives of interest groups (agriculture, conservation, recreation). Finally, the State’s Operating and Maintenance budget for Cheyenne Bottoms has increased in response to the installation of several pump stations.

**Factors Facilitating Progress**

Recent public attention and awareness on wetlands, grants from the Wetlands Conservation Council (under the North American Waterfowl Management Plan, a federal program), State commitment through funding (from pesticide and irrigation equipment taxes), and TNC’s land acquisitions have been the most important factors benefiting the project. The cooperative efforts of professionals, from many disciplines as well as public and private agencies, has been another benefit.

**Obstacles to Progress**

Lack of personnel and equipment for vegetation control has hindered this effort’s progress. The shortage of water will be a continuing problem unless base flows are reestablished in the nearby waterways. Conflict between the agricultural community and the State has always been significant, beginning with the initial purchase of land in the 1940s when farmers’ land was condemned. This opposition was solidified with the imposition of the IGUCA, which restricted farmers’ water use.

**Contact information:**

Mr. Karl Grover  
Area Manager  
Kansas Department of Wildlife and Parks  
Cheyenne Bottoms Wildlife Area  
Rt. 3  
Great Bend, KS 67530  
(316) 793-3066
CHICAGO REGION BIODIVERSITY COUNCIL

PROJECT AREA DESCRIPTION
The Chicago metropolitan area encompasses roughly six counties in northeastern Illinois. Although highly developed or industrialized, not all of this region is relegated to urban sprawl. Several hundred natural areas, comprising some 200,000 acres, can be found in the area. Some of the best remnants of tallgrass prairie and oak savanna landscapes east of the Mississippi can be found here. These remnants support a rich diversity of life, including five globally imperiled ecosystems and almost 200 of Illinois’ endangered and threatened species.

ECOSYSTEM STRESSES
Exotic species are threatening to drastically change species composition of the prairie remnants. Fire is a critical ecosystem process in prairies, and is currently lacking in most remnants due to suppression. Another major stress is increasing habitat fragmentation and habitat loss due to increasing development encroaching on natural areas.

PROJECT DESCRIPTION
Starting well before the initiation of this project, The Nature Conservancy (TNC) in the Chicago area developed an extensive volunteer network consisting of some 5,000 volunteers. These volunteers (or “land stewards”) work in preserves owned by a variety of agencies, such as county forest preserve districts and soil and water conservation districts. TNC provides general administration, coordination and training. Many land stewards have moved on to become the land managers for the owners of the preserves.

Once these land managers came together, they realized that management of natural areas could be improved with more communication and coordination between land owning agencies. In order to do this, agency executives needed to be involved. As a result, executives of 30 local agencies and organizations met in September 1994. Examples of participants include TNC, Field Museum, Northeastern Illinois Planning Commission, National Park Service, U.S. Environmental Protection Agency (EPA) Region 5, EPA Great Lakes National Program Office, U.S. Fish and Wildlife Service, and all six forest preserves and conservation districts.

During this meeting, all agencies and organizations that were present formed an informal partnership. An Executive Committee was elected, representing all levels of government and organizations. In addition, five working teams were created, each with its own focus (land management, science, policy/strategy, education/outreach, and marketing). Within each team, team members consider how the team’s particular focus area can add to the understanding and management of the ecosystems. For instance, the Science Team is defining conservation goals, determining which studies need to be done, and how to measure success. Overall, project planning takes place in the Executive Committee and in the working teams. Decisions are made by consensus.

PRESENT STATUS & OUTLOOK
As described earlier, the management plan for the Chicago “Wilderness” is currently under development. Although the partnership has not been formalized yet, this is expected to
happen shortly. Many management efforts are currently carried out by the individual partners and in small groups of partners.

Factors Facilitating Progress
Although this project is still young, it is already clear that the involvement of many committed people is very beneficial to the effort. In addition, an understanding and appreciation by all involved of the critical need for natural areas in an urban and suburban environment has been a major advantage.

Obstacles to Progress
It will be a challenge to maintain the involvement of this many partners, working through a complex matrix of projects.

Contact information:
Ms. Laurel M. Ross
Bioreserve Program Director
The Nature Conservancy
Illinois Field Office
8 S. Michigan Ave., Suite 900
Chicago, IL 60603
(312) 346-8166 ext. 14
Fax: (312) 346-5606
E-mail: lross@mcs.com
**CLINCH VALLEY BIORESERVE**

**Location:**
Southwest Virginia, northeast Tennessee

**Project size:**
1,408,000 acres

**Initiator:**
The Nature Conservancy

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**PROJECT AREA DESCRIPTION**
The project area includes the watersheds of the Clinch and Powell rivers. A mountainous area with many caves at lower elevations, the region falls within the Ridge and Valley, and Cumberland Plateau provinces. Mostly rural, the area is generally forested, predominantly in deciduous oak-hickory forests with some red spruce. There are approximately 25 federally-listed threatened and endangered species present, including freshwater mussels and three types of bats. The Nature Conservancy (TNC) has ranked 136 globally-rare species in the area.

**ECOSYSTEM STRESSES**
Abandoned mines are a major concern due to the seepage of toxic metals such as copper and zinc into the rivers. A second concern is the loss of riparian buffer zones along streams due to farming and livestock activity. Finally, non-point source pollution (especially sewage) from poor management practices threatens water quality in the watersheds.

**PROJECT DESCRIPTION**
The project was initiated in 1984 when TNC acquired their first preserve on the Clinch River. The organization was attracted to the area because Pendleton Island has the highest concentration of mussel diversity in the world. In 1989, TNC opened an office on the Clinch preserve and subsequently purchased five other reserves. In 1990, they initiated cave education programs for landowners, as well as incentive programs for farmers to reimburse them for fencing materials protecting riparian areas.

Also in 1990, TNC began gathering various partners together to hold roundtable discussions in order to begin cooperative management efforts in the watersheds. These partners, now totaling 70, include agencies, universities, landowners, and non-profit organizations. A major milestone came when the U.S. Fish & Wildlife Service opened a Clinch River Office. Other agencies also took action in the area: the U.S. Environmental Protection Agency selected the region as one of their five pilot sites for ecological risk assessments; the U.S. Geologic Survey included this area in their national water quality study; and the Tennessee Valley Authority designated the Clinch River as one of their special river action team projects.

The overall goal of the TNC project is to restore populations of rare species to levels adequate for long-term viability. The strategies designed to meet this goal fall into several categories: protection, research, and community development. Specific actions to achieve the objectives include identification of the sources of stress on populations, restoration of native vegetation along river banks, reclamation of abandoned mine lands near some of the most significant sites, and acquisition of core areas.

**PRESENT STATUS & OUTLOOK**
Since 1995, TNC has engaged in an aggressive effort to foster and encourage sustainable development in the region. Examples of this effort are the use of draft horses for timbering as an alternative to machinery and agricultural diversification into organic crop
production. The results of these projects will be seen in the long term, while results from streambank restoration projects and improvements in water quality have already been seen.

Factors Facilitating Progress
Through the work of research partners, life cycles of the rare species now are better understood so that protection efforts can be better targeted. People in the area have realized that the coal industry is decreasing and are therefore open and supportive of the sustainable development approach.

Obstacles to Progress
It has been difficult to gain acceptance for the concept that ecological results can not be observed in the short term. Coordination among many partners has proven logistically challenging. Ensuring funding for the project has been an obstacle as well, especially since the Chesapeake Bay falls within the same region and is a competitor for limited funding.

Contact information:
Mr. Bill Kittrell
The Nature Conservancy
102 South Court Street
Abingdon, VA 24210
(540) 676-2209
Fax: (540) 676-3819
**COLORADO STATE FOREST ECOSYSTEM PLANNING PROJECT**

**PROJECT AREA DESCRIPTION**

The Colorado State Forest is located in north-central Colorado along the eastern boundary of Jackson County and North Park. The State Forest is surrounded on three sides by public land: Routt National Forest to the North and South, Roosevelt National Forest (including the Rawah and Neota Wilderness areas) to the South and East, and Rocky Mountain National Park to the Southeast. The western boundary abuts private land and Bureau of Land Management (BLM) lands.

At elevations ranging from 8,100 feet to the 12,900-foot high Clark Peak, much of the project area is high mountain valley. Big sage and western wheat grass are two common cover types in the lower-elevation valleys of the Forest. The dominant forest cover is comprised of Engelmann spruce and sub-alpine fir. The second most common type of cover is lodgepole pine. No federally-listed threatened or endangered species are known to exist in the project area. However, the boreal toad, wood frog, wolverine, river otter, and greater sandhill crane are listed by the state of Colorado.

**ECOSYSTEM STRESSES**

Grazing and range management are among the stresses to the ecosystem, possibly contributing to an increase in undesirable forbs and grasses and a decrease in willow. Also, grazing may be responsible for a reduction of willow species. Roads and timber harvesting have fragmented habitat. Suppression of the natural fire regime has led to high density stands of lodgepole pine with large amounts of mistletoe infection. Finally, the ecosystem of the Colorado State Forest is and will continue to be stressed by the number of competing uses on a fixed acreage, including increases in recreational use and proposal for commercial development.

**PROJECT DESCRIPTION**

As the trustee of state trust lands, the Colorado State Board of Land Commissioners (Land Board) initiated the project. The Land Board has been interested in capturing additional revenues from the State Forest and further desired that the various agencies responsible for managing different facets of the Forest coordinate their management efforts. Finally, the Land Board was in need of more and better information on which to base renewal of several leases for grazing and other activities.

A sustainable future for Jackson County is of concern to many local citizens. Preserving local values and lifestyles is a high priority. Because most county residents depend on extractive industries for their economic security, a task force of environmental, industry, and local government representatives has been formed to facilitate public input into the planning process. Besides the open houses that Land Board convened at critical junctures of the project, community residents are free to have input into the process at any time through contact with task force members who represent their interests. The task force uses a consensus approach to decision making. Those issues for which consensus can not be attained are tabled until more information becomes available or the decision making context changes. The process for involving the public in...
agency activities was based in part on the process used by the Elliott State Forest effort in Oregon (see page 121).

A noteworthy component of the project are its proposed monitoring activities. Monitoring will focus predominantly in three areas: ecosystem components, including selected fauna that are indicator species (northern goshawk, boreal owl, boreal frog, and aquatic macroinvertebrates); ecosystem structure, including species composition in upland ranges, riparian areas, wetlands, and forest ecosystems; and ecosystem functions, such as water and air quality and landscape level changes.

Results from the monitoring will then be compared against explicit goal statements developed for ecosystem components, structure, and function. The information collected will be integrated with the existing information infrastructure and put into a GIS database developed by the College of Natural Resources at Colorado State University.

**Present Status and Outlook**
The current phase of planning and data collection is slated to end in mid-1996. By that time, the monitoring system will be in place. Attention will soon turn to a search for financing of ongoing monitoring activities. A draft strategic management plan was due in August 1995. The plan will pass through a public comment period before being finalized.

**Factors Facilitating Progress**
The task force has been instrumental in helping the Colorado State Forest Service navigate social and economic issues in Jackson County. The level of support by state and local land management agencies has been and will continue to be crucial to the project’s success. In addition, the willingness of the State Land Board to experiment with a task force and undertake and provide ongoing support to the project were also identified as factors facilitating progress.

**Obstacles to Progress**
Development pressures on the state forest, such as a recent proposal for a ski area near Cameron Pass stirred much debate, controversy, and stakeholder polarization. Other challenges involve the constitutional mandate for the Land Board to generate revenues from public land. Most of the ecological, social, and economic factors in the state have dramatically changed since the revenue-focused mandate was enacted. Agency and stakeholder “turf” battles have also slowed the project, as certain stakeholders perceive a loss of power over resource decisions in the project area.

**Contact Information:**
Mr. Jeff Jones  
Special Program Coordinator  
Colorado State Forest Service  
203 Forestry Building  
Colorado State University  
Ft. Collins, CO 80523  
(303) 491-7287  
Fax: (303) 491-7736
**CONGAREE RIVER CORRIDOR WATER QUALITY PLANNING ASSESSMENT**

**PROJECT AREA DESCRIPTION**
Located approximately 20 miles southeast of Columbia, South Carolina, the project area is the Congaree Swamp National Monument, the last remaining old-growth bottomland hardwood forest in the southeast U.S. The site is adjacent to the Congaree river, a dendritic and braided free flowing river, and has minimal topographical relief. Bobcat, turkey, alligator, otter, and more than 130 species of birds can be found there, including two federally-listed threatened species, the red-cockaded woodpecker and the American woodstork.

Preservation and recreation (hiking) are the principal uses of the National Monument, which was created in 1976 and is administered by the National Park Service (NPS). It was designated as the South Atlantic Coastal Plain Biosphere Reserve by the United Nations in 1983. Agriculture and timber are the dominant land uses in the surrounding area, along with limited rural housing.

**ECOSYSTEM STRESSES**
Stresses in the National Monument appear to have been minimal, but increasing upstream residential development and associated point and non-point source pollution are growing threats. The most significant current stress is from feral hogs uprooting significant tracts of the forest floor, the cumulative effects of which are unknown.

**PROJECT DESCRIPTION**
Several federal agencies had been conducting or planning to begin studies involving certain water quality aspects of the Congaree River. NPS has been assessing potential contaminant sources to the fragile floodplain since 1993, as part of a cooperative agreement with East Carolina University to prepare a water resources management plan. Other collaborative efforts concerning the Congaree River watershed include the U.S. Geological Survey (USGS) National Water Quality Assessment Program-Santee River Basin Study which began in 1994; and an ecological profile assessment of all major waterways in Congaree Swamp National Monument beginning in 1995 by the National Biological Service-Southern Science Center (NBS).

All of the federal agencies expressed interest in working in a collaborative effort once they became aware of each other’s mutual interests. Current “reinventing government” and other efforts to foster interagency cooperation also played a factor in initiating this effort.

An unofficial interagency panel with representatives from NPS, USGS, NBS, and East Carolina University came together in early 1995 to discuss the effort. In June, they agreed to develop a strategy to complete a comprehensive water quality assessment on the Congaree River watershed and develop strategies to address the overall health and vitality of the Congaree River corridor. The assessment phase is envisioned to last two to three years, with participants contributing different elements of research to provide a relatively complete snapshot of the floodplain’s health. At that point, long-term protective strategies will be developed.
The panel consists of 10-15 federal agency and university representatives. Initially, conference calls and electronic mail were the mode of communication, with informal negotiation and exchange of letters documenting commitments.

**Present Status & Outlook**
The panel met in August 1995 and arrived at mutually-agreeable strategies based on current and contemplated project work. Field work is expected to begin during the Fall.

**Factors Facilitating Progress**
The willingness of agency representatives to look beyond normal agency boundaries and explore the possibilities of running cooperative efforts have been described as benefits to the process. Participating organizations are able to use each other’s research in a much more cooperative manner than had occurred previously. The net result has been eliminating duplicative efforts and leveraging contributions. Participants have been characterized as enthusiastic about working towards a common goal, in spite of heavy work loads in the face of what will be a very large study. Finally, the effort would not have progressed as rapidly nor as far in this initial phase without the use of up-to-date communication technology (conference calling, electronic mail).

**Obstacles to Progress**

Problems have been limited to the administrative realm. Primarily, coordinating schedules between 12 or more participants, from 5 different agencies and offices, in many different locations, has proven challenging, albeit rewarding once accomplished.

**Contact Information:**
Mr. Richard A. Clark  
Resource Management Specialist  
National Park Service  
Congaree Swamp National Monument  
200 Caroline Sims Road  
Hopkins, SC 29061  
(803) 776-4396 ext. 307  
Fax: (803) 783-4241
CORPUS CHRISTI BAY
NATIONAL ESTUARY PROGRAM

PROJECT AREA DESCRIPTION
Centered around Corpus Christi, Texas, the 12-county project area includes three nearly separate estuaries: the Nueces-Corpus Christi, Baffin-Laguna Madre, and Copano-Aransas systems. Most of the terrain is gently sloping coastal plain with a barrier island (Padre/Mustang) that delimits the estuaries and reduces tidal exchange with the Gulf of Mexico. Inland native plant cover is mesquite brush with limited areas of prairie, although much of that has been converted to agriculture.

The bays are generally shallow with sand, silt, and shell bottom. Sea grasses form extensive beds in the shallowest and undisturbed regions of the bays. The area is home to several federally-listed threatened or endangered species, including several turtles (Kemp’s Ridley, loggerhead, green, leatherback, hawksbill), whooping crane, piping plover, and brown pelican. Twelve additional state-listed species are present, including the opossum pipe fish, sheep frog, Texas tortoise, and two dolphins.

Land ownership is mostly private, in large tracts owned by a few individuals or large corporations. One-quarter of the land is in row-crop farming (sorghum and cotton primarily), 50% is cattle grazing rangeland, and oil and gas production overlaps both of these. The remaining 25% is in urban and industrial use, with some wetlands and other undeveloped lands. Federal lands include Padre Island National Seashore and Aransas National Wildlife Refuge; state lands include submerged coastal areas and other scattered parcels.

ECOSYSTEM STRESSES
Although stresses have yet to be fully characterized, agricultural practices, urban development, hydrologic alteration, and non-point source pollution are potential significant stresses to the project area: about half of the native inlands have been converted to agricultural, urban, and industrial uses. Agricultural practices may contribute to nutrient and pesticide loading, and alter some freshwater input to the estuaries and bays. Urban-related stresses likely include dredging and filling of coastal wetlands for residential use, non-point source nutrient and pesticide run-off, oil/grease pollutants, trash dumping, and two public water supply reservoirs. Other, less significant stresses include cattle grazing, commercial and recreational overfishing, industrial point source pollution, exotic species (brown mussel, nutria), and recreation (other than fishing).

PROJECT DESCRIPTION
In April 1992, local concerned citizens with the Coastal Bend Bays Foundation, Gulf Coast Conservation Association, and local academic community, and with the support of the Texas Natural Resource Conservation Commission and the Governor of Texas, initiated the nomination process for Corpus Christi Bay (CCB) to become a National Estuary Program (NEP), a nationwide program authorized by the Clean Water Act and administered by the Environmental Protection Agency (EPA). Following its acceptance by EPA in 1992 and a start-up year beginning in December 1993, the CCBNEP officially
began in September 1994. Five committees were established in Spring 1994 to form a Management Conference.

The goal of the program is to develop a Comprehensive Conservation Management Plan (CCMP) that will be carried out under state and local auspices. As with all other NEPs, the CCBNEP attempts to involve all stakeholders in a consensus-building approach, through their participation on the five committees (Policy, Management, Citizen, Local Government, Scientific/Technical Advisory), whose members are representatives of state agencies, local government, local industry and agriculture, recreational user groups, environmental organizations, commercial fishing, and local academic institutions. A sixth committee, Financial Planning, will be formed in FY96 to aid in the implementation phase.

The CCBNEP’s first priority is to summarize all existing data on the area, with historical data confirming the severity and extent of the identified issues. Management actions will then be developed, reviewed by stakeholders, and subject to extensive public review before being revised and then submitted to EPA for approval in September 1998. A monitoring program will be designed to measure progress in meeting program goals, and will be coordinated with existing monitoring efforts.

During the four-year duration of the program, EPA provides 75% of the funding, with the state providing the remainder. Thereafter, the state is responsible for funding and implementation, anticipated to last 20-40 years.

PRESENT STATUS & OUTLOOK
Because the effort is in an early stage, few outcomes have been reported other than setting up committees and the overall program, increased communication among stakeholders, and a shift to a multi-species management approach.

Work plans have been developed for FY95 and 96, and the first All Conference Workshop was held in February 1995. It served to provide insight to the 200+ Committee participants on the CCBNEP’s habitat and degradation, and to create a common vision statement and operating principles. The program is currently receiving the results of 12 studies on the CCB’s historic and current condition.

It is still unclear whether the necessary level of consensus on major issues has been reached. Attention has been brought some of the environmental issues, but increased public awareness of these issues is considered necessary. No on-the-ground activities have yet occurred.

Factors Facilitating Progress
The willingness of the Management Conference members to attend meetings and volunteer for project development and sub-committees have been the most important factors reported. The CCBNEP’s administrative structure, clarity of its goals, and project leadership have also been cited as positive factors.

Obstacles to Progress
While the Committees and their members have worked well together, there have been jurisdictional concerns between state agencies, as well as concerns about conflicts of interest of committee members and project proposals that have been submitted. Maintaining interest in the Citizen’s Advisory Committee has been difficult, because there are few substantive issues at present for their consideration, even though this committee will become more important later. Finally, it is unclear how a new state administration will affect the project’s continued progress.

Contact information:
Dr. Hudson DeYoe
Corpus Christi Bay National Estuary Program
Texas AMU - Corpus Christi Campus
Campus Box 290
6300 Ocean Blvd.
Corpus Christi, TX 78412
(512) 985-6767 ext. 6301
E-mail: Deyoe@tamu.cc.edu
**Dos Palmas Preserve**

**Project Area Description**
Dos Palmas Preserve is a desert wetland system located within the lower Colorado Desert portion of the Sonoran Desert, near Salton Sea State Park. This desert wetland system consists of the lower portion of a watershed, including the surrounding mountains. It is a relatively flat basin bisected by the San Andreas earthquake fault zone. The fault zone causes water to reach the surface via numerous artesian springs. Palm oases are generally located at the headwaters of these springs, whereas marsh occurs where the waters have spread out into a broad area. Surrounding the marsh is mesquite bosque habitat, which consists of a dense zone of leguminous trees. Two federally- and state-endangered species occur in this area: the desert pupfish and the Yuma clapper rail. Additionally, the California black rail and the flat-tailed horned lizard, both candidate species, can be found at Dos Palmas.

Approximately 50% of the area is owned by the Bureau of Land Management (BLM); the other 50% is privately owned with fewer than 10 residences. Most of the area is undeveloped open space.

**Ecosystem Stresses**
In the recent past, fish farming pulled water from native habitats and has introduced exotic fish into the wetlands, creating competitors and predators for the endangered pupfish. Additionally, non-native salt cedar has invaded and altered vegetative composition and structure in the wetlands. Salt cedar competes with native vegetation for water, resulting in drought stress and subsequent replacement of native plants.

Approximately 15 years ago, BLM went through a planning procedure for all its desert lands in California. In response to the presence of endangered species, BLM designated its lands in the Dos Palmas area as an Area of Critical Environmental Concern (ACEC). In 1982, a site-specific management plan was prepared and partially implemented. After purchasing a 1,200-acre ranch in Dos Palmas in the Fall of 1989, The Nature Conservancy (TNC) signed a Cooperative Management Agreement with BLM. Subsequently, TNC funded a consultant to prepare an ecosystem management plan that could meet BLM standards and gain BLM approval. The plan is currently going through BLM’s internal review process. That plan, which covers the ACEC lands, will be the basis for all actions by either BLM or TNC. Currently, BLM and TNC meet four to six times per year to review progress toward goals and to assign new tasks. Decisions are made by consensus.

The overarching goal of the project is to maintain and enhance wetland habitat for the pupfish and rail species. In order to reach that goal, salt cedar will be controlled or eliminated, wetlands that were altered by previous fish farming will be restored or enhanced, and important wetland habitats will be acquired. Salt cedar removal as well as restoration of previous fish farming areas are attempted with existing as well as experimental methodologies. Pupfish and rails are monitored annually.

**Project Description**

*Dos Palmas Oasis -- continued*
**Present Status & Outlook**

This project has already accomplished several tasks. BLM has acquired an additional 1,500 acres through exchanges with TNC. Additional lands have been purchased with Land and Water Conservation Funds. As a result of cooperative management between the BLM and TNC salt cedar has been eliminated from one wetland area. Also, a pupfish refugium has been created. BLM is taking an increasingly active role in the management of the Dos Palmas Preserve.

Factors Facilitating Progress

TNC’s land acquisition has been helpful to the project’s progress. It has also been beneficial that TNC was willing to pay a consultant to write the ecosystem management plan for the Dos Palmas Preserve in accordance with BLM agency standards. The time commitment of a few individuals and their willingness to take responsibility has also been beneficial to this project. In addition, joint efforts to control salt cedar have facilitated project progress.

Obstacles to Progress

Changes in staff and lack of resources have been problematic. The current atmosphere in Congress does not indicate any future positive changes in BLM staffing or funding. TNC and BLM currently have grant funding for their work on the Dos Palmas site. However, TNC may not be able to continue to allocate resources to this project indefinitely. Professional and agency values, i.e., a single-species focus of federal personnel as opposed to a community ecology or ecosystem focus, is a continuing concern.

Contact Information:

Mr. Cameron Barrows  
Southern California Area Manager  
The Nature Conservancy  
PO Box 188  
Thousand Palms, CA 92276  
(619) 343-1234  
Fax: (619) 343-0393
PROJECT AREA DESCRIPTION
The drainage area of the Wind River ecosystem covers 350,000 acres of grasslands, mountains, and badlands. The 54,000-acre East Fork site is defined largely by two former ranches purchased by the Wyoming Game and Fish Department (WGFD) within the last 20 years. The East Fork Management Area extends from Horse Creek drainage north to the Continental Divide and south to Crow Creek on the Wind River Indian Reservation. Elevation ranges from 6,200 feet to over 12,000 feet on the Divide’s peaks.

In lower elevations, western wheat, prairie june grass, Idaho fescue, and green needle grass mix with limber pine. The vegetative cover in higher elevations includes blue grasses, aspen stands, and some firs and spruces. The grizzly bear and the peregrine falcon are the only federally-listed threatened and endangered species known to reside in the area. The presence of wolverine and lynx cannot be ruled out in the less accessible areas.

ECOSYSTEM STRESSES
Hunting, hiking, camping, and motorized recreation all take place on WGFD’s property and nearby Forest Service and Bureau of Land Management (BLM) lands. Yet strictly enforced regulations and permitting procedures prevent major stress on the ecosystem. Grazing and timber harvesting are not permitted on Department lands and the site is closed to all human presence every year from December 1 until May 1. On some parts of the former ranches, overgrazing has resulted in periodic flash floods.

The most significant stresses are due to activities outside the Department lands. Timber harvesting in Shoshone National Forest to the North could disturb migrating elk. Regionally, land conversion to residential development may alter elk migration corridors in the North and West.

PROJECT DESCRIPTION
WGFD began managing for elk in the 1940s after the herd’s winter foraging began damaging private lands. WGFD erected elk fences while simultaneously purchasing land in the area. Large-scale acquisition began with the purchase of the 17,000 acre Inberg-Roy property in the mid-1970s.

The project’s primary goal is to perpetuate the region’s wildlife by preserving sufficient habitat. In the mid-1980s, the WGFD began to stress ecosystem-based approaches to land management. Preservation of water resource quality and restoration of riparian areas damaged by grazing are also goals. In 1991, the Spence-Moriarty property (27,000 acres adjacent to the Inberg-Roy) was purchased. Now owning enough winter habitat, the WGFD removed the 13 miles of elk fence. The Game and Fish Department sets herd-unit objectives based on carrying-capacity and hunter demand.

Concurrently, a technical committee consisting of WGFD representatives, U.S. Forest Service and BLM officials, industry groups, conservation organizations (Rocky Mountain Elk Foundation, Trout Unlimited, Sierra Club) and local officials is drafting a management plan for the entire 350,000-acre Wind River ecosystem.
PRESENT STATUS & OUTLOOK
For the past three years, range data has been collected on the new property. A road plan has been developed. A meadow plan is almost finished. With the absence of grazing, willows and cottonwoods are returning to riparian areas. WGFD also provided input on mineral exploration activities on adjacent federal properties that could impact the project site.

Factors Facilitating Progress
Progress on the project is attributed to stakeholder support. The stakeholders’ participation, professionalism, and mutual respect make it difficult for splinter groups to derail planning and management activities. State and federal agencies, such as the Forest Service, and the BLM also support the East Fork project. Their support, as well as that of local politicians and county commissioners is necessary for continued progress.

Obstacles to Progress
Federal and state bureaucracies were identified as the primary factor slowing progress. Paperwork stemming from compliance with NEPA, other environmental regulations, and environmental impact studies drains WGFD resources away from project activities.

Contact information:
Mr. Chuck Clarke
Habitat Management Coordinator
Wyoming Game and Fish Department
260 Buena Vista
Lander, WY 82520
(307) 332-2688
**Location:**
Northern Michigan

**Project size:**
3,880,000 acres

**Initiator:**
Michigan Department of Natural Resources

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**PROJECT AREA DESCRIPTION**

The project area included in this effort encompasses several distinct ecosystems in the eastern one-third of Michigan’s Upper Peninsula (UP), from the west boundary of the Hiawatha National Forest (NF) eastward, including Drummond Island. The land is mostly flat, with some areas of rolling sand hills, although the elevation change never exceeds 300 feet. The region is a mix of glaciated landforms over limestone bedrock, including outwash plains, moraines, and old lake basins, as well as bedrock outcrops, dunes, and various wetlands. The area is characterized primarily by various mixes of northern hardwood and coniferous forests, mixed with marsh, bog, open plains, and agricultural lands. The climate of the entire region is highly influenced by the Great Lakes. Federally-listed threatened and endangered species are numerous, including the piping plover, bald eagle, common tern, osprey, gray wolf, and pitcher’s thistle. State-listed species include the Lake Huron tansy, dwarf lake iris, pine marten, and wood turtle.

Other than timber harvesting, this is one of the most undeveloped regions of the eastern U.S. Current uses of the project area include timber management, recreation (camping, hiking, hunting, other), wilderness, and scattered rural development. Approximately two-thirds of the land base is owned or managed by participants in this Ecosystem Management Consortium, with 50% of the region in public ownership, including the Hiawatha NF and Lake Superior State Forest (each at 1 million acres), Tahquamenon Falls State Park, Seney National Wildlife Refuge, and Pictured Rocks National Lakeshore. The remainder is privately held, including large industrial forests.

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**ECOSYSTEM STRESSES**

Timber harvesting is the most significant stress to the project area, as most of the area is forested. Timber practices have been present on a large scale for over 100 years, and virtually none of the present forest has been left uncut from earlier times. Fire suppression has been a common practice, which has led to changes in plant communities, and results in a build-up of fuel (leading to fires more damaging than normal). Other stresses, though less significant, include: exotic species such as purple loosestrife; alteration of hydrology due to development of wetlands and coastal areas, and roads; recreation and tourism pressures; and road construction.

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**PROJECT DESCRIPTION**

The project began in July 1992 to address questions that kept arising about issues that cross ownership boundaries (biodiversity, recreation, wildlife management). Initiated by the Forest Management Division in the Michigan Department of Natural Resources (DNR), the Consortium was designed to facilitate communication among the various stakeholders in the region, including federal agencies (Forest Service (USFS), Fish & Wildlife Service, National Park Service), three industrial timber landowners (Mead Corporation, Champion International Corporation, Shelter Bay Forests), and The Nature Conservancy, and the Michigan DNR.
**Eastern Upper Peninsula Ecosystem Management Consortium -- continued**

Regular Consortium meetings are held every 6-8 weeks during which progress towards goals and specific tasks is reviewed, information exchanged between members, and future direction and projects are set. As special projects arise, various subgroups are set up to address those tasks.

The effort’s mission statement is “To facilitate complementary management of public and private lands for all appropriate land uses through large-sale, landscape-ecological approach to maintaining and enhancing sustainable representative ecosystems in the Eastern Upper Peninsula.” No specific management plan is being developed, nor is the Consortium considered a planning committee. Rather, specific activities which serve to further the effort’s mission are undertaken on a continual basis. The general direction of the effort is to promote the continued gathering and exchange of information, particularly Geographic Information System (GIS) information, to allow stakeholders to make more informed decisions.

**Present Status & Outlook**

To date, the Consortium’s activities have focused on classifying the land base into ecosystems and gathering information to describe these lands, their current uses, and the natural processes occurring there. For example, a map of ecosystem units compatible with USFS hierarchical ecological classification was developed in 1994.

More broadly, the development of trust among the diverse landowners has been cited as a specific outcome. Increased communication and cooperation among stakeholders have been described as positive outcomes, along with reduction of conflict among stakeholders. Restoration of degraded areas has begun, previously identified stresses are being reduced, and management is shifting away from single species or resources to management of the ecosystem or ecological landscapes.

**Factors Facilitating Progress**

A need to work together, the development of trust among stakeholders, having a common set of goals, the informal nature of the coalition, and the exchange of useful information have been described as factors that have benefited the process. Support by stakeholders, including federal and state agencies, corporations, and other stakeholders has been especially beneficial.

**Obstacles to Progress**

Because the Consortium is unofficial, with no dedicated staff or funding, lack of time, personnel, and resources have been cited as barriers to the effort’s progress. Additional studies of the area’s resources would help the Consortium and its members make more informed land management decisions. Finally, incomplete agreement or understanding of new scientific concepts -- biodiversity, ecosystem management -- by Consortium members and the scientific community at large has caused difficulties in interpretation and decision-making.

**Contact Information:**

Mr. Les Homan  
District Forest Planner  
Michigan Department of Natural Resources  
PO Box 77  
Newberry, MI 49868  
(906) 293-5131  
Fax: (906) 293-8728
ECOSYSTEM CHARTER FOR THE GREAT LAKES-ST. LAWRENCE BASIN

PROJECT AREA DESCRIPTION
The Great Lakes ecosystem includes the drainages of five major lakes -- Superior, Michigan, Huron, Erie, and Ontario -- whose waters eventually flow into the St. Lawrence River to the East. The lakes cover a surface area of about 94,000 square miles, with the entire watershed having very diverse climate, soils, topography, and vegetation as a result of its size and location. Northern areas, once covered by vast coniferous forests, have a colder climate and relatively thin, acidic soils underlain by granite. Southern areas have been glaciated, are warmer, and were once characterized by deciduous forests, prairies, and swamps.

The lakes themselves affect the region’s climate, first by acting as a giant heat sink which results in milder climate of surrounding land compared to other areas of the same latitude. Second, the Lakes act as a giant humidifier, increasing the moisture content of the air and precipitation throughout the area, especially to the South and East.

Although part of the same ecosystem, each of the lakes has distinct features. For example, each lake drains different lands with their different characteristics, water resides in each lake for varying amounts of time (on average, 2.6 years for Erie, 191 years for Superior), and each lake is of different size, depth, and elevation, with different characteristics as a result.

The surrounding land is characterized by extensive agricultural and urban development, with a mixture of public and private lands on both sides of the border. Several dozen threatened and endangered plants and animals are found in the system, including species found across the U.S. and others endemic to the region.

ECOSYSTEM STRESSES
Clearing of the Great Lakes forests during settlement in the 1700s and 1800s, for timber and agriculture, was the first, large-scale stress to the system. Large-scale logging eliminated habitat, eroded stream banks, and disrupted stream bottoms, all resulting in erosion and smothering of spawning grounds. Conversion to agriculture resulted in loss of wetlands, plowing of native prairies, and the burning of other forests. Wetlands are still being lost to agricultural, industrial, and residential development.

The connection of waterways through many canals, starting in 1825, has not only disrupted the hydrology, but led to increased shipping and the introduction of extremely harmful exotic species, including the alewife, sea lamprey, Eurasian river ruffe, and zebra mussel.

Increased industrialization, farming, shipping, urbanization, sewage, and various forms of point and non-point source pollution led to tremendous water quality problems, peaking in the 1960s and 1970s. Commercial fishing declined precipitously due to this pollution as well as overfishing and exotics. Other severe effects were felt by wildlife, such as bird egg-shell thinning due to DDT and other pesticides.

PROJECT DESCRIPTION
When the Ecosystem Charter effort was initiated by the Great Lakes Commis -

ECOSYSTEM CHARTER FOR THE GREAT LAKES/ST. LAWRENCE BASIN -- continued
tion in 1992, the ecosystem management concept had already been adopted by many government and citizen-based institutions, regional agreements, and policies in the Great Lakes Basin. The Commission began the effort in response to the need for a single, clearly-defined document defining goals for ecosystem management in the Basin, to move beyond the largely conceptual level into implementation, and to prevent the multitude of efforts from being compromised.

A 35-member Ecosystem Advisory Committee was established in late 1992, with representatives from several different state and federal natural resource agencies, non-profit organizations, universities, industries, and regional commissions. The Committee developed the Ecosystem Charter, drawing on more than 60 existing treaties, laws, policies, and agreements from the region and beyond. It was then refined through two public comment periods, state roundtables, workshops, and presentations. A 12-member Advisory Committee, mainly from academia and policy institutes, provided guidance on the project.

The Ecosystem Charter has three priorities: 1) promoting and assessing efforts to implement ecosystem management in the Basin; 2) communicating an ecosystem management vision for the Basin; and 3) advocating the interests of the Basin ecosystem and its inhabitants. As a voluntary, non-binding document, the Charter is intended to guide the activities of each organization that signs on to it. The Charter itself contains a 12-point Vision statement, followed by 17 Principles organized under several subcategories.

**PRESENT STATUS & OUTLOOK**

The Charter was finalized in late 1994, with more than 140 signatories from nearly all Basin states endorsing it as of July 1995. The Great Lakes Commission planned to profile implementation efforts in Fall 1995 by surveying signatories on how they are using the Ecosystem Charter. Other than having a large number of participants from a wide spectrum of interests and with varying priorities and mandates, it is too early for on-the-ground or other process outcomes to have been observed yet.

**Factors Facilitating Progress**

Broad outreach by the Great Lakes Commission to organizations and agencies in the Basin from the outset of this effort has been described as instrumental to the effort’s progress, especially in drafting and revising the Ecosystem Charter. The document appears to have been readily accepted by signatories because it was based on existing laws, agreements and policies. Gaining community “ownership” has been both a deliberate strategy and result of the effort. Finally, institutional cooperation has been significant and beneficial.

**Obstacles to Progress**

Obtaining the endorsement of groups at both ends of the environmental spectrum (for example, selected environmental organizations on one end, certain industries on the other) has proven challenging. Because the Ecosystem Charter and the Basin itself are so broad-based, the Ecosystem Charter’s goals are not easily measurable. Thus, demonstrating certain kinds of progress as a direct result of this effort will be difficult. In general, the Ecosystem Charter does not directly resolve stresses to the Basin, partly because of its voluntary nature, and again because of its very large scale.

**Other Efforts in the Region**

A number of other ecosystem-based efforts have been initiated in the Great Lakes region, including the Joint Strategic Plan for Great Lakes Fisheries (by the Great Lakes Fishery Commission); Great Lakes Charter (focusing on water quality and quantity—distinct from this effort); Great Lakes Ecoregion Team (U.S. Fish & Wildlife Service); International Joint Commission; Lake Superior Basin Biosphere Reserve Feasibility Study (National Park Service); and various projects by non-profit organizations. These efforts focus on specific resources (e.g., fish, water quality) or land ownerships. The effort featured here incorporates language or concepts from many of these efforts, and was designed to bridge the gap between them.

**Contact information:**

Ms. Victoria Pebbles
Great Lakes Commission
Argus Building, 400 Fourth Ann Arbor, MI 48103-4816
(313) 665-9135
Fax: (313) 665-4370
E-mail: pebbles@glc.org
**Elliott State Forest Management Plan**

**Project Area Description**

The Elliott State Forest covers an area in southwest Oregon from the slopes of the Coast Range to within 10 miles of the Pacific Coast. The Forest is currently dominated by Douglas-fir, western hemlock, and western redcedar. Riparian areas add to the overall vegetative diversity by supporting bigleaf maple and red alder. Willow, Oregon myrtle, and Pacific yew are present but occur with less frequency. The northern spotted owl, marbled murrelet, and peregrine falcon are among the Forest’s endangered or threatened species. Hardwood forests, cliffs, talus, wet and dry meadows, wooded swamps and bogs are all important to the forest’s overall diversity. Of the 162 non-game species of fauna, 140 are found in riparian zone habitats.

**Ecosystem Stresses**

Because 85% of the Forest was managed in the past for timber, timber harvesting, road-building, and fire suppression represent the major human-induced disturbances. From 1978-1993, stands 80 years or older have decreased by 34% because of harvesting, significantly reducing habitat for the northern spotted owl. Periodic flooding of riparian forests, wind-generated blow-downs, insect and disease outbreaks, and especially fire are among the natural stresses that have played a major role in defining the Forest’s biodiversity.

The Douglas-fir stands’ early stage of succession is due to the effects of wildfires and timber harvesting that have occurred in the Forest. The varying conditions of the forest’s 38 miles of rivers and streams are the result of natural erosion, road-building, stream cleaning, and harvesting activities.

**Project Description**

The listing of the northern spotted owl was the impetus for the Oregon State Land Board to direct the state Department of Forestry to use ecosystem-based approaches on the land the Department manages. In 1992, the Department of Forestry linked up with other state agencies, universities, and federal agencies, including the U.S. Fish and Wildlife Service, to agree on management practices that were within NEPA guidelines. The resulting plan for the Elliott State Forest is a sharp departure from the previous, timber-focused management plans. The “integrated forest management plan” considers all the forest’s resources and examines its resources and health in conjunction with the forests managed by neighboring federal and private landowners. The plan is currently in draft form; a final plan was expected in March 1995.

**Present Status & Outlook**

The plan has already allowed the Department of Forestry to achieve certain goals: compliance with all legal requirements of the Endangered Species Act, the formation of partnerships with other natural resource agencies, and movement towards approaches that protect biodiversity through ecosystem-based initiatives.

Because the Department has a better understanding of the Forest’s endangered species and their locations, timber harvesting no longer occurs in their habitats. Harvest levels have fallen from 50 million board feet in 1990 to a single salvage sale in 1993. Although
the final plan will allow for some timber harvesting, timber industry and trade groups remain the least satisfied stakeholders.

Factors Facilitating Progress
Rather than developing a plan and then asking for public input, stakeholders were proactively included throughout the development process. Honesty about the impacts of the new management approaches and articulating the constraints under which the Department of Forestry manages state lands have helped stakeholders accept the change in management practices.

Obstacles to Progress
Previously, the Department of Forestry managed the forest in isolation; it was challenging to establish working relationships with several other agencies. Also, Department staff had little experience with ecosystem-based approaches and developing a management plan with heavy public participation. Furthermore, the planning process does not occur on a "stable platform:" the political and legal environments continuously shift; scientific knowledge is incomplete and new understanding of the ecosystem constantly emerges.

Contact information:
Oregon Department of Forestry
Salem, OR
**Escanaba River State Forest**

**Project Area Description**
The Escanaba River State Forest (ERSF) includes a variety of landscapes. Limestone, as well as granitic and sandstone bedrock can be found. Glacial features such as outwash plains, drumlins, kames, and moraines occur also. The dominant forest type is aspen. Also significant are stands of northern hardwoods and swamp conifers. Fourteen percent of the ERSF supports brush, grass, bogs, marshes, sand dunes, and water.

A total of 286 species of birds, mammals, and reptiles live in the ERSF. These include federally-listed threatened and endangered species such as the bald eagle and the gray wolf. The common loon, osprey, fisher, beaver, black bear, and bobcat are examples of non-listed species that occur in the area.

The ERSF is used primarily for the production of forest products and for recreational activities, such as hunting, cross-country skiing, snowmobiling, and sight-seeing. Mining of iron ore and iron oxide pigments takes place as well. A few relatively small areas (ranging from 40 to 1,500 acres) have been set aside as natural areas in which human activity is minimal.

**Ecosystem Stresses**
The suppression of fire in some forest types may impede the regeneration of some tree and herbaceous species. The large population of white-tailed deer in some areas is also problematic. Deer browsing may lower successful tree regeneration after timber sales. The deer overpopulation is due to active timber markets which have created excellent deer habitat, a long string of relatively mild winters, and public demand for good viewing and hunting. All-terrain vehicles pose another threat. They may disrupt recreational experiences of others, create new roads, and degrade existing forest roads and trails. Roads can pose a problem, since they allow more hunters and other recreationists to enter deeper into the forest, which may disrupt solitude. Roads may also be responsible for erosion and subsequent siltation of streams.

**Project Description**
The Escanaba River State Forest Comprehensive Resource Management Plan was developed in response to the 1983 Statewide Forest Resources Plan. The former was initiated by the formation of a Forest Interdisciplinary Team (FIDT) within the Michigan Department of Natural Resources. The FIDT represents the Divisions of Forest Management, Wildlife, and Fisheries, and other Divisions to a lesser extent. It is charged with the development and implementation of the Plan. The Plan’s goal is to identify management opportunities and to provide for that combination of products, services and amenities that will be of greatest public benefit.

The planning process encompassed the identification of management issues, data collection and analysis, and the proposal of management strategies. Although some of the proposed strategies apply to the entire ERSF, many strategies have been specifically written for Ecological Management Units. The boundaries of these units are based on natural landscape patterns, integrating climate, landform, soil and vegetation. Management objectives vary, but include the designation of at least 5% of
the Forest as old growth, the identification and refining of ecosystem management techniques, and the production of a regulated forest age structure. Management strategies include the sale of timber on 6,500 acres annually, the development and application of a Geographical Information System (GIS), use of Best Management Practices for erosion control, and a prescribed burn program. Monitoring focuses on timber harvests and wildlife populations. The entire plan will be reviewed once every 10 years.

**Present Status & Outlook**

The Plan has required resource managers to think about biodiversity, multiple species management, old growth, ecological management units, and many other ecosystem management concepts which previously would not have been considered.

After implementation started in 1990, annual timber sales on 6,500 acres have taken place. A timber sale monitoring program tracks compliance with the Plan’s goals. In addition, 29,000 acres of the Forest have been set aside as potential old growth to date, with more to follow. GIS equipment has been acquired. Unfortunately, funding and personnel may not be adequate to address many of the ambitious recommendations stated in the Plan.

**Factors Facilitating Progress**

Having a full-time planner assigned to the project has been very helpful. In addition, public interest has been a plus. Monitoring of the timber harvest using a database has also been advantageous to the project.

**Obstacles to Progress**

The lack of commitment from the Michigan Department of Natural Resources was apparent in the lack of funding, as well as the lack of interest and leadership at the state level. In addition, long-standing historical emphasis on timber production and harvest has limited the focus of many land managers. As a result, some disciplines were not interested in the Plan. Some key individuals were not flexible and represented special interests.

In response to local opposition to prescribed burns, a bill was introduced in the State House restricting prescribed burns to areas at least 1040 feet away from private lands. This bill may interfere with the prescribed burning program.

Outbreaks of jack pine budworm and two-lined chestnut borer affecting oaks have hampered timber management of these species. Timber management of hemlock and cedar has been hindered by internal disagreement on appropriate management techniques for these species.

**Contact Information:**

*Michigan Department of Natural Resources*
*Gladstone, MI*
Fish Creek Watershed Project

**Location:**
Northeastern Indiana, northwestern Ohio

**Project size:**
70,400 acres

**Initiators:**
Indiana Department of Natural Resources, Ohio Department of Natural Resources, U.S. Fish & Wildlife Service, The Nature Conservancy

**Project Area Description**
Fish Creek is a 30-mile-long pristine creek in the St. Joseph River basin in northeastern Indiana and northwestern Ohio. This aquatic ecosystem hosts 43 different species of fish and 31 species of mussels, three of which are federally-listed as endangered: the white cat’s paw pearly mussel, the club shell mussel, and the northern riffle shell mussel. In addition, the purple lilliput mussel, the rayed bean mussel, the eastern sand darter, and the copper belly watersnake have been proposed for federal listing. Approximately 75 state-listed species are present in the watershed, including mussels, fish, amphibians, reptiles, birds, and plants. In pre-settlement times, the watershed was covered by beech-maple and oak-hickory forests. Currently, only 15% of these forests are left. The remaining area is used primarily for row crop agriculture.

**Ecosystem Stresses**
Agriculture has posed a large stress on the ecosystem. Disc plowing, together with an alteration of the hydrology of the watershed, has led to increased amounts of run-off and subsequent siltation of the Creek. Associated with the sediments are nutrients and pesticides.

**Project Description**
In 1988, a study focusing on fresh water mussels in the St. Joseph River basin showed that Fish Creek contained the last remnant populations of fresh water mussels that once occurred throughout the entire basin. Within the basin, only Fish Creek had a high enough water quality to support these populations. After this study, the Indiana and Ohio Departments of Natural Resources, the U.S. Fish and Wildlife Service, and The Nature Conservancy (TNC) formed the Fish Creek Partnership. The goal of the Partnership is to secure the habitat of populations of fresh water mussels in Fish Creek by maintaining or improving water quality. The Partnership hopes that Fish Creek populations may serve to repopulate the entire St. Joseph River basin.

Once the Partnership was formed, a local presence was needed in the watershed to facilitate contact with local land owners. This happened in 1992 when TNC received a Section 319 grant from the U.S. Environmental Protection Agency to hire a project manager and open a project office. The Partnership has since expanded to include additional Ohio and Indiana state agencies, federal agencies such as the Natural Resources Conservation Service and the Agricultural Stabilization and Conservation Service, county surveyors, local Soil and Water Conservation Districts (DeKalb, Steuben, and Williams Counties), the Maumee River Basin Commission, and Purdue University.

In order to control soil erosion in upland areas, the Partnership promotes conservation tillage practices through one-on-one contacts with farmers, and through assistance in the purchase of the first pieces of conservation tillage equipment. Conservation tillage can reduce soil erosion up to 90%. The Partnership also works with the Natural Resources Conservation Service and the local Soil and Water Conservation Districts to implement Best Management Practices to control soil erosion. In the riparian corridor, the
**FISH CREEK WATERSHED PROJECT -- continued**

Partnership works with the land owners to identify gaps in the corridor forest. After these have been identified, the areas are reforested. In 1993 and 1994, 180 acres were reforested out of the 350-acre target area.

In addition to the formal Partnership, an advisory group has been formed, consisting of local land owners and a few project Partners. This group meets two to three times a year to discuss the progress of the project, and to obtain local input on how better to address soil erosion.

**PRESENT STATUS & OUTLOOK**

It is still too early to determine if any of the goals of the project have been realized. However, progress is being measured through monitoring of soils (erosion), land use changes, and aquatic health. Monitoring results are also used to adjust current management strategies.

**Factors Facilitating Progress**

So far, the project has been successful, according to project leaders. Factors that have facilitated this success include the presence of a project manager on site, the involvement of and communication with land owners, and a non-confrontational approach.

**Obstacles to Progress**

Somewhat problematic is the low amount of scientific knowledge concerning fresh water mussels that is currently available. For instance, tolerance levels to sedimentation are unknown, and therefore it is difficult to determine what an acceptable level of sedimentation would be.

**Contact information:**

Mr. Larry Clemens  
Project Manager  
The Nature Conservancy  
Fish Creek Watershed Project  
Office  
Peachtree Plaza, Suite B2  
1220 North 200 West  
Angola, IN  46703  
(219) 665-9141  
Fax: (219) 665-9141
**Florida Bay**

**Project Area Description**
Located between the southern mainland and the Florida Keys, Florida Bay is functionally the southern part of the Everglades ecosystem. The Bay depends on water flowing out from the Everglades for its ecological integrity. Therefore, while the Bay is a large, shallow estuary, its description by necessity includes two watersheds to the North: Taylor Slough, now the only source of water for the Bay, and the “C111” canal, notable in that it drains water away from Florida Bay. Turtle sea grass is the dominant vegetation in the Bay, with sawgrass, tree islands, and mangrove trees dominating the coastal and remnant wetlands of the Everglades region. The Everglades and Florida Bay are home to several dozen federally-listed threatened and endangered species, including the American crocodile, Florida panther, manatee, and several sea turtles.

Eighty-five percent of Florida Bay is included in Everglades National Park. Recreational fishing occurs within park boundaries, with commercial fishing in the remaining 15% only. Most of the non-protected mainland is in row-crop agriculture and urban uses.

**Ecosystem Stresses**
While Florida Bay itself has not been directly modified, most of the land upriver from the Bay has been highly modified. Because of land conversion to agricultural and urban uses, the most significant stress to both the former wetlands and the Bay is hydrologic disruption, due to a vast drainage and flood control effort known as the Central & South Florida Project.

The Bay suffers primarily from hydroperiod disruption (i.e., it does not receive the proper amounts of water at the right times). Also affecting hydroperiod has been the construction of roads on the mainland, such as the east-west Tamiami Trail (now an interstate highway) and U.S. Route 1. As a result of inadequate water flow into the Bay, over 100,000 acres of the Bay have been lost to hypersaline conditions, which has resulted in an algae ooze covering the area and smothering the sea grass. Aquatic life -- diversity and quantity -- has declined precipitously, even causing a collapse of commercial shrimp fishing as far away as the Dry Tortugas Islands, 100 miles to the West.

**Project Description**
In 1993, the Florida state legislature consolidated two state natural resource agencies into the Department of Environmental Protection (DEP). The legislation carried a mandate for the DEP to "manage and protect systems in their entirety." As a result, DEP created six water basin management areas in February 1994. Florida Bay was selected as one of the management areas because it is a high visibility region, with its decline very apparent to researchers and the public.

A conceptual management plan was written in a relatively short time, completed in March 1994. Developed entirely by DEP personnel, the plan identified three goals: 1) coordinate and integrate research on Florida Bay; 2) improve intergovernmental coordination; and 3) develop a land acquisition program in order to restore hydroperiod and water quality. Involvement from...
other stakeholders during plan development was limited, although the list of affected parties is long, including many federal agencies (Departments of Interior and Commerce, Corps of Engineers, Environmental Protection Agency), various user groups (e.g., fishers), environmental organizations, and several private landowners.

**Present Status & Outlook**

It is unclear what the future of this effort will be, as the document does not include implementation strategies, and most of the project area is under federal jurisdiction. The overall program’s future depends in large part on the state legislature. The original 1993 mandate was very broad and lacked a specific directive on how to achieve ecosystem management. Further definition from the legislature or governor will be necessary.

**Factors Facilitating Progress**

A committed DEP staff is credited with making this effort move forward despite significant obstacles. Despite lack of direction and the project’s limited potential, a program was developed from the ground up with few resources and significant time limitations.

**Obstacles to Progress**

Florida DEP has no regulatory authority over most of this ecosystem due to federal jurisdiction; for example, the National Park Service (NPS) is likely to be receptive to DEP recommendations only in as much as they agree with the NPS’s own ecosystem management effort in the region. Although DEP’s Florida Bay effort is designed to address interagency communication and public concerns, and appears to have had some success in this regard, the plan is not expected to resolve these problems, especially between scientists and decision-makers for example, who have widely divergent opinions about land management in south Florida.

The success of any restoration efforts in Florida Bay depends on the success of similar efforts in the upstream Everglades. Some parties believe that it may be impossible to fully restore the ecosystem, that perhaps only remaining functions and remnants of the ecosystem can be preserved; and preserving remnant habitat may itself be impossible without adequate restoration of modified habitat. They argue that the region has been irreversibly altered and that growing population demands will place pressures on the ecosystem that are incompatible with its survival.

Finally, DEP’s effort will require additional resources -- funding, personnel -- to succeed in achieving its goals.

**Contact information:**

Florida Department of Environmental Protection
Tallahassee, FL
**GEORGIA MOUNTAIN ECOSYSTEM MANAGEMENT PROJECT**

**PROJECT AREA DESCRIPTION**
The project area, located in Marshall County and owned by the Tennessee Valley Authority (TVA), is located within the Southern Cumberland Plateau physiographic region. Typical of the region, plateau and upper slope soils are derived from Pennsylvanian age sandstone. The topography is hilly, and the project area is mostly forested. While the forest has been harvested at least once, the general appearance suggests mature or late successional conditions. Forests range from hardwoods on upper elevation slopes to mixed pine/hardwood on plateau soils, and occasional bottomland hardwoods in valleys and along streams. The project area is the only publicly-owned land in the area, much of it bordering artificial lakes.

Human use of the greater ecosystem was once primarily agriculture, but is now mostly in rural settlement, with subsistence farms and commuter ‘ranchettes’ predominating. A few caves are also present in the area, some inhabited by federal candidate endangered species.

**ECOSYSTEM STRESSES**
The ecosystem landscape has been largely converted to agriculture and subsequently rural settlements, or consists of heavily-modified forests. While the area has undergone significant hydrologic development as well (dams and reservoirs), the major stresses to the project area have been poor forest management and agricultural practices on private uplands, causing non-point source impacts on streams and floodplain communities, including wetlands. Also, road shoulders and drainage ditches have not been maintained or managed correctly, and livestock have unrestricted access to plateau streams. On TVA lands, the greatest impacts have resulted from ORV abuses, poorly constructed or maintained forest roads, and fires, the latter resulting mostly from informal campsites. Exotic species, primarily Japanese honeysuckle and Eurasian privet, are rampant in disturbed areas.

**PROJECT DESCRIPTION**
This effort, initiated in April 1994, is a localized but highly-focused result of the efforts of a single TVA employee. The effort came about primarily because of public pressure and concern about how the land was being managed by TVA: a few well-organized individuals circulated petitions widely and applied other pressure that resulted in TVA changing its practices on this tract of land.

The effort is acknowledged not to be a true ecosystem plan, since the entire ecosystem is in multiple ownership and may never be managed as a whole. Rather, it is characterized as an ecosystem-based approach to managing natural resources. Much of the defining characteristics of the plan -- ecosystem boundaries, goals -- have been defined by TVA and modified with public involvement. The ecosystem boundaries have socio-economic limits, with part of the system cut off by a major highway.

Formal participation has been limited to public involvement, with open public meetings and commenting and informal presentations and meetings with local citizens and sportsmen’s groups. While an official plan has not yet been produced, the effort’s goals are currently being defined as: 1) planning for
Ecosystem Management in the United States: An Assessment of Current Experience

GEORGIA MOUNTAIN ECOSYSTEM MANAGEMENT PROJECT -- continued

management of natural resources in the context of the landscape; 2) maintaining and enhancing biodiversity at different scales (species, community, landscape); 3) involving the public in plan design and implementation; 4) protecting rare or unique species and populations, water quality, and public recreation among others; and 5) developing a methodology for ecosystem management for other TVA lands.

PRESENT STATUS & OUTLOOK
A baseline inventory has been completed using GIS technology, aerial photography, and field work. Several rounds of public meetings have helped to determine future desired conditions. A draft Environmental Assessment and Management Plan were expected by July 1995. Implementation is expected to begin in Fall 1995, with community-based restoration efforts as the first efforts. The plan’s anticipated temporal scope is 25 years.

Factors Facilitating Progress
The TVA employee’s initiative, effort, dedication, and vision have been instrumental to this effort’s progress. He has access to excellent resources, from TVA-based GIS and aerial photography assistance, as well as to extensive library and electronic resources. Support and flexibility of higher management has also been a benefit. Finally, public involvement has been instrumental: the public was described by the project coordinator as intelligent and willing to work with TVA towards a common vision. Working with the public “on their terms” has been especially helpful.

Obstacles to Progress
The scale of the project area is too small for the complete ecosystem to be managed in its entirety.

Rather, the effort is considered to be an ecosystem-based approach to managing the lands, still an important distinction from past management practices. Expanding these efforts to private lands is expected to be difficult, especially in terms of public education of the many landowners and relatively small lot sizes.

Contact information:
Mr. J. Ralph Jordan
Senior Natural Resource Management Specialist
Tennessee Valley Authority
Ridgeway Road
Norris, TN 37828
(615) 632-1604
Fax: (615) 632-1534
**GRAND BAY SAVANNA**

**PROJECT AREA DESCRIPTION**
The Grand Bay Savanna is a highly specialized coastal wetland located between Mobile, Alabama, and Pascagoula, Mississippi. This largely pristine ecosystem is bounded by the Gulf of Mexico and the Mississippi Gulf Coast to the South and East, and stretches inland to the Pascagoula River (north of Interstate 10). Considered one of the most diverse habitats in North America, the ecosystem forms a gradient from open long-leaf and slash pine savanna and “flatwoods,” through pond cypress savanna, brackish and saltwater marshes, out to the Mississippi Sound, and protective barrier islands beyond. It is rich in waterfowl, wading birds, shore birds, and fish, with over 20 plants considered rare by both states. It contains one federally-listed endangered species, the Mississippi sandhill crane, and two candidates for the federal list. This alluvial system provides water recharge for the regional aquifer and estuary, the latter supporting commercial and sport fishing.

Little human development has occurred other than minimal agriculture and timber, both of which were more extensive historically, but failed due to the poor soil and drainage conditions. Land ownership is primarily private, with public lands being acquired by the U.S. Fish and Wildlife Service (FWS).

**ECOSYSTEM STRESSES**
As a fire-dependent habitat, fire suppression has been the most significant stress to the ecosystem. Suppression occurred where conversion of land to other uses took place, as well as from general policies reflected by public awareness efforts, such as the “Smokey Bear” campaign. Although sparsely populated now, urban development and associated non-point source pollution are the greatest potential threats, due to pressures from nearby Mobile and Pascagoula. Less serious but still present are point-source pollution stresses from industrial (chemical) complexes, and hydrologic alteration of the wetland.

**PROJECT DESCRIPTION**
Mississippi has already recognized the Savanna as a significant wildlife resource area. Also, it is included in the Gulf Coast Joint Venture, as authorized by the North American Waterfowl Management Plan. First efforts to protect the area began in 1989 when 2,649 acres of private land were transferred from private ownership to the FWS for protection. In 1990, The Nature Conservancy (TNC) designated the Savanna as one of its “Last Great Places.” In addition to FWS and TNC, participants in the effort include the Mississippi Department of Wildlife, Fisheries, & Parks, Alabama Department of Conservation & Natural Resources, local officials of Jackson (MS) and Mobile (AL) counties, and others.

FWS is currently acquiring land for the new 13,000-acre Grand Bay Savanna National Wildlife Refuge along the Mississippi-Alabama border, at the core of the ecosystem. Similarly, the Mississippi Department of Marine Resources is acquiring land to be protected in the Bangs Lake area.

Region-wide project goals have not yet been finalized, although FWS has developed specific objectives associated with the Refuge creation, including...
establishing a nesting site for the endangered Mississippi Sandhill crane.

The biggest change in management in the area will be restoring the natural fire regime. TNC’s effort is expected to last approximately 20 years. Coordination between the institutions has been through informal meetings; no formal coordination body has been formed. While a monitoring plan has not yet been finalized, it is expected to include monitoring factors such as burning, point and non-point source pollution, visitation by humans, and amount of land under conservation easements.

**Present Status & Outlook**

FWS acquisition for the new Refuge is approximately 50% complete and state acquisition efforts are also underway. It is hoped that the area will become an official TNC Bioreserve by mid-1995, elevating it to a higher priority level within the organization.

**Factors Facilitating Progress**

Interest by FWS in creating a new Refuge and acquiring land has been especially important to this effort. Congressional support has played a key role in securing federal land acquisition funds through the Land & Water Conservation Fund. Interest and dedication of resources by TNC, including Geographic Information System resources from its Southeast Regional Office, clearly allowed this effort to begin and proceed.

**Obstacles to Progress**

Lack of resources -- funding, personnel, and expertise -- presents the greatest obstacle to this effort's progress. Opposition by a small but highly vocal group of private landowners to federal acquisition efforts has also presented obstacles. More fundamentally, there is a distrust by the public of any federal agency. TNC is attempting to alleviate the situation by acting as a go-between and by engaging in public education efforts to inform residents of the socio-economic or cultural importance of preserving this area, such as its water quality, fisheries, and recreational potential.

**Contact information:**

The Nature Conservancy
Jackson, MS
GREATER YELLOWSTONE ECOSYSTEM

PROJECT AREA DESCRIPTION
Described as one of the last relatively intact temperate zone ecosystems in the world, the Greater Yellowstone Ecosystem (GYE) consists of forested mountains surrounded by undeveloped prairies and basins. The GYE is dominated by a high plateau at its center, essentially Yellowstone National Park (YNP).

The ecosystem was first delineated in 1979 based on the ranges of animals such as the grizzly bear, elk, trumpeter swan, and mountain lion, as well as geologic, hydrologic, and other abiotic features. Located in the Park at 8,000 feet altitude, Yellowstone Lake is the largest high elevation lake on the continent. The GYE is the largest thermal basin in the world, with over 200 geysers and 10,000 geothermal features. The headwaters of three major rivers, the Yellowstone-Missouri, Green-Colorado, and Snake-Columbia, are found there.

Eighty percent of the ecosystem is forested, mostly in lodgepole pine, along with limber and whitebark pine, Douglas-fir, subalpine fir, and Engelmann spruce. Over 70 mammals are present, including large and wide-ranging animals such as moose, bison, antelope, grizzly bear, mountain sheep, and deer. Over 300 bird, 24 amphibian and reptile, 10 fish, and numerous invertebrate species inhabit the GYE. Several federally-listed threatened and endangered species can be found there, including the Kendall Warm Springs dace (a fish), the migratory whooping crane, grizzly bear, peregrine falcon, and the recently reintroduced gray wolf.

The GYE is in public ownership primarily, with more than 28 federal, state, and local agencies managing its resources; the U.S. Forest Service (USFS) and National Park Service (NPS) control over 80% of the GYE. Private landowners include industrial forest owners, ranches (working and residential), and limited rural development. Primary uses of the area are wilderness, recreation, timber, grazing/ranching, mining (hard rock, oil/gas, geothermal), and hydrologic uses.

ECOSYSTEM STRESSES
Resource extraction has been the predominant source of stress for most of this century on GYE lands outside of Yellowstone National Park. Logging, oil and gas development, hardrock mining, and grazing top the list. Several water development projects, for impoundments, hydroelectric facilities, channelization, and irrigation, alter the hydrology of many streams and rivers. All of these activities destroy, alter, and fragment habitat, produce toxic wastes, cause erosion, reduce water quality through point source and non point source pollution, and result in the introduction or spread of non-native species, all with negative consequences on the GYE’s flora and fauna. While these activities have declined since the late 1970s, they are still occurring on a significant scale. Motorized and non-motorized recreation and subdivision development pose additional threats.

PROJECT DESCRIPTION
High levels of resource extraction in the GYE throughout this century, along with the imperilment of high visibility species and public and scientific concern for the ecosystem’s health eventually led, in 1986, to congressional
GREATER YELLOWSTONE ECOSYSTEM -- continued

pressure on NPS and USFS to coordinate their activities in accordance with ecosystem management principles.

As a result, the Greater Yellowstone Coordinating Committee (GYCC), created in 1964 but generally inactive, was revived and a memorandum of understanding (MOU) was signed in 1986 between NPS and USFS. Later, the Bureau of Land Management and U.S. Fish and Wildlife Service were included on the GYCC. The MOU laid out a two-step plan, with the creation of a vision document to describe desired future conditions of GYE and how they can be achieved as the first step. Subsequent to public review, the second step of the plan would be to amend USFS and NPS plans, guides, and statements to achieve those goals.

The initial GYCC plan was developed internally by USFS and NPS, with limited public involvement (public meetings, comment periods).

PRESENT STATUS & OUTLOOK

Since the final GYCC report was released in 1991, little has happened in terms of coordinated management among public agencies. No overriding management plan has been developed for the GYE. Many of the existing plans of each agency for their lands or jurisdiction remain in conflict with one another and do not reflect attempts to incorporate ecosystem management principles. Over the last two years, there have been limited attempts to revive the ecosystem management focus, but these have been restricted to data-oriented efforts such as developing a region-wide GIS database.

Factors Facilitating Progress

Public attention and the uniqueness of the area were the most important factors facilitating the initiation and early stage development of the GYCC effort. In particular, studies of high visibility megafauna, the wildfires of 1988 throughout the ecosystem, and in general, the high level of attention that the Park had been receiving, were especially important.

Obstacles to Progress

Politicization of the GYCC process appears to have crippled the effort, driven in large part by resource extraction interests. Continued lack of coordination between agencies, stakeholder conflict, disagreements over a common vision and appropriate uses of the GYE resources, conflicting agency mandates, and a lack of scientific information about those resources have been major factors preventing the development of a comprehensive coordination effort in the GYE. Finally, national attention of ecosystem management applications has shifted away from the GYE to other areas of the country such as the Everglades and North Woods.

Following enormous outcry from special interest organizations, particularly resource extraction interests, and political opposition, the report was drastically revised and shortened, with the original emphasis on coordination giving way to an emphasis on the separate and distinct missions of the NPS and USFS.

The initial GYCC plan was developed internally by USFS and NPS, with limited public involvement (public meetings, comment periods).
GREEN VALLEY STATE PARK
ECOSYSTEM MANAGEMENT PLAN

PROJECT AREA DESCRIPTION
Green Valley State Park is located in the rolling hills of southwestern Iowa. In pre-settlement times, this area was covered by tallgrass prairie. However, by the time the Iowa Department of Natural Resources (DNR) purchased this property in 1950 and 1951, only patches of prairie remained, surrounded by blue grass pasture. Currently, the vegetation of the Park consists of brome grass, tallgrass prairie patches, and encroaching hardwoods and red-cedars. The park also sports a 394-acre artificial lake. Although its original intent was to supply water to the town of Creston, it is now primarily used for recreation and as a cooling water supply for a nearby power plant. Included in the project area are approximately 1,300 acres of lands surrounding the 1,000-acre Park. These lands are primarily covered by blue grass pasture and row crops. The project area does not contain any federally- or state-listed threatened or endangered species.

ECOSYSTEM STRESSES
The greatest stress on the ecosystem is posed by the raising of livestock and crops on the lands surrounding the Park. Through drainage and runoff, nutrients such as cow manure and crop fertilizers end up in the lake. In addition, pesticides affect the lake and fishery quality, and harm the prairie vegetation on the outskirts of the Park. Until the current introduction of fire as a management tool, fire exclusion was also a significant stress to the ecosystem, resulting in woody encroachment of the prairie vegetation.

PROJECT DESCRIPTION
In 1994, the Iowa DNR adopted a new mission statement which implicitly required long-range ecosystem management planning for Iowa’s State Parks. In response, a departmental committee was established whose main task was to design a state-wide framework for the preparation of plans for all individual state parks. Based on the committee’s work, the individual ecosystem management plans were to be developed.

Because of its highly disturbed nature, Green Valley State Park was chosen as the first park for which a plan was to be designed. A Management Planning Team was formed consisting of an executive officer, park ranger, and DNR staff representing the disciplines of forestry, wildlife management, and community ecology. The plan was written during the Summer of 1994 with the input of team members, the Natural Resources Conservation Service, private individuals (through public meetings), and park visitors (through user questionnaires). Implementation of the plan started in the Fall of 1994.

The plan has divided the Park into nine management units and makes separate management recommendations for each of these units. In order to maintain tallgrass prairie, woody encroachment will be removed by cutting and fire. In other areas, trees are to be planted. In order to protect the water quality of the lake, the DNR is working with existing programs, such as the Clean Lakes Project of the U.S. Environmental Protection Agency and Natural Resources Conservation Service programs. These programs can assist surrounding landowners in the development and use of erosion control practices and methods.
to decrease the amount of nutrients from feedlots reaching the lake. Another strategy involves the acquisition of lands surrounding the Park from willing sellers as funds become available.

The following factors will be monitored: Lake water quality, siltation of the lake basin, eutrophication, plant species composition, and animal populations. Monitoring results will be taken into account when the Ecosystem Management Plan is revised, which will happen once every five years.

**PRESENT STATUS & OUTLOOK**

Since the implementation of this Ecosystem Management Plan has just started, no ecological results have been observed yet. However, a reduction of woody encroachment should be obvious as soon as the Spring of 1995. Documentation of management activities has begun.

**Factors Facilitating Progress**

Especially helpful during the planning process were the Management Planning Team’s multidisciplinary approach, administrative commitment, and staff interest.

**Obstacles to Progress**

The limited amount of knowledge concerning animals other than birds and mammals has been a problem. In addition, the perception of the public that a state park is supposed to be a forest represents a hurdle in the implementation of the plan. Lack of staff and funding have been and will continue to be a concern.

**Contact information:**

Mr. Jim Zohrer  
Wetland Project Coordinator  
Iowa Department of Natural Resources  
Wallace State Office Building  
Des Moines, IA 50319  
(515) 281-4815  
Fax: (515) 281-6794
GUADALUPE-NIPOMO DUNES PRESERVE

PROJECT AREA DESCRIPTION
The Guadalupe-Nipomo Dunes complex on California’s central coast is a nearly 18-mile stretch of beach, sand dunes, wetlands, and freshwater lakes. This dune ecosystem comprises three dune groups: the Callender, Guadalupe, and Mussel Rock Dunes. Shrublands, arroyo willow woodlands, and an estuary at the mouth of the Santa Maria River add to the great diversity of natural communities of the Guadalupe-Nipomo Dunes. The Dunes provide critical nesting habitat for shorebirds and are home to a number of federally- and state-listed threatened and endangered animal and plant species, including the California least tern, western snowy plover, Gamble’s watercress, and marsh sandwort. Many rare species can be found there as well. Currently managed by The Nature Conservancy (TNC), the Guadalupe-Nipomo Dunes Preserve provides passive recreational opportunities such as hiking, surf fishing, horseback riding, and other non-motorized activities. Neighboring land uses include oil development, sand and gravel mining, agriculture, and livestock grazing.

ECOSYSTEM STRESSES
The Dunes attract nearly 120,000 visitors each year. The trampling of rare plant species and the disturbance of rare shorebirds that nest on the open sand are serious concerns. In the midst of the preserve and adjacent to the Santa Maria River estuary sits a 2,300-acre oil field which, over time, has spilled an estimated 8.5 million gallons of oil. The effects of this spill on the ecosystem are presently unknown. On the edge of the preserve, increasing extraction from a sand mine may be exceeding the deposition of sand from the Santa Maria River, thus removing dune habitat from the preserve. Finally, urban development on neighboring lands has promoted the introduction of exotic plants, such as European beachgrass and veldt grass, which have reduced the abundance of native vegetation and corresponding habitat.

PROJECT DESCRIPTION
Of the four intact dune complexes remaining in the state of California, Guadalupe-Nipomo Dunes is the most diverse. Because of the absence of protective management for the Dunes, the California State Coastal Conservancy and TCN began a land acquisition program in 1988 for the creation of the Guadalupe-Nipomo Dunes Preserve. The Coastal Conservancy purchased the Mobil Coastal Preserve from the Mobil Corporation, later transferring the preserve to TNC for long-term management. TNC also holds a 25-year lease on Mussel Rock Dunes, owned by the Santa Barbara County Parks Department, and has an agreement with Off-Highway Vehicle Division of California State Parks that gives TNC prescribed rights to manage its Oso Flaco Lake property as a natural area. Consulting with each of these partners, TNC’s goal is to balance human use with protection and restoration of the natural communities and native species of the Dunes.

In 1991, TNC developed a management plan that instituted new regulations on activities as well as an entrance fee for the preserve. Developed and implemented with little public input or notice, this plan met with strong public protest and, in response, public officials...
rescinded the fee. This was a major setback for TNC: the fee was to have provided income that would make this project self-sustaining. TNC realized from this experience that to protect natural systems, management plans must be both land and culturally based.

**PRESENT STATUS & OUTLOOK**

TNC is currently engaged in a user analysis study which will result in a revised management plan. Community outreach is a vital element of this study in order to learn about the needs and desires of the people who use and live nearby the preserve. Working with a local steering committee, the Coastal Conservancy and TNC are also developing a visitors center in the small town of Guadalupe near the preserve. It is hoped this center will provide a stimulus for the local economy and foster a sense of stewardship towards the Dunes. TNC is also seeking funding for an exotic plant species eradication program.

**Factors Facilitating Progress**

The construction of boardwalk trails and signs have been successful in protecting rare plant communities and least tern colonies. Furthermore, education and outreach programs have increased support from local communities.

**Obstacles to Progress**

Animosity still remains towards TNC as a result of certain elements in the original management plan for the Dunes; a great deal more local support is needed for further progress on this project. Furthermore, the project is in need of greater administrative and financial support. Finally, the project is described as being in need of an advisory committee which includes all stakeholders, to improve communication and coordinated management efforts. Such a committee may arise from the revised management plan.

**Contact Information:**

Ms. Nancy Warner  
Field Representative  
The Nature Conservancy  
PO Box 15810  
San Luis Obispo, CA  93406  
(805) 545-9925  
Fax: (805) 545-8510
Gulf of Maine Rivers Ecosystem Plan

Project Area Description
The Gulf of Maine Rivers Ecosystem consists of a network of rivers, forests, lakes, wetlands, and estuaries. This watershed includes the entire state of Maine, portions of the states of New Hampshire and Massachusetts, and the estuarine and marine waters of the Gulf of Maine. This area provides vital natural habitat for the U.S. Fish and Wildlife Service (FWS) trust resources such as anadromous fish, endangered and threatened species, and migratory birds. The watershed also sustains major forest-related fishing, tourist, and recreation industries. Portions of the Canadian provinces that are in the Gulf of Maine watershed are not addressed in this ecosystem management plan.

Ecosystem Stresses
Threats to the integrity of the Gulf of Maine Rivers Ecosystem include wetland loss, blockages of rivers by dams, habitat fragmentation, pollution, and other cumulative effects of development. In the future, the threats to specific geographical focus areas identified in the plan will be further researched and defined.

Project Description
This project is one of the many watershed-based initiatives that are part of the FWS transition to ecosystem-based land management. The project boundaries for the Gulf of Maine Rivers Ecosystem, as well as the boundaries of the other 52 projects, were set by the National and Regional offices of the FWS in early 1994. An ecosystem team was set up, consisting of Regional Office Liaisons and Field Station Project Leaders who are responsible for day-to-day operations in the watershed. The team met initially in May 1994. Through consensus and with the help of trained facilitators, the team developed a draft ecosystem plan for the Gulf of Maine Rivers project in August 1994. The plan includes a mission statement and six goals reflecting the region’s trust responsibilities. Examples of the goals include: a healthy aquatic community; healthy, diverse and functioning wetlands and associated habitats; and an informed public which values fish and wildlife. Seven Resource Priorities are further identified, defining action strategies to address specific geographical focus areas. Potential partners have been named to aid in the implementation of each of the resource priorities. These partners include non-profit organizations, local governments, and community groups.

Present Status & Outlook
The project is currently in transition between finalizing the plan and implementation; the team continues to meet on a monthly basis. Although the plan is a long-term initiative that will be realized over many years, one of the immediate successes is increased communication between the FWS offices within the project area. There is an increased understanding of the different responsibilities of the offices and less duplication of effort.

Factors Facilitating Progress
Facilitated team meetings were helpful and enabled the project team leader to concentrate on developing the plan. Facilitation also helped in clarifying and resolving some of the initial concerns of team members regarding infringement on prior responsibilities.
Obstacles to Progress
A major obstacle in reaching the overall FWS goal of an ecosystem-based approach is the current program-by-program funding structure of Congress. It is difficult to receive funding on a program basis while managing on an ecosystem level. It is also unclear where traditional mandated responsibilities fit in with new ecosystem initiatives. Early on, it was unclear how the state component of the FWS related to this new national initiative. The ambitious deadlines, set by the national office for completion of the plan, were also problematic since these coincided with an already active summer field season.

Contact information:
Mr. Gordon Russell
U.S. Fish & Wildlife Service
1033 S. Main Street
Old Town, ME 04468
(207) 827-5938
GULF OF MEXICO PROGRAM

PROJECT AREA DESCRIPTION
The U.S. Gulf of Mexico coast line is more than 1,600 miles long. About two-thirds of the continental U.S. drains into the Gulf, with the Mississippi River watershed accounting for most of that drainage. Gulf coastal areas include sand beaches, freshwater and saltwater marshes, barrier islands, mangrove swamps, and seagrass beds. Many federally-listed threatened and endangered species occur in the area, such as the Mississippi sandhill crane, Alabama beach mouse, and several sea turtles. In addition, the Gulf provides essential habitat for a large portion of North American migratory waterfowl.

Shrimping, recreation, and oil and gas offshore production occur in the Gulf. Agriculture, silviculture, aquaculture, industrial uses, and urban/rural development occur in the Gulf’s watershed.

ECOSYSTEM STRESSES
Non-point source pollution generated throughout the Mississippi River watershed ends up in the Gulf, including pesticides, toxic substances, and nutrients. In addition, over one million pounds of trash and debris are picked up on Gulf beaches annually. Coastal and shoreline erosion is another serious problem. Parts of Louisiana retreat 65 feet per year or more, while shoreline erosion rates of 15 feet per year can be found in many other areas of the Gulf. Freshwater diversion projects initiated for flood control, navigation, recreation, and water supply have led to reduced levels of freshwater entering coastal areas, with subsequent saltwater intrusion.

PROJECT DESCRIPTION
The Gulf of Mexico Program was established in August 1988 by the U.S. Environmental Protection Agency (EPA) in response to signs of serious long-term environmental damage appearing throughout the marine ecosystem of the Gulf. The Gulf of Mexico Program is an interagency effort which aims to: protect, restore, and enhance the coastal and marine waters of the Gulf of Mexico and its coastal natural habitats; protect human health and the food supply; and ensure the recreational use of Gulf shores, beaches, and waters occur in ways consistent with the economic well-being of the region. The major strategies of the Program are to: identify threats to the Gulf; suggest solutions (in action plans); and identify and, if needed, fund the appropriate agencies and institutions which could implement these solutions as individual projects.

Examples of projects promoted by the Program are education and outreach, garbage pick-up programs, and shellfish bank restoration (through reduction of sediment reaching the shellfish banks). Monitoring varies from project to project. In some, wetland vegetation is monitored. In others, water quality, toxicity, and pathogens are measured.

PRESENT STATUS & OUTLOOK
Many partnerships have been developed since the Program’s inception. For instance, in 1992 a “Partnership for Action” document was signed by governors of all five Gulf states, representatives from 11 federal agencies, and the chair of the Citizens Advisory Committee to the Program. In February 1995,
the federal partners, now numbering 18, signed a more detailed partnership document outlining individual tasks and contributions. The Gulf of Mexico Program is drawing up a similar partnership document with the states. Action plans have been developed addressing many Gulf of Mexico issues, including marine debris, habitat loss, freshwater inflow, and nutrient enrichment.

The Program has funded approximately 200 projects so far, including projects that demonstrate the use of wetlands for filtration of domestic, agricultural, and urban waste water to reduce impacts on shellfish-growing waters. In addition, the Program has facilitated restoration of 600 acres of coastal habitat in cooperation with the Tampa Bay Estuary Program and the State of Florida.

Another result of the Gulf of Mexico Program is the development of new data and information management tools, such as the Gulf of Mexico Program Electronic Bulletin Board System and a user-friendly Geographical Information System.

Factors Facilitating Progress
Multi-agency, multi-state partnerships are the strength of the Program. They have resulted in an exchange of information as well as in shared funding. Working through consensus-building has also been beneficial to the Program.

Obstacles to Progress
The Gulf of Mexico ecosystem is very large. To address all threats in this ecosystem would require large amounts of funding. Therefore, priorities must be set and addressed. In addition, because of the large geographical area involved, the project must deal with a wide array of political, geographical, cultural, and economic interests.

Contact information:
Dr. Douglas A. Lipka
Director
Gulf of Mexico Program
Building 1103, Room 202
Stennis Space Center, MS 39529
(601) 688-1172
Fax: (601) 688-2709
**Hudson River/New York Bight Ecosystem**

**Project Area Description**

The project area lies between Montauk Point, Long Island, and Cape May, New Jersey. These watersheds drain the southern half of Long Island, the Atlantic coast drainage of New Jersey, the entire drainage of New York Harbor and the Hudson River drainage area.

These watersheds are complex in physiography and include marine zones, barrier beaches, coastal plains, mountainous highlands, and the Hudson River Valley. The headwaters of the Hudson are found in the Adirondack region of New York State. Vegetation ranges from three of the most significant pitch pine barrens in the world, to remnant habitats of grassland, oak-dominated deciduous forests, and significant tidal and freshwater wetlands. The region contains 29 federally-listed threatened and endangered species and approximately 200 state-listed species.

**Ecosystem Stresses**

The greatest threat to the area is land conversion to urban uses, especially outward from the New York City Metropolitan area, resulting in fragmentation of habitat and loss of open space. A second major stress is non-point source pollution from urban and agricultural areas. This includes runoff from roads, storm water, sewers, and farms. Runoff is exacerbated by degraded riparian areas.

**Project Description**

This project is one of the many watershed based initiatives that are part of the U.S. Fish & Wildlife Service’s (FWS) transition to ecosystem-based land management, initiated in March 1994.

In May of that year, a Hudson River/ New York Bight ecosystem team began meeting to define priorities and action steps and to write an ecosystem plan. The ecosystem team consists of one representative from all FWS offices within the ecosystem. The New York Department of Environmental Conservation and the New Jersey Department of Environmental Protection became involved in project planning in September 1994. They have helped to set priorities and identify partners within the states for the various action steps.

Within the ecosystem plan, six priority goals are identified, which are defined by community or habitat types that are considered priority areas. These include barrier beaches, grasslands and forests, coastal lagoons and rivers, tidal and freshwater habitats, and pine barren communities. The plan contains a total of 21 action steps (3-4 for each priority goal). Monitoring is based on these action steps. Ecological indicators of habitat and species return will be used to measure progress in restoration activities. For other action steps, more quantitative measures are used, such as number of acres transferred from lawn to natural habitat.

**Present Status & Outlook**

Several action steps specified in the plan were existing FWS activities. As a result, the team predicts that this effort will produce results in the near future. More recently-developed action steps, currently in the data compilation and mapping phase, will require a few years before management plans are in place and on-the-ground actions underway.
In FWS Region 5, some FWS offices traditionally have had a coastal focus, thus facilitating the progression to the current watershed approach. Facilitated team meetings also helped to move the process along efficiently. The team was extremely interested and willing to see this project move forward.

**Obstacles to Progress**
The team functioned under tight deadlines and could not gain all the staff level input and perspectives that would have fostered a fuller complement of information in the plan. A second potential obstacle is streamlining the process so that reporting requirements do not become overly burdensome. With federal downsizing efforts, it may be difficult for offices with many mandated activities to find time and funds to work on priorities identified in the plan.

**Contact information:**
Mr. Mike Meagher  
Ecosystem Team Coordinator  
U.S. Fish & Wildlife Service  
Region 5  
300 Westgate Center Dr.  
Hadley, MA 01035-8588  
(413) 253-8320  
Fax: (413) 253-8308
INDIANA GRAND KANKAKEE MARSH RESTORATION PROJECT

PROJECT AREA DESCRIPTION
In presettlement times the Kankakee River watershed was dominated by the Grand Kankakee Marsh, a flat, 500,000-acre expanse vegetated by sedges, cattails and wild rice. Scattered throughout the marsh, sand ridges could be found, supporting black oaks, blueberries, and prairie-fringed orchids. Upland areas adjacent to the marsh were characterized by tallgrass prairie, beech-maple forests, and oak-hickory forests.

The project area contains 12 federally-listed threatened, endangered, or candidate species and more than 200 state-listed species. Examples of the former include the Karner blue butterfly, prairie-fringed orchid, Mitchell’s satyr butterfly, Indiana bat, bald eagle, and peregrine falcon. During spring and fall migrations, the area is frequented by migratory waterfowl, including nearly the entire population of Sandhill cranes.

ECOSYSTEM STRESSES
The most important stress on the ecosystem is the conversion of lands to agriculture and concomitant loss of natural habitats such as marsh, prairie, and forest. In 1918, the Kankakee River, once a 240-mile-long, meandering stream, was straightened and is now only 85 miles long. This was followed by drainage of virtually the entire marsh and the conversion of land to row crop agriculture. Except for some remnants, all the prairie land has been converted to agriculture as well. Approximately 50% of the forests has undergone a similar fate. The remaining forests are used for timber management. Part of the area is used for residential, municipal, and industrial purposes.

PROJECT DESCRIPTION
As early as the 1930s, efforts were made to restore the Grand Kankakee Marsh. Although most of these efforts have been unsuccessful, local residents have remained interested in restoration.

In January 1993, the U.S. Fish and Wildlife Service and the Indiana Department of Natural Resources arranged an organizational meeting aimed at initiating a project under the North American Waterfowl Management Plan. Many interested organizations, such as Ducks Unlimited and Waterfowl USA, were invited. A subsequent meetings, more partners were added to the project, which now numbers 14 different organizations, businesses, and agencies. The Partners all contributed funding, land donations, or in-kind services to the project, at a total value of $2.3 million. In April 1994, they submitted a proposal requesting $1.5 million under the North American Wetlands Conservation Act to be added to the Partner share. The grant was funded in September 1994, and in conjunction with the partners’ contributions will be used to fund the first two years of the project.

The 10-year project goal is the restoration and protection of 26,500 acres of wetlands and associated uplands in the watershed. The strategies that are employed to reach this goal include acquisition and easements, restoration of wetlands and upland prairies, ongoing fundraising, and development of public awareness of the project. Land acquired in the context of this project.
will be owned and managed by the various project partners. For instance, a parcel may be owned and managed by the Lake County Parks Department in accordance with Project goals.

Present Status & Outlook
Even before the funds were appropriated, 30 properties had been identified for potential acquisition and restoration. Properties are prioritized based on restoration potential and cost of acquisition. Some bids and property appraisals have been made. Depending on the outcome of the acquisition process, wetland restoration on these properties may start in 1995.

Factors Facilitating Progress
Because the entire ecosystem is addressed rather than a single issue, many diverse organizations have become interested and are now participating in the Partnership. The cooperation of a large number of partners and a good source of local funding have been very helpful, and are considered a success in themselves. In addition, the media has assisted the partners by keeping the public informed about the merits of the project.

Another facilitating factor is the land base itself. Ever since the Grand Marsh was drained, the drainage system has started to deteriorate. It has become more and more expensive to maintain the land as cropland. Thus, many properties are available for acquisition. In addition, the potential of the area to react positively to ecosystem management is helpful.

Obstacles to Progress
The current grant from the North American Wetlands Conservation Act has to be renewed after two years. If, at the end of this period, the two-year objectives have not been met, renewal funds may not be granted. It is also uncertain how the current Congress will influence the funding of the North American Wetlands Conservation Act. Even if funding remains at the same level, increasing requests for grants throughout the country may cause the amount of funding for each individual project to decrease. Since land values are higher than was originally estimated by the Partnership, securing additional non-federal funding is of the utmost importance.

Contact information:
Mr. Jim Ruwaldt
Assistant Field Supervisor
U.S. Fish & Wildlife Service
620 S. Walker
Bloomington, IN 47403-2121
(812) 334-4261 ext. 213
Fax: (812) 334-4273
E-mail: ruwaldtj@mail.fws.gov
INTEGRATED LANDSCAPE MANAGEMENT FOR FISH AND WILDLIFE

PROJECT AREA DESCRIPTION
The headwaters of the Lewis and Kalama rivers originate in the volcanic drains of Mt. St. Helens and Mt. Adams. The Lewis-Kalama watershed boundary stretches from the Kalama River and Mt. St. Helens to the North to Lookout Mountain in the South. Mt. Adams and Bachelor Island define the watersheds’ eastern and western boundaries respectively. The project site also includes the Indian Heaven Wilderness Area and part of Mt. St. Helens National Monument.

Douglas fir, hemlock, and western red cedar grow at lower elevations. Red alder, willow, big-leaf maple, and cottonwood are also found throughout the watersheds. The northern spotted owl and bald eagle are among the federally-listed threatened and endangered species. The Larch mountain salamander is listed as a sensitive species by the state.

ECOSYSTEM STRESSES
Between 80% and 90% of the site has been used for commercial forest management. Timber harvesting constitutes the most significant stress to the watersheds by disrupting hydrologic patterns. Harvesting had also affected the integrity of wildlife habitat. Urban encroachment has occurred due to the growth of Vancouver, Washington, to the South and has reduced wildlife habitat. Three major dams have been the source of hydroelectric power generation in the region for 50 years.

PROJECT DESCRIPTION
The project began in 1989 as an internal effort led by the director of the Washington Department of Fish and Wildlife. The director’s decision to move away from species-by-species planning to landscape level planning began as a statewide effort to inventory 129 priority species and map 19 priority habitats (PHS). Geographic Information System technology was used to create the maps for private and state forest lands, urban growth areas, and the Gifford Pinchot National Forest.

The desire to prevent the listing of more species was a prime motivating factor. The goal of the Lewis-Kalama watershed pilot project is to demonstrate how the Integrated Landscape Management process can be used to work with the public in managing fish and wildlife on a watershed basis. The project was begun to institute a systematic planning process for taking PHS data and identifying the public’s future desired conditions for managing fish and wildlife populations at the landscape level.

GIS/remote sensing data, public involvement, species plans, habitat plans, recreation plans, and the application of adaptive management are core elements of the department’s approach. By compiling data on the status and trends of species as well as the current, potential, and future use of habitats, the department will develop options for public and private landowners to manage resources to their benefit while protecting species, habitat, and recreational opportunities.

PRESENT STATUS & OUTLOOK
Species and habitat data are currently being applied to the Lewis-Kalama watershed. Lessons learned from the
INTEGRATED LANDSCAPE MANAGEMENT FOR FISH AND WILDLIFE -- continued

A pilot site will be applied to Washington’s other 61 watersheds. The most important requirement for continued project progress is agency commitment.

Factors Facilitating Progress
A highly-motivated public has been heavily involved in the planning process. The department regularly shares information and receives input from various groups including other state agencies, local environmental groups, hunting, fishing, and angling organizations, as well as industry groups such as Longview Fibre Company and Pacific Power & Light. An engaged public and key talented people in the agency are accredited for the project’s progress.

Obstacles to Progress
It was difficult for the department staff to accept the shift from species-by-species to landscape level management. Organizational difficulties such as a recent merger of two state agencies, allocating staff time, and overcoming resistance from employees have been significant obstacles in early stages of project planning. Past departmental planning efforts have had mixed success and have caused some of the department’s employees to be skeptical of the integrated landscape approach.

Contact information:
Mr. Rollie Geppert
Washington Department of Fish and Wildlife
600 Capitol Way North
Olympia, WA  98501-1091
(206) 902-2587
INTERIOR COLUMBIA BASIN ECOSYSTEM MANAGEMENT PROJECT

Location:
Eastern Oregon and Washington, Idaho, western Montana and Wyoming, Northern Nevada and Utah

Project size:
144 million acres

Initiator:
President Bill Clinton

PROJECT AREA DESCRIPTION
The vast expanse from the crest of the Cascade Range to the Continental Divide defines the boundaries of the Interior Columbia Basin area. The Columbia River Basin, as well as parts of the Klamath Basin, the Great Basin, and Yellowstone National Park are encompassed in this region. The varied topography includes high mountain alpine landforms, dissected plains, and the Columbia Plateau. Predictably, vegetation types vary widely. Ponderosa Pine and mixed conifer forests in Washington and Oregon contrast to rangelands comprised of juniper, sagebrush, and bunch grasses. Wetter climates in Idaho and Montana yield a vegetation pattern of sub-alpine fir, white pine, and some lodgepole pine. Among the 17 federally-listed threatened and endangered species are the gray wolf, grizzly bear, Snake River salmon, and several plants. The area hosts as many as 200 candidate species to the list.

ECOSYSTEM STRESSES
The area has undergone tremendous alteration of its hydrologic system. A series of dams impound the Columbia River for power and recreation; a network of reservoirs and irrigation canals has been constructed to spur agricultural development and to control flooding. These stresses and overfishing have resulted in the decline of anadromous fish and other fish species.

The region’s watersheds have been affected by excessive logging, roadbuilding, and mining in concentrated spots. Stresses from a decade-long drought has exacerbated the risk of fire. Insect infestations and diseases have also plagued the forested lands recently. The proliferation of exotic species represents a substantial threat of further alteration of the ecosystem.

PROJECT DESCRIPTION
Changing social values concerning old growth and forest health, culminating with the Forest Summit in Portland, Oregon, in 1993, were a strong catalyst for the Interior Columbia Basin Project. Although President Clinton was unsuccessfully lobbied to include the Columbia Basin on the summit’s agenda, he directed the Bureau of Land Management, U.S. Forest Service, and other federal agencies to develop a scientifically sound plan for the region’s public lands. Agency staff on the project have conducted an inventory and assessment of what trends in resource use are occurring, how the trends and ecological conditions will change in the future, and what species, disturbance processes, and elements of the ecosystem are at risk.

The team created four long-term scenarios that highlight the social, economic, and ecological consequences and trade-offs if society chooses to 1) withdraw from public lands management and allow natural processes to occur without interference; 2) maximize the economic output of public lands; 3) focus on maintaining ecosystem processes and then distributing any excess benefits; or 4) continue with present management activities. Three additional scenarios are projected to be developed before the project’s two-year charter expires in mid-1996. The report is targeted at decision makers in federal agencies.
**Present Status & Outlook**

The project’s multi-disciplinary team has reduced the uncertainty in the region’s natural resource decision making. The team is re-framing the question of resource management from “What would happen if ... ?” to “Do we want this to happen?”

**Factors Facilitating Progress**

A primary force for progress is the leadership of agency officials and their desire to avoid a repeat of the events that led up to the Forest Summit. Another has been the redefinition of “openness.” Input from numerous federal and state agencies, interest groups, private landowners, and ordinary citizens is actively sought. The public is kept informed through presentations, open stakeholders meetings, the distribution of draft material, a computer bulletin board, and a 1-800 telephone number.

**Obstacles to Progress**

Obstacles have included establishing working relationships with partners (largely due to constraints imposed by the Federal Advisory Committee Act), working within at least 20 federal land management jurisdictions, deciding the appropriate “turf” for science and management, and learning how to define and structure an open process. As reports are finalized, continued leadership is needed to buffer the political pressure to change the findings.

**Contact Information:**

USDA Forest Service
Walla Walla, WA
**INTERIOR LOW PLATEAU**

**PROJECT AREA DESCRIPTION**
The project area is a physiographic province bounded by the Cumberland Plateau to the East, the Tennessee River to the South and West, and southern Ohio to the North. Local experts call it a “catch-all” area for various eastern landforms. It includes sub-units such as Bluegrass, Knobs Coal Fields, Penn-yroyal, and Highland Rim. It has moderate elevation and climate, and large rivers and tributaries, the latter generally having dictated landforms. A common, relatively consistent forest type has been oak-hickory (including savannas and bottomland hardwoods), as well as prairies.

**ECOSYSTEM STRESSES**
Stresses have not yet been officially identified as part of this effort. However, habitat destruction due to land alteration, land conversion to agricultural and urban uses, and a variety of pollution problems are believed to be the most significant stresses to the system.

**PROJECT DESCRIPTION**
This effort is an outgrowth of the Tennessee Biodiversity Program, which has focused on improving breeding bird populations. In early 1992, state personnel from this program met with their colleagues in similar programs from surrounding states, and realized that they had common programs and thus an opportunity to coordinate their efforts. Officially, the effort began in May 1994, with a five-year duration initially. It is being coordinated by the non-profit Tennessee Conservation League, the state affiliate of the National Wildlife Federation. While this effort is currently acknowledged as a landscape-level plan for breeding bird populations only, it is viewed as a first step to an ecosystem management plan which could be extended to include other ecosystem attributes. In the short term, however, the effort lacks the capability to look at all ecosystem factors.

While specific project goals have yet to be identified, anticipated goals include: 1) using vegetative mapping through Geographic Information Systems technology (GIS) to identify patch size and distribution, in order to distinguish specific areas to manage and conserve; 2) ensuring ecosystem integrity by assuring biological sustainability for breeding bird populations; 3) cooperating with industrial private land owners in sustaining wildlife; 4) collecting baseline data; and 5) demonstrating the feasibility of private land involvement on multiple levels.

**PRESENT STATUS & OUTLOOK**
A Habitat Team is currently being set up to identify stresses and develop goals and strategies to address these stresses. A Steering Committee is already in place, whose cooperators include representatives from state agencies (wildlife, forestry), federal agencies (Fish & Wildlife, Tennessee Valley Authority), industry (Westvaco Corporation, Willamette Industries, Champion International), and citizen groups (Tennessee & Alabama Ornithological Societies, Tennessee Conservation League). These cooperators directly control one million acres within this ecosystem. The Steering Committee decided to involve the general public following an evaluation of the effort one year after its inception.
INTERIOR LOW PLATEAU -- continued

The first three years of the effort are tentatively expected to be spent developing information for guiding education efforts, research priorities, management issues, and acquisition efforts. The following two years would be used to set up monitoring. By the end of the five-year period, active acquisition and management programs are hoped to be operating, with respective state wildlife agencies leading the effort thereafter.

GIS-based vegetative mapping and some analyses of breeding bird information has been completed for approximately 50% of the project area. Progress has been made in communicating ecosystem management concepts to on-the-ground managers and getting them to think in broader terms about the impacts of their individual actions on the ecosystem.

Factors Facilitating Progress
The coordinating role that the Tennessee Conservation League has assumed has been an important asset, both for policy decision-making, and in facilitating technical research and monitoring between universities and the states. The League has been able to bring stakeholders to the table and has helped foster trust among participants. Typically-expected “turf wars” have been avoided. Finally, the League has conduits to government agencies (state and federal) and industry, key elements of this effort.

Obstacles to Progress
Administrative barriers (“red tape”) have been significant and have contributed to delays in realizing short-term goals. In fact, a small portion of southern Ohio is functionally part of the ecosystem, but Ohio’s acreage was too small to justify the added administrative processes. Top administrators and technical personnel have different understandings of what ecosystem or landscape management entails. Similarly, no official definition of ecosystem management exist to guide planning efforts.

Limited and stretched resources and personnel have been problems as well. Technical difficulties with the GIS mapping have occurred. Finally, some pessimism exists as to the future of this effort, primarily because of the uncertainty of future incentive programs (e.g., the 1995 Farm Bill debate in Congress), convincing private landowners to think of wildlife in a context beyond that of hunting, the limited impact that this effort will have on the ecosystem, and the fact that specific project goals have yet to be set.

Contact information:
Mr. Bob Ford
Project Manager
Tennessee Conservation League
300 Orlando Avenue
Nashville, TN 37209-3200
(615) 353-1133
Fax: (615) 353-0083
**Iowa River Corridor Project**

**Project Area Description**

The Iowa River runs from north-central Iowa to southeastern Iowa where it joins the Mississippi River. The U.S. Fish and Wildlife Service (FWS) considers it part of the Upper Mississippi-tallgrass prairie ecosystem. The project area is defined by floodplain boundaries, and includes a part of the Iowa River that is not channelized but that winds back and forth across a three to four mile wide floodplain. Prior to the initiation of this project, over half of the project area was crop land. About a third of the area, in the riparian corridor, was woodland, dominated by oak and maple, walnut, willow, and cottonwood. The project area also includes the Otter Creek Wildlife Management area, which measures approximately 3,000 acres.

The project area supports two active bald eagle nesting sites, and the state-listed sandhill crane and river otter. The most important human uses of the project area are cropland, livestock, timber, and recreation.

**Ecosystem Stresses**

The project area has been impacted most by agricultural practices and land conversion to agriculture. Statewide, 98% of Iowa’s wetlands and 99.9% of native prairie land have been converted to agriculture in the last 150 years. The project area floods frequently, since it is located in a floodplain and receives much water from the upper channelized parts of the river in a relatively short period of time. Although the 1993 flood was one of many floods, it was larger and lasted longer than previous ones. The inundation of the area lasted six months and stressed both natural systems and the economy of the area. Crop losses in the project area exceeded $6.9 million.

**Project Description**

After the 1993 record flood, many landowners recognized that agricultural use of lands along the Iowa River is not sustainable. Under the Emergency Wetland Reserve Program (EWRP) of 1993 and the Wetland Reserve Program (WRP) of 1994, the Natural Resources Conservation Service (NRCS) offered to buy easements on these properties to allow landowners to pursue more flood-tolerant land uses. Seventy-seven out of 250 landowners have responded positively. The NRCS was planning to have easement documents and plans finalized by August 1995. In addition, the FWS is planning to offer buy-outs to landowners who enrolled in EWRP and WRP. FWS is preparing the Environmental Assessment for its acquisition plan. If approved, it hoped to start acquiring land by early spring 1995. The land acquisitions will become part of the National Wildlife Refuge System, but may be managed by the Iowa Department of Natural Resources. The FWS and NRCS are also planning a cooperative effort with the remaining landowners focusing on sustainable land use practices, such as sustainable crop and timber management practices and improved grazing management.

Thus, a major goal of this project is to provide landowners with a broad menu of assistance options that represent sound floodplain management. Other goals include the management of public lands and easements to provide for the natural diversity and functions of the Iowa River system, to demonstrate the
**IOWA RIVER CORRIDOR PROJECT -- continued**

economic outcomes of alternative floodplain management and land uses, and to use private and public partnerships to accomplish these objectives. Non-profit organizations are involved in this effort, including the Iowa Natural Heritage Foundation, Pheasants Forever, Ducks Unlimited, and The Nature Conservancy.

**PRESENT STATUS & OUTLOOK**
The land acquisition and easement components of the project are underway. It is expected that as soon as the anticipated 50% of cropland comes out of production, immediate results may be observed. There will be better opportunities for plants (e.g., hardwoods) and wildlife to establish and regenerate in the wetlands, and water quality is expected to improve. The development of the sustainable land use program is still in its infancy, and funds for it have not yet been made available.

**Factors Facilitating Progress**
So far the project has proven very successful according to project leaders. The willingness of landowners to consider easement and buy-out options is not only economically sound, but has been invaluable in the effort to restore wetlands, forest and prairie in the Iowa River Corridor, as well as in the promotion of flood tolerant land uses as a whole. Furthermore, the cooperation between federal agencies, a state agency, non-profit organizations, and private landowners has proven very fruitful.

**Obstacles to Progress**
Initially, landowner misconceptions needed to be overcome. Although agency cooperation facilitated progress, cooperation was not always easy. Agencies disagreed about project goals, methods, and direction. Molding agency interests together into a team was difficult. In addition, a very bureaucratic easement process has well beyond the period that some agency personnel felt it would take.

**Contact information:**
Mr. James R. Munson
Iowa Private Lands Coordinator
U.S. Fish & Wildlife Service
PO Box 399
Prairie City, IA 50228
(515) 994-2415
Fax: (515) 994-2104
E-mail: james_munson@mail.fws.gov
**Karner Blue Butterfly Habitat Conservation Plan**

**Project Area Description**
Karner blue butterflies are found in the northern range of wild lupine habitat in portions of New Hampshire, New York, Michigan, Wisconsin, Indiana, and Minnesota. The pine barrens and oak savanna ecosystems are likely to be a mosaic of interspersed woody vegetation, such as pitch pine and scrub oak, and open grassy areas. The presence of wild blue lupine is a necessity, as it is the only plant that the Karner blue eats in its larval stage. Flowering plants serve as nectar sources for adult butterflies.

Nearly 20 species that are endangered, threatened, or of special concern have a high association with the Karner blue. Among them are Blanding’s turtle, eastern massasauga, prairie flame flower, western slender grass lizard, cobweb skipper, and frosted elfin butterfly. Land uses in central and northern Wisconsin include industrial forest production, state wildlife areas, county forest reserves, residential development, recreation, and agriculture.

**Ecosystem Stresses**
Historically, wildfire maintained the pine barren and oak savanna ecosystems by checking natural succession and creating a network of openings in the forest canopy. Habitat throughout the range of the Karner blue has been lost as a result of suppressed wildfire, silviculture, urbanization, and natural succession. The remaining habitat has been fragmented, preventing movement and dispersal of butterflies and resulting in small isolated populations. At one time the butterfly was found in a nearly continuous narrow band across 10 states and one province, but it has been extirpated from at least four of these states.

**Project Description**

The Karner Blue habitat conservation plan (HCP) focuses on central and northwestern Wisconsin. Concerns within the forest products industry over private land use prompted the Department of Natural Resources to undertake the HCP effort. The major thrust of the effort involves coordinating management practices across a mosaic of public and private land ownerships. The HCP will serve as a basis for seeking an incidental take permit from the U.S. Fish & Wildlife Service so that land management activities on all ownerships can continue.

The region’s stakeholders are involved in the process at different levels of participation, depending on the extent of their interests, land ownerships, etc. There are more than 20 partners at this stage.

**Present Status and Outlook**
Articles of Partnership have been developed, and the partners have been meeting. Special provisions, such as to protect private property rights, have been included in the Articles.

**Factors Facilitating Progress**
Stakeholder participation in the project planning has been the major factor facilitating progress.

**Contact Information**
Wisconsin Department of Natural Resources
Madison, WI
KENAI RIVER WATERSHED PROJECT

PROJECT AREA DESCRIPTION
Bordered on the West by Cook Inlet and on the East by Prince William Sound, the Kenai Peninsula extends out over 150 miles into the Gulf of Alaska. Diverse landforms are found throughout the Kenai River Watershed. Mountainous regions provide the headwaters for the Kenai River which runs to the estuarine and wetland systems along the coast. The Kenai River flows uninhibited by dams and other structures; it has been called the home of the last great salmon run in the Northwest.

A combination of landform variety and maritime weather patterns account for the vegetative diversity in the region. White spruce can be found at higher elevations. Kenai paper birch, quaking aspen, stunted black spruce, and coastal western hemlock are all present in the watershed. Willow species occupy riparian areas. Commercial and sport fishing are the predominant economic and recreational activities. Additional land uses include timber harvesting, other forms of recreation, and federal and state parks. Approximately 44% of land along the Kenai River is privately owned.

ECOSYSTEM STRESSES
A spruce beetle infestation is stressing tree stands in the watershed. According to a Nature Conservancy study, timber harvesting could become a significant source of stress. The most severe impacts of timber harvesting includes habitat fragmentation, sedimentation, alteration of biological assemblages, and alteration of surface water flow. Yet, the draining and filling of wetlands has had the most negative effect on the area’s natural systems. In addition to the impacts mentioned for timber harvesting, draining wetlands also causes eutrophication, altered water chemistry, and habitat degradation. Habitat destruction along the banks of the Kenai river has occurred due to sportfishing and the construction of private docks and structures, negatively impacting salmon spawning and movement. Road construction, land development, and the removal of riparian vegetation are also significant stresses.

PROJECT DESCRIPTION
Residents within the watershed had been contacting the regional office of The Nature Conservancy (TNC) for information about managing lands in the watershed. In early 1993, the Alaska Department of Fish and Game (DFG) and the U.S. Environmental Protection Agency (EPA) asked TNC to become formally involved in conserving the Kenai River Watershed. EPA asked TNC for conservation priorities for watershed lands and recommendations for effective public and private conservation actions. TNC has completed an in-depth stress assessment that determined and ranked the watershed’s subsystems, stresses, and sources of stresses.

TNC has just hired a field representative who will be located within the project site area. No other national environmental organization is active in the watershed although there are several local river-based groups. The field representative will be responsible for building coalitions among local stakeholders and landowners and providing technical assistance to their projects. The field representative will regularly meet with officials from the U.S. Forest
**KENAI RIVER WATERSHED PROJECT -- continued**

Service, U.S. Fish and Wildlife Service, state agencies, the timber industry, regional and village native corporations, and local landowners.

Specific projects will be further identified through contacts with community members and land managers. A land trust, the establishment of a resource center, and a watershed alliance were mentioned as possible activities for the field representative to develop. The TNC representative has also been charged through EPA funding to design and implement a conference in the fall of 1995. The conference will bring together landowners, land managers, and users of the Kenai River to exchange thoughts, ideas, concerns, and information regarding the maintenance of the river system’s health.

**PRESENT STATUS & OUTLOOK**

In mid-March, 1995, EPA approved funding allowing TNC to hire the field representative. Most stakeholders are aware of TNC’s efforts in the watershed; the field representative will be conducting outreach efforts on those groups not yet contacted.

Factors Facilitating Progress

The livelihood of many residents depends on the river’s resources; examples of salmon decline in other parts of the Northwest concern local residents. Public awareness and increasing involvement to protect health of the river have created a receptive environment for TNC to undertake its work. A better understanding of the area’s natural systems and the willingness of local residents to manage the river with a new understanding are required for future progress.

Obstacles to Progress

There have been no significant obstacles to date. However, different views on the causes of ecological problems, what management actions should be taken, and competing political agendas could cause difficulty as the project advances.

Contact information:

Mr. Randall H. Hagenstein
Associate State Director
The Nature Conservancy of Alaska
421 West 1st Avenue, Suite 200
Anchorage, AK 99501
(907) 276-3133
Fax: (907) 276-2584
**Location:**
Northeastern Kansas

**Project size:**
8,616 acres

**Initiator:**
Kansas State University

**Konza Prairie Research Natural Area**

**Project Area Description**
The Konza Prairie Research Natural Area consists primarily of a pristine native tallgrass prairie, interspersed with narrow strips of oak-hackberry forest in riparian areas. More than 450 plant species are present in this area, only a handful of which are non-native. The Konza Prairie contains the entire watershed of Kings Creek, and is therefore less susceptible to land management practices outside its borders. The prairie is situated within the Flint Hills, which represent the largest contiguous tract of unplowed native tallgrass prairie in the country. The Flint Hills run south in a 50-mile-wide strip from the Kansas-Nebraska border to northeastern Oklahoma. Most of the Flint Hills are managed by private landowners for seasonal cattle grazing, including the lands bordering the Konza Prairie on the East, South, and West. Nevertheless, since these lands are very similar in species composition and ecosystem integrity, they function as effective buffers for the Konza Prairie.

**Ecosystem Stresses**
Although the Konza Prairie experiences some human induced stresses, none have a significant impact. The reasons for this are three-fold: First, the Konza Prairie is used primarily for scientific research and public education; second, it is nearly surrounded by a buffer area; and third, the Prairie contains an entire watershed. Residential development of small tracts of land north of the Konza Prairie is of some concern, since it makes it more difficult to minimize human impact.

**Project Description**
The Division of Biology at Kansas State University saw a need for a large-scale, long-term ecological research center in the tallgrass prairie region. In 1971, the current Konza Prairie Research Natural Area came up for sale. It was subsequently purchased by The Nature Conservancy (TNC) with the funds of an anonymous donor, to be managed by the University's Division of Biology.

The goals of the Konza Prairie management effort are the preservation of a large tract of tallgrass prairie, as well as biological research. The effect of fire and varying fire regimes on the prairie ecosystem has been a major research thrust. In 1979, the Konza Prairie was designated as a UNESCO (United Nations Educational, Scientific, and Cultural Organization) Man and the Biosphere Reserve. In 1980, the Konza Prairie became one of the first six sites in the Long-Term Ecological Research Network of the National Science Foundation (NSF). (This network currently consists of 18 sites.) In 1987, the major research focus expanded with the reintroduction of a herd of American bison, a native grazer. Research now concentrates on the effect of grazing in combination with fire. The diversity of experimental grazing treatments will be broadened in 1996. Faculty from Kansas State University and many other regional universities conduct research at this extraordinary site.

Management strategies for the Konza Prairie Research Natural Area include the use of prescribed burning and grazing in a mosaic across the landscape to maintain natural processes and heterogeneity. Fire management is generally coordinated with the private owners of the lands surrounding Konza.
Prairie. External human-induced impacts to the area are prevented or minimized, and activities that would introduce significant disturbance are prohibited. The removal of native plants and animals and introduction of non-native plants or animals are also prohibited.

On a long-term annual basis, the following factors are monitored: species composition, diversity and populations of plants, birds, mammals, and insects, primary productivity, weather, water quality, health of the bison herd, invasion of woody vegetation, soil biota, and ecosystem nutrient cycling processes. Monitoring efforts include wildlife populations on surrounding privately owned lands. Based on the results of monitoring, management strategies are refined or adjusted.

PRESENT STATUS & OUTLOOK
Since the inception of the Konza Prairie Research Natural Area, many of the research goals have been realized. In addition to numerous publications, a long-term database has been developed on tallgrass prairie ecosystem processes and patterns. Understanding has increased significantly concerning the role of frequent fires and native grazers in the ecosystem, biodiversity, ecosystem processes, population dynamics, among others.

Factors Facilitating Progress
Several factors have contributed to the success of the Research Natural Area. They include the pristine conditions of the ecosystem when the project started, the containment within the project area of a large watershed, the proximity of Konza Prairie to Kansas State University, the cooperative arrangement with TNC, as well as funding and commitment from NSF, Kansas State University, and Kansas Agricultural Experimental Station. In addition, the commitment and cooperation of numerous scientific investigators has been very helpful.

Obstacles to Progress
The confounding influence of natural grassland fires have posed an obstacle to research, as it influences fire frequency beyond the control of scientists. Other problems include adjacent landowner concerns and low start-up funds.

Contact information:
Dr. David Hartnett
Kansas State University
Division of Biology
Ackert Hall
Manhattan, KS 66506
(913) 532-5925
Fax: (913) 532-6653
E-mail: dchart@ksuvm.ksu.edu
**LAJAS VALLEY LAGOON SYSTEM**

**PROJECT AREA DESCRIPTION**
Located within the larger Caribbean Watershed Ecosystem (which includes Puerto Rico and the U.S. Virgin Islands), the Lajas Valley runs roughly east-west on the island of Puerto Rico, connecting at both ends with the ocean. The lagoon system is located in the flat valley floor and consists of four lagoons: Guanica, Anegado, Laguna Cartagena, and Boquerón. Boquerón is a Commonwealth (of Puerto Rico) Refuge and Laguna Cartagena is protected as a National Wildlife Refuge; the other two lagoons are in private ownership or administered by Commonwealth agencies. The rest of the valley is now predominantly in sugar cane and pasture (guinea grass) for cattle grazing. The mountains on either side of the valley, also part of the ecosystem, are partially forested in native hardwoods and exotic mesquite and acacia sometimes used for limited charcoal production.

Federally-listed threatened and endangered species in and around the Lajas Valley reflect the diversity of the landforms, from coastal to mountains, and include the yellow-shouldered blackbird, Puerto Rican nightjar, brown pelican, Puerto Rican crested toad, and several plants in the adjacent hills.

**ECOSYSTEM STRESSES**
The valley has endured most of the stresses: nearly all of it has been converted to agriculture. Agricultural practices and grazing result in non-point source pollution, and to a lesser degree, point-source pollution. Hydrological disruption of the lagoon system has been significant, another result of the land conversion. Exotic species have largely replaced the native vegetation in the valley. By themselves, exotics are not responsible for the ecosystem’s decline since the habitat has already been altered. Finally, some of the land has been converted to urban uses, with corresponding point-source pollution and road construction. The mountains have been far less impacted, but still suffer from clearing, development, and exotics encroachment.

**PROJECT DESCRIPTION**
The lead agency on this effort is the U.S. Fish and Wildlife Service (FWS), which initiated this effort in 1994 as part of the agency’s new ecosystem management initiative. In particular, the Lajas Valley was included in FWS’s Caribbean Ecosystem management plan because of unique resource values and significant public interest in the valley, including local citizen conservation groups working to protect specific lagoons. This effort is expected to last five years, resulting in cooperative agreements with Commonwealth agencies and non-profit institutions.

A draft management plan for the Caribbean Ecosystem includes five major goals, with the Lajas Valley the focus of one of the goals. Specifically, the plan calls for preventing further decline of the unique lagoon ecosystem and its restoration to pre-1970s condition by the year 2000. Specific objectives are drawn up for each goal, and include elements such as funding, administrative priorities, creating partnerships and/or committees with other institutions, and identifying specific projects. While FWS personnel put together the draft plan and did not seek stakeholder involvement officially, they are working to build partnerships with
Commonwealth agencies (Agriculture, Natural Resources), citizens, non-profit conservation groups, municipalities (Lajas, Guanica), and the Puerto Rico Electric Power Authority (PREPA). FWS is expected to lead implementation of specific strategies in coordination with Commonwealth agencies.

**Present Status & Outlook**

A draft Caribbean management plan has been prepared. No implementation has yet occurred, nor has monitoring of ecosystem attributes been determined yet. The future of the effort has been described as dependent on funding and political support from both Commonwealth and federal sources (Congress, FWS).

**Factors Facilitating Progress**

Time constraints and deadlines have proven to be both problematic and beneficial to the process, the latter resulted in the plan being developed rapidly, probably sooner than might have happened otherwise. The plan helped to stress the need for projects that had been previously identified. Support and cooperation from citizen conservation groups and the Lajas Mayor’s office have been instrumental. Finally, commitment and dedication of FWS personnel have been especially important to this process, as the Lajas Valley is recognized by agency personnel as well as the general public as a particularly unique, threatened ecosystem.

**Obstacles to Progress**

As mentioned above, short deadlines imposed by the national FWS office did not allow enough time to develop a more comprehensive plan. No additional personnel and only limited resources have been provided for this effort thus far: the plan development has been an added responsibility for field personnel. Political opposition is expected to be significant, especially if and when recommendations are made to remove agricultural areas from active production. This resistance will be manifest from private landowners, leaseholders, and the Commonwealth, which allows agricultural production on some of its land in the valley. Finally, lack of funding is a concern, from both FWS and the Commonwealth, the latter likely being asked to cost-share on the restoration efforts.

**Contact Information:**

Mr. James Oland
Field Supervisor
U.S. Fish & Wildlife Service
Caribbean Field Office
PO Box 491
Boqueron, PR 00622
(809) 851-7297
Fax: (809) 851-7440
E-mail: R4FWE_MAPR@MAIL.FWS.GOV
Lower Rio Grande Ecosystem Plan

Project Area Description
The Rio Grande River is separated into three distinct sections, the Upper river from its headwaters through Colorado, the Middle in New Mexico, and the Lower from El Paso to its mouth at the Gulf of Mexico near Brownsville, Texas. The Lower river watershed is over 600 miles long from El Paso to the Gulf, and approximately 50 miles wide on either side of the river, which forms the Texas-Mexico border. Based on habitat, the Lower Rio Grande ecosystem is further divided into three sub-sections: a lower sub-section, referred to as the Valley, and including coastal features; a middle, subtropical forest subsection, with scrub and slash forest; and the upper, scrubland Chihuahuan Desert stretching to El Paso, and featuring both lowland desert and highland mountains with coniferous and pine forests.

Over 30 federally-listed threatened and endangered species occur in the Lower Rio Grande, including the ocelot, northern Aplomado falcon, brown pelican, and Walker’s manioc in the Valley. Moving upriver, the star cactus, peregrine falcon, piping plover, and Texas ayenia can be found. Also, more than 50 state-listed species are present, including the Texas tortoise and black-spotted newt.

Row-crop agriculture, particularly sugar cane, occupies 95% of the Valley, along with significant industrial and urban development. Moving upriver, grazing becomes more dominant. The middle sub-section is far less disturbed, with a greater concentration of preserved lands, including wilderness areas. Finally, the upper sub-section is again dominated by urban and industrial development. Three National Wildlife Refuges, one National Park, and several state preserves are located within the Lower Rio Grande region.

Ecosystem Stresses
Conversion to agricultural, urban, and industrial uses is the dominant stress in the Valley as well as in the upper sub-section near El Paso. Associated stresses occur from agricultural practices, such as air pollution from burning sugar cane fields, and insecticide and herbicide pollution. Similarly, urban development has led to significant road construction and non-point and point-source pollution from industry, especially near El Paso from both sides of the river. In addition, as a result of increased trade resulting from the North American Free Trade Agreement (NAFTA), 10-15 new international bridges over the Rio Grande have been proposed, posing an additional threat. Hydrologic disruption has occurred from flood control structures built to protect against hurricanes, including two international dams on the Rio Grande. Also as a result of NAFTA, Mexico has proposed extending the Intracoastal Waterway into that country, which would cause significant habitat destruction and modification.

In the middle sub-section, grazing and range management are the predominant stresses, along with lignite mining. Finally, illegal poaching of cacti for xeriscape landscaping, especially the star cactus, causes significant harm.

Project Description
The U.S. Fish and Wildlife Service (FWS) initiated this effort in April 1994 as a part of the agency’s new ecosystem.

Lower Rio Grande Ecosystem -- continued
management initiative. An initial meeting of supervisors from FWS's Region 2 (TX, OK, NM, AZ) resulted in the formation of an ecosystem team of 9-10 members. The team developed a management plan for the Region, including the Lower Rio Grande, which was given a high priority because of expected NAFTA impacts and the high number of endangered species. While a Lower Rio Grande planning document was drawn up entirely by FWS personnel, the effort included partners from outside the agency, but only on an informal basis. This planning process included four open houses, where participants from the public and other institutions (state and federal) were asked to fill out a questionnaire and to comment on the draft management plan.

The Lower Rio Grande plan contains one extremely broad goal of protecting and enhancing biologic diversity. Several objectives were designated, along with specific action items to achieve these objectives. Even though FWS controls relatively little land in the area, the plan does not apply exclusively to Wildlife Refuges. In fact, some of the activities included in the plan have been characterized as being no different than those prior to the plan's inception, except that they are now better coordinated under an ecosystem rubric. Thus the plan is more appropriately described as an internal FWS working document, subject to change.

A variety of stakeholders were involved informally in the document development or specific projects. These include several other federal agencies, Texas state agencies, agricultural interests, environmental and land conservation organizations, industry, private landowners, and the general public. According to FWS, involvement should have been solicited from the several major universities located in the region.

**PRESENT STATUS & OUTLOOK**

In addition to the working document, some on-the-ground projects have been initiated as part of this effort, several on non-FWS lands. Perhaps the greatest impacts, however, have been internal to FWS. The document is being used to guide FWS's "way of doing business" in the Lower Rio Grande, leading to improved communication among personnel and coordination among discrete projects; in the past, projects were independently developed and implemented. However, achievements are largely limited to administrative functions: no biological monitoring system has been established.

**Factors Facilitating Progress**

The FWS's open mindedness and willingness to change have been viewed as instrumental in driv-
LOWER ROANOKE RIVER BIORESERVE

PROJECT AREA DESCRIPTION
In northern North Carolina, the Lower Roanoke River begins at Roanoke Rapids (the fall line), where the river spills from the Piedmont. Moving east, the river empties into Albemarle Sound, the estuary that joins the Atlantic Ocean past the Outer Banks barrier islands. The primary boundaries of the project area are the flood plain walls on either side of the Lower Roanoke, varying from 1 to 5 miles wide. Secondary project boundaries are the river’s watershed. The larger ecosystem includes the estuary and islands, as well as the watersheds of the Lower Roanoke and other rivers that empty into the Sound. (These are not part of the project area.)

The Lower Roanoke flood plain consists of swamp forest and hardwood bottomlands, including old-growth bald cypress and tupelo. Over 200 species of birds, seven heronries, black bear, and bobcat can be found there. A few federally-listed threatened and endangered species are present, such as the bald eagle and several mussels.

Forestry and row-crop agriculture are the primary land uses, the former for furniture-grade lumber. Hunting and fishing have a long and significant tradition there. Several towns and paper mills are located in the region. Ownership is predominantly private, with significant holdings by large paper and timber companies. Other holdings are in state, federal, and private conservation.

ECOSYSTEM STRESSES
Hydrologic disruption of the river is the most significant stress. Three dams were built on the river 40 years ago, giving rise to water quantity and quality problems. Irrigation for agriculture draws significant water from the river, with associated non-point-source pollution. Fish populations have collapsed on the river, in part due to commercial overfishing, but possibly due to the hydrologic disruption as well. Forest clearing for agriculture, which increased soon after the dams allowed frequently-wet fields to dry out, has reduced neotropical bird habitat. Timber management, specifically forest roads which also disrupt hydrology and habitat, has been a significant stress. Other stresses include point-source pollution from the paper mills, and exotic species ( Asiatic clam, cowbirds, and honeysuckle).

PROJECT DESCRIPTION
The Nature Conservancy (TNC) is the lead institution of this effort, having first become involved in the region in the early 1980s with several small land purchases. Also, preparations by Virginia Power to relicense its three dams on the river have led to greater awareness of water quantity and quality issues. Following efforts to involve other cooperators, TNC’s effort was expanded with the inclusion of the Lower Roanoke as part of their “Last Great Places” campaign. This was a result of a cooperative 21,067-acre land management agreement signed in November 1994 with Georgia-Pacific Corporation (GP), one of the major industrial landowners.

The GP-TNC Roanoke Ecosystem Partnership, or GREP, includes a cooperative management committee, made up of 10-15 participants with two permanent members from both GP and TNC.
and several other invited participants from academia, North Carolina State Wildlife Resources Commission, Natural Heritage program, U.S. Fish and Wildlife Service (FWS), and several environmental organizations. Only the GP and TNC members have voting rights, so that each side effectively holds veto power. Unresolvable disagreements are to be settled by binding arbitration.

**PRESENT STATUS & OUTLOOK**

By mid-1996, an ecosystem management plan will be developed for Georgia-Pacific’s co-managed lands. Goals are expected to include ensuring economic viability of these lands, maintaining or restoring the ecosystem, and mimicking pre-dam hydrologic conditions as much as possible without restricting current uses of the river.

The GREP agreement includes permanent conservation easements in addition to co-managing lands. The entire 21,067-acre area will be declared a black bear refuge, and Georgia-Pacific is using helicopters to harvest high-grade timber, reducing traditional forestry stresses. In all, nearly 50,000 acres have been protected in the Lower Roanoke in some form, including the GREP lands, Roanoke River (State) Gamelands in Martin County, Roanoke River National Wildlife Refuge in Bertie County, and TNC’s properties, including Devil’s Cut Natural Area.

Research on hydrology, vegetation, animal populations, and alternative forestry practices is underway with several universities in the region, and will serve as a basis for developing the ecosystem management plan.

**Factors Facilitating Progress**

Agency support at all levels -- federal, state, and local in the case of one county -- has been instrumental. Ironically, the surfacing of environmental problems, including the declining fish populations and water quality, has raised awareness about the need for ecosystem restoration and conservation. Also, the dam relicensing process requires consideration of water quality and quantity effects of the dams. Long-term TNC presence and efforts -- carrying out public education, serving as a neutral third party mediator, and assisting the communities and companies in economic development and land management -- have allowed this project to progress. Finally, participation of wildlife agencies has been cited as important to the effort.

**Obstacles to Progress**

The most significant obstacle to this effort is ecological: restoring the river’s hydrology will be very difficult due to the effects of the dams. In only 40 years since the dams were built, the area has experienced significant alteration and stress. Public resistance to conservation efforts has been and will continue to be significant. Counties are concerned about a reduction in the land tax base due to the creation of conservation lands. Another source of resistance has been in the disruption of traditional hunting rights, which have been passed down through generations, and whose exclusivity has been terminated on public lands.

Because of the region’s poor economic condition, industrial development is being encouraged along the river. Conflict between this policy and preservation efforts is expected. Finally, as the federal, state, and TNC acquisition efforts are voluntary, securing additional lands for protection is not guaranteed.

**Contact information:**

Ms. A. Este Stifel  
Director, Roanoke River Project  
The Nature Conservancy  
Suite 201  
4011 University Drive  
Durham, NC 27707  
(919) 403-8558  
Fax: (919) 403-0379  
E-mail: estifel@tnc.org
LOWER ST. JOHNS RIVER ECOSYSTEM MANAGEMENT AREA

PROJECT AREA DESCRIPTION
The Lower St. Johns River Ecosystem Management Area encompasses the River’s watershed from Lake George north to the River’s mouth at Jacksonville, Florida. This segment of the river is essentially an elongated lagoon, having a low gradient and narrow flood plain, and containing numerous tributary streams and embayments. The entire lower St. Johns is subject to tidal influences and short-term reverse flows.

The Basin is relatively low and flat, with several ridge systems bordering the drainage area, and is characterized by many lakes and fresh and salt water marshes and other wetlands. Bottomland hardwood forests commonly border the river and tributaries. The area is important for migratory and year-round waterfowl.

The Basin’s condition ranges from small pockets of near-pristine areas to heavily urbanized regions, including highly industrialized sites along the river.

ECOSYSTEM STRESSES
The primary stress has been conversion to urban/suburban, industrial, and road uses. Development is considered uncontrolled in the region, with much of it abutting wetlands. Water pollution, mostly non-point source, is another major stress. As a result of the conversion and its proximity to sensitive areas, fire suppression is a significant secondary stress, affecting the composition and extent of the native vegetation, which is fire-dependent. Other, less significant, stresses include grazing, recreation, localized mining, and poor timber and forest management.

PROJECT DESCRIPTION
In 1993, the Florida state legislature consolidated two state natural resource agencies into the Department of Environmental Protection (DEP). In that legislation was a mandate for the DEP to “manage and protect systems in their entirety.” As a result, DEP created six water basin management areas, including the Lower St. Johns, in February 1994. The first phase of this effort has been to draw up a conceptual recommendations document, using voluntary, interagency committees to reach consensus on what those recommendations would be. The committee members have included representatives from DEP, the federal government (Environmental Protection Agency, Fish & Wildlife Service, Army Corps of Engineers), City of Jacksonville, St. Johns River Water Management District, County and Regional planners, large landowners, environmentalists, and citizens.

The agency’s goals with regard to ecosystem management are to: 1) better protect and management Florida’s ecosystems; 2) base agency structure and culture on ecosystem management; and 3) develop a public ethic of shared responsibility for the environment. The Lower St. Johns recommendations document will contain 12-13 goals more specific to the Basin. For example, to achieve the first broad goal described above, the initial focus of the Basin document will be to: 1) develop a comprehensive information base on the water basin, primarily an environmental inventory which will involve
obtaining and standardizing new and existing data, and coordinating between agencies on information exchange; and 2) control urban growth.

**PRESENT STATUS & OUTLOOK**

This conceptual planning document was published in June 1995. While the primary objectives of this phase of the project have been achieved according to DEP -- i.e., greater and better interagency communication, having a clearer image of environmental inventory needs -- this document does not include implementation strategies, with resulting impacts of this effort on private and even public lands still unclear. The project’s future depends in large part on the state legislature. While the original 1993 mandate was directive, it was very broad, and further definition from the legislature or governor will be necessary.

**Factors Facilitating Progress**

Leadership by the DEP Secretary was instrumental in getting all six of the water basin efforts off the ground and progressing towards accomplishing their goals. The Secretary’s vision and Governor Lawton Chiles’s support were important to the initial progress of this effort as well. The legislative mandate, despite being broad, was instrumental in allowing the effort to progress.

**Obstacles to Progress**

Not having a clear directive from the legislature on how to achieve definition of ecosystem management has been a major obstacle to this effort. Further, the project area is not well understood, primarily because there is no environmental inventory of the watershed as yet. Obtaining participation on the planning committees has been difficult, especially initially, and also because participation is purely voluntary. At first, the effort was not well known, and was viewed as an opportunity for participants to air grievances. In general, resistance to changing from traditional practices towards a new ecosystem management paradigm can be expected from various sectors (agency, general community). Challenges to the eventual plan are possible from stakeholders, particularly industry and environmentalists. Legislative and implementation uncertainty present obstacles to visioning and continuity of DEP’s effort. Finally, it is unclear who would ultimately implement management strategies, and how effectively this project is being developed in conjunction with efforts of other institutions.

Additional needs for the project to progress including improving links with other agencies and combining expertise. Finally, increased citizen education on ecosystem management, and in particular this effort, are needed.

**Contact information:**

Ms. Jan Brewer  
Environmental Specialist  
Florida Department of  
Environmental Protection  
Ste 200B, 7825 Baymeadows Way  
Jacksonville, FL 32256-7577  
(904) 448-4300  
Fax: (904) 448-4366  
E-mail: Brewer_J@JAXI.DEP.STATE.FL.US
Located along the Arizona-New Mexico border, this extensive region consists of the Animas and Peloncillos Mountain Ranges, embedded in the lower elevation Chihuahuan, Sonoran, and Great Basin Deserts. Within these "mountain islands and desert seas" exists a diverse array of vegetative communities including desert scrub and desert grasslands, pinyon, juniper and evergreen oak woodlands, Apache and Chihuahuan pine, and remnants of Southern Rocky Mountain vegetation, including ponderosa pine, Douglas-fir, and aspen. These communities support a host of state- and federally-listed threatened and endangered species, including the New Mexico ridgenose rattlesnake, Sanborn's long-nosed bat, Lowland leopard frog, and gray wolf.

The Borderlands Region is divided almost equally between private and public ownership, including the Gray Ranch, a 500-square-mile preserve and working ranch owned by the locally-based Animas Foundation with a conservation easement held by The Nature Conservancy. Current land uses on the largely unfragmented open spaces that characterize this region are almost entirely cattle ranching.

**ECOSYSTEM STRESSES**

A 100-year history of fire suppression in the region has been a major influence in the conversion and loss of native grasslands to woody shrublands. Also, pressures from human use and development threaten increased landscape fragmentation in the region. The loss of the unfragmented "open space" character of western rangelands and the loss of productive grasslands and regional ecological diversity have concerned environmentalists and ranchers alike in the Borderlands Region.

**PROJECT DESCRIPTION**

Concerned that their livelihood and "open space way of life" was threatened by the loss of productive native grasslands and potential development pressures that would lead to fragmentation of western rangelands, a grassroots coalition of private landowners and ranchers formed The Malpai Borderlands Group in 1990 to address these threats. Working by consensus, the group's goal is "to restore and maintain the natural processes that create and protect a healthy, unfragmented landscape to support a diverse, flourishing community of human, plant and animal life in the Borderlands Region." The group works closely with local conservation districts, universities, and federal and state agencies, and has received significant support in its planning efforts from The Nature Conservancy and the Animas Foundation. Recently, the Foundation has proposed the development of monitoring protocols to guide ranchers and technicians in their monitoring efforts.

Restoring the area’s natural fire regime has been the major thrust of this project so far. In an attempt to encourage agencies responsible for fire suppression to let fires burn where possible, the group has developed strategies to help guide agencies in their response to fires throughout the project area. As a result, large scale prescribed burns across public and private ownerships have been scheduled. To prevent encroaching subdivision development, the group has developed a voluntary...
Ecosystem Management in the United States: An Assessment of Current Experience

Grass banking program. By donating a permanent conservation easement on their own property, ranchers can receive needed grass for their livestock from other ranching properties.

Present Status & Outlook
Although the project still remains in its planning stages, the accomplishments that have been realized by the group are unprecedented. Not only have landowners and state and federal agencies significantly increased their level of cooperation, communication and positive interaction, they now look beyond the borders of their own lands to focus on management of the entire landscape.

Factors Facilitating Progress
Because the Borderlands Region has remained relatively unfragmented, the potential to use natural processes such as fire to restore and maintain the structure and composition of naturally occurring vegetation still exists. Furthermore, the people involved are committed to improving communication and cooperation, as well as maintaining the integrity of the landscape and the lifestyle it provides.

Obstacles to Progress
Due to the high number of sensitive species in the region, responding to NEPA requirements has proven to be a difficult process for some landowners in the Malpai region. Furthermore, conventional notions of fire and the role of fire in these ecosystems have been in conflict with the project's "let it burn" policy. Despite the great strides made in cooperation between stakeholders, the fragmented ownership pattern of the region still makes cooperative efforts difficult, particularly with the high turnover of agency personnel which prevents landowners from developing working relationships with the agencies. Finally, the lack of adequate funding may restrict programs in the future.

Contact Information:
Dr. Ben Brown
Program Director
Animas Foundation
HC 65, Box 179-B
Animas, NM 88020
(505) 548-2622
Fax: (505) 548-2267
E-mail: 617-6022@mcimail.com
MARATHON COUNTY FORESTS

PROJECT AREA DESCRIPTION
The Marathon County Forests consist of seven tracts of forest in Marathon County, Wisconsin. In presettlement times, the county’s moraines, outwash, and drumlands were covered by northern hardwoods-hemlock forests and mixed pine-oak forests. However, the vegetation underwent a substantial change around the turn of the century when most of the area was logged and severe fires raged through the landscape. As a result, almost 75% of the Marathon County Forests now consist of an aspen-hardwood cover type. Other vegetation includes jack pine, white pine, red pine, northern hardwoods, and hemlock.

Wildlife species common to the Marathon County Forests include numerous species of birds, reptiles, amphibians, fish, and mammals. Some examples are migrant neotropical songbirds, migratory waterfowl, turkeys, deer, black bears, and fishers. In addition, the tawny crescent spot butterfly, which has been proposed for federal listing, occurs in the area.

In addition to their ecosystem functions, the Forests serve two main purposes: timber management and recreation. Timber sales are established on 500 to 600 acres per year. A variety of cutting techniques are employed, including clear cuts, selection cuts, and shelterwood cuts. Recreational activities include bird watching, hunting, all-terrain vehicle use, mountain biking, cross-country skiing, snowmobiling, and horseback riding.

ECOSYSTEM STRESSES
Recreational trails and logging may lead to habitat fragmentation, which in turn may pose a threat to migrant neotropical songbirds. In addition, conversion of adjacent lands for housing stresses the forests. An increasing number of people live in close proximity to the forests and “use the forests as their own backyards,” resulting in an increase in garbage, damage to trees, and in illegal posting of county land. Furthermore, recreational uses impact the Forests by disrupting habitat for species such as the black bear, causing trail erosion, and reducing the overall wild character of some areas of the Forests.

PROJECT DESCRIPTION
Management of Marathon County-owned forest land began in the mid-1940s. Since 1966, comprehensive forest plans have been written and revised once every 10 years. Whereas management plans used to focus on the production of timber, deer, and grouse, the 1995 planning effort is attempting to take a broader, ecosystem approach to management.

In order to create a plan that takes the diversity of interests in the Forests into account, an Advisory Committee has been formed to assist in gathering information, discuss issues, and recommend management options. This Committee consists of landowners, representatives of recreational and environmental interests, loggers, timber industry, local government, and the Wisconsin Department of Natural Resources. This Committee will advise the Forestry Recreation and Zoning Committee, which in turn makes recommendations to the Marathon County Board.

Although specific goals and strategies...
MARATHON COUNTY FOREST -- continued

are still under development, an example of strategies to be included in the plan is the regeneration and maintenance of presettlement forest types, such as hardwood-hemlock and mixed oak, where practical. Natural regeneration methods as well as planting will take place.

Furthermore, in cooperation with the University of Wisconsin at Green Bay, a two-year migrant neotropical songbird census will be conducted in order to determine how current and past management practices affect these birds. Based on the results of these studies, timber sale designs, recreation development, land acquisition, and management agreements with adjoining landowners may be adjusted.

PRESENT STATUS & OUTLOOK
Since this management effort is still in the planning stages, none of its goals have been realized yet. However, a bird census and hemlock seedling establishment were to begin in May 1995.

Factors Facilitating Progress
The commitment of many people to the Marathon County Forests has been a very valuable component in the development of the Forest Plan. Their willingness to give time and thought to the planning effort has been very helpful. In addition, strong interest and encouragement for ecosystem management at both the state and the local level have been very helpful. Another important factor is the interest of state universities, and the willingness and availability of graduate students to help work on project proposals. The development of a Geologic Information System database (GIS) has also been beneficial.

Obstacles to Progress
One of the difficulties in the management of these Forests is the lack of easily analyzable data concerning the area. A second difficulty is the development of housing on lands adjoining the Forests, preventing the County Forest Administrator from acquisition of these areas for the purpose of lessening fragmentation. Conflict between and compatibility of user groups is sometimes problematic. It is anticipated that posing future restrictions on certain recreational activities may prove to be controversial. The public is still focusing on forest outputs, rather than on maintaining ecosystem integrity.

Contact information:
Mr. Mark Heyde
Marathon County Forest Administrator
Marathon County Forestry Department
Courthouse
500 Forest Street
Wausau, WI 54403-5568
(715) 847-5267
Fax: (715) 848-9210
MARYS RIVER RIPARIAN/
AQUATIC RESTORATION PROJECT

PROJECT AREA DESCRIPTION
Located 30 miles east of Elko, Nevada, Marys River is one of the major tributaries to the Humboldt River, which is part of the Great Basin watershed, a desert environment characterized by big sagebrush with perennial grasses such as bluebunch wheatgrass. Today, the area is home to more than 42 mammals, 87 birds, 6 fish, and 6 reptiles and amphibians. The area provides habitat for 7 candidate species for federal protection.

Historically, the Lahontan cutthroat trout, a federally-listed threatened species, occupied over 2,200 river miles of the Humboldt River watershed, including Marys River. Today, it exists only on 313 river miles, and Marys River is considered to have high potential for the trout’s recovery.

The project area is primarily under control of the U.S. Bureau of Land Management (BLM), and all of the public lands along the river have been closed to livestock grazing, the primary land use in the area.

ECOSYSTEM STRESSES
Conversion of the land to grazing and historical grazing practices have degraded the region’s habitat, especially along the river and its tributaries, which in turn has led to the reduction of the Lahontan cutthroat trout’s habitat. The herbicidal and mechanical clearing of riparian willow thickets and the accompanying channelization of streams has altered stream hydrology, resulting in a scarcity of high quality pools, sub-optimal stream bank vegetative cover and stability, and a lack of desirable stream bottom materials due to excessive sedimentation and elimination of habitat.

PROJECT DESCRIPTION
The trout was federally listed as endangered in 1970, then relisted as threatened in 1975 to facilitate management and restoration efforts. In accordance with the trout’s listing requirements, the Nevada Division of Wildlife (NDOW) prepared a Trout Fishery Management Plan for the Humboldt River basin, providing management recommendations and guidelines for all public landowners.

As a result of the NDOW plan, of which the U.S. Forest Service (USFS) and BLM were signatories, thus agreeing to cooperatively manage their lands, the current BLM Marys River Riparian/ Aquatic Habitat Management Plan (HMP) was completed in 1987. Its goals were to restore Lahontan cutthroat trout habitat with the objective of securing the delisting of the species and balancing use among various user groups within a multiple-use framework. While the plan did not specifically take an ecosystem management approach, BLM considers it to have similar intentions and will serve as a basis for a comprehensive ecosystem-based management plan to be developed.

The 1987 plan only covered public lands, and because of the fragmented landscape within the ecosystem, watershed recovery was not considered possible without similar improvements on non-public lands. To address those issues, a significant land exchange took place in 1991, in which a developer received 660 acres in Las Vegas in exchange for 47,000 acres, 65 miles of stream, and associated water rights in the Marys River watershed, boosting...
federal ownership to 80% of the land and 65% of the river. A master plan for the river was subsequently developed, with participation of a BLM Multiple Use Advisory Council already in place, representing a variety of interests (e.g., County Commissioners, adjacent landowners).

On-the-ground activities include extensive monitoring (for example, plant and animal populations, water temperature, water quality, visitor days) and management actions (prescribed burning, riparian planting, range and grazing practice improvements).

**Present Status & Outlook**

Many areas have shown habitat improvements, some as a result of targeted restoration activities, but a significant amount occurring without any direct activities other than removing livestock.

Two more land exchanges are pending, which would result in additional protected habitat. The effort has been featured by the “Bring Back the Natives” program, a cooperative national effort of BLM, USFS, and the National Fish and Wildlife Foundation to restore the health of aquatic ecosystems and their native species. Funding for the effort has come from federal and congressional sources, several gold mine operations or associations (as mitigation for mine damage occurring elsewhere), and several non-governmental conservation organizations associations.

**Factors Facilitating Progress**

Support for the effort, particularly the land exchanges, by BLM, local gold mines, other special interests, and to some degree by the Elko County government, is credited as the most important benefit to this project.

**Obstacles to Progress**

There has been local public skepticism as to the validity of this effort, primarily with regards to whether or not the habitat was degraded and in need of restoration. For example, there are claims that the trout’s demise occurred only after the backcountry was opened up to ORV use (i.e., fishing), and not as a result of grazing. Cooperation of all federal and state agencies has not been readily forthcoming, hindering data exchange and the ability to effectively coordinate management activities across ownership boundaries. Continued funding for personnel, equipment, research, monitoring, and yearly water rights assessments are described as additional concerns for the future.

**Contact information:**

Mr. Bill Baker
Bureau of Land Management
Elko District
PO Box 831
3900 East Idaho Street
Elko, NV  89802
(702) 753-0200
**MCPherson Ecosystem Enhancement Project**

**PROJECT AREA DESCRIPTION**

Mountainous terrain generally characterizes this 20,000-acre ecosystem on the Caribou National Forest in southeastern Idaho. Mountain maple is found within dense Douglas-fir forests. Choke cherry is the dominant shrub cover in the understory; pine grass grows on all the north-facing slopes. No threatened or endangered species are found there.

The ecosystem also serves as the municipal watershed for the town of Grace. Some sheep and cattle grazing occur in the forest. Snowmobiling, motor-biking, and hunting are the primary recreational uses.

**ECOSYSTEM STRESSES**

Natural and anthropogenic influences have combined to severely stress the ecosystem. Fire history studies indicate the mean fire return interval to be around 40 years with a mixed severity fire cycle. Most of the stands have missed two of the mixed severity fire cycles due to suppression by the U.S. Forest Service (USFS) and by private landowners managing for grazing. As a result, tree densities are well above those considered to be sustainable.

A drought has afflicted the region for nearly eight years, further stressing the dense stands as they compete for nutrients and water. The weakened trees have been highly susceptible to bark beetle infestations, which have killed over 20,000 Douglas-fir trees within the National Forest and adjoining Bureau of Land Management and state lands.

**PROJECT DESCRIPTION**

The drought, mortality from infestations, and thick stand densities have greatly increased the probability of a catastrophic wildfire in the forest. Concerned about the potential destruction of the community’s watershed, USFS staff in the Montpelier Ranger District began the project in June 1993 in order to rehabilitate 11,000 acres through helicopter salvage harvest and the reintroduction of fire. The goals of the project are to reduce the probability of catastrophic wildfire, promote conditions that minimize the potential for a loss in resource values due to fires and human activities, and provide salvageable timber to local mills.

Although the Caribou National Forest has had a timber program since the 1960s, the salvage sale is the first timber harvesting activity in the project area during 100 years of USFS stewardship. The salvage sale is considered necessary to remove excess tinder and create a manageable situation into which fire can be reintroduced. Fire will be used to thin the denser stands. Other project activities include the rejuvenation of aspen stands and leaving snags in place for birds and wildlife habitat.

National Environmental Protection Act procedures were followed during plan development. The local Sierra Club, Idaho Conservation League, Idaho Department of Fish & Game, and timber industry were heavily involved. Staff from the U.S. Fish & Wildlife Service participated to ensure that a whooping crane rearing site on a local farm would not be disturbed by helicopters.

**PRESENT STATUS & OUTLOOK**

About 500,000 of the 5 million board foot salvage sale have been removed.
**McPherson Ecosystem Enhancement Project -- continued**

from the site as of early 1995. In order for the project to continue as planned, the timber company had to fulfill its contract for removal of the remaining wood during the summer of 1995. Also, weather conditions in the Fall must provide a favorable burning window. The Forest Service considers the project a success because the timber removal has been satisfactory to all parties and implementation has occurred as planned.

**Factors Facilitating Progress**
The involvement of researchers, foresters, biologists, the timber industry, and environmentalists have allowed the project to proceed unobstructed.

**Obstacles to Progress**
There have been concerns from the State Fish and Game Department about the lack of big game hiding cover in the post-harvest stand densities after fire is reintroduced and impacts on soil productivity.

**Contact information:**
Mr. Bruce Padian
USDA Forest Service
Caribou National Forest
Montpelier Ranger District
250 South 4th Avenue
Pocatello, ID 83201
(208) 236-7500
Fax: (208) 236-7503
MESA CREEK COORDINATED RESOURCE MANAGEMENT PLAN

PROJECT AREA DESCRIPTION
The project area is a desert environment located at the confluence of the San Miguel and Dolores Rivers. This rough, broken mesa country, characterized by sandstone uplifts, is dominated by sagebrush in the deeper soil areas, and piñon juniper in the rougher, steeper country. A few federally-listed threatened and endangered species can be found there, including the peregrine falcon and bald eagle.

Location:
Western Colorado

Project size:
100,000 acres

Initiator:
U.S. Bureau of Land Management, Weimer Ranches (grazing permittee)

The project area is mostly federal land administered by the Bureau of Land Management (BLM), with private lands located in the deeper-soiled bottomlands where irrigation is possible. Ranching and livestock grazing are the predominant human uses.

ECOSYSTEM STRESSES
Livestock grazing and fire suppression, the latter due to livestock reducing the amount of fine fuels and aggressive firefighting, have been the major stresses to the ecosystem. Non-point source water pollution and hydrologic disruption have resulted from water diversions, livestock water pipelines and reservoirs, uranium mining, and the placement of roads adjacent to water courses. Exotic species such as tamarack, Russian napweed, and whitetop have invaded riparian areas in particular.

PROJECT DESCRIPTION
This effort was begun in 1992 by the BLM and the project area’s grazing permittee, Weimer Ranches, Inc., in order to develop an interdisciplinary approach to resource management, in contrast with the historic single resource approach (managing for livestock grazing). A management plan was developed in May 1993, whose principle goal is to “Emphasize the opportunity to look at the landscape mosaic and improved diversity in the ecosystem while protecting resource values with the participation of all interested parties.” Strategies for achieving better management of the land include involving the public and stakeholders more in land management decision making, as well as specific grazing management and alternate fire suppression guidelines. Monitoring of ground cover and water flow and quality will be used to gauge the effectiveness of new management practices.

This effort is designed to involve Weimer Ranches in the decision-making process on grazing management taking place on public and co-mingled private lands on a much larger scale than previously allowed.

The management plan was co-developed by BLM and the residents of the area, with significant public participation primarily through open public meetings facilitated by a neutral BLM employee unfamiliar with grazing issues or practices, and comment periods. Other activities in the plan development process have included field trips and open, semi-annual biological planning sessions.

In addition to the BLM and Weimer Ranches, stakeholders involved in the process have included representatives from Colorado Division of Wildlife, local government, citizens, mining interests, other federal agencies (Forest Service, Fish & Wildlife Service, Natural Resources Conservation Service), The Nature Conservancy, and local...
Environmental organizations.

**Present Status & Outlook**

Major outcomes of this effort have included improved communication and cooperation among stakeholders, a better understanding by stakeholders of the effort’s goals, and a common vision of what is needed for the land. There have been limited improvements in on-the-ground conditions, with glimpses of increases in perennial ground cover; in species of concern; improved water quality; and sustaining a traditional ‘way of life’ of the area.

Factors Facilitating Progress
The willingness and open-mindedness of BLM and Weimer Ranches to changes in land management, as well as their support and leadership, have been credited with helping this effort proceed. For example, the plan has required much effort and financial contribution on the part of the Ranch, and the Weimers have participated in holistic management training to better work with BLM and gain new perspectives on resource management opportunities.

Obstacles to Progress
Greater participation by all stakeholders is desired, as attendance at meetings and field trips has dropped off from its original high levels, as those not directly affected by the decisions or land have lost interest. Another challenge has been to vary management sufficiently to avoid repeating old undesirable practices. Finally, there is concern that the holistic resource management approach was adopted by BLM and Weimer Ranches without public input as to other possible rangeland management philosophies. On a larger scale, some question whether livestock grazing is an appropriate use of this semi-arid desert habitat.

**Contact information:**
Mr. Jim Sazama
Range Conservationist
Bureau of Land Management
Uncompahgre Basin Resource Area
2505 S. Townsend
Montrose, CO 81401
(303) 249-6047
**MINNESOTA PEATLANDS**

**PROJECT AREA DESCRIPTION**

Minneapolis has approximately 7 million acres of peatlands scattered across the state. In these peatlands, a layer of peat from six inches to 20 feet deep covers an old glacial lake bed. The water table in the peatlands is very high, thus causing the saturation of soils and peat. The peatlands support large fens, bogs, and ovoid and teardrop islands. Vegetation includes sedges, bog birches, black spruce, tamarack, and white cedar. The eastern timber wolf, a federally-listed threatened species, frequents the margins of the peatlands, but does not stray into the interior. Twenty-five state-listed species occur in the peatlands, including the linear-leaved sundew, four-angled waterlily, northern bog lemming, English sundew, and yellow-eyed grass.

Eighteen peatlands are managed by the Minnesota Department of Natural Resources as Peatland Scientific and Natural Areas (PSNA). These PSNAs are core areas in which no disturbance is permitted. These areas are surrounded by additional peatlands that buffer the PSNA area. The largest PSNA is Red Lake Bog. It measures 83,000 acres and is ringed by 217,000 acres of buffer area. Red Lake Bog is crossed by only one road. The PSNAs are primarily used for long-term research, nature study, wildlife photography, and recreational hunting. Winter logging occurs in the surrounding areas.

**ECOSYSTEM STRESSES**

During the early 1900s most of the peatland area was sold as agricultural land to settlers, who subsequently attempted to drain the area by digging a major ditch system. However, the land was very unproductive and the settlers abandoned the area. Their legacy, the ditch system, is now one of the main stresses to the ecosystem. Locally, the ditches have a profound influence on drainage, although the system pattern remains clear and little affected. However, the ditches allow invasion by certain tree species, colonization by exotic species, and a higher number of beaver. In addition, timing and use of winter logging roads through the peatlands may pose a stress to the ecosystem.

**PROJECT DESCRIPTION**

After the settlers left, the State of Minnesota took title to all tax-forfeited property. The peatlands were left alone until an unsuccessful effort in the mid-1960s to protect these areas as state natural areas. In response to a large peat-gasification project proposed in the early 1980s, the Minnesota Department of Natural Resources proposed legislation to protect all peatland core areas. This agency organized informational meetings for local units of government, private individuals, and industry in order to obtain input on the identification of issues and solutions. Opposition from local governments and the timber and mining industry ultimately led to the defeat of this legislation. Finally, environmental lobbyists and influential state politicians were instrumental in the inclusion of peatlands under the Wetland Conservation Act of 1991. This Act became a vehicle for the legislature to override local concerns, as it dedicated 18 peatlands as Peatland Scientific and Natural Areas, to be managed by the Minnesota Department of Natural Resources.

The management goals for these areas
are to: 1) restore the hydrologic integrity of the system; 2) reintroduce natural processes such as fire; and 3) preserve these areas as PSNAs. To reach these goals, long range management plans will be developed for each site. These plans will deal with issues such as the development of winter logging road standards, rerouting of recreational trail systems, ditch systems, and the initiation of prescribed burn management.

Monitoring will include hydrologic variables, acid deposition, the impact of fire, and the impact of the use of winter logging roads and recreational trails.

**PRESENT STATUS & OUTLOOK**

Although site specific management plans are still under development, some strategies have already been implemented successfully. Winter logging road guidelines have been developed and are currently being used. Thus, potential damage from these roads is being limited.

**Factors Facilitating Progress**

A significant step in the protection of the Minnesota peatlands involved the passage of the 1991 legislation and the inclusion of the peatlands in this legislation. Environmental organizations were instrumental in that accomplishment. Another factor facilitating progress is the low economic value of the peatlands, and the acceptance that the resources forgone from economic utilization of this area are minimal at this time.

**Obstacles to Progress**

It is unfortunate that several local units of government perceive the protection of the peatlands as meddling of state government in their "back yard," to which they are intensely opposed. Local governments, many foresters, and the timber industry still have little knowledge or appreciation of peatland ecosystems. In addition, the timber industry does not appreciate the restrictions on the use and location of winter logging roads. Removal of ditches and prescribed burning are expensive management actions and it is unlikely that the state will make that investment.

**Contact information:**

Mr. Bob Djupstrom
Scientific and Natural Area Supervisor
Minnesota Department of Natural Resources
Wildlife - SNA, Box 7
500 Lafayette Road
St. Paul, MN 55155
(612) 297-2357
Fax: (612) 297-4961
E-mail: bob.djupstrom@dnr.state.mn.us
**Missouri Coordinated Resource Management**

**Project Area Description**
The landscapes of the southern half of the state of Missouri range from rolling prairie-oak woodland landscapes to rugged hills supporting oak and oak-pine forests. The area is primarily used for forest management and hay-pasture land. The Mississippi Lowlands of southeastern Missouri consist largely of floodplains and were once covered in swamps, bottomland forests, and wetland ecosystems. The northern part of the state consists of flat to gently rolling plain which used to support prairies and woodlands.

Today, both the Mississippi Lowland and the plains are used primarily as cropland and hay-pasture land. The state is home to more than 500 vertebrate animal species and more than 200 species of fish. Of special interest are the breeding populations of migrant neotropical songbirds in the forest interior of the Lower Ozarks.

**Ecosystem Stresses**
The settlement of the state has led to the conversion of much of the land to agricultural production, especially row crops and pasture. Less than 2% of prairie and 10% of wetlands remain in the state. In addition, forest lands, while still abundant, have suffered from unregulated timber harvests, grazing, and altered disturbance regimes (especially fire). The big rivers and many other stream systems have suffered the effects of channelization, levees, reservoirs, as well as pollution or siltation from broad land use changes.

**Project Description**
In response to a growing interest in ecosystem management and biodiversity conservation, the Missouri Department of Conservation and the U.S. Forest Service initiated a Biodiversity Task Force in the 1980s. In order to address concerns about natural systems and stresses on these systems, the Task Force recommended a regional planning approach. In response, seven land management agencies came together in 1993. These agencies are the Missouri Department of Conservation, Missouri Department of Natural Resources, U.S. Fish and Wildlife Service, National Park Service, U.S. Forest Service, Natural Resources Conservation Service, and Army Corps of Engineers.

The goals of the regional planning effort, or Coordinated Resource Management (CRM), are to conserve and restore healthy ecosystems while taking into account the sustainable production of commodities, and while maintaining and creating opportunities for outdoor recreation, education, and interpretation. In order to reach these goals, the state of Missouri has been divided into 10 CRM regions. The boundaries of these regions are partially based on ecosystem criteria according to the hierarchical approach to ecosystems developed by the U.S. Forest Service and as modified by the Missouri Department of Conservation.

The boundaries of several CRM regions coincide with major river basin boundaries. A separate management plan will be written for each of these regions, each with its own goals, objectives and strategies. The contents of these plans will depend heavily on the input of the public, which is obtained through public meetings, polls, surveys, and a 1-800 number. All plans should be completed by the year 2000. Although the plans will have a 50-year vision,
they may be revised sooner if necessary. After agreeing on the plan, each agency voluntarily determines how it can contribute to the fulfillment of plan goals and objectives. On a voluntary basis, individual landowners are invited to participate as well. Varying strategies may be employed by each plan, e.g., reintroduction of fire, erosion control, wetland and prairie restoration, and reforestation. Education of the public as well as of state legislators is an important plan component.

**Present Status & Outlook**

After 10 public meetings, the plans for the Lower Ozark and the Grand River regions are now in draft. All seven agencies have signed a Memorandum of Understanding, agreeing on the CRM process.

**Factors Facilitating Progress**

Several factors have been instrumental in the CRM planning process. They include the national focus on ecosystem management, the support of state administrators, and good interagency cooperation. In addition, many people have attended the public meetings. Since 93% of the lands in Missouri is in private ownership, citizen participation from the onset of the project is crucial to the success of CRM.

**Obstacles to Progress**

The biggest challenges to the CRM process revolve around citizen input. How can fear of government and the idea that CRM is a threat to the state’s economic well-being be dispelled? How can the public be assured that CRM will not evolve into a regulatory program? How can rural and urban people be brought together? These questions present hurdles that need to be overcome. In addition, the development and organization of resource information in a comprehensive, compatible format is also a challenge.

**Contact Information**:

Mr. Russ Titus  
Wildlife Coordination Specialist  
Missouri Department of Conservation  
PO Box 180  
Jefferson City, MO 65102-0180  
(314) 751-4115 ext. 259
MISSOURI RIVER MITIGATION PROJECT

PROJECT AREA DESCRIPTION
Before the arrival of European settlers, the Missouri River was a turbid, braided prairie stream. Its width varied from a few hundred yards to half a mile, and it featured both shallow and deep areas. Flow in the river fluctuated greatly from season to season and year to year. Thus, the river supported a large diversity of aquatic habitats. Bottomland hardwoods, wet meadows, and prairies covered the floodplains, providing varied terrestrial habitats.

In the project area, four federally-listed threatened and endangered species occur: the bald eagle, pallid sturgeon, least tern, and piping plover. In addition, the project area is home to 25 state-listed species, including the chestnut lamprey, silverband shiner, and flathead chub.

Although some bottomland hardwood forests and prairies still exist in the riparian area, most of the floodplains have been converted to agricultural use. Large cities, such as Omaha, Kansas City, and St. Louis, are located on the floodplains. The Missouri River itself is used for navigation, commercial and recreational fishing, recreational boating, industrial and household water supply, and dredging of gravel and sand.

ECOSYSTEM STRESSES
Between 1912 and the late 1970s, the entire lower 735 miles of the river was channelized and lined with levees. The river became a nine foot deep, three hundred foot wide channel with very little habitat diversity. As a result, many species that historically occurred in the river are now in decline. Channelization has caused the river to erode its bed and run deeper, and some of the side channels of the river have become perched above the main channel and are no longer connected to it. Many similar hydrologic connections between the river and its wetlands are no longer in place.

Once the River was channelized and the levees were in place, it became feasible to clear the associated floodplains of hardwoods and prairies and to plant crops. Clearing occurred in many cases all the way to the edge of the river. Terrestrial habitat was lost as a result. Non-point source pollution such as sediments, agricultural chemicals, urban runoff, inputs from sewage treatment plants, and effluents from heavy industry pose an additional problem, as they find their way into the river.

PROJECT DESCRIPTION
In the mid-1970s the U.S. Army Corps of Engineers, the U.S. Fish and Wildlife Service, and the states of Iowa, Kansas, Missouri, and Nebraska recognized the impact of the channelization of the Missouri River on its fish and wildlife resources. The six agencies subsequently set out to restore approximately 50,000 acres of fish and wildlife habitat in the lower 735 miles of the Missouri River.

The U.S. Army Corps of Engineers is the lead agency, with the four states and the U.S. Fish and Wildlife Service actively involved in all phases of the project. During the planning phase, specific restoration sites were identified and prioritized, and restoration plans were developed for each site. In 1990, federal funds were made available to the Army Corps of Engineers to initiate

**Location:** Lower 735 miles of the Missouri River, Kansas, Nebraska, Iowa, and Missouri

**Project size:** 50,000 acres

**Initiators:**
U.S. Army Corps of Engineers, U.S. Fish & Wildlife Service
Missouri River Mitigation Project -- continued

the implementation phase of the project. One major strategy is the restoration of habitat on existing state and federal lands. A second strategy is to acquire land from willing sellers for habitat restoration. In both cases, restoration includes reforestation and the hydrologic reconnection of wetlands and side channels to the Missouri River.

Present Status & Outlook
It is too early to determine if any of the goals of the project have been realized. Habitat Evaluation Guidelines have been developed to be used over time to document the benefits of the project.

Approximately 8,500 acres of land have been acquired, and habitat restoration has started. It is expected that terrestrial habitats will recover more rapidly than aquatic habitats.

Factors Facilitating Progress
So far, excellent cooperation between federal and state agencies has been particularly helpful in the progress of the project. Federal agencies have benefited from the strong and united support of the states and their political representatives in Washington, D.C.

Obstacles to Progress
A major interruption resulted from the floods of 1993, which required the Army Corps of Engineers to direct its attention elsewhere. Continuation of funding is presently a concern. The project is 100% federally funded, with annual appropriations required.

Contact information:
Mr. Steve Adams
Natural Resources Coordinator
Kansas Wildlife & Parks
900 SW Jackson, Suite 502
Topeka, KS  66612-1233
(913) 296-2281
Fax: (913) 296-6953
MOLOKAI PRESERVES

PROJECT AREA DESCRIPTION
The northeastern mountain range of Hawaii’s Molokai Island is a region characterized by sheer sea cliffs, high narrow mountain ridges, and low steep valley gulches. This area hosts an array of natural communities, including lowland and montane grasslands, dry and moist shrublands, and mesic, tropical, and summit cloud forests. Several rare natural communities are found here, including the Hawaiian Continuous Perennial Stream community, and the ‘Ohi’a Mixed Montane Bog and Montane Wet Piping Cave, both found only on Molokai. Many state- and federally-listed threatened, endangered, and rare species are present as well (mostly plants), including the ‘i‘iwi, ‘o‘opu alamo‘o, oloma‘o, kakawahie, alani, and koloa maoli.

The Pelekunu Valley, one of three major valleys of this mountain system, has one of the last undiverted stream systems on the island. Pelekunu Preserve makes up 89% of this valley and is owned by The Nature Conservancy (TNC). Adjacent to Pelekunu Preserve is the 2775-acre Kamakou Preserve, owned by Molokai Ranch with a conservation easement held by TNC since 1983, when TNC first began using adaptive management strategies. Kamakou is one of the primary sources of water for irrigation on the island. Bordering these preserves are the state-owned Puu Ali‘i and Olokui Natural Area Reserves, and Kalaupapa National Historical Park (federal). Together, these areas protect more than 22,000 acres of contiguous native ecosystems.

With a population of 7000, Molokai is a traditional, rural, agriculturally-based island. Current land uses consists mostly of grazing and farming. Subsistence and recreational hunting are also prevalent in the region.

ECOSYSTEM STRESSES
Large populations of feral goats, pigs, and axis deer, as well as domestic livestock, are the primary threat to native vegetation on the island. Because Hawaii has no native terrestrial mammal species, its native plant species are easily destroyed by grazing and trampling. Humans have also introduced fire to these natural systems which encourages invasive, fire-adapted species to establish in the place of natural plant communities. Roads and pine plantations have further impacted native vegetation. Roads serve as invasion routes for non-native species, while conifers encroach on adjacent native communities.

Runoff and siltation from agricultural practices and feral animal damage are degrading the island’s reef systems. Furthermore, there is a potential threat of water development for irrigation. The state has plans to draw water from Pelekunu and Wailau valleys, gravely threatening these watersheds. There is also the potential for urban development, which would impact both forest and water systems on the island.

PROJECT DESCRIPTION
TNC’s primary goal for this project is to preserve the natural diversity of Molokai. Recognizing that conservation efforts on TNC preserves alone would not achieve this goal, TNC felt a need to affect conservation on an island-wide basis. To foster understanding and support from the community,

MOLOKAI PRESERVES -- continued
TNC began training and hiring people from the local community in 1993 to work in preserve management. At this time, TNC also formed an advisory committee made up of respected leaders in the community dedicated to protecting the island’s natural heritage.

To address present threats to the ecosystem, TNC works closely with state and federal agencies on adjacent lands, including the State Division of Forestry and Wildlife, State Historical Preservation Division, National Park Service, and U.S. Fish and Wildlife Service. TNC also works closely with local hunters, assisting them in reaching remote regions in an attempt to control feral mammal populations. Finally, TNC has helped the state develop, and now receives funding from, the Natural Area Partnership Program (NAPP), an assistance program providing funding (2/3 state, 1/3 private) for the conservation efforts of private landowners.

**PRESENT STATUS & OUTLOOK**

It appears that native forest vegetation is recovering in some areas, with a decrease in alien mammal and weed species. However, it is too early to detect whether or not the ecosystem is doing better as a whole. TNC feels that continued ecological improvements are dependent on greater community support for conservation efforts. TNC is now focusing more on outreach, getting involved in community conservation programs inside and outside the preserves such as volunteer reef protection and weed eradication programs, and educational events that emphasize the ecological, economic, and cultural values of Molokai’s natural resources.

**Factors Facilitating Progress**

Hiring people who are part of the community has helped TNC obtain an image as a local group making local decisions. This has encouraged greater community support and involvement in their conservation initiatives.

**Obstacles to Progress**

A controversy over TNC’s policy on alien species eradication lead to the loss of local support and brought into question TNC’s management practices. Animal rights groups and local hunters alike raised objections to TNC’s practice of snaring feral mammals. The animal rights groups raised objections to the inhumane killing of these animals while the hunters felt that snaring threatened traditional subsistence hunting practices. There has also been some opposition to TNC’s conservation efforts from supporters of the development of Molokai's land and water resources. Finally, TNC lacks adequate funding, staff, and other resources to fully carry out its conservation goals.

**Contact Information:**

Mr. Ed Misaki  
Director of Programs  
The Nature Conservancy of Hawaii  
Molokai Preserves  
PO Box 220  
Kualapuu, HI 96757  
(808) 553-5236
**Location:**
Kona & Kohala, Island of Hawaii

**Project size:**
Kona--100,000 acres; Kohala--22,000 acres

**Initiators:**
Hawaii State Office of Planning, Hawaii State Department of Land and Natural Resources, County of Hawaii

**PROJECT AREA DESCRIPTION**
The Roundtable covers two Natural Resource and Watershed areas in Hawaii. The larger Kona project site is located on the slopes of Mauna Loa and Hualalai Mountains, and ranges from gently sloping to steep lands. The land is characterized by a thin layer of soil over basalt and lies over a high quality aquifer, with rainfall and fog drip being the aquifer’s recharge source. The vegetative cover ranges from dense stands of relatively intact native forest to scattered native-exotic mixes, grasslands with sparse tree coverage, and open lava fields in the process of recolonization by native plant species.

The smaller Kohala site, on the flank of the Kohala Mountain range, is considered an important water recharge area. It contains native forests (‘ohi’a primarily) and pasture lands. Both areas contain critical habitat for native honeycreepers (birds) and ‘alala (Hawaiian crow), all of which are listed as threatened or endangered by the federal and state governments. The lands are predominantly in private ownership and are used for pasture (cattle primarily) and forestry.

**ECOSYSTEM STRESSES**
The most significant stresses are conversion of the land for suburban subdivisions and non-point source pollution due to erosion from logging, grazing, and roads. The native koa tree is a highly-valued, high grade timber and their removal degrades native forest bird habitat. Exotic species (pigs, feral sheep, goats, non-native birds, mosquitoes, non-native grasses) and alteration of hydrology (due to removal of trees essential to capturing fog drip) are other notable stresses. Less significant stresses include livestock grazing and road construction associated with development.

**PROJECT DESCRIPTION**
In 1992, the State Land Use District Boundary Review, conducted every five years, identified the Kona and Kohala Natural Resources and Watersheds as areas of critical concern. Subsequently, the Hawaii state legislature requested the State Department of Land and Natural Resources (DLNR) and the County of Hawaii to conduct roundtable discussions to address management and protection concerns of the area. The Center for Alternative Dispute Resolution of the Judiciary of Hawaii, created by state law to assist in out-of-court settlements of complex litigation and public policy disputes, was requested by the agencies to facilitate the roundtable discussions.

Starting in 1992, a roundtable of landowners, developers, environmental and community groups, and government agencies met over the next two years, initially to determine the various interests of the region and its users, and later to frame a common set of principles, leading finally to the development of a set of recommendations. The group sponsored a series of three informational meetings in 1993 to bring all stakeholders up to the same level of scientific and regulatory knowledge about the area. All of the roundtable group’s decisions were reached by consensus.

**PRESENT STATUS & OUTLOOK**
Proceedings of the 1993 meeting were published that year. Officially, the
Roundtable ended in mid-1995, with a report outlining the principles and recommendations of the Roundtable published in July. The most important outcomes are described as better awareness and recognition of the importance of the natural resources and water recharge characteristics of the area. The Roundtable also proposed legislation designed to provide a source of funds accessible to both private and government landowners to optimize natural resource/watershed management on sensitive lands.

Other important outcomes include better communication, understanding, and cooperation between stakeholders; enhanced public awareness; and, indirectly, changes in the state DLNR so that sustainability is the primary goal of all of the Department’s activities. Finally, there was greater recognition that property rights, property owner cooperation, and economic factors needed to be in balance in any recommendations. Another Roundtable is being considered to address more specific ‘next step’ implementation issues identified in the 1995 report.

Factors Facilitating Progress
Strong political support by the Governor and administrative support by the state natural resource agency have been essential to the effort’s progress. A willingness on the part of private landowners, despite significant misgivings, to recognize the importance of the issues and work with all parties toward creative solutions, clarity of project goals, and leadership by the Office of Planning and Roundtable participants were also described as benefits to the process. Finally, increased scientific understanding of the area has become a priority and the general public appears to be in support of the effort.

Obstacles to Progress
While many stakeholders have participated in the roundtable discussions, landowner and developer resistance to the effort has been significant, based on their past experience with government regulations and their perception that the State’s five-year boundary Review was excessively aggressive in its efforts to apply broad-brush regulatory downzoning as a catch-all solution to a far more complex set of issues. Thus, not all stakeholders are in agreement as to a common vision for the area’s future, and stakeholder conflict has yet to be reduced uniformly. Support from federal and local public agencies has not been as high as from state agencies. Finally, funding for the effort, for future Roundtables and public and private resource management incentives, is not guaranteed beyond yearly appropriations by the state legislature and agencies.

Contact information:
Mr. Scott Derrickson
Hawaii Office of State Planning
PO Box 3540
Honolulu, HI 96811-3540
(808) 587-2805
E-mail: sderric@pixi.com
**NEBRASKA SANDHILLS Ecosystem**

**PROJECT AREA DESCRIPTION**

The dunes which form Nebraska’s Sandhills were created by wind-blown sands. These sands are now held in place by mixed grass prairie vegetation. The ground water table beneath the dunes is very high. Groundwater discharge gives rise to spring-fed streams and various types of wetlands (1.3 million acres in total) in the valleys between the dunes. Deciduous trees, such as willows and cottonwoods, can be found along some of the streams.

In small areas within the ecosystem as well as in areas adjacent to the ecosystem, row crop agriculture has presented a stress also. In addition to the drainage of wetlands, it has led to desertification as a result of exposure of bare soil. However, in some areas, irrigation has led to creation of wet areas, through pumping of groundwater to the surface.

**PROJECT DESCRIPTION**

In recognition of the uniqueness of the ecosystem, the U.S. Fish and Wildlife Service (FWS) drafted a program in 1980 designed to purchase easements on the wetlands to protect them from drainage. After vehement opposition of local landowners, the plan was discontinued. In 1990 a different approach was taken, when a Sandhills coordinator was hired whose main task was to develop a program with the support of the landowners. As a result, the Sandhills Task Force was formed. The majority of its members are local landowners, many of whom were selected by locally active organizations such as the Nebraska Cattlemen, Upper Loup Natural Resources District, and the Nebraska Association of County Officials.

After much initial distrust between the landowners and agency representatives, participants discovered commonalities between landowner and wildlife needs. Subsequently, the Task Force has developed into a team of people who trust and respect each other, and who make decisions by consensus. The Task Force generated a Management Plan,

**Location:**
North-central Nebraska

**Project size:**
12.5 million acres

**Initiator:**
U.S. Fish & Wildlife Service
which, after incorporation of public comments, was signed in September 1993. The Plan has been implemented since then. The Task Force members decided to remain active as a group to help carry out the objectives of the Plan. In January 1995, Task Force membership was extended to a representative of The Nature Conservancy.

The overall goal of the Plan is “to enhance the sandhill wetland-grassland ecosystem in a way that sustains profitable private ranching, wildlife and vegetative diversity, and associated water supplies.” In order to reach that goal, a variety of strategies is employed. Since implementation started, several educational projects have been organized, e.g., a two-day work shop concerning ranching and environmental issues. Another strategy involves the provision of technical assistance to land owners in wetland restoration and erosion control. The Plan also recommends land acquisition or land easements if deemed appropriate. However, the Sandhills Management Plan states that land acquisition would only "be a last alternative to ensure that unique ecosystems will remain."

PRESENT STATUS & OUTLOOK
The new management approach has already proven fruitful. Successful projects have been completed throughout the region. Not only are wetlands being restored, but the relationship between local landowners and FWS has greatly improved. Congressional support was voiced to the Secretary of the Interior commending this program. In addition, the management plan has gained the support of non-governmental organizations, agencies, and governor. This has encouraged others to participate.

Factors Facilitating Progress
Open communication and the discovery of common ground between landowners and FWS has greatly benefited the project. The involvement and support of local landowners from the onset of the project has been invaluable. Support of elected officials has also been beneficial.

Obstacles to Progress
Currently, work carried out by agencies such as the Natural Resources Conservation Service, the Nebraska Game and Parks Commission, and the FWS is coordinated by the Sandhills coordinator. Unfortunately, the coordinator does not have any staff, which is sorely needed. Funding is lacking for additional positions. In addition, future local opposition is anticipated, for instance, if the Task Force should support land acquisition by The Nature Conservancy.

Contact information:
Mr. Gene Mack
Sandhills Coordinator
U.S. Fish & Wildlife Service
Kearney Field Office
PO Box 1686
Kearney, NE  68848
(308) 236-5015
Fax: (308) 237-3899
**NEGRITO PROJECT**

**PROJECT AREA DESCRIPTION**
The Negrito Creek Watershed in New Mexico’s Gila National Forest has a varied landscape, ranging from river bottom to upper Sonoran desert and sub-alpine mountain slopes. The watershed is 80% forested, including ponderosa pine, mixed conifers, and pinyon-juniper woodlands. The remaining 20% consists of grasslands and cieneba-type meadows. The watershed provides habitat for the Mexican spotted owl and Gooddings onion, both federally-listed threatened species. It is also home to the Apache northern goshawk, classi-fied by the U.S. Forest Service (USFS) as a sensitive species, and the spotted bat, a USFS species of concern. The region also supports a very large elk herd. Due to protection efforts for the spotted owl, restrictions on logging have drastically reduced timber harvest from the watershed. As a result, small sawmills have been forced to close and local communities have experienced high unemployment and depressed economies.

**ECOSYSTEM STRESSES**
The most profound stress to the watershed has been the effects of fire exclusion, which began in the early 1900s. In the absence of fire, a "vast sea" of abnormally dense, even-aged ponderosa pine stands have developed, while pinyon and juniper encroach on meadows and grasslands. Another problem in the watershed has been erosion damage to riparian areas, caused by year-round flooding and grazing of livestock and elk. The relationship between past logging activities and landscape fragmentation is a current source of debate.

**PROJECT DESCRIPTION**
Under the 1992 USFS New Perspectives program, a coalition of citizens proposed an ecologically-based pilot project to the Gila National Forest Supervisor. The proposal was adopted and a working group was formed, composed of a diverse array of dedicated and experienced individuals from five agencies, two conservation groups, two industries, two educational institutions, and the local community. Negrito Watershed was chosen for the project for four major reasons: 1) the Forest Service had good existing field data on the watershed as well as GIS hardware and expertise; 2) there were few scheduled management activities that would affect project recommendations; 3) Negrito Creek is a critical watershed to the Gila River system; and 4) severe county-wide economic stress has not been successfully relieved by traditional resource management practices.

This project is unique in that most of the work has been carried out by non-agency personnel: this is a community-based project where all planning and decision-making efforts are carried out by consensus through facilitated meetings. The overriding goal of the project is to have a watershed that sustains over time its ecological functions while providing for the human community. The project addresses economic concerns, with a goal of maintaining resource-based employment (i.e., supporting surviving local, small-scale sawmill operations, and maintaining grazing through range improvement projects and new grazing systems).

**PRESENT STATUS & OUTLOOK**
The project technically is still in the planning phase, with implementation
anticipated by the end of fiscal year 1995. However, a series of small scale watershed improvement projects developed by the working group are being funded and implemented in a prioritized fashion. Current project efforts include: implementation of an Information Needs Assessment; extensive field data collection; bringing the updated database online for Geographic Information System (GIS) analysis; and developing and refining desired future conditions for the watershed as data becomes available. The working group is trying to set up a non-profit community watershed organization to serve as a focal point for broad scale planning, fundraising, and other activities separate from USFS.

**Factors Facilitating Progress**
The commitment from members of the working group to a consensus-based process, the emphasis on keeping the project community-based, and keeping human needs in the equation have all lent to the progress of the project thus far. The project has also received strong support from the USFS Forest Regional Supervisor and funding from USFS Economic Diversification and Ecosystem Management programs. Finally, having GIS in place has made many broad scale planning efforts possible.

**Obstacles to Progress**
The Federal Advisory Committee Act (FACA) may limit this effort, as there are non-federal members in the working group. Also, opponents from both environmental and commodity interests, whose agendas are too restrictive to participate in this collaborative process, have attempted to derail planning efforts.

**Contact information:**
Mr. Don Weaver
USDA Forest Service
Gila National Forest
Reserve Ranger District
PO Box 170
Reserve, NM 87830
(505) 533-6231
NEW HAMPSHIRE FOREST RESOURCES PLAN

PROJECT AREA DESCRIPTION
Because this project is a New Hampshire state agency policy, the project area is defined by the state’s boundaries. The landform varies from mountainous terrain in the northern portion of the state to the Connecticut River Valley and the small seacoast area to the South. The state is 85% forested, with spruce fir in the high elevations, predominantly northern hardwoods in the North, and a mix of white pine and red oak in the South. Federally-listed threatened and endangered species include the small whorled pogonia. Significant land holdings are in public ownership, including the White Mountain National Forest at 740,000 acres. The predominant land use in the northern part of the state is forest products, agriculture in the Connecticut River Valley, and manufacturing and service industries in the southern portion.

ECOSYSTEM STRESSES
The biggest threat to the area is the conversion of forest to non-forest uses, occurring most heavily in southern New Hampshire due to the urban sprawl northward from Boston. Technology has also made it easier for people to live further from their office. The result is an increase in development and fragmentation from large to small blocks. These blocks have no management strategies. Roads often run through traditional wildlife habitat.

PROJECT DESCRIPTION
Forest Resources Plans are legislated policy documents that direct state forest policy for a period of 10 years. The plan currently being drafted is the fourth forest plan in New Hampshire; the first was in 1952 and the most recent in 1980. In the past, these plans tended to be issue-oriented, looking at forest resources as a commodity and focusing on the forest industry. The current plan is quite different, reflecting the change in knowledge and scientific base with regard to forest resources. This plan has a more ecologically-based approach and is vision driven instead of issue driven. This new direction of forest planning comes on the heels of the work of the Northern Forest Lands Council, an effort focused on maintaining large forest tracts in the region.

A Steering Committee of 28 people from diverse backgrounds was brought together by the State Forester in April 1994 to guide the Forest Resources Plan. This group comprises landowners, forest industry, state resource agencies, and property rights and environmental groups. The Steering Committee outlined a vision for the desired future landscape condition for the next 50-100 years and recorded 13 of the biggest challenges in reaching this vision. In order to assess the current condition of the forest, a group of 45 additional people were gathered into three assessment groups: economic issues, ecological resources, and human and social values.

PRESENT STATUS & OUTLOOK
A 250-page assessment was presented to the Steering Committee by the assessment groups. The Committee will develop a plan that will meet the challenges based on the information from the assessment, relying on their own knowledge and expertise as well as on people from the forest resources community. The plan is due to be completed in 1996.
Factors Facilitating Progress
New Hampshire has a history of cooperative policy development. The forest resources and environmental communities are small: most of the people have worked together previously on other projects. This familiarity aided during plan development.

Obstacles to Progress
The project follows an ambitious schedule due to legislated deadlines. Since much of this work is being carried out for the first time, working out details may take longer than anticipated, making deadlines more challenging to meet.

Contact information:
Ms. Susan Francher
New Hampshire Division of Forests and Lands
PO Box 1856
Concord, NH 03302-1856
(603) 271-2214
**NEW JERSEY PINELANDS**

**PROJECT AREA DESCRIPTION**

Located in the midst of the densely-populated northeast corridor, the New Jersey pine barren ecosystem is characterized by droughty, sandy soil underlain by the 17-trillion-gallon Cohasney Aquifer, one of the largest sources of water in the world, and vital to the 30 million nearby residents. With nearly flat topography, cedar and red maple dominate the region’s lowlands, while scrubby pine and oak forests, with an understory of plants of Ericaceae (heath family), are typical of the highlands. A significant concentration of rare and unusual plants and animals can be found in the Pine Barrens, including the federally-listed swamp pink. In addition to undeveloped forests, some in preserves, other land uses include commercial and industrial development, sand and gravel mining, glass manufacturing, housing, farming, forestry, and recreation.

**ECOSYSTEM STRESSES**

Disruption of fire regime is one of the greatest stresses to this fire-dependent ecosystem. Non-point source pollution, from agricultural fertilizers and pesticides, as well as from septic systems and landfill leachates, is a significant stress to water quality, because of the sandy substrate that easily drains to the aquifer. Additional stresses, such as rural/urban development, mining, and recreation, result in habitat destruction and fragmentation.

**PROJECT DESCRIPTION**

A proposal for a major new airport in the area in the 1970s was the catalyst for current protection of the Pinelands. The support of then-Governor Brendon Byrne and the strong voice of environmentalists were vital in gaining protection for the region under the National Parks Act of 1978 (federal) and the New Jersey Pineland Protection Act of 1979 (state). Shortly thereafter, the Pinelands Commission was formed, with seven appointees of the Governor, seven appointees of the stakeholder counties, and one appointee from the federal government.

In 1981, a Comprehensive Management Plan (CMP) was published, focusing on the ecological significance of the Pine Barrens and on land use planning. The CMP is coordinated at the state level, with local government responsibility focused on compliance plans and only minimal federal involvement. The CMP operates through prescriptive zoning designations and strict performance standards, with mandatory local compliance and regional oversight.

The CMP divides the region into two main areas based on different development allowances. The core Preservation Area of 300,000 acres has the most restrictive guidelines. The Protection Area contains the remainder of the acreage and is further delineated into six areas, each with a different focus and growth allowance. These allowances include the following: regional development and rural development areas, agricultural production areas, forest areas, military areas, and towns and villages. The overall goals of the two main areas include: preserving the essential character of the Pinelands environment, including plant and animal species; promoting the continuation and expansion of horticulture and agriculture; discouraging piecemeal development; and protecting the quality of surface and groundwater.
NEW JERSEY PINELANDS -- continued

PRESENT STATUS & OUTLOOK
Since 1981, the Commission has set environmental and development standards for 53 municipalities and seven counties. This project, created before ecosystem-scale management was seriously considered, has realized its principal objectives: preventing development in critical habitat and maintaining water quality. The current focus is to continue to manage development and monitor ecological and economic factors as an indicator of the project’s success.

Factors Facilitating Progress
The initial support from Governor Byrne and the continued support from the environmental community and state residents has been key to progress. Strong national and state legislative protection has also been critical for progress, as well as the abundance of regional natural history data on the region. Community involvement in the CMP drafting, and eventual economic support programs, helped offset local opposition with regard to the plan’s early negative economic consequences on some individuals and communities. Finally, an abundance of natural history data on the region was instrumental, especially in the early phases of the effort.

Obstacles to Progress
The Commission’s limited authority has prevented continued and consistent progress. Continued pressure from developers and private property rights advocates, and the initial exclusion of one-fifth of the ecosystem in the legislative management area delineations, are additional concerns.

Contact information:
Mr. Don Kirchhoffer
Project Manager
Pinelands Preservation Alliance
114 Hanover Street
Pemberton, NJ 08068
(609) 894-8000
Fax: (609) 894-9455
E-mail: DKIRK100@ADL.COM
**NORTHEAST CHICHAGOF ISLAND**

**PROJECT AREA DESCRIPTION**
Part of the Alexander Archipelago, Chichagof Island lies across the straits from Glacier Bay National Park, about 50 miles southwest of Juneau. A 300-yard-wide land bridge connects the northeast sector to the rest of the island.

Anadromous fish streams run to the island’s bays and estuaries. The limestone ridge that splits the island is a demonstration of the underlying karst topography.

Hemlock, Sitka spruce, muskeg, and blueberry cover the island. The subalpine forests consist of yellow cedar and shore pine (a dwarf type of lodgepole pine). Over 233,000 acres of Northeast Chichagof are Tongass National Forest lands. Timber harvesting has occurred on 23,000 acres. Patented claims for gypsum and silver mining exist, but none are currently active. The north end of the island contains the bulk of native and native over-selection lands (42,000 acres).

**ECOSYSTEM STRESSES**
Timber harvesting is the most prominent stress on the ecosystem. Native corporations, not subject to the same laws and restrictions as the U.S. Forest Service (USFS), have been logging more heavily than the Forest Service, resulting in unsustainable harvesting levels on some native lands. All 18 of the island’s watersheds have been entered for logging. Although heavy equipment was driven up some streams to access timber in the Tongass, this did not occur on Northeast Chichagof Island. Yet, 250 kilometers of roads have been built in the region since 1980. In some areas, road layout, poor drainage control, undersized and unaligned culverts, and the lack of a realistic road maintenance program have contributed to fish passage problems, sedimentation, and altered hydrologic regimes. Road-building associated with timber harvesting has caused over-hunting of brown bears, as previously inaccessible areas were opened.

**PROJECT DESCRIPTION**
This initiative is a joint research project of the Alaska Department of Fish & Game (DFG) and the USFS. The Department of Fish & Game has provided input to USFS on timber projects since harvesting began in the mid-1980s. The realization that logging was occurring at an unsustainable rate and threatening wildlife populations sparked the formation of a four-member team of DFG and USFS personnel in 1993.

Northeast Chichagof Island is being used as a demonstration project for ecosystem-based approaches that can be exported to other parts of Tongass National Forest. The goal of the project is to provide information needed to make landscape-scale predictions concerning silvicultural practices and wildlife habitat needs over the length of the timber rotation period. Previously, all timber projects were analyzed individually; cumulative effects were not assessed.

The team is conducting a woodpile analysis to determine sustainable yields for the Northeast Chichagof Island. The analysis begins with the 200,000 acres of USFS lands. Buffer zones for fish streams, areas with hazardous soils, and areas where timber is broken up by muskeg are subtracted to determine the total area where harvesting could occur. Habitat Conservation Areas (HCAs) to
support minimum viable populations of species with the largest ranges are also withdrawn so that harvesting activities do not negatively impact wildlife. With growth rates for the forest in hand, the project team can determine the sustainable yield for 100-year rotations.

**PRESENT STATUS & OUTLOOK**
Implementation of the research project is coming to a close. A final report was scheduled to be developed in mid-1995.

**Factors Facilitating Progress**
The public’s acceptance of ecosystem-based approaches was cited as a factor facilitating progress, although the public has not been involved directly as a partner. The expertise and technical capability of the 85 resource specialists within the DFG, USFS, and other state and federal agencies participating in various review roles were invaluable assets to the project. Geographic Information System data allowed information to be communicated more quickly than with past projects.

**Obstacles to Progress**
Gathering information has been expensive due to inter-island travel. Technical concerns include not having a control area for the project due to the previous disturbances to all of the island’s watersheds. Some scientists are concerned that basing HCAs on minimum viable populations is risky to the long-term survival of certain species. The Forest Supervisor has unilaterally disbanded the eco-team assigned to the project before the final season of data analysis and some on-the-ground implementation of the findings could occur. Therefore, the findings in the final report may never be applied to management of the Tongass, as there is no planned follow-up for implementing recommendations. Finally, the planning process has not included the general public at any step of the project’s development. As a result, there are no advocates for the project aside from the agency personnel involved.

**Contact information:**
Mr. Phil Mooney
Habitat Biologist
Alaska Department of Fish & Game
Habitat and Restoration Division
304 Lake Street
Room 103
Sitka, AK 99835-7563
(907) 747-5828
Fax: (907) 747-6239
NORTHERN DELAWARE WETLANDS REHABILITATION PROGRAM

PROJECT AREA DESCRIPTION
The Northern Delaware Wetlands Rehabilitation Program is focused on an area that includes 10,000 acres of tidal freshwater and brackish wetlands. The project is located along the urban corridor of the Christina and Delaware Rivers in New Castle County. The ecosystem is dominated by wetland vegetation including red maple and cattail. Federally-listed threatened and endangered species include the bald eagle and short-nosed sturgeon. Land usage is dominated by residential, urban, and industrial development.

ECOSYSTEM STRESSES
The wetlands in this area have been subject to a long history of impoundment for farming purposes, starting as early as the 1600s. Many dikes have been maintained for 300 years. As a result, the marshes have been excluded from tidal exchange and cut off from the natural system. Many wetlands in the area have also been drained and filled for a variety of reasons, including agriculture, landfills, and industrial development. Degradation of wetlands was lessened with the passage of state and federal wetland acts. Superfund sites, resulting from a large port in the area serving the chemical industry, continue to threaten the wetlands. Non-point source pollution and the nuisance species Phragmites are also current stresses.

PROJECT DESCRIPTION
An inventory of wetlands was conducted and 31 wetland sites have been identified as needing rehabilitation. A two-tiered organizational approach was established with a Steering Committee and an Adjunct Committee. A multi-agency approach is encouraged, thus replacing the traditional individual agency approach. In order to increase public awareness to better ensure long-term stewardship, the community is actively involved in management of the site.

Wetland rehabilitation plans are developed for each site, constructed around scientifically-based biological inventories and ecological evaluations of the site area. The rehabilitation plans call for site-specific goals and action steps with measurable evaluative criteria. Goals include reestablishing tidal exchange and Phragmites control plans. A systematic management procedure was developed, which provides a framework to apply across numerous sites. This planning document is expected to serve as a model for future coastal and wetland restoration programs.

PRESENT STATUS & OUTLOOK
Currently, the project is in the restoration phase on a site-by-site basis; 11 of the wetland sites have made significant progress towards rehabilitation.

Factors Facilitating Progress
The responsiveness of the wetlands to rehabilitation efforts has been a factor that has facilitated the project’s progress. A high level of cooperation from landowners and support from the com-
munity have been crucial.

Obstacles to Progress
Several marshes, initially expected to be easy to rehabilitate, turned out to be more complex as Superfund-class contaminants were found on-site. A second obstacle was the logistics of organizing and maintaining communication channels between many groups. Site-specific operation, maintenance, and monitoring plans are also required for each site. Ensuring future funding for these efforts has been a challenge.

Contact information:

Mr. Robert Hossler
Delaware Division of Fish & Wildlife
250 Bear/Christiance Road
Bear, DE 19701-1041
(302) 323-4492
Fax: (302) 323-5314
PROJECT AREA DESCRIPTION
The study area is most closely defined by the ecological boundary of the spruce-fir zone in the Northeast U.S., extending over several states (but not into Canada). Landform in this area ranges from lowland swamps to high mountain ranges. The vegetative cover, depending on the topography, is predominantly a mix of spruce-fir and northern hardwoods.

Federally-listed threatened and endangered species in the area include the bald eagle, eastern mountain lion, and osprey. The most common land uses are privately-owned timber production and small amounts of agriculture. A portion of land is maintained within private reserves, as well as in state forests and parks.

ECOSYSTEM STRESSES
Threats to the ecosystem include suburbanization and road development northward from Boston. Development especially is drawn to waterfront areas of lakes and major rivers, and can harm water quality. Population growth in the Northeast and increased recreation use in highly scenic or fragile areas also stresses the ecosystem. Intensive timber production can impair wildlife habitat and water quality. Periodic spruce budworm epidemics have affected the ecosystem as well.

PROJECT DESCRIPTION
The project was motivated by public concern over large scale changes in land ownership patterns and traditional uses. Due to increased land values in the 1980s, many lands were transferred from regional companies to multinational corporations with little allegiance to the region. The public was concerned that these companies were looking at timber as an under-valued asset without considering the environmental or social implications.

In 1988, Congress funded the Northern Forest Lands Study. A four-state Governors Task Force guided the study, and recommended formation of the Northern Forest Lands Council. The Council, funded by Congress for four years beginning in 1990, was comprised of four members from each state and one from the U.S. Forest Service. Their goal was to make recommendations to both Congress and the Governors on what could be done to maintain the large forested tracts of lands from being converted to non-forest use. The Council submitted a final report of 37 recommendations in September 1994. Many of these recommendations are not specifically ecosystem focused.

The recommendations fall into the following categories: foster stewardship of private lands, protect exceptional resources, strengthen the economies of rural communities, and promote more informed decisions. An example of one of the specific strategies designed to reach the stewardship goal is tax equity -- taxing forest land at its use value instead of its development value. Changing current tax policies aims to prevent driving land toward subdivision and development.

PRESENT STATUS & OUTLOOK
The Council dissolved in September 1994 and their report is now being implemented at the state and federal levels, albeit selectively since the recommendations are voluntary. This is a long-term effort and many recom-
mendations, such as policy changes to tax codes, will not be realized immediately.

Factors Facilitating Progress
The willingness of the 17 council members to work together was extremely important to progress, especially since their interests were so diverse. The financial backing of Congress and the support of the four Governors were also essential. The common perception of a threat in the region helped the project to maintain momentum, and the residents of the region were involved at all stages of the Council’s work.

Obstacles to Progress
Coordination of four states, each with a different view and way of doing business, was a challenge throughout the process. In addition, getting groups with different philosophies and regional perspectives to agree on a middle ground demanded innovative approaches.

Contact information:
Mr. Charles Johnson
Vermont Department of Forests, Parks & Recreation
103 S. Main St., 8 South
Waterbury, VT 05671-0601
(802) 241-3652
Fax: (802) 244-1481
E-mail: cjohnson@fr.anr.state.vt.us
PROJECT AREA DESCRIPTION
The landscape of Michigan’s Northern Lower Peninsula (NLP) is dominated by glacially-formed features. The sandy, high plain in the interior is surrounded by lower elevation lake plain, ground moraine, and outwash. Upland pre-settlement vegetation consisted of northern hardwood forests on moister sites, and oak-pine or pine forests on droughty sites. Swamp and bog communities were common. Twelve federally-listed threatened and endangered species occur in this area, including Kirtland’s warbler, Michigan monkey-flower, and dwarf lake iris. In addition, a variety of state-listed species and candidate species for federal listing are present.

The Huron-Manistee National Forests extend over one million acres; three state forests spread out over an additional two million acres. Both public and private lands are used for recreation, timber and wildlife management, and oil and gas production. Public lands also provide for protection of critical species and communities. Uses on privately-owned lands also include hunting, residential (second) homes, commercial and industrial development, and agriculture.

ECOSYSTEM STRESSES
The logging history of the state and the conversion of land to agriculture have changed forest composition dramatically. Early successional deciduous species have increased greatly in abundance, whereas the occurrence of some conifer species has been reduced.

Currently, the most significant stresses to the ecosystem are land conversion for expanding communities, resort development, home and cabin sites, additional roads or road improvements, and natural gas development. These lead to land fragmentation, disruption of habitat, introduction of exotic species, displacement of natural processes, and noise pollution.

PROJECT DESCRIPTION
In 1992, the Michigan Relative Risk Analysis Project, administered by the Michigan Department of Natural Resources (MDNR), concluded that one of the state’s top environmental concerns was the lack of integrated land-use planning. In response, Governor John Engler requested that the MDNR address this problem. This request, in conjunction with the realization that the MDNR and the Huron-Manistee National Forests often manage the same ecosystems and in some cases share boundaries, led to the formation of a joint Ecosystem Team in 1994. The Bureau of Land Management (BLM) joined the team shortly afterwards.

The overall goal of the team and the project is to address land and resource management issues that span the entire NLP. An important objective is to coordinate public land management in the NLP through the development of a guiding document, known as Resource Conservation Guidelines. This document will be ecosystem-based, include public wishes and concerns, and be developed using an adaptive planning process. It will provide an ecosystem-based umbrella for such efforts as the Huron-Manistee National Forest Plan revision, joint planning for oil and gas production, etc.
**Northern Lower Michigan Ecosystem Management Project -- continued**

development, and the update of the Kirtland’s Warbler Recovery Plan. In a Memorandum of Understanding, signed in November 1994, the three agencies represented in the team, as well as the U.S. Fish and Wildlife Service and the National Park Service, agreed to cooperate in the development of this guiding document. The Ecosystem Team has also established partnerships with local agencies and organizations, who provide advice on the appropriate public participation process.

**Present Status & Outlook**
The most important outcomes to date are the increased communication within and between agencies and disciplines. In addition, a one-year grant has been secured from the federal Coastal Zone Management Program to initiate this regional ecosystem planning effort. A public participation strategy has been developed, as well as an educational slide program.

**Factors Facilitating Progress**
Strong support from leadership and staff of the MDNR has been very helpful. Individuals with a strong interest in the project and a willingness to explore new ideas have been an important factor facilitating project progress. A willingness to cooperate and to share information has also been beneficial. Early federal funding has been helpful as well.

**Obstacles to Progress**
An overall shortage of funding has been problematic. Funding is needed for analysis of information, for delineation and characterization of land-type associations, and for analysis of social aspects of the project. Uncertainty regarding the planning process has also been a barrier. In addition, working with many people is at times cumbersome and challenging for decision making.

**Contact Information:**
Mr. Michael T. Mang  
Michigan Department of Natural Resources  
PO Box 667  
Gaylord, MI 49735  
(517) 732-3541 ext. 5042  
Fax: (517) 732-0794
**PROJECT AREA DESCRIPTION**

The boundaries of this project, set by the U.S. Fish & Wildlife Service (FWS), are based on the Ohio River Valley drainage area, crossing three FWS Regions and encompassing a portion of 11 states. The upper reaches of the drainage basin extend into New York State, the lower reaches into Kentucky. A broad range of topography is present, including high Appalachian mountains, lower foothills, and floodplains. The vegetative cover in the upper reaches is conifer, while the lower reaches are deciduous and the floodplains mostly mature bottomland forests. Federally-listed threatened and endangered species within the watershed include the peregrine falcon, Indiana bat, and various freshwater mussels. Land uses in the Ohio River Valley include navigational travel and heavy industrial uses. Row crop agriculture is present in the floodplains.

**ECOSYSTEM STRESSES**

Abandoned mines are a major stress to the ecosystem due to the devastating effects of acid mine drainage and sediment runoff on water quality and wildlife habitat. There are also several current proposals for new strip mine operations in the river valley, as well as a proposal for the largest pulp wood mill in the world. These could have significant impacts on the health of the river due to a decrease in vegetative coverage, an increase in sedimentation, and point source contaminant loading. Additional threats to the water quality of the system are posed by agriculture and timber operations, and industry such as steel mills along the river corridor. The exotic zebra mussel is also in the early stages of colonization, which could devastate native populations of mussels.

**PROJECT DESCRIPTION**

This project is part of the national FWS shift towards ecosystem management. The Ohio River Valley Ecosystem Team was established in May 1994 and includes 35 representatives from FWS field stations within Regions 3, 4 and 5. Members include personnel from hatcheries, refuges, ecological services offices, and law enforcement divisions.

The team’s first goal was to define the resource priorities for the watershed and to outline the associated action strategies to meet these priorities. Examples of the seven priorities that were defined include protecting karst cave habitats, freshwater mussel communities, and wetlands. Action strategies for the resource priority on freshwater mussel communities will likely include activities such as monitoring the rate of zebra mussel infestation and compiling a database of information to help guide management decisions. Some action strategies within the plan are continuation of existing duties, while others, such as protecting karst cave habitats are newer, more broad-based activities.

**PRESENT STATUS & OUTLOOK**

The team is focusing on refining a list of 22 draft action strategies that will help them to meet the resource priorities of the watershed. Outside partners, including non-profit organizations, state agencies, universities, and water sanitation divisions, will be brought in to work on the specific action strategies. The team is also in the process of com-
piling a GIS baseline map for the watershed.

Factors Facilitating Progress
Although the project is in its early stages, an immediate benefit to the ecosystem approach has been increased communication across the different agency functions. This has been helpful in using scarce resources more effectively. The dedication of the team and the field personnel has greatly facilitated the process.

Obstacles to Progress
Since the project area crosses three FWS regions, it takes a large amount of time to coordinate activities. Also, the initial guidance from the national level was not fine-tuned and lacked consistency, which made management at the regional level difficult. Funding for the resource priorities has not yet been secured. This is especially challenging for this project since it was not named as one of the FWS priority watersheds and lies on the boundary of three FWS regions.

Contact information:
Mr. Jerry Wilson
Team Leader, Ohio River Ecosystem
U.S. Fish & Wildlife Service
Ohio River Islands National Wildlife Refuge
PO Box 1811
Parkersburg, WV 26102
(304) 422-0752
Fax: (304) 422-0754
OKLAHOMA TALLGRASS PRAIRIE PRESERVE

PROJECT AREA DESCRIPTION
In presettlement times, the tallgrass prairie spanned 142 million acres from Canada to the Gulf of Mexico. It evolved under the forces of weather, bison grazing, and fire. Starting with European settlement, over 90% of the tallgrass prairie has been converted to agriculture.

The Oklahoma Tallgrass Prairie Preserve is located in the Osage Hills. The rolling hills are covered by tallgrass prairie interspersed with streams and post oak-blackjack oak savannas. The Preserve encompasses most of the upper portion of the Sand Creek watershed, and is buffered by adjacent privately-owned cattle ranches. Some 500 to 700 plant species can be found in the Preserve.

The Preserve is used for recreational activities such as hiking, photography, and nature observation. In addition, 107 producing oil and gas wells are located on the Preserve. The wells are independently owned, and produce oil and gas in compliance with a contract with the owners of the mineral rights, the Osage Indian Tribe.

ECOSYSTEM STRESSES
Fire suppression and prescribed burns that only poorly mimic natural fires may lead to woody encroachment or shifts in species composition. Cattle grazing, as opposed to bison grazing, may also lead to a shift in species composition. Both stresses used to impact the tallgrass prairie on the Preserve, and still affect neighboring properties. However, the natural fire-bison regime is currently being restored on the Preserve. The threat of an accidental discharge of oil or salt water from oil wells poses a potential threat to the Preserve.

PROJECT DESCRIPTION
As early as the 1930s, the National Park Service recognized that tallgrass prairies were not protected in a large enough area to recreate a functioning tallgrass ecosystem. Since the only sizable tracts of tallgrass prairie could be found in the Flint and Osage Hills of Kansas and Oklahoma, subsequent efforts by the National Park Service and conservation organizations focused on these states. These efforts collapsed with the failure of a bill proposing a Tallgrass National Preserve in Osage County, Oklahoma.

In consultation with an interdisciplinary team of experts, The Nature Conservancy (TNC) realized that a tallgrass preserve area should encompass a watershed, and should be large enough to support a genetically viable bison herd. In 1989 this realization led to the purchase of the Barnard ranch (a 29,000-acre parcel) by TNC. Additional acquisitions have since enlarged the Preserve to 37,000 acres.

After the prairie was allowed to rest for several years, TNC initiated management in 1993. The overall management goal is to restore the full complement of ecological processes. This involves the recreation of the fire-bison interaction, resulting in a dynamic landscape patch mosaic. Prescribed burns have been conducted in a manner intended to mimic presettlement burn patterns. Presettlement grazing patterns have been replicated through the reintroduction of an American bison herd on an initial 5,000 acres of the Preserve.
OKLAHOMA TALLGRASS PRAIRIE PRESERVE -- continued

While the herd builds itself up, additional grazing pressure is exerted by cattle on 24,000 acres.

TNC has worked diligently to gain the trust of local oil producers, the Osage Agency, the Bureau of Indian Affairs, and ranchers. Non-interference with oil production, cooperation in fire management and wildfire suppression, and the maintenance of a disease-free bison herd have all contributed to the development of this trust.

PRESENT STATUS & OUTLOOK
Although fire and bison have been reintroduced, only parts of the Preserve are currently subjected to these natural forces. These will be restored to the entire Preserve over the next 10 years.

Factors Facilitating Progress
In this area of the country, large ranches do not come up for sale often. Finding a suitable tract of high quality tallgrass prairie for sale was a major factor in the success of this project. Also very helpful was the national attention that the project received, leading to the raising of $15 million in private funds. According to TNC, after the controversial and unsuccessful efforts of the federal government to create a National Preserve, only a private fundraising effort by TNC was possible.

Furthermore, the expertise of the interdisciplinary team, the involvement of local people, and the tremendous dedication of many individuals has been very important.

Obstacles to Progress
Although the $15 million fundraising goal was reached eventually, this effort was not always easy. Furthermore, the $3 million endowment for management expenses will probably not be sufficient to sustain the project. Restoring and managing a large-scale fire-bison regime is a very expensive enterprise, requiring perpetual institutional support. So far, it has involved obtaining equipment and training for prescribed burns, as well as obtaining a bison herd and building a bison corral and fences.

Contact information:
Mr. Harvey Payne
Director
The Nature Conservancy
Tallgrass Prairie Preserve
PO Box 458
Pawhuska, OK 74056
(918) 287-4803; (918) 287-1290
Fax: (918) 287-1296
**Ouachita National Forest**

**Location:** Central Arkansas, eastern Oklahoma

**Project size:** 1.6 million acres

**Initiator:** U.S. Forest Service

**Project Area Description**

The Ouachita ecosystem has a ridge and valley topography, with the project area (the Ouachita National Forest) primarily mountainous, and lowland valleys in private ownership. Southeastern evergreen forest type (shortleaf pine) meets the eastern deciduous type (oak-hickory) in this region. Inholdings in the National Forest account for approximately 30% of the land within its boundaries. The area includes just under 20 federally-listed threatened and endangered species, including the red-cockaded woodpecker, leopard darter, and numerous mussels.

Timber has been and still is the primary extractive use of the Forest. Over 600,000 acres of the Forest are in wilderness, wild and scenic rivers, or are too steep for logging. Other uses of the Forest include recreation (motorized and non-motorized), historic grazing and lead and zinc mining, and limited crystal mining. In the valleys, agriculture (poultry) predominates.

**Ecosystem Stresses**

Historically, timber harvesting, over-harvesting of animals, and conversion to agriculture (valleys primarily) were the primary stresses. Today, roads, primarily unpaved, stress the system by increasing sediment loads into streams, and, from the Forest’s viewpoint, breaking up natural fire patterns. Other stresses include localized water development, conversion to urban land uses, and barriers to fish movement.

There is considerable debate as to whether fire suppression has been a stress: the National Forest project feels that fire suppression associated with traditional timber harvesting has been a stress, and so has reintroduced prescribed burns. Critics from the environmental community argue that fires were never a significant natural process (due to high rainfall and topography), and therefore increased prescribed burns are now stressing the system, as is the Forest’s practice of converting mixed stands to pine only as part of its ecosystem management efforts.

**Project Description**

The revision of the Ouachita National Forest Plan, beginning in 1989, was the first step towards ecosystem management. Extensive clear-cutting on the Ouachita had brought about significant public and political pressure, culminating in a lawsuit by the Sierra Club in March 1990 when the final Forest Plan was published, and significant congressional opposition. In August 1990, a meeting between U.S. Forest Service (USFS) Chief Dale Robertson and U.S. Senator David Pryor (D-AR) led to a halt in the clear-cutting and resulted in the Ouachita being declared a pilot site for the Forest Service’s recently-announced New Perspectives program.

The effort has led to a federally-chartered Advisory Committee, authorized by congressional legislation. The Committee initially consisted of 13 professionals, but now includes foresters, a rural sociologist, a state ecologist, recreationists, and landscape architects. The goal of the Committee’s structure is to obtain a broad spectrum of professional backgrounds and experiences. Meeting 3-4 times per year, the Committee reaches decisions through consensus and makes recommendations to the Forest Supervisor.
Various stakeholders have been involved in the effort, including many state agencies (AR Natural Heritage, Game & Fish, and Forestry Commissions; Department of Pollution Control & Ecology; OK Department of Wildlife Conservation), other federal agencies (FWS, EPA), Weyerhaeuser, environmental organizations (Audubon, Sierra Club, Ouachita Watch League (OWL), Nature Conservancy), and research institutions (University of Arkansas, OK State University, USFS Research).

The goals of the effort are: 1) sustaining and where appropriate restoring biodiversity and ecological integrity; 2) integrating human uses with environmental values; 3) maximizing options for future generations; and 4) emphasizing natural qualities, such as old-growth forests, the red-cockaded woodpecker, and social values. To meet these goals, six strategic objectives have been drawn up by the Committee, each with specific action items.

While a specific monitoring program has yet to be set up, it is expected to use as measures the rate of listings or recovery of endangered species, aquatic biodiversity indicators, water quality standards, and social indicators.

**Present Status & Outlook**

The Forest Plan has been amended to address changes in silvicultural practices and old-growth restoration. The level of conflict, while still significant, has been reduced between the Forest Service and the public. Research efforts are in place, and more monitoring of the ecosystem is under-way than existed before. Clear-cutting has been effectively eliminated on the Ouachita, leading to visual and habitat improvements. Herbicide use has been reduced; prescribed burning is increasing (although its need is disputed); and efforts are directed at restoring native forest composition (although there is debate between the USFS and its critics as to what that should be).

**Factors Facilitating Progress**

A committed public, Forest Service leadership, and adequate funding have been instrumental. Having Forest Service research professionals on site has proven extremely beneficial (not typical on most Forests), thanks in part to office facilities borrowed from the National Park Service. Support from the Arkansas and Oklahoma congressional delegations has resulted in fewer intrusions into forest management, and has actually facilitated the development of the effort.

**Obstacles to Progress**

Initially, setting up data collection was delayed due to difficulties in achieving appropriate scientific methodology. Using ecosystem management without a clear definition of the paradigm has created difficulties, particularly for external overview of the Forest’s operations. However, the project does not feel a precise definition is needed for the project to proceed. Finally, ecosystem management schemes have at times proven incompatible with traditional USFS goals.

Inherent skepticism of the government by the public continues. Critics claim that the Ouachita is using ecosystem management to justify existing on-the-ground management. Opposition by local and national environmental organizations is still quite significant, with one ongoing lawsuit filed by the Sierra Club and OWL against the USFS over its herbicide practices. The Forest was featured in a Sierra magazine article criticizing the USFS’s ecosystem management efforts, specifically on the prescribed burning and forest composition issues.

Future funding is a concern, especially for research and in terms of justifying the funding level for the effort. Being able to demonstrate that ecosystem management “works” is another key concern of the project.

Additional training of personnel is needed, as is greater commitment to effective interdisciplinary teamwork by the Forest’s specialists. Also, having additional computer hardware and software would be beneficial to the effort. Finally, open and positive relations with the public and cooperators is essential according to various stakeholders.

**Contact Information:**

Mr. Bill Pell  
Ecosystem Mgt. Coordinator  
USDA Forest Service  
Ouachita National Forest  
PO Box 1270  
Hot Springs, AR 71902  
(501) 321-5202  
Fax: (501) 321-5334  
E-mail: S=W.PELL/OU1=R08F09A@MHS-FSWA.ATTMAIL.COM
**OWL MOUNTAIN PARTNERSHIP**

**PROJECT AREA DESCRIPTION**
Extending northwest from the Continental Divide and south from the Wyoming border lies the North Park region of the Colorado Rocky Mountains. This region is bounded by high mountain ridges and includes the Arapaho National Wildlife Refuge, serving as a major wintering area and migration route for elk. The North Park region is characterized by coniferous forests, rolling sagebrush uplands, and extensive pasture lands and hay fields. There are approximately 700 square miles of intermittent and perennial streams within its watersheds, and many neotropical birds summer in this region.

The drainages of the Michigan and Illinois Rivers define the project boundaries of the Owl Mountain Partnership, which includes 67% public lands and 33% private lands. Agriculture (primarily livestock grazing), logging, and recreation provide the economic foundation of this rural and least-populated area of Colorado.

**ECOSYSTEM STRESSES**
Extensive logging has occurred in North Park, particularly in the Owl Mountain area. A large network of logging roads and extensive clearcutting are the legacy of past forestry practices on private, state, Bureau of Land Management (BLM), and U.S. Forest Service (USFS) lands. These practices have affected wildlife migration, and increased wildlife harassment and mortality. As a result, greater numbers of wildlife, particularly elk, have retreated to lower elevation private lands. Furthermore, severe drought conditions in 1994 have exacerbated degraded range conditions from past grazing practices and have stressed the region's water resource. The resulting loss of forage has caused a decline in sage grouse and deer populations.

**PROJECT DESCRIPTION**
The project originated with the Colorado Division of Wildlife Habitat Partnership Program (HPP) in which private landowners and land management agencies work together to resolve local conflicts over forage consumption of elk and livestock on public and private rangelands. In 1992, the HPP committee received a grant from the Seeking Common Ground Work Group for a cooperative ecosystem management demonstration project.

In 1993, the Owl Mountain Partnership was born, with a steering committee established to identify priority issues and problems to be addressed by the project. The steering committee includes representatives from the Colorado Division of Wildlife, Colorado State Forest Service, Colorado State Land Board, BLM, Natural Resources Conservation Service, USFS, U.S. Fish and Wildlife Service, Colorado State University, several ranchers and other private landowners, an environmental representative, and the North Park community. All planning and management decisions for the project area are made by the committee using a consensus-based process.

The intent of the Owl Mountain Partnership is to meet the economic, social, and cultural needs of the North Park community while developing adaptive long-term landscape management programs to ensure ecosystem sustainabil-
ity. To attain these goals, the project focuses on creating partnerships to resolve resource conflicts, developing and implementing a management plan across political, administrative, and ownership boundaries, and promoting communication and education efforts for the partners and the community.

**Present Status & Outlook**

So far, a comprehensive plan has not been developed for the project area. However, extensive inventory and monitoring work on vegetation, wildlife, and aquatic systems are underway. In the meantime, smaller projects have been implemented to address immediate concerns of water scarcity and fence damage. By direction of the steering committee, one method for vegetative inventory has been developed for all land management agencies and participating private landowners so that data be consistent and easily shared among partners. Despite the wide range of interests and the difficult hurdles, the committee has been very successful in maintaining cooperation in addressing resource issues.

**Factors Facilitating Progress**

To address the initial distrust and misunderstanding of the project’s intent, a great deal of outreach to local ranchers clarified these issues and achieved the support of most ranchers in the project area. The committee has also become more sophisticated in seeking funding through grants. Finally, the project is driven by a locally-based group and has full-time agency staff who work only on these ecosystem planning efforts.

**Obstacles to Progress**

Proposals for ski area development within the project area have split the community; some want to protect the rural agrarian lifestyle and the wildlife habitat the area provides, while others, such as county commissioners, see the development as a greatly needed economic opportunity for the North Park community. The committee hopes that through collaborative planning at the community level, long-term social, economic, and ecological sustainability can be achieved.

**Contact Information:**

Mr. Jerry Jack  
Project Manager  
Bureau of Land Management  
Kremmling Resource Area  
1116 Park Avenue  
PO Box 68  
Kremmling, CO 80459  
(303) 724-3437  
Fax: (303) 724-9590
LOCATION: West-central & southwest Missouri

PROJECT SIZE: 29,920 acres

INITIATOR: Missouri Department of Conservation

PROJECT AREA DESCRIPTION

The project area is separated into two target zones: a northern zone encompassing 24,320 acres in west-central Missouri south of Sedalia, and a southern zone encompassing 25,600 acres south of the town of Nevada in southwest Missouri. Both areas are former tallgrass prairies on hilltops or side slopes, giving way to woodlands in bottomlands. Once, the prairie was dominated by warm-season grasses such as big bluestem, Indian grass, and little bluestem. Today, much of the prairie has been converted to exotic cool-season grasses for grazing and haying, and crop land.

Several threatened and endangered species are known to exist in the project area, including Henslow’s sparrow, Mead’s milkweed, upland sandpiper, and prairie-chicken.

Most of the land is privately owned with core areas owned by the Missouri Department of Conservation for conservation and recreation (hunting, fishing, viewing, hiking).

ECOSYSTEM STRESSES

Fire suppression has allowed woody invasions in fence rows and upper reaches of some draws to fragment the prairie landscape. Conversion of the prairie to exotic vegetation for pasture and row cropping has decreased plant diversity, and year-long grazing does not provide suitable structure for nesting and brood rearing by a variety of birds, including the prairie chicken. Finally, agricultural non-point source pollution and low-quality timber and forest management (on side slopes and bottomlands) are present but less significant as stresses.

PROJECT DESCRIPTION

The prairie chicken is considered an indicator of overall prairie biodiversity, and although the chicken’s populations had stabilized on some public lands, the overall population was continuing to decline according to a 1992 report published by the Missouri Department of Conservation (DOC). Recovery of the species, and by extension, the landscape as a whole, was not considered possible relying only on public land. The decline of the prairie chicken, which is promoted as a flagship species because of its high visibility and concern it garners from landowners, stimulated the program’s development.

Following the 1992 report, the DOC decided to develop a 10-year pilot program coordinating conservation efforts on public and private lands, the first of its kind in the state. In 1992 and ‘93, DOC biologists selected and inventoried the two project target zones. Public-private resource management strategies to improve prairie habitat were developed in 1994. County Soil and Water Conservation District boards (SWCD), representing landowner interests, were asked to comment on the approach, with their feedback incorporated into revisions of the final program.

The program is designed to increase grassland habitat by encouraging landowners to change management to better favor prairie wildlife, with a goal of developing suitable prairie wildlife habitat on 40% of each target area. To that end, the program has three objectives: 1) enhance grassland diversity and structure to improve...
wildlife nesting and broodrearing cover; 2) reduce fragmentation of prairie landscapes by removing invading trees; and 3) demonstrate that agricultural production and prairie wildlife habitat improvements can be compatible.

The program is operated in cooperation with the Missouri Department of Natural Resources Soil & Water Conservation Districts Program and the SWCDs, with additional funding from the U.S. Fish & Wildlife Service and Monsanto Agricultural Group. Monitoring will be based on annual prairie-chicken census routes, annual breeding bird surveys, habitat inventory to monitor change, and surveys of landowner participation and perceptions.

Ten different incentive options, based on 50-75% of average conversion costs to farmers, range from converting fescue to native grasses, to removing invasive trees from fence rows. Landowners submit applications to the local SWCD; the applications are then evaluated for acceptance into the program. Technical assistance is provided by DOC biologists.

Finally, active public education, recognition and outreach efforts will be developed as important components of this program.

PRESENT STATUS & OUTLOOK
The program is operational, with the first sign-up in Spring 1995 and the second in Fall 1995. Two-to three sign-up periods per year are envisioned. An internal program plan was developed; individual management plans are developed for each landowner. Finally, it is too early to assess the effectiveness of on-the-ground improvements, although cooperation and communication between stakeholders and agencies has occurred, and the program appears to be well received by participating landowners.

Factors Facilitating Progress
The Missouri DOC’s move towards ecosystem management, or Coordinated Resource Management (see page 181) as it is officially known, has been an important benefit to this effort. Enthusiasm on the part of other agencies and private sector groups has also helped the program. Funding of this effort, for monetary incentives and program administration, appears to be assured. Finally, several other factors have been cited as positive factors, including a favorable level of scientific knowledge (inventory, understanding of processes), and the clarity and measurability of goals.

Obstacles to Progress
Convincing some traditional constituent groups that trees which fragment former prairies should be removed to benefit wildlife has been a challenge at times, in part because of DOC’s earlier success at promoting tree planting as a general way to improve wildlife habitat.

Contact information:
Mr. William D. McGuire
Private-Land Coordinator
Missouri Department of Conservation
Wildlife Division
PO Box 180
Jefferson City, MO 65102-0180
(314) 751-4115 ext. 148
Fax: (314) 526-4663
Patrick Marsh Wetland Mitigation Bank Site

Location: Southern Wisconsin

Project size: 270 acres

Initiators: Wisconsin Departments of Transportation and Natural Resources

Project Area Description

Formed during the last Ice Age, Patrick Marsh is a 160-acre restored wetland within a larger project site, with gently rolling topography, typical of this glacially-influenced landscape. Located in what is today an agricultural and urban fringe region near Sun Prairie, this site once supported a prairie-oak savanna complex. Today, predominant uses of the surrounding privately-owned lands are row-crop agriculture, dairy, and rapidly growing residential and light-industrial development. The project area is owned entirely by the Wisconsin Department of Natural Resources (DNR).

Today, a rich variety of species of plants and animals are re-colonizing the site, including 42 species of birds in the marsh and surrounding uplands, frogs and other amphibians, and native aquatic and upland vegetation such as aquatic sedges, burr oak, and various prairie forbs and grasses. It contains no endangered species.

Ecosystem Stresses

There are no direct significant stresses on the project site, since it is protected in public ownership. The greatest threats, however, are an inadequate buffer zone around the wetland and urban development on adjacent uplands. Non-point source pollution from highway runoff, seed corn operations, and future urban stormwater could be significant stresses.

Project Description

As a result of the expansion of State Highway 151 and the loss of 26 acres of wetlands in another location, the State Department of Transportation (DOT) was required to replace the lost wetlands. In consultation with the Wisconsin DNR, the DOT purchased the Patrick Marsh property in 1991 (at that time, a corn field), and transferred ownership to the DNR. Soon after, a pumping station which kept the field dry was removed, and the marsh began to refill with water. By the following Spring, the area had gained its present size, with the water level stabilizing by 1994.

Only two agencies, the DOT and DNR, have been involved in this effort. While the public has not been involved in decisions regarding the marsh, DOT purchased the land through voluntary agreements (as opposed to condemnation). An informal management plan was developed by DNR, initially to be used for DOT negotiations with landowners, but now used to guide restoration and management efforts as well.

Project literature describing the site -- including its history, goals, and recovery -- has been developed. The effort’s goal is “to recreate ... a large, thriving wetland community surrounded on the uplands by oak openings and tall-grass prairie.” Five specific objectives are listed: 1) establishment of a wildlife area for visitation and education; 2) reconstruction of mesic and wet-mesic prairie communities on uplands; 3) restoration of remnant oak openings through weed tree removal, prescribing burns, and reseeding; 4) public education on the function and value of a restored wetland and prairie community; and 5) evaluation of wetland restoration through monitoring.

Present Status & Outlook

Because the restored marsh is larger...
than the wetlands lost as part of
the original highway expansion, the extra wetlands ‘created’ as a result
of this effort can be used to
mitigate against future wetland
losses from other DOT projects.
Thus, Patrick Marsh is a bank from
which wetland credits can be used.
This is the first such wetlands
mitigation bank site in Wisconsin,
and as such, is considered an
important pilot for wetland
mitigation banking in the state.

Cooperative efforts with local
schools and interpretative activi-
ties have also been developed.
Monitoring is occurring on a
limited basis, for example, of
breeding birds and aquatic vege-
tation by graduate students and
the DNR.

Factors Facilitating Progress
Interagency cooperation between
the DOT and DNR, as well as the
two agencies’ support for this
effort, were cited as benefits to the
process. Visitation, particularly by
school groups, has helped create
local support for the marsh.

Obstacles to Progress
Insufficient funds to purchase
additional uplands and for inter-
pretive activities were cited as
obstacles to this effort’s progress.
The DNR project manager, who has
other responsibilities, is able to
devote only a very small per-
centage of his time to the marsh.
Nearby landowners have been
unwilling to sell lands which could
serve as buffers or native uplands,
because of skyrocketing land
values which make their lands more
valuable for development.
Ironically, the restoration of the
marsh has made the surrounding
uplands even more appealing for
housing development. More DNR
outreach with
the community and local officials
may have aided with buffer land
acquisitions. Finally, stresses
outside the project area which
impact the marsh and uplands are
not being reduced and may become
more significant with increased
housing development.

Contact information:
Mr. Alan Crossley
Wildlife Biologist
Wisconsin Department of
Natural Resources
3911 Fish Hatchery Road
Fitchburg, WI 53711
(608) 275-3242
Fax: (608) 275-3338
PHALEN CHAIN OF LAKES WATERSHED PROJECT

PROJECT AREA DESCRIPTION
During the past 35,000 years, the landscape of this watershed was worked and reworked by glaciers. The glaciers left a landscape of rolling, well-drained uplands dotted with lakes and wetlands in low areas. The Chain of Lakes lie along an old river valley of the St. Croix River. During the last glaciation, gravels and soils were deposited in the valley, and large chunks of ice were left in low areas, forming the chain of lakes.

Location:
South-central Minnesota

Project size:
14,790 acres

Initiators:
Ramsey-Washington Metro watershed District, 8 local governments, University of Minnesota Department of Landscape Architecture, Minnesota Department of Natural Resources

At the time of the original land survey (1845-47), most of the watershed was covered by oak woodland or oak savanna, with scattered groves of northern pin oak, bur oak, white oak, and aspen trees. Only scattered clusters of large, pre-settlement oaks remain today in some older neighborhoods and parks, and a few acres of remnant prairies remain along railroad tracks, near wetlands, and in other undeveloped areas. Today, the watershed is dominated by low-density residential land use, with commercial/industrial areas near freeways and major streets, and parks and open spaces along lakes, creeks, and wetlands. Among the area’s state-listed endangered species are three prairie plants and Blanding’s turtle.

ECOSYSTEM STRESSES
Urbanization has fragmented the landscape significantly and affected the ecological communities and systems of the watershed in many ways. Settlement has nearly eliminated the native vegetation of the area, replacing it with impervious surfaces. Habitat diversity and the varieties of birds and animals that inhabit the area have been much-reduced. Exotic species have gained a foothold in the watershed and have become invasive problems.

Hydrologic alteration has also widely occurred. Urban development has increased soil compaction, creeks have been paved and channelized, and over half the wetlands in the watershed have been eliminated. These changes cause more water to run off the land with each storm at a faster rate, creating flood and erosion problems.

PROJECT DESCRIPTION
The Phalen Chain of Lakes Watershed Project is a partnership among the Ramsey-Washington Metro watershed District, eight local governments, the University of Minnesota Department of Landscape Architecture, and the Minnesota Department of Natural Resources. The partnership was formed in 1992 when it applied successfully for foundation funding to hire a project coordinator. The purpose of the project partners was to develop and implement a comprehensive, locally-based plan to protect, restore, and manage land and water resources while accommodating continued urban growth in the watershed over the next 50 years.

The project partners organized into a Steering Committee and began meeting in May 1993. The Committee included representatives from city councils and planning commissions, county board, watershed district, local businesses and developers, environmental organizations, lake associations, private citizens, and agencies.

At the beginning of the Steering Committee’s planning process, members received a broad education on watershed history, resource conditions, and
**Phalen Chain of Lakes Watershed Project -- continued**

trends. As a result of the education process, the Committee articulated a powerful and collective vision for the watershed’s future. Seven goals supported by recommendations and action steps were also developed.

**Present Status & Outlook**
The Watershed Plan was completed in April 1994. Steering Committee members brought the plan to their community constituencies for approval and implementation. The plan has been formally endorsed by local governments, organizations, and others working in the watershed. The project coordinator is now working to implement the plan. Citizens, businesses, local governments, and agencies are now undertaking specific actions to improve and manage natural resources in the watershed.

To date, the partners have raised over $500,000 to support demonstration projects such as an innovative stormwater management project and an eight-acre wetland restoration on an old shopping center site; completed demonstration plantings to restore native wetland, upland and aquatic plant communities; and are working with cities to develop model environmental ordinances and projects.

**Factors Facilitating Progress**
The commitment of four dedicated people allowed the project to progress during the beginning stages. Members of the Steering Committee represent the diversity of local and community interests. Furthermore, Steering Committee members have a mutual respect for one another and have committed themselves to work together in new ways. The common vision shared by Committee members is also an asset, as is the creativity used to act against threats to the watershed. Other major positive influences are the level of political support the project receives, the project’s administrative structure, and the capability of project leadership.

**Obstacles to Progress**
Conflicts within and between agencies were identified as obstacles to progress. Although agency support is another factor facilitating progress, agency conflicts have required the project administration to undertake a ‘balancing act.’ Constraints have also been imposed by an insufficient inventory of the ecosystem’s biophysical components. Furthermore, there is a low degree of certainty as to how these components interact with one another.

**Contact information:**
Ms. Sherri A. Buss  
Phalen Watershed Project Coordinator  
Ramsey-Washington Metro Watershed District  
1902 East County Road 13  
Maplewood, MN 55109  
(612) 777-3665
**PIUTE/EL DORADO DESERT WILDLIFE MANAGEMENT AREA**

**PROJECT AREA DESCRIPTION**
Thirty miles south of Las Vegas, the Piute/El Dorado Desert Wildlife Management Area (DWMA) encompasses the northeastern portion of the Mojave Desert and the McCollough Mountain Range watershed eastward to the Colorado River. Four major mountain ranges border this region, which is comprised mostly of creosote scrublands, Joshua Tree woodlands, and scattered blackbrush, yucca, and cacti communities. The DWMA is also dissected by washes (i.e., periodically flowing draining channels) with unique vegetation such as acacia and mesquite. Federally- and state-listed threatened or endangered species in the area include the desert tortoise, peregrine falcon, gila monster, chuckwalla, and phainopepla.

Current land uses permitted in the DWMA include mining and recreation. Eighty percent of the project area is owned by the Bureau of Land Management (BLM), with most of the remaining lands controlled by the National Park Service (NPS).

**ECOSYSTEM STRESSES**
Hard rock mining has led to the loss of desert wildlife habitat. Roads and power line corridors provide unsupervised access into the interior regions of this management area, fragmenting habitat, and increasing species collection, harassment, and mortality. Unregulated commercial and illegal collection of reptiles and plants has caused a decrease in certain lizard and snake populations and yucca and cacti communities. The introduction of exotic grasses and other annuals for grazing has replaced native plant communities and has affected soil characteristics. These threats to native species have been exacerbated by a long period of drought in the region, increased human activity on the landscape due to the expansion of urban areas and small communities, and increased recreational pressures in southern Nevada. The species evidently most threatened by all of these stresses is the desert tortoise.

**PROJECT DESCRIPTION**
The project was initiated as a result of the federal listing of the desert tortoise in 1990. In response, Clark County, and in particular Las Vegas, sought to develop a Habitat Conservation Plan (HCP). As the primary facilitator of this process, The Nature Conservancy (TNC) helped delineate the DWMA area for tortoise recovery and began purchasing grazing allotments on public lands in 1991. A Desert Tortoise HCP steering committee was established with representatives from Clark County, Nevada Divisions of Wildlife, Agriculture, and Transportation, BLM, NPS, U.S. Fish and Wildlife Service (FWS), Southern Nevada Home Builders Association, Las Vegas Water District, Southern Nevada Off-Road Enthusiasts, mining operators, the Tortoise Group, and TNC. The HCP was the result of the committee's recommendations developed through consensus and proposed to the Clark County Commission.

**PRESENT STATUS & OUTLOOK**
Although the original intent of the DWMA was the protection of the desert tortoise, the committee now takes a multiple species and ecosystem approach in making management recommendations. Funding restrictions,
however, limit monitoring capabilities so that the tortoise continues to serve as the indicator species for the entire Mojave Desert ecosystem.

The committee has produced a 30-year plan which is currently under review by FWS. In the meantime, several committee management recommendations have been implemented. BLM has closed roads, restricting access to the DWMA, and increased law enforcement, deterring illegal collection, hunting, ORV use, and other violations. The impacts of highways in the project area are proposed to be mitigated through fencing and underpasses. Since the removal of livestock grazing, vegetation is persisting longer. The committee is currently working with a local community on a conservation easement for 85,000 acres of land in the northern end of the planning area, and has set aside 531,000 acres of tortoise habitat.

Factors Facilitating Progress
The involvement of all interest groups from the effort’s inception has been the key to this project's accomplishments.

Obstacles to Progress
There has been some negative sentiment, however, from local communities and local land users who feel that the DWMA impedes their traditional/cultural uses of the land and the ability of small communities to grow. Some backlash has occurred, such as the deliberate killing of tortoises and illegal ORV travel. Public education efforts, including billboards, radio spots, and school curricula, are being targeted to abate these negative sentiments.

Contact information:
The Nature Conservancy
Las Vegas, NV
**Plainfield Project**

**Project Area Description**

The project boundaries are those of the town of Plainfield, Massachusetts. The area is approximately 86% forested and is dominated by mature forests of northern and central hardwood species. Apart from two large tracts of land owned by Massachusetts Audubon and the State, 78% of the forests are in small private ownerships. The project area is largely undeveloped and rural, with limited agriculture and industry.

**Ecosystem Stresses**

Development poses the largest threat to the natural system. Land conversion to urban uses and development of roads and infrastructure would cause fragmentation and loss of open space, and would threaten the area’s rural character with which it is identified.

**Project Description**

This project is a pilot project in the U.S. Forest Service’s (USFS) Forest Stewardship Program. The program is run by the Division of Forests and Parks of the Massachusetts Department of Environmental Management. The overall goal is to increase the awareness of private landowners beyond their property boundaries and to motivate a shift in values towards a landscape level perspective. To reach this goal, the program is creating incentives and building mechanisms that encourage cooperative projects by adjacent landowners.

In order to be considered for the cost-sharing incentive that the project offers, landowners must first have a 10-year Forest Stewardship Plan developed by a natural resource professional. This must include a forest inventory, statement of objectives, and schedule of activities. Then, three or more neighboring properties can receive cost-sharing dollars to hire a consultant to review landowner plans and to look at opportunities that would be enhanced through cooperative efforts. Examples of projects that cross boundaries include locating projects to enhance or protect a wildlife corridor, sharing timber access to minimize costs and environmental impacts, or extending a trail network. Cooperative efforts are made as suggestions and are known as “neighborhood checklists.”

Planning for this project began in Spring 1994. The active project members are the Stewardship Coordinator for Massachusetts and the Extension Forester at the University of Massachusetts at Amherst. The Plainfield Conservation Commission, a community organization, has also been involved. A community volunteer in Plainfield, who received training under the COVERTS program, has spearheaded the program locally. (COVERTS is an educational project developed at the Universities of Vermont and Connecticut, teaching non-industrial private forest owners how to improve management of private woodlands.)

In the Fall of 1994, the Forest Stewardship Program held a public workshop and used GIS maps as an educational tool to communicate a landscape perspective to private landowners. An emphasis was placed on wildlife habitat. This workshop also highlighted the pilot project and explained to landowners what it would mean for them to get involved. Although it is difficult to measure an increase in awareness and a shift in values, the project team hoped to hold a roundtable discussion in the Summer of 1995 to survey landowners.
and gauge success. Conceivably, this pilot project could be adopted by other Forest Stewardship Programs.

PRESENT STATUS & OUTLOOK
Currently, the project is working to increase landowner participation in projects that cross property boundaries. In addition, landowners who do not have a Forest Management Plan are being encouraged to adopt one in order to be eligible for the cost-sharing mechanism.

Factors facilitating Progress
This project is a non-regulatory program and therefore is less threatening for people to get involved. Since the project is assistance based, the overall tone has been very positive and the project has been well-received. The enthusiasm of the COVERTS Cooperator has also been an important component of this effort.

Obstacles to Progress
Changing the values and mentality of how people view the land is a difficult process that will not happen overnight. Trying to affect landowners within a non-regulatory setting is a challenge that demands creative and innovative solutions. Logistically, it is also difficult to work with the mosaic of landowners. It is important to respect individual interests while also weighing in the overall interest. Adding an ecosystem approach to the Forest Stewardship Program without making the process cumbersome and bureaucratic is another challenge.

Contact information:
Ms. Susan Campbell
Stewardship Coordinator
Massachusetts Department of Environmental Management
463 West St.
Amherst, MA 01002
(413) 256-1201
**Location:**
Iowa, Minnesota, Montana, North Dakota, South Dakota

**Project size:**
64 million acres

**Initiator:**
U.S. Fish & Wildlife Service

**PROJECT AREA DESCRIPTION**

The Prairie Pothole region extends over a large area in both the United States and Canada. The region is characterized by gently rolling knob and kettle terrain. In presettlement times, it supported millions of small wetlands surrounded by mid-grass prairie. Currently, most of the area is used for agriculture and grazing. In the United States, 95% of the area is privately owned.

During spring and fall migration, almost all waterfowl crossing the central United States and Canada pass through the Prairie Pothole region. Examples include snow geese and sandhill cranes. The region is also important breeding habitat for waterfowl. The area supports many federally-listed threatened and endangered species, such as the piping plover, least tern, whooping crane, pallid sturgeon, and western prairie fringed orchid.

**ECOSYSTEM STRESSES**

Many of the prairies and wetlands of presettlement times have been converted to crop lands, thus resulting in extreme loss of waterfowl habitat, as well as degradation of adjacent habitat. Although some native grassland remains (e.g., 10 million acres in North Dakota), the structure of the prairie plant communities has changed due to overgrazing. As a result, these grasslands are no longer suitable as waterfowl habitat.

Furthermore, almost all rivers and streams in the region have been altered as a result of the construction of dams and reservoirs. For example, in North Dakota only 60 out of 450 miles of the Missouri River are still free-flowing.

**PROJECT DESCRIPTION**

In response to declining duck populations, the North American Waterfowl Management Plan (NAWMP) was signed in 1986 by the United States and Canada. Implementation of the NAWMP is the responsibility of so-called joint ventures, which are cooperative efforts between governments, private organizations, and individuals. These joint ventures are active in important waterfowl habitat areas, as identified by the NAWMP. One of these areas is the United States portion of the Prairie Pothole region. In 1987, the U.S. Fish and Wildlife Service (FWS) organized the Prairie Pothole Joint Venture (PPJV) Steering Committee, consisting of FWS, state wildlife agencies in Iowa, Montana, Minnesota, North and South Dakota, and five conservation organizations. A plan previously developed by FWS (“Concept Plan for Waterfowl Habitat Protection”) became the basic document for framing the overall design of the PPJV plan. The latter was signed in 1989.

The goal of the PPJV is "to involve the public in a broad-scale unified effort to increase waterfowl populations by preserving, restoring, creating, and enhancing wildlife habitat in the Prairie Pothole region of the United States." The objective is to maintain an average breeding population of 6.8 million ducks, and 13.6 million ducks in the fall flight by the year 2000. The PPJV Steering Committee attempts to ensure that this goal and objective are reached by providing a framework within which individual projects can be developed.
and implemented in each state. These projects will be developed and implemented by the individual participating agencies and organizations. The Steering Committee coordinates their efforts. In addition, it mediates conflicts between participants, reviews recommendations, determines policy, and guides implementation of PPJV projects. Such projects involve management of both existing and newly acquired public land for increased waterfowl production, as well as the development and maintenance of habitat on private lands through consecutive short-term agreements with landowners.

Cooperation with private landowners through the provision of financial and technical assistance is a major strategy. On public as well as private lands, a large number of individual management techniques may be applied. These include wetland restoration, delayed haying agreements, seeding cropland back to grassland, and provision of nesting structures.

**Present Status & Outlook**
Technical analyses of the factors inhibiting achievement of desirable wildlife populations have been conducted and have been used to determine the quantity and quality of ecosystems needed. Cooperation and communication among conservation partners has greatly increased. In 1994 a tremendous recovery of waterfowl numbers was observed.

Pilot projects have demonstrated successful techniques and practices and established coordination networks among stakeholders. Furthermore, goals of many individual projects have been realized. For example, one of the projects that has been formed under the PPJV umbrella is the Chase Lake project. It has developed an action plan with 38 action points, including acquisition, and public relations, among others. A number of these points have been completed, whereas others are partially completed, or have yet to be initiated.

**Factors Facilitating Progress**
Having clearly identified goals for major waterfowl species has allowed a clear definition of the desired type of habitat or ecosystem restoration. In addition, the positive attitude and cooperation of agency personnel as well as landowners has been very instrumental in the success of the project. The diverse skills of the team members, and an excellent training session prior to the beginning of this effort, have been very beneficial. Recognition that ecosystem management is a useful analytical tool has helped also.

**Obstacles to Progress**
Funding is a major problem. Only approximately 10% of the estimated cost of the NAWMP has actually been appropriated. As a result, the project has progressed much more slowly than anticipated. With the reorganization and streamlining of federal government, the restriction of funds and personnel is expected to remain problematic and may work counter to ecosystem management.

Another problem is the multitude and possible disagreement regarding the definition of "ecosystem management," which tends to confuse agency personnel, partners, and the public.

**Contact information:**
Mr. Mike McEnroe  
Ecosystem Team Leader  
U.S. Fish & Wildlife Service  
Region 6  
1500 E. Capitol Avenue  
Bismarck, ND 58501  
(701) 250-4418  
Fax: (701) 250-4412
PRINCE WILLIAM SOUND - COPPER RIVER ECOSYSTEM INITIATIVE

**PROJECT AREA DESCRIPTION**
Diverse landforms comprise this vast project area on the Gulf of Alaska. For administrative purposes, the ecosystem has been sub-classified into four resource areas: the Copper River Delta, Prince William Sound, Copper River Basin Corridor, and the continental shelf. The peaks in Wrangell-St. Elias National Park and Preserve that serve as the headwaters for the Copper and Chitina Rivers reach up to 16,000 feet above the coastal and ocean components of the ecosystem.

**Location:**
South-central Alaska

**Project size:**
30 million acres

**Initiators:**
U.S. Department of Interior, National Biological Service

The climatic and elevational diversity accounts for the broad range of vegetative types. The ecosystem’s deciduous forests include aspen, cottonwood and birch. Mixed conifer and deciduous forests and black and white spruce forests cover broad stretches of the mountain and coastal areas. Cranberries and blueberries are widely found. Many wetlands contain cotton grass. Other ecosystem components include eel grass beds on mud flats, kelp beds in inter-tidal pools, and spectacular black spruce bogs in low, wet areas.

All types of motorized and non-motorized recreation occur. Commercial and sportfishing are prominent uses of the inland, coastal, and ocean waters. The U.S. Forest Service, Bureau of Land Management, National Park Service, State of Alaska, and native corporations are the principal landowners in the region.

**ECOSYSTEM STRESSES**
Timber harvesting is among the most significant stresses affecting the region. Run-off from clearcuts has led to the sedimentation of streams. Native corporations are concerned about trash and garbage being left behind by an increasing number of recreationists. Treatment of village garbage and sewage is also an important concern.

**PROJECT DESCRIPTION**
This project is one of 12 ecosystem initiatives undertaken by the National Biological Service (NBS). Many of the area’s residents are dependent on its natural resources for their livelihoods. The Exxon Valdez oil spill was a significant impetus for this effort, with a partnership established among the region’s stakeholders to avoid future "train wrecks."

The goal of the project is to promote a multi-lateral exchange of information among resource managers in the Prince William Sound-Copper River region. NBS hopes that natural resource managers will make decisions that incorporate the concerns and interests of other landowners once the impacts of their own activities on their neighbors are understood.

The project has two primary components: partnerships and information management. NBS is responsible for initiating 1) an agreement with agencies, private landowners, and other individuals with resource management roles to identify their science and data needs for this area; and 2) an agreement with agencies, groups, and individuals conducting research and collecting data in this area. Given the recent establishment of the agreements, partners are still determining how and which agencies will interact.
NBS is also developing an information management plan focused on integrating the dispersed information sources on Prince William Sound and the Copper River. Included in the information management plan is a bibliography that references all work done within the region, a current research profile, a Directory of Natural Resource Managers, and a Metadata Catalog of Spatial Data. It is important to note that NBS is not conducting original research through this initiative, but does have other active research projects in the region. Rather, the agency is responsible for gathering the information that exists, identifying information gaps, and facilitating the sharing of information among the region’s natural resource managers.

**PRESENT STATUS & OUTLOOK**

The three-year project is now at the end of its second year and a draft cooperative agreement is ready to be finalized. Resource managers who have not spoken in over a decade of working within close proximity are communicating about the resources in the sound.

**Factors Facilitating Progress**

The support and experience of the project supervisor has been cited as the primary reason for progress to date. Having been on the ground for two similar efforts in the Lower 48, the project supervisor has seen how well such partnerships can work.

**Obstacles to Progress**

Suspicions of the federal government by native corporations and “turf” wars among government agencies were cited as obstacles to progress. Keeping the partners interested and demonstrating that the project is working for them will determine future success. Continued Congressional funding after appropriations run out next year will determine if NBS will continue participating.

**Contact information:**

Ms. Lisa Thomas  
Fish and Wildlife Biologist  
National Biological Service  
Alaska Science Center  
1011 East Tudor  
Anchorage, AK 99503  
(907) 786-3685  
Fax: (907) 786-3636
**Pu’u Kukui Watershed Management Area**

**Location:**
West Maui, Hawaii

**Project Size:**
8,600 acres

**Initiator:**
Maui Land & Pineapple Company

**Project Area Description**
The project area consists of private forest preserve lands owned by the Maui Land and Pineapple Company (MLPC), extending from Honokowai and Honokohau Valleys on the North, to the 5,788-foot summit of Pu’u Kukui on the South. The watershed is remote and extremely rugged, with a mix of vegetation: lowland communities include native koa and ‘ohi’a wet and mesic forests as well as uluhe wet and shrubland forests; montane communities include mixed fern and shrub cliffs, and various bogs and wet shrublands, some of which are considered rare natural communities. In general, the vegetation protects the fragile mountain soil by absorbing water from heavy rainfalls. Water is then gradually released into streams and groundwater aquifers. Several plants and snails, some of which are endemic to west Maui, are candidates for the federal threatened and endangered species list.

The project area is zoned as a conservation area by the state of Hawaii Land Use Commission. Lands on either side of the watershed are part of the state’s West Maui Natural Area Reserve or are privately-owned with a conservation easement held by The Nature Conservancy of Hawaii (TNCH). Total size of the protected areas is over 13,000 acres.

**Ecosystem Stresses**
Exotic plant, bird, and invertebrate species compete with native species for food, shelter, and other resources, thereby destroying and altering habitat and natural processes. Feral pigs are the greatest threat to the watershed, as they disrupt the ground cover and soil through foraging and rooting, allowing exotic plants, which cannot root in undisturbed soil, to readily become established. Also, it is believed that pig activity results in erosion and changes in plant communities, which affect infiltration rates of water into the soil and thus the area’s hydrology. Finally, grazing and recreation (trespassing hikers, mountain bikes, motorcycles) are additional, less significant stresses.

**Project Description**
In 1988, the MLPC asked TNCH for assistance in creating a private preserve in lieu of giving TNCH a conservation easement to the property and having TNCH manage the area. At the same time, MLPC hired a part-time manager for the watershed. In 1993, MLPC joined the state of Hawaii’s Natural Area Partnership (NAP) program to obtain funding to expand the program.

TNCH developed a long-range management plan, whose broad goal is “to maintain the best possible watershed through protection of native ecosystems,” especially the remaining rare natural communities of west Maui and the species that comprise them, with a focus on controlling feral ungulate (through snaring, hunting, and fencing) and exotic plants (with mechanical, chemical, and biological methods).

The watershed was divided into 10 management units based on topographical and biological features. The upper elevation bogs and forests were designated a Special Ecological Area (SEA), with management beginning there and continuing downslope. Priority was given to keeping the SEA free of exotic ungulates and plants. Access to the watershed is restricted to
Pu’u Kukui Watershed Management Area -- continued

MLPC personnel, volunteers, and researchers. Finally, a monitoring system of feral ungulate and exotic plant populations and native plant and animal population dynamics was established. The plan also called for coordinating management with adjacent landowners and state conservation efforts.

Present Status & Outlook
Currently, the MLPC is entering its third year of the six-year NAP program. Some of the major program goals have been met: the pig control program is nearly complete and feral pig populations have been virtually eliminated in otherwise pristine areas, with the subsequent recovery of native flora. Significant efforts still need be devoted to combating exotic plant species in the remaining predominantly native cloudforests. The MLPC hopes to be able to renew the six-year NAP program commitment.

Factors Facilitating Progress
Strong personal ties of the MLPC President/CEO to The Nature Conservancy (he was a founding member of TNCH) was described as essential to this effort’s inception and subsequent progress. TNCH’s efforts to secure passage of the Natural Areas Partnership Program by the Hawaii state legislature also benefitted this project.

Obstacles to Progress
Although the MLPC is technically guaranteed funding into 1998 through the state NAP program, there is concern that the current fiscal crisis in Hawaii may affect the state’s ability to provide program funding for this effort. Similarly, renewal of the NAP status in 1998 could be affected by the fiscal situation.

Contact Information:
Mr. Randal T. Bartlett
Watershed Supervisor
Maui Pineapple Company, Ltd.
4900 Honoapi'ilani Highway
Lahaina, HI 96761
(808) 669-5439
Fax: (808) 669-7089
RAINWATER BASIN JOINT VENTURE

PROJECT AREA DESCRIPTION
The Rainwater Basin can best be described as a flat loess plain, pock-marked with many deep wind-blown depressions. These depressions can vary in size from one to 2,000 acres. In presettlement times, some 4,000 major wetland basins could be found in these depressions, surrounded by native prairie. Currently, fewer than 400 wetlands remain, and the prairie has been replaced with croplands.

The Rainwater Basin is located in the center of the Central Flyway, a major migration route of migratory birds, and is thus critical to the preservation of healthy populations of migratory waterfowl on the North American continent. For instance, more than 90% of the mid-continental population of white-fronted geese uses the Rainwater Basin as a staging area during migration: there the geese gain strength before continuing on to their breeding grounds. In addition to migratory waterfowl, the Basin is frequented by shorebirds and by several federally-listed threatened and endangered species, such as the whooping crane, peregrine falcon, bald eagle, and least tern.

ECOSYSTEM STRESSES
The conversion of land use to crop agriculture has had many direct and indirect impacts on the ecosystem. The disappearance of the prairie and the drainage of many wetlands has significantly reduced wildlife habitat. Furthermore, the recharge of the remaining wetlands has been reduced as a result of irrigation tailwater recovery pits, which collect water from an irrigated field for later redistribution. These pits do not only collect irrigation water, but natural runoff as well. Land leveling and manipulation of water by the county road and ditch drainage system has reduced wetland recharge also.

PROJECT DESCRIPTION
Most wetlands in Iowa and eastern Nebraska have disappeared, and the Rainwater Basin is the last remaining staging area in the region. Recognizing the importance of the Basin, the Nebraska Game and Parks Commission, the U.S. Fish and Wildlife Service, Ducks Unlimited, The Nature Conservancy, and others developed a concept plan and subsequently applied for joint venture status under the North American Waterfowl Management Plan (NAWMP) in 1990. (The NAWMP was signed in 1986 by the United States and Canada in response to declining duck populations. Implementation of the NAWMP is the responsibility of so-called joint ventures, which are cooperative efforts between governments, private organizations and individuals.) After the concept plan was approved, joint venture status was granted in 1991. Following public input, the concept plan was expanded to become an implementation plan, which was finalized in 1992. This plan lists goals, objectives, strategies, and tasks.

The overall goal of the Rainwater Basin Joint Venture is to “restore and maintain sufficient wetland habitat in the Rainwater Basin area of Nebraska to assist in meeting [waterfowl] population objectives identified in the North American Waterfowl Management Plan.” This goal will be realized through the protection, restoration, and creation of 25,000 acres of wetlands and
25,000 acres of associated uplands, including the safeguarding of the water supply to these wetlands, and optimization of wetland values to waterfowl. These objectives will be accomplished through the coordination of non-regulatory activities in the area, such as the provision of technical and financial assistance to private land owners attempting to restore migratory waterfowl habitat.

The Joint Venture hopes to provide structure and focus for state, local, and federal agencies, private land owners, and corporations who want to contribute to a unified wetland restoration effort. Organizations that have become involved include the USDA Natural Resources Conservation Service, National Audubon Society, Nebraska Environmental Trust, Natural Resource Districts, and many others.

**Present Status & Outlook**

Since the completion of the Plan in 1992, a Joint Venture Coordinator has been hired, a private lands work group has been established, a private lands protection program has been developed, and existing wetlands have been identified and prioritized. Some wetlands have been acquired. Also, several wetland restoration projects on private lands have been carried out.

**Factors Facilitating Progress**

A recognition among government agencies that private land owner needs must be recognized, that no single agency can accomplish the task, and strong administrative support for ecosystem-based assistance have all helped this project to progress. The partnership of all involved agencies and the commitment of its personnel have been very important. In addition, national support through the North American Waterfowl Management Plan has been crucial for the success of this effort. The protection of the wetlands greatly benefits from the development of the Implementation Plan which streamlines the efforts of individual agencies and land owners.

**Obstacles to Progress**

Governmental programs offered through the U.S. Department of Agriculture (USDA) tend to provide incentives to keep even extremely poor cropland in production, e.g., through farm programs and set-aside provisions. Thus, land owners are not inclined to look at alternative uses for the land. However, until recently, it had been difficult to involve USDA in the effort. Prior to the employment of a Joint Venture Coordinator, the partnership tended to focus on agencies normally working with wildlife.

An additional obstacle to progress has been the lack of both local and agency awareness of the resource, as well as landowner mistrust of the government.

**Contact Information:**

Mr. Steve Moran  
Coordinator  
Rainwater Basin Joint Venture  
1233 North Webb Rd., Suite 100  
Grand Island, NE 68803  
(308) 385-6465  
Fax: (308) 385-6469
ROBBIE RUN STUDY AREA

PROJECT AREA DESCRIPTION
The project area is a part of a 3,500-acre landscape corridor defined by the U.S. Forest Service (USFS), consisting of seven core areas in the Allegheny National Forest. The purpose of the landscape corridor is to connect existing islands of late-successional and old growth forests and to protect riparian values. The area is managed by the USFS for secondary growth hardwoods primarily, as well as old growth. It is characterized by sweet birch, black cherry, and maple. Primary use of the area is forest and timber management.

ECOSYSTEM STRESSES
Stresses to the ecosystem include insect infestation and diseases such as Beech Bark Disease. High deer populations are a stress to the biodiversity of the ecosystem, because of overcrowding and competition for food.

PROJECT DESCRIPTION
The 1986 Allegheny National Forest Plan mandated that the USFS manage for old growth species. The impetus for this landscape corridor designation in the Bradford Ranger District is to fulfill this mandate. Adaptive management and various studies, such as the Robbie Run Project, are being used to assess the range of management options available within the corridor and to determine the extent that the corridor is achieving the designated objectives. The project was initiated in the Spring of 1994 and cooperators include, in addition to the National Forest, the USFS’s Northeastern Forest Experiment Station, Pennsylvania Game Commission, and Audubon Society.

The goal of the project is to develop guidelines for managing snags and logs for wildlife benefits, and to document the impact of such management on wildlife communities within a landscape perspective. Specific objectives to meet this goal include the following: determine how to create snags and logs; determine when cultured snags become useful to wildlife, by what wildlife, and for how long; and determine if the pattern of snag and log creation, scattering versus clumping, elicits different responses in wildlife communities.

PRESENT STATUS & OUTLOOK
The project area is currently undergoing pretreatments with final treatments planned for 1996. Treatments include girdling live trees to create snags and felling trees as a source of logs. Species richness and abundance of songbirds, reptiles, amphibians, and small mammals will be sampled every other year for nine years.

Factors Facilitating Progress
The 1986 Forest Plan brought people to the table to discuss landscape level values. Without this impetus, a study project like Robbie Run may not have been conceived.

Contact information:
Mr. Brad Nelson
Wildlife Biologist
USDA Forest Service
Allegheny National Forest
PO Box 827
Warren, PA 16356
(814) 723-5150
**RUBY CANYON & BLACK RIDGE ECOSYSTEM MANAGEMENT PLAN**

**PROJECT AREA DESCRIPTION**
The Ruby Canyon and Black Ridge Ecosystem consists of Ruby Canyon and the areas immediately north and south of it. The Canyon, characterized by steep red sandstone walls, is an approximately 25-mile long section of the Colorado River corridor in western Colorado (Mesa County). The area north of the canyon consists of rolling high desert grass-shrub lands.

The 74,000-acre Black Ridge Wilderness Study Area is located south of the canyon. This area is characterized by sheer-sided, red-rock canyons, sandstone arches, caves, and granite outcrops with spectacular waterfalls and pools. Located between the canyons are rolling sagebrush pinyon-juniper mesas. Several federally-listed threatened and endangered species occur in the project area, including the bonytail chub, humpback chub, Colorado squawfish, razorback sucker, and American peregrine falcon. In addition, much waterfowl populates the river, particularly during the spring and fall.

Ninety percent of the planning area is public land administered by the Bureau of Land Management (BLM). The other 10% consists of private inholdings. The dominant land uses are recreation, cattle grazing (on a limited number of parcels), and education.

**ECOSYSTEM STRESSES**
Fire, a natural disturbance factor, has been suppressed, leading to increasingly dense pinyon-juniper stands. Survival of desert big horn sheep may be reduced, because of their limited ability to traverse the pinyon-juniper areas. Exotic species such as salt cedar, knapweed, and cheat grass have altered plant composition, by replacing native species. In addition, increased recreational use has impacts on vegetation, wildlife, as well as on the experiences of visitors.

**PROJECT DESCRIPTION**
Increasing recreational pressures, in combination with BLM's shift in management focus from multiple use to ecosystem management, led to this effort. Development of the Ruby Canyon and Black Ridge ecosystem management plan began in 1994 with the publication of a management summary, which illustrated how different aspects of previous management of Ruby Canyon are related. This publication was followed by the formation of an ad-hoc committee consisting of representatives of user groups, local, state, and federal agencies, grazing interests, environmental groups, and community representatives. In addition, technical committees were formed, addressing either recreational aspects or vegetation management.

Based on the findings of the technical committees, the ad-hoc committee helped the BLM refine and develop possible management strategies for the area. It also developed a vision document, expressing the overall goal of the effort: “The Ruby Canyon - Black Ridge area will continue to contribute to the current quality of life for the Grand Valley and will be managed for an ideal balance of use and preservation.”

The plan will incorporate a “Benefits Based Management” approach to recreation management, which is
based on a visitor study conducted between 1992 and 1994. It ensures that BLM provides those experiences most sought by visitors, rather than unwanted services or contrary settings. Vegetation management will be based on an ecological site inventory conducted in 1993.

Strategies include the development of partnerships, managing recreational pressures, and vegetation management. In addition, some of the private inholdings will acquired by the BLM either through land exchange or purchase. Monitoring will focus on measurable management objectives (e.g., wildlife, vegetative response, visitor satisfaction). The management plan will be periodically revised based on monitoring results and public involvement.

**Present Status & Outlook**
Some of the most important outcomes of the project to date include the beginning of collaborative public land management, as well as the realization that public lands play a part in a community’s quality of life. BLM has received valuable support for many management objectives. Some issues, however, have not been resolved to everyone’s satisfaction, including mountain biking in and access routes to the Black Ridge Wilderness Study Area, group size limitations for river floating in Ruby Canyon, and restrictions on motorized use of the river in the Canyon.

**Factors Facilitating Progress**
Several factors helped this project proceed. They include: a good ecological site inventory, a good visitor use survey, community-based partnerships, willing partners, and a professional facilitator.

**Obstacles to Progress**
The potential threat of a suit under the Federal Advisory Committee Act (FACA) has been a problem. Scheduling a meeting so that all partners can attend has been difficult. Obtaining consensus from a large number of partners is not easy. Different entities were not always willing to compromise on their use of the natural resources. Until a facilitator was brought in, little progress was made.

**Contact information:**
Mr. Harley Metz  
Grand Junction Resource Area  
2815 H Road  
Grand Junction, CO 81506  
(970) 244-3076  
Fax: (970) 244-3083
SAN LUIS VALLEY COMPREHENSIVE ECOSYSTEM MANAGEMENT PLAN

PROJECT AREA DESCRIPTION
The San Luis Valley ecosystem is a high mountain desert valley, surrounded by the Sangre de Cristo and San Juan Mountain ranges. This area makes up the Upper Rio Grande Ecosystem, consisting primarily of salt desert shrub and wet meadow riparian habitat on the valley bottom, and pinyon-juniper and spruce-fir habitats at higher elevations. Since the early 1900s, most of the valley bottom has been irrigated for agriculture, converting salt desert shrub to wet meadow habitat. This altered habitat provides important migration and wintering grounds for many waterfowl species. Valley wetlands also support several federally-listed threatened, endangered, and candidate species, including the whooping crane, bald eagle, peregrine falcon, and snowy plover. State-listed species include the white-faced ibis, sandhill crane, and slender spider flower.

Current human uses in the valley consist mainly of agriculture, ranching, and mining. There are a few dams present in the Upper Rio Grande Ecosystem.

ECOSYSTEM STRESSES
Irrigation has had a positive impact for migratory bird and other wildlife species, but has contributed to a decrease in groundwater levels, adversely affecting some wetland areas. Furthermore, structures associated with irrigation (i.e., power lines) have cause high mortality rates for birds. Another serious threat to the ecosystem is the Summitville Mine, a nearby Superfund site that has contaminated the Alamosa river. Population growth in the state of Colorado also impacts the San Luis Valley. Increased water demand and consumption, increased road building, and loss of wildlife habitat and the rural character of the Valley to subdivision development are all consequences of this growth. Finally, the introduction of an extremely aggressive invasive plant species, tall white-top, has had significant impact on wet meadow riparian habitat.

PROJECT DESCRIPTION
Recognizing that long-term sustainability requires an ecosystem approach to management, the U.S. Fish and Wildlife Service (FWS) began building partnerships with private landowners for wetland development and habitat management through FWS’s Partners for Wildlife Program in 1990. At the same time, public agencies in the valley began discussing ways in which they could work together to manage the valley as a whole. This cooperative spirit grew out of an earlier valley-wide effort to stop a major water development project which planned to pump water from San Luis Valley to Colorado’s rapidly growing front range.

As a group, local, state and federal agencies, private landowners, and private organizations from both environmental and commodity interests began to work together on a common goal: to ensure the ecological, social and economic sustainability of the San Luis Valley by protecting, restoring, and maintaining viable levels of biotic diversity.

PRESENT STATUS & OUTLOOK
FWS has formed 110 partnerships with private landowners. So far, only one private landowner has left the Partners
SAN LUIS VALLEY COMPREHENSIVE ECOSYSTEM MANAGEMENT PLAN -- continued

for Wildlife Program, and the demand for contracts from private landowners far exceeds the FWS’s financial resources. In only four years, these and other partnerships have increased wetlands in the valley by 12,000 acres. Overall wildlife diversity is increasing, particularly wetland-dependent species, and a major outbreak of avian cholera has been eliminated. The group is now discussing a proactive initiative to develop a hatchery for sensitive wetland species to prevent further endangered species listings.

Factors Facilitating Progress
Funding and support provided by organizations such as Ducks Unlimited and the Colorado Division of Wildlife have made many of the project's programs possible. Perhaps more important, however, has been the attitude and support of the residents of the San Luis Valley of good land stewardship; the belief that biological diversity leads to ecological, social, and economic sustainability has fostered a strong desire to work together and resolve issues through common goals. To promote such efforts, an education center has been developed to increase educational and communication opportunities for valley residents.

Obstacles to Progress
To date, the project has run smoothly, but two factors threaten the future of the project. First, a lack of funding is the major limiting factor for the Partners for Wildlife Program. Second, increased water demand that accompanies the increased population growth of Colorado threatens the water resources of rural areas like the San Luis Valley.

Contact information:
Refuge Manager
U.S. Fish & Wildlife Service
Alamosa/Monte Vista National Wildlife Refuge
9383 El Rancho Lane
Alamosa, CO 81101
(719) 589-4021
Fax: (719) 589-9184
San Pedro River

PROJECT AREA DESCRIPTION
Flowing from its headwaters in Mexico to its confluence with the Gila River, the San Pedro River is one of the last undammed rivers in the Southwest. Surrounded by the Huachuca and Mule Mountain ranges, the San Pedro River Valley sits in a combination of Chihuahuan and Sonoran desert habitat, supporting grassland, mesquite, and riparian communities. The Southwest’s most extensive cottonwood-willow riparian forest habitat, a rare and rapidly disappearing forest type in the U.S., can be found along the San Pedro River.

This river corridor is prized for its wealth of biological diversity, and renowned by bird watching enthusiasts. This corridor is an important stop-over for migratory birds and supports over 360 bird species. Major land uses in the upper basin include ranching and suburban development. Mining also occurs within the watershed, both in Mexico and along the lower stretch of the river in the United States.

ECOSYSTEM STRESSES
The most significant threat to the San Pedro River system is past and present groundwater pumping. Hydrologic studies have shown that groundwater pumping for agricultural and domestic uses has created two distinct cones of depression in the upper basin aquifer. Although agricultural pumping has decreased, chances of the aquifer recovering are threatened by rapid growth and increasing subdivision development in the upper San Pedro. In the absence of mitigation measures, increased pumping for domestic uses could dry up the river. The habitat value of the area has also been impacted by fire exclusion, overgrazing, habitat fragmentation, and introduction of exotic species. Finally, the river is threatened by potential contamination caused by acid discharge from mining operations in Mexico.

PROJECT DESCRIPTION
Approximately six years ago, the Bureau of Land Management (BLM) acquired the 56,000-acre San Pedro National Riparian Conservation Area (SPNRCA) along the San Pedro River. Around the same time, The Nature Conservancy (TNC) and the National Audubon Society identified the river as an important system to protect because of its high species diversity and its riparian habitat. Twenty years earlier, TNC had begun operation of the Ramsey Canyon Preserve, located six miles west of the river.

TNC came to realize that the long-term viability of the San Pedro was intricately tied to water and land use in the region surrounding the river. As a result, TNC began building partnerships with the BLM and other public agencies, citizens, and private landowners in the U.S. and Mexico for the long-term protection of the entire Upper San Pedro watershed.

TNC’s overall goal for the San Pedro project is to work with local communities to promote support for the long-term protection of the river system.

PRESENT STATUS & OUTLOOK
TNC is currently working with the Water Issues Group, a community organization that has brought environmental and economic develop-
SAN PEDRO RIVER -- continued

Management interests together to develop water management strategies for the region. TNC also participates in water resource planning through the San Pedro Technical Committee, and assists public and private land managers and local decision-makers in crafting land use and water mitigation strategies for the basin. The Conservancy is also promoting eco-tourism to illustrate the economic value of the river in its natural state. Finally, TNC is working with other local conservation organizations such as The Friends of the San Pedro River to increase awareness of the river within local communities.

Factors Facilitating Progress
Efforts between environmental and economic interests in developing a comprehensive water management plan for the entire watershed continue, and initiatives to promote eco-tourism have been well received by both the general public and the business community. Furthermore, public education efforts appear to be increasing awareness of the river and promoting community discussion about water management strategies. However, long-term hydrologic protection for the river has yet to be achieved.

Obstacles to Progress
Obstacles to reaching a comprehensive water management plan are many, including inadequate funding for mitigation efforts needed to protect the river, conflicts between development and conservation interests, and a strong mistrust of projects with government involvement. Furthermore, because surrounding communities do not rely on the river economically, there is a lack of interest or support to protect it. Finally, with the large and diverse population base of the project area, it is difficult to craft a solution with so many interests around the table. What is needed is a shared community vision of desired future conditions, and a plan of action that allows for economic viability while providing for the long-term protection of the river.

Contact information:
Ms. Karlene Burrus
Field Representative
The Nature Conservancy
27 Ramsey Canyon Road
Hereford, AZ 85615
(602) 378-2785
SANTA CATALINA ISLAND ECOLOGICAL RESTORATION PROGRAM

PROJECT AREA DESCRIPTION
Santa Catalina is a rugged, mountainous island characterized by grasslands, chaparral, coastal-sage scrub, oak woodland, dunes, and beaches. The native animals are those that once made it across the channel separating the island from the mainland. These include the Catalina Island fox, an endemic shrew and ground squirrel, several reptiles and amphibians, bats, mice, and many birds. The island is home to many rare and threatened species or communities, including at least one species, the bald eagle, on the federal list of threatened and endangered species list, and several candidates for the federal list, such as the island fox (also listed by the state), Catalina Island mountain-mahogany, and Santa Catalina Island monkeyflower (presumed extinct).

Once inhabited by native Americans who lived off of fishing primarily, this isolated island has remained relatively undeveloped through modern times, having generally remained in large tract ownerships. Today, 88% of the island is owned by the private, non-profit Santa Catalina Island Conservancy, which manages it as a nature reserve with low-impact recreation, research, and environmental education. Eleven percent is owned by a tourism-oriented company, Santa Catalina Island Company, with only the remaining 1% in private ownership. Southern California Edison owns water rights on the island. Development in the project area is limited to a small ranch that is engaged in limited agriculture and grazing management, facilities in coves along the coast for lessees, a small airport, three campgrounds, and small native plant memorials and gardens. The ranch also serves as headquarters for Conservancy facilities management, while the airport houses educational and interpretive staff. The town of Avalon (not in the project area) has approximately 3,000 year-round residents.

ECOSYSTEM STRESSES
Grazing was introduced to the island by early settlers, thereby disrupting the native plants and damaging shallow soils. As a result of this and later human activities, exotic species were introduced, primarily non-native plants but also goats, cattle, pigs, sheep, mule deer, cats, rats, and a herd of bison. Sheet and gully erosion from livestock overgrazing and trampling led to excessive stream sedimentation. Hydrologic alteration occurred from impoundments and pumping of water for human and livestock consumption. Today, the Conservancy controls goats, pigs, and deer through hunting and trapping. Cattle and sheep are no longer ranched, and the bison herd is managed and limited in size.

PROJECT DESCRIPTION
Conservation practices have been in place on Santa Catalina Island since the middle part of this century, when the Santa Catalina Island Company owned most of the island. The Company was controlled by a family with a strong interest in conservation on the island. Members of this family established the Conservancy in 1972. In 1975, 42,135 acres of the island were deeded to the Conservancy by the Company. This deed included a 50-year, open-space easement agreement with Los Angeles
Santa Catalina Island Ecological Restoration Initiative -- continued

County, which allows public access to most Conservancy land for recreation and education.

The Conservancy’s legal mandate is to “preserve the island’s native plants and animals, its biological communities, and its geological and geographical formations of educational interest.” It is also charged with managing Catalina’s open space lands for viewing and controlled recreation. The Conservancy, which has a paid staff of approximately 40, is administered by a board of directors. The board provides general policy and direction to the Conservancy staff, within which projects are developed, with informal consultation from the island’s tourism business and recreational users, and formal consultation with county and state agencies (in accordance with state and county regulations).

Funding comes from membership dues, large donors, and Conservancy revenue-producing operations (such as land leases to various youth groups and recreation clubs). Volunteers are recruited for restoration/conservation activities, special events, scientific research, and administrative support.

Present Status & Outlook

The Conservancy has an internal long-range plan, with conservation as its highest priority, and two additional goals (education, recreation). A more specific and comprehensive resource management plan is being developed and will include a monitoring program. The most significant outcomes of this effort have been the reduction of feral goats, pigs, and deer, some control of invasive non-native plants, reappearance of rare native plants and animals, and regrowth of vegetation such as coastal sage scrub, oak woodland, chaparal, and native grassland.

As a result, the project area is being restored to a more natural condition. In addition, development of a volunteer program and the development of initial restoration plans are occurring.

Factors Facilitating Progress

Strong volunteer and donor programs have helped this effort progress. Scientific research (archaeology, floristic studies, wildlife, geology, marine science) is contributing to a better understanding of the island’s biophysical components. A strong conservation ethic shown by the Conservancy leadership and biological staff has also been credited as a benefit to this effort.

Obstacles to Progress

Several factors are described as specific program concerns or needs, including: limited funding for projects and increasing staff, a need to further educate staff about the island’s ecology, flora and fauna, and history; and a need to increase island residents’ support for and involvement in the Conservancy and its activities.

Contact Information:

Mr. Allan Fone
Santa Catalina Island Conservancy
PO Box 2739
Avalon, CA 90704
(310) 510-1299
**PROJECT AREA DESCRIPTION**

The Santa Margarita River corridor is the most unique and biologically diverse area in southern California, representing a microcosm of California's natural habitats. Flowing through steep granite canyons, conifer forests, dense coastal willow and cottonwood riparian forests, rare native grasslands, coastal sage scrub, and marsh communities, the Santa Margarita is the last major undammed river in coastal Southern California. These diverse habitats support many threatened and endangered species, including the California gnatcatcher, California least tern, Cooper's hawk, least Bell's vireo, and the California mountain lion. The project area abuts Riverside, Orange, and San Diego Counties, and includes the 124,000-acre Camp Pendleton Marine Corps Base.

**ECOSYSTEM STRESSES**

Fragmentation is a major threat, particularly in the project area’s western slope which is experiencing rapid residential development pressures from Orange County. Disruption of the region’s natural fire regime including fire suppression and unnatural fire frequencies has affected vegetational composition in the coastal sage scrub and other natural communities. Human uses of the river, such as the development of water supply projects, have lowered the water table, decreased water quality, and disrupted natural flooding patterns, ultimately destroying riparian forest habitat.

**PROJECT DESCRIPTION**

During a statewide analysis, ecologists identified California's southwest biogeographic region not only as the state's most biologically diverse region, but also as the most threatened region in the state. The Santa Margarita River was identified as the number one biological hot spot in southern California.

The Santa Margarita has been included in The Nature Conservancy’s (TNC) Bioreserve program, and, since 1982, TNC has placed approximately 17,000 acres under protective management. TNC's conservation plan has focused on the natural processes of the area, specifically fire and flood regimes. As a result, the boundaries of the planning area were based on the size of the area required to maintain those natural processes.

The project goals include the following, among others: 1) place the entire main stem of the Santa Margarita River into conservation ownership; 2) restore and maintain the natural occurrences of fire and flooding; 3) create connecting corridors for wildlife movement from the Santa Margarita River to TNC’s Greater Santa Rosa Plateau preserve (purchased 10 years ago), and to other surrounding large conservation ownerships such as U.S. Forest Service and Bureau of Land Management lands; 4) develop a land management strategy for Camp Pendleton Marine Corps Base that ensures protection of the resources there while continuing military activities; and 5) work with private landowners to educate them on the ecological significance of their properties and to enable them to use and develop their properties while meeting Endangered Species Act requirements.

To reach these goals, TNC has continued to build public and private partnerships at the local, state, and federal levels.
PRESENT STATUS & OUTLOOK
The Santa Margarita corridor presently is 98% in conservation ownership, primarily through TNC land acquisitions and state and federal ownership. However, TNC is just starting on the second year of what will be a five- to 10-year project, and many of the goals have yet to be achieved. TNC is now working in conjunction with southern California’s Natural Community Conservation Program (NCCP) effort to protect coastal sage scrub communities by implementing the program in the project area.

Factors Facilitating Progress
A sound scientific foundation establishing the need for protection, a non-confrontational, team approach, and detailed strategic planning have all contributed to the advancement of this project.

Obstacles to Progress
Conservation efforts have been disrupted by property rights interests whose explosive and often inaccurate rhetoric has in some cases negatively influenced the landowners with whom TNC is attempting to build partnerships.

Contact Information:
The Nature Conservancy
Thousand Palms, CA
SIDELING HILL CREEK BIORESERVE

PROJECT AREA DESCRIPTION
The project area is defined by the watershed of Sideling Hill Creek. The ecosystem has remained fairly pristine due to the low human presence throughout the watershed. Sideling Hill Creek starts in Pennsylvania and flows through the Ridge and Valley physiographic region in Maryland and finally into the Potomac. The flow of the Creek in the summer can be very low because most rains tend to fall on the Appalachian Plateau to the West before reaching the watershed. During the winter, however, the Creek can rise rapidly with intense storm events.

Significant rare communities are present in the watershed, including harperella, freshwater mussels, and shale barrens. The watershed is 75% forested, with the predominant vegetative cover in oak-hickory forest. In non-forested regions, land uses include small amounts of agriculture and development.

ECOSYSTEM STRESSES
Roads and major highways are a stress to the ecosystem due to habitat destruction and run-off of salts that threaten the rare mussel populations. Exotic species are also a direct threat due to displacement of native populations within the river, floodplains, and riparian forest lands. These include zebra mussels, Asiatic grasses, and insects. Since many of the rare species, such as harperella, are dependent on the flow regime in the Creek, anything that disturbs the hydrology threatens their existence.

PROJECT DESCRIPTION
The Nature Conservancy (TNC) and Western Pennsylvania Conservancy (WPC) were alerted to the significance of the area by survey work done by the Maryland and Pennsylvania Heritage Programs. In 1991, TNC began acquiring key parcels of land and increasingly realizing the importance of the watershed. WPC then acquired a key shale barren near the Maryland border. Both groups decided that acquisition of parcels would not be enough protection and in 1992 began planning for a bioreserve.

The seven goals of the area are to improve decision-making through research, protect shale barrens, protect the riparian corridor, control exotic species, maintain water quality, maintain flow regime, and restore riparian forest communities to buffer water quality.

Currently, a large component of the project is research and monitoring. The emphasis is on water quality, habitat requirements, and life history of freshwater mussels. Other strategies designed to meet the goals include continuing protection of shale barrens and riparian areas through acquisition, maintaining buffers, restoring disturbed areas so they do not become avenues for exotic species, and eliminating water quality degradation caused by road salt run-off. These strategies are further outlined in the Sideling Hill Strategic Plan. Additional partners include the Maryland Heritage Program and State Highway Administration.

PRESENT STATUS & OUTLOOK
TNC recently purchased a 161-acre property in the Maryland portion of the watershed. In mid-1995, TNC was negotiating with the Maryland State Highway Administration to help
SIDELING HILL CREEK BIORESERVE -- continued

purchase two additional parcels of land and to help monitor the impacts of salt and other highway run-off. In Pennsylvania, WPC has acquired three tracts and continues to work on several other parcels. The Pennsylvania Department of Environmental Regulation has recommended that the portion of the stream in Pennsylvania be given Exceptional Value Status, which would provide additional water quality protection. Future plans include expanding the list of federal community partners, and to continue securing lands to ensure long-term protection.

Factors Facilitating Progress

One factor that facilitated progress from the start was the overall consensus between partners on the ecological importance of the site. In addition, baseline information on Sideling Hill Creek was well-documented due to the Natural Heritage Survey, the nature of the threats were easily defined, and the watershed was relatively pristine. These factors facilitated the development of a management plan.

Obstacles to Progress

Sufficient funding has been a challenge to secure for such a large project area. These resources are critical in fulfilling research and monitoring goals. It has also been somewhat difficult to get federal partners interested. In addition, there was criticism early on from local communities regarding limitations on recreational fishing in the Creek.

Contact information:

Mr. Rodney Bartgis
Manager
The Nature Conservancy
2995 Grade Road
Martinsburg, WV 25401
(304) 754-6709
Snake River Corridor Project

**Project Area Description**

The project site is located within the Greater Yellowstone Ecosystem and focuses on the segment of the Snake River between the outlet of Jackson Lake Dam to the Palisades Reservoir. The river flows under the shadow of the Teton Range as it cuts across the Yellowstone Plateau. It contains one of the most floated stretches of whitewater canyon in the country, although the river is primarily known for excellent fishing opportunities.

The river is classified as a braided system with complex wetland, riverine, palustrine, and riparian areas throughout. Narrowleaf cottonwood and willow inhabit riparian areas while Douglas-fir and several species of pines cover the uplands. Moose, buffalo, trumpeter swan, osprey, mule deer, sandhill crane, grizzly bear, and other species occupy the corridor. The region is one of the most productive nesting sites for bald eagles. Although still a predominant land use, ranching is gradually giving way to high-end residential development along certain segments of the river.

**Ecosystem Stresses**

Construction of a 42-mile levee system by the Army Corps of Engineers in the 1950s and 1960s has negatively impacted the river’s fisheries and riparian lands. Changes in the composition of vegetation in the riparian zone is attributed to the levees’ disruption of the flood regime. Introduction of the levee system in the heart of Jackson Hole allowed for wetland areas to be considered upland areas for development purposes. Multi-million dollar homes now occupy the cottonwood forest that had been located in the riparian zone.

In the Fall of 1993, Teton County applied for a technical assistance grant from the National Park Service’s River and Trails Conservation Assistance Program. This program provided the county with professional planning assistance for the Snake River Corridor.

The project’s narrow initial scope on recreational planning has been expanded. Currently, the project’s goals are to: 1) preserve and enhance the natural character of the Snake River; 2) provide improved recreational opportunities within the corridor, consistent with minimum impact on river resources, adjacent private lands, and quality of experience; and 3) create a system of cooperative planning for river management among local, state, and federal agencies, and community organizations.

Future desired conditions for the river are being developed with input from numerous organizations. Input is gathered by river stretch rather than by agency jurisdiction, demonstrating the project’s focus on ecological boundaries. Among the participants are the U.S. Forest Service, Bureau of Land Management, National Park Service, Army Corps of Engineers, Trout Unlimited, Jackson Hole Alliance for Responsible Planning, Lower Valley Power and Light Company, over a half dozen state and local government entities, and many citizens and landowners.

These organizations are not trying to develop a management plan for agencies to follow. Instead, they participate in roundtable discussions to
resolve disputes, streamline management, and improve stewardship of the river resources. Geographic Information System mapping will allow tracking of changes and progress in the corridor. Specific management activities are handled by individual agencies or organizations according to their mandates or charters.

PRESENT STATUS & OUTLOOK
Public workshops have been held in Wyoming, Idaho, and Utah in order to define the project’s geographic area and identify public concerns. The project is expected to last until 1996-97 although the project’s continuation may be feasible if funding to support a local staff position becomes available. Although organizations active within the corridor share their proposed management activities, sharing proposed plans has done little to promote coordination.

Factors Facilitating Progress
The project has been assisted by the strong support of agency management in Grand Teton National Park and Bridger-Teton National Forest. The federal agencies have encouraged the county to take a leadership role in conserving the river. Continued commitment of staff time and funding are required for future progress.

Obstacles to Progress
To explain the project and the good that it can produce to the public and to government agencies has been challenging. It has been incumbent upon the Project Facilitator to demonstrate that cooperative roundtable meetings serve a useful role in conserving the river’s resources. Keeping a sense of momentum and support among Teton County commissioners may be difficult. Wavering county support, lack of landowner support for increased use or regulation, and federal agency management mandates which do not permit compromise threaten the project’s future.

Contact information:
Mr. Tim Young
Project Facilitator
Snake River Corridor Project
Teton County
PO Box 1727
Jackson, WY 83001
(307) 733-8225
Fax: (307) 733-8034
E-mail: tyoung@wyoming.com
SOUTH FLORIDA ECOSYSTEM RESTORATION INITIATIVE

PROJECT AREA DESCRIPTION
The South Florida watershed extends from Orlando, the headwaters of the Kissimmee River, through Lake Okeechobee and the Everglades into Florida Bay, the Florida Keys, and the near coastal waters beyond. The entire area is essentially a flat wetland, underlain by a limestone aquifer, with semi-tropical and tropical vegetation. The Everglades itself is actually a 100-mile long, 50-mile wide river, extending from Lake Okeechobee, the source of its water, to Florida Bay, with the land falling only 20 feet over that distance. On its year-long passage through the Everglades, water passes through vast expanses of sawgrass, which is unique to the area, small hummocks of hardwoods or “sloughs,” and mangrove swamps. The entire area is rich in all types of plant and animal life, including 75 federally-listed threatened and endangered species such as the snail kite, Florida panther, and wood stork, and many state-listed species.

Much of the lower part of the system is in public ownership. Federal lands include Everglades National Park, Loxahatchee National Wildlife Refuge, Big Cypress National Preserve, and the Florida Panther National Wildlife Refuge to the West. State lands include lands recently acquired for Everglades recovery efforts. The Big Cypress Seminole Indian and Miccosukee Indian Reservations are located within the system. The remainder of the land is in row crop farming (primarily sugar cane and vegetables), some grazing and citrus, and large urban centers to the East.

ECOSYSTEM STRESSES
Severe hydrologic alteration is the predominant stress to the region. Much of the area south of Lake Okeechobee and north of Everglades National Park has been drained for agriculture and flood control, through 1500 of miles of canals built after World War II as part of the Central and South Florida (C&SF) Project. The drainage system no longer supports natural plant communities, and the disruption of the complex water flow patterns into the Everglades, or hydroperiod, is responsible for a host of problems throughout the land, Florida Bay, and coastal regions.

Water quality has also suffered, due largely to agricultural runoff. Mercury contaminants, whose source is unclear, has bio-accumulated in fish. Land sprawl from the ever-growing Miami-Ft. Lauderdale metropolis is consuming areas essential for natural system function or restoration. Exotic species, especially the plant melaleuca, are invading vast expanses of the Everglades, thriving on the excessive agricultural nutrient runoff, and reducing biodiversity.

PROJECT DESCRIPTION
The current initiative is the latest chapter in various efforts to restore the South Florida/Everglades ecosystem, whose decline has been well documented and has gained public attention in recent years. In 1984, Governor Bob Graham initiated the Save Our Everglades Program, involving a number of projects in the area. In 1989, Governor Bob Martinez initiated efforts to restore the Kissimmee River, once a meandering river that was channelized and straightened. In the same year, Congress authorized the expansion of Everglades National Park by over 107,000 acres to include lands considered
SOUTH FLORIDA ECOSYSTEM RESTORATION INITIATIVE -- continued

essential to the Everglades’ restoration.

In 1988, an unusual lawsuit was brought by the U.S. District Attorney against the state of Florida, charging the state with failing to implement its own water quality laws, specifically with regard to agricultural runoff from the Everglades Agricultural Area. After the state fought the suit for five years, newly-elected governor Lawton Chiles abruptly admitted the state’s culpability, largely as a result of public opinion and the cost of fighting the suit, and began cooperating with the federal government.

The current initiative is being coordinated by the South Florida Ecosystem Restoration Task Force, created by U.S. Department of Interior Secretary Bruce Babbitt in 1993. The Task Force seeks to coordinate activities of federal and state activities, and includes federal representatives from the Departments of Interior, Commerce, Justice, and the Environmental Protection Agency and Army Corps of Engineers (ACoE), among others. The initiative’s goal is to restore the lost natural function in the Everglades, and for human uses in south Florida to be sustainable.

Also in 1993, the ACoE began a Restudy of the C&SF Project, which the Corps had largely been responsible for building. The study will be used to investigate ways to modify the C&SF Project to restore the Everglades while still providing water-related services to the area’s residents and industry.

Finally, in 1994, Governor Lawton Chiles created the Governor’s Commission for a Sustainable South Florida, whose task was to develop and implement options for restoring the ecosystem in cooperation with all stakeholders.

The list of stakeholders is long, including many public agencies (federal, state, local), native American tribes (Miccosukee, Seminole), agricultural interests (sugar cane, vegetable), commercial and recreational fishers, environmental interest groups, developers, other private landowners, the business community, and the general public.

PRESENT STATUS & OUTLOOK

Much of the Task Force’s efforts have been in setting up collaborative structures and agreements, including funding schemes, coordinating research, and developing plans for sustainable activities in south Florida. Selected restoration efforts have begun. For example, the Kissimmee River is being allowed to return to its original meandering state. Efforts to mimic the hydrology of the Everglades are being designed and attempted, through interagency cooperation and a broader, systems approach to restoration. Two billion dollars in public funds (one-third federal, two-thirds non-federal) have been committed to restructure the region’s water control infrastructure. Other specific outcomes include improved communication and cooperation between stakeholders, particularly public agencies.

Factors Facilitating Progress

The high visibility of the ecological problems in south Florida has brought public and political support for this effort. In itself, this federal initiative, one of six federal efforts of this scale and at this administrative level, is an indication of federal political support. Leaders have emerged to move the effort forward at the state and federal levels.

Obstacles to Progress

Operating at such a large scale, maintaining individual and agency energy for the long term are challenges. Continued state and federal funding -- for infrastructure, personnel, inventories, and monitoring among others -- is far from certain. While monitoring is occurring on smaller scales, it had yet to be instituted effectively at a landscape level. There is insufficient scientific understanding or inventories of the ecosystem’s biophysical components. Political opposition to the effort is strong, particularly from a very powerful sugar lobby, despite the commitment of some sugar companies to cooperate with the federal Task Force. Finally, the Miccosukee tribe has sued the federal government over violations of the Federal Advisory Committee Act.

Contact information:
Col. Terrence Salt
Director
South Florida Ecosystem Restoration Task Force
6220 South Point Drive, Ste. 310
Jacksonville, FL 32216
(904) 625-2520; (904) 232-2580

END OF DOCUMENT
**ST. MARYS RIVER REMEDIAL ACTION PLAN**

**PROJECT AREA DESCRIPTION**
The St. Marys River connects Lake Superior and Lake Huron, and forms one of the borders between the United States and Canada. The river is fast moving; rapids near Sault Ste. Marie required the building of the famous Soo Locks for navigation. The land surrounding the river is rolling, formed by bedrock overlain by a relatively thin layer of glacial material. Vegetative communities include upland Great Lakes hardwood forests, mixed hard-wood-conifer boreal forest, wet forests, and wetlands. Federally-listed threatened species in the area are the bald eagle and the piping plover.

Most of the land immediately adjacent to the river is privately owned. Eighty-three percent of the land within three and a half miles of the river is undeveloped forest or wetlands. Ten percent is used for farmland (mostly hay), and 5% is urban (Sault Ste. Marie). Industries in the Sault Ste. Marie area include hydroelectric power production, steel and paper mills, and shipping.

**ECOSYSTEM STRESSES**
The hydrology of the river in the Sault Ste. Marie area has been altered substantially to support navigation and power generation, resulting in significant habitat loss. Land conversion for urban development and roads have also led to habitat loss. An additional stress is posed by non-point and point source pollution. Significant point sources of pollutants include paper and steel industries and sewage treatment works. Chromium contaminants have entered the river from a former tannery nearby, now a Superfund site. The sea lamprey, an exotic species, is also a major problem. The rapids are prime breeding grounds for this species, which parasitizes and often kills large game fish.

**PROJECT DESCRIPTION**
In 1985, the St. Marys River was identified by the International Joint Commission as an Area of Concern (AOC) based on the extensive environmental problems of the river. In response, state, provincial, and federal governments in the U.S. and Canada initiated a Remedial Action Plan (RAP) process. This process is characterized by three stages. In stage I, problems and their causes were identified by a RAP team, consisting of Ontario Ministry of Natural Resources (OMEE), Michigan Department of Natural Resources (MDNR) U.S. Environmental Protection Agency (EPA), Environment Canada, and U.S., Canadian, and tribal fish and wildlife agencies. The RAP team was advised by members of the Binational Public Advisory Committee (BPAC), consisting of U.S. and Canadian citizens, environmental and industrial interests, and academicians. The stage I document was published by OMEE in 1992.

During stage II, currently underway, remedial actions are identified and implemented. In order to prepare a stage II document, facilitated task groups have been created. These groups consist of both RAP team members and BPAC members and focus on specific issues such as habitat and point source pollution. The stage II document will suggest remedial actions, which may include increased treatment of sewage and industrial waste, sediment remediation, and habitat improvement. The implementing agency will vary depending on the problem to be remediated.

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ST. MARYS RIVER REMEDIAL ACTION PLAN -- continued
During stage III, monitoring will take place and reasons for delisting the area as an AOC will be demonstrated.

In addition, the project attempts to educate the general public concerning the river, its problems, and actions undertaken to correct these problems. Education takes place through River Appreciation Days, booths at meetings and shows, and BPAC.

**PRESENT STATUS & OUTLOOK**

Many activities are already underway. They include sewer separation in the City of Sault Ste. Marie, Michigan, improved waste treatment by a local steel mill resulting in significant reductions in loadings, ongoing water column and sediment monitoring, Superfund remediation work, and several pilot-scale sediment remediation projects. In addition, the project has resulted in a greater public awareness of the issues. A decrease in the number of overlapping efforts by governmental land management agencies is another result. Fish and wildlife management agencies in both the U.S. and Canada are cooperating.

**Factors facilitating progress**

A team-based approach to the identification of problems and solutions has been helpful. Also beneficial has been the participation of individuals who care about the St. Marys River and are willing to contribute their time to the effort.

**Obstacles to progress**

Obtaining balanced representation of all stakeholders in the BPAC has been difficult. The confrontational approach of some interests on the BPAC may have kept other stakeholders from participating. Staff turn-over at the Ontario Ministry of Natural Resources has created vacancies which have slowed progress. Political support and leadership are concerns for completing the process.

**Contact information:**

Ms. Susan Stoddart
Coordinator
Ontario Ministry of Environment and Energy
747 Queen Street East
Sault Ste. Marie, Ontario,
CANADA P6A 2A8
(705) 949-4640
**STATE LINE SERPENTINE BARRENS**

**PROJECT AREA DESCRIPTION**

The State Line Serpentine Barrens is a chain of eight sites spanning 13 miles along a large serpentinite outcrop straddling the Mason-Dixon line in Pennsylvania and Maryland. Serpentine barrens vegetation is defined as an assemblage of plants with a large proportion of species having high regional fidelity to outcrops of ultramafic rock. Serpentine barrens in the eastern U.S. include some of the largest patches of truly native prairie in that region.

The eight core sites included in this project comprise the largest area of serpentine barrens vegetation in the eastern temperate zone. This serpentine barren community is exceptionally high in species diversity of herbaceous plants and specialist-feeding insects, with a large proportion of species occurring as disjunct populations from ranges farther south, in the western prairies, and along the Atlantic coastal plain. The core areas are dedicated to reserves and passive recreation while the land uses in the buffer region include agriculture, horse farming, and urban settlement surrounding Baltimore and Philadelphia.

**ECOSYSTEM STRESSES**

The serpentine ecosystem is fire dependent and as a consequence, the system will cease to exist without the presence of fire. Therefore, anything that disrupts the fire regime threatens the system with succession to mesic species. Proposed development in the buffer areas is a threat to the ability to burn. It is therefore necessary to create large enough buffers for smoke and fire management. Another stress is the introduction of invasive species into the barrens (e.g., black locust, tree-of-heaven).

**PROJECT DESCRIPTION**

In the mid-1980s, this region was identified through the Natural Heritage Inventory System as one of the highest priority areas for conservation in Pennsylvania. The project was formally initiated by the Pennsylvania Field Office of The Nature Conservancy in 1991; a year later, the ecosystem received a global significance ranking. Several other stakeholders participate in this project, including the Pennsylvania Bureau of Forestry; Lancaster and Chester Counties, PA, and Cecil County, MD; the University of Pennsylvania and Pennsylvania State University; and The A.W. Mellon Foundation.

The two major project goals are to maintain a viable representation of all priority plant communities within the barrens ecosystem and to maintain the connectivity of the system, which will allow for viable populations of lepidopteran species. Strategies designed to meet these goals include fully protecting the core sites and buffer regions through acquisition and easements, researching how best to manage the ecosystem, and then managing it in perpetuity. These goals and strategies will be included in a formal Site Conservation Plan, currently being written with completion expected in 1997.

In order to measure project success, monitoring will be emphasized. One factor that will be measured is the ability of different target communities to persist in a representative composition that is appropriate for the ecosystem.
STATE LINE SERPENTINE BARRENS -- continued

PRESENT STATUS & OUTLOOK
Two ongoing research efforts have the goal of defining how ecological transitions occur between communities. So far, about 40 burns have been completed as part of the research on the effects of prescribed fire, in order to answer such questions as when and at what severity to burn. This research has already yielded useful results with significant implications for future management.

Factors Facilitating Progress
The rural character of the area has facilitated the project, since the farming community already understands the value of prescribed burning. Also, key local players have been supportive of the project, and funding has been forthcoming.

Obstacles to Progress
Protecting the core areas has been challenging since not all landowners have been supportive of the effort. A second obstacle is the limited ability to apply prescribed burning due to resource constraints. Finally, as all land in the area is not yet included under conservation protection, the ability to burn across large landscapes is limited.

Contact information:
Mr. James Thorne
The Nature Conservancy
1211 Chestnut St.
12th Floor
Philadelphia, PA 19107-4122
(215) 963-1400
Fax: (215) 963-1406
E-mail: jithorne@tnc.org
**Stegall Mountain Natural Area**

**Project Area Description**
Stegall Mountain Natural Area is located in Missouri’s Lower Ozarks. On top of the 1,300-foot-high mountains, a mixture of igneous (rhyolite) glades and oak-pine savannas can be found. Mountain slopes support oak-hickory woodlands, interspersed with oak-pine forests. Bottomland hardwoods can be found along high quality Ozark headwater streams.

Stegall Mountain Natural Area is home to two species listed by the state as rare, the marsh violet, and the four-toed salamander. The area also supports the eastern collared lizard, a species on the state’s 1992 watch list. In addition, migrant neotropical songbirds such as Kentucky, parula, and cerulean warblers, as well as red-eyed vireos and summer tanagers, frequent the area.

Seventy percent of the Natural Area is owned and managed by the Missouri Department of Conservation, and the remainder by The Nature Conservancy and the National Park Service Ozark National Scenic Riverways. Stegall Mountain is buffered by surrounding naturally forested lands. The area is used primarily for preservation and recreational activities such as hiking, wildlife watching, and hunting.

**Ecosystem Stresses**
Savanna-glade ecosystems are among the most endangered in the U.S. The glades as well as the oak savannas found on Stegall Mountain depend on fire to reduce encroachment of woody species and to maintain prairie grasses and forbs. Thus, suppression of fire since the middle of the century threatens these ecosystems. Comparison of aerial photos show substantial encroachment of woody species such as post oak and black-jack oak into savannas and glades. Herbivores -- elk and bison -- are now missing from the system. Exotic species occur in areas adjacent to the creeks and roads.

The State of Missouri provides 80% to 90% of the lead supply of the United States. The potential exploitation of lead belts both north and south of Stegall Mountain could lead to air and water pollution, increasing development activity in the area, and could alter the area’s aesthetics.

**Project Description**
The State of Missouri identifies and preserves high quality natural areas representing its ecosystem diversity. A natural areas inventory conducted in every county supports a state-wide natural area classification by the Missouri Natural Areas Committee. This Committee is composed of four major land management agencies, including the Missouri Department of Conservation, Missouri Department of Natural Resources, National Park Service, and U.S. Forest Service.

Since Stegall Mountain supports representative igneous glade and dry igneous savanna forest ecosystems, it was nominated for official Natural Area status in 1992, which was granted by the Committee in 1993. Currently, Stegall Mountain is the largest Natural Area in the state. It will function as a prototype of a landscape scale Natural Area.

As a result of its new status, the management approach of Stegall Mountain Natural Area has changed dramatically. Whereas the Area used to be managed
for timber and wildlife, the current management goal is to maintain the Area’s natural communities in a naturally occurring landscape mosaic. Management strategies include spring and fall prescribed burns to remove woody encroachment and exotic plants, minimization of human disturbance detrimental to the ecosystem, and research and monitoring. Three research plots and three half-mile monitoring transects track the impacts of the burns on the ecosystem in terms of vegetation diversity, community boundaries, and tree recruitment.

Present Status & Outlook
The project is in its second year of implementation. Three prescribed burns have been carried out, of which the last (1994) covered 960 acres. Herbaceous plants in the glades are showing an increase in abundance and flowering. After the last burn, for the first time in 10 years of monitoring, collared lizards apparently moved between glades. Such movement may be crucial for the long-term survival of populations of these lizards. Another prescribed burn is planned for March 1996. Full “recovery” of these ecosystems is expected to take at least 10 to 100 years. Requests for additional funding for research and monitoring will continue.

Factors Facilitating Progress
A long history of successful interagency cooperation between the Missouri Department of Conservation and the National Park Service, as well as the support of these agencies for the project, was crucial to the establishment and management of the Stegall Mountain Natural Area. Furthermore, it has been very important that management decisions have been supported by scientific information.

Obstacles to Progress
Other competing programs and agency priorities limit the amount of time and number of staff for this project.

Not all people, including some professionals, are convinced that prescribed burns are an appropriate management technique. Some maintain that timber harvest can stimulate the effects of fire, or that the values enhanced do not warrant the cost. Others argue that nature can take care of itself, and that natural fires will maintain the ecosystems of interest.

Contact Information:
Mr. Larry Houf
District Wildlife Supervisor
Missouri Department of Conservation
Ozark District Office
Box 138
West Plains, MO 65775
(417) 256-7161
**TENSAS RIVER BASIN INITIATIVE**

**Location:**
Northeast Louisiana

**Project size:**
750,000 acres

**Initiator:**
Northeast Delta Resource Conservation & Development District

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**PROJECT AREA DESCRIPTION**

The Tensas River Basin is part of the Lower Mississippi River Alluvial Valley (LMRAV) that once supported 25 million acres of forested wetlands. The Tensas River Basin is now only a representative sub-basin of the LMRAV, as over 80% of the area has been converted to row-crop agriculture. The economic base today is heavily dependent on agriculture -- primarily cotton, soybeans, corn, and rice -- a significant portion of which is on marginal land. About 60% (80,000 acres) of the remaining bottomland hardwoods in the Basin are in federal or state ownership.

**PROJECT DESCRIPTION**

In the early 1990s, local Conservation Districts requested the USDA Soil Conservation Service (SCS; since renamed to Natural Resources Conservation Service--NRCS) to perform a river basin study. Following that request, the non-profit Northeast Delta Resource Conservation & Development District (NDRCCD) convened a meeting in early 1992 of local, state, and federal officials, landowners, and conservation groups to discuss the study in a larger context, since there appeared to be several focused studies or environmental management efforts proposed for the area.

This core group agreed to establish a model demonstration project, and formed a 19-member Technical Steering Committee. The Committee is chaired by a local farmer, with representatives from local parishes, federal agencies (Environmental Protection Agency, Army Corps of Engineers, Fish & Wildlife Service, NRCS, Geologic Survey), Louisiana state agencies (Departments of Agriculture & Forestry, Wildlife & Fisheries, Environmental Quality, Cooperative Extension Service, Office of Soil & Water Conservation), a local Levee District, The Nature Conservancy, National Fish & Wildlife Foundation, the NDRCCD, and six farmers.

A public Advisory Committee was set

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**ECOSYSTEM STRESSES**

Habitat destruction is the most significant stress. The remaining habitat is fragmented and the hydrology throughout the Basin has been severely altered. Water quality problems have resulted from sediment, pesticide and nutrient runoff. As a result, species abundance and diversity have declined dramatically. Rivers and lakes once were relatively clear and supported an abundant fisheries. Today, the Tensas River is among the most turbid in the state.

Endemic species that are extinct or federally-listed as threatened or endangered include the ivory-billed woodpecker, Bachman's warbler, Florida panther, red wolf, and the Louisiana black bear. These and many other species which require large areas of forested habitat have declined, as have those requiring very specialized habitats that have also disappeared.

The socio-economic condition of the region is depressed. Timber production has dramatically decreased. With the area now almost totally dependent on a single industry that is depressed (agriculture), job opportunities are seasonal and scarce. The region is characterized by tremendously high unemployment and poverty levels. Population declines have been as high as 60% over the last 25 years.
**TENSAS RIVER BASIN INITIATIVE -- continued**

up to assist the Steering Committee, with representatives including landowners, agricultural chemical and equipment dealers, U.S. Department of Agriculture, and local Conservation Districts. Through the Steering Committee’s efforts, the SCS study formed the basis for a broader land management plan for the area. This two-part plan consists of: 1) an information needs assessment, including determining what baseline data is required for strategy development; and 2) a more comprehensive study, identifying stresses and broad strategies for addressing them.

The Committee operates on a consensus basis and reached agreement on nearly all components of the plan except for flooding, a sensitive issue in this region given the extensive hydrological modifications of the Mississippi River; a separate flooding study will be performed so as not to hold up the broader plan.

**PRESENT STATUS & OUTLOOK**

Both phases of this conceptual plan are now complete (except the flooding study). The plan identifies eight major problems: a) long-term viability of row crop agriculture; b) impaired water quality; c) bottomland hardwood decline; d) flooding; e) recreation; f) reduced fish and wildlife habitat; g) socio-economic concerns; and h) linkage of problems. The plan presents three broad recommendations: 1) suggested best management practices; 2) emerging practices; and 3) wetlands restoration. Returning to pre-settlement conditions is considered unfeasible. The plan also offers to work with local and state officials to develop a detailed socioeconomic recovery plan. Anticipated next steps include devising specific implementation strategies, more public awareness efforts, involving more of the stakeholders, and implementation.

**Factors Facilitating Progress**

This process would not have progressed without a local, non-governmental, third-party institution taking the lead (the NDRCDD). The Council is not considered an “outside” organization: its representative for the Tensas is from the local community and recognizes the importance of locally-driven processes to gain stakeholder acceptance.

Widespread concern about the region from a broad cross-section of residents and users has been helpful. The federal listing of the Louisiana black bear as a threatened species helped push the effort forward. Despite initial skepticism, the willingness of participants to ‘come to the table’ was instrumental to the effort, due in part to an aggressive public outreach effort. The Steering Committee’s consensus approach allowed stakeholders to be equally represented. Finally, communication between stakeholders has improved, particularly between farmers and regulators such as the state or EPA who previously understood little about motives and methods of operation of each other.

**Obstacles to Progress**

Not all of the stakeholders were involved initially, especially large industrial agriculture landowners. While they have agreed to participate in the process, bringing them ‘up to speed’ will take additional efforts. Initially, public participation was low. Only after the Advisory Committee’s original name (“Environmental Advisory Committee”) was changed did participation increase dramatically.

The poor economic condition of the region may be a major inhibitor of participation in implementation, as only older, established farming families and individuals, who hold the best and most productive land, are more able financially to participate. Funding of implementation efforts and incentive programs is unpredictable, especially with the current 1995 Farm Bill debate in Congress. Already, there have been insufficient funds available to cover all applicants for existing wetland reserve and conservation tillage programs.

Finally, conflict among Steering Committee members and stakeholders is possible as more precise implementation strategies are developed, when greater compromises will be necessary from all sides.

**Contact information:**

Mr. Mike Adcock
Tensas River Basin Coordinator
Northeast Delta Resource Conservation & Dvlpt. District
PO Box 848
Winnsboro, LA 71295
(318) 435-7328
Fax: (318) 435-7436
TIDELANDS OF THE CONNECTICUT RIVER

PROJECT AREA DESCRIPTION
The focus of the project is the riverine system and the connected tidal marshes along the lower Connecticut River. The Nature Conservancy (TNC) has delineated 17 core sites which are included in the primary boundary of the Tidelands Bioreserve (300,000 acres). Sixteen of the 17 sites include tidal marshes; one is an upland site. The Tidelands Project does not include the entire Connecticut River Watershed (the “tertiary boundary”). The vegetative cover is a wide variety of tidal marsh vegetation and forest lands. The land use is predominantly residential with some agricultural and urban uses. Landowners include the State of Connecticut, private landowners, TNC, and other private conservation organizations. Federally-listed threatened and endangered species include shorebirds, bald eagle, an insect, fish, and two wetland plants.

ECOSYSTEM STRESSES
The most serious threat to the area is habitat loss and fragmentation from development, due to significant human presence in the area, a desire to build along the river, and the need of local towns to expand their tax base. The construction and maintenance of docks along the river is also a threat to submerged aquatic vegetation. A second stress to the ecosystem is the introduction of invasive species, such as phragmites and purple loosestrife. If uncontrolled, these species tend to dominate the marshes and lessen the habitat value. Other threats include reduction in water quality and barriers preventing water movement or species movement.

PROJECT DESCRIPTION
TNC has been working on Connecticut River issues for many years due to its significance as a hydrologic feature in the Northeast. The 17 core areas have been defined since the mid-1980s, although the Tidelands Project was not formally initiated until 1991. Prior to 1991, the core sites had basic management plans and very little buffer space. Since the initiation of the project, the core sites and buffers have been expanded to take into account larger landscape effects on the ecosystem.

Four priority goals for have been developed, which are to protect the tidal marsh system, globally rare species, state-listed threatened and endangered species, and species in decline. Strategies designed to meet the goals include an emphasis on outreach and education; traditional land protection through easements and acquisition; control of exotic species; and fundraising to support research. Key partners include the Connecticut Department of Environmental Protection (CTDEP), U.S. Fish and Wildlife Service, Connecticut River Watershed Council, University of Connecticut Cooperative Extension, and 14 land trusts. The University of New Haven and the University of Connecticut have been helpful by providing technical support for Geographic Information System mapping.

PRESENT STATUS & OUTLOOK
The project is currently focused on creating more detailed management plans for the 17 core sites and conducting research on how to best measure the health of a tidal marsh.

Factors Facilitating Progress
One factor that has been helpful to the
Obstacles to Progress

Although approximately 50% of TNC’s efforts in Connecticut are focused on the Tidelands Project, funding is still considered insufficient for such a large project. There are 18 towns to work with in the project area, a challenge further complicated by the frequent turnover of members on town boards. Also, land is very expensive to acquire in this area, and not all residents are open to preservation concepts.

Contact Information:

Dr. Juliana Barrett
Tidelands Program Director
The Nature Conservancy Connecticut Chapter
55 High Street
Middletown, CT 06457
(203) 344-0716
Fax: (203) 344-1334
TRAIL CREEK ECOSYSTEM ANALYSIS

PROJECT AREA DESCRIPTION
In this mountainous region, Hyndman Peak towers 12,000 feet over Sawtooth National Forest. Aspen, Douglas-fir, limber pine, and spruce grow along the mountains’ north slopes. Sagebrush and forbs dominate the south slopes. The region is suited for gray wolf habitat and is a wintering area for bald eagles. Sheep grazing, timber harvesting, and various types of recreation take place in and around the National Forest. Part of the National Forest is designated as a Research Natural Area. The City of Sun Valley lies at the site’s western boundary.

ECOSYSTEM STRESSES
Land conversion to residential development and associated road building are primary stresses on the ecosystem. These activities are closely linked to the heavy recreational use the region is experiencing. Automobiles driven alongside Trail Creek have created roads. The cars have thrashed vegetation in riparian zones, led to changes in species composition, and compacted soils. Sediment loading in downstream riverbeds has occurred. The potential exists for stream dislocation or filling of downstream reservoirs with sediment.

PROJECT DESCRIPTION
In 1989, the Ketchum Ranger District started a Total Quality Management process that changed the way the staff looked at the interrelationship of the district’s natural resources and their “customers.” Following a survey of the district’s internal and external customers, a strategic process was developed that generated a list of site-specific actions that address issues and problems concerning five distinct topographic drainages. The district used a five-year planning horizon for its decisions.

Broad participation by regional stakeholders forms the crux of the “ecosystem analysis decision process.” The Trail Creek Ecosystem Analysis was the first to be completed. The document satisfied NEPA guidelines, was not appealed upon its completion, and was signed by the District Ranger in 1991. The district staff have been implementing site-specific improvements since then.

The district’s philosophy is that enhanced communication of customer needs and ecosystem capacity forges a deeper understanding between the district, local residents, and the surrounding natural systems. The district has aggressively sought the input and participation of the following groups: internal personnel, Idaho Department of Fish & Game, Idaho Department of Water Resources, the Administrator of the city of Sun Valley, and numerous recreation and environmental groups. The district remains committed to those beneficiaries who do not vote or have a voice in the process: the wildlife and vegetation species that live on the Ketchum Ranger District as well as the future generations that will be able to use and enjoy a healthy and intact ecosystem.

PRESENT STATUS & OUTLOOK
Among the activities completed to date are the closing of roads, opening up compacted soils and seeding them with natural riparian vegetation, stabilizing stream banks with rocks, massive re-planting of willow species, and instal-
TRAIL CREEK ECOSYSTEM ANALYSIS -- continued

Lining water guzzlers for sheep so the animals don’t have to come to the stream to drink. The community has been involved in implementing ecosystem improvement activities during specially-designated work days. Riparian areas are already recovering.

Current and future visitors to the Sun Valley area will be the beneficiaries of this analysis process. Local residents have found a successful way of working together and anticipating and solving management challenges before they occur.

Factors Facilitating Progress
Supportive superiors and forest supervisors allowed the experimentation with the innovative quality approaches to take place. Public involvement up front and public support throughout the decision process is a primary reason for progress. Continually adjusting the process to changing social and ecological conditions is required for future progress.

Obstacles to Progress
As Trail Creek was the first ecosystem analysis decision, the process was very time-consuming. Time constraints of the team leader led to long gaps in-between meetings of the customers. Moving ahead without all customers present at group meetings led to some backtracking in the planning process.

Securing funding for the project was also difficult. The current guidelines and funding mechanisms do not always support or recognize the innovative approaches to land management being applied by the Ketchum Ranger District. The district frequently must educate governmental and nongovernmental funding sources as to the approaches and the benefits of the Total Quality Management framework for ecosystem decisions.

Contact information:
Mr. Alan Pinkerton
USDA Forest Service
Sawtooth National Forest
Ketchum Ranger District
PO Box 2356
Ketchum, ID 83340
(208) 622-5371
**TROUT MOUNTAIN ROADLESS AREA**

**PROJECT AREA DESCRIPTION**

The Trout Mountain roadless area in Colorado’s Rio Grande National Forest is located in the south-central highlands of the Rocky Mountains. Within this temperate steppe region, the project area consists of two watershed drainages, bordered to the North by the Weminuche Wilderness area and to the South by Highway 160 which runs parallel to the South Fork of the Rio Grande River. Despite historical timber and mining in the area, the majority of Trout Mountain has remained roadless old growth forest. Present day use consists primarily of recreation. There are presently no known threatened or endangered species in the area.

**ECOSYSTEM STRESSES**

Recent timber sales using shelterwood harvest treatments which result in clearcuts are the most serious threats to the region. Motorized vehicle use on a forest system gravel road which lies between Trout Mountain and Weminuche Wilderness has increased threats to wildlife. Finally, past mining and timber use have left portions of the project area fragmented.

**PROJECT DESCRIPTION**

The project began as a traditional U.S. Forest Service timber sale proposal. Signed in 1985, the Rio Grande Forest Plan proposed a set of timber sales which would result in the removal of 9 million board feet of timber from the Trout Mountain roadless area. With growing public concern for old growth and wildlife, the 1985 Forest Plan became very controversial. The plan is currently under revision to address issues raised by the public concerning the effects of timber harvest and road construction on the unroaded old growth character of the Trout Mountain area.

The stated goal of the Forest Service is to remove timber in a manner that does not sacrifice the ecological and biological needs of the project area; the amount of timber removed from the area is secondary to those needs. In other words, the Forest Service feels that ecological concerns have driven the planning process.

The project is attempting to look beyond the two drainages and National Forest boundaries to consider adjacent ecological areas that encompass most of southern Colorado and portions of northern New Mexico. Habitat capabilities and relationships between adjacent areas such as the Weminuche Wilderness area are important considerations in the plan. The planning team identified an area they felt might function as a connective corridor to meet the requirements for species migration. However, environmentalists have dubbed it the “corridor to extinction,” as the proposed area passes over a major highway. The forest plan also proposes to build 12 miles of temporary roads. Once the timber is removed, some roads would be closed, recontoured, and revegetated. Finally, the plan calls for uneven-aged management which would leave standing 70% or more of the existing vegetation, including trees in the old growth age class.

The project planning process has essentially remained an internal effort by a Forest Service interdisciplinary planning team. However, between 1990 and 1993, the planning team worked closely with a public working group made up...
**TROUT MOUNTAIN ROADLESS AREA -- continued**

of 12-14 people representing various interests in the region. This group participated in the development of project alternatives that were ultimately selected by the planning team. Six members of the working group are directly employed by industry (sawmill or loggers); another six members represented multiple use interests (recreation, hunting, outfitters, etc.); and only one member from the Colorado Environmental Coalition (CEC) represented environmental interests. The planning team actively solicited other individuals with environmental interests because of this low representation. The planning team has also worked very closely with Colorado’s Division of Wildlife in ongoing and extensive monitoring of species.

**PRESENT STATUS & OUTLOOK**

After the Final Environmental Impact Statement (FEIS) was published in 1994, the project was appealed by CEC to the Forest Service Regional Forester who upheld the decision. In mid-1995, the project was in federal district court. Meanwhile, CEC is working with the Forest Service on another revision of the Forest Plan and has submitted a management alternative to be analyzed in the FEIS for the revised plan. Furthermore, species monitoring has continued in the Trout Mountain region.

**Factors Facilitating Progress**

The Forest Service feels very good about the project’s non-traditional decision-making process (i.e., increased stakeholder participation, level of communication with public), about the level of analysis, and about how they are proposing to do the work. The Forest Service feels that these elements are significantly different than how things have been done in the past.

**Obstacles to Progress**

As evidenced by significant public opposition and the Forest plan being contested in court, much controversy remains over the Forest plan, especially the appropriateness of opening up a roadless area to timber harvesting and, more broadly, how the concept of ecosystem management applies to forest planning.

**Contact information:**

Mr. Ron Pen  
Forest Planner  
USDA Forest Service  
Rio Grande National Forest  
1803 West Highway 160  
Monta Vista, CO 81144  
(719) 852-5941
**UPPER FARMINGTON RIVER MANAGEMENT PLAN**

**PROJECT AREA DESCRIPTION**
Situated in the foothills of the Berkshires in the northeastern highland ecotone, the project area encompasses a 14-mile reach of the Farmington River, extending from the Hogsback Reservoir downstream to an area approximately one mile upstream of the confluence with the Nepang River. The vegetative coverage is mixed deciduous and coniferous forest. Up until 1994, the only mating pair of bald eagles known in Connecticut lived in the project area. Rural development is the predominant land use, with some of the upper watershed in agriculture. Landholdings upstream of the project area are dominated by a governmental water supply.

**ECOSYSTEM STRESSES**
Water quantity, water diversions, and instream flow management are primary concerns in the watershed, a fact reflected in the project’s management plan. Another threat is increased recreational use of the river by anglers and boaters, especially as its Wild & Scenic River (WSR) status becomes more widely known.

**PROJECT DESCRIPTION**
In order to help these groups reach consensus on designation, a management plan was developed by the Coordinating Committee. The plan was to be used regardless of designation and contains the following goals: conserve and enhance important land-based natural resources; encourage effective management of river-related growth; balance the legitimate demands on the river water supply; and manage river recreation.

In 1993, the study document concluded that stakeholders agreed that the Upper Farmington River should receive WSR designation, which occurred the following year. This process was unique in that management plans are not usually considered during the designation phase. Since this area is dominated by private landholdings instead of public land, this management plan was a key step in gaining buy-in from stakeholders.

**PRESENT STATUS & OUTLOOK**
Currently, the project is moving into the implementation phase of the plan. The Coordinating Committee, representing the various interests, will monitor and ensure that the protection goals are being met. Several significant zoning changes have recently been made in order to help reach the goals.

**Factors Facilitating Progress**
The National Park Service and the Metropolitan District Commission provided funds for an instream flow study while the Connecticut Depart-
**Upper Farmington River Management Plan -- continued**

...ment of Environmental Protection managed the project and provided technical guidance. The 1992 finding that the instream flow was sufficient for all management objectives was a significant force allowing the project to progress; any other finding would have ended the effort. The interdisciplinary and cooperative spirit of all those involved has also helped the project to advance. An immediate result has been an increase in communication between the citizens, the Metropolitan District Commission, and the state regulatory agencies.

**Obstacles to Progress**

There were initial philosophical differences between some of the managing entities. These have been addressed, however, as communication between parties has increased.

**Contact Information:**

Mr. Rick Jacobson  
Connecticut Department of Environmental Protection  
Fisheries Division  
79 Elm Street  
Hartford, CT 06106  
(203) 424-3482
UPPER HUERFANO ECOSYSTEM

LOCATION:
South-central Colorado

PROJECT AREA DESCRIPTION
The headwaters of the Huerfano River drainage are fed from the West and East by the Sangre de Cristo and Wet Mountains. The Sangre de Cristo mountain range boasts many 14,000 foot peaks, including the project area’s Blanca Peak, where one of the country’s southernmost glaciers is found. Within the Huerfano River drainage, the dominant vegetative types include spruce-fir, aspen, ponderosa pine, pinyon-juniper, and grassland communities. Cottonwood-willow riparian forest run along the main stem of the Huerfano River. The river supports the greenback cutthroat trout, a federally-listed threatened species and one of three pure native genetic strains in Colorado.

Half of the Upper Huerfano region is in private ownership, made up of small ranching and farming communities. The remaining lands are both state and federally owned. These public lands provide summer range for elk, while private lands provide most of the winter range. In 1994, much of Colorado's Sangre de Cristo Mountain range was designated as wilderness. There is a great deal of recreational activity in this region, including fishing, camping, Off-Road Vehicle use, hiking, hunting, and climbing of "14ers."

ECOSYSTEM STRESSES
In the last 30 years, elk populations have increased substantially in the region. Overgrazing of both livestock and elk has impacted grassland and riparian areas on both public and private lands. Furthermore, an 80-year history of fire suppression has altered the structure and composition of fire-dependent ponderosa pine, aspen, and pinyon-juniper communities, and could potentially result in catastrophic fires. Finally, increased recreational activities have resulted in concentrated use and erosion damage in the San Isabel National Forest and wilderness areas. The combination of uses and impacts over the last 120 years has significantly altered the structure and pattern of vegetative communities in the region.

PROJECT DESCRIPTION
In 1991, the Colorado Division of Wildlife (CDOW) initiated the Sangre de Cristo Habitat Partnership Program (HPP) for the Huerfano region. A committee was established to address conflicts concerning overgrazing and elk use on public and private lands. The HPP committee includes representatives from the CDOW, U.S. Forest Service (USFS), U.S. Bureau of Land Management (BLM), private landowners, Farm Bureau, and sportsmen’s groups. The committee has identified the need to work cooperatively to address issues within the entire Huerfano region, thus adopting an ecosystem approach.

The goals of this project are two-fold: to assess the existing ecological conditions and the ecological potential of the Huerfano ecosystem; and to incorporate the social and economic needs of local communities into the management of the area’s natural resources.

PRESENT STATUS & OUTLOOK
Desired future conditions for the region are being developed jointly by the HPP committee, local government, local landowners, and non-government organizations including the Sangre de
Cristo Mountain Council, a coalition of environmental, economic, and recreation groups. Inventory and analysis has been a joint effort between all four public agencies, and should be completed this year. USFS, BLM, and the Natural Resources Conservation Service are looking at management opportunities across administrative boundaries. The intent of this joint effort is to better understand resource conditions and relationships at larger scales for management issues regarding water quality, recreation, vegetative condition, biodiversity, and elk distribution.

**Factors Facilitating Progress**
The level of cooperation and communication, particularly between the major landowners in the region (i.e., USFS, BLM, private), has provided more flexibility in decision-making and greater opportunities to meet the needs of all interests involved. The Sangre de Cristo Mountain Council and the HPP committee have played vital roles in bringing parties together and building local support for this project through outreach. Also, a great deal of sharing of information and expertise has occurred between groups involved in the project.

**Obstacles to Progress**
Limited funding has restricted the inventory work, and the reluctance of some private land-owners to participate, based on government distrust and land use interests that conflict with elk usage, have to some degree impeded the project’s progress.

**Contact information:**
Ms. Nancy Ryke
Wildlife Biologist
USDA Forest Service
San Isabel National Forest
San Carlos Ranger District
326 Dozier Avenue
Canon City, CO 81212
(719) 275-4119
VERDE RIVER GREENWAY

PROJECT AREA DESCRIPTION
Located in central Arizona, the 180-mile Verde River is one of only a few rivers in Arizona that is free flowing for most of its journey. Approximately 25 miles downstream from the river’s headwaters in Arizona’s central highlands, the Verde River Greenway is a designated six-mile stretch within the river’s 100-year floodplain in the Verde Valley. The Fremont cottonwood/Goodding willow riparian gallery forest, the dominant forest community type within the Greenway, is one of five such stands remaining in Arizona, and one of less than 20 in the world. This forest community supports an abundance of wildlife diversity, including state- and federally-listed threatened and endangered species such as the razorback sucker, southwestern willow flycatcher, gray hawk, and common black hawk. Land ownership within the Greenway is a mix of state, federal, municipal, and private. Land use is equally diverse, including agricultural, grazing, industrial, commercial, residential, and recreational uses.

ECOSYSTEM STRESSES
The primary impact to the river in the Verde Valley is water diversion. During the summer months, up to 90% of the water in the channel is diverted, mainly for agricultural use. Dramatic population growth in the Verde Valley has led to rapidly-expanding residential and commercial development, which has increased water demands and sedimentation of the river. Grazing on National Forest lands in the upper watershed have also led to high amounts of erosion and sedimentation downstream. Furthermore, run-off from tailings left over from an historic copper smelter operation may impact water quality along the Greenway. Finally, historic sand and gravel mining have channelized parts of the river, altering its natural flow, increasing erosion, and decreasing bank stability and regeneration of native vegetation. The U.S. Environmental Protection Agency has placed a moratorium on mining activities until mitigation efforts are in place.

PROJECT DESCRIPTION
The Verde River Greenway project was initiated by then-Governor Bruce Babbitt in 1986 after the project area was identified as a critical stretch of the river, based on its rare riparian forest community type, its rich cultural resources, and a growing demand for recreational opportunities. State legislation was then passed and funds appropriated authorizing Arizona State Parks to acquire property along the Greenway. In 1990, the Arizona Heritage Fund initiative was enacted. Supported by state lottery revenues, this Fund provided additional funding for acquisition of lands, establishment of an ongoing ecosystem monitoring program, and development of a management plan.

Arizona State Parks realized from the Greenway’s inception that to successfully manage this riparian resource, a coordinated management system was required, including both public and private landowners along the Greenway and in the surrounding communities. As a result, the following project goals were established based on issues raised by landowners and the public in the region: conserve, protect, and enhance the ecological resources of the Verde River Greenway; preserve cul-
**VERDE RIVER GREENWAY -- continued**

...tural resources, including Native American historical sites; develop recreational opportunities that are compatible with the conservation goals of the Greenway; and build partnerships. A steering committee was set up to advise State Parks during the management planning process. A public survey was conducted and several public meetings were held throughout the duration of the planning effort.

**PRESENT STATUS & OUTLOOK**

The Verde River Greenway Management Plan outlines management strategies for Greenway lands owned by State Parks, but also offers recommendations for all landowners within the 100-year floodplain. Implementation of the plan is now underway. A full-time coordinator oversees management on the Greenway, and the community continues to strongly support State Park’s protection efforts along the Greenway. Interpretive educational programs, riparian restoration efforts, and ecosystem monitoring have begun. Cooperative relationships between landowners are beginning to develop also.

**Factors Facilitating Progress**

The initial funding and political support to protect this very significant resource have been the major factors allowing this project to move forward. Also, local communities have supported State Parks in land acquisition and planning for the Greenway.

**Obstacles to Progress**

There has been some opposition towards the plan from private landowners concerning the amount of public access allowed along the Greenway on private lands. Conflict has arisen over what should be considered appropriate recreational use within the Greenway. Finally, some elements of the plan may be difficult to implement if the State Legislature reduces Arizona Heritage Funds in the future.

**Contact information:**

Arizona State Parks
Phoenix, AZ
**VIRGINIA COAST RESERVE**

**PROJECT AREA DESCRIPTION**

The Virginia Eastern Shore is a narrow peninsula of land attached to southern Maryland, with the Atlantic Ocean to the East and the Chesapeake Bay to the West. On the Atlantic Ocean side is a string of barrier islands, coastal bays, and extensive salt marshes. The Nature Conservancy’s (TNC) Virginia Coast Reserve encompasses 45,000 acres of this coastal area. Ecosystems range from salt marsh habitats to upland wooded areas.

The vegetative cover on the islands includes dune vegetation and maritime forest, while the mainland is predominantly farmland and hardwood forest. Federally-listed threatened and endangered species include the Delmarva Fox Squirrel and numerous shore birds such as the piping plover. Farming and seafood harvesting are traditional industries.

**ECOSYSTEM STRESSES**

The barrier islands have been substantially protected, but the mainland buffer area faces threats due to development. Water quality and quantity are concerns for the sole-source, deep confined aquifer of the Eastern Shore. Development could increase the need for water at the same time as upsetting the recharge balance of the aquifer by creating impermeable surfaces. Another major stress is degradation of lagoons, which adversely impacts the shellfish communities. Recently, fecal coliform has been found at high levels due to raccoon scat. Overfishing is also a concern.

**PROJECT DESCRIPTION**

This conservation project began in the 1970s when TNC purchased the three southernmost islands from a New York corporation which had plans to build a resort. TNC continued assembling the Virginia Coast Reserve and today owns and manages 45,000 acres, including 14 islands. This is the last intact, fully functioning barrier island ecosystem on the unglaciated coast.

In 1989, TNC initiated a broad approach to ecosystem conservation based in part on the area’s United Nations Biosphere Reserve designation. The general mission of the project is to preserve biodiversity and the habitats that the species need to survive. This is accomplished through the following six initiatives: protect the core natural area of the barrier islands; ensure appropriate uses within the buffer area; monitor the ecosystem with an emphasis on scientific research; educate at all levels; form partnerships with every sector; and enhance the local economy through protection of the natural system.

Partnerships, highlighted throughout all the initiatives, have been forged in many areas. The Northampton Economic Forum was formed in 1989 to design an economic implementation plan that emphasizes sustainability of natural resources. The forum includes representatives from TNC, the National Association for the Advancement of Colored People (NAACP), local governments, and business people. In 1987, the University of Virginia was awarded a $2-million grant to begin a long-term ecological research project on the Reserve. Scientists on this effort are studying natural processes with an emphasis on developing monitoring strategies for future management decisions. Monitoring of the Reserve includes long-term scientific and...
problem-specific issues as well as sociological and economic factors.

**PRESENT STATUS & OUTLOOK**
The participants of the project believe strongly in developing a sustainable development model in the buffer area since this is the only way to ensure long-term protection of the core reserve. Currently, TNC is working on ways to support other groups in their sustainable development efforts and to demonstrate sustainable agriculture in pilot projects.

**Factors Facilitating Progress**
The community has strong ties to the natural resources of the area and has a long history of living close to the land. This ethic has greatly facilitated the momentum of the project. The community realized early on that conservation and economics are complimentary in many ways and they generally support innovative and sustainable projects. In addition, the barrier islands that TNC purchased were in relatively pristine condition due to limited human impact.

**Obstacles to Progress**
TNC and the community have been through years of planning and implementing, and yet the ecological results are slow to appear. Measuring and quantifying ecological results are also difficult.

**Contact information:**
Ms. Terry Thompson  
The Nature Conservancy  
Virginia Coast Reserve  
PO Box 158  
Nassanadox, VA 23413  
(804) 442-3049  
Fax: (804) 442-5418  
E-mail: TATHOMPSON@AOL.COM
**Wild Stock Initiative**

**Project Area Description**
This project focuses on streams and their watersheds throughout the state of Washington in which salmon and steelhead trout populations have been identified. Healthy salmonid populations need streams with cool, clean water, a gravelly bottom, stable flows, adequate summer flows, and migration access to saltwater. The watersheds of such streams vary from the forested Cascade Mountains in west-central Washington, to the agricultural Columbia basin, and the urbanized Puget Sound basin. Several federally- and state-listed threatened or endangered species occur in this state. They include the Snake River fall chinook, Snake River spring-summer chinook complex, and the Snake River sockeye. In addition, petitions have been submitted for the federal listing of numerous salmonid stocks under the Endangered Species Act (ESA).

Public lands include national forests, national parks, grazing lands, state forests, and state parks. In addition, a significant portion of forest land is owned by timber companies. Agriculture, including grazing and cultivation of grain crops (oats, barley, etc.), is especially important east of the Cascade Mountains. In the Puget Sound basin, urban development is growing.

**Ecosystem Stresses**
Hydrologic alterations have led to salmonid habitat loss, resulting in reduced productivity and high mortality rates. Such alterations are due to the following factors: in eastern Washington, water diversion and over-allocation of water for agricultural purposes have resulted in inadequate stream flow. Major hydroelectric development on the Columbia River has resulted in high upstream and downstream passage mortalities through dams. Furthermore, riparian buffer has been lost due to grazing, resulting in high water temperatures and reduced stream flow. In western Washington, both roads and timber management have affected the periodicity and amplitude of floods, and have caused severe erosion and sedimentation. Urban development has also led to habitat loss and degradation. In addition to habitat loss, overfishing and hatchery programs have affected salmonid population levels.

**Project Description**
The Wild Stock Initiative was launched in 1992 by the Washington Department of Fish and Wildlife (WDFW; formerly the Departments of Fisheries and Wildlife) and the Northwest Treaty Indian tribes in response to the growing realization that many wild salmonid stocks are seriously depleted, and that if no remedial action is taken, fisheries will be closed and many more wild salmonids will be listed under the ESA. The goal of the initiative is to protect and increase the long-term productivity, abundance and diversity of wild salmonids and their ecosystems to sustain a) ceremonial, subsistence, recreational, and commercial fisheries; b) non-consumptive fish benefits; and c) related cultural and ecological values.

The Wild Stock Initiative consists of three integral components: a) Salmon and Steelhead Stock Inventory (SASSI), development of a Wild Salmonid Policy, and protection and restoration of stocks and their habitat. Specific restoration actions may include habitat restoration, modification of hatchery...
WILD STOCK INITIATIVE -- continued

practices, captive broodstock projects, and new harvest management strategies. Also included in the initiative is monitoring. Although part of the original initiative, the development of a Wild Salmonid Policy was spurred on by legislative mandates in 1994 to create a state-wide rather than agency or tribal policy. Subsequently, the governor required all other state agencies with authority over salmonid habitat to become involved in the development of this policy.

PRESENT STATUS & OUTLOOK
By 1994 SASSI had classified 435 wild salmon and steelhead stocks. In addition, an inventory of salmonid habitat and critical physical habitat components is ongoing. Policy development has included the completion of an extensive policy discussion paper in May 1994, meetings with the Oregon Department of Fish and Wildlife, tribes, and 40 key constituents (representing fishing, environmental, and land and water use interests) in May and June of 1994, and the completion of a working draft environmental impact statement in July of 1995. The policy development process has led to increased cooperation and coordination among state agencies and with constituents. Recovery planning activities are currently underway for most stocks identified as having critically low abundance according to SASSI.

Factors Facilitating Progress
It has been fortunate that no one has challenged the existence of serious resource problems needing resolution. A specific legislative mandate for policy development has also been helpful. In addition, the legislature has allocated funds to WDFW for the Wild Stock Initiative, resulting in focused resources for the project, such as staff and funding.

Obstacles to Progress
Development of the Wild Salmonid Policy and its associated recovery plans has been much slower than anticipated. Dealing with a complex array of major resource management issues at a broad, conceptual level has proven challenging. It may also be challenging to reach agreement with all tribes and agencies on the policy while building public consensus.

Contact information:
Mr. Rich Lincoln
Washington Department of Fish and Wildlife
600 Capitol Way N.
Olympia, WA 98501-1091
(206) 902-2750
**WILDLIFE AREA PLANNING**

**PROJECT AREA DESCRIPTION**
All lands under the jurisdiction of the Washington Department of Fish and Wildlife (WDFW) are included in the project area. Within their 840,000-acre jurisdiction, individual WDFW holdings range from 400 acres in western Washington to 100,000 acres in the eastern part of the state. Many different ecosystems are included.

Much of the WDFW’s forested lands contain a mix of coniferous and deciduous tree species. On the west side of the Cascade Range, Douglas-fir, western red cedar, and hemlock are the dominant species. On the east side, Douglas-fir and ponderosa pine in the higher moister habitats transition to several hundred thousand acres of grass and shrub steppe under WDFW’s management authority. Big sage, stiff sage, and bitter brush are a few shrubs that grow the steppe. The lands are primarily managed for wildlife protection and habitat preservation. Between 10 and 20 federally-listed threatened and endangered species, such as the bald eagle, peregrine falcon, northern spotted owl, and salmon species, reside on WDFW wildlife areas.

Recreation is the second management focus, including hunting, fishing, horseback riding, rock climbing, and bird watching, among others. Motorcycling and snowmobiling are permitted by WDFW on some existing roads.

**ECOSYSTEM STRESSES**
Given the diversity of WDFW’s lands and the geographic distance between them, stresses unevenly affect wildlife areas. Localized areas are very strongly impacted by a specific stress which may not register as very significant on a statewide scale. For instance, non-point pollution sources, eutrophication, timber management, and drought are severe stresses on specific areas, yet none of these stresses have a widespread impact on several areas.

The presence of exotic species, however, is a major stress on many WDFW lands, especially on the east side of the Cascade Range. Russian olive, originally planted by WDFW to create riparian habitat cover, is now choking out native plants and decreasing biological diversity in some wildlife areas. Another exotic plant, purple loosestrife, is destroying some wetlands, which WDFW is trying to address through a control program.

**PROJECT DESCRIPTION**
WDFW began purchasing lands in the 1940s to provide for recreational hunting and fishing. There are currently 25 primary wildlife management areas in the state. The Department’s adoption of ecosystem-based approaches was an evolutionary policy to stabilize species populations in light of mounting demands on the wildlife areas by the public. In the spring of 1992, the Program Manager of WDFW’s Wildlife Area Division directed that four-year management plans be developed for all wildlife areas so that WDFW would have a defensible framework by which to approve or reject activities on the lands. Planning also ensures that consistent, statewide, biologically-based activities are being proposed. Each management plan is based on agency goals and objectives, public input, and WDFW’s legal responsibilities. Plans will be reviewed and updated every four years to determine if social or
ecological conditions that influence management have changed.

The plan’s management activities focus on specific components of the ecosystem, with the overall goal of improving habitat and maintaining species populations. Typical ecosystem-based management activities on wildlife areas include: sedimentation control through road maintenance; fencing to protect riparian areas and uplands from grazing; routing human use outside of sensitive areas; riparian and upland restoration including shrub; tree and herbaceous plantings to provide soil stabilization, food; and cover for wildlife; and fire control.

**Present Status & Outlook**

WDFW has continued to purchase lands in the last five years, often with mitigation funds that come from the dams operated by Tacoma Power and Light, Bonneville Power Administration, and other utilities. Resources have been mapped for each of the wildlife areas using GIS technology.

Factors Facilitating Progress

Cooperation from within the agency and public involvement are credited with allowing the planning processes to progress. The establishment of Citizens Advisory Groups has allowed the WDFW to receive support from the public, including citizens who previously did not understand or approve of management activities on WDFW wildlife areas.

Obstacles to Progress

Convincing internal staff and citizens that the project planning process was going to be useful and successful was challenging. At times, members of the public have not agreed with WDFW’s proposal for management activities on a specific wildlife area. Applying additional, wide-ranging ecosystem-based approaches will be a future challenge.

**Contact Information:**

Mr. Paul Dahmer
Wildlife Area Inventory & Planning Coordinator
Washington Department of Fish and Wildlife
600 Capitol Way North
Olympia, WA 98501-1091
(360) 664-0705
Fax: (360) 902-2946
E-mail: dahmepad@dfw.wa.gov
**WILDLIFE HABITAT IMPROVEMENT GROUP**

**PROJECT AREA DESCRIPTION**
The project area is defined by the property boundaries of 40 contiguous landowners in the towns of Newfane, Wardsboro, and Townshend, Vermont. The overall ecosystem that corresponds with the project area is described as a system of high wooded wetlands. The project area has been further divided into 10 ecotypes, which include mixed cover, older forest, and wetlands. The vegetative cover is a mix of northern hardwoods and conifers and is secondary growth resulting from the decline of agriculture in the region. At an altitude of 1,600 feet, the area provides the headwaters for several streams. The 4,600-acre project area is predominantly privately owned land that has passed down from generation to generation. The land use is mainly rural settlement, except for 200 acres owned by International Paper.

**ECOSYSTEM STRESSES**
Although this area has not been rated by the state as critical in terms of acid rain, the potential impacts of acidification on water quality and on growth of conifers in the area is still a major concern. A second threat is the population growth and increased demand for recreational land use. This poses a threat to wildlife habitat and is magnified by the recent trend toward development. A third threat to habitat is the improper management of woodlands and timber cuts, which can alter edge habitat for wildlife and cause loss of critical stands.

**PROJECT DESCRIPTION**
The project revolves around a voluntary consortium of private landowners with the goals of stewardship, preservation, and improvement of wildlife habitat. The force behind the project’s start-up was a single individual motivated by a three-day intensive training course offered by Vermont COVERTS, Inc. (Woodlands for Wildlife) financed by the Ruffed Grouse Society. The course promotes the management of woodlands to enhance wildlife habitat and emphasizes communication between neighboring landowners. In 1985, the Wildlife Habitat Improvement Group (WHIG) was formed from three core landowners comprising 650 acres. Over the next several years, the remainder of the 4,600 acres was added to the project through an active yet informal outreach campaign by the founding individual.

In 1989, GIS mapping was completed for the entire project area with funding through a U.S. Forest Service Stewardship Grant and the Windham Foundation. In 1990, a more formal educational outreach program was initiated with five local elementary schools, centered on the relation of silviculture and habitat. The project also has been opened up for informative nature walks to spread to the public the ethic of land stewardship and the knowledge of ecosystem connectivity.

**PRESENT STATUS & OUTLOOK**
The current focus is on long-range planning for the 4,600 acres. Although the 40 landowners are not held together by a contractual agreement or an association, a more legal agreement may be on the horizon. WHIG also may serve as a model for similar landowner projects in the future.

---

Factors Facilitating Progress
A major facilitating force for the project has been the stability in land ownership over many generations. People are therefore willing to spend time and resources on the project. Also, due to the rural character of the area, landowners already have a tradition of communicating with their neighbors. A source of technical expertise and advice has come from the U.S. Fish and Wildlife Service and the State Forester, both having been supportive during numerous meetings and helping with nature walks.

Obstacles to Progress
Some landowners did not want to participate in the project. Others who have participated have remained passive because they are only seasonal residents. Still others want to become involved at a time when the project is not looking to expand due to resource constraints. A future threat to the project is the uncertainty that is introduced when land is turned over to new generations or to new owners.

Contact information:
Mr. David Clarkson
RR1 Box 2426
Newfane, VT 05345
(802) 365-4243
E-mail: DCLARKS@LEG.STATE.VT.US
COMPREHENSIVE LIST OF
619 ECOSYSTEM MANAGEMENT PROJECTS
COMPREHENSIVE STATE-BY-STATE LISTING OF ECOSYSTEM MANAGEMENT PROJECTS NATIONWIDE

(Projects in multiple states are listed under each state. Catalog project sites are denoted by “*” and their ID numbers with a “P”.)

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### Ecosystem Management in the United States: An Assessment of Current Experience

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<td>* Upper Farmington River Management Plan</td>
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**DELAWARE**

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## Comprehensive State-by-State Listing of Projects

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<td>Florida Keys Project</td>
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### WASHINGTON, D.C.
- L106 AC/ACT Comprehensive Study - AL, GA, FL
- L115 Apalachicola River and Bay Ecosystem Management Program - FL
- L180 Central Florida Native Grassland Management Project - FL
- L196 Closing the Gap in Florida’s Wildlife Habitat Conservation System - FL
- L197 Coastal Barrier Island Ecosystem Effort - FL
- L249 Ecosystem Management Initiative - FL
- P031 Florida Bay Ecosystem Management Area - FL
- L268 Florida Keys National Marine Sanctuary - FL
- L269 Florida Keys Project - FL
- P038 Gulf of Mexico Program - FL, AL, MS, LA, TX
- L306 Hillsborough River Ecosystem Management Area - FL
- L317 Indian River Lagoon National Estuary Program - FL
- L363 Long Leaf Pine- Eglin Air Force Base - FL
- P051 Lower St. Johns River Ecosystem Management Area - FL
- L374 Loxahatchee River Basin Wetland Planning Project - FL
- L379 Mangrove Rehabilitation Program - FL
- L462 Pensacola Bay Watershed Ecological Evaluation - FL
- L516 Sand Pine-Scrub Oak - FL
- L518 Sarasota Bay National Estuary Program - FL
- P091 Southern Florida Ecosystem Restoration Initiative - FL
- L538 Southern Phosphate District - FL
- L558 Suwannee River Ecosystem Management Area - FL
- L561 Tampa Bay National Estuary Program - FL
- L589 Upper Peace River - FL
- L600 Wekiva River Basin - FL
- L614 Xeric Oak Scrub Ecological Survey - FL

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- L106 AC/ACT Comprehensive Study - AL, GA, FL
- L115 Apalachicola River and Bay Ecosystem Management Program - FL
- L180 Central Florida Native Grassland Management Project - FL
- L196 Closing the Gap in Florida’s Wildlife Habitat Conservation System - FL
- L197 Coastal Barrier Island Ecosystem Effort - FL
- L249 Ecosystem Management Initiative - FL
- P031 Florida Bay Ecosystem Management Area - FL
- L268 Florida Keys National Marine Sanctuary - FL
- L269 Florida Keys Project - FL
- P038 Gulf of Mexico Program - FL, AL, MS, LA, TX
- L306 Hillsborough River Ecosystem Management Area - FL
- L317 Indian River Lagoon National Estuary Program - FL
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- L374 Loxahatchee River Basin Wetland Planning Project - FL
- L379 Mangrove Rehabilitation Program - FL
- L462 Pensacola Bay Watershed Ecological Evaluation - FL
- L516 Sand Pine-Scrub Oak - FL
- L518 Sarasota Bay National Estuary Program - FL
- P091 Southern Florida Ecosystem Restoration Initiative - FL
- L538 Southern Phosphate District - FL
- L558 Suwannee River Ecosystem Management Area - FL
- L561 Tampa Bay National Estuary Program - FL
- L589 Upper Peace River - FL
- L600 Wekiva River Basin - FL
- L614 Xeric Oak Scrub Ecological Survey - FL

### GEORGIA
- L106 AC/ACT Comprehensive Study - AL, GA, FL
- L111 Altamaha River Bioroserve - GA
- P015 Chattooga River Project - GA, SC, NC
- L207 Conasangua River - GA, TN
- L491 Red-cockaded woodpecker - GA
- L519 Savannah River Basin - NC, SC, GA
- L520 Savannah River Basin Watershed Project - GA, SC
- L532 Southern Appalachian Man and the Biosphere Program (SAMAB) - TN, NC, SC, GA
- L536 Southern Forested Wetlands - MS, AL, AR, DC, DE, NY, WV
- L539 Southlands Experimental Forest - GA
- L609 Whole Farm/Ranch Planning - GA, ID, MN, NE, NY, PA

### HAWAII
- L129 East Maui Watershed Partnership - HI
- L130 Hawaiian Forest Challenge - HI
- L137 Kapouanae Preserve - HI
- L131 Kilauea Forest - Pu’u Ma’aka’a Fence Construction - HI
- L132 Kilauea-Olaa Working Group - HI
- L135 Land Use District Boundary Review - HI
- L136 Molokai Preserves - HI
- L139 Natural Areas Reserve System - HI
- L140 Natural Resource Roundtable - HI
- L142 Nu’u‘ina Ponds - HI
- L143 Pacific Air Force Command - HI
- P081 Pu‘u Kokui Watershed Management Area - HI
- L154 Stream Protection and Management (SPAM) Program - HI
- L156 U.S. Fish & Wildlife Service--Pacific Islands Ecoregion - HI
- L158 Waiamoini Preserve - HI
- L159 Waimāna, Koke‘e & Polihale, and Na Pali Coast State Parks - HI

### IDAHO
- L131 Bear River Watershed - WY, UT, ID
- L148 Boise Cascade Ecosystem Management Demonstration Project - ID
- L151 Boise River Wildfire Recovery - ID
- L211 Conservation Agreement for Bonneville Cutthroat Trout - ID
- L221 Deadwood Landscape Analysis - ID
- L280 Garden Creek/Craig Mountain - ID
- P034 Greater Yellowstone Ecosystem Project - WY, MT, ID
- L305 Henry’s Fork Watershed Council - ID, WY
- L311 Idaho Ecosystem Management Project - ID
- L312 Idaho Panhandle National Forest Aquatic Ecosystem Strategy - ID
- L321 Interior Basin Ecoregion - NV, ID, WY, UT, AZ
- P042 Interior Columbia Basin Ecosystem Management Project - WA, OR, ID, MT, WY, NV
- L340 Kootenay River Network - MT, ID, BC
- P055 McPherson Ecosystem Enhancement Project - ID
- L389 Mica Creek Watershed Study - ID
- L456 Pacific Northwest Watershed Project - OR, WA, ID
- L495 Revision of the Forest Plan for the Targhee National Forest - ID, WY
- L525 Silver Creek - ID
- L545 Spruce Creek and/or Logging Gulch - NEPA documents - ID
- L562 Teanaway Ecosystem Demonstration Project - ID
- L565 Thousand Springs Preserve - ID
- P097 Trail Creek Ecosystem Analysis Project - ID
- L609 Whole Farm/Ranch Planning - GA, ID, MN, NE, NY, PA

### ILLINOIS
- P011 Cache River Wetlands - IL
- P019 Chicago Region Biodiversity Council - IL
- L210 Conservation 2000 - Ecosystem-Based Management - IL
- P027 Ecosystem Charter for the Great Lakes-St. Lawrence Basin - MI, MN, WI, IN, IL, OH, PA, NY, Ont, Que
### Ecosystem Management in the United States: An Assessment of Current Experience

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**NEBRASKA**

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<th>ID</th>
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<tr>
<td>L241</td>
<td>Eastern Nebraska saline Wetlands</td>
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<td>L258</td>
<td>Elm Creek Watershed Section 319 Nonpoint Source Project</td>
<td>NE</td>
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<tr>
<td>L292</td>
<td>Great Plains Partnership</td>
<td>MN, ND, WY, IA, NE</td>
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<tr>
<td>L370</td>
<td>Lower Missouri River</td>
<td>KS, NE, IA, MO</td>
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<td>L399</td>
<td>Missouri River Division - U.S. Army Corps of Engineers</td>
<td>NE, others</td>
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<tr>
<td>P059 *</td>
<td>Missouri River Mitigation Project</td>
<td>KS, NE, IA, MO</td>
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### Comprehensive State-by-State Listing of Projects

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<tr>
<td>L208</td>
<td>Concord Pine Barrens</td>
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<tr>
<td>L245</td>
<td>Ecology and Management of Northern Hardwoods</td>
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<tr>
<td>L248</td>
<td>Ecosystem Dynamics in Mature and Harvested Forests of New England</td>
<td>NH</td>
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<tr>
<td>L296</td>
<td>Gulf of Maine Council</td>
<td>ME, NH, MA</td>
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<tr>
<td>P037</td>
<td>Gulf of Maine Rivers Ecosystem Plan</td>
<td>ME, NH, MA</td>
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<tr>
<td>L308</td>
<td>Hubbard Brook Experimental Forest</td>
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<tr>
<td>L315</td>
<td>Implementing Ecosystem Based Forest Mgmt. - &quot;Exemplary Forestry Init.&quot;</td>
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<td>L367</td>
<td>Lower Connecticut River Special Area Management Plan</td>
<td>CT, VT, NH, MA</td>
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<tr>
<td>L385</td>
<td>Measurement, anal., &amp; modeling of forest ecosystems in a changing env.</td>
<td>NH</td>
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<tr>
<td>L387</td>
<td>Merrimack River</td>
<td>NH, MA</td>
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<td>L424</td>
<td>New England - New York ECOMAP</td>
<td>ME, NH, VT, MA, CT, RI, NY</td>
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<td>L425</td>
<td>New England Resource Protection Project</td>
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<td>New Hampshire Forest Resources Plan</td>
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<td>P068</td>
<td>Northern Forests Lands Council</td>
<td>VT, NY, NH, ME</td>
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<td>L557</td>
<td>Supersanctuary (Harris Center for Conservation Education)</td>
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#### NEW JERSEY

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<tr>
<td>L190</td>
<td>Chesapeake Bay/Mid-Atlantic Highlands/Mid-Atlantic Landscape Assessment</td>
<td>NY, NJ, PA, WV, MD, VA, NC, DE</td>
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<td>L198</td>
<td>Coastal Plain Ponds</td>
<td>MA, NJ, DE, MD, RI</td>
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<td>L222</td>
<td>Delaware Bayshores Bioriver</td>
<td>NJ, DE</td>
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<td>L223</td>
<td>Delaware Estuary Program</td>
<td>NJ, DE</td>
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<tr>
<td>L225</td>
<td>Delaware River/Delmavr Ко Coastal Watershed</td>
<td>NJ</td>
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<tr>
<td>L300</td>
<td>Hackensack Meadowlands District</td>
<td>NJ</td>
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<td>P039</td>
<td>Hudson River/New York Bight Ecosystem</td>
<td>NY, NJ</td>
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<tr>
<td>L354</td>
<td>Landscape Project</td>
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<td>P065</td>
<td>New Jersey Pinelands</td>
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#### NEW MEXICO

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<td>Ark - Red River Ecosystem Team</td>
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<td>L137</td>
<td>Biodiversity Assessment, South-central CO &amp; North-central NM</td>
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<td>L155</td>
<td>Bosque Riparian Restoration</td>
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<td>L169</td>
<td>Canadian River Commission</td>
<td>OK, TX, NM</td>
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<td>L173</td>
<td>Carson National Forest Planning Project</td>
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<td>L192</td>
<td>Chihuillita Watershed</td>
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<td>L201</td>
<td>Colorado Plateau Ecosystem Partnership Project</td>
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<td>Colorado River Basin Salinity Control Program</td>
<td>CO, UT, AZ, NY, NV, CA, NM</td>
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<td>L252</td>
<td>Effects of PAH on Colorado Squawfish</td>
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<td>L271</td>
<td>Forest Ecosystem Management Plan</td>
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<td>L276</td>
<td>Fort Stanton Special Management Area</td>
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<td>Kiowa Grasslands Integrated Resource Management Program</td>
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#### NEW YORK

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<td>L108</td>
<td>Adirondack Park/Northwest Flow</td>
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<td>P002</td>
<td>Albany Pine Bush</td>
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<td>L160</td>
<td>Buffalo River Area of Concern</td>
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<td>Chesapeake Bay Program</td>
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<td>Chesapeake Bay/Mid-Atlantic Highlands/Mid-Atlantic Landscape Assessment</td>
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<td>L240</td>
<td>Eastern Lake Ontario Conservation Initiative</td>
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<td>P027</td>
<td>Ecosystem Charter for the Great Lakes-St. Lawrence Basin</td>
<td>MI, MN, WI, IN, IL, OH, PA, NY, On, Que</td>
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<td>L253</td>
<td>Eighteenmile Creek Area of Concern</td>
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<td>French Creek Bioriver</td>
<td>NY, PA</td>
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<td>Great Lakes Program / EPA Great Lakes National Program Office</td>
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<td>L293</td>
<td>Great Swamp Ecosystem Initiative</td>
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<td>Hudson River/New York Bight Ecosystem</td>
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<td>L344</td>
<td>Lake Champlain Wetlands</td>
<td>VT, NY</td>
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<td>L362</td>
<td>Long Island Sound</td>
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<td>L423</td>
<td>Neversink River Ecosystem Initiative</td>
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<td>New England - New York ECOMAP</td>
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<td>Northern Forest Lands Council</td>
<td>VT, NY, NH, ME</td>
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<td>Ohio River Valley Ecosystem</td>
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<td>Onondaga Lake</td>
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<td>Oswego River Harbor Area of Concern</td>
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<td>Peconic Bay</td>
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<td>Poultney River Conservation Program</td>
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<td>Rochester Embayment Area of Concern</td>
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<td>L522</td>
<td>Shawangunk Ridge Biodiversity Partnership</td>
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<td>L548</td>
<td>St. Lawrence River Area of Concern</td>
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<td>L555</td>
<td>Structure and Function of Urban Forests</td>
<td>NY</td>
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<td>L609</td>
<td>Whole Farm/Ranch Planning</td>
<td>GA, ID, MN, NE, NY, PA</td>
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#### NEW ENGLAND

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<tr>
<td>L355</td>
<td>Largo Canyon Watershed Management and Erosion Control Plan</td>
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<td>L356</td>
<td>Largo-Aqua Fria Watershed Project</td>
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<td>P052</td>
<td>Malpai Borderlands Initiative</td>
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<td>L558</td>
<td>McGregor Coordinated Resource Management Plan</td>
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<td>Negrito Project</td>
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<td>L470</td>
<td>Playa Lakes Joint Venture</td>
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<td>L497</td>
<td>Rio Grande Basin Landscape-Scale Assessment</td>
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<td>L498</td>
<td>Rio Puerco Watershed Stabilization Initiative</td>
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<td>L500</td>
<td>Riparian Recovery Plan Initiative</td>
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<td>L510</td>
<td>San Juan Basin Unlined Pit Closure and Remediation</td>
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<td>L515</td>
<td>San Simon River Ecosystem Project</td>
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<td>Sevilleta National Wildlife Refuge Long-Term Ecological Research Site</td>
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<td>Upper/Middle Rio Grande Ecosystem</td>
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#### NEVADA

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<td>Black Rock/High Rock Interdistrict Management Area</td>
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<td>Colorado River Basin Salinity Control Program</td>
<td>CO, UT, AZ, NY, NV, CA, NM</td>
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<td>L238</td>
<td>East Lassen Management Plan</td>
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## Ecosystem Management in the United States: An Assessment of Current Experience

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<tr>
<td>L263</td>
<td>Fish Creek Restoration Project</td>
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<td>Interior Basin Ecoregion</td>
<td>NV, ID, WY, UT, AZ</td>
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<td>P042 *</td>
<td>Interior Columbia Basin Ecosystem Management Project</td>
<td>WA, OR, ID, MT, WY, NV</td>
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<td>L322</td>
<td>Intermountain West Ecosystem</td>
<td>WA, OR, CA, NV, UT</td>
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<td>P054 *</td>
<td>Marys River Riparian/Aquatic Restoration Project</td>
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<td>L450</td>
<td>Oregon High Desert Biorseerve</td>
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<td>P077 *</td>
<td>Piste/El Dorado Desert Wildlife Management Area</td>
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<td>L483</td>
<td>Pyramid Lake/Stillwater Marsh Project</td>
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<td>Quinn River Riparian Improvement and Demonstration Project</td>
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<td>L487</td>
<td>Railroad Valley Wetlands Enhancement</td>
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<td>L602</td>
<td>Wells Resource Management Plan, Elk Amendment</td>
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### NORTH CAROLINA

- L110 Albermarle-Pamlico Sound National Estuary Program NC, VA
- L121 Atlantic Cedar Restoration Program NC
- P015 * Chattooga River Project GA, SC, NC
- L190 Chesapeake Bay/Mid-Atlantic Highlands/Mid-Atlantic Landscape Assessment NY, NJ, PA, WV, MD, VA, NC, DE
- L219 Coweeta Hydrologic Laboratory NC
- L273 Fort Brag Integrated Natural Resources Planning NC
- L359 Little Tennessee River Group NC
- P050 * Lower Roanoke River Biorseerve NC
- L406 Mt. Roan Balds Management NC, TN
- L426 New Hope Creek Corridor Project NC
- L490 Red Wolf Recovery Program NC
- L496 Richland Creek Corridor NC
- L519 Savannah River Basin NC, SC, GA
- L532 Southern Appalacian Man and the Biosphere Program (SAMAB) TN, NC, SC, GA

### NORTH DAKOTA

- L247 Ecoregions of North and South Dakota ND
- L288 Grassland Ecosystem Comparison Project ND, SD, MT, WY
- L292 Great Plains Partnership MN, MT, ND, WY, SD, IA, NE
- L400 Missouri River Natural Resource Group MT, ND, SD, MO, IA, NE, KS
- L410 Multi-Agency Approach to Planning and Evaluation (MAAPE) ND, SD, MT
- L432 North Dakota Conservation Reserve Program ND
- L433 North Dakota-Montana Paddleship Management Plan ND
- P079 * Prairie Pothole Joint Venture ND, SD, MN, IA, MT
- L478 Prairie, Wetland, and Missouri River Mainstem Ecosystem ND, SD
- L489 Red River Watershed ND, MN

### OHIO

- L120 Ashtabula River Area of Concern OH
- P006 * Big Darby Creek Partnership OH
- P027 * Ecosystem Charter for the Great Lakes-St. Lawrence Basin MI, MN, WI, IN, IL, OH, PA, NY, Ont, Que
- P030 * Fish Creek Watershed Project IN, OH
- L285 Grand River Partners OH
- L291 Great Lakes Program / EPA Great Lakes National Program Office MI, MN, WI, IN, IL, NY, OH, PA
- L314 Impact of Atmospheric Deposition & Global Change on Forest Health & Productivity OH
- L316 Indian Lake Hydrologic Unit Project OH
- L382 Maumee River Area of Concern OH
- L444 Oak-Savanna Ecosystem Project IL, IN, MN, MI, OH, WI, IA, MO
- P070 * Ohio River Valley Ecosystem IL, IN, OH, PA, NY, WV, KY, TN, VA, MD, MO
- L452 Ottawa River Watershed Study OH
- L485 Quantitative Methods for Modeling Forest Ecosystems OH
- L494 Restoration of Ohio Oak Forests with Prescribed Fire OH
- L550 Stillwater Creek OH

### OKLAHOMA

- L118 Ark - Red River Ecosystem Team CO, KS, OK, TX, AR, NM, MO
- L169 Canadian River Commission OK, TX, NM
- L313 Illinois River - Battle Branch OK
- L445 Oklahoma Biodiversity Initiative OK
- L446 Oklahoma Natural Areas Registry Program OK
- P071 * Oklahoma Tallgrass Prairie Preserve OK
- P072 * Ouachita National Forest AR, OK
- L470 Playa Lakes Joint Venture TX, OK, KS, CO, NM

### OREGON

- P004 * Applegate Partnership OR
- L138 Biodiversity Research Consortium—species distribution in 8 states OR, WA, CA
- L145 Blue Mountains Elk Initiative OR, WA
- P009 * Blue Mountains Natural Resources Institute OR, WA
- L174 Cascade Center for Ecosystem Management OR
- L179 Central Cascades Adaptive Management Area OR
- L205 Columbia River Gorge National Scenic Area OR, WA
- L217 Coos Bay/Cuquille River Basins OR
- P028 * Elliott State Forest Management Plan OR
- L287 Grande Ronde Model Watershed Program OR, WA
- P042 * Interior Columbia Basin Ecosystem Management Project WA, OR, ID, MT, WY, NV
- L322 Intermountain West Ecosystem WA, OR, CA, NV, UT
- L337 Klamath Basin Assessment OR, CA
- L338 Klamath River Basin Ecosystem Restoration Project OR, CA
- L339 Klamath-Lake Partnership OR
- L440 Northwest Forest Ecosystem Plan, Research Support WA, OR, CA
- L449 Oregon Biodiversity Project OR
- L450 Oregon High Desert Biorseerve OR, NV
- L454 PACPISH OR, WA, CA
- L456 Pacific Northwest Watershed Project OR, WA, ID
- L479 Proposed Coquille Forest of Coquille Indian Tribe OR, CA
- L526 Silverspot Butterfly Recovery Efforts OR, WA, CA
- L566 Tillamook Bay National Estuary Program OR
- L574 Trout Creek Mountain Working Group OR
- L579 Umpqua Basin Fisheries Restoration Initiative OR
- L605 West Eugene Wetlands Project OR
- L611 Willamette River Basin OR

### PENNSYLVANIA
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<td>Biodiversity Research Consortium—species distribution in 8 states</td>
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<td>L190</td>
<td>Chesapeake Bay/Mid-Atlantic Highlands/Mid-Atlantic Landscape Assessment</td>
<td>NY, NJ, PA, WV, MD, VA, NC, DE</td>
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<td>L212</td>
<td>Conserving Biodiversity in Pennsylvania</td>
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<tr>
<td>L243</td>
<td>Ecology and Management of Allegheny Hardwood Forests</td>
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<td>Fishing Creek</td>
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<td>L278</td>
<td>French Creek Biorereserve</td>
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<td>Hawk Mountain Sanctuary</td>
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<td>Long Pond Barrens</td>
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<td>National Capital Region Cons. Data Center/DC Natural Heritage Program</td>
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<td>L435</td>
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<td>Pocono Habitat Demonstration Project</td>
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<td>Pocono Mountains</td>
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<td>Resource Characterization Study</td>
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<td>Robbie Run Study Area</td>
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<td>Sideling Hill Creek Biorereserve</td>
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<td>Spring Creek Corridor Study</td>
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<td>Whole Farm/Ranch Planning</td>
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**PUERTO RICO**

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<td>Lajas Valley Lagoon System</td>
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<td>Luquillo Experimental Forest</td>
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**Ecosystems Management in the United States: An Assessment of Current Experience**

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<td>Lake Superior Binational Program Habitat Projects</td>
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<td>Lower Missouri River - Data Collection</td>
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<td>Marathon County Forests</td>
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<td>Milwaukee Estuary Area of Concern</td>
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**WYOMING**

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<td>Absaroka Front in Northwestern Wyoming: A Multiple-Use Challenge</td>
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<td>Bear River Watershed</td>
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<td>Black Hills</td>
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<td>Bridger-Teton Forest Plan</td>
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<td>Buffalo Resource Area Ecosystem Management Planning Prototype</td>
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<tr>
<td>State(s):</td>
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<tr>
<td>Contact:</td>
<td>Mr. Mike Eubanks</td>
<td></td>
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<tr>
<td>U.S. Army Corps of Engineers Mobile COE</td>
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<tr>
<td>Contact:</td>
<td>Mr. Mike Prevost</td>
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<td>U.S. Army Corps of Engineers</td>
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<td>WY</td>
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<tr>
<td>Contact:</td>
<td>Ms. Marian Atkins</td>
</tr>
<tr>
<td>Wildlife Biologist</td>
<td></td>
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<td>Bureau of Land Management</td>
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<tr>
<td>Grass Creek Resource Area</td>
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<tr>
<td>PO Box 119</td>
<td></td>
</tr>
<tr>
<td>Worland, WY 82401</td>
<td></td>
</tr>
<tr>
<td>Phone: (307)347-9871</td>
<td></td>
</tr>
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<td>Fax: (307)347-0195</td>
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<tr>
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<td>NY</td>
</tr>
<tr>
<td>Contact:</td>
<td>Mr. Tim Barnett</td>
</tr>
<tr>
<td>Executive Director</td>
<td></td>
</tr>
<tr>
<td>New York - Adirondack Field Office</td>
<td></td>
</tr>
<tr>
<td>PO Box 65</td>
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</tr>
<tr>
<td>Keenevalley, NY 12943</td>
<td></td>
</tr>
<tr>
<td>Phone: (518)576-2082</td>
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</tr>
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<td>Fax: (518)576-4203</td>
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<tr>
<td>Contact:</td>
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<tr>
<td>State(s):</td>
<td>NC, VA</td>
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<tr>
<td>Contact:</td>
<td>Mr. Guy Stefanski</td>
</tr>
<tr>
<td>North Carolina Department of Environment, Health &amp; Natural Resources</td>
<td></td>
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<tr>
<td>Albemarle-Pamlico Estuary Study</td>
<td></td>
</tr>
<tr>
<td>PO Box 27687</td>
<td></td>
</tr>
<tr>
<td>Raleigh, NC 27611</td>
<td></td>
</tr>
<tr>
<td>Phone: (919)715-4084</td>
<td></td>
</tr>
<tr>
<td>Fax: (919)715-1616</td>
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<tr>
<td>Contact:</td>
<td>Ms. Christi Lambert</td>
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<tr>
<td>Project Director</td>
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<tr>
<td>The Nature Conservancy</td>
<td></td>
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<tr>
<td>Altamaha River Bioreserve</td>
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<tr>
<td>PO Box 484, 202 Broad Street</td>
<td></td>
</tr>
<tr>
<td>Darien, GA 31305</td>
<td></td>
</tr>
<tr>
<td>Phone: (912)437-2161</td>
<td></td>
</tr>
<tr>
<td>Fax: (912)437-2161</td>
<td></td>
</tr>
<tr>
<td>E-mail: <a href="mailto:clambert@tnc.org">clambert@tnc.org</a></td>
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<tr>
<td>Contact:</td>
<td>Mr. Jon Capacasa</td>
</tr>
<tr>
<td>U.S. Environmental Protection Agency Region III (3DA00)</td>
<td></td>
</tr>
<tr>
<td>841 Chestnut Building</td>
<td></td>
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<tr>
<td>Philadelphia, PA 19107</td>
<td></td>
</tr>
<tr>
<td>Phone: (215)597-6529</td>
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<tr>
<td>Fax: (215)597-8255</td>
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<td>Contact:</td>
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<td>State(s):</td>
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<tr>
<td>Contact:</td>
<td>Mr. Bill Simon</td>
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<tr>
<td>Animas Basin Coordinator</td>
<td></td>
</tr>
<tr>
<td>PO Box 401</td>
<td></td>
</tr>
<tr>
<td>Silverton, CO 81433</td>
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</tbody>
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1 These ID numbers are also used in the electronic databases described on page ii.
Ecosystem Management in the United States: An Assessment of Current Experience

#L120
Ashtabula River Area of Concern
State(s): OH
Contact: Ms. Amy Pelka
U. S. Environmental Protection Agency
Region V
77 W. Jackson Boulevard
Chicago, IL 60603-3507
Phone: (312)886-0135
Fax: (312)886-7804

#L121
Atlantic Cedar Restoration Program
State(s): NC
Contact: U. S. Air Force
Washington, DC

#L122
Atlantic Salmon Restoration Ecology and Management Research
State(s): MA
Contact: Dr. Richard DeGraaf
Acting Project Leader
USDA Forest Service
Holdsworth Hall
University of Massachusetts
Amherst, PA 01003
Phone: (413)545-0357

#L123
Axial Basin Coordinated Resource Management Plan
State(s): CO
Contact: Mr. Ozzie Kerste
Range Conservationist
Bureau of Land Management
Little Snake Resource Area
1280 Industrial Ave.
Craig, CO 81625
Phone: (303)824-4441
Fax: (303)824-8881

#L124
Back Bay Biloxi Ecosystem Assessment
State(s): MS
Contact: Acting Director, GED/NHEERL
U. S. Environmental Protection Agency
1 Sabine Island Drive
Gulf Breeze, FL 32561-5299
Phone: (904)934-9382
Fax: (904)943-2403

#L125
Bad River
State(s): SD
Contact: USDA Natural Resources Conservation Service
Pierre, SD

#L126
Badger Creek Watershed Management Area
State(s): CO
Contact: Mr. John Carochi
Bureau of Land Management
Canon City District Office
PO Box 2200
Canon City, CO 81215-2200
Phone: (719)275-0631

#L127
Balcones Canyon
State(s): TX
Contact: Texas Parks & Wildlife Department
Austin, TX

#L128
Bald Mountain Basin Coordinated Resource Management Plan
State(s): CO
Contact: Mr. Ozzie Kerste
Range Conservationist
Bureau of Land Management
Little Snake Resource Area
1280 Industrial Ave.
Craig, CO 81625
Phone: (303)824-4441
Fax: (303)824-8881

#L129
Bar-tailed Godwit/Large Shorebird Aerial Fall Surveys
State(s): AK
Contact: Mr. Brian J. McCaffery
U. S. Fish & Wildlife Service
Yukon Delta National Wildlife Refuge
PO Box 346
Bethel, AK 99559
Phone: (907)543-3151
Fax: (907)543-4413

#L130
Baraboo Hills Bioreserve
State(s): WI
Contact: The Nature Conservancy
Baraboo, WI

#P006
Barataria-Terrebonne National Estuary Program
State(s): LA
Contact: Ms. Barbara Russell
Barataria-Terrebonne National Estuary Program
PO Box 2663
Thibodaux, LA 70310
Phone: (504)447-0868
Fax: (504)447-0870

#L131
Bear River Watershed
State(s): UT, ID
Contact: Ms. Barbara Russell
Bear River RC&D Council
1260 N. 200 East, Suite 4
Logan, UT 84321
Phone: (801)753-3871
Fax: (801)753-4037

#L132
Beartree Challenge
State(s): MT
Contact: USDA Forest Service

#L133
Beeds Lake Water Quality Project
State(s): IA
Contact: Mr. Randall L. Cooney
Franklin SWCD
115 2nd Avenue, N. W.
Hampton, IA 50441
Phone: (515)456-3530
Fax: (515)456-3762

#L134
Big Bend National Park Biosphere Reserve
State(s): TX
Contact: W. Philip Koepp
Chief, Science and Resources Management Division
National Park Service
Big Bend National Park
PO Box 129
Big Bend National Park, TX 79834-0129
Phone: (915)477-2251 ext. 141
Fax: (915)477-2251 ext. 153
E-mail: BIBE_Resource_Management@nps.gov

#L135
Big Spring Basin
State(s): IA
Contact: Dr. George Hallberg
University of Iowa Hygienic Laboratory
102 Oakdale Campus
Iowa City, IA 52242
Phone: (319)335-4500
Fax: (319)335-4535

#L136
Big Woods of Arkansas
State(s): AR
Contact: Ms. Leslee Ditzig Spraggs
Project Manager
The Nature Conservancy
Arkansas Field Office
601 N. University
Little Rock, AR 72205
Phone: (501)663-6699
Fax: (501)663-8332

#L137
Biodiversity Assessment, South-central CO & North-central NM
State(s): CO, NM
Contact: Mr. Larry D. Mullen
USDA Forest Service
Rocky Mountain Region
PO Box 25127
Lakewood, CO 80225
Phone: (303)275-5006
Fax: (303)275-5075
#1.138
Biodiversity Research Consortium--species distribution in 8 States
State(s): OR, WA, CA, PA, MD, WV, VA, DE
Contact: Dr. Larry Masters
Chief Zoologist
The Nature Conservancy
201 Devonshire Street
Boston, MA 02110
Phone: (617)543-2663
Fax: (617)482-5866
E-mail: lmasters@tncc.org

#1.139
Bioregional Planning in California
State(s): CA
Contact: California Department of Forestry
Sacramento, CA

#P007
Bitterroot Ecosystem Management Research Project
State(s): MT
Contact: Dr. Clint Carlson
Team Leader
USDA Forest Service
Forestry Science Laboratory
PO Box 8089
Missoula, MT 59807
Phone: (406)329-3485
Fax: (406)384-7699

#1.140
Black Creek Watershed
State(s): VA
Contact: Virginia Department of Mines, Minerals and Energy
Big Stone Gap, VA

#1.141
Black Hills
State(s): SD, WY
Contact: The Nature Conservancy
Bismarck, ND

#1.142
Black Rock/High Rock Interdistrict Management Area
State(s): NV
Contact: Mr. Bud Cribley
Area Manager
Bureau of Land Management
Sonoma/Gerlach Resource Area
705 East 4th Street
Winnemucca, NV 89445
Phone: (702)623-1500
Fax: (702)623-1503

#1.143
Blackfoot Challenge
State(s): MT
Contact: Mr. George Hirschenberger
Bureau of Land Management
Garnet Resource Area
3255 Fort Missoula Road
Missoula, MT 59801-7293
Phone: (406)329-3908
Fax: (406)549-1562

#1.144
Blacks Mountain Interdisciplinary Research Project
State(s): CA
Contact: USDA Forest Service
Redding, CA

#P008
Block Island Refuge
State(s): RI
Contact: Mr. Chris Littlefield
Bioserve Manager
The Nature Conservancy
Block Island Refuge
PO Box 1287
Block Island, RI 02807
Phone: (401)466-2129

#1.145
Blue Mountains Elk Initiative
State(s): OR, WA
Contact: Blue Mountains Elk Initiative
LaGrande, OR

#P009
Blue Mountains Natural Resources Institute
State(s): OR, WA
Contact: Ms. Lynn Starr
Blue Mountains Natural Resources Institute
1401 Gekeler Lane
LaGrande, OR 97850
Phone: (503)962-6529
Fax: (503)962-6504

#1.146
Blue River Corridor
State(s): IN
Contact: Mr. Allen Pursell
Project Manager
The Nature Conservancy
PO Box 5
Corydon, IN 47112
Phone: (812)738-2087

#1.147
Blufflands Initiative
State(s): MN
Contact: Minnesota Department of Natural Resources
Rochester, MN

#1.148
Boise Cascade Ecosystem Management Demonstration Project - Idaho
State(s): ID
Contact: Mr. Jonathan Haufler
Corporate Contact
Boise Cascade Corporation
PO Box 50
Boise, ID 83728-0001
Phone: (208)384-6013
Fax: (208)384-7699

#1.149
Boise Cascade Ecosystem Management Project - Central Washington
State(s): WA
Contact: Mr. Jonathan Haufler
Corporate Contact
Boise Cascade Corporation
PO Box 50
Boise, ID 83728-0001
Phone: (208)384-6013
Fax: (208)384-7699

#1.150
Boise Cascade Ecosystem Management Project - Minnesota
State(s): MN
Contact: Mr. Jonathan Haufler
Corporate Contact
Boise Cascade Corporation
PO Box 50
Boise, ID 83728-0001
Phone: (208)384-6013
Fax: (208)384-7699

#1.151
Boise River Wildfire Recovery
State(s): ID
Contact: Ms. Lyn Morelan
Ecosystem Implementation Coordinator
USDA Forest Service
1750 Front Street
Boise, ID 83702
Phone: (208)364-4170

#1.152
Bonanza Creek Experimental Forest
State(s): AK
Contact: University of Alaska Fairbanks, AK

#1.153
Book Cliffs Conservation Initiative
State(s): UT, CO
Contact: Mr. Paul Andrews
Book Cliffs Area Manager
170 South East
Vernal, UT 84078
Phone: (801)789-1362
Fax: (801)781-4410

#1.154
Bootstraps
State(s): SD
Contact: USDA Natural Resources Conservation Service
White River, SD

#1.155
Bosque Riparian Restoration
State(s): NM
Contact: Mr. Phill Norton
Refuge Manager
U.S. Fish & Wildlife Service
Bosque del Apache National Wildlife Refuge
PO Box 1246
Socorro, NM 87801
Phone: (505)835-1828
Fax: (505)835-0314
#1.156
Bridger-Teton Forest Plan
State(s): WY
Contact:
USDA Forest Service, WY

#1.157
Broken Kettle Grassland
State(s): IA
Contact: Mr. Jerry Selby
Director of Science and Stewardship
The Nature Conservancy
Iowa Field Office
431 E. Locust, Suite 200
Des Moines, IA 50309
Phone: (515)244-5044
Fax: (515)244-8890
E-mail: IAFD@netins.net

#1.158
Brush Creek EARTH Project
State(s): MO
Contact: Mr. Ron Dent
Fisheries Man. District Supervisor
Missouri Department of Conservation
1014 Thompson Blvd.
Sedalia, MO 65301-2243
Phone: (816)530-5500
Fax: (816)530-5504

#1.159
Buffalo Resource Area Ecosystem Management Planning Prototype
State(s): WY
Contact: Mr. Bruce Daughton
Project Team Leader
Bureau of Land Management
Buffalo Resource Area
189 North Cedar
Buffalo, WY 82834
Phone: (307)684-5586

#1.160
Buffalo River Area of Concern
State(s): NY
Contact: Ms. Ellen Heath
U.S. Environmental Protection Agency
Region II
26 Federal Plaza
New York, NY 10278
Phone: (212)264-5352
Fax: (212)264-2194

#1.161
Buzzards Bay Program
State(s): MA
Contact: Mr. Joseph E. Costa
Buzzards Bay Project
2 Spring Street
Marion, MA 02738
Phone: (508)748-3600
Fax: (508)748-3962

#1.162
COVERTS
State(s): VT, CT

#0.011
Cache River Wetlands
State(s): IL
Contact: Mr. John Penberthy
Project Manager
The Nature Conservancy
Cache River Office
Route 1, Box 53E
Ullin, IL 62992
Phone: (618)634-2524
Fax: (618)634-9656
E-mail: cachebio@aol.com

#1.163
Cahaba River Basin Project
State(s): AL
Contact: Ms. Mary Kay Lynch
U.S. Environmental Protection Agency
Region IV
345 Courtland Street, NE
Atlanta, GA 30365
Phone: (404)347-3555 ext. 6607

#1.164
Calcasieu-Sabine Cooperative River Basin Study
State(s): LA
Contact: Mr. Donald W. Gohmert
State Conservationist
USDA Natural Resources Conservation Service
3737 Government St.
Alexandria, LA 71302-3727
Phone: (318)473-7751
Fax: (318)473-7682

#1.165
California Desert Ecosystem Management Plan
State(s): CA
Contact:
Bureau of Land Management, CA

#1.166
California Gnatcatcher - Coastal Sage Scrub
NCCP - NBS Research
State(s): CA
Contact: Mr. Stephen Veirs
Unit Leader
National Biological Service
University of California
CPSU-DES
Davis, CA 95616-8576
Phone: (916)757-7119
Fax: (916)752-3350
E-mail: SDVEIRS@UCDAVIS.EDU

#1.167
California Watershed Projects Inventory
State(s): CA
Contact: University of California-Davis
Davis, CA

#1.168
Canaan Valley
State(s): WV
Contact: Mr. John Forren
U.S. Environmental Protection Agency
Region III (J3S42)
Philadelphia, PA 19107
Phone: (215)597-3361
Fax: (215)597-7906

#1.169
Canadian River Commission
State(s): OK, TX, NM
Contact: Mr. Leland D. Tillman
Chairman and U.S. Commissioner
Canadian River Commission
Eastern Plains Council of Governments
104 West 2nd
Clovis, NM 88101
Phone: (505)762-7714
Fax: (505)762-7715

#1.170
Cannon River Watershed Partnership
State(s): MN
Contact: Ms. Allene Moesler
Executive Director
Cannon River Watershed Partnership
PO Box 501
Faribault, MN 55021
Phone: (507)332-0488
Fax: (507)332-0513
#1 L171
Cannon Valley Big Woods Ecosystem Conservation Initiative
State(s): MN
Contact: Ms. Nancy Falkum
SE Area Coordinator
The Nature Conservancy
Cannon Valley Office
328 Central Avenue
Fairbault, MN 55021
Phone: (507)332-0525
Fax: (507)334-4448

#1 L176
Cedar Creek Natural History Area Long-Term Ecological Research Site
State(s): MN
Contact: Dr. Johannes Knops
Site Research Director
University of Minnesota
Department of Ecology, Evolution and Behavior
100 Ecology Building
1987 Upper Buford Circle
St. Paul, MN 55108-6097
Phone: (612)625-5700
Fax: (612)624-6777
E-mail: KNOPS@LTER.UMN.EDU

#1 L172
Cape Cod, Martha’s Vineyard, Nantucket
State(s): MA
Contact: The Nature Conservancy
Boston, MA

#1 L173
Carson National Forest Planning Project
State(s): NM
Contact: USDA Forest Service
Taos, NM

#1 L174
Cascade Center for Ecosystem Management
State(s): OR
Contact: Mr. Fred Swanson
Research Geologist
Forestry Sciences Lab
3200 Jefferson Way
Corvallis, OR 97331
Phone: (503)750-7355
Fax: (503)750-7329
E-mail: swanson@fsl.orst.edu

#1 L175
Casco Bay Estuary Project
State(s): ME
Contact: Ms. Patricia Harrington
Casco Bay Estuary Project
312 Canco Road
Portland, ME 04103
Phone: (207)828-1043
Fax: (207)828-4001

#1 L177
Cedar Creek Watershed Habitat Restoration
State(s): IA
Contact: T. Sue Snyder
Iowa Department of Natural Resources
12 & Washington
Ag Bldg.
Centerville, IA 52544
Phone: (515)856-3893
Fax: (515)586-6048

#1 L178
Centerville City Reservoir Water Quality Protection Project
State(s): IA
Contact: T. Sue Snyder
Iowa Department of Natural Resources
12 & Washington
Ag Bldg.
Centerville, IA 52544
Phone: (515)856-3893
Fax: (515)586-6048

#1 L179
Central Cascades Adaptive Management Area
State(s): OR
Contact:

#1 L180
Central Florida Native Grassland Management Project
State(s): FL
Contact: Mr. John Walewski
U.S. Air Force
AF/ECVP
1260 Air Force Pentagon
Washington, DC 20330-1260

#1 L181
Central Gulf Ecosystem
State(s): AL, MS
Contact: Mr. Bob Strader
U.S. Fish & Wildlife Service
6578 Dogwood View Parkway, Suite B
Jackson, MS 39213
Phone: (601)965-4903
Fax: (601)965-4010

#1 L182
Central Plains Experimental Range
State(s): CO
Contact: Mr. Gary Frasier
USDA - Agricultural Research Service
Rangeland Resources Research Unit
1701 Center Avenue
Fort Collins, CO 80526
Phone: (970)498-4230
Fax: (970)482-2999

#1 L183
Chalk Creek Coordinated Resource Management Plan
State(s): UT
Contact: Mr. Roy Gunnell
Utah Department of Environmental Quality
Division of Water Quality
PO Box 144870
Salt Lake City, UT 84114-4870
Phone: (801)538-6146
Fax: (801)538-6016

#1 L184
Channel Islands Biosphere Reserve
State(s): CA
Contact: National Park Service
Santa Barbara, CA

#1 L185
Charleston Harbor Project
State(s): SC
Contact: Ms. Shirley D. Conner
Environmental Planner
Charleston Harbor Project
Ocean and Coastal Resource Management
4130 Faber Place, Suite 302
Charleston, SC 29405
Phone: (803)747-4323
Fax: (803)747-8234

#1 L186
Chehalis River Basin
State(s): WA
Contact: Mr. Dave Palmer
Chairman
Chehalis River Council
PO Box 586
Ockoville, WA 98568
Phone: (206)273-8117

#1 L187
Cheney Lake - N. F. Ninnescah Watershed Water Quality Project
State(s): KS
Contact: Mr. Lyle D. Frees
USDA Natural Resources Conservation Service
314 North Poplar
South Hutchinson, KS 67505-1297
Phone: (316)665-0231
Fax: (316)669-5496
Ecosystem Management in the United States: An Assessment of Current Experience

#P016
Chequamegon National Forest Landscape Analysis and Design
State(s): WI
Contact: Ms. Linda Parker
Ecologist
USDA Forest Service
Chequamegon National Forest
1170 4th Avenue
Park Falls, WI 54552
Phone: (715)762-5169

#L188
Cherry Creek Landscape Analysis
State(s): CO
Contact: Mr. Phil Kemp
USDA Forest Service
San Juan National Forest
Delores Ranger District
PO Box 210
Delores, CO 81323
Phone: (970)882-7296
Fax: (970)882-7582

#L189
Cherry Creek Watershed Coop, Management Plan & Water Quality Special Project
State(s): MT
Contact:
Prairie County Conservation District
410 E. Spring
PO Box 622
Terry, MT 59349
Phone: (406)637-5381

#P017
Chesapeake Bay Program
State(s): MD, PA, DC, DE, NY, WV
Contact:
Maryland Department of Natural Resources
Annapolis, MD

#L190
Chesapeake Bay/Mid-Atlantic Highlands/Mid-Atlantic Landscape Assessment
State(s): NY, NJ, PA, WV, MD, VA, NC, DE
Contact: Mr. K. Bruce Jones
U.S. Environmental Protection Agency
EMSL-LV/MSD
PO Box 93478
Las Vegas, NV 89193-3478
Phone: (702)798-2671
Fax: (702)798-2208
E-mail: mskbj@vegas1.las.epa.gov

#L191
Chesapeake Rivers
State(s): MD
Contact:
The Nature Conservancy
Chevy Chase, MD

#P018
Cheyenne Bottoms Wildlife Area
State(s): KS
Contact: Mr. Karl Grover
Area Manager
Kansas Department of Wildlife and Parks
Cheyenne Bottoms Wildlife Area
Rt. 3
Great Bend, KS 67530
Phone: (316)793-3066

#P019
Chicago Region Biodiversity Council
State(s): IL
Contact: Ms. Laurel M. Ross
Bioreserve Program Director
The Nature Conservancy
Illinois Field Office
8 S. Michigan Ave., Suite 900
Chicago, IL 60603
Phone: (312)346-8166 ext. 14
Fax: (312)346-5506
E-mail: lross@mcs.com

#L192
Chiquitilla Watershed
State(s): NM
Contact: Mr. Brett O'Haver
Bureau of Land Management
Cuba Field Station
435 Montano Road, NE
Albuquerque, NM 87107
Phone: (505)289-3748
Fax: (505)761-8911

#L193
Clallam River Landscape Plan
State(s): WA
Contact: Mr. Mark Johnsen
Ozette District Manager
Washington Department of Natural Resources
Olympia Region
411 Tillicum Lane
Forks, WA 98331
Phone: (360)374-6131
Fax: (360)374-5202

#L194
Clear Creek Watershed Forum
State(s): CO
Contact: Mr. Carl Norbeck
Clear Creek Watershed Coordinator
Colorado Water Quality Control Division
4200 Cherry Creek Drive South
Denver, CO 80222-1530
Phone: (303)692-3513
Fax: (303)782-0390

#L621
Clear Lake Enhancement & Restoration (C.L.E.A.R.) Water Quality Project
State(s): IA
Contact: Mr. Ric Zarwell
Project Coordinator
Iowa Department of Natural Resources
1415 South Monroe, Suite E
Mason City, IA 50401-5615

#P020
Clinch Valley Bioreserve
State(s): VA, TN
Contact: Mr. Bill Kittrell
The Nature Conservancy
102 South Court Street
Abingdon, VA 24210
Phone: (540)676-2209
Fax: (540)676-3819

#L195
Clinton River Area of Concern
State(s): MI
Contact: Ms. Callie Bolattino
U.S. Environmental Protection Agency
Region V (GLNPO)
77 W. Jackson Boulevard
Chicago, IL 60604-3507
Phone: (312)353-3490
Fax: (312)353-2018

#L196
Closing the Gap in Florida's Wildlife Habitat Conservation System
State(s): FL
Contact:
Florida Game and Fresh Water Fish Commission
Tallahassee, FL

#L197
Coastal Barrier Island Ecosystem Effort
State(s): FL
Contact: Mr. John Walewski
U.S. Air Force
AF/ECVP
1260 Air Force Pentagon
Washington, DC 20330-1260

#L198
Coastal Plain Ponds
State(s): MA, NJ, DE, MD, RI
Contact: Mr. Tim Simmons
Director of Science and Stewardship
The Nature Conservancy
79 Milk Street
Boston, MA 02109
Phone: (617)423-2545
Fax: (617)423-8690

#L199
Coles Levee/Arco Ecological Preserve
State(s): CA
Contact:
California Department of Water Resources
Fresno, CA

#L200
Colorado Front Range Ecosystem Management Research & Demonstration Project
State(s): CO
Contact: Mr. Carl Edminster
Rocky Mountain Station
240 W. Prospect
Ft. Collins, CO 80526
Phone: (303)498-1264

#L201
Colorado Plateau Ecosystem Partnership Project
State(s): CO, UT, AZ, NM
Contact: Mr. Doug Johnson
U.S. Environmental Protection Agency
Region VIII (SWM-SI)
999 18th Street
Denver, CO 80202
Phone: (303)293-1469
Fax: (303)293-1647
<table>
<thead>
<tr>
<th>#L202</th>
<th>Colorado River Basin Salinity Control Program</th>
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<tbody>
<tr>
<td>State(s): CO, UT, AZ, WY, NV, CA, NM</td>
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<tr>
<td>Contact: Mr. Jack Barnett</td>
<td></td>
</tr>
<tr>
<td>Colorado River Basin Salinity Control Forum</td>
<td></td>
</tr>
<tr>
<td>106 W. 500 South, Suite 101</td>
<td></td>
</tr>
<tr>
<td>Bountiful, UT 84010</td>
<td></td>
</tr>
<tr>
<td>Phone: (801)292-4663</td>
<td></td>
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<tr>
<td>Fax: (801)524-6320</td>
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<th>#L203</th>
<th>Colorado River Endangered Fish Recovery Program</th>
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<tr>
<td>State(s): CO</td>
<td></td>
</tr>
<tr>
<td>Contact: Mr. John Hamill</td>
<td></td>
</tr>
<tr>
<td>PO Box 25486</td>
<td></td>
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<tr>
<td>Denver Federal Center</td>
<td></td>
</tr>
<tr>
<td>Denver, CO 80225</td>
<td></td>
</tr>
<tr>
<td>Phone: (303)236-8154</td>
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<tr>
<th>#L204</th>
<th>Colorado Rockies Regional Cooperative</th>
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<tr>
<td>State(s): CO</td>
<td></td>
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<tr>
<td>Contact: Mr. Howard Alden</td>
<td></td>
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<tr>
<td>Partnership Coordinator</td>
<td></td>
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<tr>
<td>800 E. Co. Rd. 58</td>
<td></td>
</tr>
<tr>
<td>Ft. Collins, CO 80524</td>
<td></td>
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<tr>
<td>Phone: (303)482-0983</td>
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<th>#P021</th>
<th>Colorado State Forest Ecosystem Planning Project</th>
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<td>State(s): CO</td>
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<tr>
<td>Contact: Mr. Jeff Jones</td>
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<tr>
<td>Special Program Coordinator</td>
<td></td>
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<tr>
<td>Colorado State Forest Service</td>
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<tr>
<td>203 Forestry Building</td>
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<tr>
<td>Colorado State University</td>
<td></td>
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<tr>
<td>Ft. Collins, CO 80523</td>
<td></td>
</tr>
<tr>
<td>Phone: (303)491-7287</td>
<td></td>
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<tr>
<td>Fax: (303)491-7736</td>
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<th>#L205</th>
<th>Columbia River Gorge National Scenic Area</th>
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<tbody>
<tr>
<td>State(s): OR, WA</td>
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<tr>
<td>Contact: Mr. Allen Bell</td>
<td></td>
</tr>
<tr>
<td>Columbia River Gorge Commission</td>
<td></td>
</tr>
<tr>
<td>PO Box 730</td>
<td></td>
</tr>
<tr>
<td>White Salmon, WA 98672</td>
<td></td>
</tr>
<tr>
<td>Phone: (509)493-3323</td>
<td></td>
</tr>
<tr>
<td>Fax: (509)493-2229</td>
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<tr>
<th>#L206</th>
<th>Comprehensive Plan for Maryland’s Wildlife Management Areas</th>
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<tbody>
<tr>
<td>State(s): MD</td>
<td></td>
</tr>
<tr>
<td>Contact: Mr. Jim Mullan</td>
<td></td>
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<tr>
<td>Chief of Land Management</td>
<td></td>
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<tr>
<td>Maryland Department of Natural Resources</td>
<td></td>
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<tr>
<td>Wildlife Division</td>
<td></td>
</tr>
<tr>
<td>3 Pershing Street, Rm. 110</td>
<td></td>
</tr>
<tr>
<td>Cumberland, MD 21502</td>
<td></td>
</tr>
<tr>
<td>Phone: (301)777-2136</td>
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<tr>
<th>#L207</th>
<th>Conasauga River</th>
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<tbody>
<tr>
<td>State(s): GA, TN</td>
<td></td>
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<tr>
<td>Contact: Mr. Gregory Huber</td>
<td></td>
</tr>
<tr>
<td>USDA Natural Resources Conservation Service</td>
<td></td>
</tr>
<tr>
<td>1401 Dean Street, Suite I</td>
<td></td>
</tr>
<tr>
<td>Rome, GA 30161</td>
<td></td>
</tr>
<tr>
<td>Phone: (706)291-5652</td>
<td></td>
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<tr>
<td>Fax: (706)291-5658</td>
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<tr>
<th>#L208</th>
<th>Concord Pine Barrens</th>
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<tbody>
<tr>
<td>State(s): NH</td>
<td></td>
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<tr>
<td>Contact: Mr. David Van Luven</td>
<td></td>
</tr>
<tr>
<td>Concord Pine Barrens Ecologist</td>
<td></td>
</tr>
<tr>
<td>The Nature Conservancy</td>
<td></td>
</tr>
<tr>
<td>2 1/2 Beacon Street, Ste #6</td>
<td></td>
</tr>
<tr>
<td>Concord, NH 03301</td>
<td></td>
</tr>
<tr>
<td>Phone: (603)224-5853</td>
<td></td>
</tr>
<tr>
<td>Fax: (603)228-2459</td>
<td></td>
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<tr>
<th>#P022</th>
<th>Congaree River Corridor Water Quality Planning Assessment</th>
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<tbody>
<tr>
<td>State(s): SC</td>
<td></td>
</tr>
<tr>
<td>Contact: Mr. Richard A. Clark</td>
<td></td>
</tr>
<tr>
<td>Resource Management Specialist</td>
<td></td>
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<tr>
<td>National Park Service</td>
<td></td>
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<tr>
<td>Congaree Swamp National Monument</td>
<td></td>
</tr>
<tr>
<td>200 Caroline Sims Road</td>
<td></td>
</tr>
<tr>
<td>Hopkins, SC 29061</td>
<td></td>
</tr>
<tr>
<td>Phone: (803)776-4396 ext. 307</td>
<td></td>
</tr>
<tr>
<td>Fax: (803)783-4241</td>
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<tr>
<th>#L209</th>
<th>Connecticut River Corridor</th>
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<tbody>
<tr>
<td>State(s): MA</td>
<td></td>
</tr>
<tr>
<td>Contact: Mr. Terry Blunt</td>
<td></td>
</tr>
<tr>
<td>Director</td>
<td></td>
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<tr>
<td>Connecticut Department of Environmental Management</td>
<td></td>
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<tr>
<td>Connecticut Valley Action Program</td>
<td></td>
</tr>
<tr>
<td>136 Damon Rd.</td>
<td></td>
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<tr>
<td>Northampton, MA 01060</td>
<td></td>
</tr>
<tr>
<td>Phone: (413)586-8706</td>
<td></td>
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<tr>
<td>Fax: (413)784-1663</td>
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<tr>
<th>#L210</th>
<th>Conservation 2000 - Ecosystem-Based Management</th>
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<tbody>
<tr>
<td>State(s): IL</td>
<td></td>
</tr>
<tr>
<td>Contact: Mr. Carl Becker</td>
<td></td>
</tr>
<tr>
<td>Illinois Division of Natural Heritage</td>
<td></td>
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<tr>
<td>524 South Second Street</td>
<td></td>
</tr>
<tr>
<td>Springfield, IL 62701-1787</td>
<td></td>
</tr>
<tr>
<td>Phone: (217)785-8774</td>
<td></td>
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<tr>
<td>Fax: (217)785-8277</td>
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<tr>
<th>#L211</th>
<th>Conservation Agreement for Bonneville Cutthroat Trout</th>
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<tbody>
<tr>
<td>State(s): ID</td>
<td></td>
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<tr>
<td>Contact: Mr. Mark Booth</td>
<td></td>
</tr>
<tr>
<td>Supervisory Rangeland Management Specialist</td>
<td></td>
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<tr>
<td>USDA Forest Service</td>
<td></td>
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<tr>
<td>431 Clay St.</td>
<td></td>
</tr>
<tr>
<td>Montpelier, ID 83254</td>
<td></td>
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<tr>
<td>Phone: (208)847-0375</td>
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<tr>
<th>#L212</th>
<th>Conserving Biodiversity in Pennsylvania</th>
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<tbody>
<tr>
<td>State(s): PA</td>
<td></td>
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<tr>
<td>Contact: Dr. Kim Steiner</td>
<td></td>
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<tr>
<td>Pennsylvania State University</td>
<td></td>
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<tr>
<td>School of Forest Resources</td>
<td></td>
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<tr>
<td>213 Ferguson Building</td>
<td></td>
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<tr>
<td>University Park, PA 16802-4300</td>
<td></td>
</tr>
<tr>
<td>Phone: (814)865-3951</td>
<td></td>
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<tr>
<td>Fax: (814)865-3725</td>
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<tr>
<th>#L213</th>
<th>Consumnes River Watershed</th>
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<tbody>
<tr>
<td>State(s): CA</td>
<td></td>
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<tr>
<td>Contact: Mr. Rich Reiner</td>
<td></td>
</tr>
<tr>
<td>13501 Franklin Blvd.</td>
<td></td>
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<tr>
<td>Galt, CA 95632</td>
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<tr>
<th>#L214</th>
<th>Contaminants Monitoring in Salvaged Waterfowl Carcasses</th>
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<tbody>
<tr>
<td>State(s): AK</td>
<td></td>
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<tr>
<td>Contact: Kim Trust</td>
<td></td>
</tr>
<tr>
<td>Ecological Services Anchorage</td>
<td></td>
</tr>
<tr>
<td>605 W. Fourth Avenue, Rm. G-62</td>
<td></td>
</tr>
<tr>
<td>Anchorage, AK 99501</td>
<td></td>
</tr>
<tr>
<td>Phone: (907)271-2888</td>
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<tr>
<th>#L215</th>
<th>Cooper Landing</th>
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<tbody>
<tr>
<td>State(s): AK</td>
<td></td>
</tr>
<tr>
<td>Contact: Mr. Duane Harp</td>
<td></td>
</tr>
<tr>
<td>District Ranger</td>
<td></td>
</tr>
<tr>
<td>USDA Forest Service</td>
<td></td>
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<tr>
<td>Chugach National Forest</td>
<td></td>
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<tr>
<td>Seward Ranger District</td>
<td></td>
</tr>
<tr>
<td>PO Box 390, 334 Fourth Avenue</td>
<td></td>
</tr>
<tr>
<td>Seward, AK 99664</td>
<td></td>
</tr>
<tr>
<td>Phone: (907)224-3374</td>
<td></td>
</tr>
<tr>
<td>Fax: (907)224-3268</td>
<td></td>
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<tr>
<td>E-mail: USFS: R10F04D03A</td>
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<tr>
<th>#L216</th>
<th>Coordinated Resource Management and Planning Council</th>
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<tbody>
<tr>
<td>State(s): CA</td>
<td></td>
</tr>
<tr>
<td>Contact: Ms. Lisa Taricco</td>
<td></td>
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<tr>
<td>CRMP Council Coordinator</td>
<td></td>
</tr>
<tr>
<td>CARCD</td>
<td></td>
</tr>
<tr>
<td>801 K Street, Suite 318</td>
<td></td>
</tr>
<tr>
<td>Sacramento, CA 95814</td>
<td></td>
</tr>
<tr>
<td>Phone: (916)447-7237</td>
<td></td>
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<tr>
<td>Fax: (916)447-2532</td>
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<tr>
<th>#L217</th>
<th>Coos Bay/Coquille River Basins</th>
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<tr>
<td>State(s): OR</td>
<td></td>
</tr>
<tr>
<td>Contact: Mr. Mike Ryker</td>
<td></td>
</tr>
<tr>
<td>U.S. Environmental Protection Agency</td>
<td></td>
</tr>
<tr>
<td>1200 Sixth Avenue</td>
<td></td>
</tr>
<tr>
<td>Seattle, WA 98101</td>
<td></td>
</tr>
<tr>
<td>Phone: (206)553-4014</td>
<td></td>
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<tr>
<td>Fax: (206)553-1775</td>
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</tbody>
</table>
Ecosystem Management in the United States: An Assessment of Current Experience

#P023
Corpus Christi Bay National Estuary Program
State(s): TX
Contact: Dr. Hudson DeYou
Corpus Christi Bay National Estuary Program
Texas AMU - Corpus Christi Campus
Campus Box 290
6300 Ocean Blvd.
Corpus Christi, TX 78412
Phone: (512)885-6767 ext. 6301
E-mail: Deyou@tamu.edu

#L218
Coos Bay National Estuary Program
State(s): OR
Contact: Mr. Randy Roberson
Resource Management Specialist
Oregon State Parks
One Capitol Mall
Salem, OR 97301
Phone: (503)682-6938
Fax: (503)682-1364

#L219
Coweta Hydrologic Laboratory
State(s): NC
Contact:
Coweta Hydrologic Laboratory
Otto, NC

#L220
DNR Regional Planning: Region V Prototype
State(s): MN
Contact:
Minnesota Department of Natural Resources
Rochester, MN

#L221
Deadwood Landscape Analysis
State(s): ID
Contact:
USDA Forest Service
McCall, ID

#L222
Deadwood Landscape Analysis
State(s): ID
Contact:
USDA Forest Service
McCall, ID

#L223
Deadwood Landscape Analysis
State(s): ID
Contact:
USDA Forest Service
McCall, ID

#L224
Delaware Inland Bays Estuary Program
State(s): DE
Contact: Mr. John Schneider
Delaware Inland Bays Estuary Program
Delaware Department of Natural Resources and Environmental Control
PO Box 1401, 89 Kings Highway
Dover, DE 19903
Phone: (302)739-4590
Fax: (302)739-6140

#L225
Delaware River/Delmarva Coastal Watershed
State(s): NJ
Contact:
U.S. Fish & Wildlife Service
Cape May Court House, NJ

#L226
Delineations of Landtype Associations
State(s): WY
Contact:
Mr. Bill Daniels
Bureau of Land Management
PO Box 1828
Cheyenne, WY 82003
Phone: (307)775-6105
Fax: (307)775-6082

#L227
Delta Levee Protection Program
State(s): CA
Contact:
California Department of Water Resources
Sacramento, CA

#L228
Denali National Park and Preserve
State(s): AK
Contact: Mr. Gordon Olson
National Park Service
Denali National Park and Preserve
PO Box 9
Denali Park, AK 99755
Phone: (907)683-2294
Fax: (907)683-2270

#L229
Desert Experimental Range
State(s): UT
Contact: Mr. Stanley G. Kitchen
Manager - Desert Experimental Range
USDA Forest Service
Shrub Sciences Laboratory
735 North 500 East
Provo, UT 84606
Phone: (801)377-5717

#L230
Desert Tortoise Technique Comparison Study
State(s): CA
Contact:
U.S. Air Force
Washington, DC

#L231
Disturbance of Eastern Forest Ecosystems by Stressor/Host/Pathogen Interactions
State(s): CT
Contact: Dr. Philip Wargo
USDA Forest Service
Northeastern Center for Forest Health Research
51 Mill Pond Road
Hamden, CT 06514
Phone: (203)230-4312
Fax: (203)230-4315
Email: FSWA/SAP.WARGO@OSU.MHS.ATTMAIL.COM

#L232
Door Peninsula Conservation Initiative
State(s): WI
Contact:
Mr. Mike Grimm
The Nature Conservancy
Door Peninsula Conservation Initiative
653 County U
Algoma, WI 54201
Phone: (414)743-8695
Fax: (414)743-8695

#L233
Dos Palmas Oasis
State(s): CA
Contact: Mr. Cameron Barrows
Southern California Area Manager
The Nature Conservancy
PO Box 188
 thousand Palms, CA 92276
Phone: (619)343-1234
Fax: (619)343-0393

#L234
Dos Palmas Oasis
State(s): CA
Contact: Mr. Cameron Barrows
Southern California Area Manager
The Nature Conservancy
PO Box 188
 thousand Palms, CA 92276
Phone: (619)343-1234
Fax: (619)343-0393

#L235
Dry Creek Basin Coordinated Resource Management Plan
State(s): CO
Contact: Mr. Clyde B. Johnson
Range Conservationist
Bureau of Land Management
PO Box 928
Meeker, CO 81641
Phone: (303)878-3601
Fax: (303)878-5717

#L236
Dry Creek Basin Coordinated Resource Management Plan
State(s): CO
Contact: Mr. Clyde B. Johnson
Range Conservationist
Bureau of Land Management
PO Box 928
Meeker, CO 81641
Phone: (303)878-3601
Fax: (303)878-5717

#L237
Dry Creek Basin Coordinated Resource Management Plan
State(s): CO
Contact: Mr. Clyde B. Johnson
Range Conservationist
Bureau of Land Management
PO Box 928
Meeker, CO 81641
Phone: (303)878-3601
Fax: (303)878-5717

#L238
Dry Creek Basin Coordinated Resource Management Plan
State(s): CO
Contact: Mr. Clyde B. Johnson
Range Conservationist
Bureau of Land Management
PO Box 928
Meeker, CO 81641
Phone: (303)878-3601
Fax: (303)878-5717
#1.236
Eagle River Multi-Objective Management Plan  
**State(s):** CO  
**Contact:** Ms. Kay Salazar  
National Park Service  
RMR-PPO  
PO Box 25287  
Denver, CO 80225  
Phone: (303)969-2857  
Fax: (303)987-6676

#1.237
East Clear Creek  
**State(s):** AZ  
**Contact:**  
USDA Forest Service  
Happy Jack, AZ

#1.238
East Lassen Management Plan  
**State(s):** CA, NV  
**Contact:** Mr. Francis Berg  
Bureau of Land Management  
355 Hemsted Dr.  
Redding, CA 96002  
Phone: (916)224-2100  
Fax: (916)224-2172

#1.239
East Maui Watershed Partnership  
**State(s):** HI  
**Contact:** Mr. Mark White  
Maui Project Director  
The Nature Conservancy of Hawaii  
PO Box 1716  
Maunaloa, HI 96768  
Phone: (808)572-7849  
Fax: (808)572-5950

#1.240
Eastern Lake Ontario Conservation Initiative  
**State(s):** NY  
**Contact:** Ms. Sandra Bonanno  
Stewardship Ecologist  
The Nature Conservancy  
Central and Western New York Office  
315 Alexander Street - 2nd Floor  
Rochester, NY 14604  
Phone: (716)546-8030  
Fax: (716)546-7825

#1.241
Eastern Nebraska Saline Wetlands  
**State(s):** NE  
**Contact:** Mr. Thomas J. Taylor  
U.S. Environmental Protection Agency  
Region VII  
Wetlands Protection Section  
726 Minnesota Ave.  
Kansas City, KS 66101  
Phone: (913)551-7226  
Fax: (913)551-7863

#1.242
Ecological Classification & Inventory Demonstration Area  
**State(s):** MN  
**Contact:** Mr. John Almdendinger  
ECS Coordinator  
USDA Forest Service  
PO Box 308  
Deer River, MN 56536  
Phone: (218)246-2123

#1.243
Ecology and Management of Allegheny Hardwood Forests  
**State(s):** PA  
**Contact:** Dr. Susan Stout  
USDA Forest Service  
PO Box 928  
Warren, PA 16365  
Phone: (814)563-1040

#1.244
Ecology and Management of Northern Conifer and Associated Ecosystems  
**State(s):** ME  
**Contact:** Dr. John C. Brissette  
USDA Forest Service  
Northeastern Forest Experiment Station  
5 Godfrey Drive  
Orono, ME 04473  
Phone: (207)866-7260  
Fax: (207)866-7262

#1.245
Ecology and Management of Northern Hardwoods  
**State(s):** NH  
**Contact:** Dr. Marie-Louise Smith  
USDA Forest Service  
PO Box 640  
Durham, NH 03824  
Phone: (603)868-7652  
Fax: (603)868-7604  
E-mail: ceagar@asr.arusda.gov

#1.246
Ecology and Management of Timber and Water Resources in the Central Appalachians  
**State(s):** WV  
**Contact:** Dr. Mary Beth Adams  
USDA Forest Service  
PO 404 - Nursery Bottom  
Parsons, WV 26287  
Phone: (304)478-2000

#1.247
Ecoregions of North and South Dakota  
**State(s):** ND  
**Contact:** Mr. James M. Omernik  
Research Geographer  
U.S. Environmental Protection Agency  
Environmental Research Lab - Corvallis  
200 SW 35th St.  
Corvallis, OR 97333  
Phone: (503)754-4458  
Fax: (503)754-4716

#1.248
Ecosystem Dynamics in Mature and Harvested Forests of New England  
**State(s):** NH  
**Contact:** Dr. Chris Eagar  
USDA Forest Service  
PO Box 640  
Durham, NH 03824  
Phone: (603)868-7636  
Fax: (603)868-7604  
E-mail: ceagar@asr.arusda.gov

#1.249
Ecosystem Management Initiative  
**State(s):** FL  
**Contact:** Ms. Pamela P. McVety  
Executive Coordinator For Ecosystem Management  
Florida Department of Environmental Protection  
3900 Commonwealth Blvd.  
Mail Station 45  
Tallahassee, FL 32399-3000  
Phone: (904)488-7454  
Fax: (904)488-7093

#1.250
Ecosystem Plan for the Caribbean Watershed  
**State(s):** PR, VI  
**Contact:** Mr. James Oland  
Field Supervisor  
U.S. Fish & Wildlife Service  
Caribbean Field Office  
PO Box 491  
Boqueron, PR 00622  
Phone: (809)851-7297  
Fax: (809)851-7440
#L252
Effects of PAH on Colorado Squawfish
State(s): NM
Contact: Ms. Stephanie Odell
Bureau of Land Management
Farmington District
1235 La Plata Highway
Farmington, NM 87401
Phone: (505)899-6314
Fax: (505)599-8998
E-mail: sodell@nm0151wp.fdo.nm.blm.gov

#L253
Eighthene mile Creek Area of Concern
State(s): NY
Contact: Ms. Alice Yeh
U. S. Environmental Protection Agency Region II
26 Federal Plaza
New York, NY 10278
Phone: (212)264-1865
Fax: (212)264-2194

#L254
Elebe Hills
State(s): WA
Contact: 
Washington Department of Natural Resources
Enumclaw, WA

#L255
Elevenmile Ecosystem Management Project
State(s): CO
Contact: Ms. Sharon Kyhl
Project Manager
USDA Forest Service
Pike/San Isabel National Forest
South Park Ranger District
Box 219
Fairplay, CO 80440
Phone: (719)836-2031

#L256
Elekhor Slough
State(s): CA
Contact: Ms. Suzanne Marr
U. S. Environmental Protection Agency
Region IX (W-3-1)
75 Hawthorne Street
San Francisco, CA 94105-3901
Phone: (415)744-1974
Fax: (415)744-1078

#L257
Elekhons Mountains Cooperative Management Area
State(s): MT
Contact: Mr. Merle Good
Area Manager
Headwaters Resource Area, MT
Phone: (406)494-5059

#L258
Elm Creek Watershed Section 319 Nonpoint Source Project
State(s): NE
Contact: Mr. Dave Jensen
Nebraska Department of Environmental Quality
Suite 400, The Atrium
PO Box 98922
Lincoln, NE 68509-8922
Phone: (402)471-3196
Fax: (402)471-2909

#L259
Eloehuman
State(s): WA
Contact:
Washington Department of Natural Resources
Olympia, WA

#L260
Ely Creek Watershed
State(s): VA
Contact:
Virginia Department of Mines, Minerals and Energy
Big Stone Gap, VA

#L261
Escalante/Kanab Resource Management Plan
State(s): UT
Contact: Mr. Pete Wilkins
Bureau of Land Management
Cedar City District
176 East D. L. Sargent Dr.
Cedar City, UT 84720
Phone: (801)865-3034
Fax: (801)865-3058

#L262
Farm of the Future
State(s): MO
Contact: Mr. David Quarles
Greeneley Resource Center
Route 1
Novelty, MO 63460
Phone: (816)739-4410

#L263
Fish Creek Restoration Project
State(s): NV
Contact: Mr. Wayne King
Manager
Bureau of Land Management
Shoshone-Eureka Resource Area
Battle Mountain District
PO Box 1420, 50 Bastian Road
Battle Mountain, NV 89820
Phone: (702)635-4000
Fax: (702)635-4034

#L264
Fish Slough
State(s): CA
Contact: Ms. Joy Fatooh
Wildlife Biologist
Bureau of Land Management
Bishop Resource Area
785 North Main Street, Suite E
Bishop, CA 93514
Phone: (619)872-4881
Fax: (619)872-2894

#L265
Fishing Creek
State(s): PA
Contact: 
North Central Pennsylvania Conservancy

#L266
Flathead County Master Plan
State(s): MT
Contact:
Flathead County Planning Department, MT

#L267
Flint Creek
State(s): AL
Contact: Mr. Charles Sweatt
U. S. Environmental Protection Agency Region IV
345 Courtland Street, NE
Atlanta, GA 30365
Phone: (205)386-2614
Fax: (205)386-3331

#L268
Florida Bay Ecosystem Management Area
State(s): FL
Contact:
Florida Department of Environmental Protection
Tallahassee, FL

#L269
Florida Keys National Marine Sanctuary
State(s): FL
Contact: Mr. Fred McManus
U. S. Environmental Protection Agency Region IV
345 Courtland Street, NE
Atlanta, GA 30365
Phone: (404)347-1740 ext. 4299
Fax: (404)347-1797
| #L269 | Florida Keys Project  
State(s): FL  
Contact: Mr. Mark Robertson  
The Nature Conservancy  
Florida Keys Field Office  
201 Front Street, Suite 222  
Key West, FL 33040  
Phone: (305)296-3880  
Fax: (305)292-1763 |
| #L270 | Forest Bird Diversity Initiative  
State(s): MN  
Contact: Mr. Lee A. Pfannmiller  
Section of Ecological Services  
Box 25, DNR Building  
50 Lafayette Road  
St. Paul, MN 55155-4025  
Phone: (612)296-0783  
Fax: (612)296-1811 |
| #L271 | Forest Ecosystem Management Plan  
State(s): MD  
Contact: U.S. Air Force  
Washington, DC |
| #L272 | Forest Insect Biology and Biocontrol  
State(s): CT  
Contact: Dr. Michael Montgomery  
USDA Forest Service  
Northeastern Center for Forest Health Research  
51 Mill Pond Road  
Hamden, CT 06514  
Phone: (203)230-4331  
Fax: (203)230-4315  
E-mail: FSWA/S=0=M.Montgomery/ou=S24L07A@M HS.ATTMAIL.COM |
| #L273 | Fort Bragg Integrated Natural Resources Planning  
State(s): NC  
Contact: Mr. Alan Schultz  
Wildlife Biologist  
U.S. Army  
DPWE, Wildlife Branch (Schulte)  
Ft. Bragg, NC 28307-5000  
Phone: (910)396-7022  
Fax: (910)396-9474 |
| #L274 | Fort Hood  
State(s): TX  
Contact: David Tazik & Tim Hayden  
U.S. Army  
Construction Engineer Research Lab  
2902 Newmark Drive  
Champaign, IL 61821  
Phone: (217)352-6511  
E-mail: d.tazik@cecer.army.mil; t.hayden@cecer.army.mil |
| #L275 | Fort Ord  
State(s): CA  
Contact: Mr. Steve Addington  
Fort Ord Project Manager  
Bureau of Land Management  
Hollister Resource Area  
Hollister, CA 95023  
Phone: (408)394-8314  
Fax: (408)394-8346 |
| #L276 | Fort Stanton Special Management Area  
State(s): NM  
Contact: Mr. Tim Kreager  
Area manager  
Bureau of Land Management  
Roswell District Office  
PO Drawer 1857  
Roswell, NM 88202-1857  
Phone: (505)624-1790 |
| #L277 | Four Mile/Divide Creek Analysis  
State(s): CO  
Contact: Ms. Cindy Hockelberg  
USDA Forest Service  
Rifle Ranger District  
094 County Road 244  
Rifle, CO 81650  
Phone: (303)625-2371 |
| #L278 | French Creek Biorereserve  
State(s): NY, PA  
Contact: Dr. Susan McAlpine  
Director  
The Nature Conservancy  
French Creek Project Office  
413 North Main Street  
Jamestown, NY 14701  
Phone: (716)484-6442 |
| #L279 | Galveston Bay National Estuary Program  
State(s): TX  
Contact: Dr. Frank Shipley  
Program Director  
Galveston Bay National Estuary Program  
Bay Plaza One, Suite 210  
711 West Bay Area Blvd.  
Webster, TX 77598  
Phone: (713)332-9937  
Fax: (713)332-8590 |
| #L280 | Garden Creek/Craig Mountain  
State(s): ID  
Contact: Ms. Janice Hill  
2990 St. Highway 3  
Deary, ID 83823  
Phone: (208)877-1179  
Fax: (208)877-1179 |
| #P032 | Georgia Mountain Ecosystem Management Project  
State(s): AL  
Contact: Mr. J. Ralph Jordan  
Senior Nat. Res. Management Specialist  
Tennessee Valley Authority  
Box 11, P.O. Box 1694  
Norris, TN 37828  
Phone: (615)632-1604  
Fax: (615)632-1534 |
| #L281 | Giant Garter Snake - Multi-Species Habitat Conservation Effort  
State(s): CA  
Contact: Dixon Research Station  
Dixon, CA |
| #L282 | Glacial Lake Agassiz Interbeach Area Stewardship Project  
State(s): MN  
Contact: Mr. Peter Bueseller  
DNR Prairie Biologist  
Minnesota Department of Natural Resources  
1221 East Fir Avenue  
Fergus Falls, MN 56537  
Phone: (218)739-7497  
E-mail: pbuesell@fergus.cfa.org |
| #L283 | Glacier Bay Ecosystem Partnership  
State(s): AK  
Contact: Dr. Joy Geiselman  
Coordinator, Glacier Bay Ecosystem Initiative  
National Biological Service  
1011 East Tudor Road  
Anchorage, AK 99503-6199  
Phone: (907)786-3668  
Fax: (907)786-3636 |
| #L284 | Glade Landscape Analysis  
State(s): CO  
Contact: Mr. Phil Kemp  
USDA Forest Service  
San Juan National Forest  
Dolores Ranger District  
PO Box 210  
Dolores, CO 81323  
Phone: (970)882-7296  
Fax: (970)882-7582 |
| #P033 | Grand Bay Savanna  
State(s): AL, MS  
Contact: The Nature Conservancy  
Jackson, MS |
| #L285 | Grand River Partners  
State(s): OH  
Contact:  
Ohio Department of Natural Resources  
Columbus, OH |
#L286
Grand Traverse Bay Watershed Pilot Project--Whole Farm/Ranch Planning
State(s): MI
Contact: Mr. LeRoy Hall
Acting State Resource Conservationist
USDA Natural Resources Conservation Service
Michigan State Office
Room 101
1405 South Harrison Road
East Lansing, MI 48823-5243
Phone: (517)337-6701 x1221

#L287
Grande Ronde Model Watershed Program
State(s): OR, WA
Contact: Grande Ronde Model Watershed Program
LaGrande, OR

#L288
Great Plains Partnership
State(s): Great Plains Partnership
#L289
Great Basin Ecosystem Initiative
State(s): NM, MT, NV, OR, UT
Contact: Bureau of Land Management
Washington, DC

#L290
Great Lakes Basin Ecosystem Team
State(s): MI, MN, WI, IN, other
Contact: Mr. Dale P. Burkett
Deputy Great Lakes Coordinator
U.S. Fish & Wildlife Service
1405 S. Harrison Road, Rm. 308
East Lansing, MI 48823
Phone: (517)337-6807
Fax: (517)337-6812

#L291
Great Lakes Program / EPA Great Lakes National Program Office
State(s): MI, MN, WI, IL, NY, OH, PA
Contact: Ms. Karen Holland
Ecological Protection & Restoration Team Leader
U.S. Environmental Protection Agency
Great Lakes Program National Office (G-9J)
77 W. Jackson Boulevard
Chicago, IL 60604-3590
Phone: (312)353-2690
Fax: (312)353-2690
E-mail: holland.karen@epamail.epa.gov

#L292
Great Plains Partnership
State(s): MN, MT, ND, WY, SD, IA, NE
Contact: Ms. Jo Clark
Western Governor’s Association
600 17th Street
Suite 1705 South Tower
Denver, CO 80202-5452
Phone: (303)623-9378

#L293
Great Swamp Ecosystem Initiative
State(s): NY
Contact: Mr. Dave Tobias
Director of Protection Programs
The Nature Conservancy
Lower Hudson Field Chapter
41 South Moger Avenue
Mt. Kisco, NY 10549
Phone: (914)244-3271
Fax: (914)244-3275

#L294
Greater Gunnison Gorge Ecosystem Management Plan
State(s): CO
Contact: Ms. Karen Tucker
Recreation Planner
Bureau of Land Management
UBRA
2505 South Townsend
Montrose, CO 81401
Phone: (303)249-6047;FTS(700)322-7317

#P034
Greater Yellowstone Ecosystem
State(s): WY, MT, ID

#P035
Green Valley State Park Ecosystem Management Plan
State(s): IA
Contact: Mr. Jim Zohrer
Wetland Project Coordinator
Iowa Department of Natural Resources
Wallace State Office Building
Des Moines, IA 50319
Phone: (515)281-4815
Fax: (515)281-6794

#P036
Guadalupe-Nipomo Dunes Reserve
State(s): CA
Contact: Ms. Nancy Warner
Field Representative
The Nature Conservancy
PO Box 15810
San Luis Obispo, CA 93406
Phone: (805)545-9925
Fax: (805)545-8510

#L295
Gulf of Coastal Bird Observatory Network
State(s): TX, LA
Contact: Mr. Ray Johnson
Gulf of Coastal Bird Observatory
1903 Port Royal Drive
Nassau Bay, TX 77058
Phone: (713)335-9040
Fax: (713)335-9826

#L296
Gulf of Maine Council
State(s): ME
Contact: Mr. Dave Kelley
State Planning Office
SHS #38
Augusta, ME 04011
Phone: (207)287-3261

#P037
Gulf of Maine Rivers Ecosystem Plan
State(s): ME, NH, MA
Contact: Mr. Gordon Russell
U.S. Fish & Wildlife Service
1033 S. Main Street
Old Town, ME 04468
Phone: (207)827-5938

#P038
Gulf of Mexico Program
State(s): FL, AL, MS, LA, TX
Contact: Dr. Douglas A. Lipka
Director
Gulf of Mexico Program
Building 1103, Room 202
Stennis Space Center, MS 39529
Phone: (601)688-1172
Fax: (601)688-2709

#L297
Gunnison Basin Ecological Classification and Inventory
State(s): CO
Contact: Ms. Sandy Hayes
Ecologist
Bureau of Land Management
Gunnison Basin Resource Area
216 N. Colorado
Gunnison, CO 81230
Phone: (303)641-0471;FTS(700)859-4447

#L298
Ha Ha Tonka State Park
State(s): MO
Contact: Missouri Department of Natural Resources
Jefferson City, MO

#L299
Habitat Partnership Program
State(s): CO
Contact: Mr. David Bray
Assistant Area Manager
Bureau of Land Management
Little Snake Resource Area
1280 Industrial Ave.
Craig, CO 81625
Phone: (303)824-4441

#L300
Hackensack Meadowlands District
State(s): NJ
Contact: Ms. Mary Anne Thuesing
U.S. Environmental Protection Agency
Region II
Water Management Division
New York, NY 10278
Phone: (212)264-8793
Fax: (212)264-4690

#L301
Harvard Forest LTER Site
State(s): MA
Contact: Harvard University
Petersham, MA
| #L302 | Hawaiian Forest Challenge  
| State(s): | HI  
| Contact: | The Nature Conservancy of Hawaii  
| Location: | Honolulu, HI |
| #L303 | Hawk Mountain Sanctuary  
| State(s): | PA  
| Contact: | Mr. Keith L. Bildstein  
| Location: | Director of Research |
| #L304 | Hayfork Adaptive Management Project  
| State(s): | CA  
| Contact: | USDA Forest Service  
| Location: | Albany, CA |
| #L305 | Henry’s Fork Watershed Council  
| State(s): | ID, WY  
| Contact: | The Nature Conservancy  
| Location: | Sun Valley, ID |
| #L306 | Hillsborough River Ecosystem Management Area  
| State(s): | FL  
| Contact: | Pat Fricano  
| Location: | Environmental Manager |
| #L307 | Hillsdale Water Quality Project  
| State(s): | KS  
| Contact: | Mr. Thomas Lorenz  
| Location: | U.S. Environmental Protection Agency |
| #L308 | Hubbard Brook Experimental Forest  
| State(s): | NH  
| Contact: | Syracuse University  
| Location: | Syracuse, NY |
| #P039 | Hudson River/New York Bight Ecosystem  
| State(s): | NY, NJ  
| Contact: | Mr. Mike Meagher  
| Location: | Ecosystem Team Coordinator |
| #L309 | Hyannis Ponds  
| State(s): | MA  
| Contact: | The Nature Conservancy  
| Location: | Boston, MA |
| #L310 | ICEM Oak Savannah Project  
| State(s): | MI, IN, MN, WI  
| Contact: | Michigan Department of Natural Resources  
| Location: | Lansing, MI |
| #L311 | Idaho Ecosystem Management Project  
| State(s): | ID  
| Contact: | USDA Forest Service  
| Location: | Silverton, ID |
| #L312 | Idaho Panhandle National Forest Aquatic Ecosystem Strategy  
| State(s): | ID  
| Contact: | USDA Forest Service  
| Location: | Silverton, ID |
| #L313 | Illinois River - Battle Branch  
| State(s): | OK  
| Contact: | Mr. Scott Smith  
| Location: | U.S. Environmental Protection Agency |
| #L314 | Impact of Atmospheric Deposition & Global Change on Forest Health & Productivity  
| State(s): | OH  
| Contact: | Dr. Robert Long  
| Location: | USDA Forest Service |
| #L315 | Implementing Ecosystem Based Forest Management - "Exemplary Forestry Initiative"  
| State(s): | NH  
| Contact: | Mr. Paul A. Doscher  
| Location: | Vice President Society for the Protection of New Hampshire Forests  
| Address: | 54 Portsmouth St.  
| City: | Concord, NH  
| Zip: | 03301  
| Phone: | (603)224-9945 |
| #L316 | Indian Lake Hydrologic Unit Project  
| State(s): | OH  
| Contact: | Mr. Greg Nageotte  
| Location: | Project Administrator  
| Address: | Natural Resources Conservation Service  
| Address: | 324 Road 11  
| City: | Bellefontaine, OH  
| Zip: | 43311  
| Phone: | (513)593-2946  
| Fax: | (513)592-3350 |
| #L317 | Indian River Lagoon National Estuary Program  
| State(s): | FL  
| Contact: | Mr. Drew Kendall  
| Location: | U.S. Environmental Protection Agency |
| #L318 | Indiana Coastal Coordination Program  
| State(s): | IN  
| Contact: | Indiana Department of Natural Resources  
| Location: | Indianapolis, IN |
| #L319 | Indiana Coordinated Resource Management Program  
| State(s): | IN  
| Contact: | USDA Natural Resources Conservation Service  
| Location: | Indianapolis, IN |
| #P040 | Indiana Grand Kankakee Marsh Restoration Project  
| State(s): | IN  
| Contact: | Mr. Jim Ruwaldt  
| Location: | Assistant Field Supervisor  
| Address: | U.S. Fish & Wildlife Service  
| Address: | 620 S. Walker  
| City: | Bloomington, IN  
| Zip: | 47403-2121  
| Phone: | (812)334-4273  
| Fax: | (812)334-4273 |
| #P041 | Integrated Landscape Management for Fish and Wildlife  
| State(s): | WA  
| Contact: | Mr. Rollie Geppert  
| Location: | Assistant Field Supervisor  
| Address: | Washington Department of Fish and Wildlife  
| Address: | 600 Capitol Way North  
| City: | Olympia, WA  
| Zip: | 98501-1091  
| Phone: | (206)902-2587 |
### #L320
**Integrating the Ecological & Social Dimensions of Forest Ecosystem Management**

**State(s):** VT  
**Contact:** Dr. Mark Twery  
Project Leader  
USDA Forest Service  
PO Box 968  
Burlington, VT 05402  
**Phone:** (802)951-6771  
**E-mail:** MTWERY@ASRR.ARS.UDA.GOV

### #L321
**Interior Basin Ecoregion**

**State(s):** NV, ID, WY, UT, AZ  
**Contact:** Carlos Mendoza & Ronald Anglin  
Ecoregion Team Co-Leaders  
U.S. Fish & Wildlife Service  
4600 Kietzke Lane  
Building C, Rm 125  
Reno, NV 89502  
**Phone:** (702)784-5227  
**Fax:** (702)784-5870

### #L322
**Intermountain West Ecosystem**

**State(s):** WA, OR, CA, NV, UT  
**Contact:** U.S. Fish & Wildlife Service  
Walla Walla, WA

### #L323
**International Sonoran Desert Alliance**

**State(s):** AZ, Mexico  
**Contact:** Hia-Ced O-odham  
Sells, AZ

### #L324
**Isle Royale Biosphere Reserve**

**State(s):** MI  
**Contact:**  
National Park Service  
Houghton, MI

### #L325
**Kakagon Sloughs**

**State(s):** WI  
**Contact:** Mr. Matt Dallmon  
Watershed Coordinator  
The Nature Conservancy  
Kakagon Sloughs Project Office  
618 Main Street West - Suite B  
Ashland, WI 54806  
**Phone:** (715)682-5789  
**Fax:** (715)682-5832

### #L326
**Kansas - FWS Partners for Wildlife**

**State(s):** KS  
**Contact:** Mr. Jerre L. Gamble  
U.S. Fish & Wildlife Service  
PO Box 128  
Harford, KS 66854  
**Phone:** (316)392-5553

### #L327
**Kapuakea Preserve**

**State(s):** HI  
**Contact:** Mr. Mark White  
Maui Project Director  
The Nature Conservancy of Hawaii  
PO Box 1716  
Makawao, HI 96768  
**Phone:** (808)572-7849  
**Fax:** (808)572-5950

### #P045
**Kerner Blue Butterfly Habitat Conservation Plan**

**State(s):** WI  
**Contact:** Wisconsin Department of Natural Resources  
Madison, WI

### #L328
**Kaskaskia Private Lands Initiative**

**State(s):** IL  
**Contact:**  
Okawville, IL

### #P046
**Kenai River Watershed Project**

**State(s):** AK  
**Contact:** Mr. Randall H. Hagenstein  
Associate State Director  
The Nature Conservancy  
421 West 1st Avenue, Suite 200  
Anchorage, AK 99501  
**Phone:** (907)276-3133  
**Fax:** (907)276-2584

### #L329
**Kennebunk Plains**

**State(s):** ME  
**Contact:** Ms. Nancy Sferra  
South Maine Preserves Manager  
The Nature Conservancy  
10 Maine St.  
Sanford, ME 04073  
**Phone:** (207)490-4012  
**Fax:** (207)490-4012

### #L330
**Kern County Habitat Conservation Plan**

**State(s):** CA  
**Contact:**  
California Department of Water Resources  
Fresno, CA

### #L331
**Kilauea Forest - Puu maka’ala Fence Construction**

**State(s):** HI  
**Contact:**  
Hawaii Department of Land & Natural Resources  
Hilo, HI

### #L332
**Kilauea-Olaa Working Group**

**State(s):** HI  
**Contact:**  
Hawaii Division of Forestry and Wildlife  
Hilo, HI

### #L333
**Kings River Ecosystems Research Project**

**State(s):** CA  
**Contact:** Mr. Mark Smith  
USDA Forest Service  
Sierra National Forest  
1600 Tollhouse Road  
Clovis, CA 93611

### #L334
**Kinnickinnic River Watershed**

**State(s):** WI  
**Contact:** Mr. Robert W. Chambers  
Kinnickinnic River Land Trust  
N8203 1130th St.  
River Falls, WI 54022  
**Phone:** (715)425-5738  
**Fax:** (715)425-1746

### #L335
**Kiowas Grasslands Integrated Resource Management Program**

**State(s):** NM  
**Contact:** Mr. Pam Brown  
District Ranger  
Kiowa National Grasslands  
714 Main Street  
Clayton, NM 88415  
**Phone:** (505)374-9652

### #L336
**Kirland's Warbler Recovery Plan**

**State(s):** MI  
**Contact:** USDA Forest Service  
Cadillac, MI
#L337  
Klamath Basin Assessment  
State(s): OR, CA  
Contact:  
USDA Forest Service  
Yreka, CA

#L338  
Klamath River Basin Ecosystem Restoration Project  
State(s): OR, CA  
Contact:  
Project Supervisor  
U.S. Fish & Wildlife Service  
Klamath Falls, OR  97601-9365  
Phone: (503)885-8481

#L339  
Klamath-Lake Partnership  
State(s): OR  
Contact:  
Klamath Falls, OR

#P047  
Konza Prairie Research Natural Area  
State(s): KS  
Contact:  
Dr. David Hartnett  
Kansas State University  
Division of Biology  
Ackert Hall  
Manhattan, KS  66506  
Phone: (913)532-5925  
Fax: (913)532-6653  
E-mail: dchart@ksuvm.ksu.edu

#L340  
Kootenay River Network  
State(s): MT, ID, BC  
Contact:  
Ms. Jill Davies  
14 Old Bull River Road  
Noxon, MT  59853  
Phone: (406)847-2228

#L341  
Kwethluk Village Fisheries Monitoring Plan  
State(s): AK  
Contact:  
U.S. Fish & Wildlife Service  
Bethel, AK

#L342  
LaBarge Watershed Cooperative Management  
State(s): WY  
Contact:  
USDA Forest Service  
Kemmerer, WY

#P048  
Lajas Valley Lagoon System  
State(s): PR  
Contact:  
Mr. James Oland  
Field Supervisor  
U.S. Fish & Wildlife Service  
Caribbean Field Office  
PO Box 491  
Boqueron, PR  00622  
Phone: (809)851-7297  
Fax: (809)851-7440  
E-mail: R4FWE_MAPR@MAIL.FWS.GOV

#L343  
Lake Champlain Basin Program  
State(s): VT  
Contact:  
Ms. Lisa Borre  
Vermont Lake Champlain Coordinator  
Lake Champlain Basin Program  
Gordon-Center House  
54 West Shore Road  
Grand Isle, VT  05458  
Phone: (802)372-3213  
Fax: (802)372-6131

#L344  
Lake Champlain Wetlands  
State(s): VT, NY  
Contact:  
Mr. Jon Binhammer  
The Nature Conservancy  
Vermont Field Office  
27 State Street  
Montpelier, VT  05602  
Phone: (802)229-4425  
Fax: (802)229-1347

#L345  
Lake Michigan Lakewide Management Plan  
State(s): IL, IN, MI, WI  
Contact:  
Mr. Gary Kohlbep  
U.S. Environmental Protection Agency  
Region V  
77 W. Jackson Boulevard  
Chicago, IL  60604  
Phone: (312)886-4680  
Fax: (312)886-7804

#L347  
Lake Ponchartrain Basin Restoration  
State(s): LA  
Contact:  
Mr. Carlton Dufrechou  
Lake Ponchartrain Basin Foundation  
PO Box 6965  
Metairie, LA  70009  
Phone: (504)836-2215  
Fax: (504)836-7283

#L348  
Lake Superior Biosphere Proposed Biosphere Reserve  
State(s): MI, MN, WI, Canada  
Contact:  
Mr. Robert Brander  
With 1 Box 146-2A  
Washburn, WI  54891  
Phone: (715)373-2988  
Fax: (715)373-2938

#L349  
Lake Superior Binational Program Habitat Projects  
State(s): MI, MN, WI, Canada  
Contact:  
National Wildlife Federation  
Ann Arbor, MI

#L350  
Lake Superior EMAP - Great Lakes Assessment  
State(s): MN, MI  
Contact:  
Mr. Stephen Lozano  
U.S. Environmental Protection Agency  
Region V  
Environmental Research Lab  
6201 Congdon Blvd.  
Deluth, MN  55804  
Phone: (218)720-5594  
Fax: (218)720-5539

#L351  
Lake Whatcom  
State(s): WA  
Contact:  
Mr. Tom Murphy  
Washington Department of Natural Resources  
919 North Township  
Sedro Wooley, WA  98226  
Phone: (360)856-3500  
Fax: (360)856-2150

#L352  
Land Use District Boundary Review  
State(s): HI  
Contact:  
Ms. Mary Lou Kobayaski  
Hawaii Office of State Planning  
PO Box 3540  
Honolulu, HI  96811-3540  
Phone: (808)587-2808  
Fax: (808)587-2824

#L353  
Landowner Forum  
State(s): WA  
Contact:  
Ms. Kaleen Cottingham  
Washington Department of Natural Resources  
PO Box 47014  
Olympa, WA  98504-7014  
Phone: (360)902-1360

#L354  
Landscape Project  
State(s): NJ  
Contact:  
Mr. Larry Niles  
New Jersey Division of Fish, Game & Wildlife  
Endangered & Nongame Species Program  
CN 400  
Trenton, NJ  08625-0400  
Phone: (609)292-9400  
Fax: (609)984-1414

#L355  
Largo Canyon Watershed Management and Erosion Control Plan  
State(s): NM  
Contact:  
Dale Wirth  
Bureau of Land Management  
Farmington District  
1235 La Plata Highway  
Farmington, NM  87401  
Phone: (505)599-6320  
Fax: (505)599-8998

---

Project Contact Information
#L356
Largo-Aqua Fria Watershed Project
State(s): NM
Contact: Mr. Jim Stovall
Bureau of Land Management
198 Neel Avenue NW
Socorro, NM 87801
Phone: (505)835-0412

#L357
Laurels Reserve
State(s): PA
Contact: Mr. Dan Hegarty
Assistant Land Manager
The Brandywine Conservancy
PO Box 141
Chadds Ford, PA 19317
Phone: (610)388-2700
Fax: (610)388-6016

#L358
Little Bear River Watershed Project
State(s): UT
Contact: Mr. Roy Gunnell
Utah Department of Environmental Quality
Division of Water Quality
PO Box 144870
Salt Lake City, UT 84114-4870
Phone: (801)538-6146
Fax: (801)538-6016

#L359
Little Tennessee River Group
State(s): NC
Contact: Little Tennessee River Group
Franklin, NC

#L360
Lk Superior Highlands/Nemadji River Basin Project
State(s): MN
Contact: The Nature Conservancy
Minneapolis, MN

#L361
Lone Mountain/San Rafael Ecosystem Project
State(s): AZ
Contact: Lone Mountain Ranch
Burrus, AZ

#L362
Long Island Sound
State(s): NY
Contact: Mr. Mark Tedesco
Long Island Sound Office
Stamford Government Center
Stamford, CT 06904
Phone: (203)977-1541
Fax: (203)977-1546

#L363
Long Leaf Pine-Eglin Air Force Base
State(s): FL
Contact: U.S. Air Force
Washington, DC

#L364
Long Pond Barrens
State(s): PA
Contact: Dr. James F. Thorne
Director of Science and Stewardship
The Nature Conservancy
1211 Chestnut Street, 12th Floor
Philadelphia, PA 19107-4122
Phone: (215)963-1400
Fax: (215)963-1406
E-mail: jthorne@tnc.org

#L365
Loomis State Forest
State(s): WA
Contact: Mr. Mark Mauren
Washington Department of Natural Resources
1111 Washington Street SE
PO Box 47014
Olympia, WA 98504-7014
Phone: (360)902-1747

#L366
Louisiana Coastal Wetlands Planning, Protection and Restoration Act
State(s): LA
Contact: U.S. Army Engineer District-New Orleans
New Orleans, LA

#L367
Lower Connecticut River Special Area Management Plan
State(s): CT, VT, NH, MA
Contact: Mr. Ron Rozsa
Connecticut Department of Environmental Protection
Office of Long Island Sound Programs
79 Elm Street
Hartford, CT 06106-5127
Phone: (203)424-3034

#L368
Lower Mississippi Alluvial Valley Wetland Conservation Plan
State(s): AR, IL, KY, LA, MO, MS, TN
Contact: Ms. A. Este Stifel
Director, Roanoke River Project
The Nature Conservancy
Ste 200
4011 University Drive
Durham, NC 27707
Phone: (919)403-8558
Fax: (919)403-0379
E-mail: estifel@tnc.org

#L369
Lower Mississippi Valley Joint Venture
State(s): LA, MS, AR, TN, KY, MO, IL, AL
Contact: Mr. Charles Baxter
Coordinator
U.S. Fish & Wildlife Service
2424 South Frontage Road
Suite C
Vicksburg, MS 39180
Phone: (601)629-6600
Fax: (601)636-9541

#L370
Lower Missouri River
State(s): KS, NE, IA, MO
Contact: Mr. J. C. Bryant
U.S. Fish & Wildlife Service
Big Muddy National Wildlife & Fish Refuge
4200 New Haven Road
Columbia, MO 65201-9634
Phone: (314)876-1826
Fax: (314)876-1839

#L371
Lower Missouri River - Data Collection
State(s): MO, MN, WI, IA, IL
Contact: Mr. Bill Mauck
Assistant Director
Midwest Science Center
4200 New Haven Road
Columbia, MO 65201
Phone: (314)875-5399
Fax: (314)876-1896

#P049
Lower Rio Grande Ecosystem Plan
State(s): TX
Contact: Mr. Art Coylekendal
Wildlife Biologist
U.S. Fish & Wildlife Service
320 N. Main St., Rm. 225
McAllen, TX 78501
Phone: (210)630-4366

#P050
Lower Roanoke River Bioreserve
State(s): NC
Contact: Mr. A. Este Stifel
Director, Roanoke River Project
The Nature Conservancy
Ste 201
4011 University Drive
Durham, NC 27707
Phone: (919)403-8558
Fax: (919)403-0379
E-mail: estifel@tnc.org

#P051
Lower St. Johns River Ecosystem Management Area
State(s): FL
Contact: Ms. Jan Brewer
Environmental Specialist
Florida Department of Environmental Protection
Ste 200B
7825 Baymeadows Way
Jacksonville, FL 32256-7577
Phone: (904)448-4300
Fax: (904)448-4366
E-mail: Brewer_J@JAXI.DEP.STATE.FL.US

#L372
Lower Tennessee River - Cumberland River Ecosystem
State(s): TN, KY, AL
Contact: Mr. John Taylor
Manager
U.S. Fish & Wildlife Service
Tennessee National Wildlife Refuge
PO Box 849
Paris, TN 38242
Phone: (901)642-2091
## Project Contact Information

<table>
<thead>
<tr>
<th>Project Name</th>
<th>State(s)</th>
<th>Contact Person(s)</th>
<th>Phone(s)</th>
<th>Fax(es)</th>
<th>E-mail</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lower Wabash Habitat Restoration</td>
<td>IN</td>
<td>Mr. Jeff Kiefer</td>
<td>(812)334-4261 ext. 212</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Loxahatchee River Basin Wetland Planning Project</td>
<td>FL</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MacKinaw River Project</td>
<td>IL</td>
<td>Mr. James P. McMahon</td>
<td>(809)766-5335</td>
<td>(809)766-6263</td>
<td></td>
</tr>
<tr>
<td>Maine Forest Biodiversity Project</td>
<td>ME</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Malpai Borderlands Initiative</td>
<td>NM, AZ</td>
<td>Dr. Ben Brown</td>
<td>(505)548-2622</td>
<td>(505)548-2267</td>
<td><a href="mailto:thanley@nm0857.lcdo.nm.blm.gov">thanley@nm0857.lcdo.nm.blm.gov</a></td>
</tr>
<tr>
<td>Mammoth Cave Area Biosphere Reserve</td>
<td>KY</td>
<td>Mr. Jeff Bradybaugh</td>
<td>(502)749-2508</td>
<td>(502)749-2916</td>
<td></td>
</tr>
<tr>
<td>Mangrove Rehabilitation Program</td>
<td>FL</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Marathon County Forests</td>
<td>WI</td>
<td>Mr. Mark Heyde</td>
<td>(715)847-5267</td>
<td>(715)848-9210</td>
<td></td>
</tr>
<tr>
<td>Mark Twain Watershed Project</td>
<td>MO</td>
<td>Mr. Donald L. Schuster</td>
<td>(816)385-6359</td>
<td>(816)385-7269</td>
<td></td>
</tr>
<tr>
<td>Marys River Riparian/Aquatic Restoration Project</td>
<td>NV</td>
<td>Mr. Bill Baker</td>
<td>(802)236-7500</td>
<td>(802)236-7503</td>
<td></td>
</tr>
<tr>
<td>Massachusetts Bays Program</td>
<td>MA</td>
<td>Dr. Diane Gould</td>
<td>(617)727-9530 ext. 406</td>
<td>(617)727-2754</td>
<td></td>
</tr>
<tr>
<td>Maumee River Area of Concern</td>
<td>OH</td>
<td>Mr. Mark Messersmith</td>
<td>(312)353-2154</td>
<td>(312)886-7804</td>
<td></td>
</tr>
<tr>
<td>Maverick Project</td>
<td>AZ</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>McGregor Coordinated Resource Management Plan</td>
<td>NM</td>
<td>Thersa M. Hanley</td>
<td>(913)551-7542</td>
<td>(913)551-7542</td>
<td><a href="mailto:thanley@nm0857.lcdo.nm.blm.gov">thanley@nm0857.lcdo.nm.blm.gov</a></td>
</tr>
<tr>
<td>McPherson Ecosystem Enhancement Project</td>
<td>ID</td>
<td>Mr. Bruce Padian</td>
<td>(603)868-7666</td>
<td>(603)868-7666</td>
<td></td>
</tr>
<tr>
<td>Measurement, Analysis, &amp; Modeling of Forest Ecosystems in a Changing Environment</td>
<td>NH</td>
<td>Dr. Dale S. Solomon</td>
<td>(603)868-7666</td>
<td>(603)868-7666</td>
<td></td>
</tr>
<tr>
<td>Meramec River</td>
<td>MO</td>
<td>Ms. Kathleen Mulder</td>
<td>(913)551-7542</td>
<td>(913)551-7542</td>
<td></td>
</tr>
</tbody>
</table>
Ecosystem Management in the United States: An Assessment of Current Experience

#L387
Merrimack River
State(s): NH, MA
Contact: Ms. Carolyn Jenkins
New England Interstate Water Pollution Control Commission
255 Ballardvale St.
Wilmington, MA 01887
Phone: (508)658-0500
Fax: (508)658-5509

#L388
Miami Basin
State(s): CA
Contact: Mr. Tom Efird
District Ranger
USDA Forest Service
805 Mill Rd.
Lewiston, ID 83501-1016
Po Box 1016
Phone: (208)799-1707
Fax: (209)683-7258

#L389
Mica Creek Watershed Study
State(s): ID
Contact: Dr. Terry Cundy
Sierra National Forest
Mariposa Ranger District
43060 Highway 41
Oakhurst, CA 93644
Phone: (508)658-0500
Fax: (508)658-5509

#L390
Mill Creek Canyon Management Partnership
State(s): UT
Contact: USDA Forest Service, UT

#L391
Milwaukee Estuary Area of Concern
State(s): WI
Contact: Ms. Marsha Jones
Wisconsin Department of Natural Resources
Southeast District
PO Box 12436
Milwaukee, WI 53212
Phone: (414)263-8708
Fax: (414)263-8483

#L392
Minnesota County Biological Survey
State(s): MN
Contact: Minnesota County Biological Survey
St. Paul, MN

#L393
Minnesota Environmental Indicators Initiative
State(s): MN
Contact: Minnesota Department of Natural Resources
St. Paul, MN

#P057
Minnesota Peatlands
State(s): MN
Contact: Mr. Bob Djupstrom
Scientific and Natural Area Supervisor
Minnesota Dept. of Natural Resources
Wildlife - SNA, Box 7
500 Lafayette Road
St. Paul, MN 55155
Phone: (612)297-2357
Fax: (612)297-4961
E-mail: bob.djupstrom@dnr.state.mn.us

#L395
Mississippi River Alluvial Plain Bioreserve Project
State(s): AR, LA, MS, TN, KY
Contact: Ms. Cindy Brown
Bioreserve Director
The Nature Conservancy
Louisiana Field Office
PO Box 4125
Baton Rouge, LA 70821
Phone: (504)338-1040
Fax: (504)338-1003

#P058
Missouri Coordinated Resource Management
State(s): MO
Contact: Mr. Russ Titus
Wildlife Coordination Specialist
Missouri Department of Conservation
PO Box 180
Jefferson City, MO 65102-0180
Phone: (314)751-4115 ext. 259

#L396
Missouri Masterpieces
State(s): MO
Contact: Mr. Paul Nelson
Missouri Department of Natural Resources
Division of State Parks
PO Box 176
Jefferson City, MO 65102
Phone: (314)751-8360
Fax: (314)751-8656

#L397
Missouri Ozark Forest Ecosystem Project (MOFEP)
State(s): MO
Contact: Dr. Terry L. Robison
Missouri Department of Conservation
PO Box 180
Jefferson City, MO 65102-0180
Phone: (314)751-4115
Fax: (314)526-6670

#L398
Missouri Resource Assessment Partnership
State(s): MO
Contact: Missouri Department of Conservation
Jefferson City, MO

#L399
Missouri River Division - U.S. Army Corps of Engineers
State(s): NE, others
Contact: U.S. Army Corps of Engineers
Omaha, NE

#P059
Missouri River Mitigation Project
State(s): KS, NE, IA, MO
Contact: Mr. Steve Adams
Natural Resources Coordinator
Kansas Wildlife & Parks
900 SW Jackson, Suite 502
Topeka, KS 66612-1233
Phone: (913)296-2281
Fax: (913)296-6953

#L400
Missouri River Natural Resource Group
State(s): MT, ND, SD, MO, IA, NE, KA
Contact: Mr. Greg Power
North Dakota Game & Fish Department
100 N. Bismarck Expressway
Bismarck, ND 58501
Phone: (701)328-6323

#L401
Missouri River Post-Flood Evaluation (MRPE)
State(s): MO
Contact: Mr. John W. Smith
Wildlife Research Supervisor
Missouri Department of Conservation
1110 S. College Ave.
Columbia, MO 65201
Phone: (314)882-9880
Fax: (314)882-4517
E-mail: Smithj5@mail.conservation.state.mo.us

#L402
Mobile Bay Restoration Demonstrations
State(s): AL
Contact: Dr. Douglas A. Lipka
U.S. Environmental Protection Agency
Gulf of Mexico Program
Building 1103, Room 202
Stennis Space Center, MS 30529
Phone: (601)688-3726
Fax: (601)688-2709

#L403
Mojave Desert Ecosystem Initiative
State(s): CA
Contact: Mr. Steve Ahmann
Natural and Cultural Resource Manager
National Training Center
PO Box 10026
Attn: AFZJ-PW-EV
Building 385
Fort Irwin, CA 92310-5000
Phone: (619)380-5291, (619)380-4760

308
#140
Monroe Mountain Livestock/Big Game Demonstration Area
State(s): UT
Contact: Mr. Larry Greenwood
Wildlife Biologist
Bureau of Land Management
150 East 900 North
Richfield, UT 84701
Phone: (303)896-8221
Fax: (801)584-8268

#1405
Montezuma County Federal Lands Program
State(s): CO
Contact: Fort Lewis College, CO

#1406
Mt. Roan Balds Management
State(s): NC, TN
Contact: Project Leader -- District Ranger
USDA Forest Service
Pisgah National Forest
Toecane Ranger District
Box 128
Burnsville, NC 28714
Phone: (704)682-6146

#1407
Muddy Creek Landscape Analysis
State(s): CO
Contact: Mr. David Van Norman
USDA Forest Service
Holy Cross Ranger District
Box 190
Minturn, CO 81645
Phone: (303)827-5715

#1408
Mudge Pond
State(s): CT
Contact: USDA Natural Resources Conservation Service

#1409
Mulligan Creek Project
State(s): MI
Contact: Dr. Dean Premo
White Water Associates, Inc.
429 River Lane
Amasa, MI 49903
Phone: (906)822-7373
Fax: (906)822-7977

#1410
Multi-Agency Approach to Planning and Evaluation (MAAPE)
State(s): ND, SD, MT
Contact: Mr. Ron Reynolds
U.S. Fish & Wildlife Service
1500 E. Capitol Avenue
Bismarck, ND 58501

#1411
Multi-Objective Flood Mitigation Plan
Vermilion River Basin
State(s): SD
Contact: Mr. Duane Holmes
National Park Service
RMR-PPO
P.O. Box 25287
Denver, CO 80225
Phone: (303)969-2855

#1412
Multi-species Forest Management Program
State(s): WA
Contact: Ms. Catherine L. Phillips
Director External Affairs
Weyerhaeuser Co.
33405 Eighth Avenue South
Federal Way, WA 98003
Phone: (206)924-3172
Fax: (206)924-3421
E-mail: phillic@wdi.com

#1413
Nanjemoy Creek Ecosystem Initiative
State(s): MD
Contact: The Nature Conservancy
Chevy Chase, MD

#1414
Nanticoke/Blackwater Rivers Bioserve
State(s): MD, DE
Contact: The Nature Conservancy
Salisbury, MD

#1415
Narragansett Bay Project
State(s): RI
Contact: Mr. Richard Ribb
Rhode Island DEM
Narragansett Bay Project
291 Promenade Street
Providence, RI 02908

#1416
Nassawango Creek Ecosystem Initiative
State(s): MD
Contact: The Nature Conservancy
Salisbury, MD

#1417
National Capital Region Cons. Data Center/ DC Natural Heritage Prog.
State(s): MD, DC, VA, WV, PA
Contact: Mr. Christopher Lea
13025 Riley's Loch Road
Poolesville, MD 20837

#1418
National Hierarchy of Ecological Units
State(s): CO
Contact: Mr. Jeff Bruggink
Forest Soil Scientist, Coordinator
Phone: (710)545-8737

#1419
Natural Areas Reserve System
State(s): HI
Contact: Mr. Peter T. Schuyler
Natural Areas Reserve Program Manager
Hawaii Department of Land & Natural Resources
Division of Forestry and Wildlife
Kawahao Plaza, Suite 132
567 South King Street
Honolulu, HI 96813
Phone: (808)587-0054
Fax: (808)587-0064
E-mail: pschuy1@pixi.com

#1420
Natural Community Conservation Planning (NCCP)
State(s): CA

#P061
Natural Resource Roundtable
State(s): HI
Contact: Mr. Scott Derrickeon
Hawaii Office of State Planning
PO Box 3540
Honolulu, HI 96811-3540
Phone: (808)587-2805
E-mail: sderric@pixi.com

#1421
Navajo Mountain Natural Area
State(s): AZ, UT
Contact: Mr. Jack Meyer
Program Manager
Navajo Natural Heritage Program
Navajo Fish & Wildlife Department
PO Box 1480
Window Rock, AZ 86515
Phone: (602)871-7059; (602)871-6472
Fax: (602)871-6177

#P062
Nebraska Sandhills Ecosystem
State(s): NE
Contact: Mr. Gene Mack
Sandhills Coordinator
U.S. Fish & Wildlife Service
Kearney Field Office
PO Box 1686
Kearney, NE 68848
Phone: (308)236-5015
Fax: (308)236-3899

#P063
Negrito Project
State(s): NM
Contact: Mr. Don Weaver
USDA Forest Service
Gila National Forest
Reserve Ranger District
PO Box 170
Reserve, NM 87830
Phone: (505)533-6231
#L422
Neponset River Watershed Project
State(s): MA
Contact:
Ms. Ellen Heath
U.S. Environmental Protection Agency
Region II
26 Federal Plaza
New York, NY 10278
Phone: (212)264-5352
Fax: (212)264-2914

#L427
Niagara River Area of Concern
State(s): NY
Contact:
Mr. Randy Kreil
North Dakota Game & Fish Department
100 N. Bismarck Expressway
Bismarck, ND 58501
Phone: (701)328-6330
Fax: (701)328-6352

#P066
Northeast Chichagof Island
State(s): AK
Contact:
Mr. Phil Mooney
Habitat Biologist
Alaska Department of Fish & Game
Habitat and Restoration Division
304 Lake Street
Room 103
Sitka, AK 99835-7563
Phone: (907)747-5828
Fax: (907)747-6239

#L423
Neponset River Ecosystem Initiative
State(s): NY
Contact:
Mr. Dave Tobias
Director of Protection Programs
The Nature Conservancy
Lower Hudson Office
41 South Moger Avenue
Mt. Kisco, NY 10549
Phone: (914)232-9431
Fax: (914)232-1543

#L428
Nicolet National Forest
State(s): WI
Contact:
Ms. Marie-Louise Smith
Research Ecologist
Northeastern Forest Experimental Station
PO Box 640
Durham, NH 03824

#L424
New England - New York ECOMAP
State(s): ME, NH, VT, MA, CT, RI, NY
Contact:
Ms. Rosemary Monahan
U.S. Environmental Protection Agency
New England J. F. Kennedy Building
Boston, MA 02203
Phone: (617)565-3518
Fax: (617)565-4940

#L425
New England Resource Protection Project
State(s): NH, CT, RI
Contact:
Ms. Susan Francher
New Hampshire Division of Forests and Lands
PO Box 1856
Concord, NH 03302-1856
Phone: (603)271-2214

#L426
New Hope Creek Corridor Project
State(s): NC
Contact:
Mr. Charles Johnson
New Hope Creek Advisory Committee
1620 University Drive
Durham, NC 27707
Phone: (919)489-5897

#L430
Niwot Ridge Biosphere Reserve
State(s): CO
Contact:
Mr. William Bowman
University of Colorado
Mountain Research Station
Campus Box 450
Boulder, CO 80309-0450
Phone: (303)429-8841
Fax: (303)429-8699

#L431
Nooksack River Watershed Initiatives
State(s): WA, BC
Contact:
USDA Forest Service, WA

#L432
North Dakota Conservation Reserve Program
State(s): ND
Contact:
Mr. Randy Kreil
North Dakota Game & Fish Department
100 N. Bismarck Expressway
Bismarck, ND 58501
Phone: (701)328-6330
Fax: (701)328-6352

#L433
North Dakota-Montana Paddlefish Management Plan
State(s): ND, MT
Contact:
Mr. Greg Power
North Dakota Game & Fish Department
100 N. Bismarck Expressway
Bismarck, ND 58501
Phone: (701)328-6323

#L434
North Temperate Lakes Long-Term Ecological Research Site
State(s): WI
Contact:
University of Wisconsin-Madison
Madison, WI

#P067
Northern Delaware Wetlands Rehabilitation Program
State(s): DE
Contact:
Dr. Andrew Gillespie
USDA Forest Service
5 Radnor Corp Ctr
Suite 200
Radnor, PA 19087-4855
Phone: (610)975-4017
Fax: (610)975-4095
E-mail: gillesp@aol.com

#L435
Northern Forest Health Monitoring Program
State(s): PA
Contact:
Mr. Richard Klukas
National Park Service
1709 Jackson St.
Omaha, NE 68102
Phone: (402)221-3603

#L436
Northern Grey Wolf
State(s): MN, WI, MI
Contact:
Mr. Kent Gilges
The Nature Conservancy
Northern Lake Huron Project Office
PO Box 567
Cedarville, MI 49719
Phone: (906)484-9970
Fax: (906)484-9971

#L437
Northern Lake Huron Biorreserve
State(s): MI
Contact:
Mr. Dave Tobias
Director of Protection Programs
The Nature Conservancy
200 North Main Street
Evart, MI 49631
Phone: (231)846-2020
Fax: (231)846-2021
E-mail: dtobias@tnature.org

#L438
Northern New Hampshire Protection Plan
State(s): NH, VT, MA, CT, RI, NY
Contact:
Mr. John H. Johnson
New Hampshire Division of Forests and Lands
PO Box 1856
Concord, NH 03302-1856
Phone: (603)271-2214

#L439
Northern New Hampshire - New York ECOMAP
State(s): ME, NH, VT, MA, CT, RI, NY
Contact:
Ms. Rosemary Monahan
U.S. Environmental Protection Agency
New England J. F. Kennedy Building
Boston, MA 02203
Phone: (617)565-3518
Fax: (617)565-4940

#L440
Northern New Hampshire Resource Protection Program
State(s): NH, VT, MA, CT, RI, NY
Contact:
Mr. John H. Johnson
New Hampshire Division of Forests and Lands
PO Box 1856
Concord, NH 03302-1856
Phone: (603)271-2214

#L441
Northern New Hampshire Watershed Initiative
State(s): NH
Contact:
Ms. Susan Francher
New Hampshire Division of Forests and Lands
PO Box 1856
Concord, NH 03302-1856
Phone: (603)271-2214

#L442
Northern New Hampshire, New York ECOMAP
State(s): ME, NH, VT, MA, CT, RI, NY
Contact:
Ms. Rosemary Monahan
U.S. Environmental Protection Agency
New England J. F. Kennedy Building
Boston, MA 02203
Phone: (617)565-3518
Fax: (617)565-4940

#L443
Northern New Hampshire, New York ECOMAP
State(s): ME, NH, VT, MA, CT, RI, NY
Contact:
Ms. Rosemary Monahan
U.S. Environmental Protection Agency
New England J. F. Kennedy Building
Boston, MA 02203
Phone: (617)565-3518
Fax: (617)565-4940

#L444
Northern New Hampshire, New York ECOMAP
State(s): ME, NH, VT, MA, CT, RI, NY
Contact:
Ms. Rosemary Monahan
U.S. Environmental Protection Agency
New England J. F. Kennedy Building
Boston, MA 02203
Phone: (617)565-3518
Fax: (617)565-4940
#L449
**Oregon Biodiversity Initiative**

**State(s):** OR  
**Contact:**

**#L450**
**Oregon High Desert Bioreserve**

**State(s):** OR, NV  
**Contact:**

**#L451**
**Ottawa River Watershed Study**

**State(s):** ON  
**Contact:**

**#L453**
**Otter Creek Watershed Restoration Project**

**State(s):** UT  
**Contact:**

**#P069**
**Northern Lower Michigan Ecosystem Management Project**

**State(s):** MI  
**Contact:**

**#P070**
**Ohio River Valley Ecosystem**

**State(s):** IL, IN, MN, MI, OH, WI, IA, MO  
**Contact:**

**#P071**
**Oklahoma Tallgrass Prairie Preserve**

**State(s):** OK  
**Contact:**

**#P072**
**Ouachita National Forest**

**State(s):** AR, OK  
**Contact:**
#P073
Owl Mountain Partnership
State(s): CO
Contact:
Mr. Jerry Jack
Project Manager
Bureau of Land Management
Kremmling Resource Area
1116 Park Avenue
PO Box 68
Kremmling, CO 80459
Phone: (303)724-3437
Fax: (303)724-9590

#1.454
PACFISH
State(s): OR, WA, CA
Contact:
State(s): OR, WA, CA

#1.455
Pacific Air Force Command
State(s): HI
Contact:
U.S. Air Force
Washington, DC

#1.456
Pacific Northwest Watershed Project
State(s): OR, WA, ID
Contact:
Ms. Domoni Glass
Manager, PNW Watershed Project
Boise Cascade Corporation
PO Box 50
Boise, ID 83728
Phone: (208)384-6670
Fax: (208)384-7699

#1.457
Panther-Cox Creek Watershed Management Plan
State(s): IL
Contact:
Mr. James Reynolds
Landscape Architect
Illinois Department of Natural Resources
Divison of Planning
524 South Second St., Room 310
Springfield, IL 62704-1787
Phone: (217)782-3715
Fax: (217)782-9599

#P074
Partners for Prairie Wildlife
State(s): MO
Contact:
Mr. William D. McGuire
Private-Land Coordinator
Missouri Department of Conservation
Wildlife Division
PO Box 180
Jefferson City, MO 65102-0180
Phone: (314)751-4115 ext. 148
Fax: (314)526-4663

#1.458
Partners for Wildlife
State(s): IN
Contact:
Mr. James J. Ruwaldt
U.S. Fish & Wildlife Service
620 S. Walker
Bloomington, IN 47403
Phone: (812)334-4261 ext. 213

#P075
Patrick Marsh Wetland Mitigation Bank Site
State(s): WI
Contact:
Mr. Alan Crossley
Wildlife Biologist
Wisconsin Department of Natural Resources
3911 Fish Hatchery Road
Fitchburg, WI 53711
Phone: (608)275-3242
Fax: (608)275-3338

#1.459
Peconic Bay
State(s): NY
Contact:
Mr. Vito Minei
Office of Ecology
Suffolk County
Department of County Center
Riverhead, NY 11401-3397
Phone: (516)852-2077
Fax: (516)852-2092

#1.460
Peconic Bioreserve
State(s): NY
Contact:
Mr. Stuart Lowrie
Director of the Peconic Bioreserve
The Nature Conservancy
South Fork/Shelter Island Chapter
PO Box 5125
East Hampton, NY 11937
Phone: (516)329-7689
Fax: (516)329-0215
E-mail: SLOWRIE@aol.com

#1.461
Penn’s Woods Strategic Plan
State(s): PA
Contact:
Mr. Daniel Devlin Chief
Resources Planning
Pennsylvania Department of Conservation & Natural Resources
Bureau of Forestry
PO Box 8552
Harrisburg, PA 17105-8552
Phone: (717)787-3444
Fax: (717)783-5109
E-mail: DEVLIN.DAN@a1.PADEA.GOV

#1.462
Pensacola Bay Watershed Ecological Evaluation
State(s): FL
Contact:
Mr. Michael A. Lewis
U.S. Environmental Protection Agency
Environmental Research Laboratory
1 Sabine Island Drive
Gulf Breeze, FL 32561
Phone: (904)934-9382
Fax: (904)934-2403

#1.463
Personal Use Firewood
State(s): WA
Contact:
Mr. James M. Pena
USDA Forest Service
Naches Ranger District
10061 Highway 12
Naches, WA 98937
Phone: (509)653-2205
Fax: (509)653-2638

#1.464
Phalen Chain of Lakes Watershed Project
State(s): MN
Contact:
Ms. Sherri A. Buss
Phalen Watershed Project Coordinator
Ramsey-Washington Metro Watershed District
1902 East County Road 13
Maplewood, MN 55109
Phone: (612)777-3665

#1.465
Pine Creek Water Quality Project
State(s): IA
Contact:
Mr. Jennifer Welch
USDA Natural Resources Conservation Service
1321 Edginton Avenue
Eldora, IA 50627
Phone: (515)858-5892
Fax: (515)858-3335

#1.466
Pine Flats Ecosystem Management Project
State(s): MN
Contact:
Mr. Doug Haertzen
USDA Forest Service
Chippewa National Forest
Cass Lake Ranger District
Route 3, Box 219
Cass Lake, MN 56633
Phone: (218)335-2283
Fax: (218)335-6579

#1.467
Pines Project
State(s): CO
Contact:
Americorps
Mancos, CO

#1.467
Pineywoods Conservation Initiative
State(s): LA, TX
Contact:
Mr. Bob McWhorter
Director
The Nature Conservancy
Sandylands Preserve
PO Box 909
Silsbee, TX 77656-0909
Phone: (409)385-0445
Fax: (409)385-4745

#1.468
Pinos Ecosystem Analysis
State(s): CO
Contact:
Mr. Steve Hartvigsen
Facilitator
USDA Forest Service
Rio Grande National Forest
Del Norte Ranger District
Box 40
Del Norte, CO 81132
Phone: (719)655-3321

#1.469
Pine-El Dorado Desert Wildlife Management Area
State(s): NV
Contact:
The Nature Conservancy
Las Vegas, NV
### 8L469
**Platte River**

*State(s):* NE

*Contact:* Mr. David Bowman

Platte River Coordinator
U.S. Fish & Wildlife Service
PO Box 25486
Denver Federal Center
Denver, CO 80225
Phone: (303)226-8186

### 8L470
**Playsa Lakes Joint Venture**

*State(s):* TX, OK, KS, CO, NM

*Contact:* Mr. Chuck Mullins

U.S. Fish & Wildlife Service
2105 Osuna Road, NE
Albuquerque, NM 87113
Phone: (505)761-4525

### 8L471
**Pocket-Baker Ecosystem Analysis**

*State(s):* AZ

*Contact:* Mr. John Gerritsma

USDA Forest Service
Cocomin National Forest
Long Valley Ranger District
Long Valley Road, HC31 Box 68
Happy Jack, AZ 86024
Phone: (520)354-2216

### 8L472
**Pocono Habitat Demonstration Project**

*State(s):* PA

*Contact:* Ms. Susan Dowell

U.S. Environmental Protection Agency
Region III (3ES43)
841 Chestnut Building
Philadelphia, PA 19107
Phone: (215)597-0355
Fax: (215)597-7906

### 8L473
**Pocono Mountains**

*State(s):* PA

*Contact:* Mr. Ralph Cook

Vice President, Director
The Nature Conservancy
Poconos Mountains Office
PO Box 55
Long Pond Road
Long Pond, PA 18334
Phone: (717)643-7922
Fax: (717)643-7925

### 8L474
**Pocotaligo River and Swamp Restoration**

*State(s):* SC

*Contact:* Mr. Robert H. Chappell

Study Manager, Engineering and Planning Division
U.S. Army Corps of Engineers
Charleston District
PO Box 919
Charleston, SC 29402-0919
Phone: (803)727-4594
Fax: (803)727-4260

### 8L475
**Poulney River Conservation Program**

*State(s):* NY, VT

*Contact:* Mr. Michael S. Butcher

Director of Science and Stewardship
The Nature Conservancy
Eastern New York Chapter
251 River Street
Troy, NY 12180
Phone: (518)272-0195
Fax: (518)272-0298

### 8L476
**Powderhorn Wilderness Management Plan**

*State(s):* CO

*Contact:* Mr. Bill Bottomly

Wilderness Plan Team Leader
Gunnison Basin Resource Area
2505 S. Townsend
Montrose, CO 81401
Phone: (303)249-6047; FTS(700)322-7327

### 8L477
**Prairie Pothole Joint Venture**

*State(s):* ND, SD, MN, IA, MT

*Contact:* Mr. Mike McEnroe

Ecosystem Team Leader
U.S. Fish & Wildlife Service
Region 6
1500 E. Capitol Avenue
Bismarck, ND 58501
Phone: (701)250-4418
Fax: (701)250-4412

### 8L478
**Prairie, Wetland, and Missouri River Mainstem Ecosystem**

*State(s):* ND, SD

*Contact:* Mr. Mike McEnroe

Ecosystem Team Leader
U.S. Fish & Wildlife Service
1500 E. Capitol Avenue
Bismarck, ND 58501
Phone: (701)250-4418
Fax: (701)250-4412

### 8L479
**Proposed Coquille Forest of Coquille Indian Tribe**

*State(s):* OR

*Contact:* Mr. Ed Metcalf

Chair
Coquille Indian Tribe
P.O. Box 1435
Coos Bay, OR 97420
Phone: (800)622-5869

### 8L480
**Protection of Forest Health and Productivity Research**

*State(s):* WA

*Contact:* Mr. Richard Everett

Science Team Leader
USDA Forest Service
Wenatchee Forest Service Laboratory
1133 N. Western Avenue
Wenatchee, WA 98801
Phone: (509)664-2742

### 8L481
**Pu‘u Kukui Watershed Management Area**

*State(s):* HI

*Contact:* Mr. Randal T. Bartlett

Watershed Supervisor
Maui Pineapple Company, Ltd.
4900 Honolua/ila Highway
Lahaina, HI 96761
Phone: (808)669-5439
Fax: (808)669-7089

### 8L482
**Puerto Rico Forest Stewardship Program**

*State(s):* PR

*Contact:* Mr. Diego Jimenez

State Forester
Puerto Rico Department of Natural & Environmental Resources
Forest Service Bureau
P.O. Box 5887
San Juan, PR 00906
Phone: (809)724-3647; (809)724-3584
Fax: (809)721-5984

### 8L483
**Puget Sound Estuary**

*State(s):* WA

*Contact:* Mr. John Armstrong

U.S. Environmental Protection Agency
Region X, MS WD-139
1200 6th Avenue
Seattle, WA 98101
Phone: (206)553-1368
Fax: (206)553-0165
#L483
Pyramid Lake/Stillwater Marsh Project  
State(s): NV  
Contact: Mr. Graham Chisholm  
The Nature Conservancy  
443 Marsh Avenue  
Reno, NV  89509  
Phone: (702)322-4990  
Fax: (702)322-5132  

#L484
Pysh River Cooperative  
State(s): WA  
Contact: Mr. Norm Schaaf  
General Manager  
Merrill & Ring Company  
PO Box 1058  
Tonopah, NV  89445  
Phone: (702)623-5025  
Fax: (702)322-4990

#L485
Quantitative Methods for Modeling Forest Ecosystems  
State(s): OH  
Contact: Dr. Charles Scott  
USDA Forest Service  
359 Main Road  
Delaware, OH  43015  
Phone: (614)368-0101  
Fax: (614)368-0152  
E-mail: scott@trees.neusfs4153.gov

#L486
Quinn River Riparian Improvement and Demonstration Project  
State(s): NV  
Contact: Mr. Steve Williams  
Supervisory Range Conservationist  
USDA Forest Service  
Humboldt National Forest  
Santa Rosa Ranger District  
1200 East Winnemucca Boulevard  
Winnemucca, NV  89445  
Phone: (702)623-5025

#L487
Railroad Valley Wetlands Enhancement  
State(s): NV  
Contact: Mr. Mark Biddlecomb  
Tonopah Resource Area Wildlife Biologist  
Bureau of Land Management  
Battle Mountain District  
Tonopah Resource Area  
PO Box 911  
Tonopah, NV  89049  
Phone: (702)482-7800  
Fax: (702)482-7810

#L488
Rattlesnake Island Marsh Project  
State(s): TX  
Contact: Dr. M. Todd Merendino  
Texas Parks and Wildlife Department  
Matagorda County Courthouse, Rm. 101  
Bay City, TX  77414  
Phone: (409)244-7634  
Fax: (409)244-7628

#L489
Red River Watershed  
State(s): ND, MN  
Contact: Mr. Paul Willman  
Red River RC&D Council  
1104 Hill Avenue  
Grafton, ND  58237  
Phone: (701)352-0127  
Fax: (701)352-3015

#L490
Red Wolf Recovery Program  
State(s): NC  
Contact: U.S. Air Force  
Washington, DC

#L491
Red-cockaded Woodpecker  
State(s): GA  
Contact: Georgia Pacific Corporation

#L492
Redding Resource Management Plan  
State(s): CA  
Contact: Mr. Francis Berg  
Supervisor Resource Mgmt Specialist  
Bureau of Land Management  
Reed River Resource Area  
355 Hemsted Drive  
Redding, CA  96002  
Phone: (916)224-2100  
Fax: (916)224-2172

#L493
Resource Characterization Study  
State(s): PA  
Contact: Mr. John Arway  
Pennsylvania Fish and Boat Commission  
450 Robinson Lane  
Bellefonte, PA  16823  
Phone: (814)359-5140

#L494
Restoration of Ohio Oak Forests with Prescribed Fire  
State(s): OH  
Contact: Dr. Elaine Kennedy Sutherland  
Research Ecologist  
USDA Forest Service  
Northeastern Forest Experiment Station  
359 Main Road  
Delaware, OH  43015  
Phone: (614)368-0090  
Fax: (614)368-0152  
E-mail: sutherland@asr.ars.usda.gov

#L495
Revision of the Forest Plan for the Targhee National Forest  
State(s): ID, WY  
Contact: Mr. Dale Pekar  
Team Leader  
USDA Forest Service  
Targhee National Forest  
PO Box 208  
St. Anthony, ID  83445-0208  
Phone: (208)624-3151  
Fax: (208)624-7635

#L496
Richland Creek Corridor  
State(s): NC  
Contact: Ms. Kate Dixon  
Executive Director  
Triangle Land Conservancy  
1100A Wake Forest Road  
Raleigh, NC  27604  
Phone: (919)833-3562  
Fax: (919)755-9356

#L497
Rio Grande Basin Landscape-Scale Assessment  
State(s): TX, NM, AZ  
Contact: Mr. K. Bruce Jones  
U.S. Environmental Protection Agency  
EMSL-LV/MS  
PO Box 93478  
Las Vegas, NV  89193-3478  
Phone: (702)798-2671  
Fax: (702)798-2208  
E-mail: msdkbj@vegas1.las.epa.gov

#L498
Rio Puerco Watershed Stabilization Initiative  
State(s): NM  
Contact: Mr. Hector A. Villalobos  
Area Manager, Rio Puerco Resource Area  
Bureau of Land Management  
Albuquerque District  
435 Montano NE  
Albuquerque, NM  87107  
Phone: (505)761-8797  
Fax: (505)761-8911

#L499
Riparian Ecosystem Assessment and Management (REAM)  
State(s): MO  
Contact: Mr. Eric W. Kurzejeski  
Wildlife Research Biologist  
Missouri Department of Conservation  
1110 S. College Ave.  
Columbia, MO  65201  
Phone: (314)882-9880  
Fax: (314)882-4517  
E-mail: kurzee@mail.conservation.state.mo.us

#L500
Riparian Recovery Plan Initiative  
State(s): AZ, NM  
Contact: U.S. Fish & Wildlife Service  
Albuquerque, NM
#L501
Rochester Embayment Area of Concern
State(s): NY
Contact: Mr. Alice Yeh
U.S. Environmental Protection Agency
Region I
26 Federal Plaza
New York, NY 10278
Phone: (212)264-1865
Fax: (212)264-2194

#L502
Sage Grouse Habitat Improvement Initiative
State(s): CO
Contact: Mr. Joe Capodice
Wildlife Biologist
Bureau of Land Management
Gunnison Basin Resource Area
216 N. Colorado
Gunnison, CO 81230
Phone: (303)641-0471; FTS(700)859-4450
Fax: (970)244-3083

#L503
Saginaw Bay Area of Concern
State(s): MI
Contact: Ms. Nancy Phillips
U.S. Environmental Protection Agency
Region V (WQW-16J)
77 W. Jackson Boulevard
Chicago, IL 60604
Phone: (312)886-9376
Fax: (312)886-7804

#L504
Salmon Habitat and River Enhancement (SHARE)
State(s): ME
Contact: Champion International Corp.
Bucksport, ME

#L505
San Francisco Bay Plan
State(s): CA
Contact: San Francisco Bay Conservation & Development Commission
San Francisco, CA

#L506
San Francisco Bay/Sacramento-San Joaquin Delta Estuary
State(s): CA
Contact: Mr. Patrick Wright
Chief
U.S. Environmental Protection Agency
Region IX
75 Hawthorne Street
San Francisco, CA 94105-3901
Phone: (415)744-1989
Fax: (415)744-1078

#L507
San Joaquin River Management Program
State(s): CA
Contact: Mr. Dale Hoffman-Floerke
California Department of Water Resources
3251 “S” Street
Sacramento, CA 95816
Phone: (916)227-7530
Fax: (916)227-7554

#L508
San Joaquin Valley Regional Ecosystem Protection Planning Group
State(s): CA
Contact: California Department of Water Resources
Fresno, CA

#L509
San Joaquin Valley: Strategy for Balancing Biodiversity and Economy
State(s): CA
Contact: Mr. James Abbott
Area Manager
Bureau of Land Management
Bakersfield District
Caliente Resource Area
3801 Pegasus
Bakersfield, CA 93308
Phone: (605)391-6000
Fax: (605)391-6040

#L510
San Juan Basin Unlined Pit Closure and Remediation
State(s): NM
Contact: Mr. Bill Liess
Bureau of Land Management
Farmington District
1235 La Plata Highway
Farmington, NM 87401
Phone: (505)599-6321
Fax: (505)599-9889

#L511
San Juan Bay Estuary Program
State(s): PR
Contact: Ms. Teresa Rodriguez
Program Director
U.S. Environmental Protection Agency
1492 Ave Ponce De Leon, Apt. 417
San Juan, PR 00907-4127
Phone: (809)729-6931
Fax: (809)729-7747

#L512
San Luis Rey River Corridor Management Plan
State(s): CA
Contact: Ms. Stephanie L. Wilson
U.S. Environmental Protection Agency
Region IX (W-3-2)
75 Hawthorne Street
San Francisco, CA 94105-3901
Phone: (415)744-1968
Fax: (415)744-1078

#P085
San Luis Valley Comprehensive Ecosystem Management Plan
State(s): CO
Contact: Refuge Manager
U.S. Fish & Wildlife Service
Alamosa/Monte Vista National Wildlife Refuge
9383 El Rancho Lane
Alamosa, CO 81101
Phone: (719)589-4021
Fax: (719)589-9184

#L513
San Miguel River Multi-Objective Plan
State(s): CO
Contact: Ms. Karen Tucker
Recreation Planner
Bureau of Land Management
UBRA
2505 S. Townsend
Montrose, CO 81401
Phone: (970)249-6047
Fax: (970)249-8484

#P086
San Pedro River
State(s): AZ
Contact: Ms. Karlene Burrus
Field Representative
The Nature Conservancy
27 Ramsey Canyon Road
Hereford, AZ 85615
Phone: (602)378-2785

#L514
San Rafael Valley Association Planning Efforts
State(s): AZ
Contact: VACA Ranch
Cooper, AZ

#L515
San Simon River Ecosystem Project
State(s): AZ, NM
Contact: Bureau of Land Management
Safford District
San Simon Resource Area
Ecosystem Management in the United States: An Assessment of Current Experience

#L516
Sand Pine-Scrub Oak
State(s): FL
Contact:
USDA National Forest
Silver Springs, FL

#L521
Sevilleta National Wildlife Refuge Long-Term Ecological Research Site
State(s): NM
Contact: Dr. Bruce Milne
Principal Investigator
University of New Mexico
Department of Biology
Albuquerque, NM 87131
Phone: (505)277-5356
Fax: (505)277-0304
E-mail: bmline@sevilleta.unm.edu

#L522
Shawangunk Ridge Biodiversity Partnership
State(s): NY
Contact: Mr. Michael S. Batcher
Director of Science and Stewardship
The Nature Conservancy
Eastern New York Chapter
251 River Street
Troy, NY 12180
Phone: (518)272-0195
Fax: (518)272-0298

#L523
Shoreline Management Initiative
State(s): TN
Contact: Ms. Tere McDonough
Tennessee Valley Authority
300 River Road
Martinsburg, WV 25401
Phone: (304)754-6709
Fax: (304)754-6709

#L517
Santa Monica Bay National Estuary Program
State(s): CA
Contact: Ms. Cheryl McGovern
U.S. Environmental Protection Agency
Region IX
400 7th Street
Oakland, CA 94622
Phone: (510)643-1430
Fax: (510)643-1429

#L525
Silver Creek
State(s): ID
Contact: Mr. Paul Todd
The Nature Conservancy
PO Box 165
Sun Valley, ID 83353
Phone: (208)788-0934

#L518
Sarasota Bay National Estuary Program
State(s): FL
Contact: Ms. Cheryl McGovern
U.S. Environmental Protection Agency
Region IX
400 7th Street
Oakland, CA 94622
Phone: (510)643-1430
Fax: (510)643-1429

#L526
Silvio Conte Refuge Environmental Impact Statement
State(s): MA and others
Contact:
U.S. Fish & Wildlife Service
Turner Falls, MA

#L527
Smoke Hole/North Fork Mountain Project
State(s): WV
Contact: Mr. Rodney Bartgis
Project Coordinator
Mid-Appalachians Field Office
2995 Grade Road
Martinsburg, WV 25401
Phone: (304)754-6709
Fax: (304)754-6709

#L528
Snake River Corridor Project
State(s): WY
Contact: Mr. Tim Young
Project Facilitator
Snake River Corridor Project
Teton County
PO Box 1727
Jackson, WY 83001
Phone: (307)733-8225
Fax: (307)733-8304
E-mail: tyoung@wyoming.com

#L519
Savannah River Basin
State(s): NC, SC, GA
Contact: Ms. Rodney Bartgis
U.S. Environmental Protection Agency
Region IV
345 Courtland St., NE
Atlanta, GA 30307
Phone: (404)347-2126 ext. 6581
Fax: (404)347-1797

#L529
Siouxon
State(s): WA
Contact:
Washington Department of Natural Resources
Olympia, WA

#L520
Savannah River Basin Watershed Project
State(s): GA, SC
Contact: Ms. Rodney Bartgis
U.S. Environmental Protection Agency
Region IV
345 Courtland Street, NE
Atlanta, GA 30307
Phone: (404)347-2126 ext. 6581
Fax: (404)347-3269

#L530
Soleduck Watershed Analysis
State(s): WA
Contact: Mr. John Meyer
National Park Service
Olympic National Park
600 East Park avenue
Port Angeles, WA 98362-6798
Phone: (360)452-4501
Fax: (360)452-0335

#L531
Southeast Michigan Initiative
State(s): MI
Contact: Ms. Mardi Klevs
U.S. Environmental Protection Agency
Region V (WCC-15J)
77 W. Jackson Boulevard
Chicago, IL 60604
Phone: (312)353-5490
Fax: (312)868-0168

#L532
Southern Appalachian Man and the Biosphere Program (SAMAB)
State(s): TN, NC, SC, GA, AL, WV
Contact: Mr. Hubert Hinote
Executive Director
SAMAB
Great Smoky Mountain National Park
1314 Cherokee Orchard Rd
Gatlinburg, TN 37738
Phone: (615)436-1701
Fax: (615)436-5598

#L509
Sawtooth National Forest
State(s): ID
Contact: Mr. Tim Young
Project Coordinator
Snake River Corridor Project
Teton County
PO Box 1727
Jackson, WY 83001
Phone: (307)733-8225
Fax: (307)733-8304
E-mail: tyoung@wyoming.com
#LS34
Southern Berkshires Bioreserve
State(s): MA, CT
Contact: Mr. Frank Lowenstein
Program Manager
The Nature Conservancy
South Berkshires Office
PO Box 268
Shefield, MA 01257
Phone: (413)229-0132
Fax: (413)229-0234
E-mail: FLOW@SIMONS.ROCK.EDU

#LS35
Southern California Ecoregion - U.S. Fish and Wildlife Service
State(s): CA
Contact: Mr. Marc Weitzel
Project Leader
U.S. Fish & Wildlife Service
Box 5839
Ventura, CA 93005
Phone: (805)644-5185

#P091
Southern Florida Ecosystem Restoration Initiative
State(s): FL
Contact: Col. Terrence Salt
Director
South Florida Ecosystem Restoration Task Force
6220 South Point Drive, Suite 310
Jacksonville, FL 32216
Phone: (904)625-2520; (904)232-2580

#LS36
Southern Forested Wetlands
State(s): MS, AL, AR, LA, SC, GA
Contact: Mr. Sammy King
National Biological Service
Southern Science Center
700 Cajundome Blvd.
Lafayette, LA 70506
Phone: (318)266-8519
Fax: (318)266-8592

#LS37
Southern Lake Michigan Initiative
State(s): MI
Contact:
The Nature Conservancy
Michigan City, IN

#LS38
Southern Phosphate District
State(s): FL
Contact: Mr. Tim King
Florida Game and Fresh Water Commission
Division of Fisheries
3928 Tenoroc Road
Lakeland, FL 33805
Phone: (813)499-2421

#LS39
Southlands Experimental Forest
State(s): GA
Contact: Mr. Craig Hedman Ph.D.
Forest Ecology Section Leader
International Paper
719 Southlands Road
Bainbridge, GA 31717
Phone: (912)246-3642 ext. 270
Fax: (912)243-0766

#LS40
Southwest Colorado Interagency LANDSAT Vegetation Classification Project
State(s): CO
Contact: Mr. James Ferguson
Wildlife Biologist
Bureau of Land Management
Uncompahgre Basin Resource Area
2505 S. Townsend Ave.
Montrose, CO 81401
Phone: (970)249-6047

#LS41
Southwest Wyoming Resource Evaluation
State(s): WY
Contact: Mr. Roger Wickstrom
Bureau of Land Management
Wyoming State Office
5353 Yellowstone Road
PO Box 1828
Cheyenne, WY 82003
Phone: (307)775-6011

#LS42
Special Ecological Stewardship
State(s): MO
Contact:
Missouri Department of Conservation
Jefferson City, MO

#LS43
Spring Creek Corridor Study
State(s): PA
Contact: Dr. Robert Carline
Pennsylvania State University
Pennsylvania Cooperative Fish & Wildlife Research Unit
Merkle Laboratory
University Park, PA 16802
Phone: (814)865-4511
Fax: (814)863-4710

#LS44
Spring Straight and Cedar Creek Ecosystem Based Planning Projects
State(s): KS
Contact: Mr. Kenneth W. Hoffman
USDA Natural Resources Conservation Service
Federal Building Rm. 190
Topeka, KS 66603-3569
Phone: (913)295-7630

#LS45
Spruce Creek and/or Logging Gulch - NEPA documents
State(s): ID
Contact: Ms. Lyn Morelan
Ecosystem Implementation Coordinator
1750 Front Street
Boise, ID 83702
Phone: (208)364-4170

#LS46
Squirrel River Integrated Activity Plan
State(s): AK
Contact: Ms. Susan M. Will
Bureau of Land Management
Kobuk District
1150 University Avenue
Fairbanks, AK 99709-3899
Phone: (800)437-7021
Fax: (907)474-2281

#LS47
St. Croix International Waterway Commission
State(s): ME
Contact: Ms. Lee Sochacky
St. Croix International Waterway Commission
PO Box 610
Calais, ME 04619
Phone: (506)466-7550
Fax: (506)466-7551

#LS48
St. Lawrence River Area of Concern
State(s): NY
Contact: Ms. Alice Yeh
U.S. Environmental Protection Agency
26 Federal Plaza
New York, NY 10278
Phone: (212)264-1865
Fax: (212)264-2194

#P092
St. Marys River Remedial Action Plan
State(s): MI, Ont
Contact: Ms. Susan Stoddart
Coordinator
Ontario Ministry of Environment and Energy
747 Queen Street East
Sault Ste. Marie, CANADA, ONT P6A 2A8
Phone: (705)949-4640

#LS49
State Involvement in National Forest Plan Revisions throughout Colorado
State(s): CO
Contact: Mr. Steve Norris
Assistant Director
Colorado Department of Natural Resources
1313 Sherman Street
Denver, CO 80817
Phone: (303)866-3311

#P093
State Lines Serpentine Barrens
State(s): PA, MD
Contact: Mr. James Thorne
The Nature Conservancy
1211 Chestnut St.
12th Floor
Philadelphia, PA 19107-4122
Phone: (215)963-1400
Fax: (215)963-1406
E-mail: jthorne@tnc.org
Ecosystem Management in the United States: An Assessment of Current Experience

#L550
Stillwater Creek
State(s): OH
Contact: Ms. Sandra Chenal
Coordinator
Crossroads RC & D
10874 State Route 212 NE
Suit A
Bolivar, OH 44612
Phone: (512)732-3096
Fax: (208)536-6794

#L552
Storm Lake Water Quality Protection Project
State(s): IA
Contact: Ms. Renee Braun
Iowa Department of Natural Resources
1617 North Lake Avenue
Storm Lake, IA 50586
Phone: (712)732-3096
Fax: (712)732-6059

#L553
Strategic Plan for the Illinois Department of Conservation
State(s): IL
Contact: Illinois Department of Conservation
Springfield, IL

#L554
Stream Protection and Management (SPAM) Program
State(s): HI
Contact: Ms. Sallie F. Edmunds
Project Manager
Hawaii Department of Land & Natural Resources
Commission on Water Resource Management
P.O. Box 621
Honolulu, HI 96809
Phone: (808)587-0252
Fax: (808)587-0219

#L555
Structure and Function of Urban Forests
State(s): NY
Contact: USDA Forest Service
Syracuse, NY

#L556
Sumner and Francis Marion National Forests
State(s): SC
Contact: Mr. Forrest Starkey
USDA Forest Service
4931 Broad River Road
Columbia, SC 29210-4021
Phone: (803)561-4000

#L557
Supersanctuary (Harris Center for Conservation Education)
State(s): NH
Contact: Mr. Meade Cadot
Hancock, NH 03449
Phone: (603)525-3394
Fax: (603)357-0718

#L558
Suwannee River Ecosystem Management Area
State(s): FL
Contact: Mr. Marvin Rallston
Suwannee River Water Management District
Route 3, Box 64
Live Oak, FL 32060
Phone: (904)362-1001
Fax: (904)362-1056

#L559
Systems to Integrate Harvesting with Other Resource Mgmt Objectives
State(s): WV
Contact: Dr. Chris LeDoux
USDA Forest Service
180 Canfield St.
Morgantown, WV 26505
Phone: (304)285-1572

#L560
TVA & Regional Natural Heritage Project
State(s): TN
Contact: Dr. William Redmond
Tennessee Valley Authority
Ridgeway Road
Norris, TN 37828
Phone: (803)561-4000
Fax: (904)362-1056
E-mail: WREDMOND@mhs-tva.attmail.com

#L561
Tampa Bay National Estuary Program
State(s): FL
Contact: Mr. Dean Ullock
Environmental Protection Agency
Region IV
345 Courtland Street, NE
Atlanta, GA 30365
Phone: (404)347-3555 ext. 2063
Fax: (404)347-3555 ext. 2063

#L562
Teanaway Ecosystem Demonstration Project
State(s): ID
Contact: Mr. Jon Haufler
Boise Cascade Corporation
PO Box 50
Boise, ID 83728
Phone: (208)384-6093

#L563
Texas Hill Country
State(s): TX
Contact: Mr. Jim Fries
The Nature Conservancy
PO Box 164255
Austin, TX 78716-4255
Phone: (512)327-9472
Fax: (512)327-9625

#L564
The Nature Conservancy Bioreserve Protection Program
State(s): MD
Contact: Mr. Nat Williams
The Nature Conservancy
2 Wisconsin Circle
Suite 300
Chevy Chase, MD 20815
Phone: (301)656-8673

#L565
Thousand Springs Preserve
State(s): ID
Contact: Mr. Chris & Mike O'Brien
The Nature Conservancy
1205 Thousand Springs Grade
Wendell, ID 83355
Phone: (208)536-6797
Fax: (208)726-1258

#P096
Tidelands of the Connecticut River
State(s): CT
Contact: Dr. Juliana Barrett
Tidelands Program Director
The Nature Conservancy
Connecticut Chapter
55 High Street
Middletown, CT 06457
Phone: (203)344-0716
Fax: (203)344-1334

#L566
Tillamook Bay National Estuary Program
State(s): OR
Contact: Ms. Marilyn Sigman
Tillamook Bay National Estuary Program
4000 Blimp Boulevard
Tillamook, OR 97141
Phone: (503)842-9922
Fax: (503)842-3680

PO Box 50
Boise Cascade Corporation
PO Box 50
Boise, ID 83728
Phone: (208)384-6093
#L567
Tomasket Citizen's Council
State(s): WA
Contact: Ms. Elaine J. Zieroth
USDA Forest Service
Okanogan National Forest
1240 South Second
Okanogan, WA 98840
Phone: (509)826-3565

#L568
Total Ecosystem Management Strategies
State(s): MI
Contact: Dr. Dean Premo
White Water Associates, Inc.
429 River Lane
Amasa, MI 49903
Phone: (906)822-7373
Fax: (906)822-7977

#L569
Town Creek Ecosystem Stewardship Project
State(s): MD
Contact: Mr. Rick Latshaw
Maryland Department of Natural Resources
Forest Service
3 Pershing Street, Rm. 101
Cumberland, MD 21502
Phone: (301)777-2137

#P097
Trail Creek Ecosystem Analysis
State(s): ID
Contact: Mr. Alan Pinkerton
USDA Forest Service
Sawtooth National Forest
Ketchum Ranger District
PO Box 2356
Ketchum, ID 83340
Phone: (208)622-5371

#L570
Trapper Creek Aquatic and Riparian Restoration Project
State(s): CO
Contact: Mr. Jay Thompson
Fishery Biologist
Bureau of Land Management
Glenwood Springs Resource Area
PO Box 1009
Glenwood Springs, CO 81602

#L571
Tri-County Leech Lake Watershed Project
State(s): MN
Contact: Mr. John Steward
Project Coordinator
Minnesota Department of Natural Resources
HCR 73, Box 172
Walker, MN 56484
Phone: (218)547-1770
Fax: (218)547-1887

#L572
Trinity River Restoration Project
State(s): CA
Contact:
California Department of Water Resources
Red Bluff, CA

#L573
Tripartite Agreement for Fish and Wildlife Resources
State(s): TN
Contact:
U.S. Air Force
Washington, DC

#L574
Trout Creek Mountain Working Group
State(s): OR
Contact: Doc and Connie Hatfield
Trout Creek Mountain Working Group
Hatfield's High Desert Ranch
Brothers, OR 97712
Phone: (503)576-2455
Fax: (503)576-2238

#P098
Trot Mountain Roadless Area
State(s): CO
Contact: Mr. Ron Pen
Forest Planner
USDA Forest Service
Río Grande National Forest
1803 West Highway 160
Monta Vista, CO 81144
Phone: (719)852-5941

#L575
Tululak River Fish Harvest Study
State(s): AK
Contact:
U.S. Fish & Wildlife Service
Kenai, AK

#L576
U.S. Fish & Wildlife Service–Pacific Islands Ecoregion
State(s): HI
Contact: Mr. Robert P. Smith
Pacific Islands Ecoregion Manager
U.S. Fish & Wildlife Service
Pacific Islands Ecoregion
Box 50167
Honolulu, HI 96850
Phone: (808)541-2749
Fax: (808)541-2756

#L577
USFS Participation in Local Agency Planning
State(s): CA
Contact:
USDA Forest Service
Lytle Creek, CA

#L578
USFS/BLM Ecosystem Management Team
State(s): CO
Contact: Ms. Marsha Kearney
USDA Forest Service Pike
San Isabel National Forest
1920 Valley Drive
Pueblo, CO 81230
Phone: (719)545-8737

#L579
Umpqua Basin Fisheries Restoration Initiative
State(s): OR
Contact: Mr. Rick Sohn
Lone Rock Timber Company
PO Box 1127
Roseburg, OR 97470
Phone: (503)673-0141
Fax: (503)440-2516

#L580
Uncompahgre Riverway
State(s): CO
Contact: Mr. Gary Weiner
RMR-PPO
National Park Service
PO Box 25287
Denver, CO 80225

#L581
Union Ridge Conservation Area
State(s): MT
Contact: Mr. Richard G. Whiteaker
District Forester
Missouri Department of Conservation
2500 S. Halliburton
Kirkville, MO 65501
Phone: (816)785-2420
Fax: (816)785-2553

#L582
Upland Wildlife Ecology Program
State(s): TX
Contact: Dr. Jerry Cooke
Program Director
Texas Parks and Wildlife Department
Upland Wildlife Ecology
4200 Smith School Road
Austin, TX 78744
Phone: (512)389-4774
Fax: (512)389-4398
E-mail: jcooke@access.texas.gov

#L583
Upper Arkansas Watershed Initiative and Forum
State(s): CO
Contact: Mr. Jeffrey Keidel
Upper Arkansas Watershed Coord.
PO Box 938
Buena Vista, CO 81211
Phone: (719)395-6035

#L584
Upper Big Mill Creek
State(s): IA
Contact: Mr. Darcy Lee Keil
Iowa Department of Natural Resources
603 1/2 East Plat
Maquoketa, IA 52060
Phone: (319)652-2337
Fax: (319)652-4889

#P099
Upper Farmington River Management Plan
State(s): CT, MA
Contact: Mr. Rick Jacobson
Connecticut Department of Environmental Protection
Fisheries Division
79 Elm Street
Hartford, CT 06106
Phone: (203)424-3482
| #1.585 | Upper Feather River Watershed Projects | State(s): CA | Contact: California Department of Water Resources Red Bluff, CA |
| #1.590 | Upper Sacramento River Riparian Habitat Management | State(s): CA | Contact: Ms. Stacy Cepello 2440 Main Street Red Bluff, CA 96080-2398 Phone: (916)529-7352 |
| #1.591 | Upper Wabash Habitat Restoration Project | State(s): IN | Contact: Mr. Jeff Kerfer U.S. Fish & Wildlife Service 620 S. Walker Bloomington, IN 47403 Phone: (812)534-4261 ext. 212 |
| #1.586 | Upper Mississippi River System Environmental Management Program | State(s): MN, IA, WI, IL, MO | Contact: U.S. Army Corps of Engineers Chicago, IL |
| #1.587 | Upper Mississippi River/Tallgrass Prairie Ecosystem | State(s): MN, IA, WI, IL, MO | Contact: U.S. Fish & Wildlife Service Winona, MN |
| #1.588 | Upper Niangua River Hydrologic Unit Area | State(s): MO | Contact: Ms. Karen Ross PO Box 1070 Buffalo, MO 65622 Phone: (417)345-7551 E-mail: dallaco@ext.missouri.edu |
| #1.592 | Upper/Middle Rio Grande Ecosystem | State(s): NM, CO | Contact: Single Point of Contact U.S. Fish & Wildlife Service Sevilleta National Wildlife Refuge PO Box 1248 Socorro, NM 87801 Phone: (505)884-4021 Fax: (505)884-7761 |
| #1.593 | Waikamoi Preserve | State(s): HI | Contact: The Nature Conservancy of Hawaii Makawao, HI |
| #1.594 | Waimea Canyon, Kokee & Polihale, and Na Pali Coast State Parks | State(s): HI | Contact: Mr. Wayne Souza Kauai Parks District Supervisor Hawaii Department of Land & Natural Resources 3060 Ewa Street Room 306 Lahue, HI 96766-1875 |
| #1.595 | Walnut Creek National Wildlife Refuge - Prairie Learning Center | State(s): IA | Contact: Mr. Richard Birger Project Leader U.S. Fish & Wildlife Service PO Box 399 Prairie City, IA 50228 Phone: (515)994-2415 Fax: (515)994-2104 E-mail: BIRGER_DICK@FWS.GOV |
| #1.596 | Waquoit Bay National Estuarine Reserve | State(s): MA | Contact: Ms. Christine Gault Waquoit Bay National Estuarine Reserve PO Box 3092 Waquoit, MA 02536 Phone: (508)457-0495 Fax: (617)727-5537 |
| #1.589 | Waterboro Barrens Preserve | State(s): ME | Contact: Ms. Nancy Sferra South Maine Preserves Manager The Nature Conservancy 160 Main St. Sanford, ME 04073 Phone: (207)490-4012 Fax: (207)490-4012 |
| #1.597 | Washington State Ecosystems Conservation Project--Riparian & Wetland Program | State(s): WA | Contact: Project--Upland Wildlife Restoration Mr. Dan Blatt Washington Department of Fish & Wildlife 600 Capitol Way North Olympia, WA 98501-1091 Phone: (360)902-2594 |
| #1.600 | Wells Creek Watershed Partnership | State(s): MN | Contact: Beth Knudsen Minnesota Department of Natural Resources 1801 S Oak Street Lake City, MN 55041 Phone: (612)345-5601 Fax: (612)345-3975 E-mail: Knudsen@dnr.state.mn.us |
#L602  Wells Resource Management Plan, Elk Amendment
State(s): NV
Contact: Mr. Bill Baker
Area Manager
Bureau of Land Management
Elko District Office
3900 E. Idaho Street
PO Box 831
Elko, NV  89802
Phone: (702)753-0200
Fax: (702)753-0255

#L603  West Clear Creek Ecosystem Management
State(s): AZ
Contact: Mr. John Gerritsma
USDA Forest Service
Coconino National Forest
Long Valley Ranger District
Long Valley Road, HC31 Box 68
Happy Jack, AZ  86024
Phone: (520)354-2216
Fax: (520)354-2216

#L604  West Elk Wilderness HRM/AMP
State(s): CO
Contact:
USDA Forest Service
Paonia, CO

#L605  West Eugene Wetlands Project
State(s): OR
Contact: Mr. Johnathan T. Beall
West Eugene Wetlands Project Manager
Bureau of Land Management
Eugene District
PO Box 10226
Eugene, OR  97440-2226
Phone: (503)683-6413
Fax: (503)683-6981

#L606  West Fork Bear River Ecosystem Management Project
State(s): WY
Contact:
USDA Forest Service
Evansville, WY

#L607  Westvaco Corp., Timberlands Division, Southern Region/Southern Woodlands
State(s): SC
Contact: Mr. Fred W. Kinard Jr.
Westvaco
PO Box 1950
Summerville, SC 29484
Phone: (803)871-5000
Fax: (803)851-4602

#L608  Wetlands Productivity Study
State(s): LA
Contact:
U.S. Air Force
Washington, DC

#L609  Whole Farm/Ranch Planning
State(s): GA, ID, MN, NE, NY, PA
Contact:
USDA Natural Resources Conservation Service
Washington, DC

#P103  Wild Stock Initiative
State(s): WA
Contact: Mr. Rich Lincoln
Washington Department of Fish and Wildlife
600 Capitol Way North
Olympia, WA  98501-1091
Phone: (206)902-2750

#P104  Wildlife Area Planning
State(s): WA
Contact: Mr. Paul Dahmer
Wildlife Area Inv. & Planning Coordinator
Washington Department of Fish and Wildlife
600 Capitol Way North
Olympia, WA  98501-1091
Phone: (360)664-0705
Fax: (360)902-2946
E-mail: dahmepad@dfw.wa.gov

#L610  Wildlife Communities and Habitat Relationships in New England
State(s): MA
Contact: Dr. Richard DeGraaf
Project Leader/Chief Research Wildlife Biologist
USDA Forest Service
Holdsworth Hall
University of Massachusetts
Amherst, MA  01003
Phone: (413)545-0357

#P105  Wildlife Habitat Improvement Group
State(s): VT
Contact: Mr. David Clarkson
RR1 Box 2426
Newfane, VT  05345
Phone: (802)365-4243
E-mail: DCLARKS@LEG.STATE.VT.US

#L611  Willamette River Basin
State(s): OR
Contact: Mr. Mike Rylko
U.S. Environmental Protection Agency
Region X
1200 Sixth Avenue
Seattle, WA  98101
Phone: (206)553-4014
Fax: (206)553-0165

#L612  Willapa Alliance Natural Resource Program
State(s): WA
Contact: Mr. Dan'l Markham
Willapa Alliance
PO Box 278
South Bend, WA  98586
Phone: (360)875-5195
Fax: (360)875-5198
E-mail: willapanet@IGC.APC.ORG

#L613  Wilson Creek National Battlefield
State(s): MO
Contact:
National Park Service
Republic, MO

#L614  Xeric Oak Scrub Ecological Survey
State(s): FL
Contact:
U.S. Air Force
Washington, DC

#L615  Yakima River Watershed Council
State(s): WA
Contact:
USDA Forest Service
Cle Elum, WA

#L616  Yampa Valley Alliance
State(s): CO
Contact: Mr. Duane Holmes
National Park Service
RMRO-PPO
PO Box 25287
Denver, CO  80225
Phone: (303)969-2855
Fax: (330)987-6676
Yavapai Ecosystem
State(s): AZ
Contact: Mr. Mark Johnson
District Ranger
USDA Forest Service
Chino Ranger District
Chino Valley, AZ  86313

Yazoo Basin
State(s): MS
Contact: The Nature Conservancy

Yreka River - Siskiyou Forest Management Roundtable
State(s): CA

Yuba Watershed Institute
State(s): CA
Contact: Yuba Watershed Institute
17790 Tyler Foote Road
Nevada City, CA  95959
Phone: (916)292-3777; (916)478-0817
APPENDICES
RESOURCES GUIDE:
SELECTED DOCUMENTS ON ECOSYSTEM MANAGEMENT

BIBLIOGRAPHIES AND INTERNET SOURCES


CASE STUDIES AND CATALOGS

Colorado Ecosystem Partnership (Colorado Department of Natural Resources and USDI-Bureau of Land Management), 1994. Partnerships for sustainability. Colorado Department of Natural Resources, 1313 Sherman Street, Denver CO 80203.


OVERALL ASSESSMENTS AND POLICY STATEMENTS


U.S. Congress, House of Representatives, 1994. Ecosystem management: Sustaining the nation’s natural resources trust. Majority Staff Report, Committee on Natural Resources, 103-2, Committee Print No. 6.


USDA-Forest Service and Morris Arboretum, 1994. An ecosystem-based approach to urban and community forestry: An ecosystem manager’s workbook. USDA Forest Service (State and Private Forestry) and Morris Arboretum of the University of Pennsylvania (Center for Urban Forestry), Philadelphia, PA.


Theory

Barth, Sara, R.L. Gooch, J. Havard, D. Mindell, R. Stevens, and M. Zankel, 1994. Exploring the theory and application of ecosystem management. School of Natural Resources and Environment, The University of Michigan, Ann Arbor, MI.


### Abbreviations & Glossary of Commonly-Used Terms

#### Abbreviations

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
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<tbody>
<tr>
<td>ACOE</td>
<td>U.S. Army Corps of Engineers.</td>
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<tr>
<td>BMP</td>
<td>Best Management Practices; management practices recognized by the U.S. Environmental Protection Agency as acceptable with regard to the associated level of pollutants.</td>
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<tr>
<td>DNR</td>
<td>Department of Natural Resources; the land management or environmental quality department in many states. Also common: DEQ—Department of Environmental Quality; DOC—Department of Conservation.</td>
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<tr>
<td>DOI</td>
<td>U.S. Department of Interior.</td>
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<tr>
<td>EPA</td>
<td>U.S. Environmental Protection Agency.</td>
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<tr>
<td>FACA</td>
<td>Federal Advisory Committee Act.</td>
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<td>GIS</td>
<td>Geographic Information Systems.</td>
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<tr>
<td>NEP</td>
<td>National Estuary Program; a nationwide program authorized by the Clean Water Act and administered by the U.S. Environmental Protection Agency.</td>
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<tr>
<td>NPS</td>
<td>National Park Service, U.S. Department of Interior.</td>
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<tr>
<td>NRCS</td>
<td>Natural Resources Conservation Service (formerly SCS–Soil Conservation Service), U.S. Department of Agriculture.</td>
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<tr>
<td>NWR</td>
<td>National Wildlife Refuge; managed by the U.S. Fish and Wildlife Service.</td>
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<tr>
<td>TNC</td>
<td>The Nature Conservancy; a national non-profit land trust.</td>
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<tr>
<td>TVA</td>
<td>Tennessee Valley Authority.</td>
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<td>USDA</td>
<td>U.S. Department of Agriculture.</td>
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#### Glossary

<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
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<tbody>
<tr>
<td>Biodiversity</td>
<td>The variety of living things, including variation at the genetic, species, and landscape levels.</td>
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<tr>
<td>Community</td>
<td>The organisms living and interacting in a given area.</td>
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<tr>
<td>Disruption of Fire Regime</td>
<td>Many ecosystems in North America depend on the occurrence of fires at particular intervals for ecosystem health and regeneration. However, since the turn of the century, public and private landowners alike have tended to suppress fires. As a result, many ecosystems are imperiled: characteristic species are not regenerating, and uncharacteristic species are taking over.</td>
</tr>
<tr>
<td>Ecosystem</td>
<td>A three-dimensional volume of space, including all its physical and biological components, which are recognized to be interconnected. An ecosystem contains soil, air, and all organisms living in the soil or air. An ecosystem is more or less homogenous both as to the form and structure of the land and as to the vegetation supported thereon. The ecosystem concept is hierarchical. For instance, large</td>
</tr>
</tbody>
</table>
ecosystems defined by a relatively homogenous macroclimate and physiography may be subdivided into smaller ecosystems
based on finer distinctions in physiography, soil, and vegetation.

**Ecosystem Management**

The definition of this term is the subject of much debate in the literature. For example, Edward Grumbine states that "Ecosystem management integrates scientific knowledge of ecological relationships within a complex sociopolitical and value framework toward the general goal of protecting native ecosystem integrity over the long term." (Grumbine, E.R. 1994. What is ecosystem management? Conservation Biology 8:2:27-38.)

U.S. Forest Chief Jack Ward Thomas gives the following definition: "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." (Thomas, J.W. 1994. New directions for the Forest Service. Statement of Jack Ward Thomas, Chief, Forest Service, U.S. Department of Agriculture, before the Subcommittee on National Parks, Forests and Public Lands, and the Subcommittee on Oversight and Investigations, Committee on Natural Resources, U.S. House of Representatives, February 3.)

This assessment does not adhere to any particular definition in the literature. Instead, natural resource management projects are considered ecosystem management if they fulfill at least one of two criteria. (See Introduction, page 4, for criteria.)

**Exotic Species**

Species that do not naturally occur in the ecosystem. In many instances, exotic species become invasive pests. Well-known examples include kudzu (*Pueraria lobata*) and European buckthorn (*Rhamnus cathartica*).

**Federally-Listed Species**

Under the Endangered Species Act (ESA), the federal government, in particular the U.S. Fish and Wildlife Service, is required to list species that are considered threatened or endangered. Listed species are protected by the provisions of the ESA.

**Geographic Information Systems (GIS)**

A computerized system of maps and linked databases. These systems generally make use of a base map of a particular area and a set of overlays. Each overlay shows a characteristic of the area. Through combining particular overlays, a natural resource manager has a visual image of the manner in which certain area characteristics spatially relate to one another.

**Hydrologic Alteration**

Modification of the amount or movement of water through an ecosystem. This includes drainage of wetlands, dams, levees, aquifer mining, reservoirs, and channelization of rivers and streams.

**Non-Point Source Pollution**

Pollution from diffuse sources that do not discharge at a single location. Examples include seepage, stormwater runoff from agricultural lands and urban streets, and septic tanks leachate.

**Point Source Pollution**

Pollution discharged by discrete sources, including factories, power plants, and sewage treatment plants.

**Riparian areas**

Areas adjacent to streams or lakes.

**Stakeholders**

Individuals and organizations with an interest in a particular area or project. Stakeholders may include public agencies at all levels (federal, state, and local), non-profit organizations, private landowners, industry, and others.

**State-Listed Species**

In addition to the federal listing system under the Endangered Species Act, many states have enacted parallel legislation pertaining to the protection of threatened and endangered species in those states. Such species are not necessarily threatened or endangered in other states, nor are they necessarily listed as federal threatened or endangered species.
**Sustainability**  Management practices that do not take more from an ecosystem than it can provide. Theoretically, sustainable management practices can continue in perpetuity, since they do not lead to exhaustion of natural resources.

**Watershed**  An area that is drained by a particular stream system. For instance, the Mississippi watershed consists of the entire area drained by the Mississippi and its tributaries.