RECENT TRENDS IN ECOSYSTEM MANAGEMENT

by

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Abstract

Since the early 1990s, ecosystem management (EM) has emerged as a promising new paradigm for natural resource management and conservation planning. In 1995, researchers at the University of Michigan conducted a broad-based study of 105 EM projects, the results of which were published in *Ecosystem Management in the United States* (Island Press, 1996). In an effort to track and evaluate the ecological and institutional developments these projects experienced over the past five years, our research team designed a comprehensive follow-up survey and administered it to project managers at these same sites. The survey focused on advances in project lifecycle, strategies, monitoring techniques, process and ecological outcomes, self-rated success, and factors impeding and facilitating project progress. Survey data received from 84 respondents was analyzed using a variety of statistical techniques, including factor analysis and several standard tests of statistical significance. Follow-up interviews with project managers were used to develop a series of 26 case studies that highlighted significant trends in the contemporary practice of ecosystem management. In general, our study reveals that the ecosystem-based approach is resulting in improvements in the field. While a small percentage of projects have been terminated as a result of budget shortfalls or political opposition, most projects are moving from planning into implementation of ecosystem management. Process outcomes, which dominated responses in 1995, have increased further still. Ecological outcomes, especially those related to ecological restoration, have also increased significantly since 1995, suggesting that several years of institution-building often precede accomplishments being made in the field. Based on the analysis of the survey data and the case studies, recommendations are presented to aid policy makers and ecosystem management practitioners in implementing EM on the ground.

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Executive Summary

In 1995, researchers at the University of Michigan conducted a broad-based study of 105 ecosystem management (EM) projects, the results of which were published in *Ecosystem Management in the United States* (Island Press, 1996). In an effort to track and evaluate the ecological and institutional developments these projects experienced over the past five years, our research team designed a comprehensive follow-up survey and administered it to project managers at these same sites. This study provides a characterization of 84 ecosystem management projects surveyed; the outcomes that the EM projects have realized through their program activities; an analysis of factors that have facilitated and impeded project implementation; advice from project managers; and recommendations offered by the research team to policy makers and resource managers involved in EM efforts. It also includes in-depth case studies focused on attempts to implement EM in the U.S. Forest Service in the Pacific Northwest and on efforts to establish EM in state natural resource and environmental protection agencies.

Lifecycle of Ecosystem Management Projects. Ecosystem management projects included in the survey have moved steadily from the planning stages into implementation. In 1995, only 63 percent of projects had begun implementation activities, while 89 percent of projects in 1999 were in implementation status, signaling advances along the project lifecycle, conceptualization, planning, implementation, and conclusion. In 1999, 10 percent of project managers classified their projects as "inactive." Ecosystem management projects administered by state agencies were a high proportion of these inactive projects. While some ended because the mandated projects were completed, others are currently inactive due to political opposition or changes in state government administrations. By examining differences between projects classified as "early implementation" and "late implementation," clear increases in project outcomes become evident. Late implementation projects, achieving their goals and realizing outcomes, are rating themselves more successful than early implementation projects. In addition, project managers in later stages of implementation appear to not only overcome impediments to project progress, but also improve on the factors that facilitate project implementation.

Strategies for Project Implementation. The strategies most commonly used by the project managers in this study are leveraging existing state and federal programs, ensuring and/or increasing stakeholder involvement, collecting new information on ecological, social or economic factors, and promoting compatible resource use. Strategies related to setting land aside for protection are among the least popular strategies reported, although this may be due in part to the heavy involvement of state and federal agencies in the population studied. Between 1995 and 1999, there was a dramatic increase in the proportion of projects indicating that they used existing state and federal programs as a major strategy. Interviews with practitioners suggest that state and federal agencies are often able to provide the necessary resources and expertise to EM efforts that may be lacking in non-governmental and other agencies. There was also an increase in the proportion of respondents developing an ecosystem management plan to help achieve project goals.

Stakeholder Involvement. Government agencies, non-governmental organizations, universities, and local landowners were the most important stakeholder groups for the projects examined in this study. State and federal land management

agencies (the U.S. Forest Service, state departments of natural resources) and non-government organizations such as The Nature Conservancy are frequently the initiators and the day-to-day organizers of the projects. Local landowners constitute a highly significant set of participants, particularly as EM projects set their sights on developing public-private partnerships for the purpose of fostering more pervasive stewardship attitudes and practices.

Monitoring Project Progress. Project managers have incorporated various types of monitoring practices into their activities. The most commonly reported indicator used for monitoring was monitoring for flora and/or fauna. Most of these EM projects are ultimately attempting to improve upon an ecological condition, such as the reintroduction or protection of a plant or animal species. Such monitoring reveals whether concrete, on-the-ground results are being achieved. The next two indicators in rank were monitoring for changes in management activities and monitoring the level of coordination and cooperation with others. However, when asked to explain their answers, respondents noted that monitoring for such behavioral indicators was difficult to capture.

Organizational and Behavioral Outcomes. The data suggests that the EM projects are continuing to grow and evolve in terms of institutional strength. In the early and middle phase of a project, success should perhaps be understood primarily in terms of positive procedural and behavioral outcomes. Of these procedural and behavioral outcomes, the most frequently reported are improved communication and cooperation, increased public awareness of ecosystems, and new stakeholders involved in projects. At the same time, as projects mature and institutional structures become more stable and reliable, the success of ecosystem management projects will certainly be assessed in terms of the ability of those institutions and processes to secure higher levels of ecological integrity while balancing the needs of surrounding communities. This study found significant increases between 1995 and 1999 with respect to several types of organizational and behavioral outcomes. Sharp increases were observed in levels of trust and respect between stakeholders, in the public's awareness of the ecosystem and stresses on it, in public education efforts, and in land acquisition.

Ecological Outcomes. Ecological outcomes are being reported with greater frequency now than they were four years ago. There was a significant increase in the proportion of project managers reporting that scientific understanding of the project area had improved, ongoing restoration efforts, and ecological restoration results. Overall, practitioners were most likely to report improved scientific understanding, increased research, improved integrity of the ecosystem, and ongoing ecological restoration as ecological outcomes of their EM project efforts. Because collecting and sharing scientific information was also reported as a major project strategy, this suggests that project managers are achieving some of what they set out to do. Ecological outcomes, such as the removal of invasive species and an increasing numbers of native species, were considered relatively less significant outcomes, however such outcomes may be less likely to apply to a larger subset of the projects.

Measuring Project Success. EM projects do not have a simple formula for measuring the success of their projects; nor is such a formula likely to evolve in the near future. Instead, projects take into account the unique social, political, and ecological context of their project in designing project goals, and thereby the indicators by which their success will be measured. On average, project managers rated themselves roughly as successful in 1999 as they did in 1995. However, an average self-rated

success of approximately 4 on a scale of 1 to 5, indicates that these projects do, on the whole, consider themselves relatively successful. Managers of these projects reported that they rely heavily on stakeholder involvement, progress in implementing a project plan, public opinion regarding the project, and change in ecological conditions on-the-ground when evaluating their success. Although both ecological and process factors were considered in rating success, the majority of factors considered in rating project success were not changes in ecological conditions.

Factors Facilitating Project Progress. The two highest rated facilitating factors were the presence of dedicated and energetic individuals and interagency cooperation. The lowest rated factor was hiring staff from surrounding communities. Three facilitating factors have increased in importance from 1995 to 1999: dedicated participants, well-defined management plans, and political support. Project managers often reported the importance of strong individual efforts as key to carrying projects through the initial stages of development – a period often marked by slow progress and opposition from outside groups. The rising significance of well-defined management plans as a factor facilitating project progress also seems to point to a maturing in the developmental stage. Management plans not only aided projects in focusing on specific goals; the plans were also used as a method to increase stakeholder involvement. Finally, the increase in political support as a facilitating factor from 1995 to 1999 may, in part, be driven by increased public.

Factors Impeding Project Progress. In 1995, project managers ranked resource constraints second only to organized opposition in terms of factors that impeded project progress. In 1999, 28 percent of survey respondents replied that resource constraints were a serious impediment, giving it a rating of 4 or 5 on a 1 to 5 scale. Ecological stresses and pressure for development have significantly increased as obstacles to progress since 1995. In 1999, pressure for development was tied with resource constraints as the most frequently cited impeding factor. It appears that projects are moving beyond planning and establishing relationships, and are, as a result, encountering greater challenges on the ground, including ecological stresses and development pressure threatening the ecosystems they are focused on. Pressure for development, considered a serious impediment in 1995 by only eight percent of survey respondents had a positive response of 28 percent in 1999. Similarly, while ecosystem stresses were considered a serious impediment by only nine percent of respondents in 1995, 24 percent indicated so in 1999.

Advice from Project Managers. The advice offered by project managers and the factors they identified as necessary for continued progress provide a window into the rich opportunities and the many frustrations faced by those committed to pursuing ecosystem-based approaches to natural resource management. Organizational complexity and logistical problems tend to multiply as stakeholder participation increases; the budgeting process is complicated and sometimes compromised by interagency cooperation; planning and implementing programs on a large scale can threaten to dilute action as understaffed organizations attempt to tackle problems potentially beyond their program capacities. At the same time, however, the commitment demonstrated by many project managers in this study suggest that these difficulties are not insurmountable and that the on-the-ground results that more and more managers are seeing through their efforts justify the many challenges presented by this still young and dynamic experiment in natural resource management.

Ecosystem-Based Management in the U.S. Forest Service. This study suggests that, to some extent, change efforts have permeated the ranks of the U.S. Forest Service to the ground level in Wenatchee National Forest. Interviewees cited improved stakeholder relations, increased inter-disciplinary collaboration, job functions which are increasingly aligned with ecosystem management, more science-based decision-making, and efforts to limit ecologically threatening management practices.

The major influences thought to be driving change in Wenatchee National Forest are primarily external, not internal, to the agency. Court cases, which led to the President's Northwest Forest Plan, were cited as the primary driver. A number of factors were cited as facilitating and impeding a move toward ecosystem-based management at the local level. Stakeholder involvement, public collaboration, strong leadership and the willingness of individuals to create change were all thought to be factors helping Wenatchee National Forest move toward ecosystem-based management. Resource constraints were thought to be a major factor hindering progress; employees expressed a sense of not being able to carry out more ecosystem-based activities because of a shrinking workforce and declining budget. An over-emphasis on planning and under-emphasis on implementation also emerged as an impediment.

Implementing Ecosystem Management in State Agencies. This series of case studies examines efforts to implement ecosystem management in state natural resource agencies. All three agencies examined, the Missouri Department of Conservation, the Florida Department of Environmental Protection, and the Minnesota Department of Natural Resources, have made considerable strides toward developing regional or ecosystem-based systems of natural resource inventory, monitoring, and analysis. They have also instituted program planning and implementation at a regional or ecosystem scale, often focusing on watersheds or other well-defined landscape features.

State EM efforts have failed or faced serious implementation difficulties both because of external opposition by stakeholders and because of internal resistance to the initiative by employees within the agency. Implementation successes have occurred at various scales and with respect to differing levels of planning and management. In Missouri and Minnesota some level of ecoregional planning is now standardized within the agencies. In Florida, the fate of EM in the agency as a whole is unclear, given a recent turnover in the state administration and reorganization efforts within the Department of Environmental Protection. However, a number of the EM programs established under the broad-scale EM initiative begun in the early 1990s have taken root in particular regions of Florida and will likely persist in the future, with or without strong leadership from agency headquarters.

Recommendations for Policy Makers and Project Managers. The information shared by EM practitioners and the quantitative and qualitative analyses conducted by the research team lead to a number of proposed guidelines for both policymakers and managers.

- Develop policies recognizing the long-term nature of ecosystem management projects;
- Develop Land Legacy programs;
- Focus on stakeholder outreach and involvement;
- Use pilot approaches to demonstrate EM approach and show early success;
- Collect baseline information and establish monitoring programs; and
- Set realistic timelines for achieving both ecological and process outcomes.

Chapter 1
Introduction

Since the early 1990s, ecosystem management (EM) has emerged as a promising new paradigm for sustainable natural resource use and conservation. Improved scientific understanding of ecosystem processes, heightened demands for meaningful public involvement, and increased frustration with the goals and strategies of traditional resource management have fueled the gradual shift to an ecosystem-based approach to management that is more holistic in its conception of the natural environment and more inclusive in its dealings with stakeholders.

As a form of natural resource management, EM is a successor both to the tradition of multiple use stemming from Gifford Pinchot and to the preservationist policies advocated by environmentalists following John Muir. Multiple use focuses on optimizing the productivity of natural resources such as forests, fisheries, or aquifers and on developing management regimes that are economically efficient in the sense that they maximize net benefits associated with the uses of those resources. Preservationism, on the other hand, has long put a premium on wilderness and pristine natural environments, which it often conceives of as set apart from human activity and interference.

As a set of ideas about *management*, ecosystem management challenges the "hands-off" policies of preservationists, insisting instead that ours is a historical condition in which, for better or worse, most ecosystems are and will continue to be actively manipulated by human beings. In view of this reality, what needs to be done is to develop better management strategies, not to abandon management altogether. Insofar as it focuses on *ecosystems*, however, ecosystem management understands and evaluates natural resources differently than traditional multiple use doctrine. It invokes as its primary goal the maintenance or restoration of ecosystem integrity and to this end attempts to develop strategies for moving human communities towards more sustainable patterns of natural resource use. The ecosystem concept is viewed as particularly important because it prompts natural resource managers and others involved in decisions about environmental planning to think about the natural systems concerned across a range of spatial and temporal scales.

A rich body of literature has developed describing various principles, goals, and strategies of the EM approach. Summarizing much of the literature that had been written up until 1994, Edward Grumbine offered the following concise account of ecosystem management:

> Ecosystem management integrates scientific knowledge of ecological relationships within a complex sociopolitical and value framework toward the general goal of protecting nature ecosystem integrity over the long term.[1]

Given its diverse and changing goals, the variety of governmental and non-governmental institutions and organizations that have embraced it, and its relative youth as a management paradigm, EM admits of no precise definition. However, Grumbine identifies ten "dominant themes" that traverse discussions of EM.[2] These include:

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[1] R. Edward Grumbine, "What is Ecosystem Management?," Conservation Biology 8 (1994), p.31.
[2] R. Edward Grumbine, "Reflections on 'What is ecosystem management?," Conservation Biology 11 (1997), 41-47.

- "Big-picture thinking"—a systems approach that recognizes the complexity and dynamism of ecological and social systems

- Ecological boundaries—the use of ecological rather than political or social boundaries to define management units and objectives

- Ecological integrity—an integrated, holistic approach to management and conservation that aims at maintaining or restoring ecological processes specific to particular landscape units

- Data collection—an emphasis on developing the adequate scientific information needed to make sound management decisions

- Monitoring—a push to increase monitoring efforts so as to enable more effective evaluation of natural and social conditions targeted by program activity

- Interagency cooperation—a recognition that ecological boundaries rarely correspond to jurisdictional boundaries, thus requiring the need for collaborative decision-making and management by agencies

- Humans embedded in nature—an acknowledgement that human beings are a part of nature and are thoroughly dependent on "ecosystem services" provided by the surrounding biotic and abiotic environment

- Adaptive management—an approach to management that recognizes complexity and uncertainty, and that builds on the knowledge and experience accumulated in and through program implementation

- Organizational change—the need for institutions to transform organizational structures, work plans, incentive structures, budgets, and evaluation protocols in order to advance EM objectives

- Value orientation—a recognition of the value-laden character of natural resource management decisions and policies

In a recent article, Steven Yaffee has advanced the discussion of EM a step further by distinguishing between three basic types or "faces" of ecosystem management: "environmentally-sensitive ecosystem management," "the ecosystem approach to resource management," and "ecoregional management."[3] Yaffee's typology is based on the recognition that individuals representing different interest groups and natural resource disciplines come to EM with different underlying scientific, management, and ethical preconceptions. These differences are reflected in how they think and talk about EM. "Environmentally-sensitive multiple use" represents a form of EM largely continuous with traditional multiple use resource management, differing only by being more holistic in its consideration of the environmental constraints that limit the satisfaction of human wants and needs. Typically, environmentally-sensitive multiple use versions of EM view continued economic expansion as being compatible with ecosystem health, so long as greater efforts are made to mitigate harms done by

[3] Steven L. Yaffee. "Three Faces of Ecosystem Management," Conservation Biology, 13 (1999).

pollution and to limit unsustainable patterns of resource extraction and use. The "ecosystem approach to resource management" represents a more robust and conservation-minded form of EM, one that incorporates the ideas of balancing sustainable resource use and ecological integrity, working on a regional scale, and relying on the organizational tools of adaptive management, multi-party collaboration, and interagency cooperation. The final form of EM is "ecoregional management," which subscribes to the idea that there are real ecosystem units on the landscape and that EM is about maintaining and restoring ecological processes using regionally based organizational strategies.

All three faces of EM are represented in the projects examined in this study. Some of the state and federal EM projects, especially those centered on forest management or other renewable resources, subscribe to the first version of EM. The majority of the projects probably qualify as ecosystem approaches to resource management. Then there are a number of EM projects that aspire to ecoregional management, at least as a long-term goal. Taken as a whole, this study illustrates the diversity of EM projects that environmentalists, industry representatives, private landowners, and government agencies across the United States have forged over the last two decades. The projects surveyed range in size from 60 to 410 million acres. Some are predominantly public projects, led by either a federal or state agency; others are run by non-governmental organizations, often with extensive partnership networks in the local community. What unifies all these projects is a commitment to working toward the long-term, large-scale, sustainable ecological and economic health of ecosystems. In virtually all cases, this goal is pursued by means of interdisciplinary work and information sharing, increased stakeholder involvement, and recognition of the need to work across traditional political and administrative boundaries.

Without directly consulting ecosystem management practitioners, it would be impossible to evaluate the potential or success of this new approach. Prior to 1995, there had been no comprehensive evaluation of ecosystem-based approaches to natural resource management. The research that had been undertaken was restricted in scope to single agencies, a limited number of case studies, or certain regions of the country. In 1995, a group of graduate students from the University of Michigan's School of Natural Resources and Environment, recognizing the need for a more comprehensive study, initiated a broad-based study of ecosystem-based projects in the United States. With many of these EM projects still in the early stages of development, the group set out to gather ideas and experiences from ecosystem management practitioners, the people in the field who could best articulate the benefits and drawbacks of managing from an ecosystem-based standpoint. The study comprised a representative set of project managers who were questioned about project background, goals and strategies, ecological and institutional accomplishments, levels of stakeholder involvement, and factors facilitating and impeding progress on their projects. This study culminated in the publication of *Ecosystem Management in the United States*, a book that has proven to be a valuable resource for academics, natural resource managers, and policy makers.[4]

The 1995 study and 1996 book provided a substantive overview of the accomplishments and challenges faced by ecosystem managers and practitioners. Few of the projects investigated in 1995, however, had progressed to the point where

[4] Steven L.Yaffee, Irene C. Frentz, Paul W. Hardy, Ali F. Phillips, and Barbara E. Thorpe. 1996. Ecosystem Management in the United States: An Assessment of Current Experience. Island Press, Washington, DC.

meaningful assessments of on-the-ground ecological improvements and longer-term accomplishments could be made. With this group of ecosystem management projects now nearly five years further along in their progress, our research team recognized that there was an opportunity to learn considerably more about the practice of ecosystem management by revisiting the projects and reevaluating their strategies and accomplishments, as well as the obstacles they have faced.

In an effort to document and assess the ecological and institutional developments these projects experienced over the past five years, the research team designed a comprehensive survey and administered it to project managers at the same 105 sites studied previously. Eighty-four surveys were returned. Data from incoming surveys was entered into a database and supplementary materials received from the projects were catalogued and filed. The research team conducted extensive statistical analyses of the data in order to understand significant trends and correlations. Analysis of the data also assisted in the development of case studies about the lessons these projects offer about the practice of EM. The analysis of the survey results, coupled with in-depth telephone interviews with a broad range of project managers, stakeholders, and experts involved in ecosystem management, provide the basis of the study contained herein.

Among the questions this project attempts to answer are the following:

- Of the ecosystem management programs surveyed in the previous study, how many are still operative?
- What stages of development have these projects reached?
- What strategies are these projects employing to meet their goals?
- What progress has been made in meeting the process and ecological goals of the project?
- What factors have impeded or contributed to the successes of the project?
- What indicators are ecosystem management project managers using to track success?
- What trends emerge and what areas deserve further study?
- What shape has ecosystem management taken in the U.S. Forest Service and in state natural resource and environmental protection agencies?

Much of the insight offered by this study arises from the testimony of actual EM practitioners and from the advice they have to offer to others engaged in the process of managing natural resources with the “bigger picture” in mind. The experiences of these practitioners, combined with the analysis of general trends in EM, combine to make this study an important resource for those concerned about the collaborative stewardship of natural resources.

OVERVIEW OF STUDY

The study begins with an account of the methodology underlying the research team’s work (Chapter 2). The methodological discussion outlines the research questions that drove the study, the survey development process, the forms of statistical analysis used to interpret the survey data, and the approach used in developing the 22 short case studies and the 4 longer case studies. Also discussed are the assumptions

governing the use of data collected in 1995, which forms the baseline for many of the analyses pursued in the present study.

In Section I, the study provides an outline of the basic characteristics of 84 EM projects. An effort is first made to describe the lifecycle of the EM projects under investigation, focusing on the movement from planning to implementation (Chapter 3). Chapter 4 characterizes the projects in terms of the ecological, political, economic, and organizational strategies that managers and stakeholders have devised to achieve project goals. Chapter 5 provides an overview of the types and levels of stakeholder involvement in the projects. Finally, an account is given on the forms of monitoring that projects have undertaken in an effort to track changes in the project area and to evaluate the effectiveness of their program activities (Chapter 6).

Section II of the study focuses on the outcomes that the EM projects have realized through their program activities. Two specific types of outcomes are distinguished. Discussed in Chapter 7, process-related outcomes include organizational processes and the behaviors and attitudes of stakeholders. Chapter 8 addresses ecological outcomes, on-the-ground achievements related to natural processes that result from program activities. An analysis is also provided of self-rated success scores provided by project managers in Chapter 9.

Section III of the study includes an analysis of information provided by managers about the factors that have facilitated project implementation (Chapter 10) and the factors that have hindered project implementation (Chapter 11).

Section IV concludes the survey-based portion of the study with a discussion of advice offered by project managers to other potential EM practitioners (Chapter 12) and with a series of recommendations offered by the research team to policy makers and resource managers involved in EM efforts (Chapter 13). In the Conclusion (Chapter 145), the research team reviews the significant findings of the survey-based component of this investigation and reflects on the lessons learned from conducting this type of study five years after the initial study.

Throughout the body of the study, 22 short case studies are interspersed to illustrate major findings arrived at through the analysis of the survey data and further supported by interviews with project managers. Chapter 15 is an in-depth case study focused on attempts to implement EM in the U.S. Forest Service in the Pacific Northwest. Another series of 3 case studies investigates efforts to establish EM in state natural resource and environmental protection agencies in Chapter 16.

Chapter 2
Methodology

INTRODUCTION

The 1995 study provided the research team with a defined set of 105 sites as well as a wealth of background information about them (Appendix A). In addition, the research team also had at its disposal extensive files and databases developed by the earlier research team through the use of surveys, interviews, and requests for written information.

The initial task was to review recent literature concerning ecosystem management and the data available from the previous study. This information was used to formulate the questions that would define our research. The team was particularly interested to find out what kinds of changes and developments had occurred at the 105 EM projects in the intervening five years. It was determined that "Phase I" of the new study would focus on the following questions:

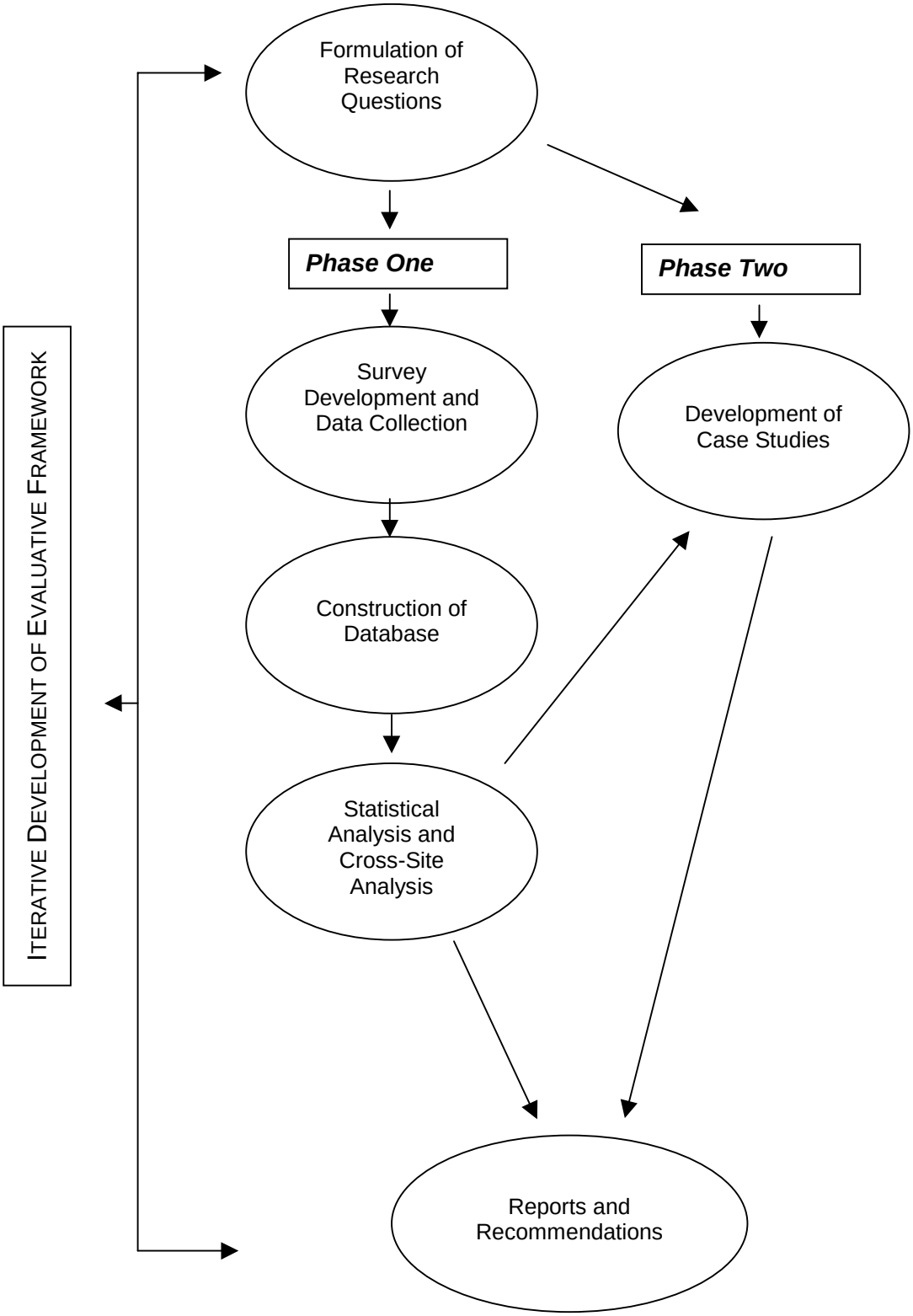
- How many of these projects are still operative?
- What kinds of ecological and process-related outcomes have been realized?
- What kinds of obstacles and difficulties have those projects encountered?
- How successful are the projects?
- What kinds of advice would project managers offer to those seeking to develop a new EM project?

The research team decided that the best way to answer these questions would be through a written survey addressed to the project managers of the original 105 sites. After extensive development and pre-testing, the survey was mailed in May of 1999. Information from returned surveys was then used to construct a database and develop a quantitative assessment of recent trends in ecosystem management (Figure 2-1).

The research questions underlying "Phase II" of our project reflect both the individual interests of the research team members and our desire to explore ecosystem management at least in part through qualitatively richer, case-based narratives. These questions focused on trends in ecosystem management in: (1) the United States Forest Service, (2) a series of representative state agencies, and (3) subsets of the 105 projects that exemplified particular EM strategies, stakeholder configurations, and achievement of ecological and organizational outcomes. These in-depth case studies were developed on the basis of interviews, agency and program documents, and analysis of relevant survey data.

The products of the study as a whole are at once theoretical and practical. They consist, first, of a statistically-based analysis of the survey and an account of how this set of EM projects has developed over the past five years. Second, they include a series of more narrowly focused case studies of recent experiments in EM, at the federal, state, and local levels. Third, they consist of a set of practical recommendations for project managers, policy makers, government officials, and academics that embody the lessons we have learned about how best to design and implement ecosystem management in the field.

FIGURE 2-1: FLOW DIAGRAM OF THE DEVELOPMENT OF RESEARCH METHODOLOGY



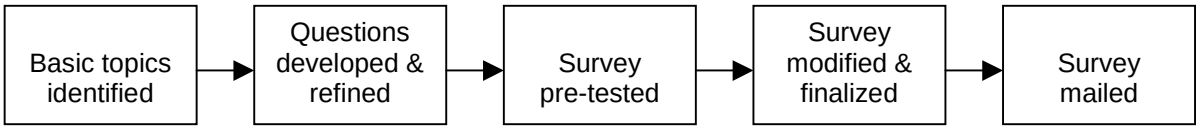
DEVELOPMENT OF THE SURVEY

During the spring of 1999, the research team designed and pre-tested a survey for the follow-up study of the 105 sites (Appendix B). The team first outlined basic topics for exploration based on a review of EM literature, the questionnaire developed in 1995, and findings from the previous study that we believed would provide a useful baseline for comparison (Figure 2-2). These general topic areas were:

1. Project organization and strategies
2. Monitoring
3. Project outcomes and success
4. Factors facilitating and/or impeding project implementation

Each team member developed questions for different sections of the survey. Faculty and other advisors with expertise in ecosystem management and survey methods provided feedback in an iterative survey development process. The team then pre-tested the survey with ecosystem management practitioners, including the authors of the 1995 study, and made final revisions to the survey. The final survey contained 20 questions, of which three were categorical, seven were on a 1 to 5 Likert scale, and ten were open-ended. (Seven of these questions, it should be noted, were multi-part questions.) While the length of the final survey was somewhat of a concern, the team hoped to gather a broad set of data about the projects in order to draw meaningful conclusions about how they have developed and changed since the 1995 study. The team thought it best to do this through a single survey and to search for more detailed answers in Phase II of the project. It was also believed that practitioners would have a greater incentive to respond to the survey, despite its length, because of the published results associated with the previous study.

FIGURE 2-2: SURVEY DEVELOPMENT PROCESS



The team relied on the selection of ecosystem management projects completed by the 1995 research team. In 1994-1995, the previous team compiled a list of 615 ecosystem-scale projects that could be considered as “ecosystem management” projects. From this list, they narrowed their targeted list to 77 projects, later expanded to 105, that provided adequate representation across geographic regions, sizes of projects, landscape types, and leadership or initiation by different organizations including federal and state agencies and local and national non-governmental organizations. Because one of the primary goals of this Masters Project was to follow progress at specific projects over time, our team decided to solicit information from the same 105 target projects.

Prior to mailing the survey, the team contacted all planned recipients of the survey by telephone in order to gather some preliminary information on project status, confirm addresses, and facilitate a higher response rate. Surveys were mailed in May 1999 to the 105 projects, along with a cover letter and a two-page description of each project from the 1996 book, which we requested the recipients to edit and update

(Appendix C). Follow-up calls were made to survey recipients who had not responded by late summer to encourage their participation. A total of 84 surveys (80 % of the original population) were completed and returned by fall 1999 (see Appendix A for a complete list of survey respondents). Very few of the two-page project descriptions were returned with updated information, however, and those that were returned included few substantive changes. Consequently, the project team decided not to update the project descriptions.

DEVELOPMENT OF SITE DATABASE

In order to compile the collected data in a form conducive to interpretation and analysis, the project team developed a database using Microsoft Access. We designed the database to mirror the format of the survey. One hundred seventy four separate fields were created to accommodate each question (e.g., 13a, 13b, etc.). Drop-down menus were used whenever possible to minimize chance of error when entering the results. Project names and identification numbers, created for the 1995 Masters Project, were merged into the database and used as the key identifying information for the records. Each site, with an assigned project number, was made into one record. Additional fields, such as the team member to which the project was assigned and the date the information was entered, were added in order to facilitate management of the information. The team created a data entry form within Access to further facilitate data entry, including drop-boxes for scaled questions and memo fields for open-ended questions.

A table containing information for project contacts was created within the same Access database, and linked to the survey results through project number. Contact information was imported from databases used by the previous ecosystem management masters project team, confirmed through individual telephone calls over the summer, and updated as necessary.

STATISTICAL ANALYSES

Data analysis for the 84 returned surveys was broken into three methodological categories based on question type:

1. Quantitative analysis
2. Categorical analysis
3. Narrative analysis

Twenty survey questions were divided up among the project team members by type (Table 2-1). The statistical software package SPSS, version 8.0, was used to examine the quantitative and categorical survey responses. The data was imported from the Microsoft Access database.

TABLE 2-1: SUMMARY OF SURVEY CATEGORIES AND ANALYTICAL METHODS

Survey Question	Hypotheses In the intervening 5 years, projects will have:	Type of Analysis Required Descriptive analyses, including the distribution, mean responses, and ranked-responses of variables, were used for all quantitative variables.
Current status of the project	- progressed from planning to implementation of specific activities	Quantitative Analyses • Pearson Chi-square tests to compare against 1995 results • Independent sample t-tests to compare "early implementation" projects against "late implementation" projects for other variables
Strategies currently being used by the project and planned for the future	- continued to rely on core EM strategies, and reduced use of strategies likely to be more effective at earlier phases of the - increased use of EM plans as a project strategy	Quantitative Analysis • T-tests to compare means of strategies used, interpretation using 95% confidence intervals of the means • One-way ANOVA to compare distribution of responses to different variables • Pearson Chi-square tests to compare against 1995 results
Changes to project objectives and organization	- modified the basic organizational structure and objectives of the projects as necessary as they have gained experience	Narrative Analysis • Content analysis of responses, extraction of key quotes
Responsible party(ies) for project implementation	- relied heavily on state and federal agencies for project implementation	Narrative Analysis • Content analysis of responses, extraction of key quotes
Levels of involvement of stakeholder groups	- incorporated a wide variety of stakeholder groups in EM projects - relied heavily on state and federal agency involvement for resources and expertise	Quantitative Analysis • T-tests to compare means of strategies used, interpretation using 95% confidence intervals of the means • Two-proportion z-tests to compare 1995 and 1999 results • Correlation between involvement of specific stakeholders and other variables
Indicators used to monitor project success and baseline information	- employed a wide variety of approaches to monitor project activities	Categorical and Quantitative Analysis • T-tests to compare proportions of monitoring indicators used, interpretation using 95% confidence intervals of the means • Independent sample t-test to compare responses between projects using "more monitoring" and "less monitoring" for other variables
Measures for evaluating process or organizational change	- employed a variety of approaches to monitor "process" changes	Narrative Analysis • Content analysis of responses, extraction of key quotes

Self-rated success of the project	- based their evaluation of success on both ecological and procedural outcomes - grown more successful over time	Quantitative Analysis • One way ANOVA to compare responses in 1995 to 1999 • Correlation of self-rated success to other variables
Factors considered in rating success	- used both ecological and procedural outcomes to measure success	Narrative Analysis • Content analysis of responses, extraction of key quotes
Ecological and procedural/behavioral outcomes	- realized increased ecological outcomes since 1995 - realized different levels of ecological outcomes depending on the project size - realized different levels of ecological outcomes depending on geographic region of the project	Quantitative Analysis • T-tests to compare means of outcomes reported, interpretation using 95% confidence intervals of the means • Correlation between specific outcomes and other variables • Pearson Chi-square tests to compare against 1995 results • Narrative Analysis • Content analysis of responses, extraction of key quotes from additional ecological and procedural outcomes listed
Facilitating and impeding factors to project progress	- faced primarily obstacles related to resources - taken advantage of and created facilitating factors for their success - overcome some obstacles (report fewer impeding factors) since 1995, report more facilitating factors since 1995	Quantitative Analysis • T-tests to compare means of facilitating and impeding factors, interpretation using 95% confidence intervals of the means • Correlation between specific facilitating and impeding factors and other variables • Narrative Analysis • Content analysis of responses, extraction of key quotes from additional factors listed
Factors needed for continued progress	- identified prerequisites for continued progress, including adequate resources, leadership, and stakeholder involvement	Narrative Analysis • Content analysis of responses, extraction of key quotes
Advice for undertaking an EM effort	- learned many valuable lessons that those involved in other EM efforts would benefit from	Narrative Analysis • Content analysis of responses, extraction of key quotes

Quantitative Analysis

Quantitative analyses were conducted on the Likert scale (5-point scale) questions in the survey: stakeholder involvement, procedural and ecological outcomes, facilitating and impeding factors for progress, and self-rated success.

To get an impression of each question's distribution, the project team constructed histograms noting overall shape, center point, and spread. The team then ran frequency analyses to determine the order and rank for each question based on the average response. For each question the project team recorded the means, standard deviations, the number of valid responses, and the percentages in each range (i.e. 20 % answered "1", 33 % answered "2" etc.). Each question was then rank ordered by the means enabling the project team to view which variables were rated highest, which variables lowest, and whether or not they appeared to be significantly different from one another.

Factor analysis using SPSS's Principal Axis Factoring was used for data reduction purposes for questions such as impeding factors that had many variables within a larger question. This method produced several "factors," sets of variables grouped together based on similarity of response. The individual variables grouped together by this analysis were then joined into one composite variable that was used in further analyses. The composite variable was calculated by the averages of the responses to the variables that were included in the group. For example, the composite variable "lack of resources" as an impeding factor includes the individual variables of funding shortages, personnel shortages, and high turnover of agency personnel. In some cases, the patterns of response to individual variables were too disparate to permit the creation of composite variables. Even when composite variables were formed and used for some analyses, individual variables were often used to provide another layer of information or to test of more specific hypotheses.

To determine if the order of the ranked means was significant, the team examined the 95% confidence intervals of the means of each question. Confidence intervals can be used to determine if the differences between the means are statistically significant. Variables whose confidence intervals overlap are not considered to be statistically different from each other, even if there is a difference between their means. The 95% confidence interval represents the range of responses within two standard deviations of the mean; if this survey were repeated with another sample of ecosystem mangers using the same methods, 95% of the responses to that question would be expected to fall within that range. Those questions whose confidence intervals appeared considerably different were tested using t-tests. Differences were generally considered significant if the resulting p-value (p) was less than or equal to 0.05.

To test hypotheses of relationships and influence of variables on each other, the team relied heavily on testing the correlation of groups of variables to each other. Several hypotheses were tested using this method, including the strength of the relationships between certain strategies and outcomes on self-rated success. A correlation is considered significant by the team if p equals 0.05 or less.

Categorical Analysis

Categorical analysis was conducted on questions regarding project status and strategies and monitoring methods being used by the project. Statistical methods employed for the analysis of these questions include: descriptive statistics, one-way ANOVA to compare the distribution of variables with multiple categories, and analysis of difference of proportions if the variable was re-categorized into a dichotomous variable (for example, transforming a “not used,” “not used, will use in future,” “minor use,” and “major use” categories into “used” or “not used”).

The current status of projects was analyzed using multiple approaches. The question asked respondents to “check all that apply” from a list of five possibilities: planning, some implementation, full implementation, inactive, and other. From the responses given, six categories resulted: inactive; planning; planning and some implementation; some implementation; planning and full implementation; and full implementation. These six categories were used with one-way ANOVA analyses to reveal the potential relationships between the different status responses and responses to other questions in the survey. A second approach discarded inactive projects and broke the resulting five categories into two simple categories: early implementation and advanced implementation based on responses given. This newly created dichotomous variable then was used to divide the sample into two “populations” and test hypotheses using independent sample t-test procedures that certain strategies, outcomes, and success levels relate to the degree of implementation. Finally, the six categories were collapsed into “planning” and implementation” categories to compare the 1999 status responses against the information collected from this same population in 1995. A Pearson Chi-square analysis was used to determine if the differences between the percentage of projects in planning and implementation could be considered statistically significant.

Questions on strategies and monitoring were broken down from their original categories into dichotomous variables for analysis purposes following the same technique described above. The responses to the use of the 19 strategies listed were re-indexed from three categories ('not used,' 'minor strategy,' and 'major strategy') to two ('not a major strategy' and 'major strategy'). Responses to the survey of the use of nine major areas used for monitoring the project were re-indexed from four categories ('not used,' 'not used, will use in future, 'minor use,' and 'major use') to two ('not a major strategy' and 'major strategy').

To determine if the differences between the proportion of responses in the two categories could be considered statistically significant, the team examined the 95% confidence intervals of the proportions of each question in a method similar to the analyses of the 95% confidence intervals of the means described above. Those questions whose confidence intervals appeared considerably different were tested using t-tests. Differences were considered significant if the resulting p was less than or equal to 0.05.

Content Analysis

Content analysis was conducted on the open-ended questions of the survey, which included questions on: changes in project objectives, changes in project goals, responsibility for project implementation, factors for evaluating effectiveness of project

organization, factors for evaluating overall project success, additional ecological or procedural outcomes not listed, additional facilitating or impeding factors not listed, factors required for continued project progress, and advice for those undertaking an EM effort. For each open-ended question the project team created several categories based on the responses given and tallied project responses. Descriptive analyses, such as frequencies of responses for the categories were conducted. Bar graphs were created to display the most commonly entered response for each question. In addition, respondent quotes were extracted to illustrate the range of responses.

DEVELOPMENT OF CASE STUDIES

Beyond the statistical analysis of responses to the survey, the team also focused on developing qualitative, case-based accounts of a diverse set of ecosystem management experiences. Research questions were formed using two methods. First, topics on federal and state trends in ecosystem management were explored based on the hypotheses regarding the role of ecosystem management activities of the U.S. Forest Service in the Northwest and of state natural resource agencies involved in ecosystem management activities. Second, case study research topics were developed based on the statistical findings from returned surveys.

Case Studies: The U.S. Forest Service and State Natural Resource Agencies

Through initial background research and literature reviews the project team developed two research questions that touched on major developments in the field of ecosystem management.

1. How have ecosystem management principles manifested themselves in the U.S. Forest Service?
2. What has been the experience of state natural resource agencies that have tried to implement ecosystem management guidelines and principles?

Research on these topics was conducted by background inquiry into existing literature, web-based resources (i.e. information on project histories, status, and relevant articles), and through recorded interviews, both telephone and person-to-person interviews. The interviews were transcribed to aid analysis.

Through an in-depth study of one National Forest, the U.S. Forest Service study aimed to better understand changes that had occurred in response to EM initiatives at the agency level. U.S. Forest Service employees in the Pacific Northwest were instrumental in identification of a candidate site. The Wenatchee National Forest was identified for the case study, and the Cle Elum District within the Wenatchee was selected for a more detailed review (Appendix C).

Fifteen interviews were conducted in-person with U.S. Forest Service employees in the fall of 1999 (Appendix D). Interviewees included employees representing a broad cross-section of disciplines at both the District and National Forest levels. Questions posed to the interviewees sought to gain insight into the degree to which day-to-day activities in one National Forest have changed since 1990 when the agency began issuing directives and policies related to principles of ecosystem management.

Questions also tried to elicit what was driving change and what factors have facilitated and/or impeded implementation of ecosystem-based management practices.

Research questions directed toward state implementation of ecosystem management principles were conducted through telephone interviews with a representative set of individuals from Minnesota, Missouri, and Florida. Additional background material on state ecosystem management efforts was gathered for Michigan, Illinois, Wisconsin, and the Enlibra, a cooperative Western Governors' Association initiative.

Minnesota, Missouri, and Florida were chosen as the case study states because their initiatives provided an interesting cross-section of approaches to state ecosystem management. The EM initiative by Florida's Department of Environmental Protection (DEP) was the most ambitious in terms of the amount of resources devoted to it, its legislative foundation, its reach throughout the organizational structure of the agency, and the amount of publicity it was given. The Florida DEP, moreover, is both a regulatory and a management agency. Minnesota's EM initiative, by contrast, is a more modest and less publicized effort, but one that appears to be taking hold throughout the Minnesota Department of Natural Resources (DNR). The Minnesota DNR is a land (and water) management agency with little regulatory authority. Missouri's ecosystem management initiative, Missouri Coordinated Resource Management, was chosen in part because it was one of the EM projects profiled in the 1995 study and in part because it never progressed beyond the planning phase. Intense political opposition by property rights activists forced the Director of the Missouri Department of Conservation (MDOC) to suspend the program.

Interviews were conducted in the summer and fall of 1999. Eleven interviewees in all, ranging from state natural resource officials to regional directors of non-governmental organizations, were asked questions regarding the experience of state sponsored ecosystem management projects. In each case, available documentation on the ecosystem management initiative was first reviewed and then a series of questions were written up in advance of the interview. To provide them with an opportunity to prepare, the principal interviewees—officials in state governments—were supplied with the questions in advance of the telephone interview. Eight of the interviews were taped and later transcribed. (The other three telephone interviewees declined to have the conversation taped.)

Case Studies Driven by Statistical Analysis

In order to build upon insights gained from statistical analysis, the project team developed twenty-two small case studies. Seventeen interviews were conducted with project managers to put real-life stories behind statistical findings. Case studies were written with the goal of providing a snapshot of the projects' involvement in various aspects of ecosystem management. Rather than being complete overviews of the projects and their accomplishments, they focused on a specific aspect of ecosystem management, and were designed to be incorporated within the discussions of the five primary areas of interest: lifecycle, strategies, ecological and process outcomes, facilitating and impeding factors, and success. To that end, the resulting case studies

were designed to be brief, approximately one to two pages in length. (See Appendix E for a complete list of case study titles and projects.)

The team first compiled a list of statistical findings that, based on uniqueness and research interests, warranted further investigation. The team then used this list in conjunction with the survey database to select potential candidates for telephone interviews. For example, if the research team was interested in investigating projects that had a high level of stakeholder involvement, the database was filtered to display only those projects that reported stakeholder involvement as a "very significant" facilitating factor, and "not significant" as an impeding factor.

Once the list of potential projects was completed, the research team developed a list of questions to be used during telephone interviews with project managers (Appendix F). To limit duplication, projects that were determined suitable for more than one case study were asked questions on all research topics in the same phone call. Interviews were tape-recorded and transcribed for review purposes during case study development.

DEVELOPMENT OF RECOMMENDATIONS

Finally, the project team examined the results of literature reviews, the 84 returned surveys, and 22 case studies to develop a set of recommendations for project managers and policy makers, government officials, and academics. For project managers, the recommendations focus on calling attention to those factors that can facilitate project progress and success. While this approach may take significant human and financial resources to undertake, it does produce on-the-ground and organizational changes with time. For policy makers the recognition that positive changes come with time underlies recommendations for the integration of an ecosystem-based approach to land and resource management decisions. The importance of collaboration in designing the management plan and the importance of continued funding and leadership in implementing these approaches is at the heart of these recommendations. For academics interested in evaluating ecosystem management practices, the project team examined the methods it used, primarily survey research and data interpretation, as a means of collecting and evaluating project development, outcomes, and success. While some aspects of ecosystem management planning can be adequately captured in a survey approach, the project team recommends alternative methods that may be better suited to the broad spectrum of approaches and goals of ecosystem-based projects.

PRESENTATIONS

The project team held a data review workshop with invited faculty and doctoral students in the School of Natural Resources and Environment on January 28, 2000. The purpose of the workshop was to present and to elicit evaluation and feedback regarding the team's preliminary interpretations of the statistical tests performed and their significant statistical findings.

The project team presented their completed project on April 10, 2000, at the School of Natural Resources and Environment, University of Michigan, in Ann Arbor, Michigan. The team presented key findings from the survey analysis, selected quotes from the case studies, and summaries of key findings. This presentation was used to

evaluate the findings and presentation methods before presenting a poster at the Society for Conservation Biology Annual Conference in June 2000.

SECTION I

Characteristics of Ecosystem Management Projects

Major Findings: Lifecycle of Ecosystem Management Projects

Ecosystem management projects included in the survey have moved steadily from the planning stages into implementation. In 1995, only 63 percent of projects had begun implementation activities. Eighty-nine percent of the project managers that responded to the 1999 survey categorized their status as in either "some" or "full" implementation, signaling advances along the project lifecycle, conceptualization, planning, implementation, and conclusion.

A third of the project managers classified their projects as being both in planning and in some form of implementation. Project implementation appears to be moving forward incrementally, with project managers undertaking some activities while continuing long-term planning. Many project managers suggested conducting pilot activities early in the process, demonstrating the ecosystem management approach and addressing the concerns of stakeholders. The coincidence of planning and implementation activities may reflect this pilot/demonstration approach. In addition, this combination of planning and implementation may be a reflection of an "adaptive management" approach, with managers learning lessons from implementation of some activities and consequently adjusting future planning and implementation.

In 1999, 10 percent of project managers classified their projects as "inactive." Ecosystem management projects administered by state agencies were a high proportion of these inactive projects. While some ended because the mandated projects were completed, others are currently inactive due to political opposition or changes in state government administrations, and the accompanying project deprioritization and defunding.

Project managers of continuing projects appear to be building on the lessons learned in the early stages of planning and implementation. By examining differences between projects classified as "early implementation" and "late implementation," clear increases in project outcomes become evident. Project respondents indicated that outcomes, including the development and implementation of an ecosystem management plan, improvement in on-the-ground management practices, increased scientific understanding, and establishment of monitoring programs, are all achieved to a greater degree by late implementation projects. Late implementation projects, achieving their goals and realizing outcomes, are rating themselves more successful than early implementation projects.

In addition, project managers in later stages of implementation appear to not only overcome impediments to project progress, such as lack of funding and opposition by landowners, but also improve on the factors that facilitate project implementation, including using existing state and federal programs, relying on dedicated and energetic individuals, and using an adaptive management approach.

Chapter 3
Lifecycle of Ecosystem Management Projects

INTRODUCTION

One of our research goals was to examine the activities and outcomes of ecosystem management projects in terms of project lifecycle. The challenges of information collection, collaboration, adaptive management, and incorporation of ecosystem processes make moving from conceptualization of an ecosystem-based management effort to planning to implementation especially challenging. We were especially interested in examining changes over time in project outcomes and factors that facilitate and impede project progress to determine if the factors influencing projects changed as they matured. Because the team had baseline data on the 105 projects contacted in 1995, we were able to examine how these projects, as a group, have changed and adapted over time.

The team hypothesized that as projects progressed the strategies they used, the outcomes they saw, and the factors that facilitate and impede project progress would change to reflect the adaptation of project strategies and activities in reaction to their experiences. For example, certain activities such as stakeholder outreach, developing an ecosystem management plan, establishing a monitoring plan, and training personnel serve as a prerequisite to most on-the-ground ecological activities. In addition, we hypothesized that both process and ecological outcomes would increase over time, primarily because of the continued work of the programs. For example, we expected outcomes such as increased public awareness and increased trust among stakeholders to increase because so many projects emphasize the importance of outreach and stakeholder involvement in all aspects of the project.

In the early 1990s, the term “ecosystem management” became increasingly prevalent in the United States with the adoption of the approach by several federal and state natural resource and land management agencies. However, ecosystem management is not a concept new to the 1990s: the projects included in the 1995 study now range in age from 5 to 44 years old. Of the 105 projects initially included in the study, thirty-five began before 1990, when ecosystem management began receiving considerable notice. An additional sixty-five projects were initiated between 1990 and 1995. However, there is an appreciable difference between the time an ecosystem management project is initiated and when implementation begins. The exact definition of implementation within the ecosystem management context can be difficult to define. Implementation generally refers to the commencement of on-the-ground activities, which includes activities ranging from stakeholder outreach and meetings to physical activities involved in the management of the resources of the ecosystem.

The team hypothesized that, given the passage of nearly five years since the last survey, the projects included in the 1995 study would have progressed to later stages of implementation. Project managers were asked to designate the status of their project by choosing as many of the following as they saw fit: planning, some implementation, full implementation, inactive, and other. Based on information gathered in 1995 on initiation and implementation dates of ecosystem management projects, 35 projects had been initiated before 1990, but only eight had begun implementation activities (23%). Significant progress was made in the next five years. By 1995, 64 projects out of 101 initiated had begun implementation of ecosystem management activities (63%) (Figure

3-1). Almost all projects responding to the 1999 survey are now implementing ecosystem management activities; 78 of the 88 respondents (89%) categorized their projects as being in the implementation stage ("some implementation" or "full implementation") (Figure 3-2). While the amount of time needed to move from planning into implementation may be considerable, overall the EM projects we examined are moving beyond the planning stages into implementation.

FIGURE 3-1: PROJECT STATUS IN 1995

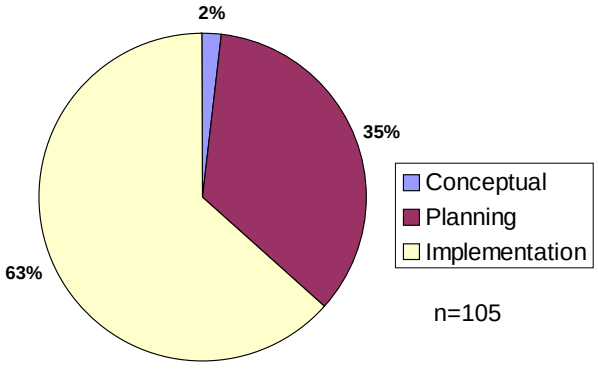
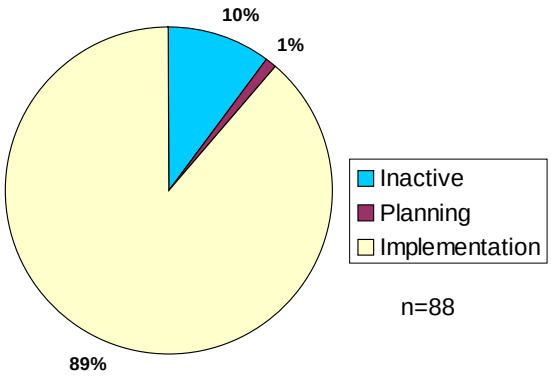


FIGURE 3-2: PROJECT STATUS IN 1999



The increase in percentage of projects reporting implementation activities only tells part of the story. Some projects initially included in the 1995 study are no longer active. In preparation for the survey, the team attempted to contact each project manager from the 1995 study. Of the project managers contacted, nine reported that the ecosystem management project was no longer active either in the survey or in telephone conversations (10%) (Appendix G). The team hypothesizes that there are likely more projects from the original set of 105 that are inactive. However, because we could not contact every one of the 105 projects, we were not able to verify this. Of the nine projects reported as being inactive, five specifically sited lack of resources as a key issue. For the Missouri Coordinated Resource Management Project, Washington's Integrated Landscape Management Program, the Natural Resources Roundtable in Hawaii, and Colorado's Partnership for Prairie Wildlife project, changes in the state administration, including the governor and natural resource agency directors, resulted in the end of their mandate to conduct ecosystem-based activities. In many cases, funding was cut to the programs and key personnel were given other responsibilities, leaving ecosystem-based activities essentially without resources. Occasionally, some of the activities of the original project have been maintained at a reduced scale. For example, the Natural Resources Roundtable has split into subgroups that continue to implement a portion of the Roundtable's original activities. Sometimes, changes in federal or state agency priorities have left ecosystem management partnerships to falter. For the Northeast Chicagof Island in Alaska, a project participant from the Alaska Department of Fish and Game pointed to "abandonment" by the U.S. Forest Service as the primary reason why the project is no longer active. Other projects appear to have faltered due to organizational dysfunction; the Canyon Country Partnership in Utah is inactive because, according to a project participant, the "partnership deteriorated."

Twenty-one percent of survey respondents indicated that their projects were simultaneously implementing activities and continuing with project planning. Faced with many challenges and a broad scope of activities within the project goals, the

simultaneous planning of certain phases of the project and implementation of other stages is likely necessary. This was, in fact, a strategy proposed by some project respondents to both the 1995 and 1999 surveys. Project managers stressed the importance of quickly realizing outcomes in order to frame EM as a viable management alternative even before planning activities are completed. Robert Hossler of the Northern Delaware Wetlands Rehabilitation Program suggested implementing at least one visible piece of the project as soon as possible, and advises ecosystem managers not to "spend too much time planning without physical progress." Several project managers also suggested starting with a pilot project. Nathan Frohling of the Tidelands of the Connecticut River project advises potential ecosystem management practitioners to "do a pilot! Work with a smaller subregion, make it a success, learn from it, and then broaden your scope." In addition, this combination of planning and implementation may be a reflection of an "adaptive management" approach, with managers learning lessons from implementation of some activities and consequently adjusting future planning and implementation.

As projects move beyond the planning stages, modification of project objectives is sometimes necessary. Thirty-one percent of respondents (n=80) indicated that project objectives had changed since 1995. Twelve projects reported significant changes to their original objectives. The El Dorado Desert Wildlife Management Area has expanded their focus to include the needs of 78 additional species beyond their original target species, the desert tortoise. Some projects are shifting or expanding their ecosystem focus. For example, the San Luis Valley Comprehensive Ecosystem Management Plan is increasingly shifting its focus to riparian habitat protection and restoration; the Bitterroot Ecosystem Management Research Project expanded its scope to include the removal of exotic (non-native) vegetation and restoration of riparian areas. Other, more moderate, changes to project objectives were reported as well, such as an increased focus on education of the local community at the Block Island Refuge.

Changes to project objectives result from several factors, including the discovery of new information regarding the systems at play in the ecosystem, changes in resource availability, or the unexpected influence of outside parties. For example, the Gulf of Maine Rivers Ecosystem project reported that it reduced its wide-reaching original ecosystem management plan to a statement of seven Resource Priorities. The Colorado State Forest Ecosystem Planning Project modified its objectives when it discovered that the objectives outlined in its strategic plan were not tenable.

To examine further the hypotheses related to the lifecycle of ecosystem management projects, the respondents were divided into two groups. Those that indicated that they were in the Planning, Planning and Some Implementation, or Some Implementation stages were considered to be in the earlier stages of implementation ("early implementation"). In total, 40 projects classified themselves in this way. Nearly the same number of projects, 39, indicated they were either in the Planning and Full Implementation or Full Implementation stages ("late implementation").

AGE OF PROJECT

As projects age, planning and implementation activities advance. When initiation dates are compared, the projects rated as "early implementation" had an average age just over 8 years. The projects in "late implementation" averaged 10 years and six

months in age. The difference between the average ages of the two sets of projects, approximately 2 years and five months, is statistically significant ($p < 0.10$). This supports the hypothesis that given the time to develop, ecosystem management projects will see increased implementation activities over time. We observed that age also significantly correlated to increases in project outcomes, discussed in Chapter 7: Organizational and Behavioral Outcomes and Chapter 8: Ecological Outcomes.

BUILDING SUCCESS IN STAGES

Because the projects included in the study have been using an ecosystem management approach for at least five years, they can serve as a guide to new EM projects. An ecosystem approach is generally not considered the "easiest" approach to resource management. The EM approach relies on collaboration across stakeholder groups, development of an understanding of both ecological and social processes, and the planning and implementation of long-term, large-scale management strategies. Projects that have pursued these goals for a long period of time have gained a lot of experience in balancing these challenges. When asked what factors they consider to facilitate project progress, project managers in late implementation projects replied that several factors were significantly more important to them than their counterparts in early implementation projects ($p < 0.10$) (Figure 3-3). Factors cited address concerns of project leadership, project planning, and ensuring resource availability, themes that are found throughout our study. The significance of dedicated and energetic individuals and well-trained personnel in the project speak to the often-expressed notion that people are at the center of ecosystem management. A well-defined management plan, adaptive management approach, and adequate monitoring draw attention to the importance of planning and organization of a project that has such a broad scope. Finally, commitment and follow-through by agencies and links to existing state and federal programs point to the growing reliance on state and federal agencies as key partners in ecosystem management. These last findings will be further addressed in Chapter 5: Stakeholder Involvement.

FIGURE 3-3: FACILITATING PROJECT PROGRESS

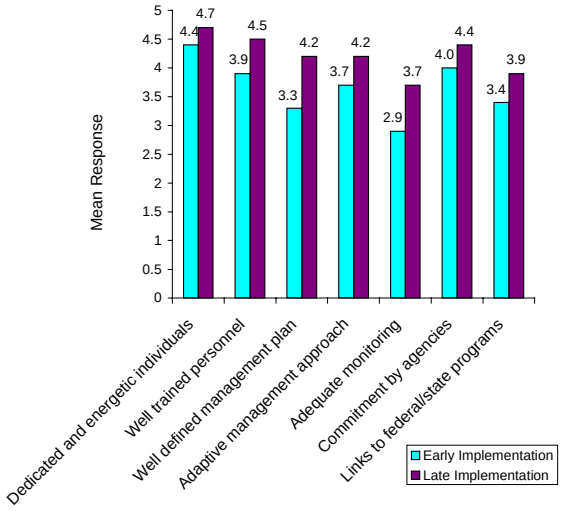
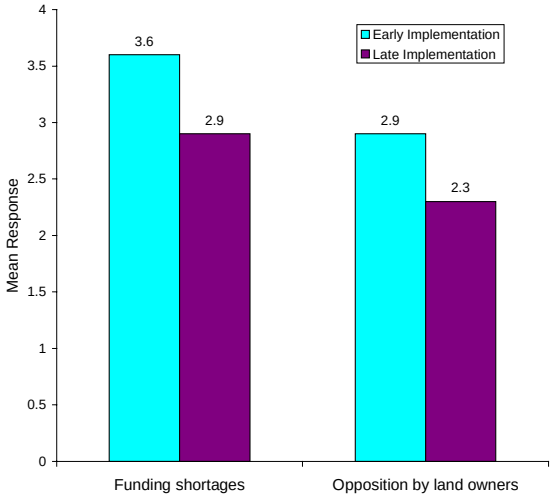


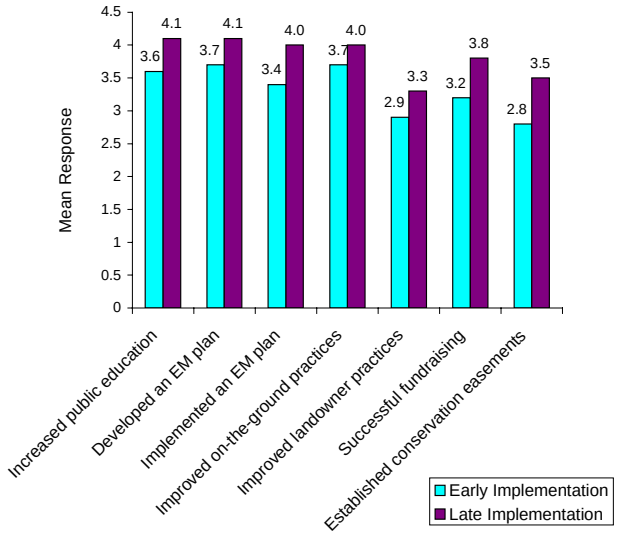
FIGURE 3-4: OVERCOMING CHALLENGES



On the other hand, project managers have apparently found strategies to address factors that are often cited as impediments to project progress (Figure 3-4). Project managers in late implementation projects ranked lack of funding and opposition by landowners significantly lower than managers of early implementation projects ($p < 0.10$). As seen in Chapter 11: Factors Impeding Project Progress, lack of resources and public opposition to projects are among the most highly cited impediments to project progress reported. That project managers further along in implementation are addressing these concerns head on, and apparently overcoming them, is encouraging to those facing those same challenges.

Several process outcomes are reported more frequently by projects in late implementation stages than those in early implementation stages ($p < 0.10$) (Figure 3-5). This supports the team's hypotheses that several outcomes, especially process outcomes, are in part a product of project longevity. Relying heavily on partnerships across stakeholder groups, an ecosystem management project would expect to see increases in outcomes such as public education and development and implementation of its ecosystem management plan. Improvements in on-the-ground management practices and landowner practices are encouraging as projects move into implementation. Ensuring adequate funding through fundraising and the establishment of conservation easements are two strategies that are more common in privately initiated projects than projects coordinated by public agencies. Both of these strategies would be expected to be more successful as the project, and the personnel associated with the project, become more accepted within the community.

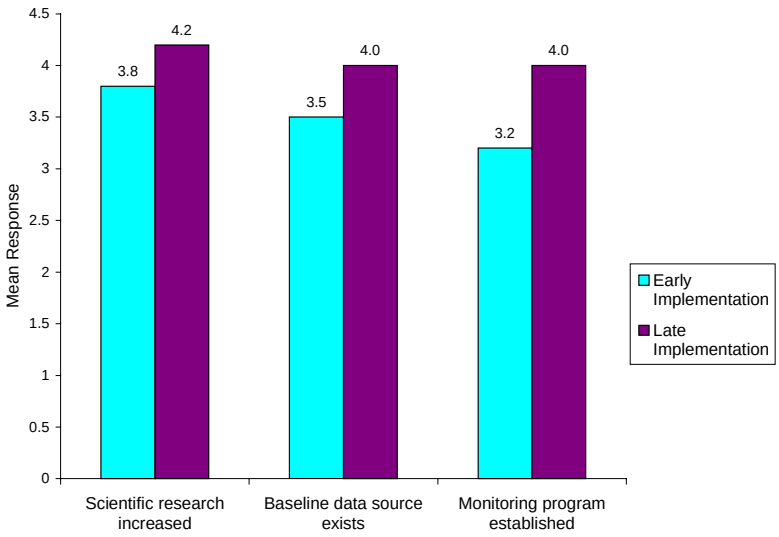
FIGURE 3-5: PROCESS OUTCOMES



THE IMPORTANCE OF INFORMATION

Ecosystem management projects rely heavily on the understanding of the complex ecological relationships at play within the ecosystem. Projects further in the implementation process have recognized the importance of that understanding. Compared to projects in the early stages of implementation, respondents for projects in the later stages have reported significantly higher use of scientific research, collection of baseline data, and monitoring programs as outcomes of their projects ($p < 0.10$) (Figure 3-6). Monitoring, as discussed Chapter 6: Monitoring Project Progress, is a critical part of the ecosystem management approach. Facing the challenge of evaluating change of complex systems, the importance of collecting baseline data and measuring change over time is paramount.

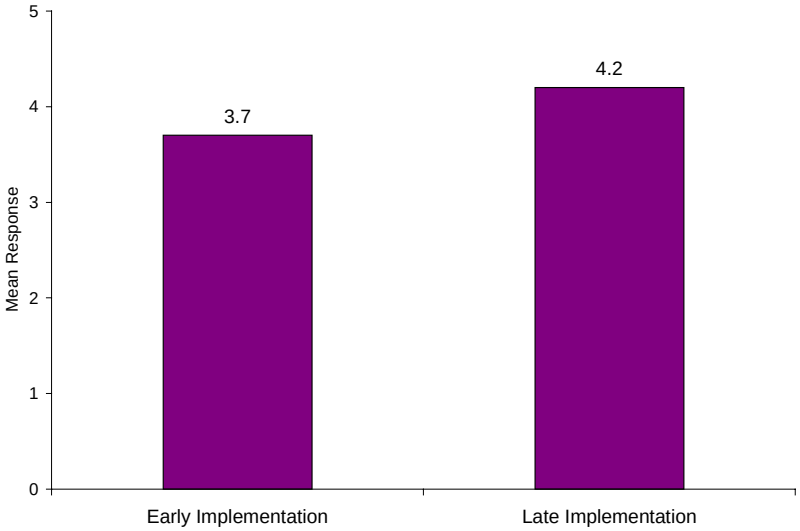
FIGURE 3-6: GATHERING INFORMATION



IMPLEMENTATION AND SUCCESS

Finally, it was hypothesized that because projects in early implementation stages would likely be focused on overcoming challenges and would have achieved fewer outcomes, that their project managers would rate themselves as relatively less successful than those late implementation projects. On a scale of 1-5, with 1 being 'not successful' and 5 being 'very successful,' the average rating for early implementation projects was 3.7, compared with an average rating of 4.2 for the late implementation projects, a statistically significant difference ($p < 0.05$) (Figure 3-7). This supports our hypothesis that advances in project implementation increase

FIGURE 3-7: SELF-RATED PROJECT SUCCESS



the opportunities for project success. In the later stages of implementation, project participants have had an opportunity to learn from their early experiences. In addition, project objectives and strategies can be modified accordingly, and outcomes are given a chance to be realized, all contributing to an increased sense of success.

AREAS FOR FURTHER RESEARCH

The format of the question regarding project status – allowing project managers to check off more than one item – leads to some ambiguity in the interpretation of the responses received. In addition, the terms "some implementation" and "full implementation" were not defined within the survey, allowing project managers to react to these implementation stages according to their own interpretation. In order to create more useful data, a listing of all the conceivable possibilities for current status could be used, possibly with some examples of what activities would be associated with that status. That is, instead of a "check all that apply" format, respondents could be asked to check off their status from a list of possibilities that included all the permutations reasonably possible.

Because of the complex nature of ecosystem management projects, it is difficult to convey the unique nature of each project's situation and approach to ecosystem-scale resource management in general terms of lifecycle that are broadly applicable to "ecosystem management" as an approach. Further qualitative research, including the expansion of focused case study analyses would assist in providing the "big picture" to those undertaking ecosystem-based management. This would permit refining the lifecycle framework beyond a simple conceptualization, planning, implementation, conclusion model.

In addition, because the projects included in this analysis were originally included in the 1995 study, all projects are at least 5 years old. The presence of relatively new projects and their outcomes, impeding and facilitating factors, and measures of success are lacking. An expanded sample of projects would provide a more thorough analysis. An expansion of projects included in future studies to include larger sample sizes for groups at a variety of ages would also permit a more systematic comparison of older and younger projects.

Major Findings: Strategies for Project Implementation

Ecosystem management practitioners apply various strategies to achieve their project goals, including political, social, economic, and organizational strategies. The strategies most commonly used by the project managers participating in this study are leveraging existing state and federal programs, ensuring and/or increasing stakeholder involvement, collecting new information on ecological, social or economic factors, and promoting compatible resource use. Strategies related to setting land aside for protection are among the least popular major strategies reported by these project managers, although this may be due in part to the heavy involvement of state and federal agencies in the population studied.

Some interesting changes were observed in the strategies applied by project managers between 1995 and 1999. A few of the most commonly cited strategies today were the least common strategies used by survey respondents in 1995. There was a dramatic increase in the proportion of projects indicating that they used existing state and federal programs as a major strategy. Interviews with practitioners suggest that state and federal agencies are often able to provide the necessary resources and expertise to EM efforts that may be lacking in non-governmental and other agencies. There was also an increase in the proportion of respondents developing an ecosystem management plan to help achieve project goals, as EM plans are thought to provide a useful tool for project organization and measuring success. Still other popular project strategies, including collecting information and ensuring and/or increasing stakeholder involvement, have the same relative level of importance to respondents today as in 1995. Only one strategy – creating reserves from currently owned land – was reported less frequently by managers today than in the previous study.

High project success scores corresponded with four project strategies: developing an EM plan, locating a project office or staff within the project area, conducting education and outreach, and ensuring adequate resources through fundraising.

Finally, a comparison of strategies used and project outcomes gives some indication that projects are accomplishing what they set out to do. Those projects undertaking ecological restoration were more likely to indicate that their EM efforts are producing ecological restoration results than were those for which ecological restoration was not a major strategy.

Chapter 4
Strategies for Project Implementation

INTRODUCTION

Ecosystem management project managers use a combination of ecological, political, social, economic, and organizational strategies to achieve project goals. In the 1995 survey, the most commonly reported strategies were conducting research, increasing stakeholder involvement, and restoring ecosystem composition and function. Using existing state and federal programs and developing an ecosystem management plan were the least popular strategies reported. The research team wanted to understand what strategies are currently favored by the projects, and which of those have become more or less important to the projects over time.

Because an understanding of the ecological, social and economic situation is essential in assessing and re-examining project goals, we hypothesized that certain strategies such as collecting and sharing information about the project area would remain important throughout all phases of project lifecycle. Strategies facilitating coordination over time, such as development of an EM plan, were expected to become more popular among respondents to the 1999 survey as levels of trust and cooperation increased within the projects in the intervening four years.

To elicit this information, project managers were given a list of 19 strategies and asked to categorize each as a 'major strategy,' 'minor strategy,' or 'not a strategy.' Managers were also asked to indicate whether they planned to use these strategies in the future. Eight of these 19 strategies corresponded with those identified by respondents in the 1995 survey, enabling some comparison across studies.

RESULTS: 1999 DATA

In 1999, the most commonly reported major strategies were using existing state and federal programs (80%), increasing/ensuring stakeholder involvement in the projects (73%), collecting new information on ecological, social, or economic factors (68%), and coordinating with existing projects (68%). Other important strategies employed by ecosystem management practitioners include promoting compatible resource uses, developing an ecosystem management plan, sharing existing information, and undertaking ecological restoration (Figure 4-1).

Strategies related to setting land aside for protection are among the least popular major strategies currently used by EM project managers included in this study. These strategies include the purchase of rights (e.g. water, grazing, timber, or development) (11%), promoting policy changes at the state or national level (16%), creating reserves from currently owned land within the project area (21%), and acquisition through easements or purchase (34%). These low responses may be influenced by the projects participating in the study, which include a large majority of state and federal agencies. The land management and natural resource agencies already own or control most of the land included in ecosystem management projects they are implementing; therefore land acquisition is not expected to be a major strategy. Just ten projects indicated that purchase of rights is currently a major strategy. However, creating reserves, purchasing rights, and promoting policy changes were significantly lower than the rest of the results.

Land Acquisition

While not a primary strategy for most state and federal initiated EM projects which focus their ecosystem management efforts on land they already own, many privately initiated projects use land acquisition as a means of preserving resources and ensuring changes in management practices. Not surprisingly, projects initiated by land conservancies and land trust organizations rely most heavily on this strategy. Some of these organizations, such as The Nature Conservancy (TNC), have been active in land acquisition for many years. After the land trust and conservancies acquire the land, they frequently transfer it to state and federal natural resource agencies, which assume responsibility for managing the lands. It should be noted that land acquisition is usually just one strategy out of many employed by these groups, including public outreach, education, and conservation easements.

In the **Cache River Ecosystem Project**, TNC acquires land that is later transferred to the Illinois Department of Natural Resources or the U.S. Fish and Wildlife Service (FWS). This collaborative approach between state, federal, and non-profit partners enables them to allocate resources more efficiently. For example, when a piece of land becomes available, TNC may have funding available, while the state may not. The partnership allows TNC to purchase the land and hold it until a transfer is possible. Since both the state and the FWS have significantly more personnel for management and stewardship, transfer is an attractive option for TNC.

Control over management is one of the significant advantages to directly acquiring land. Harvey Payne, Preserve Director for The Nature Conservancy's **Oklahoma Tallgrass Prairie Preserve**, notes that areas outside the Preserve that are not under control by the Conservancy are being "managed for economic return." TNC, by contrast, is "trying to manage to recreate a functioning ecosystem."

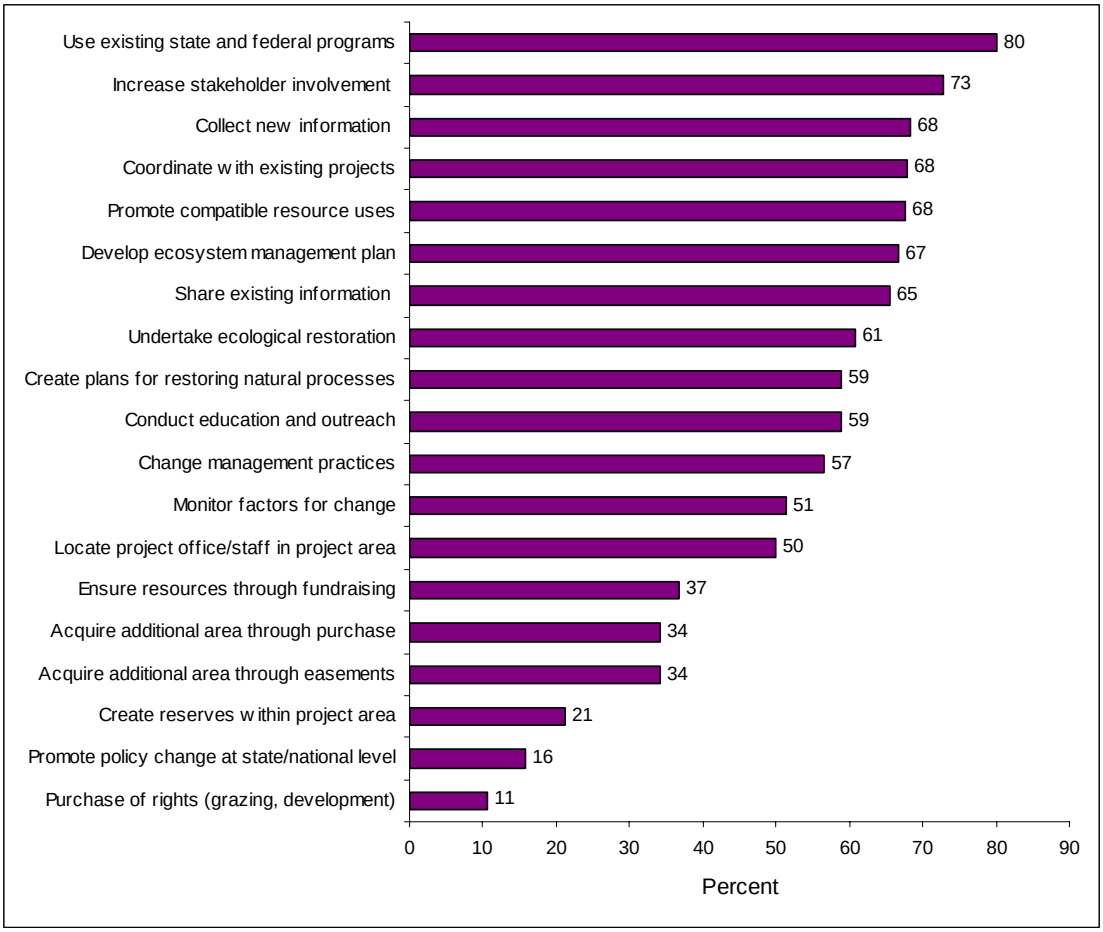
Land acquisition is also an attractive option when land is available in large tracts, as it can have a greater potential impact on the targeted ecosystem. Both Doug Samson and Kara Woodruff Smith, of TNC's **Guadalupe-Nipomo Dunes Preserve**, noted that the availability of large tracts from one landowner, such as agricultural land, favored use of an acquisition strategy.

The **Marathon County Forest Preserve** (Wisconsin), managed by the Marathon County Forestry Department, is an example of a government agency project that actively uses land acquisition as a major long-term strategy. Faced with increasing residential development within the county, the public identified preservation and expansion of the forests as a priority. The Forestry Department primarily targets areas within its set "acquisition zone." While the Department will consider areas outside the zone for acquisition, they must have some unique or productive habitat to be justifiable.

Marathon County Forest Administrator Mark Heyde noted that his agency faces two major obstacles. First, with land being developed at such a rapid pace, it is difficult to purchase enough land to make a "big difference." Second, the fact that the county wishes to purchase land makes it all the more valuable: "Within the last five years land prices have more than tripled, so it's hard to compete, especially since we're trying to buy the lands that are next to public land and for recreational purposes and hunting. Those are the most desirable lands, so they command the highest price. We're continually trying to buy land that is actually some of the highest priced because it's next to land we own."

The strategies that practitioners intend to use in the future generally look much like those currently used. The most common responses include: promoting compatible resource use (97%), using existing state and federal programs (80%), sharing existing information on ecological, social or economic factors (97%), coordinating with existing projects (94%), increasing and/or ensuring stakeholder involvement (94%), and collecting new information on ecological, social, or economic factors (68%). Furthermore, there was little indication that the least common strategies were to become more popular as project strategies in the future. Project managers appear to be confident that strategies they are currently using will continue to be important through future phases of the project lifecycle.

FIGURE 4-1: MAJOR STRATEGIES CURRENTLY USED



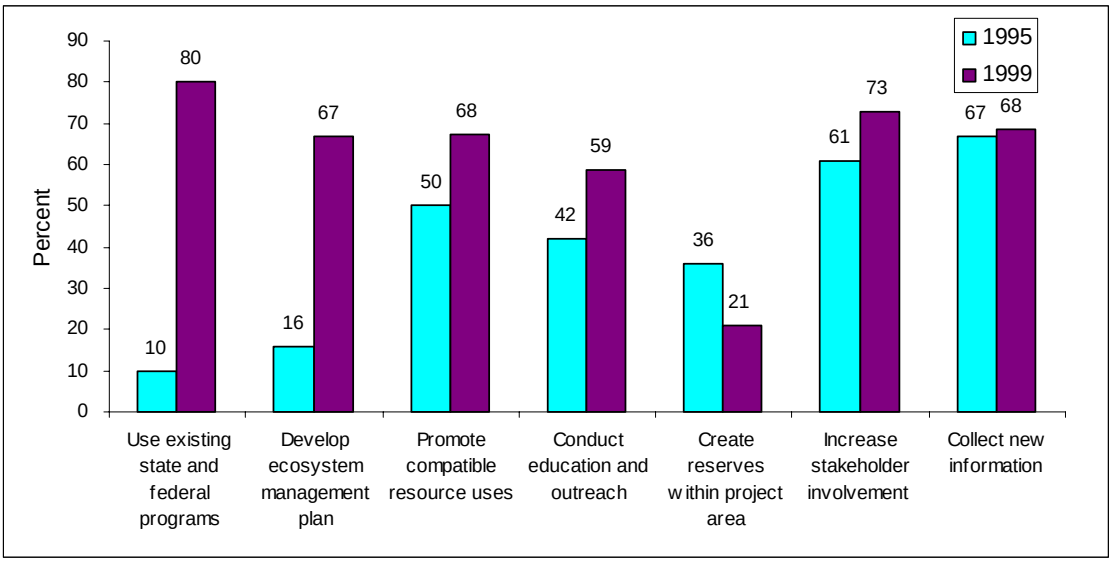
COMPARISON TO 1995 DATA

The team hypothesized that despite the fact that projects are four years older than in the 1995 study, certain strategies would remain important because the strategy reflects one of the central tenets of ecosystem management such as stakeholder involvement or compatible resource use. On the other hand, other strategies might be appropriate only after certain milestones have been reached, such as undertaking

ecological restoration and monitoring the ecosystem for change. A comparison of findings across the 1995 and 1999 data sets lends support to some of the team's hypotheses and reveals other interesting findings (Figure 4-2).

Eight of the categories from the 1995 data corresponded with the 1999 data, however a few methodological issues limit the strength of our conclusions regarding change over time. In a few cases, there was some inconsistency in nomenclature. For example, "setting land aside" in the 1995 study was compared to "create reserves from currently owned land within the project area" in the 1999 study, and "research" in the 1995 survey was compared to "collect new information on ecological, social, and economic factors" in the 1999 survey. In addition, the 1995 data only included percentages of those indicating that they used a particular strategy, without specifying whether or not the strategy was "major" or "minor" for the project. Therefore, the 1999 data was collapsed into two categories to provide a more appropriate basis for comparison. The category "major strategy" remained the same and responses "minor strategy" and "not a strategy" were combined in a second category, "not a major strategy." In addition, data from 1995 was aggregated so that individual responses could not be associated with particular projects, thereby precluding comparison on a project-by-project basis over time.

FIGURE 4-2: CHANGE IN MAJOR STRATEGIES USED FROM 1995 TO 1999



One notable increase was observed in the percentage of respondents indicating they used existing state and federal programs as a major strategy. Although state and federal agencies initiated the majority of these EM projects, only 10 percent (n=103) of respondents in 1995 indicated that using existing state and federal programs was a major strategy, compared to 80 percent (n=80) of respondents in 1999, a statistically significant difference ($p < 0.0005$).

This increase in the use of state and federal projects as a major strategy may be due in part to the fact that many of these projects were in early stages of development at the time of the first survey. For projects that are not coordinated by state and federal agencies, the increase in awareness and funding of ecosystem-based activities by state

and federal agencies creates opportunities for partnership. Because projects are further into implementation activities, they are better able to take advantage of the opportunities posed by state and federal programs. Likewise, projects being implemented by state and federal agencies are more able to take advantage of interagency partnerships as implementation advances. In addition, it may be that resource managers have seen positive results from partnership with state and federal initiatives over the past four years, generating greater interest from others to participate in these initiatives. State and federal ecosystem-based programs, meanwhile, have also matured and are better able to serve as a foundation for new EM efforts, having developed more relationships with stakeholders and increased awareness about an ecosystem-approach to resource management. Since 1995, there are also a growing number of these state and federal ecosystem management initiatives with which projects can partner. With state and federal natural resource agencies, such as the U.S. Forest Service, issuing EM-aligned mandates and developing ecosystem-based "best management" practices, the number of ecosystem management projects managed directly by these agencies may be subsequently increasing.

A second notable change since 1995 was an increase in the proportion of respondents that rely on developing an ecosystem management plan to achieve project goals. The research team anticipated that more projects would rely on use of an ecosystem management plan as a strategy over time, as it can provide a useful tool for project organization and management. It was also believed that in some cases building trust and interest among stakeholders might be necessary before all stakeholder groups would commit to a management plan. In 1995, 16 percent of respondents (n=103) indicated that using an ecosystem management plan was a project strategy, whereas 67 percent of survey respondents (n=78) said that it was a major strategy in 1999, a statistically significant change ($p < 0.0005$).

Two other strategies that respondents indicated they were using more in 1999 than in 1995 were "promote compatible resource use" and "conduct education and outreach." The proportion of respondents promoting compatible resource increased from 50 to 68 percent (n=80). Those indicating that they used "conducting education and outreach" as a strategy rose from 42 to 59 percent (n=80). The increase in both cases was statistically significant.

Creating reserves from currently owned land within the project was the only strategy which practitioners indicated they were using less today than in the previous study. In 1995, 36 percent of respondents considered creating reserves to be a project strategy. Just 21 percent said this was a major project strategy in 1999. It was illustrated in Figure 2-1 above that land set-aside and acquisition strategies are among the least popular applied by the 87 projects participating in this survey. It may be that projects might have applied this strategy, been frustrated by the lack of results, and stopped using it. Or, given the change in social climate since 1995 and the increasing strength of property-rights movement, it is possible that land acquisition for conservation is perceived as being increasingly difficult and thus is being set aside as a major strategy.

Finally, it was observed that increasing and/or ensuring stakeholder involvement and collecting new information on the project area both remained important strategies over time. Increasing and/or ensuring stakeholder involvement was considered a major strategy by 61 percent of respondents (n=103) in 1995 and 73 percent of respondents

(n=81) in 1999. This moderate – and statistically insignificant – change seems to indicate that the strategy carries the same relative level of importance for project managers. Similarly, collecting new information on the project area was a major strategy used by 67 percent of respondents (n=103) in 1995. In the 1999 study, 68 percent of respondents (n=79) indicated that they collect new information as a project strategy.

Use of Federal and State Programs

The use of existing state and federal programs as a strategy for ecosystem managers has increased significantly between 1995 and 1999. Federal and state agencies are recognized as having resources and expertise available for non-governmental organizations and other agencies undertaking an ecosystem-level effort. For some projects, federal and state partners have been around the table since the inception; for others, agency partners became involved as additional needs and capabilities were identified.

The involvement of state and federal agencies with the **Cache River Ecosystem Partnership** has evolved over time. The Nature Conservancy (TNC) acquired its first land within the Cache River Watershed in the 1970s. In the 1980s, the area was designated a TNC bioreserve. The Illinois Department of Natural Resources has long owned and managed 11,768 acres in the watershed as the Cache River State Natural Area. The U.S. Forest Service has been a partner in the project since the 1980s, largely because the Shawnee National Forest partially lies within the bounds of the watershed. In 1990, the U.S. Fish and Wildlife Service (FWS) established the Cyprus Creek National Wildlife Refuge in the area.

The U.S. Natural Resources Conservation Service (NRCS) has spent a significant amount of research time focused on the Cache River watershed. A NRCS pilot project recently completed assembly of a resource survey publication for the watershed. The Cache River was one of only five pilot sites in the country. The NRCS has been involved in the watershed for a long time because their technical expertise is needed. However, their involvement has increased in the past ten years, since the FWS Refuge has been established.

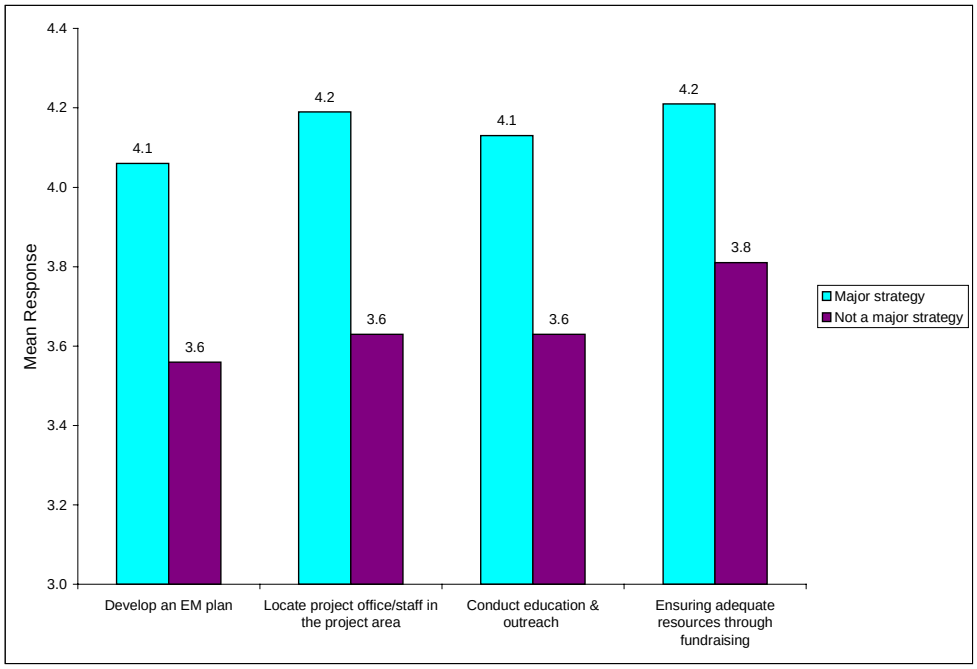
The U.S. Army Corps of Engineers (USACE) has been primarily involved in the watershed for flood control of the Cache River. Since the mid-1990s, however, they have increased their involvement in habitat preservation and restoration.

Overall, Max Hutchinson of TNC agreed that partnering with state and federal programs increased the effectiveness of the ecosystem management project, especially on a project as large as the Cache River Watershed – nearly 500,000 acres. “I think it is more efficient in a lot of instances to have the flexibility for everything from buying the land to managing it to being able to see who is best suited to do what in the broad effort. In some instances the FWS may not have the budget to buy a tract of ground this year, but the Conservancy might. That might be true with the State as well… It has been a lot more efficient because each agency involved with us has different expertise and is able to take care of different phases of the program and do a better job overall.”

SUCCESS AND STRATEGIES

Four strategies applied by ecosystem management projects were found to show a relationship with the projects self-rated success scores. These include developing an EM plan, locating the project office/staff in the project area, using education and outreach, and ensuring adequate resources through fundraising. The summary table below compares the mean responses for those indicating that each of these strategies was a "major strategy" versus "not a major strategy" (Table 4-3).

FIGURE 4-3: RELATIONSHIP BETWEEN SUCCESS RATING AND STRATEGIES USED



Respondents currently characterizing development of an EM plan as a major strategy gave themselves higher self-rated project success scores than did those projects for which development of an EM plan was not a major strategy. An independent sample t-test was used to compare the mean success rating of the two populations, both of which were based on the 5-point scale of 1 (not successful) to 5 (very successful). The test showed a statistically significant difference between the population of projects not using an EM plan as a major strategy and the population of projects using an EM plan as a major strategy ($p < .05$).

One possible reason for this observed relationship between success and use of an EM plan as a strategy might be that plans provide the necessary structure for project organization and management. It is well known that in any collaborative initiative a plan can provide a useful framework for achieving project objectives. When disparate interests come to play in a collaborative effort, as is often the case with natural resource issues, a plan might help project managers to integrate the diverse interests and carry out the work necessary to achieve project objectives.

There is also evidence that those using EM plans as a strategy rate themselves as more successful because they have a better "measuring stick" for determining project success. It was found that projects using ecosystem management plans are also more likely to be engaged in monitoring ecological change. The 49 respondents developing an EM plan as a major strategy also showed greater agreement to the statement that their projects had been monitoring ecological change, with an average score of 3.9 (on the 5-point Likert scale). The 24 respondents not using this as a major strategy showed less agreement that monitoring ecological change was an outcome of the project, averaging 3.2, a statistically significant difference ($p = 0.05$). That is, those projects that have an EM plan as a major strategy report monitoring as an outcome more frequently than those projects that do not use an EM plan as a major strategy.

Development of an Ecosystem Management Plan

For managers of ecosystem-scale projects, a delicate balance must be struck between a broad view of the resources in question and localizing on-the-ground activities necessary for effective management of those resources. Robert Hossler of the Delaware Division of Fish & Wildlife faced such a challenge with the **Northern Delaware Wetlands Rehabilitation Program**. "[The plan] is kind of a double-edged sword. We started looking at this wetland restoration as a chain of linked wetlands and we started getting very big. The program itself takes all the energy away from on-the-ground projects. So, I'd say we have this umbrella which is ecosystem management, but we do all our work on a site-by-site basis so we can get things done. Sometimes when you have too big a program or too big a goal, that eats up your time. It becomes a vicious cycle. We've found that if you have this umbrella, you can say you're working under a general program or an ecosystem program, but you really have to work each site individually."

He notes the advantages of having a plan in place as being twofold: as a rallying point to garner funds for wetland restoration activities within the ecosystem, and as a management tool to coordinate small projects within the broader ecosystem. "If you restore one site knowing that the site just north of you was also restored, you might be able to something different with one that you couldn't do with the other. So you can have the best of both worlds. Under this big plan, I'm using my other sites and the history of those sites to help with the other ones."

A second relationship observed between success and strategies was that projects that locate the project office/staff in the project area rated themselves as more successful. The 37 respondents indicating that locating the project office/staff in the project area was a major strategy gave their projects an average success score of 4.2 on the 5-point Likert scale. The 38 respondents not using this as a major strategy gave themselves an average success score of 3.6, a statistically significant difference ($p < 0.01$).

The 1995 EM study revealed that building relationships and trust among stakeholders are considered critical components to building successful EM initiatives. A local presence may contribute to this trust-building. Locating the office on the site may be taken as a sign of commitment to the project, while it is also certain to enhance the decision-maker's understanding of local challenges, including ecological, economic, and social challenges, to achieving project goals.

Those projects using education and outreach as a major strategy also had higher project success ratings than those not using this strategy. The 46 respondents using this as a major strategy had an average self-rated score of 4.1. The 33 respondents that do not conduct education and outreach as a major strategy gave themselves an average success score of 3.6 ($p < 0.01$). Communities and the general public can be important forces in EM efforts. The extent to which these constituencies understand the project, including its goals, status, challenges and success, will directly influence their support of it. Conducting education and outreach is an obvious vehicle for communicating information about the project and thereby garnering the support of these groups.

Finally, projects that ensure adequate resources through fundraising had higher average project success ratings than those that do not use it as a major strategy. The 28 respondents using this as a major strategy gave themselves an mean success score of 4.2, whereas the 47 respondents not using this as a major strategy gave themselves an average success score of 3.8 ($p < 0.05$). Practitioners indicated in the 1995 and 1999 studies that funding shortages were a major barrier to many site-level activities, such as research, monitoring, and restoration. As some of the findings in this study suggest, ecosystem management often achieves results through long-term sustained efforts. Sustained funding is therefore critical to the success of these projects. It is possible that using fundraising as a major strategy has helped the projects to secure a more steady flow of financial resources needed to conduct ongoing management activities.

ECOLOGICAL OUTCOMES AND STRATEGIES

Not surprisingly, projects undertaking ecological restoration as a major project strategy are more likely to see ecological restoration results as a project outcome than are projects that do not use this strategy. Ecological outcomes were measured on a 5-point Likert scale and practitioners were asked the extent to which they agreed that an outcome resulted from the project efforts, with 1 representing “strongly disagree” and 5 representing “strongly agree.” The 29 respondents using ecological restoration as a major strategy showed a higher level of agreement that they had achieved ecological restoration results, averaging 3.7 on the 5-point scale. The 47 respondents not using it as a major strategy showed a lower level of agreement, averaging 3.3 ($p < 0.05$).

Considering the relationship between projects that develop an EM plan and the self-rated success scores, the research team wanted to understand whether developing an EM plan as a major strategy was also related to achieving ecological restoration results. There was some indication of a positive relationship between use of an EM plan and ecological restoration results. The 49 respondents indicating that developing an EM plan was a major strategy showed an average level of agreement of 3.7 to the statement that ecological restoration results were an outcome. The 24 respondents not using this as a major strategy showed slightly less agreement that the projects produced ecological restoration results, with a mean response of 3.4, although the difference between the means is not statistically significant ($p = 0.188$).

AREAS FOR FURTHER RESEARCH

Will certain strategies, such as ensuring stakeholder involvement, continue to be a priority for projects in five years, and will others, such as creating reserves within the

project area, demonstrate more cyclical or less constant use? While looking at the extent to which strategies used have changed or not changed over time may be helpful to practitioners, limited conclusions can be drawn based on the findings in this study.

Trends in the use of different project strategies should be observed over longer time periods as project lifecycle periods will vary in absolute terms. What may take one project three months to accomplish could take another project three years. Language and concepts should be fairly consistent across studies to ensure a common understanding of the questions being asked. The bounds of the study might also be expanded to include a greater number of projects. By including more recently developed ecosystem management projects, it might enhance our understanding of which strategies, if any, tend to be most useful at the outset of an EM effort.

Strategy Spotlight: Promoting Policy Change

Few ecosystem-based project managers reported that promoting policy change was a key project strategy or goal. The **Lajas Valley Lagoon System** project in Puerto Rico, overseen by the U.S. Fish and Wildlife Service (FWS), is an exception. For the Lajas Valley project, the ownership of a significant portion of the ecosystem in question falls under the Commonwealth of Puerto Rico's Department of Agriculture. Since the department's primary goal is to promote and preserve agricultural development on the island, wetland restoration often suffers as a result. FWS project managers involved in the project hope to use the Natural Resources Conservation Service's (NRCS) Wetlands Reserve Program as a carrot for restoration activities. According to James Oland, a Field Supervisor with FWS, "We're hoping that that through [NRCS'] Wetlands Reserve Program … we can convince the Department of Agriculture that… the farmers could be compensated for some of the areas that are currently being used for hay and grazing and sugar cane production. The Wetland Reserve Program could do a pretty good job of compensating for any losses to the agricultural industry in the area."

Many projects are using existing policy and programs to their benefit. On the national level, several programs of the Natural Resources Conservation Service (NRCS) and Farm Services Agency (FSA) are being used to establish conservation easements and protect privately-held land, including: the Wetland Reserve Program, the Wildlife Habitat Improvement Program, the Environmental Quality Incentives Program, the Conservation Reserve Program, and the Farmland Protection Program.

On the state level, the existence of laws and policy such as Vermont's Use Value Assessment law make a big difference for local conservation groups such as the **Wildlife Habitat Improvement Group** (WHIG). According to David Clarkson, one of the founders of the group, that law, and the "Current Use" program that is run in conjunction with it, "provides that the land is taxed on its use value, which is considerably lower than its development value... So, it's actually possible to manage forestland in Vermont over the long term in that program because the tax level is commensurate with the amount of income you can draw from forestland. So, you don't have to buy, as the industry has, forestland and log it heavily and then sell it for development, which takes it out of production permanently." Clarkson also noted that about a third of the private forestland in the state is enrolled in the program.

Major Findings: Stakeholder Involvement

One of the central tenets of ecosystem management is that ecosystem-scale approaches to natural resource management call for increased levels of participation by relevant stakeholder groups. This basis of this claim is the recognition that larger scale management units tend, as a rule, to bring more diverse sets of interests, both public and private, into play. In practical terms, this means that managers of EM projects tend to devote considerable energy on working to involve relevant stakeholder groups in the management process and in developing institutional structures that facilitate such participation.

Government agencies, non-governmental organizations, universities, and local landowners were the most important stakeholder groups for the projects examined in this study. State and federal land management agencies (the U.S. Forest Service, state departments of natural resources) and non-government organizations such as The Nature Conservancy are frequently the initiators and the day-to-day organizers of the projects. Local landowners constitute a highly significant set of participants, particularly as EM projects set their sights on developing public-private partnerships for the purpose of fostering more pervasive stewardship attitudes and practices.

A key finding with respect to stakeholder involvement was that both federal and state agencies have remained highly involved in EM projects. Since the 1995 survey, moreover, state agencies have become more involved in EM projects. Government agencies, these findings suggest, remain a driving force behind EM in the United States.

Another finding was that private landowners have also become more involved in projects. The increased participation by private landowners is an encouraging trend, suggesting, among other things, that EM is moving beyond the boundaries of public lands. It was found, moreover, that self-rated success is significantly correlated with improvements in small, private landowners' management practices and with involvement of private landowners.

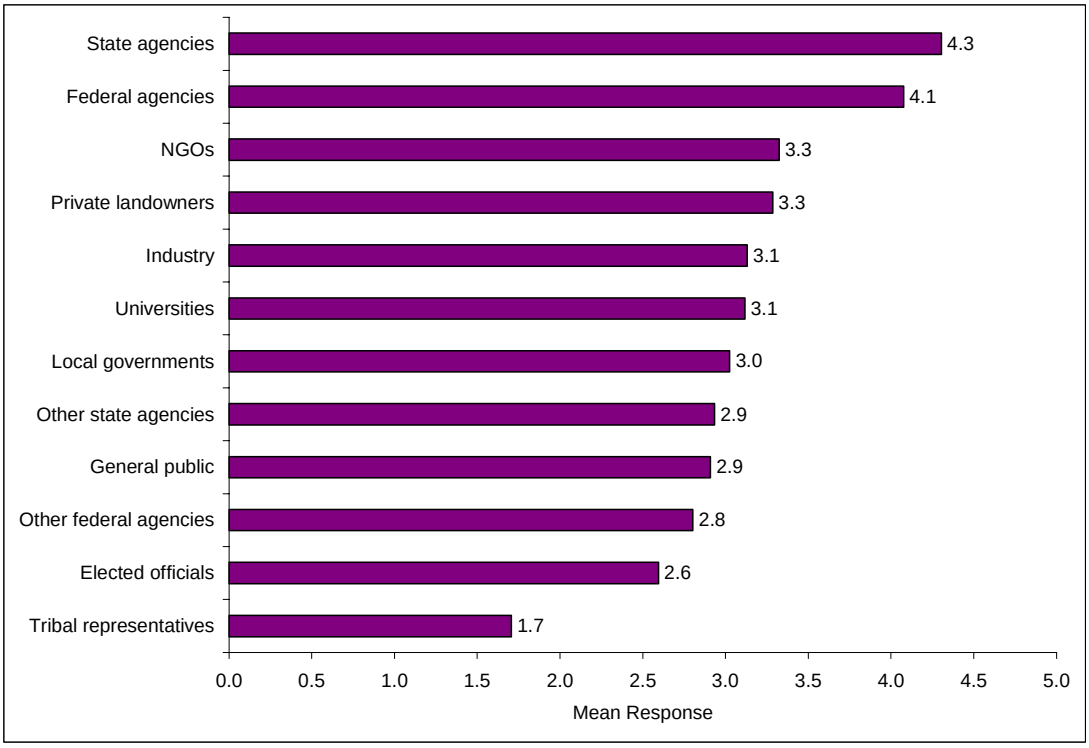
Chapter 5
Stakeholder Involvement

INTRODUCTION

Virtually all of the ecosystem management projects examined in this study are collaborative ventures with multiple stakeholders. Many of the projects were initiated by federal and state agencies, often with the participation of conservation organizations such as The Nature Conservancy. To gauge the current levels of involvement of various types of agencies and organizations, the team asked respondents to rank the involvement levels of twelve types of stakeholder groups on a scale of 1 (not involved) to 5 (very involved). Seven of these types overlap with data collected in the 1995 study, though the earlier data contained only percentages of projects in which particular agencies or organizations were involved and did not provide any rankings by the project managers of involvement levels.

RESULTS: 1999 DATA

Project managers involved in ecosystem management efforts ranked the level of involvement of federal and state natural resource agencies significantly higher than the involvement levels of all other groups (Figure 5-1). On the other hand, project managers surveyed ranked tribal representatives significantly lower than all other stakeholder groups in involvement in ecosystem management projects. These differences are statistically significant based on an examination of the 95% confidence intervals of the means and t-tests comparing the differences between the means.



Stakeholder Involvement

Stakeholder involvement is often cited as a key factor in the success of an ecosystem management project. Establishing and maintaining stakeholder involvement takes many forms depending on the goals of the projects. Although plans for stakeholder involvement meet with varying degrees of success, no project manager contacted in this study regretted the public involvement or outreach done in conjunction with their project.

When the Washington State Department of Fish and Wildlife initiated the **Integrated Landscape Management (ILM) Plan** for the Lewis-Kalama watershed, participation was solicited from diverse interest groups in the region. Rollie Geppert, who was involved in the initiative at the time, characterized the effort as "essentially the largest public involvement at the watershed level that the agency ever undertook." He continues, "for the first time, people in that watershed came together to collectively look at these multiple species and work collectively to solve some of the issues." Thirty-three representatives were selected from the various interests in the watershed – including agriculture, forestry, environmentalists, sports groups, and industry – to participate in the Citizen's Advisory Group (CAG). The CAG met monthly for three years, sharing their views about how to manage the watershed and working with the Washington Department of Fish and Wildlife to develop an integrated, landscape-scale resource management plan. Stakeholder involvement continued to be strong until the State lagged in implementing the plan. Interagency paralysis resulted from resistance within the Department of Fish and Wildlife in concert with the growing crisis surrounding the Pacific Salmon. Frustrated by the lack of follow-through, many participants withdrew.

Partners in the development of the **Habitat Conservation Plan (HCP) for the Karner Blue Butterfly** became involved for one primary reason: they each worked in land that contained the endangered butterfly or its habitat. As a result, they needed to secure an Incidental Take permit from the U.S. Fish and Wildlife Service (FWS). Representatives for 25 types of stakeholder groups – including managers of road rights-of-way, managers of county forests, private landowners and small farmers, the utility industry, industrial foresters, and The Nature Conservancy – participated in the five-year development process of the HCP. Each of the 25 stakeholder representatives signed a "Species and Habitat Conservation Agreement" with the Wisconsin Department of Natural Resources (WDNR) to secure the Incidental Take permit for the parties they represented. In addition, several non-land holding organizations interested in the conservation of the butterfly and its habitat were active in the process, including the Sierra Club, Audubon Society, and the Wisconsin Woodland Owners. Although it took five years to get to that point, the finalization of the HCP and designation of the Incidental Take permit in 1999 were just the first step in this partnership. The ongoing implementation of the HCP and the measures required by it will involve all the partners, as they are bound by the Species and Habitat Conservation Agreements signed with the state that will last for the duration of the Incidental Take permit, ten years, with an option to extend it.

WDNR is active in the effort to educate and involve individuals affected by the conservation plan. Through small group meetings and pilot workshops targeted to specific groups of interested stakeholders (e.g., woodlot owners), WDNR is working to spread the word about things that can be done to protect the butterfly and conserve and expand its habitat. The challenge is significant. Regarding the workshops with private landholders, David Lentz of WDNR noted, "this way, at least, we are – in a non-threatening way – identifying and helping good stewards to voluntary conservation that otherwise wouldn't happen... That's part of the big experiment here: to try and make the paradigm shift from purely regulatory to one that includes voluntary stewardship over a large portion of the people."

The prominence of the involvement of government agencies indicates the degree to which the government, both state and federal, is still relied upon for resources and expertise in ecosystem management. On the other end of the spectrum, the level of involvement of tribal representatives was significantly lower than all other stakeholder groups. This finding points not to the systematic exclusion of Native American representatives in ecosystem management projects, but to the fact that relatively few of the projects in this study encompassed tribal lands.

The remaining stakeholder groups had mean responses ranging from 3.3 (national/regional non-governmental groups) to 2.6 (elected officials). However, the differences between these responses are not statistically significant.

COMPARISON TO 1995 DATA

In 1995, federal and state natural resource agencies were found to be involved, respectively, in 88 percent and 86 percent of the projects. The 1999 survey data indicated continued strong involvement by these federal and state agencies: federal natural resource agencies were involved in 81 percent of the projects, while state natural resource agencies were involved in 94 percent of the projects (n = 82) (Figure 5-2).

The slight decline in federal involvement in the EM projects was not found to be statistically significant. Moreover, follow up interviews conducted by the research team with project managers provided no anecdotal evidence that this decline is indicative of a broader trend.

The increase between 1995 and 1999 in the number of projects reporting involvement by state agencies is statistically significant. To compare 1995 state involvement levels (86%) with those from 1999 (94%), a two proportion z-test was used (since means and standard deviations were not available for the 1995 data), showing that the difference in percentages is moderately significant ($p < 0.10$). The research team's case study work provides additional evidence that state involvement may be increasing in EM projects across the country.

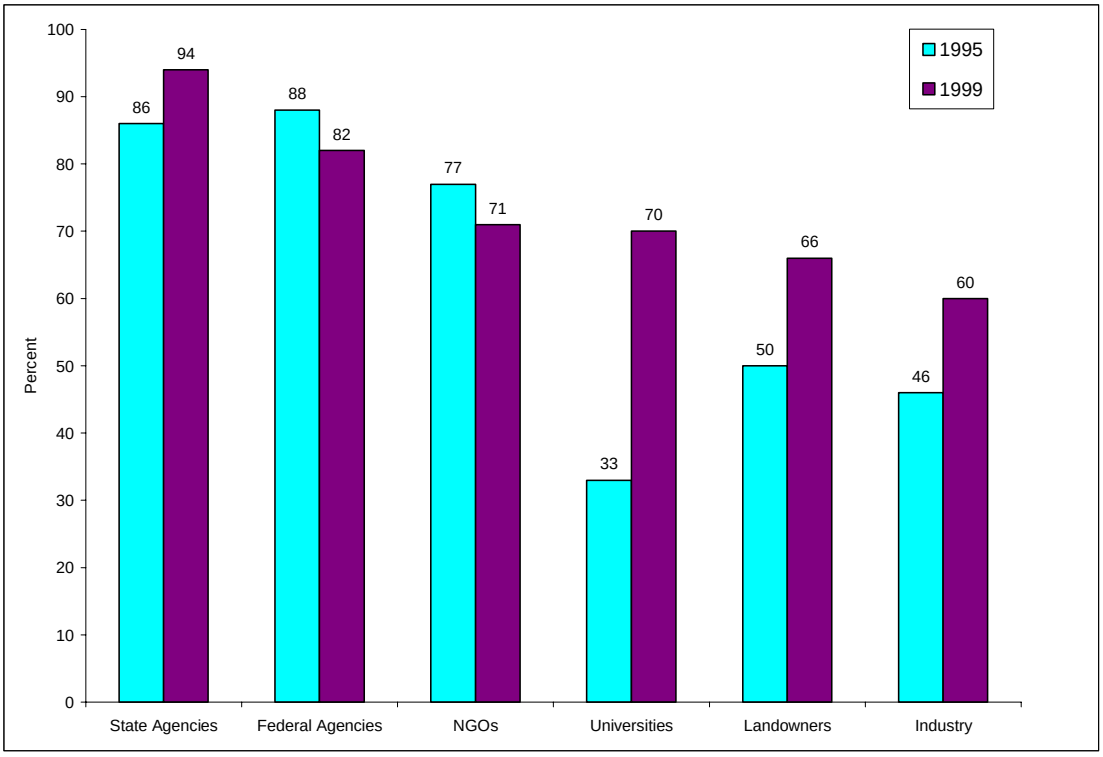
Between 1995 and 1999 there was a significant increase in the involvement of universities (and colleges). In 1995, universities were reported to be involved in only 33% of projects. By 1999, this figure had increased to 70% ($p < .005$). The sharp increase in university involvement over this time period is probably best explained in terms of the project lifecycle, particularly in the expansion of research and monitoring activities of projects. Evidence in support of this claim can be seen in the strong correlation between university involvement and several variables, most notably monitoring for "ecosystem processes" ($p < 0.05$) and the ecological outcomes 'historical disturbance regimes are being restored' ($p < 0.01$) and "scientific research within the area has increased" ($p < 0.005$)

Private landowners and industry groups were also significantly more involved in projects in 1999 than in 1995 ($p < 0.05$ and $p < 0.10$). Here again, the research team hypothesizes that the involvement of certain kinds of stakeholders might be a function of project maturity. Private landowners and industry groups in particular may be less likely to become involved in the early stages of EM projects. Concerns about privacy and

increased regulation are often paramount for such groups, and considerable time must be spent developing trust relationship and clarifying the goals of the project before significant participation can occur. The increased participation by these groups is an encouraging trend, however, since it points to the emergence of the public-private partnerships that are essential for EM to work in parts of the country where extensive private lands fall within the EM project area.

Non-governmental organizations (NGOs), next to government agencies, continue to play a very prominent role in the EM projects. The decrease in NGO involvement between 1995 and 1999 was not statistically significant.

FIGURE 5-2: STAKEHOLDER INVOLVEMENT IN PROJECTS, 1995 TO 1999



INCREASING ROLE OF STATES

Government agencies, both federal and state, remain a driving force behind EM in the United States. As noted above, state natural resource agencies appear to be proportionally more involved in the projects than they were in 1995. That is, state agencies are involved in a greater percentage of the EM projects overall, regardless of their level of involvement.

The 1999 data alone suggests that state natural resource agencies are proportionally more involved in the EM projects than federal natural resource agencies. Indeed, the involvement of state agencies, at 94 percent, is significantly higher than federal natural resource agencies, at 82 percent ($p < 0.05$).

Finally, again based on the 1999 data alone, the statistically significant difference between the mean involvement levels of the state natural resource agencies (4.3) and the federal agencies (4.0) indicates that the former are more significantly involved in the projects than the latter ($p < 0.05$).

Taken together, these three observations suggest more generally that state-level involvement in ecosystem management has increased and now rivals or exceeds that of federal agencies such as the U.S. Forest Service, U.S Fish and Wildlife Service, and the Bureau of Land Management. This is certainly not the case across the board. Regions such as the southeast and southwest had projects initiated by considerably larger proportions of federal agencies than state agencies, and the influence of the former probably remains strong. Moreover, projects located primarily or exclusively on federal lands will not have been affected by such trends.

Why have states become more involved in EM? In the broader scheme, increased state involvement in EM results from factors ranging from the gradual influence of changes in the education and training of natural resource managers to the devolution of oversight authority and delegation of federal programs and funds to states. Many federal agencies such as the Natural Resource Conservation Service (NRCS) and Farm Service Agency (FSA) have developed cost-share arrangements whereby states contribute cash or in-kind services in exchange for federal funds. Programs such as these, including the Wetland Reserve Program and Conservation Reserve Program, promote increased participation in conservation management by state agencies and officials.

The increase in state involvement also appears to be due to a shift in the strategies used by many project managers. As was discussed in Chapter 4, between 1995 and 1999 a steep jump was observed in the number of managers reporting “use of existing state and federal programs” as a major strategy for their EM projects.

Increasing Role of States

Project managers indicated a significant increase in the involvement of state natural resource agencies in ecosystem management projects from the previous study. Several projects explained how state agencies were involved in their projects and some of the benefits that partnership afforded. Increased state involvement appears to be a result of more extensive partnerships between federal and state agencies and, in some cases, increased recognition of the value of ecosystem-level management.

The increased involvement levels of states in the ecosystem management projects probably in part due to the influence of EM-driven reorganization efforts underway in many state natural resource agencies across the country. Over the past ten years, state agencies in Florida, Illinois, Washington, Michigan, Minnesota, Missouri, Washington, Wisconsin—to name several of the better known efforts—have all been experimenting with EM.

For the U.S. Fish and Wildlife Service (FWS), the participation of Colorado state agencies such as the Colorado Department of Natural Resources’ Division of Wildlife has been essential to the on-going efforts of the **San Luis Valley Comprehensive Ecosystem Management Plan**. According to Mike Blenden of FWS, the state has helped FWS organize and set goals for wetland conservation in the San Luis Valley. Although the state has always been a partner in the project,

state involvement in the project has increased over time. As the scope of the project has increased, however, the opportunity for state involvement has likewise increased, and the state has stepped forward to meet the challenge.

The **Kenai River Watershed Project** in Southern Alaska is a project of The Nature Conservancy (TNC) in partnership with the Alaska Department of Fish and Game, Alaska Department of Environmental Conservation, U.S. Environmental Protection Agency, and the FWS. Both state and federal agencies coordinate several projects on the Kenai River, and provide funding for various activities in the watershed. Increases in state agency involvement over the past five years in the Kenai Watershed are attributed to individual employee interest and the strength of stakeholder involvement in the project, but not necessarily to any decline in federal involvement in the area.

Jerry Jack, a Bureau of Land Management (BLM) employee working with the **Owl Mountain Partnership** in Colorado, feels that state agency involvement has grown by "quantum leaps" because of the Partnership. He explains how the Partnership empowered the state agencies to take an active role in land management: "If you think about it, the 'Feds,' particularly the Forest Service and the BLM in this part of country and throughout the west, they're the big eight-hundred pound gorillas. They own the majority of the land… State agency employees are paid less, have less wherewithal to do things, [and] less budget to do things. What we have been able to do, and that's the neat thing about this, is that we've brought them [the state agencies] up to a full seat at the table. We probably try to do as much on state lands and private lands as we do on federal lands… We've empowered them because we've got them at the table making decisions and they also have input to management decisions on federal lands and private lands." The Partnership has enabled agencies involved in land management to look across management boundaries and to be aware of all the interests encompassed within the project.

Jack also attributes the success of getting states more involved to the flexibility he has as project manager. He points out that he spends half of his time working on non-BLM issues and says the same thing is occurring with other members of the partnership as well: "I expect to have the Division of Wildlife people make recommendations on private lands and they do. I use FWS personnel to haul gravel and materials to private lands to develop a spring because that shows that we are cooperating. We're trying to break down that barrier that I only have to work on BLM lands and you can only work on state lands and so and so can only work on private lands." Although, the Colorado Division of Wildlife has traditionally been the primary state agency involved with the Partnership, within the last two years, the development of a Comprehensive Grazing Plan on Silver Spur Ranch has increased the involvement levels of the Colorado State Land Board, the Colorado State Forest Service, and the Colorado State Parks Department.

IMPORTANCE OF LOCAL STAKEHOLDERS

For many projects, the involvement of private landowners (and local stakeholders more generally), has been an important element of success, in terms of both strengthening the organizational structure of the project and on-the-ground ecological outcomes. The research team noted several statistically significant correlations between local stakeholder involvement and other variables.

Increased stakeholder involvement is a major strategy of many ecosystem management projects and it is likely that managers associate success, at least at the level of developing organizational strength and effectiveness, with recruitment of local landowners. It was found that self-rated success is significantly correlated with improvements in small, private landowners' management practices ($p < 0.01$) and with

involvement of private landowners ($p < 0.05$). Where the scope of the ecosystem management project runs beyond federal or state lands, moreover, incremental changes in the management practices of local landowners almost certainly rank high on the list of successes for many project managers.

The research team also found that small landowner management improvements were highly correlated with water quality improvements ($p < 0.01$) and with restoration of hydrologic regimes (p-value < 0.05). The ecological outcomes associated with improved management practices and increased involvement by private landowners thus appear to be clustered around watershed management issues. This association is probably due to the fact that watershed-based EM projects tend to involve large number of private landowners. It may also be due to increases in funding available for water quality improvement efforts directed at small private landowners stemming from the mandate of the Clean Water Act of 1972.

Involvement of Private Landowners

Private landowners play a pivotal role in successful ecosystem management efforts. From altering their own management practices to protect and improve ecosystem health to establishing conservation easements or selling ecologically sensitive lands, private landowners are important stakeholders in most EM efforts. As a manager from the **Natural Resource Roundtable**, a group of public and private stakeholders focused on planning within two Hawaiian Natural Resource and Watershed Areas, stated: the goal is to "get landowners to begin seeing their land in the overall landscape rather than as a discrete parcel."

Mike Blenden, Refuge Manager for the U.S. Fish and Wildlife Service in the **San Luis Valley Comprehensive Management Plan** in Colorado, commented on the importance of involving private landowners in EM projects. "Private landowners own most of the landscape that we're trying to either preserve, enhance, or manage in some way, shape, or form... We've got to impact management of private property to make a long-term difference at all, or even a short term for that manner - it's absolutely essential."

This sentiment was echoed by Max Castillo, the coordinator of the **Verde River Greenway** project in central Arizona. Although a portion of the project area is owned and managed by the State Parks department, a significant portion of the riverfront is in private ownership. "It's 100 percent important because we'll never be able to own all the properties along the river. If we don't get the landowners involved as stakeholders and partners, then there will always be someone who is doing something counter to the rest of the efforts because they haven't been contacted or aren't aware. I think it would be impossible to have a linear park like we have here without getting the private properties involved." To ensure the continued health of the riparian ecosystem, the project has used public outreach and education regarding the establishment of conservation easements and management practices to control noxious weeds. Slowly, trust toward the project and the state government has been growing. As Castillo notes, "Before the private property owners were a little distrustful of us. Now, they're easier to work with. I'm getting more and more calls regarding what's going on down on the river. It's been getting better all along."

A variety of outreach efforts have proven successful for EM projects across the country. In the **San Luis Valley Comprehensive Ecosystem Management Plan** initiated by the U.S. Fish and Wildlife Service (FWS) and the **Cache River Wetlands** project initiated by The Nature Conservancy, outreach has relied heavily on public meetings explaining options open to private

landowners, including adaptation of management techniques and establishment of conservation easements.

Some private landowners decline to become involved in local EM projects when they do not perceive there to be a problem. For the San Luis Valley, which centers on the management of two FWS National Wildlife Refuges, some landowners believe that they have "enough wildlife on their land," and therefore do not need to change their behavior. This point of view was also encountered by a manager at the **Cheyenne Bottoms Wildlife Area**: "Be prepared for opposition from landowners concerning 'landowner rights' and, if water is involved, the view that water used for wildlife is 'wasted' because it is not available for agriculture." Indeed, the deep-seated suspicions that some landowners harbor toward government or any organization interested in acquiring or managing large tracts of land can seriously inhibit an EM project's efforts to work cooperatively with the local community.

For some projects, the term "ecosystem management" itself has caused concern among landowners. Fearing government takeover of their land, some landowners in the Owl Mountain area of north central Colorado initially viewed the effort with trepidation. To assuage their concerns, the **Owl Mountain Partnership** moved from talking about "ecosystem health" to the less technical and more intuitive concept of "land health." They also made a concerted effort to implement projects that would show early successes. Illustrating the power of simple word choice, Jerry Jack contrasted the rich associations connected with the term "land health" with the abstractness of the term "ecosystem": "[the former] means that our forests are healthy… that we don't have a lot of soil movement, that we've got good cover on our vegetation, that we've got a real good diversity of plant and animal species, that people are happy, [and] that there's some kind of a social, cultural, and economic lifestyle at play. When I say ecosystem to you, that could be anything from mycorrhizae soil studies to the steppes of Mongolia." Addressing individual landowner concerns about the health of their own property proved to be a good first step for the Owl Mountain Partnership to address the needs of the greater ecosystem.

Private landowners present EM managers with significant opportunities and obstacles. In offering advice to other EM practitioners, a project manager from the **Wildlife Habitat Improvement Group** (WHIG) stressed the importance of building up trust with local landowners: "First and foremost, establish a relationship of trust and confidence with landowners. This takes time and considerable tact. Never presume to tell a landowner what he or she should do or press a landowner to act too quickly, no matter how sure you are about what they should do… The best way to establish a friendly trusting relationship is to take the time to socialize and get to know your neighbor."

INVOLVEMENT OF NON-GOVERNMENTAL ORGANIZATIONS

In both 1999 and 1995, non-governmental organizations (NGOs) were found to be involved in roughly three-quarters of the EM projects investigated (1999: 71%, 1995: 77%). Aware of the critical role that national NGOs such as The Nature Conservancy have played in initiating and supporting the ongoing work of many of the EM projects, the research team hypothesized that the involvement of such groups in projects might translate into increased levels of ecological or organizational outcomes. It was also hypothesized that, given their roots in local communities, local NGOs might serve the purpose of broadening and strengthening the base of stakeholder participation in the projects.

National and Local NGO Involvement

By their very nature, ecosystem-scale projects call for participants to move beyond fixed ideological and political boundaries. The collaborative work required for developing and implementing an ecosystem management plan encourages the formation of relationships between government agencies, private industries, landholders, and non-governmental organizations (NGOs). NGOs continue to be important players in ecosystem-scale projects for a variety of reasons. Because NGOs often more directly represent local interests in the project than state or federal government agencies, their role in ecosystem management projects is an important one. Several project managers indicated that NGO involvement, whether through national or local organizations, was helpful in the planning process, in generating community interest and support, and in facilitating outreach and educational activities. The types of NGOs involved in the ecosystem management projects surveyed varied tremendously, ranging from traditional environmental and land conservation groups to organizations focused on recreational and "quality of life" concerns to those organized around economic development issues.

The **Negrito Project** in New Mexico's Gila National Forest focuses on the Negrito Creek watershed. The partnership developed in 1992 between the U.S. Forest Service (USFS) and several other agencies, conservation groups, industries, and local community groups. One local organization in particular has been key to the activities of the project. The Ketchem County Citizens Group addresses several areas of community concern in the area, but they took on this project as one to support. According to Chuck Oliver of the USFS, the Group's regular meetings and newsletter have been an effective means of providing both "a format for people to see what's happening and to bring their comments forward." In addition, the group has built interest and support for the project from other local groups. Essentially, this local group has been the "driving force" behind the project. The Citizens Group has lobbied for the project through grant proposals; they've worked with state government to promote economic development; and they've also been effective at "getting Congress interested, involved, and looking at what we have going on the ground." Overall, grants and volunteer labor contributed by the local organizations make up 20 percent of the total project, the remainder being funded by the USFS.

The importance of the local groups has not gone unnoticed by USFS. While the Forest Service is ultimately responsible for the watershed, which lies within the boundaries of the National Forest, Chuck Oliver notes, "we couldn't do it without the money that's being generated through the grants and the lobbying of this group." A true partnership has developed between these organizations. For example, Oliver explains, "we have a commitment to this group that if we need to hire outside help to get things done that we will hire local whenever and wherever possible."

In the Lewis-Kalama watershed in southwest Washington, representatives of NGOs were integral participants in developing the **Integrated Landscape Management (ILM) Plan** overseen by the state Department of Fish and Wildlife. Both national and local organizations were involved, ranging from representatives of the Sierra Club and Audubon Society, to local organizations such as Cowlitz Game and Anglers and Friends of the Cowlitz Fly Fishermen. All of the organizations were involved in the Citizens' Advisory Group that developed the ILM plan. Beyond participation in the planning meetings and providing the input that shaped development of the plan, some groups took on additional responsibilities within the watershed. According to Rollie Geppert, who was involved in the initial organization of the ILM initiative, "Some of them were involved on their own in getting funds to do surveys of the culverts and bridges that blocked fish movement… We were not funding any of these organizations, although they were involved in identifying the problem, collecting some information, but not doing hard-core monitoring. They wanted to do that, so part of the implementation plan was to engage this volunteer force to collect more information."

Several statistically significant correlations were observed in conjunction with NGO involvement in the EM projects. National and regional NGO involvement was significantly correlated with the "improved management practices" as one project outcome ($p = 0.05$). This variable aggregates data on organizational and behavioral outcomes related to the education of managers in EM, management practices being more responsive to new information, managers shifting their concept of land management toward EM, and on-the-ground improvement of management practices. Neither success nor ecological outcomes were found to be significantly correlated with national or regional NGO involvement. It should be noted, however, that such a correlation was not found with any other stakeholder groups with the exception of private landowners.

Local NGO involvement was highly correlated with the involvement of new stakeholders ($p < 0.01$), industry groups ($p < 0.01$), and private landowners ($p < 0.05$). While these correlations may simply reflect the fact that the local NGOs are themselves the involved new stakeholders, industry groups, and private landowners, it is also possible that the local NGOs facilitate the process of increased involvement. This latter conclusion is supported by several other correlations observed by the research team. The involvement of local NGOs is significantly correlated with increased levels of trust and respect between stakeholders ($p < 0.01$); with increased public awareness of the EM project ($p < 0.05$); and with increased public education efforts project ($p < 0.05$).

STAKEHOLDER INVOLVEMENT AND PROJECT IMPLEMENTATION

In their survey responses, project managers clearly articulated the variety and importance of stakeholder involvement in EM projects. The project team hypothesized, however, that while EM projects are often characterized by multiple stakeholders, those with a single party responsible for ensuring the implementation of the project might be more successful and realize more outcomes.

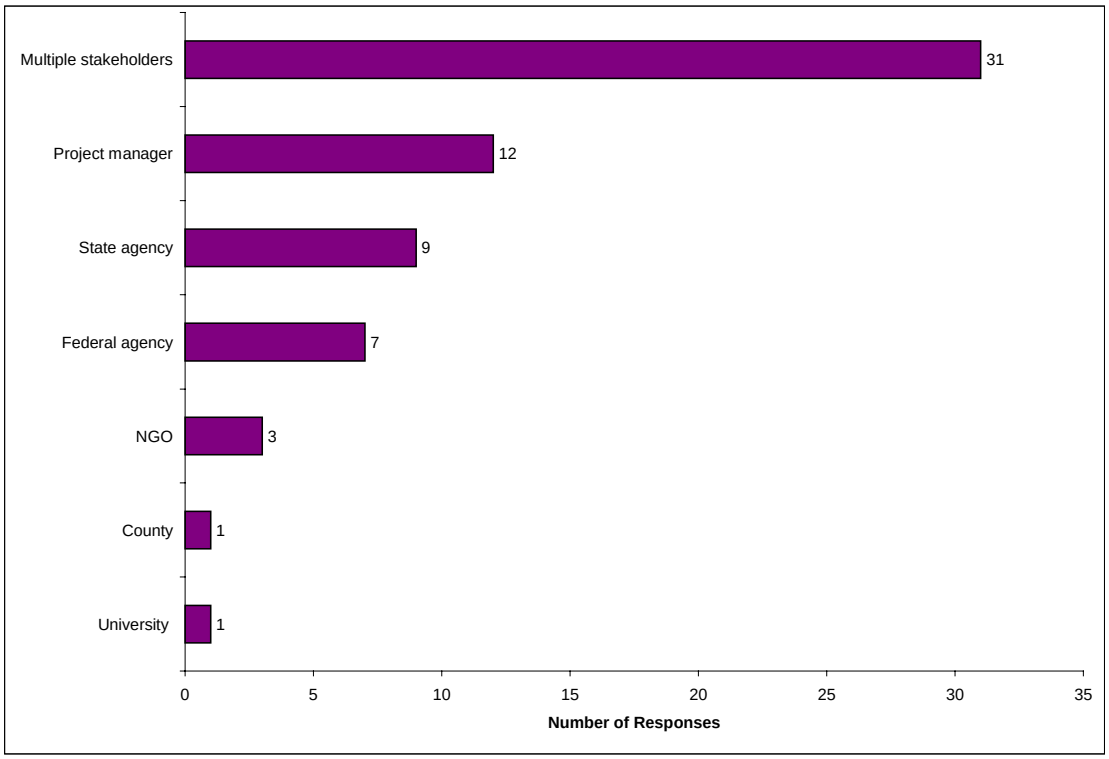
In an effort to better understand how EM projects have developed systems of oversight and authority, the research team asked the project managers an open-ended question to indicate who was ultimately responsible for ensuring the implementation of the EM project. Answers ranged widely but a content analysis of the 65 responses received revealed some interesting patterns and trends.

Forty-eight percent (n=31) of the projects indicated that a committee, council, or some other group of stakeholders was responsible for implementing the project (Figure 5-3). Eighteen percent identified the project manager as primarily responsible, while 14 percent named a state agency and 11 percent a federal agency. Of the remaining nine percent, three projects named an NGO as primarily responsible and one each named county government, project staff, or a university as responsible for overseeing implementation.

These results indicate that ecosystem management projects have truly taken to heart the idea of enabling a group of vested stakeholders to manage both the process and the outcomes of an ecosystem management project. This collaborative approach, which is at the heart of ecosystem management, enables those involved to benefit from the variety of expertise around the table. It appears that a significant number of ecosystem management projects have recognized the value of this collaborative

approach and are applying it to not only the development of an ecosystem management plan, but its implementation.

FIGURE 5-3: RESPONSIBLE FOR PROGRAM IMPLEMENTATION



However, there do appear to be differences between the outcomes of projects depending on the parties responsible for their implementation. Confirming our hypothesis, projects for which oversight responsibility was vested either with federal agencies or program managers had significantly higher self-rated success scores (4.6 and 4.2 respectively) than those overseen by state agencies (3.7) or by multiple stakeholders (3.7). Ecological outcomes were also significantly higher for projects overseen by federal agencies (4.5).

These differences are striking but it would be premature to conclude that EM projects overseen by federal agencies or by single program managers are inherently better at achieving results than state EM projects or those overseen by multiple stakeholders. A number of factors may be influencing these correlations between responsibility and success, and responsibility and outcomes. For example, EM projects led by federal agencies may be engaged in more extensive monitoring than others, and this developed monitoring infrastructure may lead to increased reporting of outcomes. It is also possible that projects headed up by state agencies or multiple stakeholders are situated in areas with more mixed patterns of ownership and confront greater obstacles to setting up the process-related institutions that serve as precursors to on-the-ground ecological results.

AREAS FOR FURTHER RESEARCH

One important topic for future study is the long-term patterns of stakeholder involvement. With projects situated primarily on public lands, it would seem natural that federal and/or state involvement would remain a constant. What of partnerships established with private stakeholders? In which projects do such broader based involvement remain strong? Does this strength translate into more significant ecological outcomes? What about with projects that begin their lives as public-private partnerships—are there regular patterns of involvement and are these significantly correlated with success?

With respect to the question of responsibility for program implementation, because only 65 of the 84 survey respondents answered this question, the results should only be regarded as indicative of some trends in ecosystem management projects. While it is encouraging that many projects rely on an organized group of stakeholders for ensuring the implementation of the project, the differences between the self-rated success and outcomes depending on single or group oversight are interesting. Further investigation of the operational and organizational differences between projects overseen by a group and those overseen by a single entity could reveal some of the benefits for each approach. When collaboration works at all levels, from project management through implementation, the factors that make that collaboration effective should be identified and shared. Further, individual managers of projects realizing outcomes and success may use strategies available to group-managed processes.

Major Findings: Monitoring Project Progress

Monitoring the progress of an EM project can be a daunting task especially when considering the number of scientific, social, and political components typical projects undertake. Despite the difficulties, the research team found that many project managers have incorporated various types of monitoring practices into their activities. The types of monitoring practices undertaken reflect the multiple approaches project managers often take in attempting to achieve their goals. They are not only evaluating ecological changes, but behavioral changes as well.

The most commonly reported indicator used for monitoring was monitoring for flora and/or fauna. Most of these EM projects are ultimately attempting to improve upon an ecological condition, such as the reintroduction or protection of a plant or animal species. Such monitoring reveals whether concrete, on-the-ground results are being achieved.

The next two indicators in rank were behavioral in nature. Monitoring for changes in management activities and monitoring the level of coordination and cooperation with others. Collaboration and behavioral changes are central tenets of EM so it is easy to see why these two indicators are so important to project managers. However, when asked to explain their answers, respondents noted that monitoring for such behavioral indicators was difficult to capture. This same response was noted along with several other indicators that typically do not have established monitoring protocols, such as monitoring levels of public awareness or levels of information sharing.

One striking characteristic among projects whose participants engaged in extensive monitoring practices showed that they also reported higher ecological outcomes on average. The difference may be highlighting a developmental difference. Simply, that those projects engaged in significant monitoring efforts have moved further along in their lifecycle, and would be expected to show more ecological outcomes. The data did support this observation. It was noted that the respondents from older projects tended to report higher levels of monitoring and ecological outcomes.

Still other characteristics that stood out among projects engaged in more monitoring was the fact that the respondents from these projects often reported that the development of an ecosystem management plan was an important strategy. These respondents also reported that links to existing state agencies and access to Geographic Information Systems were important factors in facilitating progress toward project goals.

These results do not suggest that these factors must be in place to have a successful monitoring program. However, they do point toward differences between projects that engage in more monitoring versus those projects that engage in less monitoring. How a project develops a monitoring program will be undoubtedly be highly individualized, based on circumstances and resources available.

Chapter 6
Monitoring Project Progress

INTRODUCTION

Ecosystem management projects attempt to bring about changes, whether distinct ecological goals, such as the reintroduction of an endangered species, or less specific educational goals, such as raising levels of awareness. In many cases evaluative processes are put in place to reflect on past efforts and to assess current methods. An established monitoring program can become the yardstick by which to measure the effectiveness of project efforts. Are the methods applied working? Do they need adjustment? The answers to these questions become important when looking to adapt project goals in response to new and evolving information, such as scientific discoveries or public sentiment. The ability to demonstrate results is also important when seeking funding. From the survey results, it appears that monitoring is widespread and takes diverse forms.

In 1995 most projects examined were either in the planning or early implementation stages, and many had not yet reached a phase where evaluation of project outcomes could begin. In fact, the most frequently reported strategy in 1995 was research, and an important component of this research was said to be inventory work. Most projects were beginning the work of discovering what it was they were attempting to manage. What resources did they have to work with? What are the major threats? Who are the people that should be involved? Efforts were focused on getting projects up and running. Evaluation would follow. We wanted to discover whether evaluation practices were in place, and if so, what types of evaluation practices were being utilized.

The research team hypothesized that in 1999 projects would be further along developmentally, and therefore, would be engaged in varying degrees of monitoring activities. The team asked the respondents to provide information on nine potential indicators that could be used to monitor project success: flora and/or fauna, soil, water, ecosystem processes, changes in management activities, changes in resource/land use, coordination/cooperation with others, levels of information sharing, and public awareness/opinion. For each indicator they were asked the extent to which the indicator was used and whether or not baseline information existed. When asked about the degree to which indicators were used, respondents were given four possible answers: not used; not used, will use in the future; minor use; and major use. For analysis purposes, these data points were later collapsed into two categories, not a major use, and major use. The indicators were purposefully left in general terms as the team recognized monitoring practices could take on a variety of forms. To provide more detail on the kinds of monitoring used, project managers were asked to explain their responses further.

The nine indicators on monitoring activities covered two broad categories: ecological monitoring and behavioral monitoring.

- **Ecological monitoring** included monitoring for natural biota and natural processes: flora and fauna, soil, water, and ecosystem processes.

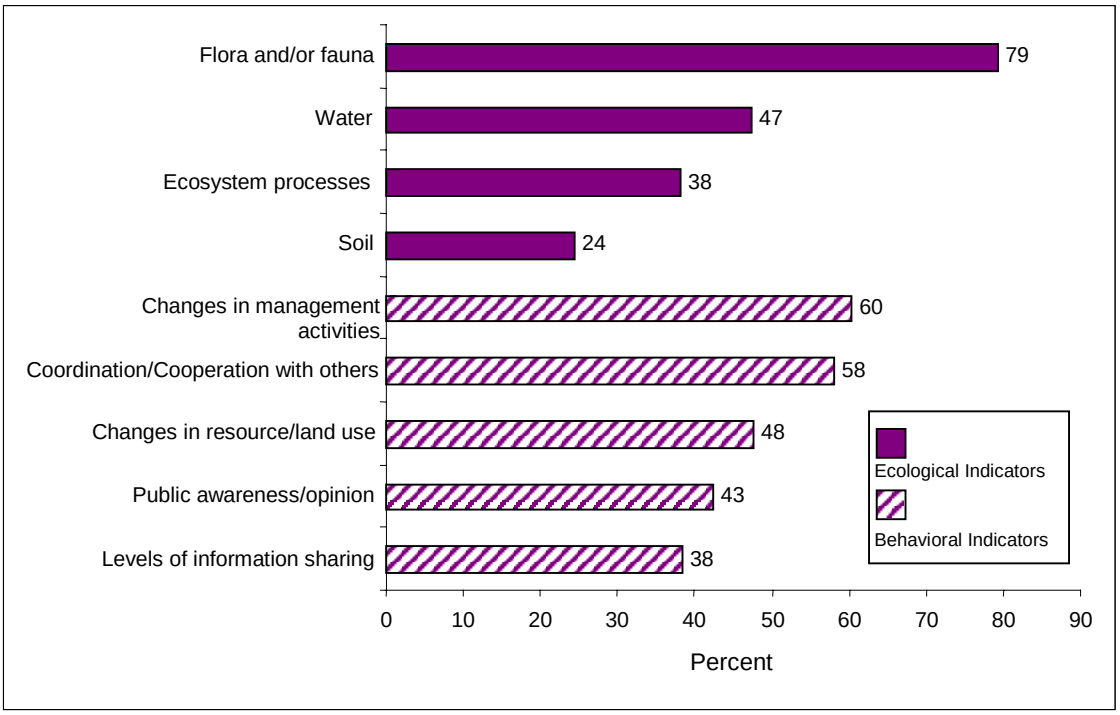
- **Behavioral monitoring** included monitoring human behaviors and elements on the landscape: changes in management activities, changes in resource/land use, coordination/cooperation with others, levels of information sharing, and public awareness/opinion.

The team discovered that an assortment of monitoring activities were taking place and that monitoring for ecological changes was used with the same relative frequency as monitoring for behavioral changes. Fifty-one percent of the respondents reported monitoring behavioral indicators, while 49 percent reported monitoring ecological indicators. Responses indicated that the majority of the projects are engaged first in monitoring for flora and/or fauna, and second in monitoring for changes in management activities (Figure 6-1). The project team also found some interesting results by breaking the projects into various populations and comparing the differences among them. These populations included projects that monitor more vs. monitor less, older vs. younger projects, and successful vs. less successful projects.

RESULTS: 1999 DATA

Monitoring flora and/or fauna was rated highest among the nine indicators with 79 percent of the respondents (n=78) stating that this type of monitoring was a 'major use.' Explanations for the monitoring of flora and/or fauna depended upon each project's particular circumstance. For example, the respondent for the Karner Blue Butterfly Habitat Conservation Plan explained how they monitor for change in the butterfly's lupine dependent habitat, while the Chesapeake Bay Program stated that they monitor for changes in underwater grass cover. In addition to explaining what they monitored, some respondents also mentioned explicit monitoring techniques they used,

FIGURE 6-1: INDICATORS USED IN MONITORING PROJECT SUCCESS (MAJOR USE)



such as revisiting permanent transects (Stegall Mountain Natural Area) and examining aerial photographs (Cheyenne Bottoms Wildlife Area). The majority of the explanations involved monitoring plant communities. Of the 65 respondents indicating monitoring flora and/or fauna was a major use, 62 provided explanations. Twenty-five said they monitored plant communities, 11 said they monitored wildlife, and nine said they monitored aquatic species. The remaining 17 projects provided a mix of explanations including rare and priority species monitoring, invasive species monitoring, and habitat monitoring.

The next two indicators in rank were both behavioral indicators: “changes in management activities” (60%, n=70) and “coordination/cooperation with others” (58%, n=62). Both of these indicators are often cited as central tenets in EM projects, therefore it is fitting that the respondents consider them important indicators. In the 1995 study, “collaboration” was considered the most important factor helping projects move forward, and “change in approach to land management” was an outcome that over half of the respondents noted. How projects monitored for such changes varied greatly. Explanations provided by the respondents indicated that monitoring for changes in management activities revolved around farming, ranching, and forest management practices. Explanations for coordination and cooperation with others varied from the maintenance of a list of partners to levels of participation at meetings. Several respondents replied that monitoring for these types of indicators was difficult to measure indicating that although they answered positively, it may not be something they formally monitor.

The indicator reported as used the least was “soil.” It is possible that this indicator was ranked last, because its application may be considered case specific. The Lajas Valley Lagoon System in Puerto Rico explained that this indicator is “an important factor in determining the feasibility of lagoon restoration.” Another explanation may be that once soil profiles are understood there is less of a need to engage in continual monitoring as these profiles typically do not change rapidly.

“Ecosystem processes” was ranked second to last among the nine indicators. It appeared from the explanations that this indicator was difficult for respondents to interpret. Twenty-nine projects stated that this was a major use, however 33 took the opportunity to provide an explanation. Four projects replied the indicator was not a major use and provided an explanation stating that ecosystem processes, by themselves, are difficult to measure. Fifteen of the projects that stated this was a major use for the project explained how they monitored historical disturbance regimes, such as fire or hydrologic cycles.

Monitoring for levels of coordination and cooperation, levels of information sharing, public awareness/opinion, and ecosystem processes are sometimes difficult to quantify and were considered difficult indicators to measure by some respondents. The Blue Mountains Natural Resources Institute responded that monitoring for coordination/cooperation, information sharing, and public awareness was "subjective" in nature. The Nebraska Sandhills Ecosystem explained that these same indicators were measured through "personal perceptions." Indicators, such as monitoring flora and/or fauna, and monitoring water had clear explanations of what the project was monitoring and in some cases, how the monitoring was carried out. It seems that many of the indicators that were listed are not considered something that is discretely monitored, rather they are watched informally by the individuals involved in the project.

It might be argued that if ecosystem management projects are to become more standardized, a formal process for tracking behavioral changes will be an important part of monitoring a project's effectiveness. Project managers have suggested that funders are interested in knowing whether a project and its methods are effective. What projects are trying to affect isn't always a change in the biota; it is often a change in the way agencies operate and ways resource management is practiced.

Project Monitoring

Ecosystem management projects have a variety of monitoring systems in place, depending on the scale and goals of the project. The capacity for effective monitoring is complicated by the fact that multiple agencies and organizations are typically involved in EM projects. In some cases, monitoring of project implementation and progress is the responsibility of the lead organization in the partnership. In others, each organization is responsible for tracking its progress according to the guidelines established by the partnership. In still other cases, reporting is not a formalized part of the agreement. Wherever responsibility lies, one characteristic the projects seem to have in common is that their monitoring programs are often collaborative efforts.

While still in its early stages of collecting baseline information and establishing a monitoring system, the Wildlife **Habitat Improvement Group** (WHIG) in Vermont has partnered with the Vermont Agency of Natural Resources and local county foresters to advance the process. Although there is not a formal baseline survey of all the lands held by WHIG members, the group is combining GPS resources with on-the-ground surveys by state and county foresters to assess the current state of many of the lands. Because many of the landowners involved in WHIG also are participating in the state's Current Use program, there is an additional level of monitoring. The Current Use program requires that professional foresters complete management plans for the land every ten years. Every five years, the plans are overseen, reviewed, and monitored by the county forester, who is an agent of the state, to certify that the management plan is being followed. In addition, the state is undertaking a survey of indicator species/biota in the 1,000 to 1,100-acre Townshend State Forest, which abuts some WHIG-controlled land.

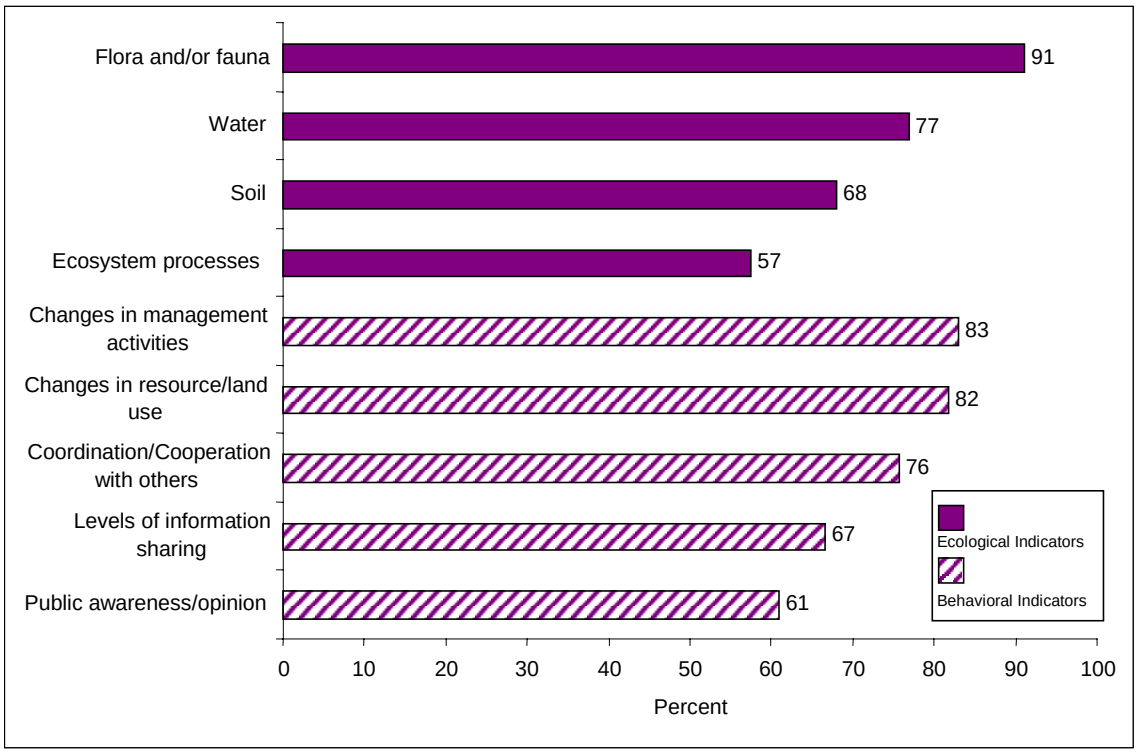
Under a new directive from headquarters, projects run by **The Nature Conservancy** will begin to collect more standardized baseline information regarding the ecological health of the sites. While TNC chapters have always been encouraged to monitor sites and collect field data, especially data that relate to rare plant and animal species, this is the first move toward standardized monitoring. Using new "Measures of Success" criteria, chapters will collect baseline data on the biodiversity health of conservation targets and the threats posed to it. Sites will be reassessed every three to five years, allowing project managers to evaluate the changes over time.

BASELINE DATA

The respondents were asked specifically about whether they had baseline information for each indicator. From the responses it appears that much information has been collected by projects taking an ecosystem-approach to management (Figure 6-2). Nearly all the respondents (91%, n=78) indicated that they had baseline information for

flora and/or fauna, and over half said they had baseline information on ecosystem processes (57%, n=68). It is difficult to determine from the data what form this baseline information takes. When an indicator was considered difficult to monitor, such as ecosystem processes and all behavioral indicators, some respondents did not answer the baseline portion of the question. In all categories other than "water" and "flora and fauna," the number of respondents that replied to both portions of the question decreased by 8 to 15 responses. This seems to indicate that it may have been unclear what baseline information for these indicators would look like.

FIGURE 6-2 BASELINE INFORMATION EXISTS



DEGREE OF PROJECT MONITORING

We broke the projects into two groups: those that are engaged in more monitoring versus those engaged in less monitoring. Projects were first divided into groups based on whether indicators were a "major use" or "not a major use" in their monitoring activities. Projects with a preponderance of "major use" indicators were grouped as "more monitoring," while the remaining projects were grouped as "less monitoring." Nineteen projects were classified as "more monitoring," while 56 were classified as "less monitoring."

Monitoring and Strategies

Projects that reported that they engaged in more monitoring were found to undertake certain strategies more frequently when compared to projects that were involved in less monitoring. The development of an EM plan was one of these strategies

that was found to be more likely a major strategy of those projects engaged in more monitoring activities. Ninety-eight percent of those projects engaged in more monitoring reported that the development of an EM plan was a major strategy, while only 55 percent of the projects engaged in less monitoring reported it as a major strategy. It is possible that this is the case because ecosystem management plans often call out specific goals projects are attempting to reach and are likely to develop monitoring programs in conjunction with the development of their management plans.

Monitoring and Ecological Outcomes

The variable "ecological restoration results" (discussed in Chapter 8: Ecological Outcomes) was found to be significantly higher for those projects who are engaged in more monitoring practices ($p < 0.05$). Mean responses for this factor were 3.9 for those projects engaged in more monitoring, versus 3.5 for those projects engaged in less monitoring. It is possible that projects engaged in more monitoring activities have a heightened sense of awareness and are therefore more likely to report ecological outcomes. These projects are engaged in bringing about ecological change and they are also actively watching for those outcomes.

Monitoring and Facilitating Factors

We also noted that projects that are engaged in more monitoring also are more likely to report that certain facilitating factors helped their project progress. The following facilitating factors were rated higher by those projects engaged in more monitoring: links to existing local/state agency programs, geographic information systems, availability of baseline data, and well-defined understandable project boundaries.

It is possible that these facilitating factors point to resources and assistance that projects tap into in order to develop their monitoring programs. Projects engaged in more monitoring had a mean response of 4.1 for links to existing local/state agency program(s), while projects engaged in less monitoring had a mean response of 3.5. Many projects rely on coordination with other state and federal agencies to support their efforts, especially when undertaking such a broad-based approach as ecosystem management (Chapter 5: Stakeholder Involvement). State and local agencies can lend resources such as expertise in the form of wildlife biologists from a state's department of natural resources, or information on agricultural practices from the local soil and conservation district. In fact, several respondents explained how information for soil and water is provided by outside agencies. The project manager at the Sideling Hill Creek Bioreserve states: "Across the Conservancy, there is no question that we will need Heritage Program partners to do measures in many sites, because they're the field biologists that know the sites best." Outside agencies may also help by simply providing a workforce. Local programs can also provide much needed labor through established volunteer monitoring programs.

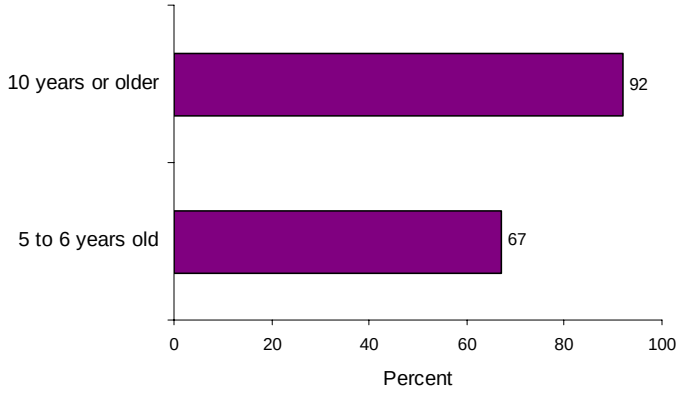
GIS has proven to be a valuable resource in the management of EM projects. Projects engaged in more monitoring had a mean response of 4.3 for Geographical Information System (GIS), while projects engaged in less monitoring had a mean response of 3.4. The 1995 study reported that respondents explained how GIS "greatly expanded their management capabilities." Mark Heyde, Marathon County Forest

Administrator, stated in 1999 that the county's implementation of a GIS system was one of the factors that enabled their project to take a broader look at the resources within their boundaries.

INCREASED MONITORING WITH AGE

We hypothesized that older projects would be further along in their development and therefore would be more likely to have established monitoring protocols. When examining the data by age, the data did indicate a difference in monitoring for flora and/or fauna: the older the project, the more likely they were to report that monitoring for flora and/or fauna was a major use (Figure 6-3). Since monitoring for flora and/or fauna was the top-rated indicator used by the respondents, the project team believed this difference held some significance.

FIGURE 6-3: MONITORING FLORA AND/OR FAUNA & PROJECT AGE



The team compared projects that were 5 to 6 years (n=18), projects that were 7 to 9 years old (n=37), and projects that were 10 years old or older (n=26). When averaging the responses by age group, there was a statistically significant difference between the older and the younger projects ($p < 0.05$). Ninety-two percent of the projects 10 years or older responded that monitoring flora and/or fauna was a major use, while 67 percent of the projects 5 to 6 years old said it was a major use.

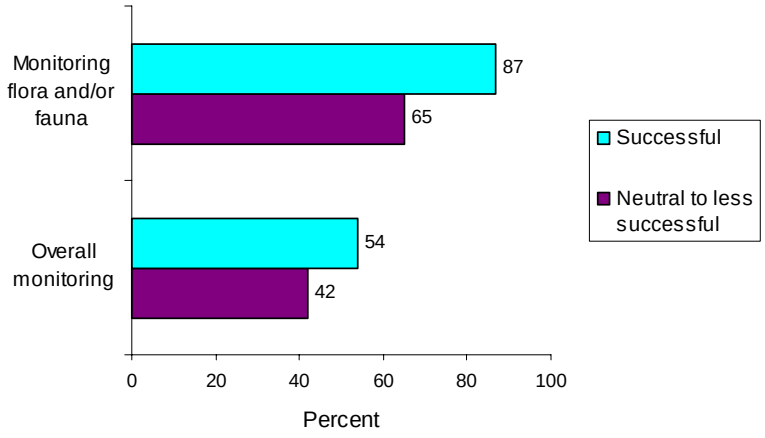
It appears that as projects mature and progress they begin to develop more processes and programs that support project success. The above data only points to a hypothesized difference among projects, however. A more focused study would need to be conducted to discover whether the difference is accurate.

MONITORING AND PROJECT SUCCESS

Projects that rated themselves more successful (self-rated success of 4 or 5) (n=54) also reported that they were significantly more engaged in monitoring activities than those projects who considered themselves less successful (self-rated success of 1,2, or 3) (n=23) (Figure 6-4). When all the monitoring indicators were aggregated into one variable called "overall monitoring," 54 percent of successful projects reported overall monitoring activity, whereas only 42 percent of less successful projects reported monitoring ($p < 0.10$). Monitoring specifically for flora and/or fauna was also found to be significantly different among the two populations ($p < 0.05$).

Monitoring in itself does not appear to be the driving factor behind whether or not a project considers itself successful, but it may be that projects that have a system where they can see results will be able to more easily witness those results. The amount of monitoring may also be an indicator of the amounts of resources available to a project. The more resources available, the more likely the project will have a monitoring program established, which may influence how successful the project considers itself.

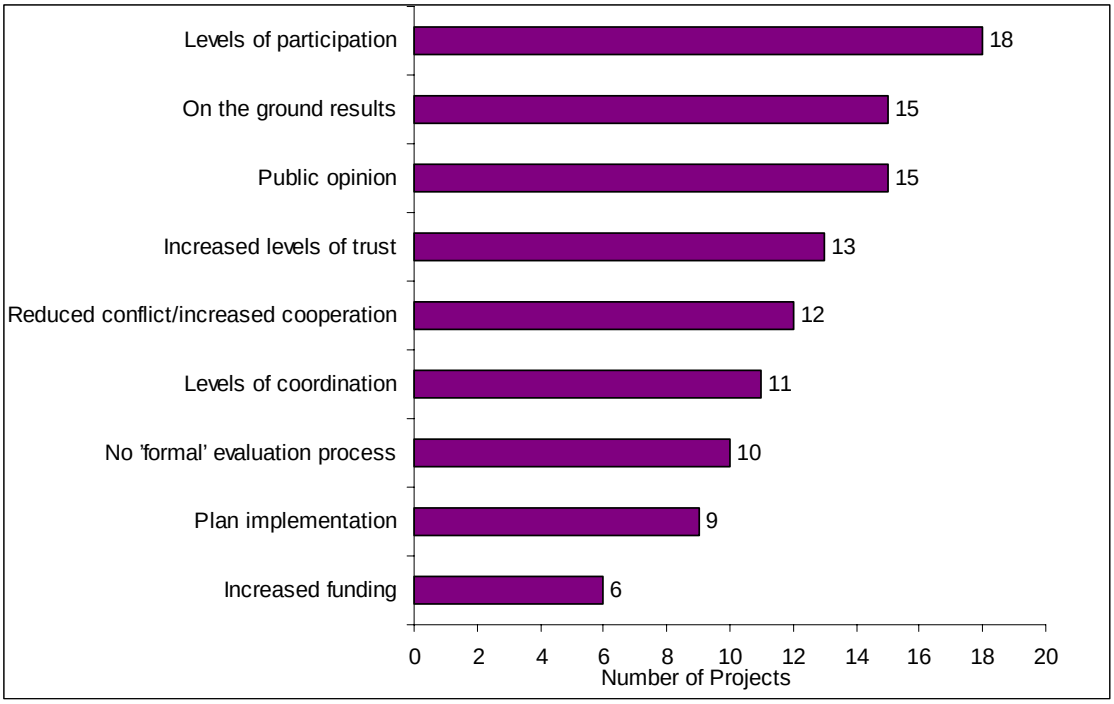
FIGURE 6-4: MONITORING ACTIVITIES & SELF-RATED SUCCESS LEVEL



MONITORING PROJECT PROCESSES

In an open-ended question, respondents were asked how they evaluate the effectiveness by which the process of the project is managed. Seventy-nine projects completed this question, often with multiple responses. Nine variables were created to capture these responses (Figure 6-5).

FIGURE 6-5: FACTORS USED TO EVALUATE PROCESS OUTCOMES



The greatest number of respondents (18) replied that they look to levels of participation to evaluate how well their project is faring. In general, the more stakeholders there are involved, the more effective they view the process by which their project is managed. The respondent from the Indiana Grand Kankakee Marsh Restoration Project states: "If [the partners/stakeholders] feel it's successful, and their interests are being taken into consideration, they will continue to be involved."

Fifteen project managers replied that on-the-ground results and public opinion were important factors in evaluating the process. On-the-ground results are often the primary goal of all these ecosystem management projects, so it is not surprising that they would measure success in terms of the degree to which such results have been achieved. Public opinion points to the impact that the project is having on the surrounding community. Gauging the favorable or unfavorable reception of project activities by the local community is important for assessing public outreach and education activities and for developing strategies to sustain or increase stakeholder involvement.

Increased levels of trust are one of the most frequently reported behavioral outcomes reported by the projects in this study (discussed in Chapter 7: Organization and Behavioral Outcomes). The Nebraska Sandhills Ecosystem respondent reported that they "rely heavily on levels of trust… open communication, and [a] decline in negative comments in [the] community." Given the importance of trust in developing productive working relationships between stakeholders, it makes sense that respondents would evaluate project processes, at least in part, in terms of trust building.

A number of respondents also pointed to two interrelated factors that they use to evaluate the effectiveness of project processes: reduced levels of conflict and increased

levels of coordination. The project manager from the Natural Resources Roundtable reports that the effectiveness of the process is evaluated by "reduced conflict and levels of trust as seen in continued willingness to sit down and explore non-regulatory options for management and protection strategies."

AREAS FOR FURTHER RESEARCH

Comprehensive research into the types of monitoring techniques used and their effectiveness would benefit these projects greatly. As noted, these projects engage in a variety of monitoring techniques, and these techniques are highly dependent upon the types of challenges the project faces. Determining what techniques are effective and efficient forms of monitoring will help in the quest of measuring the effectiveness of strategies. Effectiveness and efficiency are important to projects that have limited resources, and also is very important to projects that look to adapt their strategies based on the results of current strategies.

Because initial successes of these projects are often measured in terms of behavioral changes, such as increased levels of communication and trust, research into how these projects would monitor these types of changes would be of great benefit. As noted, projects felt these behavioral changes were difficult to monitor. If these projects had the ability to measure these changes, their successes may become more apparent, not only to project managers and employees, but also to funding and enabling agencies.

Monitoring programs can consume significant resources in money, time, and personnel. Projects may be able to manage for these deficits by connecting with other programs that have resources, such as equipment and expertise. It would be of interest to find out the best ways projects can tap into these resources. Research into the resources that may be available or closer looks at potential scientific partnerships would aid projects in developing the necessary bonds in order to establish effective monitoring programs.

Continued research into precisely how ecosystem processes function is of critical importance to these EM projects. Understanding how these complex and dynamic webs function and how they react to anthropogenic influences will advance EM projects in their ability to more effectively manage these systems. Respondents in our survey indicated that monitoring these processes is a difficult task to undertake. Hopefully, it will become less difficult as our knowledge of these systems increases.

SECTION II

Project Outcomes

Major Findings: Organizational and Behavioral Outcomes

Ecosystem management stresses that the solutions to natural resource conflicts and movement toward ecosystem integrity necessitate institutional innovation. This study found significant increases between 1995 and 1999 with respect to several types of organizational and behavioral outcomes. The most frequently reported were improved communication and cooperation, increased public awareness of ecosystems, and new stakeholders involved in projects.

As in 1995, improved communication and cooperation was the most commonly reported procedural outcome: 86% of survey respondents claimed that project activities had produced this result. The most striking finding was in the increased levels of trust and respect among stakeholders, which jumped from 14% in 1995 to 69% in 1999. This increase is consistent with the research team's hypothesis that levels of trust and respect are highly dependent on the phase of the project in its lifecycle.

Another set of findings related to views of the wider public about ecosystem management projects. Survey respondents cited significant increases in public awareness of ecosystems and the stresses on them, as well as increases in public education efforts.

The data suggests that the EM projects are continuing to grow and evolve in terms of institutional strength. In the early and middle phase of a project, success may need to be measured in terms of positive procedural and behavioral outcomes. As projects mature and institutional structures become more stable and reliable, the success will be assessed in terms of the ability of those institutions and processes to secure higher levels of ecological integrity while balancing the needs of surrounding communities.

Chapter 7
Organizational and Behavioral Outcomes

INTRODUCTION

The goals of ecosystem management are multiple. While maintaining or restoring ecosystem integrity is in most cases uppermost, the intermediate goals of building coalitions, practicing adaptive management, and increasing public awareness of natural resource issues are often pressing concerns for practitioners of ecosystem management. For this reason, in addition to learning about on-the-ground ecological outcomes, the research team wished to gain information about organizational and behavioral outcomes that had resulted from the operation of the ecosystem management projects.

The terms "organizational and behavioral outcomes" and "process outcomes," as used in this section, are meant to embrace a wide range of results bound up with organizational processes and institutional practices. Managers were asked to assess the extent to which 19 types of outcomes related to planning activities, program development, organizational protocols, management practices, and norms of interaction between project participants had resulted from their project efforts.

In the 1995 study, projects were asked to report specific outcomes but were not prompted to distinguish between ecological outcomes and organizational/behavioral outcomes. As the authors noted, "While one-third of the projected reported specific ecological results, the five outcomes cited most frequently can be viewed as procedural in nature." On the basis of these findings, we hypothesized that ecosystem management projects would continue to report significant process-related outcomes. Moreover, we expected that some types of organizational outcomes, such as increases in levels of trust and respect between stakeholders and changes in management practices, would be more likely to occur as the projects matured. For the most part, these hypotheses were confirmed.

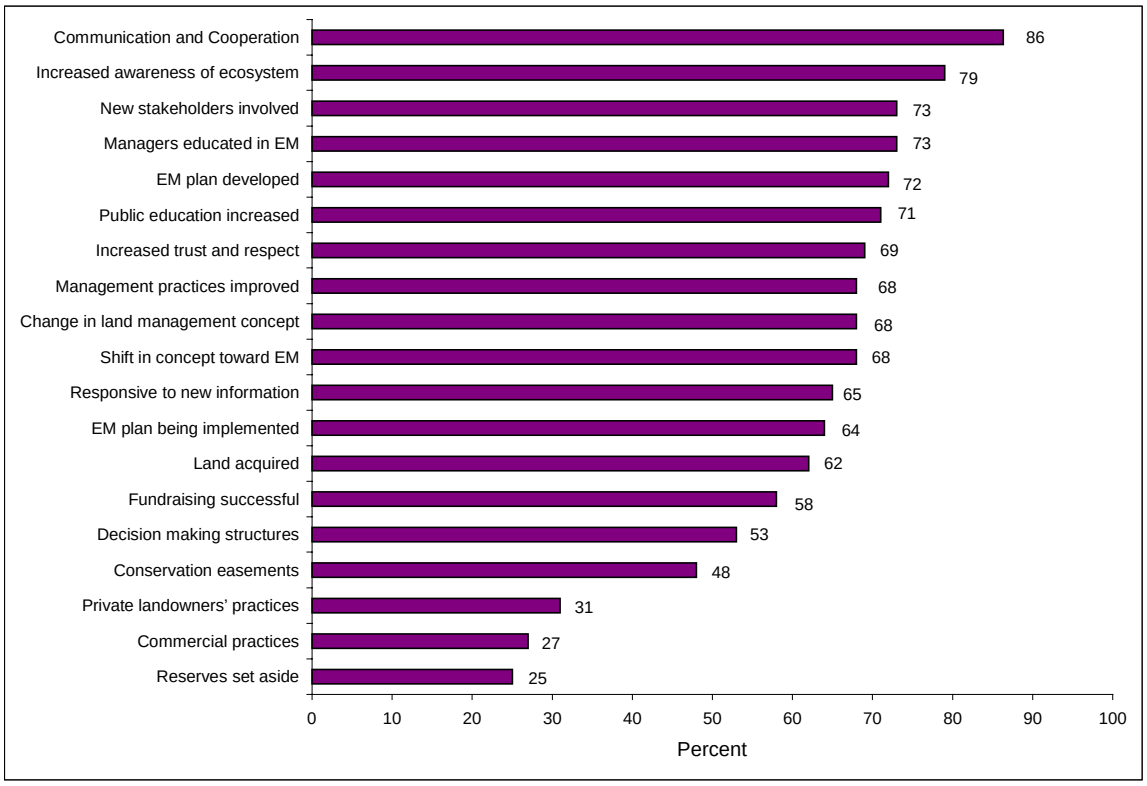
RESULTS: 1999 DATA

In general, respondents reported significant realization of process outcomes (Figure 7-1). Three of the top four process-related outcomes reported by the project managers dealt with the attitudes and involvement levels of stakeholders: 86 percent of projects reported improvements in communication and cooperation between stakeholders; 73 percent indicated that new stakeholders have been involved in project activities; and 69 percent reported increases in trust and respect among stakeholders. Of the nine top responses dealing with procedural outcomes only improved communication and cooperation between stakeholders are statistically considered higher than the others ($p < 0.05$).

Outcomes related to the public at large also ranked high on the list: 79 percent of respondents cited increased public awareness of ecosystems and the stresses on them, 71 percent reported increased public education efforts, and 68 percent indicated that public awareness of the EM projects' efforts had increased.

Projects reported significant procedural outcomes related to management practices: 73 percent of the projects reported that managers had been educated in ecosystem management; 72 percent indicated that an EM plan had been developed; 68 percent agreed that managers had shifted their concept of land management toward EM; and 65 percent reported that management practices were more responsive to new information.

FIGURE 7-1: ORGANIZATIONAL AND BEHAVIORAL OUTCOMES



Relatively few of the projects reported significant improvements in management practices on private lands. Thirty percent of project reported some improvements with small, private landowners, though only 5 projects—Cache River Wetlands, Nebraska Sandhills Ecosystem, Prairie Pothole Joint Venture, Virginia Coast Reserve, and Wildlife Habitat Improvement Group—"strongly agreed" that this was the case. However, given the challenges faced by working with landowners to effect changes on private land, improvements cited by 30 percent of the respondents is a significant impact. Twenty-seven percent cited some improvements in commercial and industrial landowners' management practices. In this case, only three projects—Indiana Grand Kankakee Marsh Restoration Project, St. Mary's River Remedial Action Plan, and Virginia Coast Reserve—"strongly agreed" with the statement.

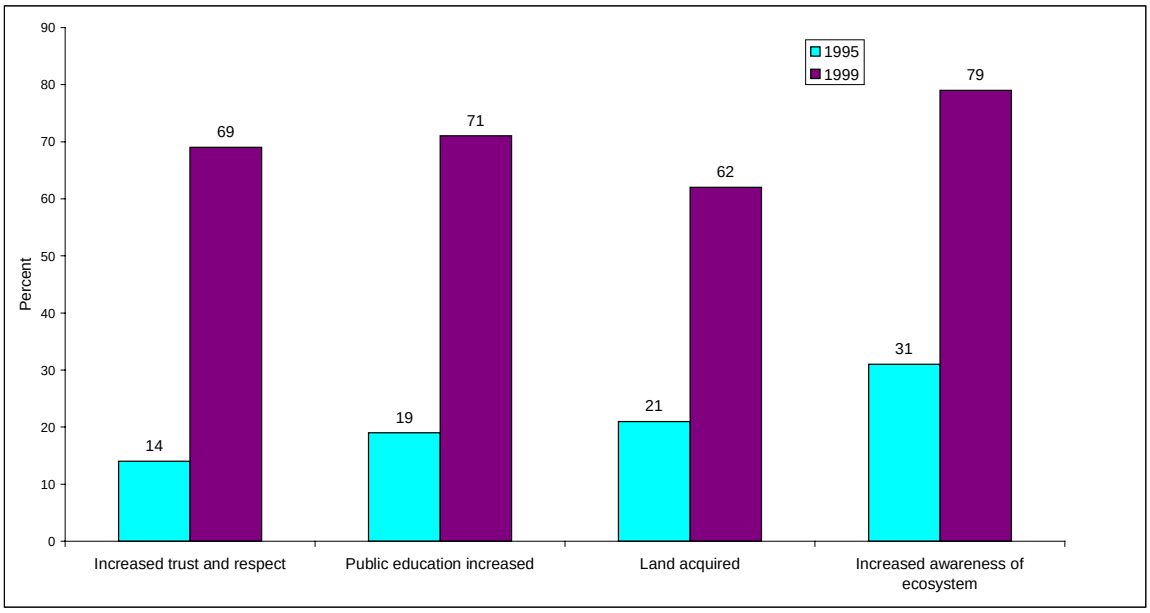
COMPARISON TO 1995 DATA

Several of the procedural and behavioral outcomes identified in the 1995 study showed significant increases in the intervening five years (Figure 7-2). Most striking was the fact that increases in the levels of trust and respect between stakeholders went from

lowest on the 1995 list (14%) to second highest in the 1999 data set (68%), a statistically significant difference ($p < 0.01$). This finding is consistent with the research team's hypothesis that levels of trust and respect will increase over time. Considerable anecdotal evidence backs this claim up.

Statistically significant increases between 1995 and 1999 ($p < 0.01$) were also observed for public education efforts (19% to 71%), land acquisitions (21% to 62%), and public awareness of the ecosystem (31% to 79%). (It should be noted, however, that these increases are probably far sharper than is really the case since the procedural outcomes recorded for the 1995 study were volunteered by the respondents in a phone interview rather than specified on a survey, as in 1999.) Nevertheless, these increases can also be sensibly accounted for in terms of a lifecycle analysis, as demonstrated in Chapter 3: Lifecycle of EM Projects. As a project becomes established and better known in the community, you would expect awareness of it to increase. Public education would likely increase as the project is better able to reach out and communicate its goals and plans to those in the area. Finally, as the community accepts the project, land acquisition, which often will face serious initial challenges and resistance, becomes a more acceptable strategy.

FIGURE 7-2: ORGANIZATIONAL AND BEHAVIORAL OUTCOMES, 1995 AND 1999



Building Trust

Those involved with ecosystem management projects for long periods of time have come to realize the value of building trust among stakeholders. As something that facilitates communication, cooperation, and a sense of common purpose, trust is an essential element of any multi-stakeholder, collaborative venture. Those involved with ecosystem management projects attribute success at building trust to a number of factors, from repeated interactions over an extended period of time to working together for a common goal.

Frequent interaction with those involved in the project was often cited as a key factor in building trust, especially by government-initiated projects. Mike Blenden, a Refuge Manager for the U.S. Fish and Wildlife Service, is involved in the **San Luis Valley Comprehensive Ecosystem Management Plan**. Of frequent contact with stakeholders, he notes: "It puts faces with agencies and relationships develop… It puts a face and a name and a personality with a program instead of just some government program that's being run from somebody sitting behind a desk." The importance of personal contact and mingling with community members was also emphasized. Blenden recounted a story from the San Luis Valley: "One farmer five or six years ago wanted nothing to do with the federal government, period. We hired a technician who was going to lead up our Partnership for [Fish and] Wildlife Program and just out of coincidence this landowner had a trailer… that he wanted to rent, so our employee rented the trailer from him—and they struck up conversation, obviously as landlord and tenant. Before you know, in the next year, this guy has a "Partners for [Fish and] Wildlife" wetland restoration project on his land…. [If] you talk to him today, he's a poster child for the program. He says, 'this is the most valuable use of this land I can make use of – the primary production of wildlife and providing crane migration habitat that's what I want it for.' It's very dramatic."

David Lentz, of the Wisconsin Department of Natural Resources, explains that trust was possible for the partners of the **Karner Blue Butterfly Habitat Conservation Plan** (HCP) once they recognized that partnership did not require compromising values. "With such a diverse set of values, we recognized that we weren't going to change anyone's values, and that we shouldn't try to do battle… What we did is identify what they had in common. They all needed an Incidental Take permit to get back to work. Whatever it was, whether it was maintaining a barrens … to being able to do emergency access on a utility right of way when a storm knocks out some lines…and perhaps incidentally take some Karen's when they drive in with their big trucks in the middle of the night. So, we all had that in common." Trust between partners also consolidated as the project began to take shape on paper and there was something to commonly focus their attention on. Likewise, when partners were able to get out of the hotel conference rooms and into the Karner habitat, common interests and problems were identified and trust grew. When they got out in the field "they started talking about how they did things, and they discovered that they weren't so different and began to talk about how they could make this strategy work for all of them."

Commonalties brought the team together as they were working to develop the Karner Blue Butterfly HCP. Individuals also came together with the recognition that the HCP process in the past had been cumbersome for participants and the willingness to find "a better way." Finally, individual team members each had a significant investment of time and effort in the process. Beyond a certain point, individuals were not willing to leave the table – they were invested in working together to create the HCP, "it was too far down the road to turn back."

It took over five years to develop the HCP and accompanying Environmental Impact Statement (EIS) required by the Incidental Take permit. During this time, trust was built among the partners because of relatively low turnover of the individuals around the table. David Lentz noted, "individuals stuck with it because it got so complex that it was difficult when someone new came on board because they would have a lot of institutional learning to catch up on and we

didn't have the time to give it to them. So, partner organizations tended to keep the same people working on it and people got to know each other, they got to appreciate each other's point of view a little bit better, and accepted the fact that they weren't going to change each other."

For other projects, the recognition of the potential "win-win" situation available through cooperation and trust was significant in establishing a partnership. In the case of the **Mesa Creek Coordinated Resource Management Plan** in southwest Colorado, cooperation benefited both the Bureau of Land Management (BLM) and the private grazing permittee, Weimer Ranch, Inc.. According to Dean Stindt, Rangeland Management Specialist for BLM, BLM benefited "in terms of improved management of the public lands" while private landholders were "able to take advantage of more flexibility in terms of grazing administration on public lands. So, it is kind of a win-win situation."

Michelle Brown of the **Kenai River Watershed Project** offered some important advice on gaining trust from local landowners. "Always do what you say you're going to do and never do what you say you're not going to do. Follow through. Be honest - don't lie… It takes time to prove that actions speak louder than words."

PROCESS OUTCOMES, ECOLOGICAL OUTCOMES AND SUCCESS

A number of the top organizational and behavioral outcomes were correlated significantly with ecological outcomes and success ratings. This correlation makes good sense since, as a rule, the institutional framework needed to guide and coordinate action must be in place before planned outcomes begin to occur with regularity.

The composite variable ecological outcomes was strongly correlated with four organizational and behavioral outcomes: on-the-ground improvements in management practices ($p < 0.01$), land acquisition ($p < 0.01$), increased trust and respect ($p < 0.01$) and increased public education efforts ($p < 0.01$). Here again, these correlations appear to point to the institutional changes that serve as preconditions of longer term, ecological changes in the ecosystems targeted by the projects. The composite scientific understanding variable was strongly correlated with public education efforts ($p < 0.01$) and moderately correlated with land acquisition ($p < 0.05$) and increased public awareness of the ecosystem and its stresses ($p < 0.05$). Unlike in the previous cases, where organizational outcomes were hypothesized to work as preconditions of ecological outcomes, it is probably the case that increased scientific understanding (which the research team classified as an ecological outcome) informed public education efforts and enabled increased awareness of the ecosystem and its stresses.

Increased trust and respect are highly correlated with increased public awareness ($p < 0.01$), with managers being educated in ecosystem management ($p < 0.01$), and with new stakeholders becoming involved ($p < 0.01$). These associations point, perhaps, to the significant role that building relationships can have on the acceptance of new ideas. Since the concept of ecosystem management has been difficult for some stakeholders to understand or accept, personal relationships facilitate communication and enable managers to convince potential stakeholders that their fears are unwarranted.

Finally, success was strongly correlated with: improvements in on-the-ground management practices ($p < 0.01$), increased public education efforts ($p < 0.01$) and land

acquisition ($p < 0.01$). Success was moderately correlated with: the development of decision making structures ($p < 0.05$), and increased trust and respect among stakeholders ($p < 0.05$).

FIGURE 8-3: SELECT CORRELATIONS BETWEEN PROCESS OUTCOMES, ECOLOGICAL OUTCOMES, AND SELF-RATED SUCCESS

PROCESS OUTCOMES	ECOLOGICAL OUTCOMES	SUCCESS
Improved Management Practices	XX	XX
Land Acquisition	XX	XX
Increased Public Education	XX	XX
Increased Trust and Respect	XX	X
Decision Making Structures		X

X – MODERATE CORRELATION
XX – STRONG CORRELATION

On the basis of these data, it is possible to hypothesize a model that explains which process outcomes serve to enable ecological outcomes and project success. It would appear that increased levels of trust and respect, public education efforts, land acquisition, and improvements in management practices are all highly important components both of ecological outcomes and project success. Of these process outcomes, increased trust and respect itself seems to be tied to increased public awareness of the ecosystem and its stresses, managers becoming educated about EM, and new stakeholders becoming involved in the project. The reliability of this model needs to be tested further, but if it proves to have some explanatory power, it provides an indication of the types of strategies that EM managers and project stakeholders should attend to carefully.

AREAS FOR FURTHER RESEARCH

One important area for further research concerns the relative importance of these organizational and behavioral outcomes over time, as the projects mature. Do communication and cooperation remain paramount considerations for managers? Do educational efforts wane as the project gains acceptance and on-the-ground ecological outcomes occur with greater frequency? Will improvements in the management practices of commercial and small, private landowners become more prevalent?

Perhaps the most important area for future research is the relationship between process outcomes and ecological outcomes. What set of process outcomes are most important to realizing ecological outcomes? Which process outcomes are fundamental to successful EM projects and how are they best set in place? Are some process-related strategies emphasized by theories of EM that are less significant in terms of producing on-the-ground ecological outcomes?

Improvements in Management Practices of Private Landowners

Involving private landowners in the responsibilities of ecosystem management is a strategy used by many projects. Especially in projects based on public-private partnerships, managers have come to realize that maintaining or restoring ecosystem health is inseparable from changing the attitudes and on-the-ground management practices of landowners within the targeted areas of the project.

In the **Kenai River Watershed Project**, outreach and education through the use of popular media and flyers has educated local landowners on how the river works, and how their activities affect the health of the river. Many landholders removed boat docks and groins once they learned the structures were impeding the movement of salmon and other fish species up and down the river. Because the outreach efforts were a combined effort of The Nature Conservancy and many other local and regional organizations, residents got the message in many forms.

The **San Luis Valley** project coordinated by the U.S. Fish and Wildlife Service (FWS) has been taking advantage of the FWS program called "Partners for Fish and Wildlife" for over ten years. According to Mike Blenden, Refuge Manager for FWS, the program has met with great success. "The program has some funding sources and legal authority to work with private landowners to improve wildlife habitat on their land. We've restored and enhanced between 15 to 20 thousand acres of wetlands in the last ten years with 250 different landowners and it's all word of mouth—we don't advertise a bit. You do one project in one part of the county and in the next six months you'll get calls from three of the neighbors."

To encourage private landowners to implement resource management practices with the ecosystem health in mind, many projects will encourage landowners to take advantage of state and federal opportunities. The federal government, as well as many state governments, offers tax breaks and other incentives for riverbank restoration, habitat protection, and the establishment of conservation easements. Blenden gave the following example: "Somebody calls and says, 'I've got six hundred acres next to the river and am having trouble with the irrigation system. It just doesn't do what I think it ought to do. Can you help? And I'm interested in wildlife—I love Canada geese.' We go out there and take a look at it and in many cases we provide engineering services that increase the efficiency of the irrigation system. Sometimes that means we do construction work. Then we say, 'O.K. Now we've invested this in your land. What we would like you to do is alter your grazing practices to leave some residual cover, in other words, leave part of this property un-grazed every year.'" The best known programs are the USDA-administered Conservation Reserve Program (CRP), Wetland Reserve Program (WRP), and Wildlife Habitat Incentives Program (WHIP).

For the Weimer Ranches, Inc., (Colorado) cooperation with the Bureau of Land Management (BLM), on the development of a **Coordinated Resource Management Plan** (CRMP) for the 100,000-acre Mesa Creek area presented a win-win situation. Weimer Ranches is a private ranching company that holds grazing permits for approximately 500 acres under the management of the BLM. With the implementation of the CRMP, the Weimer Ranches has more flexible grazing schedules and practices, significantly reducing impacts to vegetation and the land. According to Dean Stindt, Rangeland Management Specialist for BLM, "instead of spreading out their livestock over all the land that they have available to them in grazing, they concentrate the livestock. Where they previously had run them in seven or eight different herds, they now run them in two or three herds. They have better control over the movement. When they get done grazing a particular pasture, they move them into another one. There are always pastures that are rested every year, in the spring and the fall. The timing of when the pastures are grazed is different from year to year." In addition to obtaining better pasturage for their herds, the cooperation with BLM has led to greater flexibility on the beginning and ending dates of their grazing permits.

Major Findings: Ecological Outcomes

Because ecosystems are dynamic, ecosystem management emphasizes the need for practitioners to first understand the components and processes of the ecosystems in which they work, to continuously monitor change over time, and to incorporate new information into management practices. This is clearly an involved process and achieving ecological results will take time.

Nevertheless, ecological outcomes are being reported with greater frequency now than they were four years ago. There was a significant increase in the proportion of project managers reporting that scientific understanding of the project area had improved between 1995 and 1999, as well as an increase in the projects reporting ongoing restoration efforts and ecological restoration results. Further supporting this relationship between ecological outcomes and time, there is evidence that older projects are more likely than younger projects to achieve ecological restoration results.

Overall, practitioners were most likely to report improved scientific understanding, increased research, improved integrity of the ecosystem, and ongoing ecological restoration as ecological outcomes of their EM project efforts. Because collecting and sharing scientific information was also reported as a major project strategy, this suggests that project managers are achieving some of what they set out to do. Ecological outcomes, such as the removal of invasive species and an increasing numbers of native species, were considered relatively less significant outcomes, however such outcomes may be less likely to apply to a larger subset of the projects.

The social, economic, political, and ecological peculiarities of different geographic regions could be one factor influencing a project's ability to realize ecological outcomes, as projects in the Midwest and Southwest U.S. reported significantly higher ecological restoration results than those in the Southeast U.S. This potential relationship between geographic region and ecological outcomes is worthy of further study. The size of the project area might also influence ecological outcomes, as smaller projects were more likely to report ecological restoration results. However, explanations from project managers for this relationship were mixed and inconclusive.

While practitioners use various indicators to gauge project success, projects with the highest ecological restoration results tended to rate themselves as most successful. It is good news then that ecosystem management projects in this study have indicated increasing ecological results from their project efforts. With an increased understanding of their ecosystems and a process in place for measuring change, the projects are now both realizing and capturing ecological results from their EM efforts.

Chapter 8
Ecological Outcomes

INTRODUCTION

In the 1995 study, just one third of the 105 projects reported ecological outcomes resulting from their ecosystem management efforts. The most frequently reported outcomes were procedural in nature, such as improved communication and cooperation. The research team believed that relatively few ecological outcomes had been observed because ecological change would take longer to manifest and procedural outcomes may be a necessary precursor to ecological change. We hypothesized that with the passage of time the projects would see greater ecological outcomes.

Survey participants were given a list of 13 ecological outcomes and asked to indicate the extent to which they agreed that each of the outcomes had resulted from the efforts of the project. Responses were based on a Likert scale of 1 (strongly disagree) to 5 (strongly agree). Several of these variables related to actual physical changes in the ecological system, while others were science-based outcomes relating to the project participants understanding of the ecosystems and mechanisms for monitoring change.

To reduce the amount of data considered in our analysis, SPSS Principal Axis Factoring was applied to the data set. All but one of the 13 variables (invasive species are being removed) fell into one of three categories:

Ecological restoration results: This factor includes the variables: populations of native plant or animal species have increased, the overall integrity of the ecosystem has improved, native plants or animals are being reintroduced, hydrologic regimes are being restored, the number of native plant or animal species has increased, restoration of degraded areas within the ecosystem is ongoing, historical disturbance regimes are being restored, and water quality has improved within the ecosystem.

Monitoring ecological change: This factor consists of: a baseline data source exists upon which to track ecological results, and a monitoring program has been established to track changes within the ecosystem.

Improved scientific understanding: This factor considered the variables scientific understanding of the area has improved, and scientific research within the area has increased.

These composite variables were used for most analyses of relationships between outcomes and other variables, such as stakeholder involvement. In some cases, the individual variables were considered to help understand the relative importance of different types of ecological results and to make relevant comparisons across the 1999 and 1995 studies.

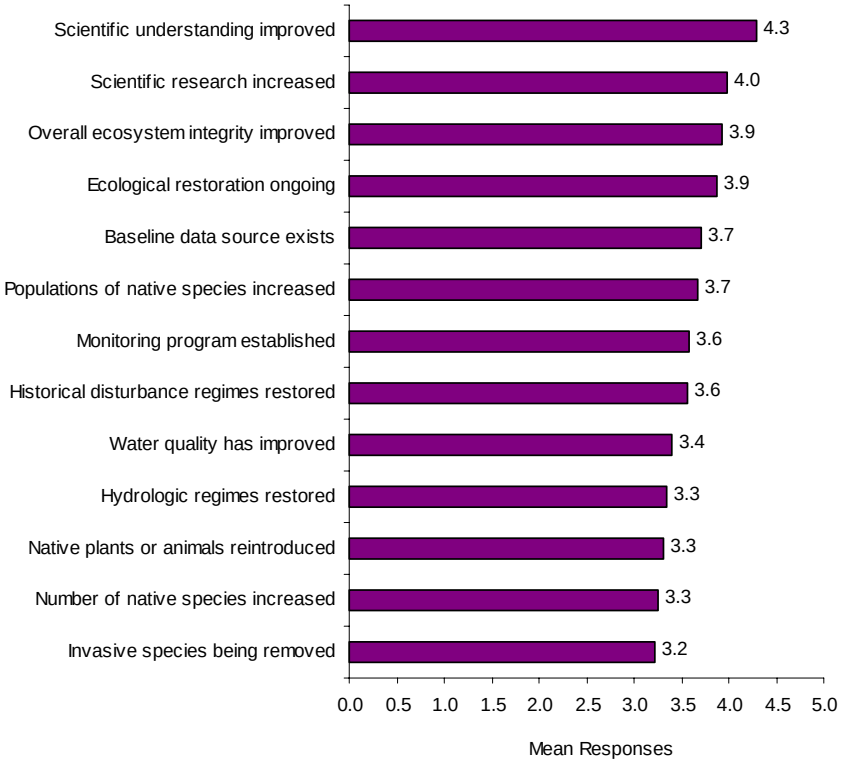
RESULTS: 1999 DATA

When considering the 13 original variables in the survey, the four most frequently reported ecological outcomes observed were: scientific understanding of the area has improved, scientific research within the area has increased, overall integrity of the ecosystem has improved, and restoration of degraded areas within the ecosystem is

ongoing (Figure 8-1). While the mean responses of these outcomes vary from 4.3 to 3.9, tests of statistical significance showed that the difference between the means of the first and fourth highest outcomes is not significant. This suggests that there is no statistical difference in the degree to which projects are reporting "improved scientific understanding" and "ongoing ecological restoration."

The least frequently reported ecological outcomes relate to the removal of invasive species, an increase in the number of native plant or animal species, reintroduction of native plants or animals, and restoration of hydrologic regimes. While these means range from 3.2 to 3.6, tests of statistical significance show that the least common response, "removal of invasive species," was not a less significant outcome than the sixth least common response, "historical disturbance regimes are being restored."

FIGURE 8-1: ECOLOGICAL OUTCOMES, 1999



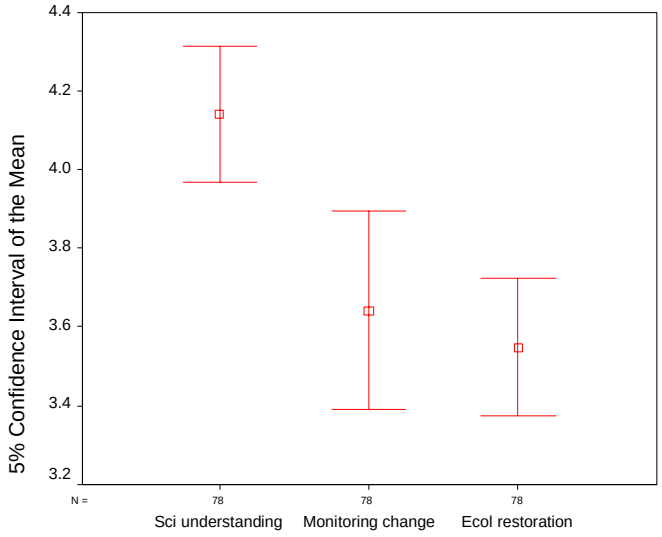
An initial comparison of the difference between the three composite variables indicates that "improved scientific understanding" has been the most significant ecological outcome (Figure 8-2). The mean response for this composite variable was 4.1. The second and third most frequently reported factored ecological outcomes were "monitoring ecological change," with a mean response of 3.6, and "ecological restoration results," with a mean response equal to 3.6. In comparing the 95% confidence intervals of the mean, "improved scientific understanding" was shown statistically to have a higher response than both "monitoring ecological change" and "ecological restoration results" (Figure 8-2). There is not a statistically significant difference between the mean responses of "monitoring ecological change" and "ecological restoration results."

It is possible that the ecological restoration composite variable is lower than the improved scientific understanding variable because gaining an understanding of the ecosystem is a preliminary step in any EM project – a step that is currently underway at many of the projects included in the survey. Collecting and analyzing scientific information about the project area can take time and other resources. Once projects

have an established baseline for understanding change, coupled with ongoing monitoring and improved scientific understanding of the project area, we might expect to see more physical ecological results, such as an increase in populations of native species.

It is also possible that the composite variable "ecological restoration results" had a lower mean response because the individual variables that comprise it are less likely to apply to all projects. For example, not all projects have disturbance regimes to restore in their project areas. On the other hand, improving scientific understanding of the project area is more likely to apply to a larger subset of the projects sampled. Hence, this difference in relevance to the projects may account for the lower scaled responses for several ecological variables and the composite variable ecological restoration results.

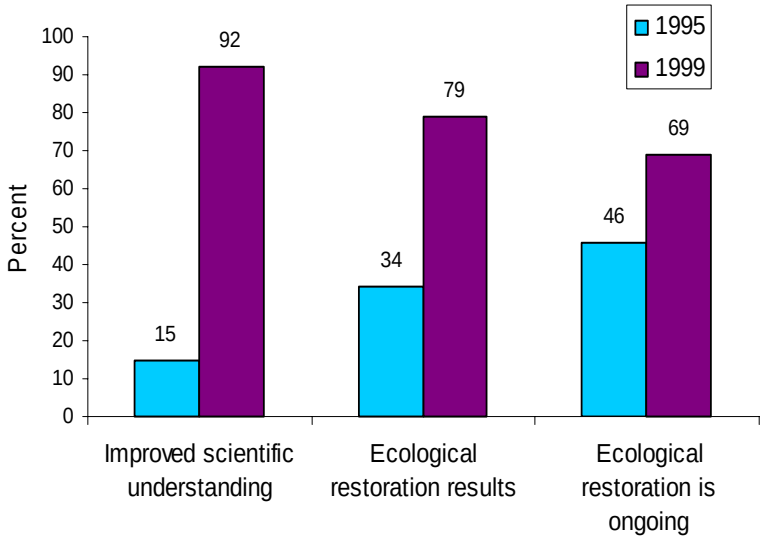
FIGURE 8-2: ECOLOGICAL OUTCOME FACTORS, 95% CONFIDENCE INTERVALS OF THE MEAN



COMPARISON TO 1995 DATA

One composite variable, "ecological restoration results," and two individual variables, "ecological restoration is ongoing" and "increased scientific understanding," were included in both the 1999 and 1995 studies and could therefore be used for comparison (Figure 8-3). The data available from 1995 included only the percentage of the 105 respondents agreeing that ecological outcomes were a result of the project, whereas the 1999 data are based on 5-point scale responses. In order to compare our findings across the 1995 and 1999 data sets, the

FIGURE 8-3: CHANGE IN ECOLOGICAL OUTCOMES, 1995 AND 1999



1999 scaled responses were collapsed into two groups. Average scores of 3.01 and higher were combined to reflect that respondents agreed that a variable was an outcome of the project. Variables given scores of 3.0 or lower were not considered outcomes.

We observed a significant increase in the proportion of projects indicating that scientific understanding of the project area had increased between 1995 and 1999. In 1999, 92 percent of respondents agreed that this was a project outcome, whereas just 15 percent indicated that this was an outcome in 1995. A Pearson Chi-square test showed the difference between those indicating that scientific understanding within the area had improved from was statistically significant ($p < 0.0005$). This is consistent with evidence that collecting and sharing information are currently major strategies used by project managers.

There was also a significant increase in the proportion of projects identifying ecological restoration results. In 1999, 79 percent of respondents (n=77) indicated that ecological restoration results had been realized, compared to 34 percent of respondents (n=103) who observed restoration results in 1995, a statistically significant difference ($p < 0.001$). This lends support to the team's hypothesis that projects would identify more ecological results once further procedural outcomes and mechanisms for monitoring change over time were in place.

More participants also indicated in the 1999 survey that restoration of degraded areas within the ecosystem was an ongoing practice. In 1999, 69 percent of respondents (n=77) indicated that restoration of degraded areas within the ecosystem was ongoing, compared to 46 percent of respondents (n=103) in 1995, also a statistically significant difference ($p < 0.005$). This is consistent with our findings that more projects are practicing adaptive management, which calls for ongoing monitoring and responsiveness to new information.

AGE OF PROJECT AND ECOLOGICAL OUTCOMES

To test further the idea that over time projects would achieve more ecological outcomes, the team ran tests for correlation between the project initiation year and the composite variable "ecological restoration results." In addition to observing an increase in ecological restoration results since 1995, the research team found a moderate correlation of -0.240 ($p < 0.05$, n=70) between the project initiation year and "ecological restoration results." This suggests that managers of older projects were more likely to agree that their projects had achieved ecological outcomes.

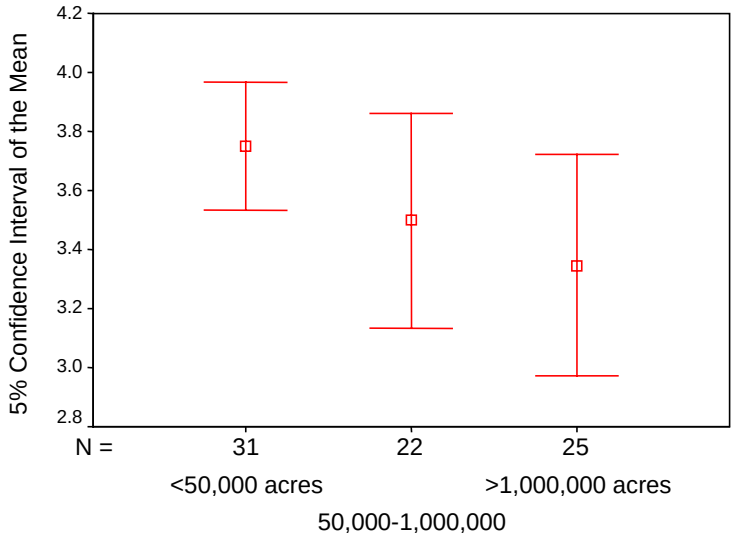
Together, this relationship with initiation year and the observed increase in ecological restoration results between 1995 and 1999, lend support to our hypothesis that over time, the ecosystem management projects would realize greater ecological outcomes.

SIZE OF PROJECT AND ECOLOGICAL OUTCOMES

The research team also hypothesized that project size might influence the project's ability to track and realize ecological outcomes because smaller projects have less area to account for and their ecosystem management efforts might involve less

diversity of stakeholders and interests. A stronger relationship was observed between smaller projects and ecological outcomes than between larger projects and ecological outcomes (Figure 8-4).

FIGURE 8-4: SIZE OF PROJECT AND ECOLOGICAL RESTORATION RESULTS



To test this hypothesis, projects were broken down into three groups: 50,000 acres or less, 50,000 to 1,000,000 acres, and greater than 1,000,000 acres. Independent sample t-tests reveal that projects covering 50,000 acres or less were more likely to agree that their ecosystem management efforts had led to ecological restoration results than were projects in the 50,000 to 1,000,000 acres and greater than 1,000,000 acres categories. Mean responses for the three composite variables, from smallest to largest, were 3.8, 3.5, and 3.4. The difference between the means in the smallest and largest categories was statistically significant based on a t-test analysis ($p < 0.05$). Project managers offered mixed explanations for this as explained in the case study 'Ecological Outcomes and Project Size' on the following page.

SUCCESS AND ECOLOGICAL OUTCOMES

The research team was interested in understanding whether certain outcomes were more likely than others to be associated with project success. The correlation between the project's self-rated success score and both ecological and process outcomes was tested to help determine this.

Ecological outcomes showed a stronger correlation with success than did process outcomes. The correlation between success and the ecological restoration results factor was 0.526 ($p < 0.0005$, $n=76$). While the project managers are likely to view procedural changes as major project outcomes, it appears that ecological results are strongly associated with project success. This makes good sense since procedural changes are, for the most part, simply a means of obtaining the end goal of increased ecological integrity.

Ecological Outcomes and Project Size

Ecological outcomes at ecosystem-scale projects depend on many factors. Survey results indicated that managers of small-scale projects, on average, reported more ecological outcomes than their peers at larger-scale projects. A variety of factors seem to be involved in this: small projects can apply limited resources for more tangible outcomes, stakeholder identification with local areas may be easier than with large regional ecosystems, on-the-ground activities are more easily achievable in small areas, and activities and changes are more easily monitored in small scale projects.

Some managers of small-scale projects agreed that the ability to achieve some ecological outcomes was facilitated by project size. Robert Hossler of the Delaware Division of Fish and Wildlife works on small-scale restoration projects as part of the **Northern Delaware Wetlands Rehabilitation Program**. He notes: "If I restore a 200-acre wetland, suddenly the area itself has become available to wildlife, whereas I could put the same amount of effort into a much larger wetland and it wouldn't make as much of a difference." Scott Cummings of the **Block Island Refuge** project echoed that sentiment. Approximately 25 percent of the 6,400-acre island is being managed by an organization or agency focused on conservation. "One less house we have out here is a positive. It's one more piece of property for rare and endangered species to use."

However, project size might influence the managers' perception of ecological change. For managers of small projects, the smaller scale makes recognition of changes to the ecosystem that much more dramatic. Scott Cummings notes: "If you're working in Texas and you protect a thousand acres in Texas it's difficult to grasp, whereas if you're working on a six-thousand acre island and you protect a hundred acres in a year, that's pretty dramatic."

Managers of small projects questioned the effectiveness of management of an ecosystem-scale problem in smaller fragments. In response, some have devised strategies to maximize their effectiveness. The Northern Delaware Wetlands Rehabilitation Project takes a "corridor approach" to combat the problems of working within a fragmented landscape, assembling small fragments of habitat in a longer chain or habitat.

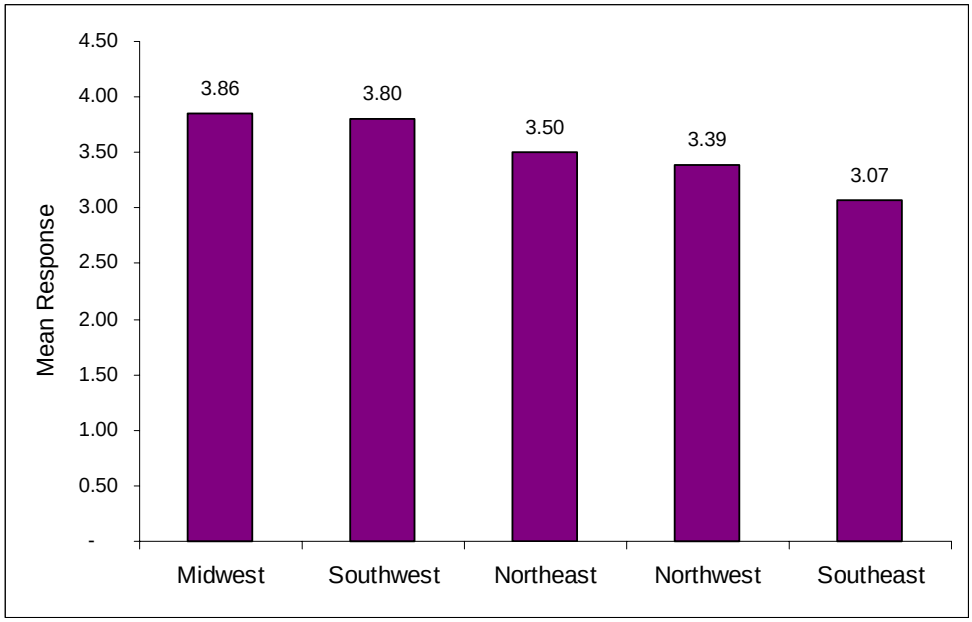
The concern over effectiveness of restoration of small fragments of the ecosystem was also voiced by mangers of larger-scale projects. The Nature Conservancy's **Oklahoma Tallgrass Prairie Reserve** is working to restore over 27,000 acres. According to Harvey Payne, the Preserve Director, the project had to be a minimum size and on a large enough scale "to recreate the functioning ecosystem that we were trying to do." Anything smaller could restore a fragment, but would not be able to restore the ecosystem.

Kara Woodruff Smith, Project Director for The Nature Conservancy's **Guadalupe-Nipomo Dunes Preserve** in San Luis Obispo, CA, noted that the appropriate size of a project depends on the goals of the project. "Only a good ecologist can determine what the minimal conservation area is needed to protect the resources found there… For one plant's protection, maybe you only need a few thousand, or even hundred, acres. For a migratory bird, you may need hundreds of thousands of acres protected. Thus, first you need to decide what it is you aim to protect. Next you need to determine what is really required to protect it—and go for that."

GEOGRAPHIC REGION AND ECOLOGICAL OUTCOMES

The research team was interested in understanding whether certain regions of the country would be more or less likely to achieve ecological outcomes given the different political, economic, social and ecological challenges faced by each region (Figure 8-5).

FIGURE 8-5: ECOLOGICAL RESTORATION RESULTS BY GEOGRAPHIC REGION



There was an observed relationship between geographic region and the likelihood that projects in the region would report ecological outcomes. Independent sample t-tests indicated that mean responses to the variable ecological restoration results are statistically are higher for projects in the Midwest than in both the Southeast ($p < 0.05$) and the Northwest ($p < 0.05$). Projects in the Southwest also reported significantly higher ecological restoration results than did projects in the Southeast ($p < 0.05$).

AREAS FOR FURTHER RESEARCH

The potential relationship between geographic location and the ability to achieve ecological outcomes is worthy of further study. A future study encompassing a wider sample of EM efforts around the U.S. might confirm whether regional differences in ecological outcomes are evident on a broader scale, and more focused conversations with national-level resource managers positioned to observe regional differences might help to explain any variation. Questions might address what the Midwest is doing differently, what major policy, social, economic, and/or ecological differences exist between regions, and what are the attitudes that shape this?

Project Outcomes

Ecosystem management projects have produced significant outcomes since the last discussions with project managers five years ago. Projects have progressed and seen concrete changes in: the development and implementation of concrete management plans, on-the-ground changes in the ecosystem, and relationships with other partners. For some projects, the necessary first steps of establishing a resource management plan, conducting outreach and education, creating working relationships with partners, and identifying and collecting necessary resources took several years. These steps were often crucial before a project could begin seeing actual ecological outcomes. For other projects, especially those with the necessary financial and management resources already in place, ecological goals have been realized more quickly.

The process of creating the Habitat Conservation Plans (HCP) required by the Endangered Species Act has often proved to be long and contentious. The **Karner Blue Butterfly** team has proven that by taking an ecosystem-level approach, involving stakeholders in a collaborative process, and being mindful of the science and policy involved in management of an endangered species, that creation of a comprehensive plan for protection is possible. The partners in the project, 26 signatories to the Habitat Conservation Plan, including the Wisconsin Department of Natural Resources (WDNR) spent 5 years and approximately $1.5 million to develop the Karner Blue Butterfly HCP. According to David Lentz of the WDNR, that investment worth the trouble. He characterized the project as essentially carrying out "twenty-six full blown environmental impact statements and 26 habitat conservation plans" that, if done alone, would likely cost between $250,000 and $1,000,000 each. While creation of the HCP and subsequent award of the Incidental Take permit are both monumental accomplishments, the relationships that were forged across the table as partners met monthly over a five year period are also significant outcomes of this projects.

The **Wildlife Habitat Improvement Group** in Vermont has reported a wide range of outcomes associated with its project, from expanded participation by local landowners to increased wildlife sightings. Through extensive personal outreach to and education of new private landowners, enrollment in the state's Current Use program has increased significantly. In addition, the awareness of management options available to landowners that are both economically and ecologically beneficial continues to grow. As a direct result of changing forestland management practices since 1985, several unique parcels of habitat have been preserved, rare and endangered species have been identified and protected, awareness of exotic species has increased, and regular sightings of wildlife such as moose, bear, wild turkey, and beaver have become more common.

Chuck Clarke of the **East Fork Management Plan** (Wyoming) has also seen a combination of ecological and process outcomes resulting from this project. Not only has public stakeholder satisfaction increased – including the satisfaction of grazing leasees, fishers, and hunters – the integrity of the ecosystem has also improved. He notes a measurable increase in the overall condition of various plant communities, improved water quality of streams and rivers, and meeting population objectives for various wildlife and fish species.

Robert Hossler, project manager of the **Northern Delaware Wetlands Rehabilitation Program**, cited very specific measurable ecological restoration outcomes. Since the project's beginning in 1992, he has observed an increase of fish species diversity by 236%, a decrease in habitat dominated by invasive species by 49%, an increase in vegetative cover types by 68%, a decrease in residential flooding by 54%, and improved waterfowl nesting by 19%. Having clear objectives, baseline information, and an ongoing monitoring plan enabled this EM project to produce these compelling results.

Major Findings: Measuring Project Success

Ecosystem management projects do not have a simple formula for measuring the success of their projects; nor is such a formula likely to evolve in the near future. Instead, projects take into account the unique social, political, and ecological context of their project in designing project goals, and thereby the indicators by which their success will be measured.

On average, project managers rated themselves roughly as successful in 1999 as they did in 1995. Although the average success rating did not increase as hypothesized, the above average rating, with an average self-rated success of approximately 4 on a scale of 1 to 5, indicates that these projects do, on the whole, consider themselves relatively successful. This supports the hypothesis that the ecosystem approach is meeting with some success in the field as a resource management tool. Managers of these projects reported that they rely heavily on stakeholder involvement, progress in implementing a project plan, public opinion regarding the project, and change in ecological conditions on-the-ground when evaluating their success.

Although both ecological and process factors were considered in rating success, the majority of factors considered in rating project success were not changes in ecological conditions. It might be true that in an increasingly complex field of resource management, practitioners think that procedural factors must be in place before any changes to ecological conditions can be realized. It might also be that practitioners recognize the longer temporal and spatial scales needed to measure ecological change, and therefore expect procedural successes to occur first. The complex nature of managing across traditional political and jurisdictional boundaries, while working within the context of a wide group of stakeholders, appears to lead projects to value process and organizational outcomes in their perceptions of success.

Success ratings were strongly correlated with improvements in on-the-ground management practices, increased public education efforts, and with land acquisition. Success was also moderately correlated with the development of decision-making structures and with increased trust and respect among stakeholders.

Project managers that rated their success highly (4 or 5) also reported significantly more ecological and process outcomes than managers that gave their projects lower ratings, indicating that success ratings are indeed based on project activities and accomplishments. This eliminates some of our concerns that project managers may inflate their reported success ratings without a basis in outcomes, and thus reduces some of our fear of systematic bias related to this question.

Chapter 9
Measuring Project Success

INTRODUCTION

Every project, of course, strives to be successful. Developing measures of success for ecosystem management is certainly a challenge. Can a single set of measures be defined for projects that vary so widely in project size, ecosystem-type, and goals? Although the approach is the same, standardized measures for achieving "collaboration" and "adaptive management" at an ecosystem scale have neither been developed nor adopted across project boundaries or different coordinating organizations.

The 105 projects surveyed in 1995 range from 60 acres to 410,000,000 acres. The goals of the projects range from the restoration of ecosystem health, to improving involvement of local residents in the stewardship of a particular ecosystem, to just encouraging partner organizations to consider ecosystem impacts when they plan their projects with no coordinated on-the-ground activity.

Given this wide variety of project types and goals, one of the primary goals of our research was to ascertain the level of success of the 105 ecosystem management projects from the 1995 study. In examining the question of success, the team was forced to consider the many different means of evaluating and ascribing success to a project. Because ecosystem management does not have a common set of goals or planned outcomes, the means of measuring success would be different at each project in the study. The team hypothesized that each project would have a specific set of measures for evaluating success. For example, for one project, the number of acres of habitat restored to pre-settlement conditions might equate to a successful project; for another project success would be considered increased public awareness of the stresses to the ecosystem. Despite efforts of organizations and agencies to develop standardized metrics for evaluating ecosystem-scale change, these metrics are not broadly disseminated or used by managers in the field. Without a definitive framework conceivable for evaluating success based on goals obtained or specific ecological or process outcomes achieved, asking project managers directly to rate the success of their project was the first step. Managers were asked to rate the success of their projects on a 1-5 scale, with 1 being "not successful" and 5 being "very successful."

RESULTS: 1999 DATA

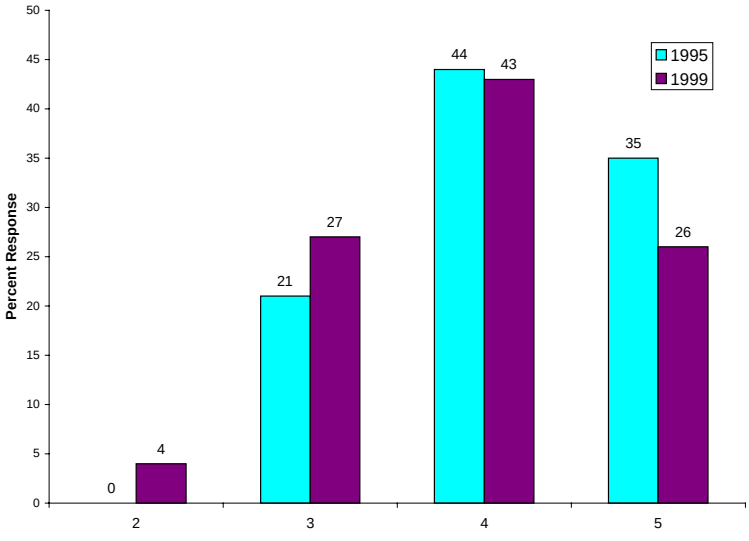
By and large, managers of the EM projects surveyed in 1999 view their projects as fairly successful (Figure 9-1). Sixty-nine percent of projects rated themselves as successful (response of 4 or 5), while 27 percent rated themselves neutrally (n=81). Only 4 percent rated the project as less successful (2). Interestingly, no projects rated themselves as "not successful." The relatively high success ratings may be due to a number of factors. Projects meeting their goals and realizing ecological and organizational outcomes as a result of their efforts are a key reason for project success. An imperfect return rate on surveys may have introduced a bias for the more successful projects to report their success, with the less successful projects simply choosing not to respond. Finally, as this question of success was self-rated and not based on particular outcomes, it is possible that feelings of success have been inflated by the respondent. Because the survey was targeted to those responsible for the implementation of the

project, the evaluation of success was potentially non-objective. However, as shown in Chapters 7 and 8, certain project outcomes were correlated with success. Further, those project managers that consider themselves more successful consistently reported more ecological and process outcomes than projects rated as less successful, reducing concerns of ratings inflation.

COMPARISON TO 1995 DATA

The perception of success by project managers did not significantly change between 1995 and 1999 (Figure 9-1). Projects rated themselves slightly less successful in 1999 than in 1995, with the mean success rating dropping from 4.1 to 3.9. This shift in the mean success rating can be attributed to both a lower percentage of self-rated "5"s and higher proportions of neutral "3"s. Although neither sample attributed any "not successful" ratings, the 1999 sample had a small percentage of less successful ratings ("2"), which the 1995 sample did not contain. However, the differences between the two years are not considered statistically significant based on a Chi-square Test of Homogeneity. This remains the case even if the 1999 responses of "2" are combined with the "3"s before comparing to the 1995 data. Thus, although the mean rating for success in 1999 is slightly lower than 1995, statistically the numbers are not different.

FIGURE 9-1: SUCCESS RATINGS, 1995 TO 1999



We had hypothesized that project managers would consider their projects more successful over time, because more opportunities for realizing outcomes existed. This was not the case, as the self-rated success in 1999 was virtually unchanged from 1995. This may be attributed to the recognition on the part of the project managers that success is not always defined solely in terms of outcomes. Realizing the challenges faced in the early stages of a project, a project manager might base a rating of success on meeting with stakeholders or gathering information about the ecosystem. In effect, that manager is creating means to attribute success to the project before outcomes are realistically feasible.

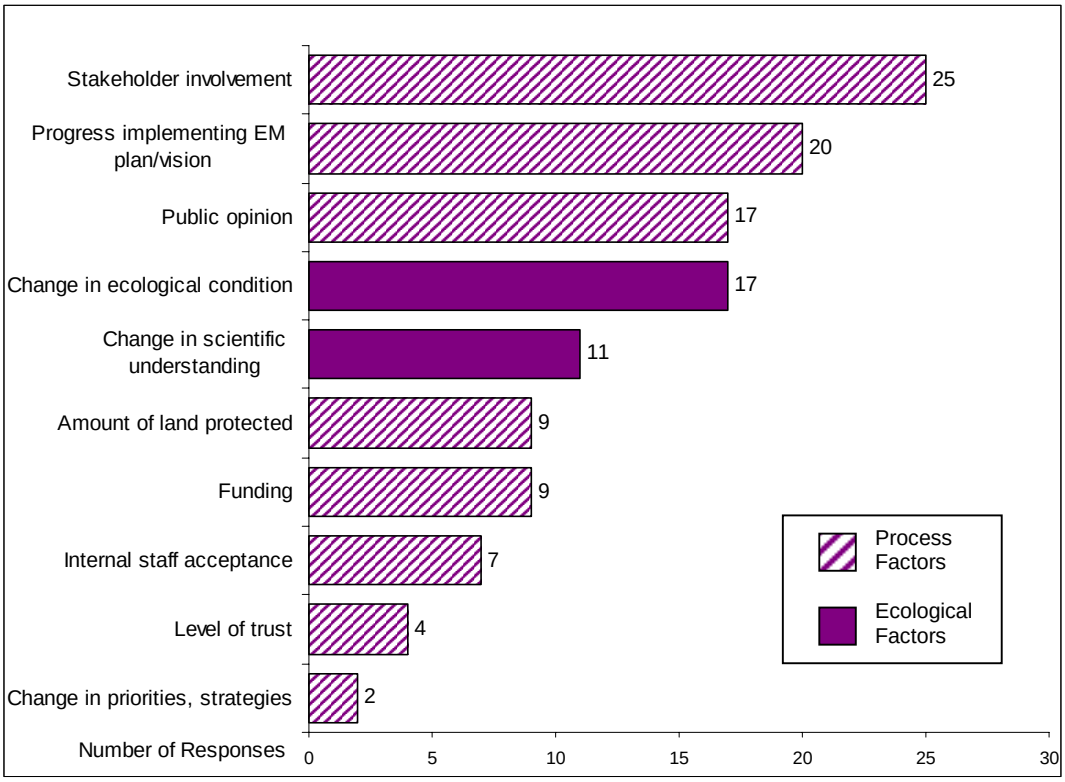
Although the overall average is not statistically different, the relative shift in the number of "5" ratings to increased neutral "3" ratings is notable. The change in success rating over time toward a more neutral response may reflect a number of issues, including a change over time in the perception of success, the factors used in determining the success rating, and the method of obtaining the success rating. The time difference between these two surveys is significant, approximately five years. Many

of these projects began in the early 1990s, and were likely eager to portray early success in 1995. At the beginning of the process, project managers were probably both optimistic and encouraged by basic successes such as convening stakeholders and progress toward the design of an ecosystem management plan. Indeed, in 1995, increased communication, coordination, and cooperation were cited as primary reasons for rating a project highly. In 1999, the project managers' rating of success may reflect their feeling of the project as a mature program. The differences in the method of obtaining the success rating may have had some influence on the responses received. The 1995 survey requested the project manager to rate their success in a telephone interview, giving them little time to formulate a thoughtful response. The 1999 survey, on the other hand, was a written survey, so the project managers could take some time to consider their answer without pressure from the interviewer. Although we do not know what factors were considered in rating project success in 1995, in 1999 project managers used a variety of ecological and process outcomes to as a gauge of their project's success.

FACTORS INVOLVED IN RATING SUCCESS

Participants were asked what factors they used to determine their success (Figure 9-2). Their responses (n=77) fell into ten broad categories. The most frequently mentioned consideration relates to stakeholder involvement and/or satisfaction (25 responses). Other important factors considered in rating success include progress toward implementing an EM plan or project (20 responses), public opinion (17 responses), and change in ecological conditions (17 responses). Participants also

FIGURE 9-2: FACTORS CONSIDERED IN RATING SUCCESS



mentioned a change in scientific understanding, the amount of land protected, funding, acceptance by internal staff, the level of trust, and changed priorities and strategies. It should be noted that the factors mentioned could relate to either high or low success ratings.

A representative of the Karner Blue Butterfly Habitat Conservation Plan in Wisconsin cited as an example of its successful stakeholder involvement its ability to merge cooperative conservation efforts of 26 public and private entities possessing a diverse variety of values. The project manager from the Corpus Christi Bay National Estuary Program considered the involvement of over 300 individuals representing over 100 entities, including state/federal agencies, educators, recreational groups, ranchers, farmers, and university researchers, in rating the success of that EM project. A forester involved in the Marathon County Forest planning effort in Central Wisconsin considered increasing cooperation among recreational user groups in rating success.

Lacking Success: What Factors Were Missing in Less Successful Projects?

The measures of success for ecosystem management projects vary with the geographic scale, scope, and goals of the projects. Several project managers self-rated their success at levels significantly below the mean response. We were interested in examining why these project managers considered their projects less successful.

For one project, the lack of long-term monitoring and oversight of project implementation prompted a lower success rating. The project consisted of a number of partners across a wide geographic area pledging to consider the greater ecosystem in their planning activities and projects. Signatories were expected to act in good faith according to their pledge, however no implementation or monitoring activities were planned as part of the original project. Further, once the original pledges were made, no financial or human resources were made available to follow-up with the partners by the organization that originally spearheaded the effort. As a result, there is no way of verifying if partners are remaining true to their pledges or not.

The dearth of staff and funding has directly affected the oversight capacity of the organizing party and contributed to the relative lack of success of the project. The project manager cited several ideas to increase the success of the project: a public education campaign to remind signatories of their pledge and to enlist new partners into the project; a checklist or set of criteria to measure if and to what extent a signatory organization is acting according to the tenets of the agreement; and a formal review process in which new programs undertaken by signatories are evaluated relative to their initial pledges.

For another project, an unstable political environment has made progress challenging. Significant effort went into establishing contact with local residents and building support for the project. Subsequently, however, the project area was designated a focus area for agricultural development by the state agricultural department, a use which directly conflicts with the wetland restoration goals of the EM project. Despite the challenges it faces, the project manager remains optimistic, “Having that public support and people involved with the issues here has been a real plus - and will help us in the long term as far as getting the [local] agriculture department and the Natural Resources Conservation Service to buy into it.”

A number of respondents also considered ecological conditions in making their project success assessment, noting a net reduction of threats to the ecosystem,

measurable improvements to water quality, increase in indicator species, reduced erosion, healthier plant communities, and the overall condition of riparian areas.

While there were 17 responses indicating that progress toward implementing an EM plan or meeting established project management objectives were important in rating project success, at least one participant does not consider this in rating success. A respondent from the Eastern Upper Peninsula Partners in Ecosystem Management indicated that stakeholder involvement and improved scientific understanding were more important in rating the success of this group. The partners in the project have chosen to focus on information gathering and sharing and letting each organization do with it what they choose. There is no plan to do anything jointly other than simply gather and share information to aid in ecosystem management and discuss management ideas among partner organizations.

OTHER INFLUENCES ON PROJECT SUCCESS

As shown in preceding sections related to project strategies (Chapter 4) and outcomes (Chapters 7 and 8), a number of factors correlate strongly to the manager's rating of project success.

TABLE 9-1: STRATEGIES AND OUTCOMES INFLUENCING SUCCESS

Process Outcomes
• Improvements in on-the-ground management practices
• Increased public education efforts
• Land acquisition
• Development of decision-making structures
• Increased trust and respect
Ecological Outcomes
• Ecological restoration results
Strategies
• Develop an ecosystem management plan
• Locate project office/staff in the project area
• Conduct education and outreach
• Ensure adequate resources through fundraising

AREAS FOR FURTHER RESEARCH

Development of a system of metrics for evaluating both ecological and process or organizational change at the ecosystem level remains a challenge. The incorporation of the numerous, complex, interconnected factors that comprise an ecosystem into a set of comprehensive, measurable indicators that are applicable across ecosystem types, scales, and approaches seems untenable. Several efforts by universities, national non-governmental organizations, federal and state agencies, and various partnerships and consortia are underway for evaluating ecosystem changes. For example, The Nature Conservancy has developed a protocol to assess and measure changes in threats and stresses to the ecosystem that it expects to apply to its preserves nationwide. An assessment of the applicability and effectiveness of these approaches for evaluating on-

the-ground results could further the ability of ecosystem-scale projects to be able to demonstrate the effects they are having – not only ecological effects, but changes in awareness, communication, and trust, as well.

SECTION III

Factors Affecting Project Implementation and Progress

Major Findings: Factors Facilitating Project Progress

What moves a project forward undoubtedly is highly dependent upon each project's set of unique circumstances, but taken in aggregate a picture of key common factors that assist progress in these projects begins to emerge. The two highest rated facilitating factors were the presence of dedicated and energetic individuals and interagency cooperation. The lowest rated factor was hiring staff from surrounding communities.

Three facilitating factors have increased in importance from 1995 to 1999: dedicated participants, well-defined management plans, and political support. These factors may point to important factors needed in order for projects to continue to pursue their goals. One common response from the project managers queried in the survey and in subsequent interviews was the importance of strong individual efforts. These individual efforts were often reported as key to carrying projects through the initial stages of development often marked by slow progress and opposition from outside groups.

The rising significance of well-defined management plans as a factor facilitating project progress also seems to point to a maturing in the developmental stage. These documents tend to take on many different forms as illustrated in follow-up interviews. Management plans not only aided projects in focusing on specific goals; the plans were also used as a method to increase stakeholder involvement.

Although it is still one of the lower rated variables, the increase in political support as a facilitating factor from 1995 to 1999 may, in part, be driven by increased public awareness and may also be the result of some projects experiencing a lack of support from certain state administrations.

Collaboration and agency support were important factors in 1995 and still remained as important factors at the time of our study. Projects still seem to rely heavily on involving multiple partners when implementing their goals. Support of their agency allows these projects to continue to implement these new and innovative approaches to resource management.

There are many different types of projects and no single facilitating factor can be claim to be the "golden" factor that all projects should seek in order to be successful. Rather, a combination of factors allows projects to progress in their complex and unique environment.

Chapter 10
Factors Facilitating Project Progress

INTRODUCTION

It is difficult to evaluate specific reasons for an ecosystem management project's progress. Each situation is unique, and unique solutions are employed in gaining ground toward better management. For projects overseen by state or federal agencies, organizational support may be one of the critical elements in fostering better management practices. On the other hand, efforts overseen by non-governmental organizations may rely on adequate and consistent funding as the lifeline to other elements of success. Since no single factor can alone facilitate project progress, combinations of factors are most often cited as keeping the project alive and healthy. Dave Lentz of the Karner Blue Butterfly Habitat Conservation Plan expresses his opinion about which collection of factors is most important:

> Of those factors listed… a combination of leadership, common goals, professional facilitation, collaborative/consensus-based decision-making, [and] increased trust among stakeholders, led to a successful conclusion. Not alone, but *all these factors together were needed to succeed*. [emphasis added]

When looking at what the projects most often report as factors that facilitated project progress, a number of variables stand out as important. While there is no single facilitating factor that leads to success, there are factors that are consistently reported as being significant. Some of these elements may be considered critical to undertaking a successful EM effort.

RESULTS: 1999 DATA

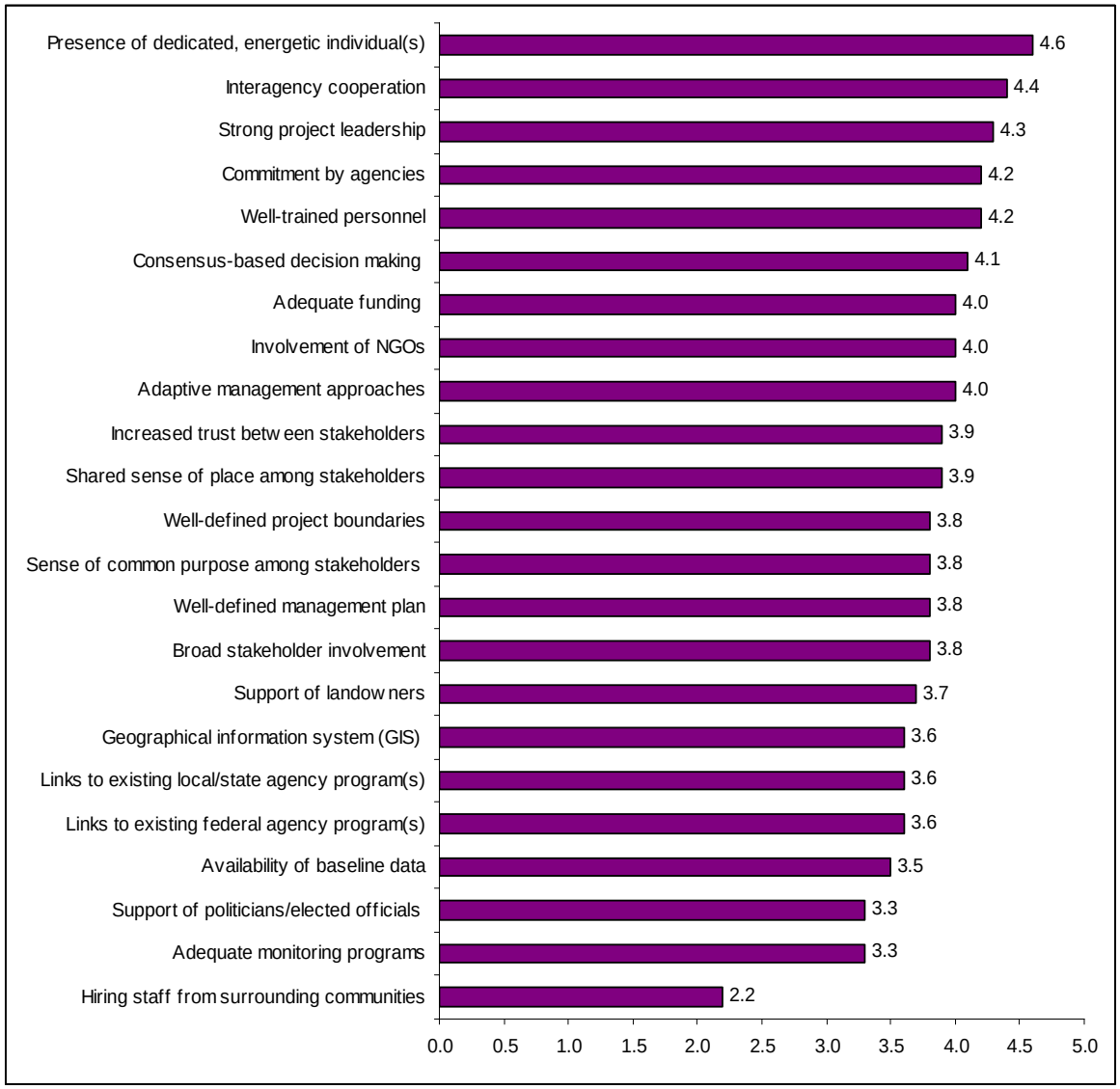
The survey asked respondents to report how significant 23 variables were in facilitating progress on their project. Responses were based on a Likert scale of 1 (not significant) to 5 (very significant). Initial analysis revealed high mean values for most variables, indicating a positive assessment of their roles in moving the project forward (Figure 10-1). Overall, the average response for all the factors listed was 3.80, signifying that factors were generally believed to be more than "moderately significant" in assisting project development.

Examining the data more closely revealed two variables that stood out from others, one as the highest ranked variable and one as the lowest ranked variable. Respondents reported the presence of dedicated, energetic individuals as the most significant variable with a mean rating of 4.5. A paired sample t-test showed that this variable was significantly higher than all other variables (when compared to the next highest variable, $p < 0.005$). No respondents indicated that the presence of dedicated and energetic individuals was "not significant." This finding reflects the fact that EM projects are, in a sense, in uncharted territory. Practitioners of EM do not have clear paths blazed for them and they often come up against difficult obstacles (Chapter 11: Factors Impeding Project Progress). Respondents indicated in our survey that "dedicated and energetic individuals" are an extremely critical element in moving these projects forward.

The variables interagency cooperation, strong project leadership, commitment and follow-through by agencies, well-trained personnel, and collaborative and consensus-based decision making represent the next set of high responses. T-tests show that the differences between the means of these variables are not statistically significant.

There was, statistically, no difference in the mean responses to adequate funding, adaptive management approaches, shared sense of place among stakeholders, increased trust between stakeholders, broad stakeholder involvement, well-defined, understandable project boundaries, well-defined management plan, sense of common purpose among stakeholders, support of landowners, links to existing local/state agency programs, geographic information systems, and links to existing federal agency programs. Nor was there any statistical difference between the responses concerning availability of baseline data, adequate monitoring programs, and support of elected officials.

FIGURE 10-1 – MEAN RESPONSES TO FACTORS FACILITATING PROJECT PROGRESS



Hiring staff from surrounding communities had a mean of 2.2 and was significantly lower than all other variables ($p < 0.0005$ when compared to the variable closest in rank). Its low ranking may indicate the limited number of projects that actually engage in hiring staff members from the surrounding community. Whatever the reasons may be, a notable proportion of the project managers believe that this factor is less significant. However, an interesting difference between these projects does reveal itself when the projects are broken down by self-rated success as will be discussed in the Success and Facilitating Factors section.

COMPARISON TO 1995 DATA

Seven of the variables from the 1995 data corresponded with the 1999 data, however a few methodological issues limit the strength of our conclusions regarding change over time (Chapter 2: Methodology).

When comparing the 1999 survey to the 1995 study, many variables remained unchanged in their order of importance. However, three changes were noted. Projects viewed the dedication of participants, the character of the management plan, and political support as more important in 1999 than they did in 1995.

To compare the two studies the project team pared down the data collected in 1999 into the categories used in 1995 (Table 10-1). Several variables collected in 1999 were left out of this portion of the analysis. Percentages for the 1999 data were interpreted based on responses. Projects answering 4 or 5 were counted as a positive response. Finally, percentages between the two studies were compared and significant changes were noted.

TABLE 10-1: VARIABLES USED FOR CROSS-STUDY COMPARISON

1995 Variables	1999 Variables
Collaboration	Collaborative/consensus-based decision-making
Public support	Broad stakeholder involvement, support of landowners
Agency support	Links to federal agency program(s), links to existing local/state agency program(s), commitment and follow-through by agencies
Availability of resources	Adequate funding, geographical information systems
Dedication of participants	Presence of dedicated, energetic individuals
Attitude of stakeholders	Increased trust between stakeholders
Character of management plan	Well-defined management plan
Political support	Support of politicians/elected officials

Increasing in Significance: Dedication of Participants, Management Plans & Political Support

The dedication of participants was rated as significantly more important in 1999 than in 1995. In 1995, 45 percent of the respondents stated that the dedication of participants was important to project progress. In 1999, that number jumped to 94 percent. With much of the initial stages of projects focused on process oriented activities, such as contact with stakeholders and the development of decision-making structures, the process of establishing an EM project can be long and may at times be cumbersome. Further, the outcomes of these initial processes may not always be clear. Dedicated participants can help projects move through these time consuming, difficult, and at times, unclear stages of development. Individual efforts become important in the continuation of these projects. Jerry Jack of the Owl Mountain Partnership underscores the importance of individual dedication to a project and its goals:

> [Ranchers] know they can call me at night. I'm not an eight to five employee. Everybody has my home phone, because when you deal with the livestock community, you've got to deal with them at night…If we want to do something we may have to do it over the weekends or in the evenings… it takes that kind of a commitment.

The Iowa River Corridor Project respondent also provided an example of how dedicated employees pushed the project forward despite obstacles:

> The process has had difficulties largely because of its unique approach, in effect lots of bureaucratic red tape, but there have been just enough forward thinking government employees to get the project pushed through and implemented.

Over the years, it appears that projects have found the need for management plans that specify clear goals and the means to achieve them. In 1995, a well-defined management plan was considered necessary only by 34 percent of the respondents. In 1999 that number jumped to 68 percent. The master's project team also found that some projects were coming to rely upon the development of these management plans as a way to involve stakeholders early in the process. Further, some projects found funders to be more receptive when told efforts were part of a larger approach. A response from the Northern Delaware Wetlands Rehabilitation Program described the use of an EM plan as an umbrella under which smaller projects could be completed:

> In order for you to get that funding it [is] really nice when you can say, "look this is part of much a bigger program" and for that reason it helps you get your funding. Plus it means that you're not just working in a black box. Initially, we brought it all to the people and we said this is what we want to do and we outlined it in a very general regional approach and it was acceptable and because you have that blessing it's a lot easier to go in and do your individual projects.

While the importance of political support still ranked low in 1999 (46%), there was a significant increase when compared to 1995 when only 21 percent of the respondents stated that political support was important to their project's progress. This increase may be attributed to the increase we saw in public education efforts and in public awareness of ecosystem-based efforts (Chapter 7: Organizational and Behavioral Outcomes). As public support increases, political support, it is logical to assume, will follow. The importance of political support seems to increase when an EM implementing agency has

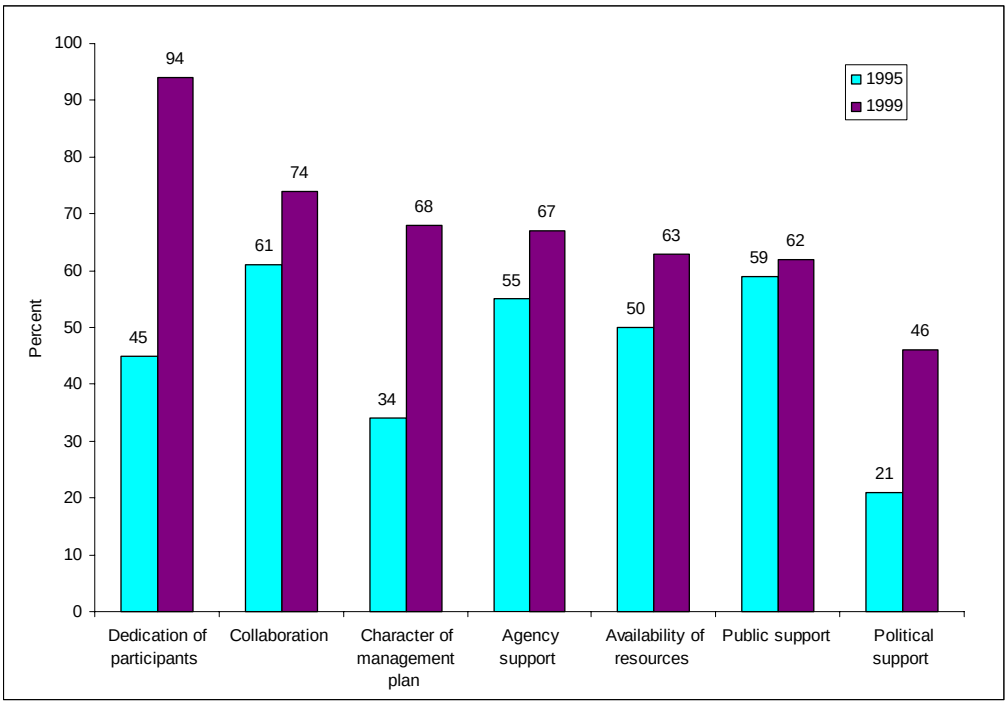
a high profile, such as the United States Forest Service or Florida's statewide EM efforts (Chapter 16: Implementing EM in State Natural Resource Agencies). However other projects are able to maintain their efforts specifically because they do not draw attention, as was noted by Jerry Jack:

> The BLM has been great, but they're a lot more flexible of an agency than some of the other agencies. We've always had more ability to take some risks, I think, because we have less high-profile lands.

Collaboration and Agency Support

Sixty-one percent of the projects polled in 1995 stated that collaboration facilitated project progress. Collaboration took on many forms, including using consensus-based decision making and the pooling of resources to accomplish on-the-ground results. In 1999, 74 percent of the projects stated collaboration was important to facilitating project progress. Projects still seem to rely heavily on these inclusive methods when implementing EM goals (Figure 10-2).

FIGURE 10-2: FACILITATING FACTORS, 1995 TO 1999



Fifty-five percent of the projects in 1995 and 67 percent of the projects in 1999 stated that agency support was an important facilitating factor. For many of these EM projects, support for their work from federal and state agencies is critical for providing both financial and human resources, as well as expertise in the field of ecosystem and resource management. For some, agency support was strong when the project was initiated, but that support eventually waned. The Partners for Prairie Wildlife, in a response on their survey, illustrated how the lack of support can set projects back:

> Interest and support of the program…took time, especially in conservative communities. Premature termination of funds for the program probably eroded

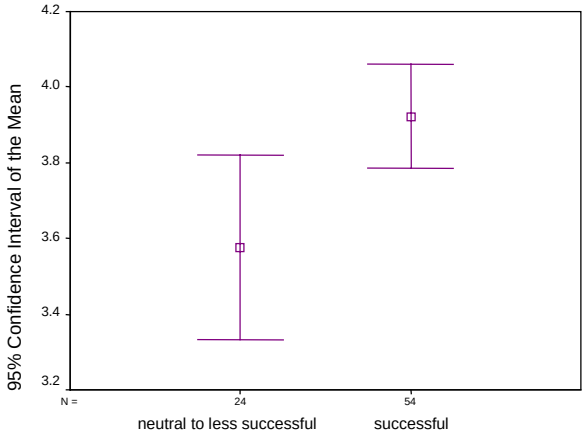
some of the confidence we gained. [It's] very important for governments to be consistent.

SUCCESS AND FACILITATING FACTORS

The research team divided the respondents into two populations based on self-rated success: projects rated by survey respondents as successful (self-rated success of 4 or 5) and projects that were less successful (self-rated success of 1, 2, or 3). The Masters Project team wanted to determine what facilitating factors "successful" projects consider important.

The average response rate for all facilitating factors was compared between the two populations. Not surprisingly, "successful" projects rated facilitating factors higher on average. The mean for facilitating factors for those projects considering themselves less successful was 3.6, and for projects considering themselves more successful was 3.9 (Figure 10-3). The difference was found to be significant ($p < 0.01$). This indicates that successful projects had more facilitating factors to report, which would be expected.

FIGURE 10-3: AVERAGE OVERALL RESPONSE FOR FACILITATING FACTORS BETWEEN "SUCCESSFUL" AND "LESS SUCCESSFUL" PROJECTS



The following facilitating factors stood out as significantly higher by successful projects: support of landowners, well-trained personnel, adaptive management approaches, and a well-defined management plan.

Having private landowners involved in the implementation of project goals often is paramount to the success of the project (see the discussion of private landowners in Chapter 5: Stakeholder Involvement). Because EM projects are often looking at large scale systems, private landowners become an important piece of this system that must be engaged. It appears that projects that report themselves successful have had success in getting private landowners involved in the process. When private landowners are not involved in the process and their presence is needed, they likely can be a severe impediment to moving the project forward.

Well-trained personnel appear to be an invaluable resource. As stated in the 1995 study, ecosystem management clearly asks more of both agency staff members and the public than is needed in traditional management approaches. When projects are successful they often attribute that success to the people involved in the process. Having a staff that can work well with a wide variety of stakeholders, that understand the dynamic ebbs and flows of ecosystem processes, and that have specific areas of

technical expertise will undoubtedly aid in project development. Projects that rate themselves more successful appear to report the presence of these well-trained individuals.

A well-defined management plan helps a project advance its goals by providing targets for individuals and supporting agencies. It provides a focus point for all the individual stakeholders involved in the project to come to a resolution over how a particular resource will be managed and in what manner. These EM plans often take on several different characteristics. Sometimes they are referred to as master plans or forest plans. It appears that projects that consider themselves successful more often have been able to do the work required to develop some type of comprehensive planning document.

Implementing an Ecosystem Management Plan

Project plans took many different names as they were developed: ecosystem management plan, coordinated resource management plan, integrated resource management plan, site conservation plan, and forest plan, among others. However, even with different monikers, project managers discussing the development of the plans reiterated very similar aspects of ecosystem management. These included focusing on a landscape or ecosystem-scale, working toward preservation or improvement of ecological health, being mindful of the ecological systems in place, and collaborative consensus-based decision making.

For the **Marathon County Forest Preserve** in Wisconsin, the goal of the planning process was to involve the public and find a balance between recreational development and forest management. The development of the forest plan was less of a deliberate "ecosystem approach" than an evolution toward incorporating more information about the forest as it became available. Mark Heyde, Marathon County Forest Administrator, notes "we have always been managing ecosystems or within ecosystems and our knowledge of those ecosystems is imperfect… We really didn't look at it as if we were doing something different. It was just a natural evolution into something more complex than we've been able to look at before."

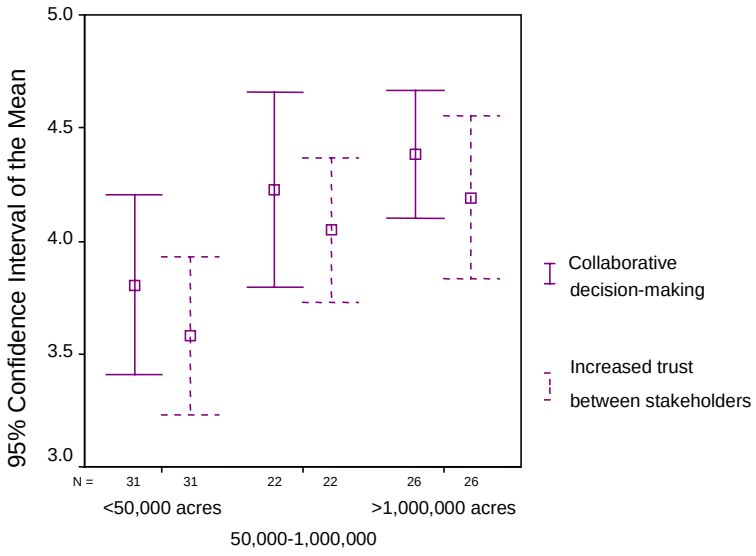
The management plan for the **Northern Delaware Wetlands Rehabilitation Program** was created primarily as a means of defining the project and acquiring funding for its activities. The Delaware Division of Fish and Wildlife was primarily responsible for the visioning and creation of the plan. With seed money from the National Oceanic and Atmospheric Administration (NOAA), Robert Hossler of the Delaware Division of Fish and Wildlife worked with over twenty partners and stakeholders in the region to capture their interests and concerns. "It was over a year process at least—maybe a year and a half—and in the beginning we had people that wanted this and that and I tried to incorporate as much as I could." The input, he reports, was essential, both because it opened up funding opportunities, but also because it defined the boundaries and goals of the project.

Hossler underscored the importance of flexibility. He said that the most important aspect of the management plan was to have clear objectives and goals for a defined area. "You must have clear objectives of what you want to do, not so much a time frame – I don't think that is as important because you never stay with it – but you have to have clear objectives on what you're going to try to achieve." Hossler also warned against getting too wrapped up in the process of developing the plan to the extent that implementation is sacrificed: "You've got to steer away from having the process of developing the plan take over implementing the plan. You could spend your whole time developing a plan and not have anything implemented... We were fortunate that we were able to get something implemented. And, once we started implementing, the plan was there. As long we worked under the general guidance of that plan then we were able to do stuff."

There are clear challenges to using the broad, interdisciplinary approach of ecosystem management. **The Negrito Project** in Arizona used a participatory, consensual process to develop an ecosystem management plan for the watershed. Chuck Oliver of the USDA Forest Service Gila National Forest noted: "The plan got complicated early on because there were so many people who wanted to see so many different things... When the plan actually came out it was pretty elaborate and we felt there was no way we were going to be able to get any funding to go forward with this." He continues, "it was much more difficult to get it to go forward because there were just too many people, too many different things taking place and we had a hard time focusing down onto what was really necessary. The idea [of being consensual] is that you're trying to please everybody and we knew that but the people that wanted that found out along with us that that's impossible. There's no way you're going to please everybody, but we had to go through those steps and we had to determine that." In the end, though, a plan was developed. The USFS and its partners in the Negrito Watershed produced the "Negrito Ecosystem Management Plan" that included specific on the ground projects with a timetable for completion.

For the Marathon County Forest Preserve, sharing information has been a challenge. The availability of an inventory of the forest's 28,000 acres—a fine-scale map of plant communities that can be used as indicators of forest health—has been a key element in enabling the development of their forest plan. The inventory allows the managers to analyze the impacts of changes in forest management practices. However, that information is not easily shared with the adjoining Langley County Forest because that County Forestry Department lacks the level of information and tools available to Marathon County, such as GIS. Sharing data between the two adjoining forests is particularly difficult and has made the development of a comprehensive forest inventory a big challenge.

FIGURE 10-4: COLLABORATION AND INCREASED TRUST BY PROJECT SIZE



LARGE AND SMALL PROJECTS

When looking at larger (one million acres or more) and smaller projects (50,000 acres or less), some differences in factors that facilitated project progress were noted primarily by larger projects. As the size of the project increased, so too did the importance of collaboration and trust and respect. The figure at left illustrates this rising trend using the 95% confidence intervals of the variables (Figure 10-4). These differences seemed to illustrate the effect of the number of actors involved in the process. With more area to deal with, larger projects are naturally going to have more actors involved the process. Larger projects report that collaborative or consensus-based decision making facilitates progress on the project, more so than do smaller projects ($p < 0.05$). Larger projects report that increased trust facilitates progress on the project more than smaller projects ($p < 0.05$). This does not mean that smaller projects can do without these factors; it only points to the possibility

that larger projects find these factors more important to their progress because of the size of their effort.

Advantages and Challenges Faced by Large and Small Projects

Ecosystem management projects across the U.S. vary tremendously in size. It was hypothesized that large projects would face impediments that would hinder the realization of wide-scale ecological outcomes, while small projects might be able to more effectively involve stakeholders and realize on-the-ground objectives.

Managers of large projects, however, do not necessarily consider themselves at a disadvantage. Max Hutchinson, from The Nature Conservancy (TNC), works on the **Cache River Ecosystem Project**, which covers nearly 500,000 acres. One of the benefits of a project this size, he noted, is that "There is always plenty to do, always plenty of places to work. If we have problems in one area, there is always something else." Because the project spans the entire watershed, it encompasses a broader spectrum of ecosystem features, such as entire natural community types.

With large projects, however, the sheer size almost invariably strains resources, both human and financial. Programs must be carefully chosen and prioritized. For the Cache River Ecosystem Management Project, strategic partnerships between The Nature Conservancy, the U.S. Fish and Wildlife Service, the Illinois Department of Natural Resources, and other groups have been essential for managing such a large area. TNC has received considerable assistance from local educational institutions (both universities and grade schools) in activities ranging from studying factors influencing the survival of restored vegetation to monitoring water levels. Another federal partner, the Natural Resource Conservation Service has conducted studies on soil and plant relationships. In addition, the U.S. Forest Service and U.S. Army Corps of Engineers have also taken a proactive role in the land management and restoration of the watershed.

Larger projects are also in a better position to address ecosystem-scale issues. The Nature Conservancy's **Oklahoma Tallgrass Prairie Preserve** spans over 37,000 acres. The goal of the project is to "recreate a functioning tallgrass prairie ecosystem using fire and bison." The tallgrass prairie ecosystem once covered portions of 14 states, encompassing over 142 million acres. Today, less than 10 percent of the original tallgrass prairie remains, most of it in small fragments that cannot function as an ecosystem. According to Harvey Payne, Preserve Director, TNC is trying to "put the forces back into play that shaped this ecosystem." In this case, that means grazing by bison and seasonal fires.

Small projects, on the other hand, also have their advantages. As Scott Cummings, the Bioreserve Manager for TNC's **Block Island project**, states: "I look at some of the bigger projects and see people getting pigeonholed into certain phases. Because we're a small project, we see all phases - we do fundraising, we do land protection, we do stewardship, and we do education. In a bigger project you may only do one of those and as time goes by you become less effective as a spokesperson for the project."

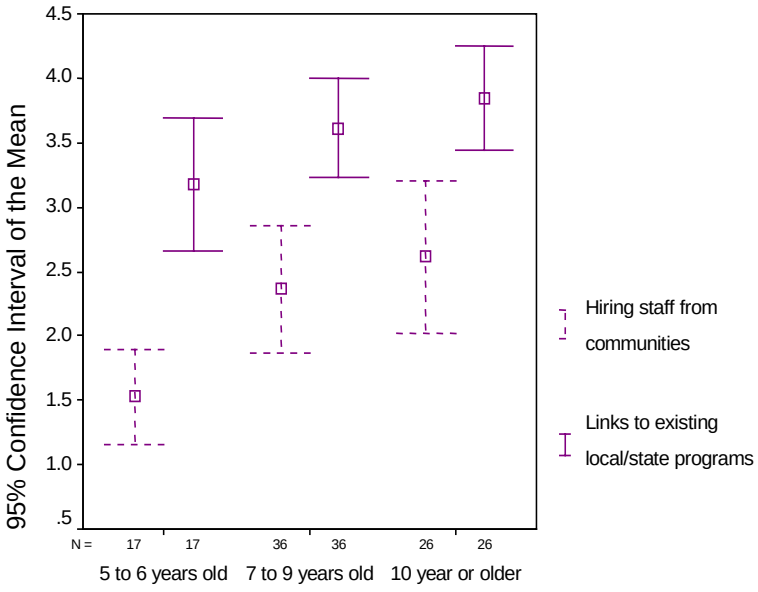
AGE OF THE PROJECT

As projects age, project managers will hopefully become more knowledgeable about what has helped and what has not, and therefore will continue to exploit elements that have seemed to aid their progress. For this reason, the project team analyzed differences between older and younger projects in what they report as facilitating factors.

Older projects report that hiring staff from surrounding communities helps their project more than younger projects ($p < 0.05$) (Figure 10-5). Many projects face opposition or mistrust based on the fear of outsiders or even ideas from the outside. Some projects report that hiring staff within their boundaries facilitates project progress. In 1995, several projects echoed this opinion citing that if they expected to get the support of the community "you have to hire people from the community." Today this same sentiment holds true as explained by Block Island Refuge's Scott Cummings:

> I think you need to put a face to your project. People get invested in not only the project, but in the people who do it. That's the reason things happen… I'm known on this small island. I'm looked at as the Nature Conservancy first and Scott Cummings second and I've lived here my whole life.

FIGURE 10-5: HIRING STAFF FROM COMMUNITIES AND LINKS TO EXISTING LOCAL/STATE PROGRAMS, BY PROJECT AGE



Although, hiring staff from within the community is not seen as a particularly strong facilitating factor by projects taken in aggregate, the fact that it is rated higher by older projects holds some significance. If age brings wisdom, some of the younger projects may learn from the lessons of those that went before them. This difference may also point to an evolutionary trend, where projects that have been in existence for longer periods of time have more opportunities to hire staff locally as the local population comes to know the project, along with its goals and motivations.

Older projects were more likely to report that "links to existing local/state agency programs" facilitate their project ($p < 0.05$). It is possible that this difference also points to a maturing trend. As projects age, they may be gaining a better understanding of which agencies and programs can help the project move forward, and which agencies are not as helpful. Time may also allow the other local and state agencies to come to an understanding of what a project's goals are and exactly how their assets can help such a

project. Simply being in existence for longer periods may, in itself, aid projects in their pursuit of partnerships and the realization of their goals.

AREAS FOR FURTHER RESEARCH

In looking forward, discovering what makes these programs unique would be an invaluable asset in future assessments. With additional information about the context of the projects, a more complete and specific model for the facilitating factors that influence project progress and success could be developed.

This survey was sent to people who play a central role in the implementation of the project and its goals. It would be interesting to understand how people on the periphery of the project would rate what facilitates project progress. A mix of perspectives would shed more light on these programs and on what helps them move forward.

How projects attract and keep dedicated individuals would also be valuable information. Are there incentive programs or reward systems that can be established to attract and keep dedicated individuals involved in the process, such as formal recognition in the form of an award or other incentives for employees in the agencies to increase stakeholder involvement?

In our interviews with project managers many responded that involvement and attachment in the community is very important. How can projects go about developing these critical relationships? Some have taken to hiring within project boundaries. What of areas where this option is not viable, such as in sparsely populated counties? Research into how connections and communication can be fostered within communities would benefit these project managers greatly, especially in areas where their presence is viewed with skepticism, and at times, outright hostility.

Major Findings: Factors Impeding Project Progress

Despite the positive influence of facilitating factors in moving projects along, impediments and constraints are often indicated as reasons why projects have not proceeded to the extent expected. However, compared to factors which facilitate project progress, impeding factors appear to be less significant in influencing the progress of implementing ecosystem management projects. The highest rated impediments, personnel shortages and funding shortages, were rated a 3.5 and a 3.3, respectively, on a scale from 1 to 5, only slightly above a neutral rating.

In 1995, project managers ranked resource constraints second only to organized opposition in terms of factors that impeded project progress. When the impediments included in the survey were consolidated using a factor analysis, the composite variable representing resource shortages was ranked very highly again in 1999. This variable included the individual variables of funding shortages, personnel shortages, and high turnover of agency personnel. Twenty-eight percent of survey respondents replied that resource constraints were a serious impediment, giving it a rating of 4 or 5 on a 1 to 5 scale.

In 1999 pressure for development was tied with resource constraints as the most frequently cited impeding factor. While the survey did not specify the type of development pressure faced by the EM projects, follow-up interviews with project managers indicated residential development and land use conversion are the primary types of development pressure being faced.

Compared to 1995, organized opposition and problems with project process, have declined. The variable “organized opposition” includes opposition by elected officials/politicians, resistance by agencies, opposition by interest groups, opposition by landowners, and legal action. The variable “problems with project process” includes including lack of interagency cooperation, inadequate leadership, and lack of stakeholder involvement. We hypothesized that these factors would decline as projects mature due to more established relationships with stakeholders and the resulting increase in trust and respect.

On the other hand, ecological stresses and pressure for development have significantly increased as obstacles to progress since 1995. We believe that projects are moving beyond planning and establishing relationships, and are, as a result, encountering greater challenges on-the-ground, including ecological stresses and development pressure threatening the ecosystems they are focused on. Pressure for development, considered a serious impediment (rated 4 or 5) in 1995 by only eight percent of survey respondents had a positive response of 28 percent in 1999. Similarly, while ecosystem stresses were considered a serious impediment by only nine percent of respondents in 1995, 24 percent responded with ratings of 4 or 5 in 1999.

Chapter 11
Factors Impeding Project Progress

INTRODUCTION

Projects taking an ecosystem-based approach to resource management rarely move forward without any impediments. Faced by resource constraints, lack of scientific information, and opposition to the project and/or its activities, project managers must identify and overcome a number of significant challenges. In 1995, the most commonly reported obstacles were opposition (50% of respondents), lack of resources (44%), and problems associated with project process (31%). While these impediments appeared significant, projects were beginning to formulate strategies to overcome them.

We hypothesized that some impeding factors would change over time in response to progression in the project's lifecycle. Impediments such as lack of stakeholder involvement and lack of interagency cooperation were expected to decrease, given that many projects had identified these aspects as important strategies in 1995. On the other hand, given their prominence in 1995, some factors such as resource constraints were expected to remain high.

In 1999, we asked ecosystem management project managers to consider what factors were impeding the progress of their project, and rank sixteen variables on a scale of 1 to 5 (not significant to very significant). These factors were based primarily on project manager responses in 1995. A factor analysis (Principal Axis Factoring) produced six composite variables derived from the original sixteen questions:

Resource Constraints: funding shortages, personnel shortages, high turnover of agency personnel
Ecological Stresses: severity of ecological stresses
Development Pressures: pressure for development
Lack of Scientific or Technical Information: insufficient scientific information, inadequate baseline data, lack of geographic information systems (GIS)
Problems with Project Process: lack of stakeholder involvement, lack of interagency cooperation, inadequate leadership
Organized Opposition: opposition by elected officials/politicians, resistance by agencies, opposition by interest groups, opposition by land owners, legal action

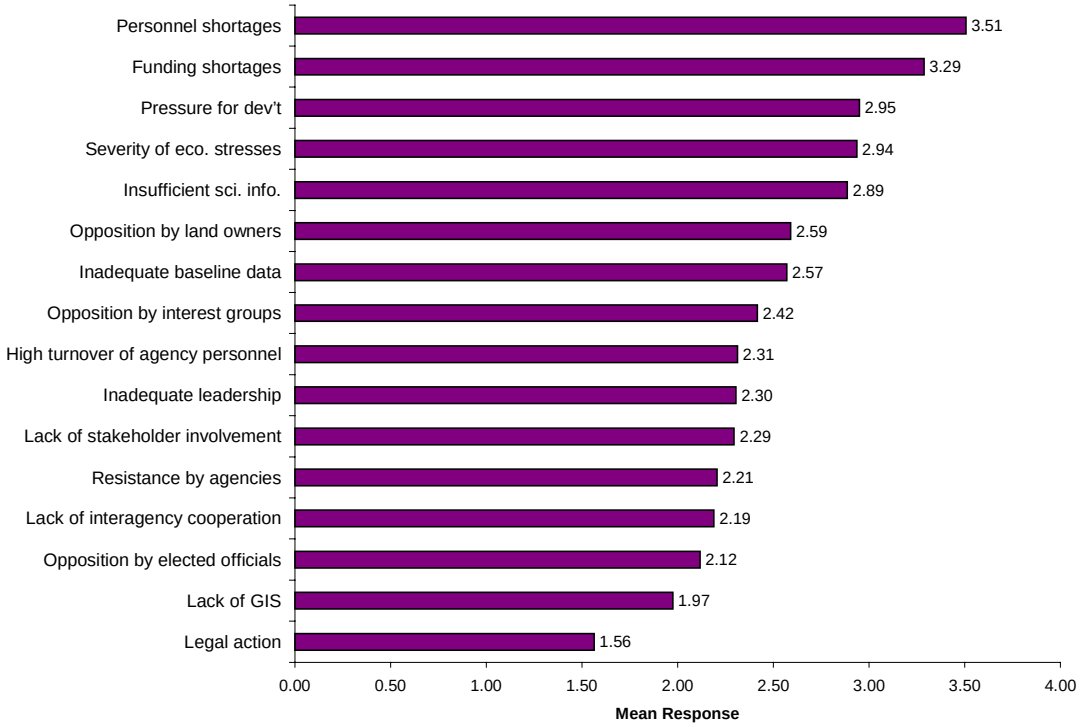
RESULTS: 1999 DATA

When project manager responses to the 16 individual variables are examined, personnel shortages and funding shortages clearly have a higher average response than potential impeding factors such as opposition by interest groups or lack of stakeholder involvement (Figure 11-1). Indeed, as shown in Chapter 12: Advice from Project Managers, project managers cited securing financial resources as a key factor in the continued progress of their project. For both private organizations and public agencies, the constant challenge to secure funding and trained personnel for ecosystem-scale activities makes the implementation of these projects difficult.

On the other hand, legal action clearly stands apart as a factor that survey respondents did not feel was a significant impediment to progress for their projects.

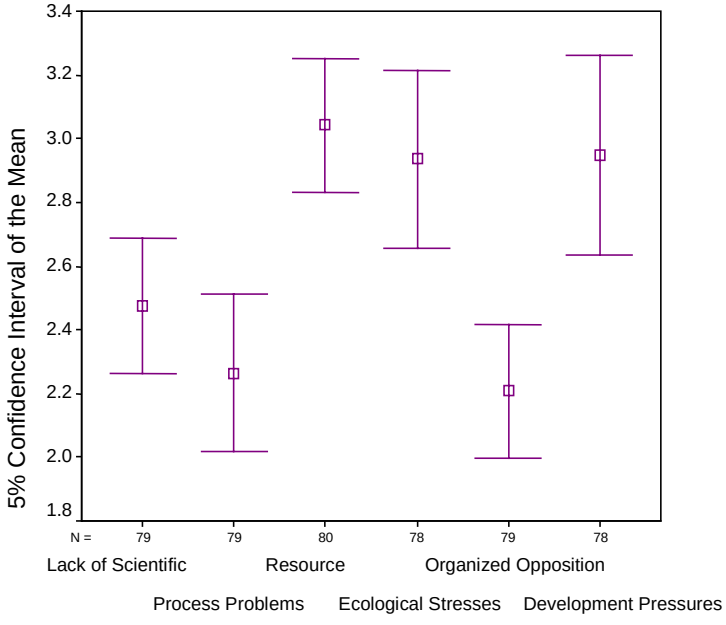
Legal action, it would seem, is not a strategy used very often for those opposing EM efforts. Most responses, however, are clustered around the center, without significant differences between them.

FIGURE 11-1: IMPEDING FACTORS TO PROJECT PROGRESS



It can also be noted that, in general, ecosystem managers did not find impeding factors to highly impact the progress of their project, as reflected in mean scores ranging from only 1.6 to 3.5 on a 1 to 5 scale. This would seem to suggest that project managers, in general, are not finding these impeding factors to be a significant hindrance to project implementation. It may be that project managers are more likely to rate positive influences (facilitating factors) positively and challenges (impeding factors) more modestly. On the other hand, it may

FIGURE 11-2: IMPEDING FACTORS



indicate, as we hope, that project managers recognize the challenges faced by implementation of EM, but do not consider those challenges to be critical impediments to project progress.

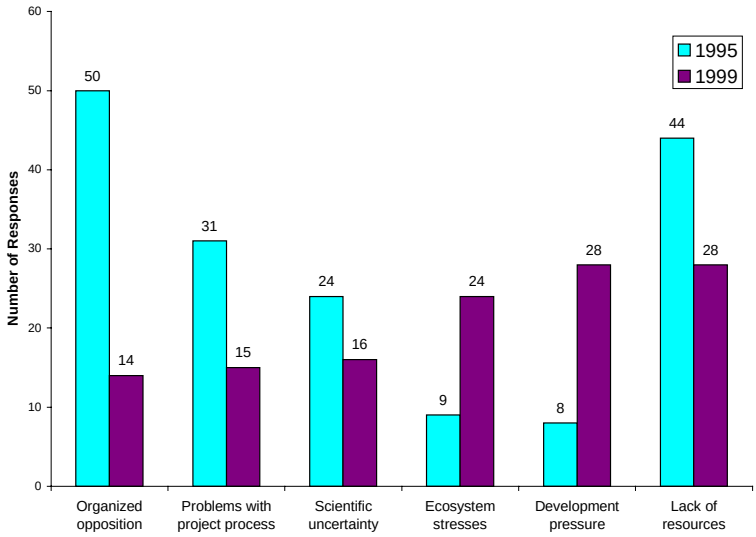
In examining the 1999 responses, the six composite variables can be divided into two groups (Figure 11-2). The mean responses for lack of resources, ecosystem stresses, and development pressures were significantly higher than the responses for inadequate stakeholder involvement, scientific uncertainty, leadership and process inadequacies, and organized opposition. The 95% confidence intervals of the mean responses indicate that these two groups of responses are statistically similar to each other. That is, that responses to resource limitations, ecological factors, and development pressure were statistically equivalent. This is similar to the findings of the individual variables, with the top five individual variables reflected in these three more highly rated groups.

COMPARISON TO 1995 DATA

As with facilitating factors, the manner in which the data was collected precludes a direct comparison between the two surveys. In 1995 respondents indicated the impeding factors they believed significantly impacted the project, in 1999 respondents replied to a fixed set of factors on a 1 to 5 scale. Some basic observations comparing the two sets of data are possible, however. The responses to the 1999 survey were collapsed from a 1 to 5 Likert scale into a dichotomous variable. Where the mean response to a variable was 3.01 or higher, the response was considered to be an impeding factor. For responses of 3.00 or lower were considered that the factor was not an impeding factor to project progress.

Since 1995, opposition to projects and problems related to project process declined significantly as an impeding factor to the project (Figure 11-3). In 1995, 50 percent of projects responded that opposition was an impeding factor; in 1999, respondents responded that opposition was only an impeding factor 14 percent of the time. It should be noted that in 1995, because the analysis relied on extraction of information collected from open-ended question within telephone conversations, the category of "opposition" was fairly broad. It was unspecified whether opposition by the general public and private landowners directly referred to opposition ecosystem management as an approach to resource management or opposition to the

FIGURE 11-3: IMPEDING FACTORS, 1995 TO 1999



activities associated with a particular local or regional effort. The marked decline in opposition is reassuring. It appears that strategies to involve stakeholders in project planning and implementation are paying off in reduced opposition. The significant increases in trust and respect over time, discussed in Chapter 7: Organizational and Behavioral Outcomes, contribute, we believe, to the decline seen in opposition to the projects.

In 1995, while 31 percent responded that problems related to project process (stakeholder involvement, lack of interagency cooperation, and inadequate leadership) were a significant problem, in 1999 only 15 percent of respondents reported this as a significant impeding factor. Similar to the decline in organized opposition, we believe this drop reflects the concerted effort of those involved in EM projects to ensure adequate stakeholder involvement and to encourage cooperation across agencies and organizations.

Scientific uncertainty has also seen a significant decline since 1995. Project activities in gathering baseline information and conducting inventories of ecosystem characteristics and processes appear to be paying off. Lack of information about the ecosystem and its functions, although far from perfect, does not appear to be a significant factor in projects moving forward in implementing their plans.

On the other hand, ecosystem stresses and development pressure increased significantly as impeding factors. While in 1995, they received relatively minor responses of 9 percent and 8 percent respectively, in 1999 an average of 24 percent and 28 percent, respectively, of respondents agreed that these factors were significant impediments to project progress. As projects move from planning into implementation, it appears as though the nature of basic impediments to project progress are changing. When first getting started, opposition by landowners, resistance by agencies, and skepticism about the ecosystem-based approach abound. As that approach becomes accepted by those involved in, and affected by, the project, primary obstacles shift to more tangible problems. Now that scientific information has been gathered about information regarding the ecosystem and its processes, it is up to project managers to determine how to use that information to effect change and move toward project goals. Information, however, only provides a description of the current state of the ecosystem. Knowing how to manage stresses is another matter entirely. In general, knowledge about an ecosystem does not translate into knowledge about management of affected ecosystem processes for change.

Pressure for development is another obstacle that faces projects on the ground, as they move from planning into implementation. Especially for projects that focus on privately held land, implementation activities will likely make pressure for development of the target area seem to have a much more acute effect on project progress.

IMPEDING FACTORS AND PROJECT LIFECYCLE

We hypothesized that some impediments to project progress would decline as projects moved from planning into implementation. Indeed, five impeding factors included in the survey were found to decline as projects moved into the more advanced stages of implementation (Planning and Full Implementation or Full Implementation stages). These factors were resistance by agencies, lack of stakeholder involvement,

inadequate leadership, inadequate baseline data, and lack of geographic information systems (GIS).

Ecosystem management projects appear to face the most significant resistance from federal and state agencies in the earlier stages of their inception ($p < 0.005$). When taken in conjunction with the fact that a large number of ecosystem management projects within our study have state and federal natural resource agency involvement (94 percent of respondents report state agency involvement; 82 percent report federal agency involvement), it points to the increasing acceptance of ecosystem management within agencies that have initiated projects or that are project partners. Federal and state agency involvement is discussed more fully in Chapter 5.

Agency Resistance to Ecosystem Management

Management of land for ecosystem health is a new concept for many federal and state agencies involved in land and resource management. For some, ecosystem-scale management represents a threat to their traditional way of doing business. In these cases, project managers have had to work hard to overcome agency resistance. Other project managers, however, have found many willing state and federal partners.

For the **Guadalupe-Nipomo Dunes Preserve**, fostering participation by the U.S. Fish and Wildlife Service, the California Department of Parks and Recreation, and the California Coastal Conservancy in the Dunes Council first required setting up a mechanism whereby the different agencies could cooperate without undermining the individual authority held by each. Resistance arising from these concerns was overcome by working together and clearly articulating the goals of the project.

With the **Integrated Landscape Management (ILM) Plan** for the Lewis-Kalama watershed in Washington, agency resistance was a significant hindrance to project implementation. The ILM approach requires both management decisions at an ecosystem level (in this case, for a watershed) and significant public involvement in decision-making. For officials at the Department of Fish and Wildlife, this unaccustomed way of approaching resource management proved to be too far beyond their comfort zones. Because the ILM approach was not prioritized by the Department Director or other agency supervisors, field staff were not motivated to accept or implement the proposed plan. Making matters more difficult still, the Director of the Department of Fish and Wildlife has changed five times in the past six years, leading to discontinuity of department program priorities. However, resistance to ecosystem-scale resource management is not prevalent across all state agencies in Washington. The state Department of Ecology has recently adopted a pilot “Watershed Characterization Approach” to address ecosystem health issues in the Lewis-Kalama watershed.

Stakeholder involvement is a key strategy for most ecosystem management projects. It is logical, therefore, that as ecosystem management projects move from planning through implementation, involvement of important stakeholders generally increases ($p < 0.05$). Likewise, issues related to leadership of the project were resolved as the project matured; without adequate leadership, the project would be more likely to stall in the planning stages than continue on to implementation ($p < 0.05$).

As seen in the changes between 1995 and 1999, EM projects appear to be collecting the data they need in order to move forward into implementation. Technical impediments appear to decline as projects mature. Inadequate baseline data declines as projects move into later stages of implementation, suggesting that data required for project planning and implementation was gradually collected as needed. Likewise, lack of geographic information systems is less significant for more advanced projects. This may be because those projects which required GIS technology for implementation acquired it earlier in the process, or that projects decided early-on that GIS was not necessary for the success of their project, and therefore, that the lack of this analytic tool was not seen as an impediment.

Strategies for Projects Facing Development Pressure

One reason why ecosystem management projects evolve is because a particular area is threatened by the actions, deliberate or not, of individuals and organizations. Development pressure on projects takes a variety of forms, including: transformation of pristine landscape to agriculture or residential uses, division of large parcels into smaller parcels under individual ownership, and uneven or conflicting management approaches taken by individual landowners. Ecosystem management projects, therefore, often place significant emphasis on educating and informing landowners about the effects that their actions have on the ecosystem. Some of the strategies ecosystem-scale projects use to mitigate the ecological effects of the varied ownership and management practices within the ecosystem include the acquisition of land, the purchase of development rights or establishment of conservation easements, outreach and education of local landowners, and involvement of landowners in management decisions regarding the ecosystem.

For the **Cache River Wetlands** located in southern Illinois, getting local farmers involved to protect the wetlands has been a major concern of The Nature Conservancy (TNC). The Cache River watershed covers approximately 500,000 acres. Agriculture is a significant disturbance factor within the watershed because of sedimentation and runoff created by agricultural activities. TNC has worked extensively with local farmers to protect the land in the watershed without changing ownership. Using federal programs such as the Wetland Reserve Program and the Conservation Reserve Program, farmers are able to remove land from agricultural use and create long-term or permanent conservation easements, allowing the gradual restoration of the original vegetation and hydrology. One-on-one discussions and small public meetings have been used to inform farmers about these options open to them: options that both protect the watershed and protect the farmers' investment in their land.

The **Oklahoma Tallgrass Prairie Preserve** has also found conservation easements to be useful. Managed by TNC, the preserve covers over 27,000 acres in northeastern Oklahoma. The development pressure on the remaining tallgrass prairie remnants is characterized by both ranching and residential development. In 1993, TNC acquired 6,000 acres of land adjacent to their Oklahoma Tallgrass Prairie Preserve. Before selling the land to the State of Oklahoma Wildlife Department, TNC established a conservation easement on the property.

Development in the area of southern Vermont where the **Wildlife Habitat Improvement Group** (WHIG) is active is of a different sort. Land is primarily sold in large parcels of several hundred or thousands of acres, either between private parties or between industrial forestry companies. Many of the buyers of private lands are inexperienced in owning and managing a large parcel of forested land. Therefore, it is a primary objective of WHIG to reach out and educate these new owners of management options available to them. One means of conserving and restoring the health of the forest ecosystems is to encourage landowners to participate in Vermont's "Current Use" program that ensure that the land is taxed on its use value, which is

considerably lower than its development value. The program also requires that the landowner establish a ten-year forest management plan that can be monitored and evaluated by the local county forester. WHIG also actively encourages the establishment of conservation easements when working with private landowners in the area. In general, the transfer of land between forest industries is not looked on as a negative step, according to WHIG member David Clarkson. Although transfer to the state or federal government for management may be beneficial in terms of ecosystem health, that is not guaranteed. According to David Clarkson, "at least the timber industry keeps the land open, contributes to the local woodland economy, and pays more taxes than the federal government into the town coffers."

In developing the **San Luis Valley Comprehensive Ecosystem Management Plan**, the U.S. Fish and Wildlife Service (FWS) worked hard to involve local stakeholders in designing the management strategy for the ecosystem. FWS realizes that the ecological health of refuges relies on the health of the entire ecosystem. The San Luis Valley, located in the mountains of Colorado, is facing increasing development pressure. In reaction, the Rio Grande Headwaters Land Trust was established by concerned local citizens. In cooperation with FWS, the Rio Grande Headwaters Land Trust, The Nature Conservancy, Ducks Unlimited, and the American Farmland Trust are working toward purchasing conservation easements along sensitive wetland areas to protect the entire ecosystem. The development of conservation easements by these partners has relied heavily on outreach to and involvement of local private landowners. Although this is a new strategy for FWS and its partners, it has already met with success. An estate-planning workshop was widely attended by private landowners. According to Mike Blenden, Refuge Manager for FWS, "there was tremendous interest in the private sector on trying to keep agricultural lands in agriculture and not urbanized or developed into 35-acre ranchettes… In most cases these are riparian areas and extremely sensitive environmentally."

The Washington Department of Fish and Wildlife took a similar approach in initiating its **Integrated Landscape Management plan** in southwestern Washington. The development of a Citizen's Advisory Group (CAG) ensured representation of stakeholders from all of the major land uses within the Lewis-Kalama watershed. The watershed is faced with a variety of pressures, including three dams, industrial forests, and increasing residential development in the form of medium-acreage "hobby farms" by Vancouver, WA and Portland, OR residents.

OUTCOMES AND IMPEDING FACTORS

Factors that impede project progress were found to have a significant correlation with a number of outcomes of ecosystem management projects, including both process and ecological outcomes.

Insufficient scientific information and inadequate baseline data both have a moderately strong negative correlation with restoration of historic disturbance regimes. This may suggest that, without sufficient scientific information regarding the history of disturbance regimes in the ecosystem, the specific effects of restoration, or the most effective means of restoring them, land managers are hesitant to proceed. For example, the reintroduction of fire to prairie ecosystems has sometimes met with significant resistance because managers are unable to specify the frequency and intensity of burning required for restoration efforts.

Similarly, restoration of hydrologic regimes had a strong negative correlation with inadequate baseline data and lack of interagency cooperation. The reasons for these negative relationships are hypothesized to be similar to those for the restoration of disturbance regimes. The most effective means of restoring hydrologic regimes is

debatable. Without sufficient baseline data and cooperation across a wide variety of stakeholders, it is likely that this activity would be less effective.

Other agency factors, including resistance by agencies and lack of interagency cooperation correlate negatively to the shift of managers' practices toward ecosystem management. This supports the hypothesis that the individual manager is more likely to successfully work toward implementation of an ecosystem management project if he/she has the support of their agency (including their superiors) and their collaborators.

It appears that opposition to the project by interest groups had both positive and negative outcomes. While acquisition of land and creation of reserves are impeded by interest group opposition, increased public awareness of the ecosystem and its stresses has a positive relationship with interest group opposition. This suggests that interest group opposition is likely creating press surrounding the ecosystem management project, thereby raising awareness among the public. On the other hand, if a project is attempting to acquire additional land or create reserves within currently-held land, private property owners are likely to react negatively to a perceived threat to the value of their land or reduction of access to the property in question, reducing the likelihood that land acquisition or reserves would be feasible.

Establishment of conservation easements has a strong negative correlation with pressure for development. This supports the hypothesis that strong private pressure for development of land targeted by the ecosystem management project makes it more difficult to secure that land via conservation easements. Increased pressure for development often leads private landowners to be less willing to establish a conservation easement on their land, as that may lead to a decline in property value.

Finally, severe ecological stresses within a project area correlate strongly with successful fundraising, suggesting that projects that faced extreme ecological stresses were able to hold up the ecosystem's crisis situation in order to mobilize greater fundraising success.

AREAS FOR FURTHER RESEARCH

The changes in relative impact of various impeding factors over time indicate that project managers are identifying and overcoming challenges to ecosystem management as projects move from planning into implementation. Additional discussions with project managers regarding the strategies they used to overcome these challenges could be very useful to ecosystem-scaled projects just beginning. While every project is unique, the results of the 1995 and 1999 studies indicate that some impeding factors are more prevalent than others are. Knowing the prevalence and impact that impeding factors may have on a project can prepare managers undertaking ecosystem-scaled efforts to face the challenges more easily.

Overcoming Obstacles: Keeping the Project Alive Over Time

Although dominated by lack of funding and personnel, a wide variety of factors have been cited by project managers as the roadblocks toward implementation of their projects. Likewise, managers attributed the progress made to a number of different factors, including dedication of personnel and partners, agency prioritization of the projects, and success in achieving project goals.

The Nature Conservancy (TNC) has been involved with preservation and restoration activities at the **Block Island Refuge** on Rhode Island since the 1970s. It was not until 1991, however, that TNC established a year-round office on the island. That full-time presence has made a significant difference in the Conservancy's activities on the island. For one thing, the amount of open space has increased dramatically. According to Scott Cummings, TNC's Bioreserve Manager, in 1991, only 8 or 9 percent of the island was preserved as open space; today nearly 38 percent of the island is. Over 100 acres were protected in 1999 alone.

Staffing was a major issue for the **Verde River Greenway** project in central Arizona, as well. Initiated in 1986 by then-governor Bruce Babbitt, the greenway project enjoyed a rapid start aided by $2 million of state funding for land purchase. Land purchases, and the project in general, has moved slowly since then. The greenway project has had only one staff member for the duration of the project, limiting the scope of what can be accomplished. Partnerships with nonprofit organizations such as the Arizona Wildlife Federation have enabled project progress, including the planting of approximately 1,000 cottonwood poles in 1999. In 1998, the Arizona State Parks department acquired sixty-one acres of land on the river. According to Max Castillo, Verde River Greenway Coordinator, that was the first "real purchase of property since the first ones in 1989."

The establishment of partnerships has provided some projects the resources and initiative to continue. The Block Island project, a partnership with TNC, The Block Island Conservancy, the Block Island Land Trust, the Town of New Shoreham, the State of Rhode Island, the U.S. Fish & Wildlife Service (FWS), the Committee for the Great Salt Pond, and others, has relied heavily on the dedication and commitment of the residents and long-time visitors of the island. "There are a lot of people out here who love this island and who have lived here their whole lives or who have summered here for a long time. Their generosity in giving land is the reason [for our success]… I would say it is the people, the community at large."

On the other hand, the high prices of land have made continued acquisition of land and preservation difficult. According to Scott Cummings, "What we pay for one small lot could buy you a thousand acres some places. Land takes a long time to work on. We have a piece of property we just closed on last spring that we've been in negotiations over for the last seven or eight years. We have another one that we've been negotiating for twenty years and nothing's happened yet."

Likewise, the **Grand Bay Savanna** ecoregion stretching across southwestern Alabama and Southeastern Mississippi has benefited by partnerships between The Nature Conservancy and the U.S. Fish and Wildlife Service. Designated one of TNC's "Last Great Places" in 1990, FWS established the Grand Bay Savannah Refuge in the area in the mid-1990s. The presence of the federal refuge, in addition to the funding for management and expertise made available through FWS has aided the conservation of this unique ecoregion.

Initially faced with distrust from landowners in the community fearful of the state invoking eminent domain to acquire additional land for the Verde River Greenway, Babbitt insisted that the project acquire land from willing sellers only. Because of this approach, trust has grown over the

intervening ten years, as residents have seen that the state would not force them to give up their land. Max Castillo explains that residents "realize that we're not going to run roughshod over them and force them to do anything they don't want to do. I've even had some people offer us some conservation easements across their property. That's exactly what we're looking for. We don't need to own the land, we just want to be able to help to maintain it and decide how it's going to be used and protect it." Conservation easements are a strategy being used by the project to protect the land, to increase involvement in its management, without requiring the land to change ownership. Increasing community involvement is another significant strategy. Now that the project is trusted more by the community, the coordinator plans to establish a stakeholder group "that can write letters and show support for it, and see if we can't bring it back up on everybody's radar screen, and get some support from… the State Parks Board."

Individual dedication and perseverance of project coordinators can sometimes make the difference between a successful project and one that slowly disintegrates. The greenway coordinators of the Verde River Greenway project have provided the context for continued growth and progress of the project. Faced with limited budgets and little staff assistance, Max Castillo calls some of the coordinators visionary. "They weren't really going to give up too easily, so they just kept plugging along and trying to see what they could do with what they had. I'd like to think that is what I'm doing, still plugging along and eventually sometimes you push the right buttons and get some notice or something happens."

Despite the best efforts by project coordinators and stakeholders, sometimes project progress is delayed by nature itself. Citing the frequency of spring droughts in the southeast, Dave Ruple, project director for TNC's Grand Bay Savanna project, noted that prescribed burning has not been possible for several years. Because many of the ecosystems in the southeast rely on periodic burning, the droughts have precluded projects from achieving some of the ecological goals they expected.

SECTION IV

Looking to the Future

Major Findings: Advice from Project Managers

The advice offered by project managers and the factors they identified as necessary for continued progress provide a window into the rich opportunities and the many frustrations faced by those committed to pursuing ecosystem-based approaches to natural resource management. In many ways, ecosystem management presents far more challenges to the practitioner than traditional strategies focused on a single medium or single agency. Organizational complexity and logistical problems tend to multiply as stakeholder participation increases; the budgeting process is complicated and sometimes compromised by interagency cooperation; planning and implementing programs on a large scale can threaten to dilute action as understaffed organizations attempt to tackle problems potentially beyond their program capacities. At the same time, however, the commitment demonstrated by many project managers in this study suggest that these difficulties are not insurmountable and that the on-the-ground results that more and more managers are seeing through their efforts justify the many challenges presented by this still young and dynamic experiment in natural resource management.

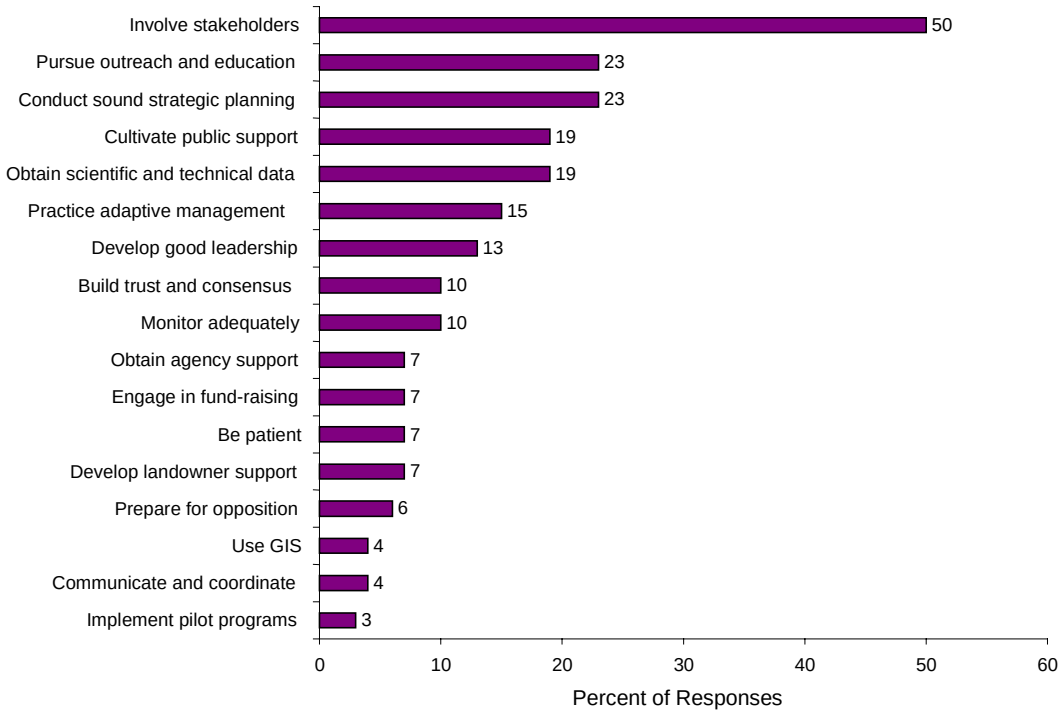
Chapter 12
Advice from Project Managers

Project managers were asked to provide two or three pieces of advice that they would offer to natural resource managers undertaking a new EM effort and what they believed were the most important factors for continued progress on the projects. We performed a content analyses on both sets of responses, sorting them into categories that best captured, at a higher level of generality, the sense of the responses. What follows is an overview of these categories, much of it using the words of EM practitioners themselves (Figure 12-1).

ADVICE TO PROJECT MANAGERS

Managers provided a wide variety of responses, including ways to overcome initial obstacles, words of encouragement, and reiteration of the importance of some of the basic components of ecosystem management: stakeholder involvement, strategic planning, and adaptive management. The research team divided the responses – many managers offered multiple suggestions - into seventeen basic categories of advice.

FIGURE 12-1: ADVICE FROM PROJECT MANAGERS



Involve Stakeholders

Project managers strongly advocated the need to develop broad stakeholder involvement in EM projects, pursue stakeholder outreach and education, and cultivate public support. Three of the top four responses were related to stakeholder involvement.

Fifty percent focused specifically on stakeholder involvement. As a manager from Blue Mountains Natural Resources Institute explained: "Bringing everyone (scientists, managers, public) along takes a lot of time and energy, but the result is worth it if everyone has ownership of the outcome. You can then build on it for the next iteration." Commenting on stakeholder involvement, another respondent stressed the need to "start locally. Gather support and input from local stakeholders and let them drive the process."

There is a strong and understandable tendency of managers and administrators to seek out and work closely with like-minded stakeholders. A manager from the Natural Resources Roundtable urged his colleagues to resist this temptation and to seek "broad involvement, particularly from the most strident naysayers… To effect legal (statutory) or administrative changes, you need a broad coalition of supporters."

The manager from the San Pedro River project offered advice about how to go about involving stakeholders, particularly those who are lukewarm to the ideas behind the project. "Involve skeptical stakeholders in on-the-ground activities… Allowing them to collect monitoring data under supervision, for example, will help to achieve their 'buy-in' to the results of research activities and possibly prevent disputes over scientific findings. Getting people out on the ground is always a good idea."

Five respondents (7%) pointed specifically to the importance of involving private landowners. The project manager from Camp Johnson Sandplain Restoration wrote that "landowner support is key." A word of warning about landowners came from a respondent at the Cheyenne Bottoms Wildlife Area: "Be prepared for opposition from landowners concerning 'landowner rights' and, if water is involved, using water for wildlife being viewed as 'wasted' since it is not used for agriculture."

There was one notable voice of skepticism from someone at the Chesapeake Bay Program regarding broad-based, stakeholder-driven EM projects: "Forget 'voluntary' approaches. Regulations work."

Plan Appropriately

Nearly a quarter of respondents advised their colleagues to pay close attention to the planning process. Two very different, though not mutually exclusive, targets for planning were identified. One set of respondents stressed the importance of formulating realistic, prioritized plans in light of the known physical parameters of the ecosystem in question. The respondent from the Tidelands of the Connecticut project summarized this view clearly. "Be clear about what your ecological targets are. Know your stresses and their source. The sources of the stress may be multiple, as may be the effects. For example, residential development can lead to a number of different stresses, including eutrophication, nuisance species pathways and habitat loss. Tailor strategies to meet the greatest threats." This view was echoed by the manager of the Butte Valley Basin project, who emphasized the need to "plan projects that are with the ecosystem's natural range of variability."

Another set of respondents focused their discussion of strategic planning more on the set of goals and objectives that would build common ground among stakeholders. The Marathon County Forest respondent urged managers to "develop or identify a

common vision for the project." The manager of the San Pedro River project echoed these sentiments: "Start with the parts of the project that all stakeholders can agree on. In the early stages, focus on what unites you as a group, not what divides. Hopefully the trust that is fostered through this approach will provide a platform from which to tackle more difficult issues down the road."

One interesting cautionary piece of advice with respect to planning was offered by the project manager from the Northern Delaware Wetlands Rehabilitation Program: "Implement at least one project or facet of a project as soon as possible. Don't spend too much time planning without making physical progress. You will lose support and develop 'planning paralysis.'"

Educate and Cultivate Public Support

Approximately one quarter of the respondents stated the importance of outreach and education to the general public. These activities were cited as one of the principal means of developing broader public support for the EM project, which also ranked high (19 percent) in the advice given to new or potential EM managers.

The respondent from the Wild Stock Initiative pointed to the importance of linking the concerns that motivate conservation biologists—habitat loss, species extinction, ecological health—with those that tend to predominate in the general public, e.g. considerations of human health and well-being: "Sell the problem. You must establish that there is a significant problem that, if it is not resolved, will have a profound effect on the quality of life. You must link ecosystem processes and management with protecting basic natural and human values."

As one manager from the Lajas Valley Lagoon System stressed, "if public lands or agencies are involved, make sure the public has opportunities to be involved and are regularly informed of where their tax dollars are going!"

Other Advice

Collaborative projects often face the problem of a leadership vacuum. The administrator of the Phalen Chain of Lakes Watershed Project emphasized the need to make sure that the project plan "deals with the question of 'who' implements and how." These concerns were also on the mind of the respondent from the Sideling Hill Creek Bioreserve: "Hire a committed project manager responsible for implementation and located in or near the project area."

A number of project managers urged their colleagues to develop the staff and resources necessary for developing a monitoring system and establishing baseline data. As the Prairie Pothole Joint Venture respondent reminded: "Develop a credible biological/scientific foundation based on research—too many assumptions will undermine the effort."

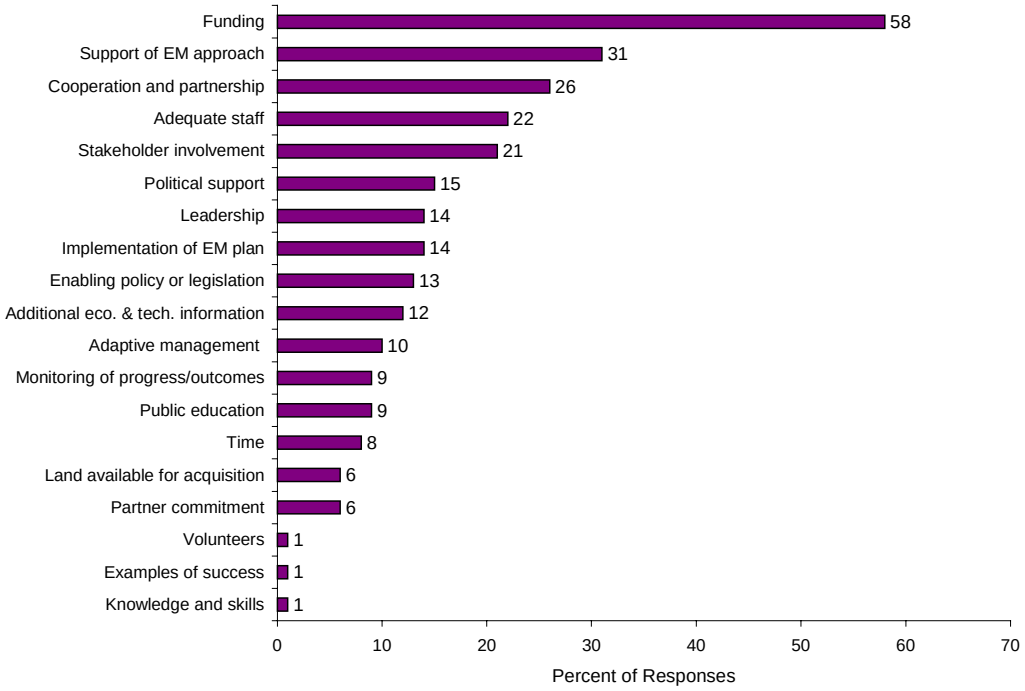
The Tidelands of the Connecticut Project provided a compelling account of how a pilot program can work to focus efforts, provide a basis for learning, and facilitate outreach, education, and increased participation. "Do a pilot! Work with a smaller

subregion, make it a success, learn from it, and then broaden your scope. Allow the success of the model to inspire and involve others."

FACTORS FOR CONTINUED PROGRESS

Resource considerations topped the list of factors that project managers identified as most necessary for continued progress toward realizing the goals of their EM projects. Funding was the most frequently mentioned need with fifty-eight percent of respondents indicating that their projects had inadequate funds. Another twenty-two percent stated that additional personnel were needed to facilitate continued good work on the projects. While respondents generally provided a bulleted list of concerns, without much supporting detail, we noted that the respondents generally indicated the need for *continued* support or resources. It appears as though these project managers feel strongly that, at a minimum, continuation of support, if not augmentation, is important.

FIGURE 12-2: FACTORS FOR CONTINUED PROGRESS



Many project managers addressed the critical importance of building support for their projects in the local communities. Drawing in more stakeholders, building trust, and developing strong partnerships were all identified as basic to success implementation of project goals. The manager of the Nebraska Sandhills Ecosystem project pointed to the importance of providing "milestones measuring success so that stakeholders can see they are making a difference. This may be a news article, a successfully completed project, a solution to a long-term problem."

In a similar vein, two other projects spoke of the need to motivate action through the identification of a common cause. The Tidelands of the Connecticut River

respondent stated that one needed to find “the right catalyst for igniting the community into more meaningful involvement and action in future planning.” Conversely, the respondent from the Prince William Sound-Copper River Ecosystem Initiative warned of the difficulty of sustaining an organization in the absence of a galvanizing issue: “Our efforts were also stymied by lack of a central issue to drive the process. Trying to create an ecosystem partnership without some driving issue is a bit like swimming upstream.”

The manager of the San Pedro River project called for no less than a revolution in thinking and leadership. “Governmental approaches which honor multiple resource values must replace approaches put in place decades ago to optimize single resource values. Leaders of the New West must replace local leaders from the Old West.”

Chapter 13
Recommendations for Policy Makers and Project Managers

What are the implications of these findings for policymakers trying to develop new EM initiatives and ensure the success of those already in place? How might managers of ecosystem-based initiatives use this information to enhance their project efforts? The information shared by EM practitioners and the quantitative and qualitative analyses conducted by the research team lead to a number of proposed guidelines for both policymakers and managers.

Develop policies recognizing the long-term nature of ecosystem management projects

Given that outcomes take time to realize, and that resource constraints are a primary impediment to EM projects achieving their objectives, it is critical that policymakers consider the long term when developing policy in support of ecosystem-based management. A long-term perspective will help policymakers to establish more realistic expectations regarding the outcomes expected from an EM projects and the amount of time it will take to realize different outcomes. It will also better enable the projects to carry out the ongoing monitoring work that is necessary to an adaptive management approach. Specifically, policies that address multi-year year budgeting, long term staffing, and appropriately aligned incentive systems can help to overcome the single greatest obstacle thought to impede the success of EM efforts.

Guaranteed multi-year funding will eliminate some of the administrative and organizational uncertainty that surrounds many of these projects and provide a better match between the project's EM plan and the time required to implement it.

Long term staffing is also critical, as EM relies on building relationships. Agencies and organizations that experience high personnel turnover can disrupt the relationship building effort. Long term, consistent staffing is key to providing the stability needed to establish trust and a solid working relationship that can then foster an EM approach. A project manager from the Block Island Refuge in Rhode Island explains the importance of relationships in EM efforts: "I think you need to put a face on conservation, a face to your project. People become invested not only in the project, but also in the people who do it. That's the reason things happen."

Finally, because dedicated employees are so important to building relationships with stakeholders, garnering resources, and working toward the success of the program, reward and incentive programs should be developed with EM objectives in mind to help keep dedication levels high and efforts properly directly. These programs should recognize the amount of time required to see results on the ground and the critical importance of process outcomes. While process outcomes are often difficult to quantify when conducting an annual performance review, it is critical to understand what process outcomes are critical to the success of the project and to have a sense for the extent to which they have been realized.

Develop Land Legacy Programs

A second recommendation for policymakers involves developing Land Legacy programs. The Clinton Administration's Land Legacy initiative provides ways to preserve green spaces and wilderness areas in the U.S. through state and federal land acquisition. Programs in line with the Administration's Land Legacy initiative can help stave off development pressure and ecosystem stresses, which have been identified as mounting impediments to EM project implementation and progress. Growth management programs, addressing increasing concerns over sprawl loss of habitat, and impact on ecosystem processes should be developed. In the face of growing pressure for development, land conservation programs will serve an even more critical role in the future.

Focus on stakeholder outreach and involvement

Key findings from this study also have some important implications for the people in the field implementing ecosystem-based management. From the outset, it is essential to focus on stakeholder outreach and involvement to help manage community uncertainty and opposition to the EM effort. In many parts of the county, even voluntary, partnership-base EM initiatives can potentially send up red flags with farm groups, property rights activists, and landowner groups. The fear, whether misplaced or not, is that increased collaboration will result in more comprehensive information collection on private lands, and that information - in the hands of federal and state agencies - will eventually translate into stricter land use regulations.

The best way to mitigate this is to work closely with local stakeholders in the early phases of the initiative, particularly those who are the most skeptical. While this work is difficult and at times uncomfortable, it can mean the difference between a project that succeeds and one that never makes it beyond the planning phase. Findings from respondents in this study suggest that using stakeholder outreach effectively to reduce levels of opposition has been an important strategy behind the effectiveness of many of these EM efforts.

Use pilot approaches to demonstrate EM approach and show early success

Use of a pilot project is a key strategy for demonstrating the possibilities that an EM approach holds for resource management. A third of the projects surveyed characterized themselves as being both in planning and implementation. This supports the idea that it is important to plan, but that it is also critical to show results early in the process. A pilot project can help to demonstrate results while experimenting with the EM approach. The results of that pilot could then be folded back into the planning process.

When choosing a pilot, managers should focus on discrete projects that are likely to see significant results in the near future. Success, even at a small scale, serves to legitimate a project, boost morale, and provide good public relations.

Collect baseline information and establish monitoring programs

To determine whether a project is meeting its goals, a monitoring program is essential. However, without baseline information against which to measure change, monitoring will have little value. Baseline information and monitoring are important not only to measure ecological change, but also to evaluate behavioral changes. Project managers have been challenged to define measures for evaluating things like "increase in trust" and "stakeholder outreach." The development of standard measures for examining these types of less tangible changes is necessary to be able to paint a full picture of the effect EM is having on the ground. To the extent possible, these procedural and behavioral factors should be woven into employee performance reviews and work plans, and not left as a vague "community outreach" component, for example.

In addition, collecting good baseline and monitoring data also provides project managers with evidence that the project is being effective, which is essential to justify ongoing project budgeting.

Set realistic timelines for achieving both ecological and process outcomes

Although some process outcomes, such as stakeholder involvement, are easily achieved in the early stages of a project, others, such as increased trust and respect, only come with time. Likewise, ecological outcomes generally take longer to implement. Therefore, projects should keep this in mind as they set their goals, and recognize that in the early and middle phases of a project lifecycle, success may be looked at in terms of positive procedural and behavioral outcomes. As the projects mature, institutional structures become more stable and reliable, permitting on-the-ground activities to increase and ecological change to begin. At that stage, the measures of success of ecosystem management projects might include the ecological changes seen on the ground and the process outcomes that are critical to the long-term viability of the project.

Chapter 14
Conclusion

The 1995 study catalogued a variety of ecosystem management (EM) projects in the United States and demonstrated that these projects take many forms. The goals these EM projects seek to realize and the partnerships they establish vary with the social, economic, and ecological environment of the project. The past five years of experience have shown that, while some projects included in the original survey have been discontinued, the majority continue to evolve, modify goals and strategies, enlist new partners, and solidify relationships with established partners.

FROM PLANNING TO IMPLEMENTATION

It is encouraging to see that an ecosystem-based approach to resource management is becoming a more credible and desirable form of resource management, and that projects are beginning to realize more on-the-ground accomplishments. There was a notable increase in the number of projects reporting that they are in the implementation phase of development. More projects are putting their plans into action. In most cases, these plans developed through months, and sometimes years, of meetings and discussions often involving a variety of public agencies, non-profit organizations, and private citizens. Participants have worked through many differences, and have come up with new approaches to address their needs. With process and organizational outcomes such as increased communication, trust, and respect, and the development of management plans, EM projects are beginning to see more extensive ecological results on-the-ground.

Although long and challenging roads lie certainly ahead for these EM projects, it appears from our analysis that they are beginning to move beyond the initial stages of development. They are coming to a place where people who once mistrusted each other now move closer together in partnership and tackle the challenging tasks of managing these resources in the face of increasing stresses to the ecosystem. Bill Pell, the Ecosystem Management Coordinator for the Ouachita National Forest explains the change he has witnessed in their EM project:

> I've seen tremendous change and evolution over the last… 20 years… from the outside and the inside, and it's just amazing… when I step back and look at it that way. Sometimes when I'm down in the trenches it's hard to see that it's so much better, and we still have a ways to go. By no means have we reached the pinnacle where we rest on our laurels. There are still some hardcore critics who don't think we ought to be cutting a stick of lumber or burning any acre of a National Forest, and they'll never back off those divisions. But lots of other folks have been able to work with us and we have achieved some real positive things.

ADAPTING TO CHANGES

Not only are these projects moving forward with implementation, they are doing so while checking the rearview mirror: reviewing strategies as they progress, using customized monitoring programs, and continuing meaningful involvement of the partners in the project. The number of respondents replying that they are actively engaged not only in implementation but also in planning possibly indicates that projects are using an

adaptive management approach. It appears projects have built in the flexibility to modify management practices if existing strategies are not working. Regular meetings with stakeholders keep projects abreast of public opinion, a critical aspect of many projects. In several cases, managers commented how this public input is informing use of new strategies and management activities on the ground.

Monitoring practices have also developed over the years, providing projects with another valuable tool in evaluating and adapting their strategies. Because developing a monitoring program can consume already scarce human and financial resources, projects often take advantage of partnerships to accomplish the time-consuming, and often complicated, task of monitoring project progress. They often look to state or local agencies for assistance by using the expertise of agency wildlife biologists and botanists. Specific ecological parameters such as presence of specific flora and fauna and water quality are most often monitored by the projects in our study. Furthermore, a large number of these projects are evaluating behavioral activities, including changing management activities on the landscape and levels of coordination and cooperation among the parties involved in the project.

INCREASES IN SCIENTIFIC UNDERSTANDING AND ECOLOGICAL RESULTS

Many of the projects have witnessed dramatic increases in both scientific understanding of their project areas and true ecological results from their EM efforts. Increased scientific understanding has enabled projects to get a better grasp of the way their ecosystems function. This was also noted in 1995, but it appears that projects are continuing to investigate and learn more about the areas they manage, and are putting this knowledge to work.

It was also found that as projects age, they begin to report more ecological outcomes. This knowledge provides hope for those projects that are in the beginning stages of development. The knowledge that on-the-ground results take time provides some comfort to projects that may be encountering frustrations along the way.

KEY STAKEHOLDER INVOLVEMENT IN EM PROJECTS

The importance of stakeholder involvement in planning and implementation was underscored by project managers both in telephone conversations and in survey responses. From the beginning stages of education about the ecosystem to collaborative processes for planning and implementation of an ecosystem management plan to garnering resources and expertise not available through a single organization, partnering was identified as key to the success of many EM efforts.

Among the EM projects included in our data set, state and federal agencies remain the principal partners involved in the implementation of the ecosystem management plans. As managing resources on an ecosystem scale becomes established as a credible and effective form of resource management, it appears that many more state agencies are beginning to incorporate the practice. A moderate increase in the involvement of state agencies was noted over the span of the two studies. State natural resource agencies are coming to better understand how decisions made at the landscape level affect surrounding communities. At the same time, they are

realizing that simply managing resources without forging some type of community partnership may create difficulty for the agency down the road.

The analysis also revealed that private landowner involvement is one of the keys to a successful project. Each project employs its own methods to get landowners involved in their project. Whether it is giving them a seat at the table or assisting them with problems on their land, getting landowners to link their property with its surrounding environment seems to be paramount in reaching many of the goals set by EM projects.

INCREASING LEVELS OF TRUST

Levels of trust and respect appear to increase with the age of the EM project. As communities come to an understanding of the people and the goals of the project, and as individuals involved in the projects come to know the community, trust is gradually built. Jerry Jack of the Owl Mountain Partnership explains how increased trust has led to the evolution of constructive working relationships within their project:

> I think where trust comes from is getting the right people together… and when you get people together [they] first figure out that they have a common problem - and then they figure out that there's some solutions - and then they figure out that they can work together to get those done - and then they see a few successes - and then they get to liking each other - and then they're willing to go drink coffee or eat lunch or do whatever and do some things together - maybe go fishin' - work together side by side - I work with ranchers putting up electric fences or moving cattle a lot. They trust me, I trust them.

DEDICATED INDIVIDUALS

The presence of dedicated and energetic individuals also appears to be a significant factor in moving these projects forward. While collaborative processes are important, the efforts of individuals appear to play a significant role in helping projects move through cumbersome and difficult processes. Drumming up political and public support, managing projects with lean budgets, volunteering long and erratic hours – all of these tasks are performed by individuals who are dedicated to applying a different approach to achieving resource management goals. The processes of developing an effective EM project can be frustrating, especially during times of disagreement. Dedicated individuals assist these projects in moving forward precisely because they provide the energy required to work through disagreements and unforeseen problems.

MORE DEVELOPMENT PRESSURE, LESS ORGANIZED OPPOSITION, CONTINUED LACK OF RESOURCES

Findings from this study suggest some change in the factors impeding progress of EM projects. Compared to 1995, organized opposition and problems with project process, including lack of interagency cooperation, inadequate leadership, and lack of stakeholder involvement, have declined. On the other hand, development pressure and ecosystem stresses are increasing as impediments to project progress. With projects overcoming many of the process-related challenges, addressing the threats to the ecosystem in the form of development pressure, including continued increases in growth and sprawl, and ecological stresses, such as invasive species, becomes more important.

Project managers struggle most with inadequate access to resources. Funding shortages, personnel shortages, and high turnover of agency personnel continue to be major factors hindering the progress of these EM efforts. A commitment of human and financial resources to EM activities is therefore essential to ensuring the long-term viability of these projects.

FACILITATING FACTORS A GREATER INFLUENCE THAN IMPEDING FACTORS

Although ecosystem management practitioners face many challenges in the field, overall they responded more positively to citing factors that aided project progress than those factors that hindered it. This seems to point to the fact that practitioners are learning how to make ecosystem management work for them. Challenges, while they exist, are expected and many met head on.

THE POLITICAL AND ORGANIZATIONAL CLIMATE

Natural resource management takes place in a highly politicized environment. Because of the scale and complexity of EM projects, the political challenges they face are often even more daunting. Integrating management across jurisdictional lines, urging interagency cooperation and coordination, involving diverse interest groups in decision making are all laudatory goals but, in many instances, are also political minefields.

Many EM projects in this study used broadly representative, collaborative processes to develop management plans for their project areas. Frequently, managers reported that a planning process that was initially characterized by mutual distrust and suspicion between different individuals and interest groups gave way, with time and ongoing conversation, to highly productive working relationships that culminated in a consensus-based management plan.

Ecosystem management projects often attempt to get agencies from different levels of government (federal, state, and local) and with diverse responsibilities and capacities to collaborate in managing an ecosystem-scale unit of the landscape. However, many agencies (and authorizing powers in legislative bodies) are notoriously jealous of their authority and loath to cooperate. Agencies are generally unwilling to engage in enterprises that require them to take on additional responsibilities, particularly when additional resources are not connected to the mandate.

At the same time, workable models for interagency cooperation do exist. Cost-share arrangements between federal and state governments, interagency planning groups, legislatively mandated cooperative arrangements, and technology and information transfer programs have all assisted in the development of ecosystem management projects.

It seems likely that property rights issues will continue to play a major role in defining the politics of ecosystem management for some time to come. Advocates of ecosystem management have good reason to urge a shift from a piece-meal to an integrated approach to natural resource management. At the same time, there are many

landowners that do not want to have their land inventoried in a geographical information system or their management practices second-guessed by government agencies or conservation organizations.

On the positive side, however, many of the projects contacted in this study indicated that individual landowners and local citizens were becoming increasingly involved in their efforts. These are encouraging signs that suggest that many people are interested in taking a more proactive and cooperative approach to managing the landscapes they inhabit together.

LESSONS LEARNED ABOUT EVALUATING AN EM EXPERIENCE

This project has attempted to capture the experiences of these ecosystem management projects over the last five years. The survey the project team developed was a useful tool for collecting information on a wide variety of topics, including project status, goals, strategies, monitoring techniques, ecological and process outcomes, and factors facilitating and impeding project success.

Using a written survey tool to collect information on the practice of ecosystem management in the field, the project team learned some valuable lessons. While this technique does permit the standardization of results, the unique nature of each project in the study calls into question the effectiveness of such an approach. While one of our research goals was to discern general trends within ecosystem management over the last five years, it was frustrating to be unable to capture the details and the unique stories that each manager had to tell. The survey technique minimizes the ability to recognize that each EM project is unique, facing a different ecological, social, and economic situation, and therefore employing different strategies for addressing resource management. The project team did capture some of these details through interviews based on survey results, but because of the time required to analyze the survey results, these interviews were not as exhaustive as would have been ideal.

The survey technique was valuable in creating a catalogue of information regarding the generalized trends in ecosystem management over the last five years. However, the population size and information available often was insufficient to make statistically significant conclusions about trends or relationships observed, for example, the use of specific ecological outcomes tied to ecosystem-types, or the influence of specific federal programs on the management of resources at an ecosystem-scale. Further, each project being analyzed only had one respondent, and in most cases this respondent was a project manager. This approach was problematic in trying to capture an unbiased perspective of progress.

Because “ecosystem management” is a term that has many interpretations, cataloguing EM projects in order to derive a statistical sample set is quite a challenge. Many of the projects included in this study would not label themselves as ecosystem management projects, although they exhibit the majority of characteristics of an EM approach: an ecosystem-scale approach to resource management, a collaborative approach, utilization of adaptive management techniques, and consideration of the interaction of complex systems in making management plans. With no easily defined population, the administration of a survey to a random sample of projects is further complicated.

Future evaluations of ecosystem management will likely rely on a variety of techniques of data acquisition. For the projects that have participated in the 1995 and 1999 studies, a wealth of information on ecosystem-type, stresses, strategies, and progress to date exists. By looking to these projects and categorizing them along areas such as ecosystem-type, goal of project, and key federal agency involvement, trends specific to these areas may more easily be discerned. That additional analysis could assist future research groups in forming hypotheses to test on an expanded set which of EM efforts.

In addition, due to the diverse nature of ecosystem management in the US, a case study approach to testing and showcasing specific hypotheses might be more fruitful. With this approach, both “typical” EM projects and the exceptional cases can be analyzed according to hypotheses developed by future research teams. The development of case studies highlighting the activities of other project managers and their successes and failures in the field would also produce a set of tools for ecosystem managers interested in improving their approach.

SECTION V

Ecosystem Management Applied

Major Findings: Ecosystem-Based Management in the U.S. Forest Service

This case study explores change occurring in Wenatchee National Forest and it causes, as perceived by employees working at both the district and forest level. This study does not attempt to make broad assertions about change in the U.S. Forest Service or even change within the Pacific Northwest. It does, however, provide some interesting perceptions, observations, and learnings from employees *on the ground* in one National Forest. It also captures some useful lessons for practitioners of ecosystem-based management.

First, this study suggests that, to some extent, change efforts have permeated the ranks of the U.S. Forest Service to the ground level in Wenatchee National Forest. Interviewees cited improved stakeholder relations, increased inter-disciplinary collaboration, job functions which are increasingly aligned with ecosystem management, more science-based decision-making, and efforts to limit ecologically threatening management practices. At the same time, there were areas in which we might expect to see change but did not, including budget allocation for EM activities. It was also found that not all change is having the desired ecological impact. While timber extraction has been de-emphasized, recreation is thought by many to be having a serious impact on the resource base.

Perhaps one of the most interesting changes relates to the mindset of the district- and forest-level employee. Many employees are tired and frustrated with the agency, and some fear losing their jobs. This is a marked change from the can-do attitude that the agency was known for.

The major influences thought to be driving change in Wenatchee National Forest were primarily external, not internal, to the agency. Court cases, which led to the President's Northwest Forest Plan, were cited as the primary driver. If interviewees had not been asked about internal drivers, such as New Perspectives, it is not clear that they would have volunteered it.

That change came – or at least is perceived to have come – predominantly from outside the agency has important implications for the forest, and certainly throughout the region. In a recent talk at the University of Michigan, Undersecretary of the U.S. Department of Agriculture, Jim Lyons, commented, "No change is lasting unless it is internally driven." While internal change is clearly happening at some levels in the agency, as U.S. Forest Service Chief Dombeck's natural resource agenda provides evidence, the perceptions of many in the field are that this change is being propelled from outside the agency.

Finally, a number of factors were cited as facilitating and impeding a move toward ecosystem-based management at the local level. Stakeholder involvement, public collaboration, strong leadership and the willingness of individuals to create change were all thought to be factors helping Wenatchee National Forest move toward ecosystem-based management. Resource constraints were thought to be a major factor hindering progress; employees expressed a sense of not being able to carry out more ecosystem-based activities because of a shrinking workforce and declining budget. An over-emphasis on planning and under-emphasis on implementation also emerged as an impediment to progress.

Chapter 15
Ecosystem-Based Management in the U.S. Forest Service: A Case Study of the Wenatchee National Forest

INTRODUCTION

Ten years ago, U.S. Forest Service (USFS) Chief Dale Robertson articulated a vision and created an environment for change in the way national forests and grasslands would be managed with the announcement of "New Perspectives for Managing the National Forest System." The New Perspectives principles emphasized the importance of sustaining healthy, diverse and productive ecosystems, involving people as full partners in resources management, strengthening the scientific basis for management, and integrating all aspects of natural resources conservation through collaboration within the community of interests.[5] This vision reflects many of the key components of an ecosystem management approach, and suggests that the agency was beginning to embrace a more holistic resource management paradigm early in the EM movement.

Since then, the establishment of regional ecosystem offices, dramatically reduced timber harvest levels, and a natural resources agenda that restricts road-building and emphasizes water quality and recreation, suggest that the USFS is taking seriously the ecosystem-based approach to management.

While the agency has issued directives and policies based in ecosystem management ideas, it is not well understood to what extent the EM approach has permeated the ranks of Forest Service employees and created change at the local level. The research team sought to better understand on-the-ground change by speaking with Forest Service employees at the forest and district levels about ways that their responsibilities, activities, and attitudes have changed, if at all. In addition to understanding change that has occurred on the ground, the team wanted to understand the primary drivers of change.

A host of factors, both internal and external to the Forest Service, are thought to have driven this heightened emphasis on ecosystem-based management. In addition to New Perspectives, litigation, the President Clinton's Northwest Forest Plan, changing public values, and advances in scientific understanding have been cited as drivers of change in the agency. We wondered whether these factors were also thought to be driving change at the local level, and what other influences were facilitating and impeding the move toward ecosystem-based management.

Of particular interest to the team was the change occurring in the Pacific Northwest region of the United States. National forest management practices in the Pacific Northwest have been the subject of much public scrutiny, debate, and regulation over the past decade, and major efforts have been made to encourage ecosystem management practices in this region.[6] To explore these questions, in-person interviews

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[5] Kessler, Winifred and Hal Salwassar. "Natural Resource Agencies: Tranforming from Within." A New Century for Natural Resources Management. Eds. Richard Knght and Sarah Bates. (Washington, DC: Island Press, 1995). pp.171-187.

[6] Yaffee, Steven L. The Wisdom of the Spotted Owl: Policy Lessons for a New Century. (Washington, DC: Island Press, 1994).

were conducted with 15 employees of the Wenatchee National Forest (NF), primarily in the Cle Elum District. (See Appendix C for research methodology and Appendix D for list of interviewees by discipline.)

This chapter begins with an overview of the Wenatchee NF and the Cle Elum District, followed by a characterization of change occurring in the forest, a description of the factors thought to be driving the forest toward EM, and identification of other factors that have facilitated and impeded the move toward EM.

OVERVIEW OF WENATCHEE NATIONAL FOREST AND THE CLE ELUM DISTRICT

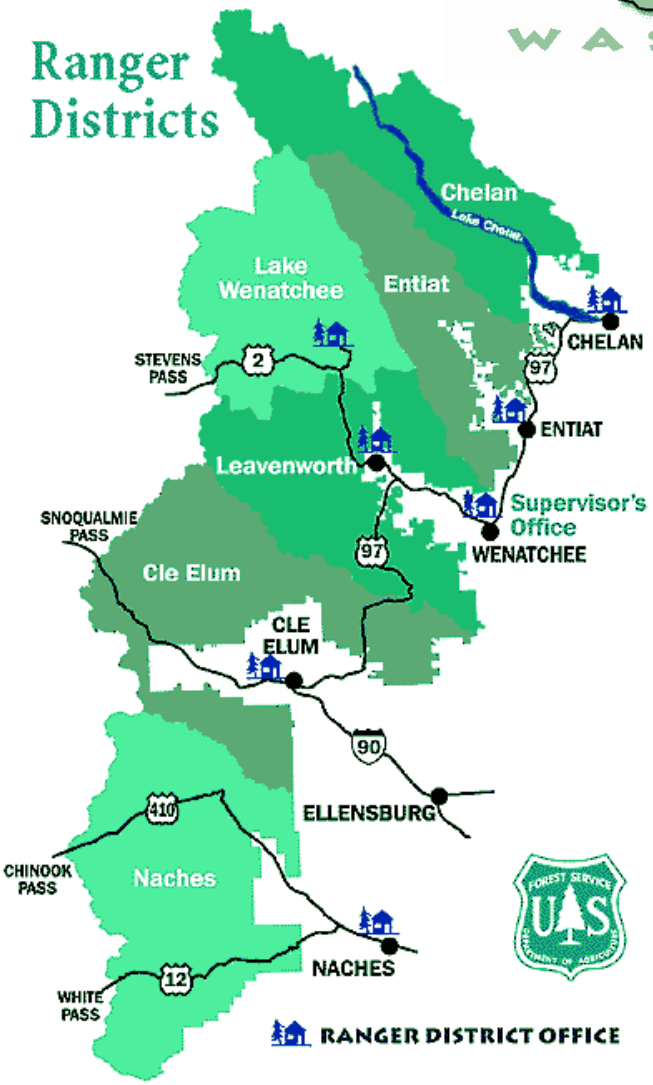
Wenatchee NF encompasses 2.2 million acres of central Washington, stretching about 40 miles east to west and 135 miles north to south along the east side of the crest of the Cascade Mountains. The vegetation varies with the elevation, from sagebrush and pine covered slopes at 2,000 feet, to higher elevation areas with alpine fir and mountain huckleberry, to the crest of the Cascade Mountain range at 8,000 feet, above where vegetation is sparse. Approximately 40 percent of Wenatchee NF is designated as wilderness.[7]

Recreation is a major influence on Wenatchee NF. There are approximately 5,000 miles of forest roads that provide access to campgrounds, trailheads, scenic vistas, woodcutting areas, berry picking areas, hunting areas, lakes, and streams. In the winter, snow-covered roads are used for cross-country skiing, snowshoeing, and snowmobiling. There are also about 2,500 miles of recreation trails available for hiking, horseback riding, trail biking, mountain biking, and cross-country skiing.

Cle Elum is one of six districts on the Wenatchee and covers 476,657 acres. The district itself is comprised of a broad range of forest ecosystems, including pacific silver fir-western hemlock forest, ponderosa pine, Englemann spruce, and lodgepole pine. While a substantial amount of land within this zone is National Forest, there is a sizeable area of "checkerboard" ownership, with privately owned parcels scattered throughout the district. The Plum Creek Timber Company owns most of the private land. There are several communities within a few miles of the ranger station, with populations ranging from 2,500 to around 12,000. Furthermore, the district is easily accessed by visitors from the Puget Sound metropolitan area, located just 80 miles west on Interstate 90. As a result the district is subject to one of the heaviest recreation loads in the region. An estimated 2.25 million visitors entered the Cle Elum Ranger District last year.[8]

[7] USFS web page. http://www.fs.fed.us/r6/wenatchee/recreate/recmain.html. (3/23/00).
[8] Telephone interview with Roger Skistad, Cle Elum District. April 5, 2000.


WENATCHEE
NATIONAL FOREST
CANADA
Washington
Montana
Oregon
Idaho
Nevada
California
OKANOGAN
EVERETT
CHELAN
SPOKANE
SEATTLE
WENATCHEE
TACOMA
ELLENSBURG
OLYMPIA
YAKIMA
TRI-CITIES
WASHINGTON


Ranger Districts
Chelan
Lake Chelan
Lake Wenatchee
Entiat
CHELAN
STEVENS PASS
ENTIAT
Leavenworth
Supervisor's Office
WENATCHEE
SNOQUALMIE PASS
Cle Elum
CLE ELUM
ELLENSBURG
CHINOOK PASS
Naches
NACHES
WHITE PASS
RANGER DISTRICT OFFICE

CHARACTERIZATION OF CHANGE IN WENATCHEE NATIONAL FOREST

We asked interviewees a series of questions about procedural, ecological, and behavioral change in Wenatchee NF, focusing on observations from Cle Elum District employees.[9] These changes are summarized in Table 15-1 below, with a brief description of the effect these changes have on the ability of the agency to implement EM and on the ability of the agency to function. (A "+" sign implies that the change has helped the agency, a "–" sign suggests that the change has hindered the agency, and a "0" suggests that the change has had no real effect in either area.) As shown below, while many of the changes are reflective of an EM approach, certainly some areas of change are unrelated to efforts to implement EM and in fact hamper it.

TABLE 15-1: SUMMARY OF CHANGE IN WENATCHEE NATIONAL FOREST

Area of Change	Effect on Agency's Ability to Implement EM	Effect on Agency's Ability to Function
Employee roles and responsibilities		
• Changing job functions	+ and –	–
• Changing workload	–	–
• Changing workforce	+ and –	–
Budget allocation	– –	– –
Employee mindset	+ and –	–
Management strategy and practices	+ +	0
Landscape ecological change	+ and –	0
Types of pressures on the resource base	+ and –	0
Changes in stakeholder relations and collaboration		
• Public outreach / involvement with user groups	+ +	+ and –
• Interdisciplinary collaboration	+ +	+ and –
• Involvement with agencies and public officials	+	+ and –
Decision-making	+ and –	+ and –

Employee Roles and Responsibilities

Job functions, workforce composition, the amount of work associated with different jobs, and the amount of time spent in the field have evolved over the past decade in Wenatchee NF, particularly at the district level. Some jobs have been virtually eliminated, forcing employees to diversify their responsibilities, while the demand for other functional areas has grown. For some employees, these functional changes coupled with a shrinking workforce have greatly intensified their workload.

Changing Job Functions: We wanted to understand whether the nature of people's jobs on the ground has changed over the course of ten years. Our focus was on the change in responsibilities associated with different job functions – not necessarily change in

[9] The time of Chief Robertson's New Perspectives principles was used as a baseline for change. While interviewees were asked to consider change since 1990, it was difficult to discuss more subjective indicators of change with a precise concept of time. At times, interviewees referred to change over periods longer than ten years.

one's personal duties, as those will naturally evolve with increased experience. That is, how has the role of a timber planner or a biologist on the forest changed?

Scientists, often referred to as "specialists" or "ologists" in the agency, have traditionally played support roles to other programs, such as the timber program or the roads program. Because of the changing emphasis on timber and other productive activities, the support roles of many ologists have changed. While they may still technically be classified as program support, the nature of the support provided is different in some cases.

For example, the support role of the geologist on the district has been affected by a de-emphasis on road building. Geologist Keith Kelly explains that for those geologists who remain, their job has gone from one of supporting road engineers with road stability improvements to supporting other management roles. This might involve conducting slope stability studies for a watershed analysis project, and working closely with hydrologists on sediment delivery issues. Kelly notes that this change in support roles puts new educational demands on the Forest Service geologist, shifting from a traditional engineering focus to one on environmental engineering.

Cle Elum District hydrologist Bill Ehinger has seen his focus shift from inventorying to restoration ecology.

> For me the job has evolved into more of a stream ecologist or a landscape ecologist… I came to the position with a background in forest hydrology. Specifically in surface erosion or road related erosion. And over time, with more of an emphasis on restoration and ecosystem management, I've probably switched more to stream restoration ecology; from more of a quantitative inventory of disturbance to more restoration.

The forest has also seen a consolidation of job functions resulting from a shrinking budget and a reduced emphasis on activities such as timber extraction. Elton Thomas, who for most of the 1990s worked in the Wenatchee NF Supervisor's Office as the Natural Resources Group Leader, explains:

> The big change that's occurred in this particular job is that when I came here in February of '91, it basically became a collapsed position of three former staff areas. One area had timber, one area had recreation, wilderness, and cultural resources, and the third area had fish and wildlife. The forest realized it didn't have enough funding. It had three staff officers and it only needed one. So they combined those various functions.

At the district level, fire fuels planner Gary Fudacz has also experienced a consolidation of duties. The work of the fire fuels planner is largely dependent on timber sales, which have declined in the Cle Elum District over the past decade. (See section "Management Strategy and Practices".) Fudacz, who has been with the district since 1966, explains that the duties of the fire fuels planner have been affected by the declining timber cuts and the increasing emphasis on science in resource management. While the number of projects he works on each year has declined, the amount of time spent writing a fuels prescription for a timber cut has increased.

> [As a fire fuels planner] your job was to go out on those sites… and work with a crew of silviculturists and a fuel prescription writer. We went out together in a lot of cases and reviewed stands and would come up with something we could work

> with in terms of a fuels prescription and a silviculture prescription and what to do with a particular stand…. [The responsibilities] haven't changed a lot. It's just that we have to do it a little more in-depth. I guess it was more common sense back then and now we're trying to get science into it…. [Around 1990] we were probably putting out four, five, six timber sales a year. We were doing a lot more fuel work. [Now] we're lucky to get out one.

Because of the decrease in demand for fuels planning, responsibilities for monitoring air quality were added to Fudacz's job in 1994. Cle Elum is one of three air quality measurement sites set up in Forest Service Region 6. Fudacz says his new responsibilities involve going to the air quality station once a week, collecting the filters, and sending them in for analysis.

Another major job function change in Wenatchee NF, according to Elton Thomas, relates to people in "staff officer" positions becoming "group leaders." He says that as a staff officer, one had a fairly narrow view of the world, so they were able to be more technically competent in and focused on a topic such as cultural resources. The staff officer knew the budget, the forest program, and the people working with the program at the ranger district level. They were very familiar with the changes occurring on the land. Furthermore, they were closely connected to their constituent bases: the timber staff was connected to the timber industry; the recreation staff was connected to a variety of user groups including snowmobilers, backcountry horseman, and hikers. Thomas explains how that role changed for him in his former job as Natural Resources Group Leader:

> [Staff officers] were the eyes and ears of the Forest Supervisor when they were out in the forest monitoring projects, looking at the accomplishments, seeing how the budget was spent… They were much more closely tied to the programs. The group leader on the other hand, is just that. I managed a group, and the group was basically a recreation wilderness group, a timber group, and a fish and wildlife group. And it was impossible for me to get technical expertise in any one of those, although my background and training would be more in timber and recreation than in fish and wildlife. I had more oversight of the budget rather than being really closely aligned with it. I don't get in the field nearly as much… I have to be more strategic in my thinking rather than tactical…. When I get calls from rangers on technical matters, I'm not able to answer them specifically – I have to refer them to the associates that work with me, who are still tied to parts of the program.

A final change in the functions performed by employees is an increasing amount of time spent planning versus implementing. This is a consequence of the environmental assessments and more rigorous planning requirements. Employees from different disciplines, including timber and wildlife, indicate that they are spending more time writing at their desks and less time in the field. Timber planner Bryce Cotton notes that environmental assessments have gone from 25 pages in length to over 300 pages, Illustrating the greater complexity and time associated with writing these documents. As a result, he estimates that the proportion of time he spends in the field versus in the office has gone from 70/30 to 30/70.

Changing Workload: For many employees in Wenatchee NF, the workload has greatly intensified. The work associated with conducting watershed analyses under the President's Northwest Forest Plan (NWFP) has had a tremendous impact on their responsibilities.

The district hydrologist explains that in addition to getting the existing timber contracts through, his responsibilities include supporting a larger scale landscape analysis of the district and the watershed analysis associated with the NWFP. There was a lot of work involved with finding and organizing existing data, and scrambling to supplement this data within a relatively narrow time frame; over the course of five years, they covered the entire land base within the ranger district. Fortunately, he says, his workload has diminished some with the recent completion of the watershed assessment studies.

District Ranger Catherine Stephenson says the workload has increased in part because the complexity of the task of putting a timber cut out has increased, as have the number of acres being treated. "Before you were producing timber to produce timber. You were going out and cutting a lot." She adds that now…"we don't have timber sales that don't really have some other purpose to them. We're designing them to treat conditions such as too many trees per acre, too small trees per acre."

Changing Workforce: In general, the workforce in Wenatchee NF is aging, getting smaller, and diversifying. It is aging because the forest has not been hiring many new employees, and many of those who remain are older. The number of employees in the Cle Elum District has shrunk from 72 full-time employees circa 1990 (with an additional 155 seasonal employees) to just 39 full-time employees in 1999 – a reduction of almost 50 percent.[10] This has been the result of attrition and the fact that fewer employees are staying on after reaching retirement age, as they had done in the past. One employee comments, "The loyalty is gone and people are basically fed up with the pressures… [Before] people would hang on. Now they say 'I'm out the door' as soon as they hit [retirement] age."

There has also been some diversification in terms of the technical backgrounds of employees and skills available, although much of this change began in the Cle Elum District before 1990. According to the District Ranger, there are more botanists, fewer foresters, and fewer engineers. Geologist Keith Kelly says that the number of geologists has dropped from one on each of the six districts to just three on the entire forest. To meet the needs of new programs in the forest, Kelly says that there has been some cross training of geologists in areas such as hydrology.

Budget Allocation

While the workload has increased over the past decade, the agency's budget has declined and many employees in Wenatchee NF have felt its effect. At the forest level, the annual budget allocation from the Regional Office decreased slightly from $34.2 to $30.9 million between 1990 and 1999, representing a total reduction of 10 percent. The Cle Elum District allocation from the Forest Supervisor's Office fell from $4.14 to $2.90 million during that same period, representing a total decrease of 30 percent.[11] The forest did experience a significant amount of fluctuation in the budget allocation over the decade, increasing for a few years in the mid-90s to $41.5 million, however this was largely the result of emergency funds received for fighting devastating wildfires that

[10] Telephone interview with Roger Skistad. April 5,2000.
[11] "Summary of Forest Allocations: Wenatchee National Forest." USFS database query for FY 1990-99.

struck the forest in 1994. With the exception of a few annual budget increases during this period, the district has observed a relatively steady decline in its allocation. Simply looking at the nominal dollar decline does not fully account for the real decline. It is important to note that inflationary pressure over ten years deflated the value of these dollars, and that the demands on the forest have concurrently increased.

While budget constraints are certainly not unique to Wenatchee NF, remarks by employees on the ground provide some interesting insight to the impact it has on their jobs. Many believe that the current budget is inadequate to allow them to perform their responsibilities, causing a great deal of frustration among employees, particularly at the district level.

One district employee expresses some dissatisfaction with the manner in which money trickles down from the Forest Supervisor's Office to the district, suggesting that the district personnel are feeling the budget crunch worse than those at the forest level.

Others commented that the district's budget does not reflect the change in priorities and practices occurring on the ground. One might expect to see increasing funds allocated to areas such as recreation and wildlife, and decreasing funds allocated to timber. This is not necessarily the case. The trails program leader says that his trails budget allocation has decreased, forcing the district to charge user fees at trailheads in order to provide for their upkeep. The roads budget has also shrunk, leaving an inadequate amount of money to maintain the 1200 miles of roads on the Cle Elum District. According to the District Ranger, the current budget does not allow them to maintain more than 200-300 miles of roads, and poorly maintained roads carry with them ecological risks.

At the same time, several interviewees indicated that timber continues to be the primary determinant behind district budget allocations. One respondent is somewhat baffled by the way money is currently allocated at the national level:

> I see a disconnect sometimes between what the natural resource agenda is and the money that gets put in the budget, and recreation is a prime example of that. Recreation is one of the four points on the Chief's natural resource agenda. And yet the amount requested [to Congress] in recreation actually went down in the budget…. Timber is still the driving force in terms of what we finance the ranger districts with… So while the way we're accomplishing things on the ground is significantly different, if you were to just look at the budget it would look exactly the same [as it did in the early 1990s].

This respondent further explains that most support functions, including wildlife and hydrology, are still tied to timber targets or other special uses, barring the freedom to use this money for things such as training.

Cle Elum District business manager Cindy Hester is hopeful that they will be able to overcome some of these budget allocation challenges with the implementation of an agency-wide financial reform effort called Primary Purpose. Under this new policy, the primary purpose associated with each activity will be used to identify the appropriate funding source. For example, if wildlife protection is the objective of a prescribed burn, then the wildlife dollars will be appropriated for such an activity. Hester explains that the agency received a critical opinion from a congressional review committee a few years ago, which has led to some of this change.

> We couldn't account for our real property and Congress suspected we weren't spending the money the way that they indicated we were supposed to be spending it. So we're getting this new financial system and we have a Chief Financial Officer now, which we've never had in the Forest Service before.

One USFS employee anticipates that implementing the new program could be difficult initially. This respondent explains that currently the biologists' activities can be funded in part with money earmarked for timber or other programs, but that under the new program this will not be possible. Unless the biologists' activities are properly funded at the outset of the program, it could be problematic for the first few years of Primary Purpose.

> The first couple of years are going to be very painful because some of those things won't get done. We won't be able to do them through the back door by using timber dollars anymore… If they want the district to do a biological study, they can't just send us $1000 for it… They're going to have to send the district several thousand dollars to do it, instead of making the biologists go and beg the timber program for some of their big bucks, which is what happens now.

Employee Mindset

Change is always difficult and this is particularly true when the course of change is not of an individual's choosing. Add to this equation a workforce that traditionally has prided itself in being independent with a "can-do" attitude, and the likelihood that people will struggle with change increases.

Not surprisingly, heavy work loads, declining budgets, shrinking workforce and increasingly complex management processes have taken a toll on many employees in Wenatchee NF. In general, interviewees expressed some sense of uncertainty about the future of their jobs, frustration with the change process, disappointment with the politicization of the agency, and stress induced by the heavy workload. A few individuals, however, expressed a sense of relief with the change that is occurring.

At the district level, some interviewees referred to a pervasive fear of employees losing jobs, although Ken McDonald did not believe that this was a concern at the forest level. Wildlife biologist Patty Garvey-Darda shares her observations of how this paranoia has affected some district employees:

> You get district employees thinking that we've got to get these timber sales out because if we don't get these timber sales out then it affects our livelihood. We lose our jobs - they surplus us or they're going to zone us with another district. We're going to get zoned with [the neighboring district] Naches and we'll lose our jobs. So it's kind of sad because you don't want people being paranoid about losing their jobs.

In addition to a fear of losing jobs at the district level, interviewees expressed an increasing sense of inertia and frustration with the change process. To better understand the impact of change on employees in Wenatchee NF, we asked them how their attitudes as employees of the USFS had changed over the course of ten years. It is not surprising then that a more complex and time-consuming set of procedural requirements has led to some frustration, particularly for those with a long history with the agency. As

previously noted, it takes more time and more planning to carry out a project. Environmental impact studies and analyses that took a few weeks to complete before now take up to two years to complete. Fire fuels planner Gary Fudacz shares his perspective:

> Results take longer. It's a longer process because of all the surveying and management… The wildlife stuff has kind of bogged everything down. I would say that in 1990 we were starting to go the other way in terms of things slowing down. But the Forest Service was always a 'can-do' outfit, and now it's almost like you can't do something… There's always an obstacle there… I mean [ten years ago] you went home feeling good that you got something done. Now you go home and you don't feel good because you didn't get anything done. You just spin your wheels.

Others are also frustrated with the change process and the impact it has on the agency's ability to function. In one employee's opinion, the lack of clear focus and sense of common mission has affected levels of trust and motivation among employees in the USFS.

> I'm disappointed with the way the Forest Service is right now. I'm disappointed how we operate as an agency. I am disappointed with the level of professionalism… I feel we've lost our ability to get things done. I thought of the agency as a group of people that were very dedicated, very much understood what their mission was – we were a timber producer out here. Set aside the fact that heavy cutting was the right thing to do because there are a number of us, myself included, that tried to point out that this was not sustainable forestry and we need to be making some adjustments… But that aside, we knew what our mission was, we had targets, we knew how to meet those targets. If you were to go out and start up a business, and you wanted to grab some people that you knew could help you get things done and make it work, no problem. You could have just gone right into the District Office and grabbed people that you would have been able to count on… Now we've gotten to a point where people don't trust each other. People don't have that motivation or dedication to the job.

Despite some of the dissatisfaction expressed with the change process, the District Ranger believes that many employees are embracing the EM mentality, and that it makes sense to them. She says that employees did not embrace the big clear cuts and huge timber production goals. Instead, she believes, "They tried to make it as light on the land as they could. They were doing what they thought Congress was telling them to do, and there was a great deal of dissatisfaction."

Much of this increased frustration of district- and forest-level employees seems to come from resentment that the USFS has been politicized over the past decade. One employee says that the behavior of Congress is what upsets him most: "Congress chastises us for things that they're saying we've done wrong, when they're the ones who write the laws that we have to abide by. We've been caught in a political arena, not of our choosing." He notes that one of the things he was most proud of when he began with the USFS was that it was the one federal agency that had not politicized. Now, he says, "It may be the worst."

Another district employee is not as frustrated with the change itself as much as the Washington Office's lack of attention to financial management over the past decade. This person said, "I'm excited about [the change] happening but I feel really angry that

they let it get so bad… Where are the people that should have been seeing that we were letting everything fall apart financially?" Furthermore, there dissatisfaction with the way some of the financial management changes have been communicated to employees, stating that employees on the ground were made to feel like they contributed to the problem.

One interviewee expresses frustration with the way change has been communicated to employees. Specifically, this person senses that Chief Dombeck is out of touch with people on the ground.

> I just wonder where our Chief is coming from a lot of times. He's a political appointee and I don't think he has a clue as to the caliber of people that are in the Forest Service, and their dedication. I don't think there are more dedicated people in any job, any place than what I've seen among our folks... When [Dombeck] first came in he was sending out all these memos and tapes we had to view. He was treating us like dummies… [He was sending us information about] how we should deal with the public, and interact with the public. I think we know how to do that on the ground. We've been doing it for a long time. And I don't see anybody that's not dealing with the public very professionally.

Other employees suggest that levels of stress associated with their jobs have increased from this change process. Timber planner Bryce Cotton says that the stress level induced by his work is unequivocally higher than it was ten years ago, and he suspects that people in other districts feel the same way. Not only has this been emotionally draining, but physically demanding because he is responsible for cruising a much broader area than before. That is not to say that the work was not difficult before. Cotton says that the 1980s were also an intense period because of the number of board feet being harvested and people being very focused on getting the cut out. However, there seemed to be a greater sense of interest in achieving a goal then, and a greater sense of camaraderie among employees. He suggests that somehow compensated for the difficult work. Today that sense of camaraderie among employees is diminished.

Management Strategy and Practices

At a strategy level, many interviewees believed that Wenatchee NF has made the shift toward ecosystem-based management. Elton Thomas, the former Natural Resources Group Leader, offers his perspective on the state of the organization's changing management philosophy:

> I would say we're not multiple use anymore. We're not implementing multiple use like we did at one time. Our timber program is much smaller. And that reflects a shift in values…. The whole philosophy [of ecosystem management] came about at the turn of the decade, and got us thinking more holistically and recognizing that other things were more important than outputs, and that let us focus away from targets and more towards...a desired future condition of the land… I think [ecosystem management] brought our collective attention to the notion that we deal with very complex systems, and that we were trying to simplify the forest with respect to clear-cutting and silvicultural treatment, and we were ignoring – just because we maybe didn't know what we were dealing with – how it all fit together.

Another Wenatchee NF employee corroborates this, suggesting that the concern of managers of this forest has moved from the sustainability of timber to the sustainability of ecosystems. He indicates that the Wenatchee NF's move to implement a dry site management strategy is reflective of this shift.

> I think from 1990 on we moved away from the previous planning efforts, which were really geared toward sustainability of timber harvest, to really looking at sustainability of spotted owls. But, when we looked at the dry site strategy, we were really talking about sustainability and restoration of what we call the dry site forest. And at about the same time, the push started for the President's Northwest Forest Plan, and some of the findings that we had in terms of the dry sites and the owl habitat on the eastern side carried over into the President's Plan, allowing flexibility for the restoration of those sites.

These comments seem to reflect a mental shift in management strategy from multiple use with a production focus, to one that focuses on ecological integrity at a landscape level. To some extent, people at the local level are speaking the same language as those in the Regional Office and Washington Office. But how well does this rhetoric translate into action? Have the forest and, in particular, the district changed their management practices on the ground?

Management practices in the Wenatchee NF have evolved in some areas over the past decade. Timber, grazing, and snag-cutting practices are a few areas in which employees have observed change. The scale of assessments has increased. Monitoring and research have also become more important management practices. Together, these provide evidence that words are translating into action to some extent at the local level. As discussed below, however, changes in management practices have come with mixed levels of acceptance from local stakeholders.

Since the late 1980s, the amount of timber offered has dropped dramatically across the agency, particularly in the Pacific Northwest. Wenatchee NF is no exception, with its timber targets falling from 153 million board feet (MBF) to 29 MBF between 1990 and 1999.[12] The Cle Elum District watched its timber offer slide from 33.9 MBF to 1.6 MBF during that same period.[13] Elton Thomas of the Supervisor's Office provides an overview of the change in timber targets for the forest beginning just before the turn of the decade.

> In the middle '70s on into the '80s we harvested about 225 million board feet of timber. The forest went through the preparation of the forest plan that was directed by the legislation for the [National] Forest Management Act. We completed our forest plan in 1990, and the planned harvest level at that time was 136 million board feet of timber. So there was a fairly significant adjustment between [that] plan and what we had been cutting. And then, following the Northwest Forest Plan amendment to our forest plan, which occurred April of 1994, we went down to about 25 million board feet of timber. They got that back up to 45 million board feet last year and we are down to about 39 million feet this coming year. So, we've been bouncing around a little. And the reason why we got it up some is because we finished all the process steps on watershed analyses and [environmental] assessments so that we could move some of our

[12] This figure represents an average timber offer for 1989 and 1990. The timber offer for 1990 alone was slightly skewed because of a large number of sales from 1989 that had been accounted for in 1990.
[13] Telephone interview with Kent Clarida, Wenatchee National Forest. April 2000.

> projects into LSRs [late-successional reserves] then treat the old LSRs to more adequately fire proof them.

A few employees indicated that the Cle Elum District has reduced its timber output more than other districts in Wenatchee NF. Historically one of the largest timber cut districts in Wenatchee, according to Bryce Cotton, it is now one of the smallest. This is due to much of the district land area being classified as Late Successional Reserve under the Northwest Forest Plan, and also the restrictions placed on it as an Adaptive Management Area. A district wildlife biologist is encouraged by this change, but fears that it will affect their budget allocation.

> Personally I think our district has been very receptive. We don't have timber folks that are trying to get the cut out. They've been very accommodating as far as what specialists think is the right thing to do. But because they've been accommodating we haven't been getting these big volume timber sales out, we will hear through the rumor mill that the Supervisor's Office isn't going to give us this timber money because we can't produce timber like the other districts.

Given that many other activities are tied to timber, including hydrology and wildlife projects, that is a big concern for the district. This basis for budget allocation could certainly threaten to undermine the district's management practices and steps toward ecological restoration.

Grazing on the district has also slowed significantly over the past decade, due to heavier restrictions being placed on grazing permittees. For example, stricter requirements keep grazing out of riparian zones. Despite the improved quality of the national forest lands that were previously grazed intensively, Ranger Stephenson worries that this new policy is having an adverse impact on the ecosystem. Because new permits are not being issued and much of the land where ranchers were grazing is no longer viable for this purpose, many have migrated to the foothills of the national forest. They are now seeing increased subdivision on private land as a result. So the ecological impact has merely shifted from public to private lands.

The reduction in grazing has come with varying levels of acceptance from the community and agency employees. One USFS employee, who is a rancher, does not believe that the district has paid enough attention to the social implications of these new policies. He says, "It's almost as if they're out for the cattlemen or the sheepmen. Somebody is out to get them. And they have to realize that those people are working, too. They supply dollars… to the local community as well."

A third area of change with respect to management practices relates to snag cutting. Snags in the Cle Elum District are thought to be essential to 62 species of birds and mammals for nesting, feeding, and roosting.[14] Timber harvest and firewood cutting have diminished snag populations. In 1993, a decision was made by the District Ranger to end snag cutting in the Cle Elum District. According to the Ranger, Cle Elum is currently the only district within the forest with this policy. The decision was made to stop cutting snags to put the district in line with other major landowners in the Yakima Resource Management Cooperative, of which the Cle Elum District is a member. At the time of the decision, the U.S. Forest Service had been the only member agency that

[14] "Questions and Answers on the Prohition of Snag Cuttting." Information sheet distributed by the Cle Elum Ranger District, Wenatchee National Forest. 1993.

allowed firewood cutting of standing snags. Ranger Stephenson elaborates on her decision to stop snag cutting in her district:

> We're simply out of the business on this issue. And that's a real sad thing for the public. [They think] if you're the National Forest and you're not producing firewood, what are you doing? And that was what I would call a "lone ranger" decision on my part. And there are some people who will never get over that. Public and employees both who think that I should never have made that decision. They tried very hard to change my mind.

Apparently, some of this discontent has lingered in the community. The fire fuels planner, who historically dealt with snag management, says that there are still people in the community that stop him at the gas station and express their frustration to him today – five years after the decision was made to stop allowing snag cutting.

A fourth management practice that has changed includes the use of technical and scientific information in management decision-making. Ken McDonald describes the forest's change as "becoming a bit more science-based as opposed to the seat of our pants." For example, use of GIS has greatly increased. There is also more frequent monitoring of recreation impacts on the forest; more photo points have been set up to document resource damage. One interviewee admits that the science did not always find its way into decisions about management activities. In the past, decisions were often made before the assessment. Now, decisions are based on the assessment.

> The decisions aren't made up front. I mean before with long documents…. you knew what you were going to do. So you wrote the document in that direction…. Not anymore. With these big planning areas, there's really no preconceived idea of where you're going to treat… Right now we try to gather all the information we can gather. And then there are decisions… And if we find snails, owls or whatever, you know – sometimes in the past when things were found, it was like, you didn't tell anybody. I mean it was kind of an unwritten rule – you didn't do it. Now it doesn't work that way. Sooner or later if you found it, somebody else will find it.

Whatever the incentive, science is working its way into management activities on the district, and that suggests a move in the direction of ecosystem-based management.

Still, at least one employee believes that the forest could be doing a better job of monitoring and applying an adaptive management approach. Geologist Keith Kelly indicates that too much emphasis on planning detracts from their ability to get into the field and monitor change. "I'm looking at one side of the coin," he says. "And I'm not able to still get out and make sure what we said on paper is going to happen."

Landscape Ecological Change

As observed in the broader study of EM projects across the US, ecological change in response to modified management practices can take time to see and understand. In fact, two of the most significant ecological changes at the forest level were caused by management practices carried out for decades before the agency turned toward a more ecosystem-based management paradigm. According to Vladimir Steblina, succession to shade-tolerant species on the forest has occurred from decades of fire suppression. Not only did this create a more dense forest cover in Wenatchee, it led to fuel build-up. Consequently, in 1994 186,000 acres of forest across northern

Wenatchee burned in a devastating series of wildfires. These fires had a remarkable ecological impact on the forest. The fires did not directly affect the Cle Elum District, which is situated on the southern end of the forest, although many district employees were called to fire fighting duty. For much of the northern portion of Wenatchee NF, however, the landscape was left charred. It is just beginning to revegetate.

Other ecological changes observed at the district level are perhaps related more directly to some of the change in management practices described in the previous section. Both the district hydrologist and timber planner have noticed vegetation changes resulting from modified timber practices and some of the district's restoration efforts. The quality of riparian areas and wet meadows has improved from efforts to reduce disturbances to them. The timber planner notices that second growth is coming up in former heavy cut areas that have been the focus of reforestation efforts.

Fire, Trails, and Heritage Resources Group Leader Jim Bannister also acknowledges that the district is seeing ecological benefits from harvesting less timber, yet he believes that the district's ability to fully benefit from its modified management practices is limited by its checkerboard ownership pattern and the management practices of its neighbors. He explains that Plum Creek Timber Company is doing a lot of cutting right up to the Cle Elum boundaries, "so that does have an effect on what we can cut in places, because we then become our brother's keeper. We're left holding the bag, so to speak, on some watersheds." Bannister does indicate that they have worked in collaboration with Plum Creek to manage this.

Type of Pressure on the Resource Base

The decline in timber and other productive activities on the forest does not mean that adverse ecological impacts on the resource base have disappeared. In fact, many interviewees from Wenatchee NF indicate that the source of pressures on the resource base has merely shifted. Recreation activity in Wenatchee has grown tremendously over the past decade. One employee believes that the ecological impact of recreation has surpassed that of timber extraction on the forest.

Because of its proximity to the growing Puget Sound (greater Seattle) area and the ease of access, more people are recreating in Wenatchee NF each year. One employee calls Wenatchee the "playground" of Puget Sound residents, and estimates that they have seen a three- to four-fold increase in the number of visitors over the past two decades. The Cle Elum District, just off of Interstate 90, is particularly vulnerable to this heightened use.

This change in recreation includes a growth in the number of users and the number of different recreational activities on the forest, as well as a change in the expectations and demands of users. Roger Skistad elaborates on this change:

> When I started working for the Forest Service in 1972, people camped, people did a little bit of hiking, they went hunting and fishing, bird watching, berry picking, and wood cutting. You could just about list on your fingers, you know, the things people did when they came to the National Forests. Now… users are becoming much more sophisticated in their activities. So, you could take snowmobilers and break them down into, four, six, eight, maybe ten different categories [based on] what these people are seeking. Cross-country skiers you

> can break down into… probably a minimum of four different kinds of users: people who don't want to see another person, they want to conquer the mountain; people who just want to go out and get a little exercise on the skis, go back and have a cup of tea and go home; and there are several variations in between. Likewise with jeeps, motorcycles, and horsemen. You can virtually take any recreation activity and then break down, within it, people who have entirely different expectations for entirely different reasons.

The activities have created an added financial obligation for the forest. According to Roger Skistad, "If you look at just snowmobilers, we went from a cost of $18,000 a year [in the early 1980s] to provide for their needs to now over a quarter million dollars a year to provide for their needs. If you were to pull figures like that for horses or hikers or other traditional uses, they would increase like that." Another financial burden relates to the heightened demand for services such as sanitation and waste disposal. The estimated 3000 visitors to the Cle Elum Valley on summer weekends leave behind an estimated 6000 pounds of waste every weekend.[15] This has created a serious human health and safety risk to campers and residents, according to the Ranger Stephenson. A number of stakeholders were consulted to come up with a solution to this problem before the district decided to charge a $5 per vehicle user fee for overnight campers to cover toilet installation and servicing costs.

Changes in Stakeholder Relations and Collaboration

Employees of Wenatchee NF and the Cle Elum District have witnessed a change in both the groups with whom they collaborate and the levels of collaboration with different stakeholders. These stakeholders include other agencies, politicians, the local community, small private landowners, private industrial landowners, and recreational user groups.

Public Outreach and Involvement with User Groups: Ken McDonald calls this increase in collaboration a major change for this forest over the past decade, and suspects there is more occurring here than on other national forests. He notes that this is related to people, organizational structure, and leadership. He also indicates that there has been a bigger push for public involvement and input in project planning, particularly on management actions that might be controversial.

The Buck Meadows watershed restoration project is one example that the District Ranger is particularly proud of for its interdisciplinary approach and stakeholder involvement. Buck Meadows is an important area covered under the Northwest Forest Plan, which is also quite popular among outdoor recreational vehicle (ORV) users. In an effort to restore the area and protect the riparian reserves, an interdisciplinary team was formed on the district in 1993. They began outreach to various local community and user groups in the Northwest, including the Yakama Indian Nation, environmental groups, hikers, equestrians, motorized vehicle users and hunters. Respondents to the initial solicitation for public involvement in the Buck Meadow project totaled over 200. Forest Supervisor Sonny O'Neal praised the team's ability to take these diverse viewpoints and turn them into a common vision. As a result of this collaboration, the

[15] "Cle Elum Lake Sanitation." Briefing paper prepared by Catherine Stephenson for district employees to help answer the public's questions regarding the new fee policy.

project helped to protect cultural resources, improve hydrologic function, riparian health and water quality, while providing more user-friendly recreation opportunities. The Cle Elum District received the Forest Service Region 6, "1997 Caring for the Land Award" for this effort, with collaboration cited as one of the principal reasons for its success. [16]

There is evidence that this increased stakeholder involvement is having a real impact on management activities. Public Services Group Leader Roger Skistad discusses how public involvement with the Buck Meadows campgrounds influenced end results:

> We were just in the process of building a trail here at the campground in Buck Meadows, and the users designed it. Our landscape architect [drew up] the design based on the environmental analysis…, which would have been signed off on. But the users said 'No, that's not what we want to see out there,' and completely redesigned the whole thing. In the process of doing public involvement, the public said, 'Wait a minute. We're not sure that we like this. We're not sure this is what we prefer to see out there.' And we said, 'Okay. What would you like to do?' So, they were directly involved.

The manner in which some people in the district communicate with the public has also changed, according to district hydrologist Bill Ehinger. Specifically, he has observed a change in the terminology used to communicate to different stakeholder groups how ecosystem management relates them.

> Because of the President's Forest Plan… we now have a tool in our back pockets to discuss how we manage to achieve this. So that's the biggest change. Instead of me just standing up and talking about aquatic resources or hydrology, I can now talk about a program that's aimed at achieving different things. And that I think can be beneficial in steering people.

Despite these advances, one employee believes that the district could do more effective public outreach with more adequate funding. "They haven't been giving us money for education and interpretation and I think that's something that we really need."

Interdisciplinary Collaboration: In some sense, there is a diverse set of stakeholders within the agency, as people in different functional areas represent different interests. Biologists might be more sympathetic to environmentalists, and timber planners might be more sympathetic to interests of industrial landowners. The level and nature of interdisciplinary collaboration is an important component of the move toward ecosystem-based management.

There is some indication that collaboration among district employees has increased over the past ten years, as tension between the specialists and the production-oriented employees has waned. Patty Garvey-Darda notes that in the past the biologists were often viewed as "obstructionists" when she brought up biological impact concerns in the past. She says, "there would be the perception that I was just trying to undermine the project." This dynamic seems to be changing. The timber program manager points out that his relationship with the specialists has improved in the last three years. He says, "There was always animosity, typically. And now it's a

[16] Nomination form for the 1997 "Caring for the Land Award." Submitted by Forest Supervisor Sonny O'Neal to the Regional Office.

different story. We drag [the specialists] out into riparian zones, and we say, 'Bill and Tina, here's the ribbon. Flag them out where you think they're going to go.' So there's a lot more trust."

The Buck Meadows project is also reflective of increased interdisciplinary collaboration. District Ranger Stephenson has noticed a dramatic change in her district and notes, "If you go back many years – even ten, but certainly longer – you had people just going with their heads down doing their work in their own functional area without having to coordinate or integrate with other areas… [Now] you don't do that."

Jim Bannister provides an example of how he has become more likely to involve others in project planning related to trails. "Fifteen years ago, I might not have done anything interdisciplinary to build a new trail… If we had a problem out there and needed to reroute a mile of trail, we just went and did it. Now you involve all of the folks that deal with something that might be affected."

While interdisciplinary collaboration has improved, Keith Kelly believes that many employees still lack a big picture, longer-term perspective.

> I think we're finally getting to the point where we're actually getting a little bit more interdisciplinary in the environmental assessments, [but] we're still a little bit locked into compromises. We butt heads departmentally. We haven't gotten to fully integrating enough to say that we're looking at the best solution. Too many people walk away and say, 'I lost today.'

Involvement with Agencies and Public Officials: Most interviewees say that collaboration with agencies and congressional staff has increased over the past decade. This is thought to be the result of both declining budgets, which can force people to rely on the resources of other agencies, and the heightened regulatory role of the U.S. Fish and Wildlife Service since the northern spotted owl listing in the late 1980s. Vladimir Steblina suggests that the change in agency collaboration is the most profound in terms of stakeholder involvement in Wenatchee NF. In his opinion, "There has always been pretty good collaboration with stakeholders and the public. I think what's changed since 1990 is our collaboration between different government agencies."

In at least one case, improved interagency involvement has helped to alleviate financial constraints on the district. Relations with the Interagency Committee for Outdoor Recreation, a state agency that assists governments in planning, acquiring, and developing recreation and outdoor resources resources, have strengthened over the past several years. The Committee is now providing the district with resources to support ORV activities. It funds three of the district's seasonal employees to patrol motorized recreation areas, as well as three seasonal county deputies. The group has also donated a Jeep to the district to help staff patrol its 100 miles of 4X4 trails.

District hydrologist Bill Ehinger does not believe that collaboration has improved with the Washington State Department of Natural Resources (DNR). The USFS had an opportunity to work collaboratively on the State's watershed analysis process, but funding and differing program objectives interfered. Ehinger explains:

> The state DNR came out with its own watershed process in 1992, and at that point in time the Forest Service knew that they were going to have their own process, but we were kind of dragging our feet in terms of participating in the

> DNR process. And that really drove a wedge between [the Forest Service] and private landholders because they wanted to get on with their process and the state's process. They wanted us to be a participant because we were a landowner in the basin. So there was a lot of frustration there. We tried for about a year to participate and in fact we weren't funded properly to do it. And there was some resistance from above to really be involved in it… [The watershed analyses] were time intensive and fiscal intensive modules to conduct. We wanted a broad-brush stroke. We were doing 200,000 acres and they were doing 20,000 acres.

Ehinger indicates that the failure to collaborate here was a real lost opportunity for Wenatchee NF hydrologists and fisheries biologists to learn, because the state had established such a rigorous training process that most landowners in the state were participating in with the exception of the Forest Service.

Decision-making

Because ecosystems are unique, there is no blanket approach called ecosystem management that fits all ecosystems or all EM projects. Ecosystems are complex and no two are likely to respond in exactly the same way to the same management practices. This makes it important that people who understand the ecosystems in which they work also understand the management objectives of an area and have proper input into the decision-making process. This is of primary importance to an adaptive management approach. We tried to understand whether decision-making within the agency had changed at all to reflect this need for ongoing local-level input to decision-making.

Historically, the USFS has been known for having a highly decentralized decision-making process. District Ranger Catherine Stephenson notes that the USFS has received a lot of criticism for this recently because national political leaders find it difficult to wield control over the agency. This has led to a shift toward centralization of the decision-making agency-wide over the past decade. As a result, Ken McDonald notes, the rangers have much less power today than they did in the past.

Within the district, however, decision-making is thought by some to be more decentralized than it was in 1990. This seems to be a function of the Ranger's leadership style. Stephenson elaborates on her approach to decentralized decision-making.

> I told all my interdisciplinary teams working on whatever project they are working on…that if they reach consensus, I will always do what it is they reached consensus on. Now if they can't reach consensus, I'll make the decision for them. I think that's been a pretty powerful motivator for them to reach consensus because I'm finding that now all of the projects are coming to me with consensus.

Despite this effort to decentralize, other factors seem to be interfering with the ability to derive real benefits from this approach. A key assumption behind the idea that decentralized decision-making is better aligned with EM is that people making decisions are informed about on-the-ground activities. However, because many decision-makers in the district are spending less time in the field, they are not able to make such informed decisions. Roger Skistad explains:

> I used to spend a day a week in the field with the crews. Working with them, seeing what was going on. It was a chance to interact on the ground – not in an office or meeting environment – to find out what their concerns were about the issues. And now I get out a couple times a year with the crews. So… we've kind of become detached from the ground… In order to do a good job of managing, you need to see it.

Instead, Skistad says, most of the input to his decisions comes from phone calls, letters, and "conversations with people at the gas station." They do not come from first-hand observations. In his opinion, that is not a sufficient basis for making management decisions. He believes that what happens on the ground has become disconnected from decisions that people writing the environmental impact studies are making.

> If we've got a project that requires an environmental analysis at some level… there are so many survey protocols and consultations with the Fish and Wildlife Service… that we have to do, but that has become extremely detached from what goes on in the field. The field people are making their decisions and those of us that are involved in [environmental analyses] are dealing with that, trying to kind of clear the way so things can happen. But it's really kind of disconnected. …. We used to say we were functionalized, but we were much more integrated and worked much more closely than we do now. There just isn't enough time. There aren't enough people to make all that process work. There's too much work to be done. And we have too many other protocols that need to be done.

PRIMARY DRIVERS OF CHANGE

The discussion above provides some evidence that the Wenatchee NF is moving in the direction of ecosystem-based management. Some forest employees argue that it has changed to a greater extent than others, but it is difficult to dispute that the management practices, strategies, procedures and the forest landscape itself are in some ways different from how they were in 1990.

What has caused this change in Wenatchee NF and within the Cle Elum District? At the national level, research on change in the Forest Service cites a multitude of factors leading up to Chief Robertson's 1990 New Perspectives announcement and the subsequent efforts to institutionalize ideas of ecosystem management. These pressures to reform resource management practices have come from both within and outside the agency. However, we were interested in learning whether employees *on the ground* perceived the same events and processes to be the primary drivers behind this move toward ecosystem-based management. Specifically, we wanted to know whether internal mandates or external forces were thought to be the primary drivers of change. Employee responses are summarized in Table 15-2 below.

TABLE 15-2: SUMMARY OF FACTORS DRIVING CHANGE IN WENATCHEE NF

Internal drivers	• New Perspectives principles • Forest leadership
External drivers	• Public appeals / litigation • President Clinton's 1994 Northwest Forest Plan • Devastating wildfires • Demands of the Puget Sound population

Internal Drivers

New Perspectives: The New Perspectives principles are thought by some to reflect a real paradigm shift within the agency, marking the agency's initial commitment to an ecosystem-based approach to resource management. Because of this, we asked interviewees directly what influence they thought New Perspectives has had on change in Wenatchee NF. Interviewees were asked to rate on a scale of 1 (little impact) to 5 (significant impact) the level of impact they thought Chief Robertson's New Perspectives program had on their efforts to move toward ecosystem-based management in Wenatchee NF.

A district geologist rated New Perspectives a 4, saying, "It was the kick off - I think the impact it has had to get things rolling – both the learning curve and the [forest planning] – was just phenomenal… I really feel it put the forest plan process light years out." A district wildlife biologist also rated it a 4, indicating that she had more power as an 'ologist' because of New Perspectives. She notes, "Before, as an ologist, I might have jumped up and down and said you can't do this. This is a unique wetland." With Robertson's new vision, she felt that she could point to New Perspectives and it gave some legitimacy to her ability to challenge management activities.

At the other extreme, the district hydrologist rated the impact of New Perspectives a 2. He indicates that its impact did not percolate down to the ground level.

> I think it set the framework for managers a level higher than the district level. In the Supervisor's Office, they probably changed when it shifted things around enough for those people… But, I think it somehow lost a lot of its momentum [at the district level]… I don't recall seeing any change in management… that came out of New Perspectives.

District Ranger Stephenson offers one perspective of why Robertson's vision did not have a greater impact:

> [New Perspectives] didn't have the power of regulation…You take the Northwest Forest Plan and all the standards and guidelines in it, and they are very prescriptive. There are not ways to wiggle around and do it or not do it. With New Perspectives you could have just gone on about business as usual, for a while at least. There wasn't anything prescriptive there... Everybody had a different idea about what it meant.

The majority of interviewees indicated that the New Perspectives alone may not have had a tremendous impact, but that it did provide the initial push that set the Forest Service on a course of change. Ken McDonald sums up this sentiment:

> Direct impact – I think it had very little. Indirect impact – I think it had a lot. It started the ball rolling, and it just progressed. I mean… it is hard for [the Chief] to change direction quickly, but he can allow it to be changed by setting the course. And if people *want* to change they have the freedom to do it. That's what New Perspectives did. It kind of opened the door. So in that way, I think it did something.

Roger Skistad agrees that New Perspectives really helped to get things started. He adds, however, "I don't think most people could go back and tell you what Chief Robertson said."

Both Elton Thomas and Vladimir Steblina of the Supervisor's Office indicated that the region and Wenatchee NF in particular were already on its way to change by 1990, when New Perspectives was announced. However, each indicated that New Perspectives made it easier for the forest to continue on this path toward ecosystem-based management. Steblina comments, "My initial response was a 1 when it first came out... But looking back... it made the move to the dry site strategy and addressing those issues much easier for us. In hindsight I'd probably rate it as a 5."

Forest Leadership: Leadership is a frequently mentioned factor enabling EM efforts. As discussed in the section below in "Facilitating and Impeding Factors," several interviewees in Wenatchee NF commented that Forest Supervisor Sonny O'Neal has been a very effective leader in the forest. District Ranger Stephenson indicates that O'Neal has been a primary driver behind change in this forest. Stephenson says of the Supervisor, "He is really responsible for the dynamics here - for this forest being the way that it is… This is a forest that allows dissident voices, dissent, differing opinions, diversity of views." She believes that this has really helped the forest to move toward an ecosystem-based management.

External Drivers

Interestingly, interviewees pointed to very few internal drivers of change. Instead, the drivers of change thought to be most influential were from forces external to the USFS.

Public Appeals / Litigation: Growing public interest and changing judicial interpretations of agency legal requirements fueled a number of acrimonious court cases between federal land management agencies and public interest groups. This increase in litigation over forest management practices in the Pacific Northwest began with the listing of the northern spotted owl as "threatened" under the Endangered Species Act. Numerous court cases since 1988 and the continued threat of litigation are both believed to be influences behind the USFS shift toward ecosystem-based management, particularly in the Pacific Northwest.

Interviewees in Wenatchee NF cited litigation as a major influence leading to changed management practices there. Catherine Stephenson believes that this litigation had an impact greater than any influence from inside the agency.

> I think that the biggest thing that moved us quickly there had nothing to do with the Wenatchee itself. It had to do with all the lawsuits and coming to a grinding halt in the late '80s and early '90s. And then having to build to the Northwest Forest Plan to climb out of the hole. That was the biggest thing that impacted the change. Just grinding to a halt.

District employee Jim Bannister offers a similar perspective.

> The courts are what have changed [us], and internal directives are probably the outcome of the court decisions. Yeah, so the internal directives are obviously leading us more towards the ecosystem-based management, but whether they

> would have happened without courts, I don't know… I don't think for the most part it's an internally driven thing.

District timber planner Bryce Cotton also believes that the single biggest impact on their timber harvest practices came from the spotted owl controversy around 1990. He adds that the Northwest Forest Plan then caused a further drop in timber production.

President's Clinton's 1994 Northwest Forest Plan: The President's Northwest Forest Plan was created in an effort to end the impasse over federal forestland management within the range of the northern spotted owl. The Plan established a framework and system of standards and guidelines using an ecosystem approach to resource management. The Plan addressed ecological, social, and economic impacts, and emphasized collaboration among federal agencies, states, tribes, and local governments.

Given that the Northwest Forest Plan is fundamentally ecosystem-driven, it is not surprising that interviewees considered this a major driver behind change in Wenatchee NF. Again, corroborating the idea that change would have been less dramatic without such external forces as the Northwest Forest Plan, Ken McDonald explains, "Overall I'd say the Forest Service is a hard sell… I think if it hadn't been for the Northwest Forest Plan, agency-wide [change] would have been a lot slower."

Interviewees mentioned two ways in which the Plan created a positive change: providing some of the money needed to implement change and by mandating increased collaboration. Having some funding attached to the NWFP certainly differentiates it from other EM efforts, such as New Perspectives. Patty Garvey-Darda explains how funding associated with the Plan has helped.

> It is all based on the funding… We finally started getting Jobs in the Woods [funding] so we could do restoration work. And, those [funds] are targeted towards trying to do things that will improve the hydrology, which has had an impact. It's had a positive impact on the ecology of the forest by improving wetland habitat and meadows and that type of thing.

While the Jobs in the Woods funding helped, many interviewees indicated that the money provided under the Plan was inadequate to carry out ongoing EM efforts.

A second way that the NWFP has helped move toward EM, according to Garvey-Darda, is by forcing the forest to work more closely with the U.S. Fish and Wildlife Service. She says that it has forced USFS employees in Wenatchee to get involved in planning earlier than they would have otherwise.

Devastating Fires: A third external factor driving change in Wenatchee were the 1994 wildfires. Three major wildfires burned more than 186,000 acres across the northern end of the Wenatchee. Thousands of residents evacuated their homes, tourism was shut down for months, and nearly $90 million was spent fighting the fires and 'healing' the land.[17] This had a devastating effect on the area Forest Service employees and the local communities.

[17] "Cascade Lookout." A publication of Wenatchee National Forest. 1999. p.6.

Fisheries Program Leader Ken McDonald says that the fires served as a big wake-up call to the USFS and the surrounding communities. He says the fires contributed to the forest being more science-based, looking more to fire records, and ultimately implementing a new management strategy for the forest – the dry site strategy.

> I think probably the biggest event that changed the Wenatchee as far as approach were those fires. Things were changing anyway, with the Northwest Forest Plan. But those fires really woke up a lot of people – that things are kind of screwed up. It was pretty traumatic for a lot of people…. There were a lot of people evacuated. It burned right down to [the city of] Leavenworth itself… That really started us looking at fire records and other things. So things had been changing before then. And people were more into this ecosystem thing. But I think that accelerated it on this forest – especially the science base. We're trying to be more science-based now.

Demands of the Puget Sound Population: Historically, the demands of the Puget Sound population have had a tremendous influence on the type of land use patterns seen in Wenatchee NF, particularly in its southern counties situated closer to the Sound. Vladimir Steblina suggests that the changing demands of people in these urban areas were a major driver behind the decreased emphasis on timber in Wenatchee NF. He explains that at the turn of the century, the region demanded from the forest hay to feed horses – prior to the development of the internal combustion engine – then it changed to coal mining to fuel the engines. Then, he believes, the demand for housing in the Puget Sound area led to a subsequent increase in timber harvesting from Wenatchee NF. Following this argument, it is not surprising that the increased population of the Puget Sound region and its inhabitants interest in recreational activities is driving some of the change occurring in the forest.

FACILITATING AND IMPEDING FACTORS

In addition to identifying key drivers behind change at the local level, interviewees were asked what other factors they thought had facilitated or impeded implementation of ecosystem-management in Wenatchee NF. As discussed below, in many cases facilitating factors and impeding factors were one and the same. The major factors observed by employees include:

- Resource constraints
- Stakeholder involvement
- Public outreach and education
- Strong leadership and vision
- Incentives
- Individual willingness to change
- Too much emphasis on planning and not enough on implementation
- Court appeals

Resource Constraints

Consistent with findings in the broader study of 84 ecosystem management projects, the majority of Wenatchee NF interviewees indicated that financial and human resource constraints were a major impediment to progress. When characterizing change related to the budget in the previous section, several interviewees had commented that their budget allocation was shrinking despite the mounting workload. Catherine Stephenson summarizes the challenge faced by her district: "I've got half the budget. I've got half the people. I've got twice the mandate in terms of complexity of work to do." She adds with a laugh, "One of the rangers up north says, 'We take our employees, we ride 'em hard and put them away wet.' And we've been doing that for years."

Not only is a general lack of funds for the district a concern, the line-item allocation of the budget is also viewed by many as an impediment to implementing more ecosystem-based management practices. Several interviewees mentioned that because timber is still driving budget allocation, other programs lack sufficient funds to do ongoing monitoring and ecological restoration work. Wildlife biologist Patty Garvey-Darda explains:

> So what's happened is at the same time they're telling us do ecosystem management, they're still giving all the money to timber and they're saying, 'You won't get this money if you don't get the cut out.' And so that's hard to do because all of a sudden we're not getting to decide what we think is the right thing to do as far as ecosystem management. We're still being told to get timber, to get the volume out… The budget has a very big impact on what we get to do out there… Wildlife and hydrology have just been really strapped and we are strictly support [to timber]. So it's like whatever recreation and trails wants to do, they need our specialists' input for their documents. So that's what our job is. We never get to do things that are [solely] restoration oriented toward wildlife or that type of thing.

Keith Kelly agrees that the budget's focus on timber has impeded change. Because it is not yet apparent that the district will get the budget needed to carry out activities other than managing timber, he thinks that employees are afraid to steer away from "business as usual." Kelly comments, "I mean there's still that subliminal message… 'If you don't produce you will eventually pay the price later… We won't need you.' That's the way federal budgets are rationed and always have been since at least the '60s."

Bill Ehinger thinks that budget allocation is a major impediment to carrying out team-based, interdisciplinary work in the district. He says the budget allocation issue "[is] this undercurrent that seems to undermine a lot of good programs or possibilities... Particularly the fact that it's so functional. And if we can overcome that, I think we'd see better teamwork on the district. We'd see more creativity. I think we'd probably be farther ahead."

Furthermore, the additional work associated with conducting environmental assessments has not been complemented with an adequate increase in funding and human resources to carry out the work. Fire fuels planner Gary Fudacz indicates that biologists tend to be particularly vulnerable to the increased science and monitoring requirements. "We've got three biologists here working and they don't seem to be able

to keep up. And so… managing all the requirements that are coming down, it just seems like – well, I wouldn't want that job. There's no way I'd want that job."

Utilizing volunteers has helped the district to deal with resource constraints, according to Roger Skistad, although it takes the time of employees to show volunteers what they are supposed to do and ensure that they have the right tools to do it. Working directly with user groups has helped manage this to some extent. Skistad explains, "[User groups] find key leaders within their own organization that can shoulder a lot of that responsibility. And one person from the Forest Service deals with one person from [the various user group organizations.]" So, it has helped to have a user group assume responsibility for managing the many volunteers.

Public Collaboration & Stakeholder Involvement

The study of 84 EM projects showed that stakeholder involvement was thought to be a key factor facilitating success of EM projects. In general, interviewees from Wenatchee NF sense that national- and local-level stakeholder involvement has been a positive thing for the implementation of ecosystem-based management. Others, however, suggested that local stakeholders were an impediment in some cases because they were more likely to be resistant to alternative uses of the forest. District Ranger Stephenson comments:

> In the West it's pretty interesting that many of the publics we deal with on a day-to-day basis and in our public meetings are folks who still believe very strongly in commodity production… There's this Western land ethic in Eastern Washington that focuses on commodity extraction and they're often not on the same page with our move towards ecosystem management. I think the vast support of the American people has helped us to move this way. Yes that has had an impact. It has allowed us to move forward. But where our ranger stations are located, you're not going to get that picture and many folks are not interested in collaborating with us to move toward ecosystem management. They would like to see us move toward more grazing, more timber harvest, more commodity production. When I put "roads" on the agenda for a public meeting here, there will be standing room only. And there will be angry people because if you want to close 100 yards of road, they're ready to fight.

A district biologist indicates that people around Wenatchee NF are accustomed to using the forest as if it were their "back yard," so when changes are proposed they tend to have a disproportionate influence. For example, when NEPA documents are issued, the local communities are most likely to comment on them, as they do not want to see their rights infringed upon. So by being responsive to public input, this employee believes the district is only getting local concerns.

The District Ranger points to the Cle Elum District's collaboration with the Yakima Provincial Advisory Committee as an example of how collaboration has helped the district move forward. She believes that the advisory group has helped to get the public on the same page as the agency. Two primary results of this collaborative effort have been increased awareness of the challenges that the USFS faces and an improved understanding on behalf of surrounding communities of how difficult it is to get a solution that works for everyone.

> When you talk about collaboration and where it has helped us, clearly I think these [advisory] groups have. The biggest strength of this is that we have people now from all walks of life who don't work for the agency but who understand the complexity of the issues that we deal with… You get these people who come on to the Yakima Provincial Advisory Committees or [other groups], but walk through the door and they have the answer. It's just that simple. Then they begin working with us on these advisory committees and we take them on field trips and we spend a lot of time with them. And they begin to see the big picture of what we're doing. Then they go out to the community and they are speaking for us because of their depth of understanding. And these are usually movers and shakers in the community to some extent, who can influence public opinion. At the same time, they are able to articulate the interests and perspectives of the public to us; to advise us about what they think the public wants us to do.

Timber planner Bryce Cotton believes that the broader set of constituents with which he works have brought a refreshing and important perspective to the planning process. In the past, stakeholder involvement meant working primarily with agencies and environmental groups. Cotton says that typically he could anticipate what each stakeholder was going to say. Now, with the increase in collaboration with ORV groups, horse groups and other recreationalists, input to projects is no longer "canned or standardized." Cotton says that this broader input has led directly changes in management practices and has created further openness to collaboration.

Public Outreach and Education

In addition to direct collaboration with stakeholders, a key component of EM rests in informing the public of the goals and activities associated with the project and managing public perceptions. Public outreach and education are important tools applied by project managers to accomplish this. Employees of Wenatchee NF suggest that public awareness of the issues surrounding USFS activities have both facilitated and impeded application of new management practices.

Hosting monthly meetings open to the public, posting proposed actions, and use of signs on trails or roads that may be modified are a few components of the forest's public education and outreach efforts. When asked about public outreach, however, most employees referred to agency-wide efforts to inform the general public; there was little discussion of local level outreach, beyond direct collaboration with stakeholders. This is not surprising as many of these public outreach efforts are mandated by the agency.

Roger Skistad says that people's knowledge and interests are much more sophisticated now, and that has helped to garner public support. "Even if they don't understand the concept, they're interested in the concept of ecosystem management. So that helps." Another employee believes that the lack of understanding on the part of the general public has impeded progress. Business manager Cindy Hester says it is this lack of support that is ultimately driving budget cuts. "I think that people in our country don't recognize how much money it costs to support things that are for the good of us all. User fees and things like that. We have this idea that they aren't worth paying for."

Bill Ehinger does not believe that the agency in general, or Wenatchee NF, have adequately explained to the public the change occurring within the agency over the past decade.

> I guess that by now I think the general feeling is that the public doesn't really know what the Forest Service is doing. And we've made no effort to take an ecosystem-based program outside of the dry site strategy. We haven't really gone to the public and explained what ecosystem management is. A lot of times we get caught up trying to produce products. I don't think we've adequately explained that to the public that there's been this change in the agency and this is now the mission… I think outreach to the public explaining the ecosystem-based approach to land management is a necessity.

Strong Leadership and Vision

Also consistent with findings from the broader study of EM, the interviewees from Wenatchee NF believe that strong leadership has facilitated the move toward ecosystem-based management. A lack of strong leadership and direction, on the other hand, was cited as an impediment to change. Bill Ehinger talks about the importance of leadership: "If you don't have the leadership that can articulate a common vision for ecosystem management which should come out of that process, then I think there's a certain tendency to backslide." Without the right leadership, he suggests, employees may find ways to carry on business as usual.

Regional Office / Washington Office Leadership: Some employees indicate that the Regional Office and Washington Office have impeded the move toward EM because they are not providing an overall regional and national direction for the agency. One interviewee says, "We don't have a common vision of what our mission is. We don't have a common understanding of where we're going or how to get there." He notes, "We've been riding the fence politically on a lot of issues trying to take the middle ground, and the Forest Service still hasn't really come out of that shell shock, [feeling that] we can go out and do something." Instead, managers are encumbered by a fear of getting "beat up" in court.

Another district employee agrees that clarity of objectives is lacking at higher levels in the agency. "We're still floundering I think, as an agency or at least as a region." He says that it is still not clear whether the agency will continue to be in commodity production in the future and where the Northwest will be relative to the Northeast U.S. The Regional and Washington Offices, he believes, need to better articulate a vision of where they are going to be in the future.

Forest Leadership: Several individuals indicated that the leadership of the Forest Supervisor, Sonny O'Neal, has facilitated the shift in management practices. Fisheries biologist Ken McDonald says of the Supervisor, "He has not only condoned people to work toward ecosystem based management, he has insisted on it." McDonald appreciates that the Supervisor supports the ecosystem-based approach to management but has not told people how to people how to do it. He adds that people are empowered to do their jobs in the Forest Supervisor's Office, in particular, because they are not over-supervised, and have a lot of leeway in terms of how they carry out their responsibilities.

The District Ranger associates the Forest Supervisor's leadership with the development of a strong science-based program on the forest. The collaboration with the Forestry Sciences Lab – an arm of the Pacific Northwest Lab – has improved over the last ten years, which she attributes to the Supervisor's strong leadership.

> All of that is Sonny O'Neal's doing. That was his vision. That's the way he wanted to run this forest… in partnership with science. This forest facilitates people taking leaves of absence, getting their Ph.D.'s. You used to think of scientists only being research people, but the view on this forest is the scientists actually apply it. Many of our employees are scientists.

A timber planner also indicates that forest leadership and support has encouraged a move toward landscape-level planning. He indicates that Sonny O'Neal "…has been a strong proponent of ecosystem management. It's really been pushed. I had some real concerns about trying to implement projects within large-scale areas. But actually after doing them, it seems to be easier."

Finally, O'Neal has been a strong backer behind the dry site management strategy – an approach that many interviewees believe is aligned with an ecosystem-based management approach. Vladimir Steblina says that his ongoing commitment to the dry site strategy for over five years now, has really facilitated its implementation.

District Leadership: An employee also indicated that district-level leadership has encouraged inter-disciplinary collaboration in the district – another important component of EM. Keith Kelly explains, "[The Ranger's] management style seems to be that you have to have a lot of crossover." She does not just reward people for "doing a darn good job," he says, but for working toward ecosystem management.

Incentives and Awards

Failure to align incentive and award systems with goals is a common reason that organizational goals are not achieved. In the Cle Elum District, employees have a history of receiving cash awards for helping to achieve district timber targets. Over the past few years, however, cash awards have tapered off due to some concerns expressed by employees about the basis for issuing them, and also due to heightened budget constraints. However, recognition is still an important means of aligning behavior with program goals in Wenatchee NF.

Employees indicate that incentives and awards have both helped and hindered efforts to integrate EM practices into the day-to-day management activities. Bryce Cotton says that he has received some recognition for his work on the environmental assessments. "District-wise, you get patted on the back, and the Forest Supervisor, and people come and they say you're doing a good job, and you get a nice letter…for the environmental assessments and for doing the work on the ground." He adds that it not the same, however, as it was in the old days when people were given large cash awards the more they produced.

Another interviewee does not believe that awards in any form have been adequately aligned with EM objectives.

> I don't see people who are doing restoration work being rewarded more than anybody doing any work in the compound. If somebody does something in the compound, helps pick something up in the parking lot, I think they're recognized as much as somebody doing something in the forest. So, I don't know if there's been an emphasis on it at the district level.

The Ranger says that she awards and recognizes people for collaboration and teaming among employees. She discourages what she calls the "lone ranger" approach – when an employee rides off on their own and carries out a project without the input of others.

> It's banned. The lone ranger approach is a bad thing. In fact, I teased for a while that I was going to give a lone ranger award, which would be like the dunce hat... We don't have it happen as much as they used to but now and then somebody will do something like that. And everybody else just gets so incensed. They're just furious when they see that kind of thing happen.

While she does not have large cash awards to give any longer, she thinks that recognizing employees for collaboration has been an effective means of aligning behavior with EM goals.

Individual Willingness to Change

Having dedicated and committed individuals has been cited as a key facilitator to implementation of EM. This holds true for Wenatchee NF as well. Bill Ehinger explains that while having strong leadership is important, it is not enough. The individual also needs to embrace the change.

> I think that has probably been the biggest downfall – that it kind of falls back on not just the district rangers, the district leaders, but having enough individuals within the staff that all want to see it happen, that all have kind of a stake in the success of the ecosystem-based approach. So it gets back to each individual's values. And if it's not something the individual values and it's not something that's being championed by somebody leading the district then the chances of it happening are slim.

Roger Skistad believes that employees have had the will to change management practices for some time. He thinks that the bulk of the employees thought the agency was cutting too much, too fast when they were on that "clear-cut harvesting freight train" in the late 1980's, and was in need of a more realistic approach. Despite some employees feeling discontent with the previous path, Skistad acknowledges that change has been difficult for some, and there will always be some resistance.

Emphasis on Planning vs. Implementation

As discussed above, the nature of the planning procedures and the time it takes to plan have increased dramatically over the past decade. Such procedures are rooted in efforts to help managers plan more carefully and make more ecologically sound decisions. Ironically, some interviewees mentioned this as an impediment to ecosystem-based management. Keith Kelly explains:

> We produce a lot of planning documents. We don't produce a lot of end results of those planning documents… From my scope of things, it's getting harder and harder to see on-the-ground accomplishments because we're spending so much more time indoors, going through some of the management plan designs with a hope of saying 'Well, now that we've gone through our watershed assessment, maybe we can get back to work and accomplish some of the suggestions in those watershed assessments.' We are doing some, but we're not probably accomplishing as much because it seems like we're getting ready to go into another planning phase. And so we're sort of leaving things half done.

Roger Skistad also expresses some frustration with the complexity of the process. He has been with the agency since 1983 and knows the agency inside-out, yet "If someone says take a piece of paper, and write down what it takes to get a project from start to finish, I couldn't do it." He believes that people lose sight of the purpose of the activities because of the complexity of the protocols, and this impedes progress toward reaching EM goals.

Court Appeals

Although cited as a major driver of change in Wenatchee NF, Jim Bannister believes that court appeals have served as an impediment to EM, because it has driven up the costs associated with management activities and limited their flexibility to make management decisions that make sense.

> I'd say we're doing very little in the move toward [ecosystem-based management]. And I don't think that's really anybody's fault so much as, we're looking at the court's interpretations of everything and it really doesn't allow us a whole lot of room. I think what it has done is made everything we have to do so prohibitively expensive to get to the point where we could cut a tree… because of the multitude of surveys we have to do.

CONCLUSION AND RECOMMENDATIONS

This study suggests that change has occurred to some extent in Wenatchee NF. These changes have affected both the agency's ability to implement EM and its ability to function. Change – or the lack of change – related to budget constraints, demanding workloads, and employee morale have had some negative effect on efforts to shift toward EM. Change related to resource management strategy and practices, as well as collaboration and stakeholder relations, are thought to have had a more positive effect on Wenatchee NF and its ability to implement EM. That change is perceived by interviewees to be driven by forces external to the agency has important implications for the agency.

What does this mean for the U.S. Forest Service? How might future efforts to implement EM more effectively permeate the ranks of agency employees to the ground level? In light of this analysis of change in Wenatchee NF and its causes, the following recommendations might facilitate continued efforts to implement EM.

Dedication of Resources

The lack of money, staff, and time are continuously cited as factors that undermine EM efforts. In Wenatchee NF insufficient resources have led to onerous workloads for employees and a diminished sense of workforce morale.

Long-term sources of funding are critical to effectively implement EM. Ongoing monitoring and science programs demand a steady source of funding for staff to carry out adaptive management. At the regional and forest levels, multi-year funding should be committed to forest- and district-level ecosystem-based management projects. At the local level, user fees might be applied for different recreational uses in order to offset the heightened costs associated with recreation. While there may be some public opposition to user fees, public outreach and education explaining the basis for change can help to mitigate this opposition.

In addition to the amount of money, the line-item allocation of funds at the forest and district levels is important. Money might be best allocated to a defined place or ecosystem, rather than strictly to functional areas. By having funds dedicated to a watershed project, for example, and linking individuals from different functional areas to this budget item, it will help to ensure that allocated funds are being used for what they were intended and encourage interdisciplinary collaboration. The timber line item in the budget should not be a convenient "holding pot" for money intended to be spent on a watershed or stream restoration project, as some employees have indicated currently happens.

Leadership

Leadership and the dedication of individuals have been cited as key factors facilitating the implementation of EM. Employees who value and embrace EM ideals such as interdisciplinary collaboration, stakeholder involvement, and science-based input to decisions should be charged with leading EM initiatives in the forest and district. These leaders should be given ample discretion to manage local processes and make informed decisions.

Aligning Goals and Incentives

Employee incentives and rewards must be tied to EM objectives. The challenge is that EM objectives may not always be defined and measured in a clearly tangible way. "Implementing EM" is not nearly as tangible an objective as "extract 1.6 MBF of timber in 2001." To the extent possible, clear, measurable, and realistic goals aligned with an ecosystem-based management approach should be laid out in an annual employee goal and work plan process. These should include ecological goals as well as those that are procedural in nature, such as building stakeholder relations. It should be considered that many of these procedural goals are necessary intermediate steps to many ecological goals. For example, "identify stakeholders affected by changes to Cle Elum Lake access and hold first stakeholder meeting by June 2001" might be an intermediate step to a longer-term objective of "reduce the ecological impact of recreation on the lake."

It is equally important to ensure that goals are being met in the employee performance evaluation process. When supervisors acknowledge fulfillment of EM objectives and make sure it is understood how an activity meets EM objectives, employees will be more inclined to continue the push toward EM. Such successes should be held up as examples of positive change in the direction of ecosystem-based management. This process of identifying and clarifying expectations and recognizing when expectations are met can help to increase trust, reduce frustration, and improve employee morale.

Finally, it is important to allow flexibility in the way employees achieve their EM objectives. There is no formula for effective EM; creative approaches are encouraged and necessary to dealing with complex resource management challenges. Creating an environment favorable to innovation in problem solving can facilitate the development of effective management solutions within the agency. When a suggested management action comes from inside the agency, it is almost always easier for employees to embrace than when it comes from outside the agency. By establishing EM goals and enabling employees to create their own path to achieving that goal, we increase the chance that change will be lasting.

Planning AND Implementing

Adaptive management might be succinctly described as a process of planning, implementing, and adapting. While adaptive management is held up as a central tenet of the agency, many interviewees indicated that follow-through is lacking. Several Wenatchee NF employees expressed frustration with their inability to get beyond planning due to inadequate resources and cumbersome planning processes.

As mentioned above, implementation activities, including ongoing monitoring and research, must be built into EM project budgets and employee goals. It is paramount that some of the planned activities are carried out and monitored to determine whether the management activity is effective. This information is also relied upon to justify future EM funding.

Small, manageable pilot projects can be an effective means of ensuring that plans are actually implemented. Pilot projects also allow employees to see results early on in an EM project, which can help to boost morale.

AREAS FOR FURTHER RESEARCH

The importance of relationships and trust building to successful EM efforts has been emphasized throughout this study. It is largely the people within the organizations, not the organizations, that make EM work. While not mentioned as an explicit impediment to progress by project managers in the larger study, the “promotion-by-relocation” practice of the USFS could potentially threaten the development of these relationships.

An employee of Wenatchee NF commented that this practice of relocation has decreased dramatically, driven primarily by the cost involved in relocating employees and the downsizing of the agency. As employees leave the agency, often their positions

are not filled. A future study might explore whether this changing policy has had a positive effect on the contribution of USFS employees to the EM initiatives in which they participate.

Major Findings: Implementing Ecosystem Management in State Agencies

This series of case studies examines efforts to implement ecosystem management in state natural resource agencies. Three agencies were selected for analysis: the Missouri Department of Conservation, the Florida Department of Environmental Protection, and the Minnesota Department of Natural Resources.

All three agencies examined have made considerable strides toward developing regional or ecosystem-based systems of natural resource inventory, monitoring, and analysis. They have also instituted program planning and implementation at a regional or ecosystem scale, often focusing on watersheds or other well-defined landscape features.

The case studies illustrate both a range of strategies for implementing EM and a range of implementation failures and successes. State EM efforts have failed or faced serious implementation difficulties both because of external opposition by stakeholders—property rights activists in the case of Missouri—and because of internal resistance to the initiative by employees within the agency—as was at least partly the case in Florida. Implementation successes have occurred at various scales and with respect to differing levels of planning and management. In Missouri and Minnesota some level of ecoregional planning is now standardized within the agencies. In Florida, the fate of EM in the agency as a whole is unclear, given a recent turnover in the state administration and reorganization efforts within the Department of Environmental Protection. However, a number of the EM programs established under the broad-scale EM initiative begun in the early 1990s have taken root in particular regions of Florida and will likely persist in the future, with or without strong leadership from agency headquarters.

Chapter 16
Implementing Ecosystem Management in State Natural Resource Agencies

INTRODUCTION

This chapter examines the development of ecosystem-based management in three representative state natural resource and environmental protection agencies. It examines both the internal organizational structure of these agencies (including bureaucratic structure, chains of command, and established norms of action) and the external institutional environments in which these agencies are situated and by which they are affected. Factors making up the external environment include the political forces that crafted enabling legislation and that fund the agencies, the interagency and intergovernmental dynamics between federal, state, and local units of government, and the influence of elected officials, interest groups, and the press.

The case studies begin by providing an overview of the agencies' basic organizational structures and the goals that traditionally have defined their missions. Through a review of planning documents and a series of interviews with state officials and other participants in the planning process, they then outline the proposals these state agencies developed to initiate a shift to ecosystem-based management. The case studies then turn to a review of implementation strategies and to an evaluation of the successes and difficulties encountered to date. A final section provides a series of recommendations to ecosystem managers and policy makers based on the findings of the case studies.

BACKGROUND

In recent years, many state environmental and natural resource agencies have begun shifting away from traditional management practices to ones based on the concept of ecosystem management. A 1995 study initiated by the U.S. Environmental Protection Agency and the Florida Center for Public Management determined that forty two states have some form of place-based or ecosystem-based management programs operating in at least one of their state environmental or natural resource management agencies.[18]

In political terms, the development of state-level EM initiatives has paralleled and probably derived impetus from the range of more general experiments in government that Osborne and Gaebler identify in their influential book Reinventing Government.[19] For example, some of the key concepts that these authors identify, and which inform EM as well, are decentralization of decision-making and management, increase of local community involvement in government processes, focus on outcomes rather than procedures, development of non-regulatory alternatives to traditional regulatory

[18] State Environmental Goals and Indicators Project, "Survey of Environmental Management Activity in State Environmental and Natural Resource Agencies," www.fsu.edu/~cpm/segip/survey

[19] Osborne, David E. and Ted Gaebler, Reinventing Government: How the Entrepreneurial Spirit is Transforming the Public Sector. New York: Penguin, 1992.

programs, and a shift from crisis management to the development of proactive solutions to potential problems.

State-level experiments with EM have been fostered by a host of more specific factors and forces. These include:

- A continued move, as a result both of external interest group pressure and internal developments within agencies, away from one-sided consumptive-use and extraction-based management regimes to more environmentally sensitive and broad-based management paradigms

- A recognition that states contain large, landscape-level natural systems (ecosystems, bioregions, watersheds) whose boundaries can and should be used to define management units and program activities

- An awareness that larger management units bring about the need for multi-party and cross-jurisdictional management plans

- A wish to use the extensive networks of state offices and staffs with direct experience dealing with multiple stakeholders (federal officials, local government officials, industry groups, recreational users, environmental organizations, etc.)

- A desire to move away from confrontational politics and protracted legal battles and to experiment instead with proactive processes of collaborative problem-solving

- A shift from command and control approaches to environmental regulation to market-based approaches relying on tradable permits, tax credits, and other economic incentives

- A willingness to experiment with adaptive management, i.e., to treat management plans and agency programs as works-in-progress that need to be modified as their weaknesses and failures become known in implementation

The rise of EM in state agencies has also probably been stimulated, at least indirectly, by the general increase of authority and activity by state natural resource agencies over the past fifteen years. The Council of State Governments estimates that between 1986 and 1996, government spending by states on environmental protection and natural resources (including EPA funds delegated to states) increased 140% from $5.2 billion to $12.5 billion. Staffing of state environmental protection and natural resource agencies also increased dramatically, with total work-years by employees increasing from 38,000 in 1986 to 61,000 in 1996.[20]

The hiring and advancement of professional staff over the last twenty years have also had a significant impact on the internal cultures of many natural resource and environmental protection agencies. As “new blood” has entered into and risen through the ranks of agencies, so too have interdisciplinary and larger scale approaches to natural resource management. Much as the National Environmental Policy Act (NEPA),

[20] Brown, R. Steven, “The States Protect the Environment,” Council of State Governments (Lexington, KY). http://www.sso.org/ecos/statesarticle.htm (7/27/99).

through its statutory requirement that federal agencies use an interdisciplinary approach when assessing the environmental consequences of proposed projects, transformed the internal staff composition and planning processes of federal agencies, so too have state natural resource agencies been reshaped by hiring and advancement patterns over the last twenty years.

These changes are due in large part to shifts in the educational institutions that train natural resource managers and scientists. These institutions are the primary pathway through which new scientific research and new information technologies are disseminated through the ranks of policy makers, planners, program managers, decision-makers, and field scientists. Ecosystem-level approaches to understanding the relationships between biota and the abiotic processes that sustain them have assumed an increasingly dominant place in the curricula of forestry, wildlife and fisheries, and natural resource management programs.

Concurrently, landscape-level information technologies that use high-resolution remote sensing data and the powerful integrative and analytical tools of computerized modeling and geographical information systems (GIS) have transformed the way managers understand and visualize the landscapes they manage. These systems have enabled new and more effective modes of information sharing between agencies and new means of disseminating information to the public. In the social sciences, ecological economics, more expansive conceptions of cost-benefit analysis, new models of collaboration, environmental systems theory have introduced theoretical paradigms that understand natural resources as embedded in complex natural and social systems. Increasingly espoused in the universities and departments that train resource managers, these paradigms have influenced a new generation of management professionals interested in translating the theory into practice.

The larger study of which this chapter forms a part has consistently emphasized how important collaborative partnerships between diverse agencies and stakeholder groups are to the development and implementation of long-range, ecosystem-based natural resource management. Most of the EM projects examined in this study have been collaborative ventures undertaken by multiple organizations and agencies. Participants have devoted considerable energy to dealing with the organizational dynamics of their projects and have often measured project success, at least initially, in terms of institutional achievements related to increased trust, improved communication and understanding, and the establishment of decision-making structures.

When examining multi-party ecosystem management projects, there is a tendency to treat government agencies as individual entities with relatively unified and coherent agendas. Closer examination almost always reveals, however, that large government agencies have complex, even fragmented, structures and agendas. Different divisions of the same agency frequently pursue goals and objectives not only in isolation from one another, but sometimes even at cross-purposes.

In the realm of natural resource management and environmental protection the situation is no different. Many state agencies have media-based organizational structures that have evolved, on the one hand, through the institutionalization of different kinds of disciplinary expertise (forestry, fisheries, etc.) and, on the other hand, through consolidations and mergers with previously independent agencies (fish and game, forestry, waters, etc.). What often results is an organizational structure in which forestry,

fisheries, and wildlife divisions, in the case of natural resource agencies, and air, water, and waste divisions, in the case of environmental protection agencies, work more or less independently of one another. For these reasons, state agencies seeking to implement ecosystem management within their organizations often face many of the same challenges that multi-party initiatives do. They need to develop lines of communication, work across disciplinary divides, break down long-standing forms of misunderstanding and mistrust, and create workable procedures for planning and implementing programs across traditional administrative and jurisdictional lines.

METHODOLOGY

Three case studies form the heart of this section. In each case, the development of ecosystem management policies at the state natural resource agencies are first described in detail and then an evaluation of the agency's progress toward implementing these policies is provided. The three agencies examined are the Florida Department of Environmental Protection (DEP), the Minnesota Department of Natural Resources (Minnesota DNR), and the Missouri Department of Conservation (MDC).

Data for the case studies was gathered from two principal sources: written documents and questionnaires/interviews. Written documents for the study consulted included memos, policy documents, and public information announcements as well as newspaper articles and relevant scholarly studies. Additionally data was obtained via telephone interviews with select agency staff and other individuals knowledgeable about these EM initiatives. The telephone interviews, focusing on implementation strategies and outcomes, were conducted with 11 agency administrators and central office managers and independent observers intimately familiar with the EM initiatives.

Prior to conducting the interviews, a series of questions were developed in order to isolate the most important issues to be analyzed and to lend consistency to the interviews and research:

- What agency is the EM initiative housed in? What is the mandate and relative power of this agency relative to other agencies with authority over natural resources and/or environmental policy?

- How, in general terms, does the agency define ecosystem management? How are these definitions made explicit in planning documents?

- Why has ecosystem management been taken up by state natural resource agencies? Is there a legislative mandate behind these efforts?

- What specific reorganization plans have been developed in order to implement new EM policies (budgeting, reassignment, personnel, shared responsibility)?

- What shortcomings in management practices is EM meant to redress?

- How have agencies reconceived and remapped physical parameters of management area? Does the concept of EM set out by the agency require redefinition of existing management units? (e.g. from media-based divisions to place-based units or ecoregions?)

- What is the impact of the adoption of EM on the organizational structure of the agency? Have new divisions/offices been created? Have new staff been hired or existing staff reassigned? Have budgeting schemes and priorities been altered? Have pilot programs been established? Is new scientific research being conducted?

- How have agencies managed the external social and political environment – other federal, state, and local agencies; business and industry groups; citizen groups (environmentalists, sporting interests, property rights advocates, etc.); the media—in their efforts to implement EM?

- Have the agencies conducted internal training sessions in EM? Have they made concerted efforts to educate the public about EM?

- How have agencies dealt with internal resistance to change and developed incentives to facilitate acceptance/lessen distortion of new policies?

- Have agencies encountered serious external resistance to their EM initiatives from interest groups, politicians, or other agencies?

- Have agencies made efforts to involve industry and citizens' groups in voluntary, non-regulatory conservation programs?

The case studies that follow all emerged from an effort to find answers to these questions. But they tell three very different stories.

CASE STUDY ONE: MISSOURI DEPARTMENT OF CONSERVATION

INTRODUCTION

The Missouri Department of Conservation (MDC) introduced its Coordinated Resource Management (CRM) program in the early 1990s in an effort to create a long-term, statewide, multiparty, ecosystem-based framework for conservation planning. Developed primarily as a planning mechanism for preserving biological diversity, CRM aimed to bring together and coordinate the activities of a large number of state and federal natural resource and environmental agencies. CRM also stressed the importance of citizen participation and called for educational outreach programs.

CRM, however, never developed much beyond the planning stage. The program was discontinued in 1997 as a result of what some – including the current director of the MDC – believe was an orchestrated misinformation campaign waged by local and national property rights activists.

After tracing the origins of the CRM initiative, this section examines MDC efforts to implement the program and the ultimately insurmountable difficulties they encountered as a result of external opposition. Despite the termination of its higher profile initiative, the MDC has persevered with ecosystem management. This case study also investigates how, in recent years, MDC has developed and implemented a smaller scale and primarily internal ecosystem-based planning and management effort.

AGENCY ORGANIZATION

Missouri's natural resources and environmental polices are managed and directed by two separate agencies: the Department of Conservation (MDC), the primary management agency, and the Missouri Department of Natural Resources, the regulatory and environmental quality agency. Established in 1937, the mission of the MDC is to protect and manage the state's fish, bird, game, and forest resources and to facilitate the public's use and enjoyment of these resources. The MDC is a non-regulatory agency except for enforcement activities related to the state's fish and wildlife codes. A four member, bipartisan Conservation Commission chosen by the Governor oversees the activities of the MDC and appoints the agency director. Funding for the MDC derives primarily from the sale of hunting and fishing licenses and the state sales tax with an additional fraction coming from federal sources.

The MDC has seven divisions: Forestry, Fisheries, Wildlife, Natural History, Protection, Design and Development, and Administrative Services. In addition to its central administrative office in Jefferson City, the MDC maintains ten regional offices through the state. The ten regional offices are defined primarily by political (county) boundaries, so the degree with which natural divisions on the landscape are incorporated within the regional offices varies. Each of these offices has distinct program activities and management priorities. The agency as a whole employs approximately 1,400 people.

ORIGINS OF THE COORDINATED RESOURCE MANAGEMENT INITIATIVE

The CRM initiative of the MDC originated in the 1991 with the creation of a six-person biological diversity task force made up of representatives from the MDC and the U.S. Forest Service (USFS). By 1993, seven agencies were participating in the development of the program: MDC, USFS, Missouri Department of Natural Resources, U.S. Fish and Wildlife Service, National Park Service, Natural Resources Conservation Service, and the U.S. Army Corps of Engineers. Their joint involvement in the initiative was formalized in a memorandum of understanding.

The overarching aim of Missouri's CRM program was to develop a comprehensive planning framework for the management and conservation of the state's biological diversity. As a 1995 report states:

> Restoration, protection, and management of native species and natural communities are primary features of CRM. It also provides for resource-based recreation, education, and encourages the sustainable production of commodities.[21]

As the statement above suggests, the principal goal of CRM was to move toward a more efficient, effective, and integrated form of regional conservation planning by pooling and coordinating the activities of federal and state agencies. Only secondarily did it incorporate what are often seen as the broader ecosystem management goals of citizen and non-governmental stakeholder involvement, outreach and education, and sustainable development and resource use, although MDC officials recognized that landowner participation would be crucial for realizing their conservation goals. As CRM Coordinator Carl Hauser stated:

> [Biological] diversity is critical in sustaining our natural environment and providing good living conditions. The Conservation Department only owns about 1.6 percent of the land in Missouri. We recognized immediately that our agency couldn't do much by itself to conserve biological diversity. In fact, all the government agencies in the state can't get the job done, because most the state's land is privately owned. It became obvious that to be effective, we needed to involve other landowners on a voluntary basis—as many as possible.[22]

The first task undertaken by the CRM program was to delineate regions based on ecological criteria and boundaries. Working with an adapted version of the U.S. Forest Service's Ecological Classification System, CRM used geology, soils, topography, climate, and vegetation to identify ten distinct ecosystem regions. With these planning units in place, interagency teams were assembled to begin the work of developing regional conservation plans.

The goal was to develop long-term (50-year) regional management plans that would prioritize conservation potentials in terms of an understanding of historic and restorable natural communities of plants and animals. Special concern would be taken to consider rare, threatened and endangered species and an effort would be made to

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[21] Missouri Department of Conservation, Wildlife Diversity Report, July 1994-1995. (http://conservation.state.mo.us/nathis/wilddiv/95div5.html).

[22] Missouri Department of Conservation, "Lower Ozarks CRM Plan Available for Review," All Outdoors, February 16, 1996.

link up and coordinate conservation efforts around Missouri's network of Natural Areas. Cooperation would be sought from local landowners in an attempt to realize regional conservation goals. Finally, conservation needs would be weighed against ongoing recreational and commercial needs.

IMPLEMENTING CRM: A CAUTIONARY TALE

The CRM program was introduced in June 1993 with considerable fanfare and optimism. Extensive public meetings were held throughout the state to raise awareness about the initiative and to give Missouri citizens an opportunity to raise questions and make comments about CRM. This attempt to obtain citizen input marked something of a new direction for the agency, which according to a spokesman for a major environmental group, had not always been the most open and participatory of agencies.

MDC-led regional teams developed draft CRM plans for two regions: the Grand River Region and the Lower Ozark Region. After review by the key agencies involved, the plans were introduced at a series of public meetings hosted by MDC.

In the Grand River area, the meetings were well attended, with audiences of approximately 50 persons. Agency staff noted that citizens were particularly concerned about the "social and economic aspects" of the natural resources in the area, even though this was not the primary focus of CRM. When the concerns of citizens were ranked in order of importance, property rights issues emerged as the most pressing. Environmental education, regulation of livestock operations, water quality, and balancing environmental and economic considerations within CRM planning were the other top concerns. Whether these concerns stemmed from a misunderstanding of the functions of the MDC—which is not a regulatory agency and does not issue rules that would affect property rights, water quality, or livestock operations—or derived from a concern about the partners in the CRM initiative, which included regulatory agencies such as the DNR, the U.S. Fish and Wildlife Service, and the Army Corps of Engineers, it is interesting to note that CRM was immediately viewed with suspicion and trepidation by at least some of the citizens attending the public meetings.

These concerns were even more pronounced in the Lower Ozarks region. The draft CRM plan for the Lower Ozarks was released for public comment in early 1996. The draft plan identified a series of very broad management goals. These included forest management and protection aimed at preserving biological diversity; protecting and restoring typical and unusual ecosystems in the Ozarks region (e.g. prairies, glades, savannas, springs, caves, and fens); and maintaining and restoring populations of rare, threatened, and endangered species. The plan stressed the need to integrate these conservation objectives with patterns of "sustainable use and enjoyment." Although MDC emphasized that these objectives would be pursued through voluntary programs, the plan's inclusion of endangered species and surface water and groundwater resources as areas for increased coordination and effort suggested to some – perhaps not unreasonably – that regulatory measures were part of the CRM toolkit.

A series of property rights groups including the Alliance for America, Take Back Arkansas, Association for Private Property Rights, and People for the West! began holding meetings with citizens about the possible implications of the CRM plan for local landowners. The highly influential and generally more moderate Missouri Farm Bureau

(MFB) also participated in these meetings. Charles Kruse, the president of MFB, wrote a newspaper opinion explaining the view of his organization:

> What is of concern to our members are the cumulative economic effects of local, state, and federal regulations. Regulation can affect land use and, over time, actually make it impossible for a family farm to survive.[23]

It was a seemingly innocuous reference in the Lower Ozarks draft report to the United Nations' "Man and the Biosphere" program, however, that became the rallying point for extremist opposition to CRM and that appears to have been the straw that finally broke the back of the initiative. The Man and the Biosphere program was established by the United Nations to draw attention to and increase scientific research in areas around the world that were determined to be of particular ecological significance. One of the drafters of the Lower Ozarks plan, believing that the rich biological resources of the Ozarks region made it a potential candidate for the program, included language in the draft report that suggested that CRM explore the possibility of having the Lower Ozarks designated as a biosphere reserve under the Man and the Biosphere program.

The property rights activists, notably those from out-of-state organizations who some environmentalists and agency employees believe may have been recruited by the lead mining industry, a vocal opponent of increased government regulation, seized on the proposed link-up of CRM and the United Nations' program as evidence of a far-reaching government conspiracy to confiscate private lands and impose draconian regulations on the hapless folks who remained behind. Rumors that U.N. troops would be used to enforce regulations circulated widely and were reported in at least one local newspaper. As one MDC official who had been involved in efforts to defuse the situation recalled:

> They brought in 'People for the West!' and started hollerin' and hootin' about mistrust and a government takeover and, you know, I stood right in their faces and said 'Where do you think we're going to get the money to do this stuff you're afraid of? We're running around damn near broke! And here you guys think we're going to buy the whole world and take you over, put you in salt mines… What the hell's the matter with you?

Ken Midkiff, program director of the Ozarks Chapter of the Sierra Club, pointed out that a sense of the area's history was necessary to understand these hyperbolic claims and the willingness of some to believe them:

> There's a lot of hostility toward the government in that area. And this was really exacerbated back in the 60s and 70s when the Ozark National Wild and Scenic Riverways were being formed. There was violence at the time, directed at the National Park Service and other government agents.

The hostility and distrust arose specifically from eminent domain actions that led to the condemnation of several properties along the river and the eventual eviction of their former owners. More generally, the designation of the Eleven Point and Current Rivers under the federal program led to new regulations on the river that continue to rile many residents in the area.

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[23] Tribune Online Show Me, 05/18/1997. http://archive.showmenews.com/coodinated resource management/archive/1997/may/18/features.

The controversy over CRM in the Ozarks region coincided with the appointment of a new director of the MDC, Jerry Conley. Director Conley, who had served previously as a natural resources official in Idaho and was very familiar with property rights activism, decided in early 1997 to terminate the CRM program. CRM, he stated, "was a forward-thinking resource planning effort, but it was before its time." Concerning the rumors and his decision to terminate the program, he continued:

> People who have worked with the Conservation Department and know how we do business know those rumors were nonsense. But the spread of misinformation was creating a climate of distrust that threatened to undermine confidence in all conservation programs.[24]

A NEW REGIONAL PLANNING EFFORT

To what extent has the CRM initiative lived on within the MDC but without the label that led to the political opposition? Over the past three years, the MDC has launched a lower profile, "in-house" ecosystem management initiative. Incorporating many of the principals, goals, and organizational units of CRM, MDC's regional planning initiative focuses primarily on agency reorganization. Interagency collaboration plays little or no role in the initiative and public involvement, at least in the development of the initiative itself, has been virtually nonexistent.

The MDC's "Regional Management Guidelines" outline a formal planning process to be implemented in the agency, with the primary focus on the 1.6 percent of Missouri's lands that are state owned and directly managed by the MDC. Nevertheless, since the broader mission of MDC is to work to conserve and protect all of the state's forest, game, and wildlife resources, the management practices of private landowners remain very much a concern of the MDC. Thus the MDC's private lands programs are also an important part of the initiative. The purpose of the guidelines is provide managers with a framework for developing ten-year regional management plans that will promote biological diversity, commodity production, and recreation.

Before it could meaningfully implement its regional planning process, however, the MDC first had to reorganize so that its divisions were all operating with the same regional boundaries, something that had not been true in the past. Regional boundaries were established using the ten regions that were initially introduced under CRM. These shared boundaries enabled the agency to bring staff from all divisions into a single regional office and to create interdisciplinary (i.e., cross-divisional) planning and management teams.

Central to the planning initiative has been the compilation of a regional resource inventory guide, which one official intimately involved in the effort called "the most comprehensive regional inventory that we've ever produced." The guide, which was distributed to the regional team members, contained historic vegetation coverages and assessments, National Wetlands Inventory information, and Land Type Associations based on the U.S. Forest Service Ecological Classification System. Maps were provided that detailed landowner participation in the U.S. Department of Agriculture's Wetland

[24] Jim Low (Missouri Department of Conservation), "MDC Scraps Coordinated Resource Management," All Outdoors, March 21, 1997.

Reserve Program (WRP) and Conservation Reserve Program (CRP). Natural Heritage data was provided which showed where rare and endangered species were located in the region. There was extensive information about recreational opportunities in the region. Finally, the guide contained survey data developed by the public opinion section of the MDC, which provided insight into the conservation and recreation priorities of the public and their perceptions about the role and effectiveness of the MDC in addressing those priorities.

As a result of creating common regional boundaries, integrated regional offices, and regional planning and management teams, the central administration of MDC has delegated more authority and responsibility to regional offices than in the past. The regional offices now develop their own ten-year plans and are also required to create and submit their own budgets. The central office, for its part, now allocates funds on a regional as opposed to a media or divisional basis.

One of the major challenges the MDC has faced with this new initiative, which is still very young, is getting regional managers to accept the considerable new responsibilities being demanded of them. Developing ten-year comprehensive management plans and working with interdisciplinary teams to come up with a regional budgets are difficult tasks that require many new skills and areas of expertise. There is optimism in MDC, however, that this approach to regional planning will yield good on the ground results in the near future.

CONCLUSION

In retrospect it is clear that the Lower Ozarks, given the history of local opposition to government involvement in natural resource issues, was a poor choice for implementing the first of the CRM plans. At the same time, the biological riches of the area and the fact that public ownership accounts for a more significant percentage of lands than elsewhere in the state suggest why the MDC was drawn to the Ozarks. Some agency staff believed that it would be possible to abandon only the Lower Ozarks plan and to continue implementing CRM in other regions of the state, such as around St. Louis, where support for the program was greater. However, the Director appears to have decided that it was better to make a clear break with the program rather than to risk damaging the agency's reputation and credibility any further.

In many respects it was bad luck that led to the demise of CRM. It is impossible for an agency to predict exactly how a proposal will be received by local citizens and exactly what small elements of a proposal might set off a firestorm. Moreover, the wider political climate that surrounds a policy initiative is something over which agency officials have very little control. That property rights would have emerged as a national concern right at the time when MDC sought to unveil its initiative was something that couldn't be anticipated or prevented.

At the same time, MDC failed to take some steps that might well have helped to avoid the misunderstandings and discredit the unfair criticisms of their initiative. Above all, MDC should have involved non-governmental organizations, interest groups, and local citizens more directly in the planning process itself. Most of its public involvement efforts were indirect or after the fact: telephone information lines about the plan, public

meetings to discuss the plan, a public comment period. The result of this approach was far too little understanding of or buy-in to CRM by local stakeholders.

The MDC's new planning initiative represents, in part, the afterlife of CRM. It incorporates the geographical planning units that were delineated in CRM and it follows through with the decentralization of agency structure that enables cross-divisional regional planning and management. It is not at all surprising to see that plans developed over many years and with much effort are not simply abandoned but are "repackaged" and put to use in a less visible initiative. For the time being, it appears that the MDC believes that extensive public involvement in ecosystem-based policy development and planning is politically too risky. As a consequence, the MDC is pursuing a form of ecosystem management that is more insular and that de-emphasizes what many consider a fundament element of EM, community involvement.

CASE STUDY TWO: FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION

INTRODUCTION

Florida's ecosystem management initiative, begun by the Florida Department of Environmental Protection (DEP) in 1993, is perhaps the best known and most ambitious in the nation. As Slocombe observes, Florida has attempted a very broad scale experiment in ecosystem-based management, one in which "processes of management, information flow, and planning and target setting" are being redesigned systematically and with high-level government leadership.[25] The DEP's EM initiative has been multi-pronged, involving substantive agency reorganization, overhauling of agency objectives, remapping of planning and management areas, and creating major new programs and projects.

Florida's EM initiative has focused to a far greater degree than other state efforts on environmental regulatory issues and the role that federal and state environmental quality standards and regulations play within the overall EM planning and implementation process. This emphasis reflects the joint mandate of the agency, which embraces both environmental protection through regulatory enforcement and natural resource management.

The challenges facing the Florida DEP are myriad. Florida ranks 22nd in the nation in terms of total land area with 58,560 square miles but is 4th in terms of population, which was nearly 13 million in 1990 and is currently estimated to be more than 15 million. Rapid development, habitat loss and degradation, increased pressure on resource bases, and the accumulating environmental impacts of pollutants all form parts of the complex environmental management situation confronting the DEP. In a 1995 report, Defenders of Wildlife ranked Florida first in the nation in terms of risk of ecosystem loss and second it terms of imperiled species. Environmental and ecological health are vital to Floridians for reasons of human health and safety and conservation ethics, but also because of the state's tourism industry, which is inextricably linked to outdoor recreation and ecotourism. The state hosted 43 million visitors in 1996 and derived an estimated $37.9 billion from tourism.

Although over the past decade the DEP has been widely acknowledged as a leader in state ecosystem management, the nature of its commitment to EM at the present time is unclear. The current administration of Governor Jeb Bush has recently appointed a new secretary of the DEP. The secretary's reorganization efforts, still underway, appear to signal a retreat from the ecosystem approach to natural resource management and environmental protection.

AGENCY ORGANIZATION

The Florida DEP is a large and complex organization. The DEP was created in 1993 by the Florida Environmental Reorganization Act of 1993, which consolidated the

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[25] Slocombe, D. Scott. 1998. Lessons from experience with ecosystem-based management. Landscape and Urban Planning 40, p. 36.

Department of Natural Resources (DNR) and the Department of Environmental Regulation (DER). The merger and reorganization of the DEP came in the wake of Carol Browner's departure from the DER to assume the position of Director of the U.S. Environmental Protection Agency. Then Governor Chiles appointed Virginia Wetherell, the former secretary of the Florida DNR, as head of the newly formed agency.

The reorganized agency was vested with the authority to manage both natural resource and environmental quality matters, which had previously been handled by the two separate agencies. As a result, it dealt with environmental and natural resource issues including air pollution control programs, water resource management, operation and maintenance of 150 state parks, management and conservation of coasted and aquatic ecosystems—just to name a few areas of jurisdiction and program activity. With over 4000 employees, this massive agency had total appropriations in fiscal year 1998-99 of $1.66 billion.

The DEP is organized into both divisions and regional offices. The divisional structure of the agency has three major parts: Regulatory Programs, Land and Recreation, and Planning and Management, each headed by a Deputy Secretary. Under Regulatory Programs fall the Divisions of Water Resource Management, Air Resources, Waste Management, and Offices of Beaches and Coastal Systems, and Siting Coordination. Under Land and Recreation fall the Divisions of State Lands, Recreation and Parks, and the Offices of Greenways and Trails and Coastal and Aquatic Managed Areas. Finally, under Planning and Management fall the Divisions of Resource Assessment and Management, Administrative Services, and Strategic Projects and Planning.

Prior to 1999 there was an Office of Ecosystem Management (OEM) located within the Division of Planning and Management. Its first (and only) director, a Deputy Secretary-level position, was Pam McVety, who had served previously in the DER. The primary function of this office was to develop and implement the Ecosystem Management Implementation Strategy, a strategic plan designed to integrate regulatory and management activities on an ecosystem basis. The principal activities undertaken by OEM were 1) to provide technical support to divisions and regional offices; 2) to assist in the development of ecosystem management agreements, also know as "team permits;" and 3) to help with the implementation of place-based management through the creation of Ecosystem Management Areas and Ecosystem Management Teams.

In March 1999, the newly elected governor of Florida, Republican Jeb Bush, appointed David B. Struhs the new Secretary of the DEP. Secretary Struhs has instituted a series of organizational changes in the agency which have directly impacted the continued implementation of the ecosystem management initiative undertaken by the agency in the early 1990s. The reorganization has resulted in the elimination of the Office of Ecosystem Management and the Deputy Secretary-level position in charge of that office and responsible for developing agency-wide EM strategies. Moreover, the DEP as a whole has been restructured according to more traditional, media-based approach to resource management and environmental protection.

DEVELOPING AND IMPLEMENTING ECOSYSTEM MANAGEMENT

The 1993 Environmental Reorganization Act called for the DEP to develop and implement measures to "Protect the functions of entire ecological systems through enhanced coordination of public land acquisition, regulatory, and planning programs." This language is especially noteworthy because it explicitly defines the agency's mission in terms of protecting ecological systems and the functions internal to them. Unlike most agency charters, it does not list the series of media to be protected and enhanced: soil, water, air, forests, wildlife, etc. Rather it explicitly directs the agency to manage the overarching whole of which these media are subordinate parts.

The Environmental Reorganization Act is also innovative in its creation of a hybrid agency with both regulatory authority and land management responsibilities. For many involved in development of the EM initiative in Florida, the joint mandate of the DEP was seen as a tremendous opportunity. Prior to the merger of the DER and DNR, the DNR had initiated some ecosystem-based management programs. According to a former DEP employee, the fundamental shortcoming of this initiative was that it was restricted to state-owned lands:

> DNR, before the merger, was doing something it called ecosystem management. But the only thing it could do ecosystem management on was state lands, the lands that it managed. It couldn't do ecosystem management on other lands and it couldn't bring in the regulated entities and work with them. There's no way it could have worked without a so-called 'superagency.

The view articulated here is that ecosystem management, to be true to its name, necessarily requires regulatory teeth to go along with collaborative partnerships and voluntary incentive programs. The tools of environmental regulation enable an agency to extend the influence of its ecosystem management initiative beyond state-owned lands and by means other than incentive programs and voluntary partnerships.

For DEP, then, ecosystem management combines environmental regulation with regional planning, public outreach and education, land acquisition, and land management. As defined in a 1994 DEP planning document, ecosystem management is:

> An integrated approach to management of Florida's biological and physical environments—conducted through the use of tools such as planning, land acquisition, environmental education, regulation, and pollution control—designed to maintain, protect and improve the State's natural, managed, and human communities.[26]

The Office of Ecosystem Management (OEM) was established to play the lead role in articulating the guidelines for and implementing ecosystem management. Shortly after the EM initiative was launched, OEM set about developing a systematic Ecosystem Management Implementation Strategy (EMIS). It established the EMIS Committee, on which served the chairpersons of eleven separate subcommittees developed to investigate various environmental, economic, and social issues identified as central to ecosystem management. More than 300 Florida citizens, from diverse professions and interest groups, served on these subcommittees. The subcommittees examined and

[26] Florida Department of Environmental Protection, "Toward Ecosystem Management," February 1995.

developed recommendations about issues including scientific research, land management, training and education, the role of landowners, incentive-based alternatives to regulation, pollution control, and auditing and evaluation methods. Emerging from these meetings was a two-volume EMIS report (September 1995), which included an EMIS Action Plan that detailed specific tasks to be undertaken by the agency. The report defined the first 24 Ecosystem Management Areas and provided guidelines for regional staff to begin implementing place-based ecosystem management.

OEM devoted considerable energy and care to the task of articulating the theory of ecosystem management that underlay its implementation strategy. It identified what it called the "four cornerstones" of ecosystem management: Cultural Change, Common-Sense Regulation, Place-Based Management, and Foundations:

> **Cultural Change** refers to the need for both DEP staff and Floridians in general to develop attitudes and behaviors more conducive to "environmental citizenship." The DEP identified "non-adversarial, voluntary partnerships" and increased knowledge of Florida's environment as fundament to this effort.
>
> **Common-Sense Regulation** "builds on … traditional regulatory programs to provide workable alternatives that encourage the regulated public to voluntarily go beyond tradition and move toward wise stewardship of Florida's ecosystems and resources."[27]
>
> **Place-Based Management** is the local and regional planning and decision-making infrastructure that DEP hoped to develop through the designation of Ecosystem Management Areas (EMA). These areas would be defined in terms of ecological rather than political boundaries and would be the on-the-ground units managed by cross-disciplinary EMA teams.
>
> **Foundations** is the term developed by DEP to identify the basic scientific and technical tools needed to implement ecosystem management. Included under this heading were basic scientific data about the natural systems, information technologies such as geographical information systems (GIS), monitoring programs, and training programs designed to inform DEP staff about ecosystem management and the skills required to implement it.

The DEP developed specific programs that gave substance to one or more of these "four cornerstones." With respect to effecting cultural change, for example, the OEM worked both with DEP staff and with the public at large. All 4,000 DEP employees were provided with training in ecosystem management, both through a formal 8-hour training session and through the guidance of ecosystem coordinators and staff who were assigned to each district office. The heart of the public education effort was the Office of Environmental Education, which published and distributed a newsletter, "Ecosystem Management News," and an extensive series of pamphlets and brochures. The pamphlet "Ecosystem Management at Home," for example, was developed as part of the

[27] Florida Department of ENVIRONMENTAL Protection, "Ecosystem Management at Work in Florida," http://www.dep.state.fl.us/ecosystem/enved/emwork/eminfl.htm.

DEP's Environmental Citizenship Initiative and explained how environmental stewardship begins in the home, yard, and local community. An estimated 1.5 million copies were circulated.

Common-Sense Regulations embraced a very large set of programs and activities within the regulatory framework of the DEP. It is best exemplified, however, by an innovative, and controversial, program called "team permitting." The idea behind team permitting is to create a "win-win" situation for both regulated entities and the public within the framework of the regulatory process.[28] For regulated entities, team permitting offers a streamlined permitting process. With the DEP serving as a facilitator, all the possible agencies involved in issuing permits for a particular activity are brought together to consider a proposal developed by the factory, plant, or company. Also invited to the table are interested third parties, such as other businesses, concerned citizens, or environmental groups. Having such parties participate directly in the permitting process reduces the likelihood of legal challenges later on. If it is determined by the parties involved in the negotiations that a "net environmental benefit" will arise through the proposal, then the DEP will expedite the permitting process by packaging individual permits into a unified permit. In theory, the transaction costs of the regulated party are significantly reduced at the same time that the public obtains environmental benefits that would not otherwise have been achieved. For example, in the case of a team permit developed for the phosphate industry company CFI, the permitting process for a proposed plant expansion was expedited on the condition that the company transfer a large parcel of environmentally sensitive land to the county and impose property use restrictions on other parcels it retained.

Complementing these regulatory programs were attempts to assist Florida businesses in developing and implementing appropriate Best Management Practices (BMPs). BMPs are programs, usually voluntary, that are designed to reduce the environmental impacts of a particular type of commercial activity. In conjunction with its Private Lands Initiative, an effort to enlist landowners in ecosystem management, the DEP developed the "Whole Farm Program." The program provided technical assistance to farmers who were interested in reducing the environmental impacts of their farming practices.

Place-based management was implemented through the development of Ecological Management Areas. The boundaries of the EMAs were determined on the basis of several scientific and pragmatic criteria. These included hydrologic connections (basin or watershed designations), natural community types, patterns of resource use, existing conservation lands, jurisdictional boundaries, and consideration of the overall manageability of the area (given existing resources).

After developing the boundaries, DEP established EMA teams to develop strategic plans and implementation strategies for the particular regions. Initial steps included amassing the relevant scientific and technical information about the EMAs and determining what agencies and stakeholder groups would need to be involved in the planning and implementation process. The scope and character of the projects outlined and undertaken within the particular EMA teams—50 of which were identified in the Performance Report for 1997-98—varied greatly.

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[28] See Barry G. Rabe, "Facilitywide Permits and Environmental Regulatory Integration: Lessons from New Jersey," National Environmental Enforcement Journal, April 1997, 3-13.

An excellent example of an EMA project is the Ichetucknee Springs Water Quality Working Group. The working group was formed to study and develop a management and environmental protection plan for the Ichetucknee Springs and River, a relatively pristine river that is highly valued for its ecological, cultural, and recreational reasons—the river is visited by over 200,000 people annually. Although much of the river falls within a state park, many of the springs and groundwater sources that feed the river are located outside the park in the vicinity of a major city and other developed areas. DEP officials and concerned citizens recognized that the health of the river could not be ensured by managing only that part of it which lay within the state park. A basin-wide effort was needed to protect it.

A working group was put together to organize monitoring activities, map the complex watershed of the system, identify environmental threats to the system, and conduct interviews with citizens about the history and value of the resource. The working group was made up of individuals from federal, state, and local agencies with non-governmental members representing local towns, private landowners, businesses, environmental organizations, and educational institutions.

The first goal of the working group was to establish a firm scientific basis for understanding the river system. While this scientific work is ongoing, the group has turned much of its energy toward educating local officials and the local citizenry about the watershed and the measures necessary to protect it. One DEP official told this story about a public outreach effort:

> One person would go to a gas station owner and say, 'Do you know where the oil and grease go when you wash down the concrete?' And he'd say, 'Yeah, it goes in this ditch.' And our staff would say, 'Well, that ditch goes into that sinkhole and that sinkhole is connected to a system that extends 60 miles downstream and it comes up in the state park.' And he'd say, 'No, I didn't know that.' That particular gas station owner, with his own money, under no regulatory direction, put in a treatment system. So the water no longer goes from the pavement, into the ditch, into the sinkhole, and down underground for dozens of miles. So in that particular watershed we've had a lot of success.

Other measures implemented in the Ichetucknee basin include the construction of stormwater retention ponds, the establishment of buffer strips in the riparian, reduction of pesticide and fertilizer use, purchase of sensitive lands, and trash cleanup.[29]

The Foundations component of the DEP ecosystem management initiative sought to develop and integrate environmental information on a statewide and regional basis. Recommendations were made to improve baseline monitoring and develop an environmental indicator system. Both would be used to assess environmental trends and to enable planners and program managers to make scientifically well founded decisions. The DEP continues to integrate data in a geographic information system. The goal is to develop and make readily available a comprehensive set coverages showing land type associations, habitats, water and air quality, land use, demographics, permitting, transportation infrastructure and any other data that might prove important to

[29] Florida Department of Environmental Protection, "Ecosystem Management at Work in Florida. Cornerstone: Place-Based Management." http://www.dep.state.fl.us/enved/emwork/place.htm (9/15/99)

decision makers. A centralized clearinghouse for GIS information has been established through the University of Florida.

IMPLEMENTATION CHALLENGES AND SUCCESSES

Perhaps the most remarkable thing about the EM initiative launched by the Florida DEP was that it encountered very little external opposition. Politicians and business leaders were either noncommittal or generally supportive of the initiative. The criticisms that were heard came largely from the environmental community, which feared that "common-sense regulation" would lead to a less stringent permitting review process and a relaxation of enforcement efforts.

The most serious resistance to EM actually issued from within the DEP itself. This resistance had two primary sources. First it was the product of a deep "cultural divide" between staff who had previously worked in the Department of Environmental Regulation and those who had come from the old Department of Natural Resources. One DEP official characterized the difference between these groups as follows:

> The DER, the regulatory agency… was staffed with people who came out of the education system just on the cutting edge of the new environmental movement. The DNR folks, including some of those in the leadership roles, came out of the old resource management school, the consumptive use orientation: how many fish can I get… The cultures were just different: one was a good ole boy culture and one was more of a hippy-intellectual culture—and that's what met and clashed.

Many on the regulatory side of the newly created DEP were suspicious of the fact that Secretary Wetherell had come from the former DNR. They feared that the "old school," consumptive use orientation of the former DNR and, more general, the outlook of natural resource management, would define the new agency's priorities, to the detriment of regulatory policy. As if to confirm their suspicions, Secretary Wetherell, in her early days as head of the DEP, made a number of controversial decisions on regulatory affairs—one involving a wetlands permit, another the siting of a power plant—that did not endear her to many in the regulatory division or, beyond the DEP, in the environmental community. Many DEP employees—particularly those from the former DER—were harshly critical of Secretary Wetherell's management style, which was described as intolerant of criticism and dissent.

Partly as a result of this atmosphere of suspicion and distrust that arose from the merger, and partly because the former DNR had itself used the term "ecosystem management" to characterize some of its earlier land management strategies, the new EM initiative of the DEP was believed by some to be less than environmentally progressive. According to DEP staff, this association dogged the EM initiative throughout its six and a half year life span.

The team permitting process, touted by advocates of Florida's EM initiative as a showcase example of how to inject EM into the regulatory process, provides an interesting illustration of these tensions. Team permitting was hailed by many industry groups as an innovative and timesaving process. Some environmentalists and some within the regulatory community, however, are considerably less sanguine about the

process, arguing that "net environmental benefits" is too vague a concept and that tradeoffs it allows are in fact concessions to the regulated entities. The upshot, in other words, was regulatory laxity. Indeed, the CFI team permit for the phosphate plant expansion, the first of the team permits granted by the DEP, was challenged by the Sierra Club in August 1998. In a formal 60-day notice of intent to file suit, the Sierra Club detailed its complaint against CFI, arguing that CFI had violated an effluent standard or limitation under Section 505(a)(1)(A) of the Clean Water Act. In its notice, the Sierra Club claimed that "when DEP issued the final NPDES permit to CFI on September 26, 1997, DEP knew, or reasonably should have known, that CFI had not provided reasonable assurance that it would meet the permit's discharge limitations."[30]

The bottom line is that some regulators and environmental protection advocates believe that the DEP will make concessions in the area of regulatory policy for the sake of gains in the area of land management or habitat improvement. Elaborating on this point, Steve Medina, a former DEP enforcement attorney who is now the director of the Florida Public Employees for Environmental Responsibility (PEER), stated:

> All too often DEP is willing to make trade-offs on regulatory matters in exchange, for example, for land, wetlands buffers, parks, and so on. Pollution increases are allowed because land acquisitions and easements are seen as gains that produce 'net ecosystem benefits.' A mentality has developed that as long as we're 'doing better,' we're producing 'net ecosystem benefits.' The problem is that the floor is already so low. Moreover, once you're willing to allow increases in emissions in exchange for other ecosystem benefits, the floor drops even further.

Another of the great difficulties that the DEP faced with ecosystem management was in trying to develop a convincing set of measures for quantifying and evaluating the results of ecosystem management programs and activities. In its Performance Reports for 1996 and 1997, the DEP noted "that the indicator chosen (establishment of Ecosystem Management Area (EMA) Teams) does not do justice to the many implementation activities underway throughout the state."[31] Certainly this purely organizational achievement seems an inadequate measure or index of whatever ecological changes have been effected by EM. But the challenge of devising a suitable alternative indicator of ecological integrity remains.

The DEP has been especially dogged by this issue because of a legislatively mandated performance-based budgeting scheme. In 1994, the Governor signed into law Chapter 94-249, the "Government Performance and Accountability Act." This Act requires state agencies to justify budget requests in terms of an accounting system that measures performance in terms of meeting (or exceeding) precise work load or performance targets that were specified in the previous year. The effect of performance based-budgeting, according to one DEP official, was that the legislature "…forced the agency to divide budgeting back into the traditional way that the regulatory agency works. So budgeting is divided into air, water, waste, resource management, law enforcement. And that has worked at cross-purposes with implementing EM."

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[30] "Formal 60-day Notice of Intent to File Suit Pursuant to Section 505(a)(1) of the Clean Water Act/Plant City Phosphate Complex (NPDES Permit No. FL0000078), provided by Steven A. Medina, PA, legal counsel for Sierra Club.

[31] Florida Department of Environmental Protection, "Performance Report for the FY 1997-2002 Agency Strategic Plan," www.dep.state.fl.us/admin/asp, p. 37.

CONCLUSION

Despite the recent reorganization of the DEP by Secretary Struhs, ecosystem management appears to have made significant inroads into the institutional structure of the DEP. This is particularly true of the EMAs, several of which have emerged as relatively autonomous regional ecosystem management projects. Within the DEP the team permitting process is likely to continue on in the new administration. So too will continuing efforts to upgrade information technologies and to increase monitoring activities. What will be lacking in the new DEP, as a result of the elimination of the Office of Ecosystem Management, are both a strong and well-situated advocate for EM and, more importantly, a central coordinating mechanism for EM activities.

Why has the new administration backed away from EM? Officially, the incoming administration claims that EM was an important interim exercise that has run its course within the agency, producing many positive effects. However, it does not see a continued need to emphasize EM as an integral part of everyday work in DEP or for EM to remain institutionalized in the high profile manner it was in the previous administration. This line of argument was the basis of Secretary Struhs' decision to abolish the Office of Ecosystem Management and to reassign employees from that office to other divisional and regional offices.

The new administration has indicated, however, that it looks favorably upon some elements of the EM initiative. Team permitting, increased citizen involvement, and the push to develop the scientific infrastructure of the DEP are all measures that the new Secretary has signaled an interest in continuing, though perhaps not under the banner of ecosystem management.

It should be noted that even before the change over of administrations, there were indications of an impending phasing out of the EM initiative. The "Performance Report for the 1997-2002 Agency Strategic Plan" arrived at the following conclusion:

> The original purpose of having Ecosystem Management as a Priority Issue in the Agency Strategic Plan was to keep it elevated in the minds of staff until it was fully integrated into all program areas. We feel, as evidenced by the rapid establishment of EMA teams and the integration of ecosystem management principles into many of our primary program areas, that we have made significant progress toward this goal. Although there is much work to be done to ensure that the philosophy and principles of ecosystem management are applied consistently and routinely throughout all programs, they are now widely understood and applied in most parts of the agency.
>
> For this reason, and because of changes to the Agency Strategic Plan associated with the implementation of Performance Based Budgeting, Ecosystem Management is not a Strategic Issue in the 1998-2003 Agency Strategic Plan.[32]

It is likely, however, that EM has not been publicly embraced by the Struhs administration for a number of other reasons. First, there is the issue of political ownership. EM was introduced and officially espoused by the previous administration.

[32] Ibid, p. 39.

Seeking to make its own mark on the agency, the new administration is, not surprisingly, dismantling or downplaying at least those parts of the initiative most commonly associated with the former administration. Ironically, the EM initiative might be the victim of its own high levels of visibility and publicity.

Another factor may be that EM is a relatively foreign concept to the incoming administration. The new Secretary himself has had a distinguished career in the field of environment protection, having served previously as commissioner of the Massachusetts Department of Environmental Protection, chief of staff to the Council on Environmental Quality under President Bush, and executive assistant to the Administrator of Region I of the U.S. Environmental Protection Agency. With this background in environmental regulation, the charges of lax enforcement and agency co-optation by regulated entities might have proved especially worrisome. Defenders of the EM initiative claim that whatever lax enforcement there may have been over the last few years is the result of DEP policies and priorities independent of the policies and priorities emphasized in the EM initiative. That EM would bear some of the brunt of this association is perhaps regrettable, but not surprising.

CASE STUDY THREE: MINNESOTA DEPARTMENT OF NATURAL RESOURCES

INTRODUCTION

The Minnesota Department of Natural Resources (MN DNR) states that its mission is "to preserve, protect and enhance Minnesota's natural resource heritage in order to benefit the environment, economy, and quality of life of all Minnesotans, present and future." Its "vision" or guiding philosophy is "to work with people to management the state's diverse natural resources for a sustainable quality of life." Over the course of the past decade, the MN DNR has pursued this mission and sought to realize this vision through a strategy it calls "ecosystem-based management" (EBM).

AGENCY ORGANIZATION

The Minnesota Department of Natural Resources is the primary natural resource management agency in the state of Minnesota. The MN DNR administers 5.3 million acres of land for state forests, wildlife management areas, parks, trails, scientific areas, and water access sites as well as an additional 12 million acres of land in mineral rights. Minnesota's public waters include over 4.7 million acres of lakes, more than 260,000 acres of wetlands, and approximately 95,000 miles of rivers and streams. With over 3,100 employees, the MN DNR had an operating budget of $233.8 million in fiscal year 1998, representing approximately 6.3 percent of state operations expenditures.

Like many other natural resource agencies across the county, the MN DNR is organized both regionally and functionally. In functional terms, the agency is organized around six natural resource management divisions: Fish and Wildlife, Forestry, Minerals, State parks, Trails and Waterways, and Waters. Since the early 1970s, the MN DNR has maintained a system of six regional headquarters, which in turn are overseen by a central office in St. Paul. Though the boundaries of these regional divisions are defined by county lines, they also trace, with varying degrees of accuracy, regional ecosystem boundaries. For example, the Southwest Minnesota regional headquarters encompasses much of Minnesota's Prairie Pothole Region, an area that was once a rich mosaic of wetland, marshes, and tall grass prairie. The central office has seven primary operational support bureaus: Engineering, Field Services, Human Resources, License Bureau, Management Information Systems, Office of Management and Budget, and Real Estate Management. The Office of Management and Budget, interestingly enough, houses the Ecosystem-based Management Section.

The MN DNR is not a regulatory agency. The primary state environmental regulatory agency, charged with monitoring environmental quality and enforcing environmental regulations, is the Minnesota Pollution Control Agency (MPCA). Through an ongoing strategic planning and review process called GOAL 21, MPCA is also incorporating elements of an ecosystem management approach. Some of these initiatives resemble regulatory reforms attempted by the Florida Department of Environmental Protection.

ORIGINS OF THE ECOSYSTEM-BASED MANAGEMENT APPROACH

In a recent document entitled "Ecosystem-based Management: Executive Summary," the MN DNR defines ecosystem-based management as

> …the collaborative process of sustaining the integrity of ecosystems through partnerships and interdisciplinary teamwork. The long-term goal is [the] sustainability of Minnesota's ecosystems, the people who live in them, and the economies founded on them.[33]

The document goes on to identify four key principles that underlie EBM. First, the EBM approach asserts the importance of encouraging citizen participation and developing partnerships with multiple stakeholders. Increased public involvement is identified as central to the process of assessing needs, identifying problems, and developing solutions. Second, EBM calls for a science-based approach to natural resource management, one that uses "the best available scientific knowledge (social, economic, and ecological) as a foundation for decision-making." Third, EBM is based on setting long-term management goals that are framed with respect to sustainable patterns of use. Sustainable use implies a recognition and assessment of the limits of ecosystems to supply benefits and services to the public. Finally, EBM requires that managers take a "comprehensive perspective." As articulated by the MN DNR, this means that the agency must work to balance considerations of economic development with those of ecological health.

The ecosystem-based management approach currently being implemented by the MN DNR has evolved in stages. Beginning in the 1970s, many Minnesotans began urging the MN DNR to open up the process of natural resource planning and management. This demand for greater public involvement prompted Governor Rudy Perpich to instruct an incoming commissioner to "make a concerted effort to include the public in the decision making process." Public involvement increased in the succeeding years and as did calls for the agency to more actively acknowledge a multiple use management framework, especially in its Forestry and Mining Divisions, which were dominated by a single-use outlook. The Minnesota Forest Resources Act of 1982 explicitly mandated that MN DNR consider the multiple uses and values of forest resources in its future planning and management activities.

Beginning in roughly 1989, a group of core MN DNR officials set about defining a new vision for the agency. The management paradigm that emerged from their work was called "integrated resource management" (IRM). IRM contained many ideas that would later become central to Ecosystem-based Management. In 1991, the agency formed an IRM Demonstration Projects Team to study and offer recommendations about how to implement IRM through a series of preexisting projects or initiatives (The Prairie Stewardship Partnership, the Chippewa National Forest Ecosystem Management, the Leech Lake Comprehensive Water, and the Regional Natural Resource Planning). The four programs were chosen as demonstration projects because, to one degree or another, they already embodied certain goals and strategies basic to IRM:

> These were existing, ongoing efforts that provided opportunities to illustrate progress toward IRM through 'learning by doing' approaches. The projects' goal

[33] Minnesota Department of Natural Resources, "Ecosystem-based Management: Executive Summary (Definitions, Principles, and Major Activities)," February 26, 1999.

> is to illustrate multi-partner approaches to sustaining land and water resource systems. Each project is unique, representing a different ecosystem with distinct people/resource interactions and problems. Although strategies for each project differ, they all share a common process model designed to operationalize sustainable development at the local level.[34]

IRM, this earlier incarnation of EBM, thus incorporates the concepts of adaptive management, sustainability, broad-based partnerships, and an ecosystem-based project definition. The IRM Demonstration Project Team also concluded that these projects were particularly noteworthy because of their capacity to build new kinds of coalitions (e.g., between agricultural and environmental groups), develop innovative funding mechanisms (e.g., through cost-share arrangements with the federal government and donations from private foundations and individuals), promote educational and outreach objectives (e.g., through the involvement of local schools), and bring national attention to the efforts of the MN DNR (e.g., the Prairie Stewardship Partnership was used as a model by the Western Governors' Association in developing its Great Plains Initiative).

The IRM Demonstration Project Team also identified a series of basic obstacles to fuller implementation of integrated resource management. The Team complained of "shallow organizational commitment" by senior MN DNR management to the goals and strategies of IRM. It argued that guiding ideas behind IRM had not yet been formulated in a sufficiently clear or consistent fashion. In part as a result of these ambiguities, in part because of long-standing and competing visions of resource management, IRM was not understood or accepted by many MN DNR staff. The Team asserted that many within MN DNR failed to understand adequately that IRM, focusing as it did on large landscape units, had long-term objectives that would not and could not be realized within short time frames. Finally, the Team pointing to budget shortfalls and to the existing budget structure as major impediments to the successful implementation of IRM.

The conclusions and recommendations of the IRM Demonstration Project Team are important because they provide an excellent overview of the challenges that planners within MN DNR faced in the years that followed. The implementation strategies and program activities designed by these planners, moreover, were clearly formulated in an effort to surmount these challenges.

By the mid-1990s, MN DNR had substituted the term "ecosystem-based management" for "integrated resource management." The key concepts of IRM were preserved in EBM, though increased attention was paid to both community involvement and economic considerations. As succinctly stated in a 1997 strategic planning guidebook:

> Ecosystem-based management is the process of sustaining ecosystem integrity through partnerships and interdisciplinary teamwork. Ecosystem-based management focuses on three interacting dimensions: the economy, the social community, and the environment. Ecosystem-based management seeks to sustain ecological health while meeting socioeconomic needs.[35]

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[34] Minnesota Department of Natural Resources, "IRM Demonstrations Projects Team Report: Preliminary Report," December 12, 1992.

[35] Minnesota Department of Natural Resources, "Directions for Natural Resources: An Ecosystem-Based Framework for Setting Natural Resource Management Priorities," July 1997.

In recent years the MN DNR has placed more emphasis on the need for sound science and for extensive community involvement. Accurate scientific information—both ecological and socioeconomic—is necessary in order to understand natural and social trends and to decide how to prioritize natural resource management programs. Community involvement is identified as a paramount concern because of the need to learn what kinds of needs exist in the community and what kinds of technical assistance is required by different citizens, to involve citizens as partners in the planning and implementation phases of particular projects, and to improve communication and education efforts in the community.

EBM IMPLEMENTATION STRATEGIES AND PROGRAM ACTIVITIES

In July 1997 MN DNR created the Office of Management and Budget through a consolidation and reorganization of the former Office of Planning and the Financial Management Bureau. "The newly created Office of Management and Budget Services (OMB) provides management and budget leadership and services that help DNR employees work with people (both statewide and locally) to integrate ecosystem sustainability with the recreational and commercial uses of Minnesota's natural resources."[36]

Within the Office of Management and Budget Services, the Ecosystem-based Management Section heads up the EBM-related strategic planning activities for the agency as a whole. The heart and soul of the EBM-activities, however, lie in the programs being implemented through regional offices and, even more concretely, through local working teams defined in terms of landscape or watershed units or in relation to particular problem areas. Indeed, rather than seeking a radical restructuring of agency, the MN DNR has pursued a strategy of implementing EBM within the existing organizational framework and by focusing on locally organized and administered pilot projects. These on-the-ground activities, while overseen and supported by central and regional management offices, are the real grassroots efforts where ecosystem management is being most extensively tested, revised, and elaborated.

Pulling back somewhat, however, it is possible to distinguish four basic program areas through which the MN DNR is attempting to implement its ecosystem-based management approach. These are 1) place-based projects; 2) public outreach and involvement activities; 3) scientific research and ecosystem-based information programs; and 4) strategic planning and organizational change activities.

The MN DNR has focused considerable energy and effort into developing a series of place-based projects. The idea behind these projects is to use particular landscape or watershed units as the physical frameworks around which to involve local stakeholders in collaborative approaches to natural resource management issues.

At least seventeen major watershed and landscape projects are currently underway. To illustrate, among these projects are the Heron Lake Watershed Restoration Project, which has used tools ranging from municipal sewage treatment improvements to land acquisition as a means of improving water quality and waterfowl

[36] http://www.dnr.state.mn.us/omb/index.html (6/20/99).

and prairie habitat in southwestern Minnesota; the Big Woods Project, a community-led effort in south-central Minnesota that has involved over 500 citizens in maintaining and restoring forest remnants through proposed zoning ordinances, land conservation programs, replanting activities, and tourism initiatives; the Red River Basin Flood Damage Reduction Work Group, which, through protracted negotiations between stakeholders, produced an agreement that will facilitate the permitting of flood reduction projects and the development of comprehensive watershed planning in the Red River Basin.

The MN DNR has used a variety of innovative tools for public outreach. To gauge public sentiment about various natural resource issues, it has used surveys and forums to solicit information from citizens about their concerns and priorities. To improve public understanding of natural resource issues, the MN DNR has sponsored workshops and roundtables and worked to develop better information distribution systems. The Community and Environmental Assistance section of the Office of Management and Budget coordinates some of these efforts; others are managed out of regional and area offices.

Public involvement in the planning process is being encouraged in a new forest management project. As a DNR employee explained:

> We're starting a new forest management plan process that's based on our ecological classification system. It's going to involve citizens at a couple of stages. It will also involve web pages that will allow people who live in areas where harvests are occurring to find out exactly where they're taking place. That's a really new thing. In the past, forest management was a lot more internal and harder for the public to access. We didn't have anything like what the Forest Service has had, with appeals and all that. We've had some controversies over the last few years. So it's a step toward greater public involvement.

The MN DNR has undertaken a series of intensive research projects to build up the scientific database it uses to make its ecosystem-based management decisions and formulate policy. These include the Forest Bird Diversity Project, which will enable forest managers to use songbird diversity as a measure of general ecological health; the Minnesota County Biological Survey, a statewide survey of plants and animals; an Ecological Classification System, which identifies basic landscape-level ecological units (based on climactic, geological, and vegetative regimes); the Minnesota Environmental Indicators Initiative, a broad-based monitoring system aimed at identifying environmental trends, problems, and risks; and a comprehensive assessment of geological and hydrogeologic information.

Strategic planning on the basis of ecosystem-based management principles is underway both in regional offices and statewide. An example of regional planning is the Blufflands Initiative along the Mississippi River, which encourages broad stakeholder involvement in land use planning and decision-making. Another example is the Metro Greenways Initiative currently being developed by the (Twin Cities) Metro Regional Office. Statewide EBM planning initiatives are underway in several of the agency's divisions. For example, the division of Ecological Services is developing an comprehensive wetlands conservation plan.

In its effort to affect organizational change in a more pervasive way in the agency, the MN DNR has, for example, located its EBM planners within the Office of

Management and Budget. This decision points to the seriousness with which the agency is approaching EBM, since budgeting decisions are the driving force behind the implementation of any initiative. There is also a clear recognition by the EBM planners that the ecosystem approach to natural resource management, particularly one that stresses the need for collaboration between agency divisions and a certain degree of decentralization in planning and programming, strains traditional structures of planning, budgeting, accounting, and program evaluation. According to one official at MN DNR, however, the agency has made considerable progress in integrating its planning, science, and budgeting:

> This overall process, starting with strategic planning and using scientific assessment within that process and then developing more specific work plans and budgets—it's finally about trying to base budgeting on more of a scientific assessment of what the priorities are, what the issues are, what the trends are.

Finally, the MN DNR has recognized the importance of reaching out to agency staff and enlisting them in the EBM efforts. To foster improved understanding of the objectives of EBM among MN DNR staff, the agency has developed workshops and lectures on both the natural scientific and the management dimensions of EBM.

CONCLUSION

The ecosystem-based management efforts of the Minnesota Department of Natural Resources traverse a broad range of divisions, regions, programs, and activities. While the MN DNR has engaged in some restructuring as a result of its ecosystem-based management initiative—for example, the creation of the Office of Management and Budget was at least in part influenced by EBM—it has for the most part pursued an "evolutionary" strategy toward implementation.

The use of pilot projects – some of them statewide planning initiatives, most of them place-based watershed or landscape projects – has been a major strategy of the MN DNR. The idea behind such pilot projects, and one that seems to be working, is that they facilitate the implementation of EBM on the ground and in the field, lessening the sense both among MN DNR staff and participating partners that EBM is more a theory than a workable management framework. This willingness to work from the grassroots up, to look for results and acceptance at the local level, and to resist the temptation to impose a new management regime on the agency by executive fiat demonstrates the seriousness and realism of the MN DNR's EBM initiative.

Another particularly innovative dimension of Minnesota's experiment in ecosystem-based management lies in its situating its EBM office in the central planning and budget office. One of the great challenges faced by government-led ecosystem management efforts has been to transform long-standing organizational and behavioral norms and routines. These norms and routines, in turn, have their roots in well-defined management hierarchies and program structures and in the funding streams that drive and uphold them. The MN DNR recognizes if ecosystem management is to have any long-lasting and systematic impact on the agency it must be driven by funding mechanisms that are flexible enough to accommodate interdisciplinary programming and budgets that are adequate to satisfy basic program needs.

Finally, the MN DNR has been particularly successful in articulating and communicating its working definition of ecosystem-based management. Part of what makes this effort so successful is the clear recognition that the concept of EBM is itself a work-in-progress. The MN DNR exhibits a distinctly pragmatic – in the best sense of the term – relation to its concept of ecosystem-based management. The concept of EBM, in other words, is itself treated as a tool that must be assembled, tried in the field, tinkered with and improved upon, and tried again.

STATE ECOSYSTEM MANAGEMENT: CONCLUSIONS AND RECOMMENDATIONS

On the basis of the three case studies developed here it is possible to discern certain patterns in the experiences that state agency officials have had in their efforts to implement ecosystem management initiatives. It is also possible to identify strategies that have been more conducive to implementation success stories and those that have tended to be less successful. The research team's analysis of these successful and unsuccessful strategies leads to the series of recommendations offered in this section.

PILOT PROGRAMS

The successful local programs initiated by the Florida DEP and the Minnesota DNR as well as the unsuccessful regional program attempted by the Missouri Department of Conservation point to the tremendous importance, especially for government-led EM efforts, of selecting manageable pilot programs and devoting the resources necessary to see them implemented. Successful pilot programs serve as catalysts for staff morale and public support. They provide a foundation that can be used to expand programs, legitimate further expenditures, and draw in additional partners.

MONITORING AND SCIENTIFIC FOUNDATIONS

Adequate resources must be directed, from the earliest stages of a project or initiative, toward developing a monitoring system. Without a well-developed monitoring system, it is impossible to establish reliable baseline data. Without reliable baseline data, it is impossible to measure outcomes in a rigorous way. This in turn makes the evaluation of strategies and programs elusive and makes genuine adaptive management difficult, if not impossible, to practice.

In more general terms, developing the scientific foundations for the EM project is essential. Scientists need to be involved in the planning process, in order to identify the kinds of baseline information that need to be established and the types of programs necessary to obtain that information.

This component of EM can be done relatively independently of extensive public involvement. Since having baseline data against which to measure accomplishment is so important for justifying EM to legislators and the broader public, state agencies should devote special attention to this dimension of EM from the earliest phases of an initiative.

BUDGETING, ACCOUNTING, AND PERFORMANCE EVALUATION

One of the principal battlegrounds for state agencies in their efforts to implement EM is the budgeting process. Agencies are unlikely to succeed with EM initiatives unless strenuous efforts are made to transform budgeting, accounting, and performance evaluation procedures and match them to the objectives and outcomes of EM.

To accord with the objectives of many EM initiatives, funds need to be allocated on a regional, as opposed to a divisional or media-specific, basis. This mechanism

enables priorities to be set by managers closer to and more familiar with ecosystem-level program activities. Moreover, budget schemes can be designed—as is true to some extent in all three of the state agencies examined here—in such as way as to encourage regional-scale work by interdisciplinary ecosystem teams. These schemes can be used to promote a more localized and interdisciplinary approach to management problems, but also to engender competition between regional offices, potentially stimulating creative program activity at the grassroots level.

A budget system that allocates funds and allows the administration of programs to occur on a more regional or place-based level, however, will fail to achieve its purposes if it is not coupled with an evaluative system that is capable of quantifying and reporting outcomes that result from ecosystem-scale program activity. Serious theoretical and practical issues are involved here. From a theoretical perspective, it remains unclear what ecosystem-level measures of success in fact are and how best they should be quantified. Until a firmer consensus arises in the scientific community about what set of indicators are best suited to measuring ecosystem integrity, it will remain difficult for EM practitioners to justify their activities in anything other than process terms. (It is not an accident that "performance," in the case of the Florida EM initiative, was measured in terms of the number of ecosystem management teams established over the course of a year. This is certainly quantifiable, but whether it bears any real relationship to ecosystem health or integrity is by no means clear.)

The practical problem resulting from this situation is that managers and administrators will be unable to justify their achievements to central offices and ultimately to the legislative bodies that authorize and appropriate funds for their programs. In Florida, a pattern developed in which legislative budget committees required that program performance be accounted for in terms of media specific outcomes (e.g., reduced concentrations of particular chemical substances in air or water samples). This demand reflected both the traditional way of doing things within the political system but also the familiar ways of tracking and reporting results within the scientific, management, and regulatory communities. Until alternative methods measuring and reporting achievements are developed, ones that more adequately reflect wider-scale ecological processes and trends, and until these results can be communicated intelligibly to policy makers, progress on internal agency EM initiatives will prove difficult.

ECOSYSTEM MANAGEMENT AND REGULATORY POLICY

Ecosystem management originated as a new way of thinking about natural resource management. Early experiments with EM were with land management agencies such as the U.S. Forest Service and Bureau of Land Management and with partnership-based projects that often radiated out from programs initiated by these federal agencies. Natural resource management, however, especially when approached at an ecosystem scale, is inextricably bound to regulatory policy.

A very large and interesting field for EM opens up in relation to environmental regulation. Florida's EM initiative is a case in point. Florida DEP officials involved with the EM initiative repeatedly expressed the opinion that purely voluntary, partnership-based approaches to EM were unlikely to succeed. Wherever significant private lands and commercial enterprises were involved, they claimed, some form of regulatory regime was necessary as a complement to voluntary, incentive-based programs.

Commenting on EM initiatives in other states, especially those such as Wisconsin in which regulatory and management responsibilities are housed within one agency, one Florida official remarked:

> The EM was primarily placed-based and I advised them at that point that they needed to get the permitting integrated with the place-based management. What we find in our system is that you can get all the permits done within a basin and have compliance, but the basin can still be deteriorating because of non-point sources or development or other factors going on in the system. And until you get all of that laid out in one place so that you can analyze it, you generally won't be sure what's happening in the basin.

What Florida officials recognized, in other words, was that the ecosystem approach is as germane to regulatory policy as it is to resource management policy. Piecemeal regulatory policy often fails to identify systemic problems and to formulate solutions that are sufficiently comprehensive and coordinated to address such problems. To take another example, the problem of cross-media shifting of environmental contaminants – wherein, for example, waste matter from scrubbers designed reduce air pollution finds its way into water supplies or generates problems for solid waste disposal – also points to the need for an integrated approach to environmental protection.

Considerable obstacles will continue to be encountered by regulatory agencies seeking to implement EM initiatives. Chief among them is the fact that regulatory scheme delineated by much federal and state law – from the Clean Water Act to the Clean Air Act – is media-based and does not adequately recognize the overarching ecological systems of which these media are subordinate and interdependent elements.

HEADING OFF POLITICAL OPPOSITION

The saga of the CRM initiative in the Missouri Department of Conservation is in part particular to the state and the local political dynamics of the Ozarks. With the benefit of hindsight, however, some more general lessons can be learned from this misadventure.

The overriding lesson is that EM managers need to be aware that many farm and landowner groups are highly suspicious of interagency collaborative ventures with significant participation by state and federal regulatory agencies (e.g. the Missouri Department of Natural Resources or the U.S. Fish and Wildlife Service). The fear, whether misplaced or not, is that increased collaboration will result in more comprehensive information collection and information sharing efforts and that the information, especially that gathered on private lands, will eventually translate into stricter land use regulations. These concerns derive in large measure from the enforcement of the Clean Water Act and the Endangered Species Act, but also and more generally as a result of stricter permitting regimes being established by many state and federal environmental regulatory agencies.

Theoreticians of ecosystem management frequently stress the importance of public participation in natural resource planning and management. This statement by Cortner is typical: "If ecosystem management is to succeed, it will require widespread

public support: support which must be generated through democratic processes."[37] While the former claim is undoubtedly true, the difficulties experienced by public officials in Florida and Missouri and the successes encountered by EM strategists in Minnesota suggest that a measure of pragmatism should be mixed with one's embrace of public involvement. It is important to remember that the democratic process is inextricably linked with a political process based on vying interest groups. Advocates of EM need to devote considerable time and effort to preparing the ground for the public debate over the merits of EM. Given the complexity of ecosystem-level resource management and the ease with which complex issues can become distorted in public discourse and media representations, managers and policy makers should work to establish the scientific credibility of their programs prior to engaging in large-scale public involvement efforts.

With that caveat stated, it remains true in most cases that the best way to head off potential political trainwrecks is to work closely with local stakeholders – especially those who are most skeptical of the project – in the early phases of the initiative. While this work is difficult and at times uncomfortable, it can make the difference between a project that succeeds and one that never makes it beyond the planning phase.

[37] Cortner, Hanna J., Mary G. Wallace, Sabrina Burke, and Margaret A. Moote, "Institutions Matter: The Need to Address the Institutional Challenges of Ecosystem Management," Landscape and Urban Planning 40 (1998), 162-3.

Appendices

Appendix A

Ecosystem Management Projects Originally Included in 1995 Study

Ecosystem Management Project Name	State	1995 Study	1999 Study
ACE Basin	SC	♦	♦
Albany Pine Bush	NY	♦	♦
Allegan State Game Area	MI	♦	♦
Applegate Partnership	OR	♦	NR
Barataria-Terrebonne National Estuary Program	LA	♦	NR
Bitterroot Ecosystem Management Research Project	ID, MT	♦	♦
Block Island Refuge	RI	♦	♦
Blue Mountains Natural Resources Institute	OR, WA	♦	♦
Butte Valley Basin	CA	♦	♦
Cache River Wetlands	IL	♦	♦
Cache/Lower White Rivers Ecosystem Management Plan	AR	♦	♦ - Inactive
Camp Johnson Sandplain Restoration	VT	♦	♦
Canyon Country Partnership	UT	♦	Inactive
Chattooga River Project	GA, NC, SC	♦	NR
Chequamegon National Forest Landscape Analysis and Design	WI	♦	NR
Chesapeake Bay Program	MD, VA, DE, DC, PA, WV, NY	♦	♦
Cheyenne Bottoms Wildlife Area	KS	♦	♦
Chicago Regional Biodiversity Council (formerly Chicago Wilderness)	IL	♦	♦
Clinch Valley Bioreserve	VA, TN	♦	NR
Colorado State Forest Ecosystem Planning Project	CO	♦	♦
Congaree River Corridor Water Quality Planning Assessment	SC	♦	NR
Corpus Christi Bay National Estuary Program	TX	♦	♦
Darby Creek Partnership (formerly Big Darby Creek Partnership)	OH	♦	♦
Dos Palmas Oasis	CA	♦	♦
East Fork Management Plan	WY	♦	♦
Eastern Upper Peninsula Partners in Ecosystem Management	MI	♦	♦
Ecosystem Charter for the Great Lakes-St. Lawrence Basin	MN, WI, IL, IN, MI, OH, PA, NY, Ontario, Quebec	♦	♦
Elliott State Forest Management Plan	OR	♦	♦
Escanaba River State Forest	MI	♦	♦

Ecosystem Management Project Name	State	1995 Study	1999 Study
Fish Creek Watershed Project	IN,OH	♦	♦
Florida Bay Ecosystem Management Area	FL	♦	NR
Georgia Mountain Ecosystem Management Project	AL	♦	♦
Grand Bay Savanna	AL, MS	♦	♦
Greater Yellowstone Ecosystem	WY, MT, ID	♦	NR
Green Valley State Park Ecosystem Management Plan	IA	♦	♦
Guadalupe-Nipomo Dunes Preserve	CA	♦	♦
Gulf of Maine Rivers Ecosystem Plan	ME, MA, NH	♦	♦
Gulf of Mexico Program	FL, AL, MS, LA, TX	♦	
Hudson River/New York Bight Ecosystem	NY, NJ, CT, MA	♦	♦
Indiana Grand Kankakee Marsh Restoration Project	IN	♦	♦
Integrated Landscape Management for Fish and Wildlife	WA	♦	♦ - Inactive
Interior Columbia Basin Ecosystem Management Project	OR, WA, ID, MT, WY, NV, UT	♦	♦
Interior Low Plateau	KY, TN, AL	♦	♦
Iowa River Corridor Project	IA	♦	♦
Karner Blue Butterfly Habitat Conservation Plan	WI	♦	♦
Kenai River Watershed Project	AK	♦	♦
Konza Prairie Research Natural Area	KS	♦	♦
Lajas Valley Lagoon System	PR	♦	♦
Lower Rio Grande Valley National Wildlife Refuge	TX	♦	♦
Lower Roanoke River Bioreserve	NC	♦	NR
Lower St. Johns River Ecosystem Management Area	FL	♦	♦
Malpai Borderlands Initiative	NM, AZ	♦	♦
Marathon County Forest	WI	♦	♦
Mary's River Riparian/Aquatic Restoration Project	NV	♦	♦
McPherson Ecosystem Enhancement Project	ID	♦	♦
Mesa Creek Coordinated Resource Management Plan	CO	♦	♦
Minnesota Peatlands	MN	♦	NR
Missouri Coordinated Resource Management	MO	♦	♦ - Inactive
Missouri River Mitigation Project	NE, KS, IA, MO	♦	NR
Molokai Preserves	HI	♦	NR
Natural Resource Roundtable (project has since split into sub-groups)	HI	♦	♦ - Inactive
Nebraska Sandhills Ecosystem	NE	♦	♦
Negrito Project	NM	♦	♦

Ecosystem Management Project Name	State	1995 Study	1999 Study
New Hampshire Forest Resources Plan	NH	♦	NR
New Jersey Pinelands	NJ	♦	NR
Northeast Chichagof Island	AK	♦	Inactive
Northern Delaware Wetlands Rehabilitation Program	DE	♦	♦
Northern Forest Lands Council	ME, NH, VT, NY	♦	♦
Northern Lower Michigan Ecosystem Management Project	MI	♦	♦
Ohio River Valley Ecosystem	IL, IN, OH, KY, WV, PA, MD, VA, NY, TN	♦	♦
Oklahoma Tallgrass Prairie Preserve	OK	♦	♦
Ouachita National Forest	AR, OK	♦	♦
Owl Mountain Partnership	CO	♦	♦
Partners for Prairie Wildlife	MO	♦	♦
Patrick Marsh Wetland Mitigation Bank Site	WI	♦	♦
Phalen Watershed Project	MN	♦	♦
Piute/El Dorado Desert Wildlife Management Area	NV	♦	♦
Plainfield Project	MA	♦	♦ - Inactive
Prairie Pothole Joint Venture	IA, MN, MT, ND, SD	♦	♦
Prince William Sound - Copper River Ecosystem Initiative	AK	♦	♦ - Inactive
Pu'u Kukui Watershed Management Area	HI	♦	♦
Rainwater Basin Joint Venture	NE	♦	NR
Robbie Run Study Area	PA	♦	♦
Ruby Canyon and Black Ridge Ecosystem Management Plan	CO	♦	♦
San Luis Valley Comprehensive Ecosystem Management Plan	CO	♦	♦
San Pedro River	AZ	♦	♦
Santa Catalina Island Ecological Restoration Program	CA	♦	NR
Santa Margarita River	CA	♦	NR
Sideling Hill Creek Bioreserve	MD, PA	♦	♦
Snake River Corridor Project	WY	♦	Inactive
South Florida Ecosystem Restoration Task Force (formerly "South Florida/Everglades Ecosystem Restoration Initiative")	FL	♦	♦
St. Marys River Remedial Action Plan	MI, Ontario	♦	♦
State Lines Serpentine Barrens	PA, MD	♦	♦
Stegall Mountain Natural Area	MO	♦	♦
Tensas River Basin Initiative	LA	♦	NR
Tidelands of the Connecticut River	CT	♦	♦
Trail Creek Ecosystem Analysis	ID	♦	♦
Trout Mountain Roadless Area	CO	♦	NR

Ecosystem Management Project Name	State	1995 Study	1999 Study
Upper Farmington River Management Plan	CT, MA	♦	NR
Upper Huerfano Ecosystem	CO	♦	♦
Verde River Greenway	AZ	♦	♦
Virginia Coast Reserve	VA	♦	♦
Wild Stock Initiative	WA	♦	♦
Wildlife Area Planning	WA	♦	♦
Wildlife Habitat Improvement Group	VT	♦	♦

NR = No Response

Appendix B

Survey of Ecosystem Management Practitioners

Survey of Recent Trends in Ecosystem Management

School of Natural Resources and Environment
University of Michigan

May 1999

Survey of Recent Trends in Ecosystem Management

I. Project Organization and Management

1. What is the current status of the project? (Please check all that apply.)
   - _____ Planning
   - _____ Some implementation
   - _____ Full implementation
   - _____ Inactive
   - _____ Other: _____

2. Which of the following strategies are being used in your project? Also indicate which strategies you plan to use in the future.

	Strategy *Currently* Used			*Plan* to Use in the Future?		
	Not Used	Minor Strategy	Major Strategy	Yes / No / Don't Know		
a) Develop ecosystem management plan				Y	N	D K
b) Collect new information on ecological, social, or economic factors				Y	N	D K
c) Share existing information on ecological, social, or economic factors				Y	N	D K
d) Monitor ecological, social, or economic factors for change resulting from the project				Y	N	D K
e) Create plans for restoring natural processes (hydrologic flows, disturbance regimes, etc.)				Y	N	D K
f) Undertake ecological restoration				Y	N	D K
g) Acquire additional area for the project through purchase				Y	N	D K
h) Acquire additional area for the project through easements				Y	N	D K
i) Purchase of rights (water, grazing, timber, development)				Y	N	D K
j) Create reserves (from currently owned land) within the project area				Y	N	D K
k) Change management practices within project area				Y	N	D K
l) Promote compatible resource uses				Y	N	D K
m) Increase/ensure stakeholder involvement				Y	N	D K
n) Coordinate with existing projects				Y	N	D K
o) Conduct education and outreach				Y	N	D K
p) Use existing state and federal programs				Y	N	D K
q) Locate project office/staff in the project area				Y	N	D K
r) Promote policy changes at the state or national level				Y	N	D K
s) Ensure adequate resource through fundraising				Y	N	D K

3. Have the objectives of the project changed (e.g., objectives modified or added) since the 1995 write-up? If so, which objectives have changed, and how? Why have they changed?

4. Has the organization of the project changed since the 1995 write-up (for example, new committees, different decision making approaches, etc.)? If so, how? Why has it changed?

5. Please indicate the current level of involvement of the following groups.

	Not Involved		Moderately Involved		Very Involved	Don't Know
a) Elected officials/politicians	1	2	3	4	5	X
b) Federal natural resource agencies	1	2	3	4	5	X
c) Other federal agencies	1	2	3	4	5	X
d) State natural resource agencies	1	2	3	4	5	X
e) Other state government agencies	1	2	3	4	5	X
f) Local governments	1	2	3	4	5	X
g) National/Regional non-governmental organizations	1	2	3	4	5	X
h) Local non-governmental organizations	1	2	3	4	5	X
i) Industry (e.g., timber, grazing, recreation)	1	2	3	4	5	X
j) Colleges/Universities	1	2	3	4	5	X
k) Private landowners	1	2	3	4	5	X
l) Tribal representatives	1	2	3	4	5	X
m) General public	1	2	3	4	5	X
n) Other:	1	2	3	4	5	X

6. Who is ultimately responsible for ensuring implementation of the project's objectives?

II. Monitoring & Success

7. Please provide information on the following indicators that could be used to monitor project success.

Indicator	Extent to which indicator is used				Have baseline information?
	Not Used	Not Used, Will Use in Future	Minor Use	Major Use	
a) Flora and/or fauna *Explain:*	1	2	3	4	Yes No
b) Soil *Explain:*	1	2	3	4	Yes No
c) Water *Explain:*	1	2	3	4	Yes No
d) Ecosystem processes *Explain:*	1	2	3	4	Yes No
e) Changes in management activities *Explain:*	1	2	3	4	Yes No
f) Changes in resource/land use *Explain:*	1	2	3	4	Yes No
g) Coordination/Cooperation with others *Explain:*	1	2	3	4	Yes No
h) Levels of information sharing *Explain:*	1	2	3	4	Yes No
i) Public awareness/opinion *Explain:*	1	2	3	4	Yes No
j) Other *Explain:*	1	2	3	4	Yes No

8. What factors do you use to evaluate the effectiveness of the *process* by which the project is managed (e.g., reduced conflict, levels of trust)?

9. How successful do you consider the project?

Not Successful 1 2 3 4 5 Very Successful

10. What factors did you consider in rating the success of this project?

III. Project Outcomes

11. To what extent do you agree that the following *ecological outcomes* have resulted from the effort of your project?

	Strongly Disagree		Neither Agree nor Disagree		Strongly Agree	N/A
a) Historical disturbance regimes are being restored.	1	2	3	4	5	X
b) Native plants or animals are being reintroduced.	1	2	3	4	5	X
c) Hydrologic regimes are being restored.	1	2	3	4	5	X
d) The overall integrity of the ecosystem has improved.	1	2	3	4	5	X
e) Invasive species are being removed.	1	2	3	4	5	X
f) Populations of native plant or animal species have increased.	1	2	3	4	5	X
g) Water quality has improved within the ecosystem.	1	2	3	4	5	X
h) Scientific understanding of the area has improved.	1	2	3	4	5	X
i) Scientific research within the area has increased.	1	2	3	4	5	X
j) Restoration of degraded areas within the ecosystem is ongoing.	1	2	3	4	5	X
k) A monitoring program has been established to track changes within the ecosystem.	1	2	3	4	5	X
l) A baseline data source exists upon which to track ecological results.	1	2	3	4	5	X
m) The number of native plant or animal species has increased.	1	2	3	4	5	X

12. Are there other ecological outcomes (or outcomes mentioned above) you would like to explain further?

13. To what extent do you agree that the following *procedural and/or behavioral outcomes* have resulted from the efforts of your project?

	Strongly Disagree		Neither Agree nor Disagree		Strongly Agree	N/A
a) Communication and cooperation between stakeholders has improved.	1	2	3	4	5	X
b) An ecosystem management plan has been developed.	1	2	3	4	5	X
c) An ecosystem management plan is being implemented.	1	2	3	4	5	X
d) Public awareness of the project's ecosystems and their stresses has increased.	1	2	3	4	5	X
e) Managers have shifted their concept of land management towards ecosystem management.	1	2	3	4	5	X
f) Land has been acquired.	1	2	3	4	5	X
g) Conservation easements have been established.	1	2	3	4	5	X
h) Reserves from currently held project land have been set aside.	1	2	3	4	5	X
i) Public awareness of ecosystem-based management efforts has increased.	1	2	3	4	5	X
j) Small, private landowners' management practices have improved.	1	2	3	4	5	X
k) Public education efforts have increased.	1	2	3	4	5	X
l) There has been an increase in trust and respect among stakeholders.	1	2	3	4	5	X
m) Decision making structures have been developed.	1	2	3	4	5	X
n) New stakeholders have become involved in project activities.	1	2	3	4	5	X
o) Fundraising efforts have been successful.	1	2	3	4	5	X
p) Commercial/industrial landowners' management practices have improved.	1	2	3	4	5	X
q) On-the-ground management practices have improved within the area.	1	2	3	4	5	X
r) Managers have been educated in ecosystem management.	1	2	3	4	5	X
s) Management practices are more responsive to new information.	1	2	3	4	5	X

14. Are there other procedural outcomes (or outcomes mentioned above) you would like to explain further?

IV. Attaining Project Goals

15. Please rate the significance of the following factors in *facilitating* progress on the project.

	Not Significant		Moderately Significant		Very Significant
a) Collaborative or consensus-based	1	2	3	4	5
b) Broad stakeholder involvement	1	2	3	4	5
c) Adequate funding	1	2	3	4	5
d) Support of landowners	1	2	3	4	5
e) Involvement of non-governmental organizations	1	2	3	4	5
f) Hiring staff from surrounding communities	1	2	3	4	5
g) Links to existing federal agency program(s)	1	2	3	4	5
h) Well-trained personnel	1	2	3	4	5
i) Adaptive management approaches	1	2	3	4	5
j) Interagency cooperation	1	2	3	4	5
k) Shared sense of place among stakeholders	1	2	3	4	5
l) Support of politicians/elected officials	1	2	3	4	5
m) Links to existing local/state agency program(s)	1	2	3	4	5
n) Geographical information system (GIS)	1	2	3	4	5
o) Sense of common purpose among	1	2	3	4	5
p) Adequate monitoring programs	1	2	3	4	5
q) Well-defined management plan	1	2	3	4	5
r) Presence of dedicated, energetic	1	2	3	4	5
s) Commitment and follow-through by	1	2	3	4	5
t) Strong project leadership	1	2	3	4	5
u) Increased trust between stakeholders	1	2	3	4	5
v) Availability of baseline data	1	2	3	4	5
w) Well-defined, understandable project boundaries (e.g., watershed, public lands)	1	2	3	4	5

16. Are there additional factors (or comments about factors listed above)? If so, please explain.

17. Please rate the relative significance of the following factors in *impeding* the project.

	Not Significant		Moderately Significant		Very Significant
a) Funding shortages	1	2	3	4	5
b) Severity of ecological stresses	1	2	3	4	5
c) Personnel shortages	1	2	3	4	5
d) High turnover rate of agency personnel	1	2	3	4	5
e) Insufficient scientific information	1	2	3	4	5
f) Opposition by elected officials/politicians	1	2	3	4	5
g) Resistance by agencies	1	2	3	4	5
h) Opposition by interest groups	1	2	3	4	5
i) Legal action	1	2	3	4	5
j) Lack of stakeholder involvement	1	2	3	4	5
k) Lack of interagency cooperation	1	2	3	4	5
l) Inadequate baseline data	1	2	3	4	5
m) Lack of geographical information system (GIS)	1	2	3	4	5
n) Inadequate leadership	1	2	3	4	5
o) Pressure for development or other	1	2	3	4	5
p) Opposition by land owners	1	2	3	4	5

18. Are there additional factors (or comments about factors listed above)? If so, please explain.

V. Outlook

19. What are the most important factors needed for continued progress?

20. What two or three pieces of advice do you have for natural resource managers initiating a new ecosystem management effort?

Thank you for taking the time to complete this survey! We appreciate your effort. Please return the completed survey in the enclosed stamped envelope by ***June 14***.

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You may use this space for additional comments or elaboration on your project if you wish.

Appendix C

Forest Service Methodology

The research team was interested in understanding to what extent the ecosystem-based management philosophy had permeated the ranks of Forest Service employees and created change at the local level. The general themes explored included:

- What changes have occurred on the ground over the past decade?
- What is driving what happens on the ground? Has the EM mandate had an affect?
- What factors have facilitated and/or impeded implementation of ecosystem-based management practices?

To search for finer scale answers to these questions, the team focused on a single national forest and conducted interviews with employees at both the forest and district level. Major methodological steps included:

1) *Development of research questions:* The research team first developed a set of questions for examining changes in behavior and attitudes of staff at both the forest and district offices, as well as changes in programs, organization, management, and monitoring practices. The "Recent Trends in Ecosystem Management" survey elaborated by the EM 2000 Project Team provided a basis for developing these questions that target the USFS. In addition, a literature review and preliminary conversations with regional- and national-level employees helped to develop key interview questions.

2) *Selection of case study site:* Prospective case study sites were limited to Forest Service Region 6 (Pacific Northwest). This region was of interest because of the ecosystem management efforts resulting from endangered species litigation and the President's 1994 Northwest Forest Plan. (It should be noted that the goal of this in-depth case study was not to draw broad conclusions about EM in the Forest Service, but to make an informed hypothesis about the impact of EM in one Pacific Northwest National Forest.) Preliminary discussions with Region 6 Forest Service employees facilitated the identification of candidate sites for case studies. The Wenatchee National Forest and the Cle Elum District within the forest were selected for several reasons:

- The availability and willingness of Forest and District staff to share detailed information about day-to-day activities of their job.
- Situated along the east side of the Cascade Mountain range, the Wenatchee National Forest is affected by two major ecosystem-based management efforts: FEMAT on its East side and the Interior Columbia Basin Ecosystem Management Project on its west side.
- Wenatchee National Forest and the Cle Elum District have a major urban influence. The greater Seattle is just 85 miles east of the Cle Elum District. This made the forest interesting from the perspective of understanding the role of human activities in ecosystem-based management.
- The Cle Elum District sits in one of the ten Adaptive Management Areas established under FEMAT.

3) *Identification of interviewees within the district and forest:* A total of 15 interviews were conducted, including four employees from the Wenatchee National Forest Supervisor's Office and 11 from the Cle Elum Ranger District. Staff interviewed represented a diverse set if disciplines and groups at the forest and district level, including but not limited to fish and wildlife sciences, timber management, fire management, fire fuels, recreation, and the District Ranger.

4) *Interview process:* The first part of the interview focused on understanding how organizational life has changed over the past ten years. The latter part of the interview addressed questions about what is driving what happens in the forest. An interview questionnaire was used as guide during the interviews, however the interviews were conducted in a relatively conversational manner. All interviews were taped and transcribed to ensure accuracy and completeness of the information. The transcripts were also used as a basis for coding and organizing the content of the interviews.

5) *Review of literature and other material on the case study site:* Manuals, reports, organizational charts, budgets, articles and internal correspondence related to change occurring past decade within Wenatchee National Forest and the Cle Elum District were collected and reviewed.

Appendix D

Profile of Interviewees from Wenatchee National Forest and the Cle Elum Ranger District

Name	Title/Area of expertise	Year started USFS	Year started Cle Elum District or Wenatchee SO
Catherine Stephenson	District Ranger	1970	1992
Bill Ehinger	Fisheries biologist	1990	1993
Patty Garvey-Darda	Wildlife biologist	Late 1980s	1990
Roger Skistad	Public Services Group Leader	1972	1983
Cindy Hester	Support services (business administrator)		
Gary Fudacz	Fire Fuels Planner	1966	1966
Bryce Cotton	Timber Planning Group Leader	1970	1983
Keith Kelly	Mineral administration (Geologist)	1988	1988
Jim Bannister	Fire, trails, and heritage resources		
Jim Furlong	Planning & Environment, Lands and Minerals, 1999-present; Ecosystem Coordinator 1992-99	1980	1992 (SO)
Steve Carter	Wildlife biologist	1972	1981
Tina Mayo	Fisheries biologist	Circa 1988	circa 1992
Jo Ellen Richards			
Elton Thomas	Natural Resources Group Leader 1991-early 1999	Circa 1965	1991 (SO)
Ken MacDonald	Fisheries, Wildlife, Timber and Recreation Group Leader	Circa 1980	1988 (SO)
Vladimir Steblina	Previously Planning Team Leader and forest economist; Currently manages recreation and wilderness programs		1986 (SO)

Appendix E

Case Studies Developed

Keeping the Project Alive Over Time
- Block Island Refuge
- Grand Bay Savannah
- Verde River Greenway

Use of Federal and State Programs
- Cache River Wetlands
- Northern Delaware Wetlands Rehabilitation Program

Land Acquisition
- Cache River Wetlands
- Grand Bay Savanna
- Guadalupe-Nipomo Dunes Preserve
- Marathon County Forest
- Oklahoma Tallgrass Prairie Preserve
- Sideling Hill Creek Bioreserve
- Verde River Greenway

Development of an Ecosystem Management Plan
- Ouachita National Forest
- Northern Delaware Wetlands Rehabilitation Program

Strategy Spotlight: Promoting Policy Change
- Lajas Valley Lagoon System
- Wildlife Habitat Improvement Group

Stakeholder Involvement
- Ecosystem Charter of the Great Lakes-St. Lawrence Basin
- Integrated Landscape Management for Fish and Wildlife
- Karner Blue Butterfly Habitat Conservation Plan

Increasing Role of States
- Kenai River Watershed Project
- Owl Mountain Partnership
- San Luis Valley Comprehensive Ecosystem Management Plan

Involvement of Private Landowners
- Mesa Creek Coordinated Resource Management Plan
- Owl Mountain Partnership
- San Luis Valley Comprehensive Ecosystem Management Plan
- Verde River Greenway

National and Local NGO Involvement
- Integrated Landscape Management for Fish and Wildlife
- Negrito Project

Project Monitoring

Ecosystem Charter of the Great Lakes-St. Lawrence Basin
Karner Blue Butterfly Habitat Conservation Plan
Sideling Hill Creek Bioreserve
Wildlife Habitat Improvement Group

Measuring Success: What Makes a Project Successful?

Ecosystem Charter of the Great Lakes – St. Lawrence Basin
Lajas Valley Lagoon System

Measuring Success Based on Ecological Outcomes

Block Island Refuge
Wildlife Habitat Improvement Group

Project Size and Ecological Outcomes

Block Island Refuge
Guadalupe-Nipomo Dunes Preserve
Northern Delaware Wetlands Rehabilitation Program
Oklahoma Tallgrass Prairie Preserve

Ecological Outcomes and Age of Project (Project Outcomes)

Karner Blue Butterfly Habitat Conservation Plan
Verde River Greenway
Wildlife Habitat Improvement Group

Building Trust

Kenai River Watershed Project
Karner Blue Butterfly Habitat Conservation Plan
Mesa Creek Coordinated Resource Management Plan
San Luis Valley Comprehensive Ecosystem Management Plan

Improvements in Management Practices of Small, Private Landowners

Kenai River Watershed Project
Mesa Creek Coordinated Resource Management Plan
San Luis Valley Comprehensive Ecosystem Management Plan

Implementing an Ecosystem Management Plan

Karner Blue Butterfly Habitat Conservation Plan
Marathon County Forest
Mesa Creek Coordinated Resource Management Plan
Negrito Project
Northern Delaware Wetlands Rehabilitation Program
Sideling Hill Creek Bioreserve

Advantages and Challenges Faced by Large and Small Projects

Block Island Refuge
Cache River Wetlands
Oklahoma Tallgrass Prairie Preserve

Insufficient Scientific Information as an Impeding Factor

Kenai River Watershed Project

Agency Resistance to Ecosystem Management

Guadalupe-Nipomo Dunes Preserve
Integrated Landscape Management for Fish and Wildlife

Strategies for Projects Facing Development Pressure

Cache River Wetlands
Integrated Landscape Management for Fish and Wildlife
Lajas Valley Lagoon System
Oklahoma Tallgrass Prairie Preserve
San Luis Valley Comprehensive Ecosystem Management Plan
Wildlife Habitat Improvement Group

Characteristics of Leadership Demonstrated in EM Projects

Integrated Landscape Management for Fish and Wildlife

Appendix F

Case Study Interview Questions

Keeping the Project Alive Over Time

1. When was your project established?
2. When would you say that implementation activities began?
3. Have you found increasing results (process and ecological outcomes, level of involvement, links to resources) from your project as it has grown older?
4. Did you expect to see results sooner than you did?
5. How long was your project established before results were seen?
6. What has kept the project going?
7. What major roadblocks did the project encounter? When was that?
8. People indicated in our survey that the presence of energetic and dedicated individuals is one of the most important facilitating factors for project progress – this is a big change from 1995 – why do you think this is?

Development of an Ecosystem Management Plan

1. How did your project go about developing an Ecosystem Management plan?
2. Do you think that the development of an EM plan is a necessary part of the evolution of the project?
3. What have you found to be the key elements of an EM plan that must be in place?
4. What factors make the plan effective?
5. How is it communicated to managers and other interested parties?

Implementing an Ecosystem Management Plan

1. Has the development of an EM plan been a major strategy for your project from the outset or has it become a more important strategy in the past five years? Why has it become a major strategy?
2. In what ways has the use of an EM plan contributed to the success of your project?
3. How does use of an EM plan help you to monitor ecological change?
4. How does use of an EM plan help you to achieve different ecological outcomes?

Strategies for Projects Facing Development Pressure

1. What type of development pressure does your project face? (a specific industry, land conversion, fragmentation)
2. Has your project attempted to create conservation easements?
3. If yes, was it successful? When was it? How much land was included in the easement? Who does the land belong to?
4. If no, was any other conservation method attempted, such as purchase of development rights, outright buying of land to include in the project, etc.?

Use of Federal and State Programs

1. Why is “use of existing state and federal programs” a major strategy for your project?
2. Was it a major strategy five years ago and if not, why the change?
3. What state and federal programs are you currently working with?
4. Are these the same programs you worked with five years ago?
5. Do you work with more EM projects/programs today than five years ago? (i.e. trying to understand reason that there has been an increase in use of this strategy.)
6. Do you believe that EM efforts done in conjunction with existing state and federal programs are more likely to be successful?

Strategy Spotlight: Promoting Policy Change

1. Why is promoting policy change a major strategy for your project?
2. How are you implementing this strategy?
3. We found that survey respondents who promote policy change as a strategy also indicated that their projects realized few ecological outcomes. We are trying to understand if there are unique challenges to EM projects that rely on policy change strategies or whether achieving ecological outcomes is not a major goal these projects. Is achieving ecological outcomes a goal of your project? Why do you think your project indicated lower ecological outcomes?

Building Trust

1. In our survey data, project managers report significant increases in the levels of trust and respect between stakeholders. Is this true with your project?
2. What do you think accounts for these increases in trust and respect?
3. How do increased trust and respect facilitate the achievement of project goals?

Land Acquisition

1. Why did the project decide that land acquisition would be a major strategy?
2. In what situations is acquiring land appealing?
3. Are there disadvantages to using land acquisition as a strategy?
4. What are the main ingredients to a successful land transfer?

Project Monitoring

1. How did your project go about building its monitoring program? How did you get the resources to move a monitoring project forward?
2. What do you see as the key elements of a successful monitoring program?
3. What advice do you have for projects establishing monitoring programs?
4. How important is GIS in a monitoring program?
5. How did you determine what the project would monitor?
6. How important are partnerships for monitoring? Specifically, I was curious about a noted correlation in our survey between monitoring programs and state/local agency involvement … i.e. do projects depend upon an environmental agency for data, data gathering, equipment etc.?

Stakeholder Involvement

1. What has kept stakeholders involved in the process?
2. What obstacles have you encountered in getting people involved?
3. Many people say a successful ecosystem management project must get stakeholders involved 'early and often.' Do you agree? Why is that?
4. Key stakeholders - landowners – Did you focus specifically on getting private landowners involved in your project? If so, how did you get landowners involved?

Involvement of Private Landowners

1. How successful has the project been in involving private landowners?
2. How important has landowner involvement been for the advancement of project goals and objectives?
3. What strategies has the project used to involve private landowners?
4. Among the private landowners who decline to become involved, what reasons do they give?

5. Do you think that landowner involvement is an important factor in lessening opposition/increasing support to the project?

Increasing Role of States

1. In your response to the survey, you indicated that both federal and state natural resource agencies were strongly involved in the project. Can you elaborate?
2. Has the role of state agencies increased over the past five years? What agencies?
3. Has this increase been accompanied by a decrease in federal involvement (or a transfer of authority from federal to state agencies)?
4. You indicated (didn't indicate) a strong commitment and follow-through by agencies involved with the project. Could you elaborate?
5. You indicated that your program has significant links with existing local and state programs. What programs?

National and Local NGO Involvement

1. NGOs were cited as being very involved in this project. Who is involved? Which of these are national groups? Local chapters of national groups? Local groups?
2. What is the nature of their involvement?
3. Who/what organization is responsible for the implementation of the EM plan?
4. If not the NGO, is the NGO expected to contribute to the implementation of the plan?
5. If so, how?
6. Who is primarily responsible for funding this project? What is the approximate percentage of their contribution?

Agency Resistance to Ecosystem Management

1. What federal and state agencies are involved in your project?
2. What are their roles?
3. What would you characterize as the greatest impediment toward an acceptance of ecosystem management as an appropriate way to manage the resources in question?
4. What do you think could change managers' attitudes to favor ecosystem management?
5. Who are the proponents, if any, of an ecosystem-based approach to managing this project?

Insufficient Scientific Information

1. Are you working to restore any historic disturbance regimes within the project?
2. If so, which? How?
3. Would you characterize the baseline data regarding the ecosystem that you possess as wholly inadequate, inadequate, sufficient, or more than sufficient?
4. Was baseline data available to the project at its inception, or was it necessary to gather it through the project?
5. Who was responsible for gathering the information?

Improvements in Management Practices of Small, Private Landowners

1. What kinds of improved management practices have been seen with small, private landowners? (Who are these landowners?)
2. What kinds of incentives—financial or otherwise—do landowners have to improve management practices?
3. What are the major obstacles to continued improvements in management practices?

Improvements in Management Practices of Commercial Landowners (not written up separately)

1. What kinds of improved management practices have been seen with commercial landowners?
2. What kinds of incentives—economic or otherwise—do commercial landowners have to improve management practices? (Is it a major strategy of the project to develop such incentives?)
3. What are the major obstacles to continued improvements in commercial management practices?

Ecological Outcomes and Project Size

1. Do you think that the size/area of your project affects your ability to achieve ecological results?
2. Do you believe that smaller projects can still have a significant ecosystem-level impact?

Ecological outcomes and age of project (not used separately)

1. Would you say that your project is realizing more ecological outcomes now than it did in its early stages of development?
2. What has facilitated/impeded this?
3. Is your project realizing more procedural outcomes now than it did 5 years ago?
4. (Might want to explain that in the survey conducted 5 years ago we saw more procedural outcomes. We hypothesized that these might have to occur before projects would see more ecological outcomes. Ask how this fits with their project's experience.)

Ecological Outcomes and Geographic Region (not written up separately)

1. It appears from the survey that the southeast (Midwest, southwest) US had significantly lower (higher) ecological outcome scores. How does that fit with your project's experience?
2. Do you believe that being located in ____ has any influence on your project's ability to achieve ecological results?

What Does a Project Need to be Successful?

1. In response to our survey, you characterized the overall success of the project as a __ out of 5. What were your criteria for that assessment?
2. What would you consider the most significant impediments to the success of the project?
3. Was there a time that you would have considered the project more successful?
4. What is the difference between now and that time?

Measuring Success based on Ecological Outcomes

1. What ecological outcomes do you associate with the success of your project?
2. Are certain ecological outcomes easier to achieve than others? If so, which?
3. Would you associate an ecological outcome (e.g. historical disturbance regimes being restored) with success more readily than you would a procedural outcome (e.g. increased communication among stakeholders)?

Characteristics of Leadership Demonstrated in EM Projects

1. What are the qualities of leadership that are important in implementation of an ecosystem management project?

2. Is there someone involved in this project that exhibits these characteristics?
3. Is a strong leader necessary in this project?
4. Why/why not?
5. Do you think it is necessary to have an individual involved in the project in a leadership role, or can an institution effectively lead this type of project?

Advantages and Challenges Faced by Large and Small Projects

1. What advantages do you see being a large/small project?
2. What disadvantages do you see?
3. Are there ways you can manage for the drawbacks?
4. How do you manage its size?
5. What do you think this means for the project's future?