



**AgEcon** SEARCH

RESEARCH IN AGRICULTURAL & APPLIED ECONOMICS

*The World's Largest Open Access Agricultural & Applied Economics Digital Library*

**This document is discoverable and free to researchers across the globe due to the work of AgEcon Search.**

**Help ensure our sustainability.**

Give to AgEcon Search

AgEcon Search

<http://ageconsearch.umn.edu>

[aesearch@umn.edu](mailto:aesearch@umn.edu)

*Papers downloaded from **AgEcon Search** may be used for non-commercial purposes and personal study only. No other use, including posting to another Internet site, is permitted without permission from the copyright owner (not AgEcon Search), or as allowed under the provisions of Fair Use, U.S. Copyright Act, Title 17 U.S.C.*

*No endorsement of AgEcon Search or its fundraising activities by the author(s) of the following work or their employer(s) is intended or implied.*

## **Historic, Archive Document**

Do not assume content reflects current scientific knowledge, policies, or practices.

November 30, 1993

ECOSYSTEM-BASED MANAGEMENT AT THE PUBLIC-PRIVATE LAND INTERFACEpresented by Joan M. Comanor, Director  
Land Management Planning and Ecosystem Management  
USDA Forest Service

Good afternoon. I am delighted to share with you our current thinking about natural resource management and conservation and likely directions during the decade of the 1990's.

There is purportedly an old Chinese proverb or hex that is, "May you live in interesting times." Someone has obviously placed that hex on all of us! A couple of years ago I heard a speaker who offered the theory that the last decade of every century during the last several hundred years has been a volatile time - a time of transition, an explosion of ideas and creativity, and a time focused on getting one's house in order to enter the next century.

I can find ample evidence to support the premise that we are under the hex of living in interesting times and that for the Department of Agriculture and agencies such as the Forest Service, this is a decade of transition. We are in transition in how we approach our responsibilities for natural resource management and conservation. One aspect of that transition is a paradigm shift or evolution in our management. We refer to the new approach as ecosystem management and it applies to both USDA agencies responsible for natural resource management and conservation - the Forest Service and Soil Conservation Service.

The Forest Service adopted an ecosystem management philosophy in June 1992. We have been engaged for several years in much dialogue, both internally and externally, about this evolution that has centered around several questions. What do we really mean when we refer to ecosystem management? What is different? And for some, the question has been, "What is wrong about what we have been doing?" Because this is an evolution NOT revolution, we do not have complete answers to these questions.

For some in our agency as well as for our publics, especially those who have direct relationships to National Forests and Grasslands and are neighbors, this uncertainty or ambiguity is troubling. Concerns have been expressed about the effect of ecosystem management not only on the public lands but also on individual landowners and their rights. Change - even when it is positive - can be discomfoting and create uncertainty. This discomfort exemplifies the hex I mentioned in my opening comment about living in interesting times, times of transition, of new ideas and shifts in public policy. I want to acknowledge these concerns (they may be yours as well) while I try to describe where we are headed with ecosystem management. The evolution to ecosystem management will be a shift over time, not over night, in our management practices.

## Ecosystem-based Management

Ecosystem management provides a framework for promoting management decisions that are:

- o ecologically responsible,
- o economically viable, and
- o socially acceptable.

These attributes are not new ones for our management. What is new is that we are placing priority on integrating these attributes on multiple scales in framing management choices.

By ecologically responsible we mean management of our natural resources in ways that are sustainable over time and that maintain the structure, function and processes of our natural environment. We are not abandoning our past, but building upon over 100 years of experience in managing forest resources. We are blending with that practical experience and forestry expertise the more recent scientific information and principles developed under the ecological sciences. Our past management has focused primarily on extracting goods and services from the National Forests and Grasslands. Obviously our society will continue to need and expect to have goods and services from the land. What we will put increased emphasis on is maintaining or improving the condition of the land as the context for providing sustainable levels of goods and services. The volume and timing of goods and services must be considered within the capability and suitability of the land. We will be directing more attention to understanding that capability and suitability.

Another aspect of being ecologically responsible is bringing to bear scientifically-credible information more effectively on management activities. We continue to learn more about the individual components of the environment. That has been a strength of our past management. However, in addition we need to understand better the interrelationships among the components of the environment. That is something we have not focused on sufficiently up to now. Better knowledge about the interrelationships among human and natural components of the environment will allow us to manage the land more efficiently and effectively and redeem our stewardship responsibilities. Because there is still much to discover, we will be increasing emphasis on adapting management over time based upon knowledge learned through monitoring the effects of activities.

Perhaps the most significant aspect of ecosystem management is the emphasis on multiscale analyses to aid decisionmaking and monitoring. By better understanding the capability of the land and monitoring effects of management at varying scales (both in space and over time), we will increase our effectiveness. This approach contrasts to our typical activities in which most of our attention is directed to site specific analysis. The implications or consequences of many activities are more readily apparent at a broader, landscape perspective and when followed through time.

## Ecosystem-based Management

Ecosystem management offers a way to place ideas and management into context, both spatially and over time. Individual sites, such as farms, woodlots or ranches, or a tract on the National Forest, are part of watersheds, which form landscapes, which may be aggregated to higher and higher scales to encompass the planet (see Figure 1). It is the recognition of how each of these components nests within larger components that positions us to take an ecological approach to management.

An example that illustrates ecosystem management applications across ownerships is the "Butternut Coalition." In response to serious disease outbreaks affecting butternut trees in the south and northeast, a regional level partnership has been formed among federal and State agencies, universities and the National Association of State Foresters. Their efforts are focused on keeping the butternut tree on the landscape through applied research, sharing genetic material and devising special management practices for landowners. There are many challenges a land manager or landowner faces that he or she simply cannot solve individually or in some cases even recognize. But taking an ecological approach across the landscape allows better understanding of the situation while allowing individual landowners to be the most effective in achieving their individual objectives.

As in the example I just described, ecosystem management is an approach that can also be useful to individual landowners as well as federal or other public land managers. For either a federal land manager or an individual landowner, the sequence of ecosystem management steps would be similar (see Figure 2):

1. Identify and understand resource conditions and trends; the capability and suitability of the land and resources to provide goods and services in a sustainable way based upon the interrelationships among people and the other components of the environment.

Consider these elements not only on the specific tract of ground but also the conditions and trends of the surrounding landscape (i.e., what is happening at that scale which will influence condition and trend on the specific tract of land).

2. Determine desired conditions within the context of the land's capability and suitability (these include conditions of the land over time as well as the goods and services to be derived). For public land managers, these desired conditions would be developed with ongoing open public dialogue.
3. Identify the actions necessary to achieve and sustain the desired conditions.
4. Monitor the effects of management activities and adjust actions as appropriate.

## Ecosystem-based Management

Among the many programs of the Forest Service, none is better suited for delivering ecosystem management assistance to private nonindustrial forest landowners than the Forest Stewardship Program and the Stewardship Incentive Program. They are intended to provide professional assistance to landowners on a voluntary basis to meet their own objectives in an environmentally sensitive and economically beneficial way. Authorized by the 1990 Farm Bill, the programs to date have provided more than \$21 million in assistance to 25,000 landowners. State Stewardship Committees are operating in every state and they can provide an outstanding forum for discussing ecosystem management applications to meet local needs and objectives. A couple of the state committees have formally adopted ecosystem management concepts. The reason these programs are well positioned for ecosystem management is that they are based upon voluntary partnerships, which is a cornerstone of our State and Private Forestry activities.

In conclusion, as we learn more and bring science into a stronger partnership with management, we can be more successful in living in harmony with our natural environment. By bringing the thinking together about environmental, social and economic objectives, we will begin implementing ecosystem management (see Figure 3). We can develop more prudent management activities and be more cost effective in achieving our conservation objectives for our forests and woodlands. Indeed, ecosystem management provides an effective framework for living in interesting times!

Figure 1

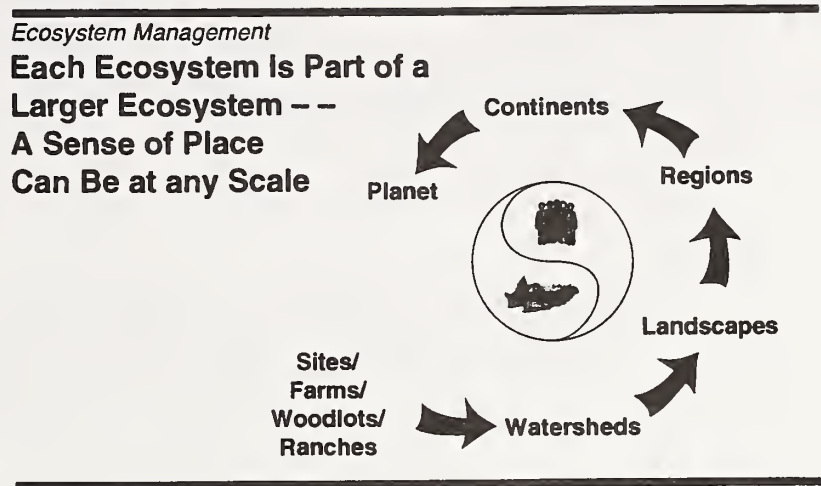


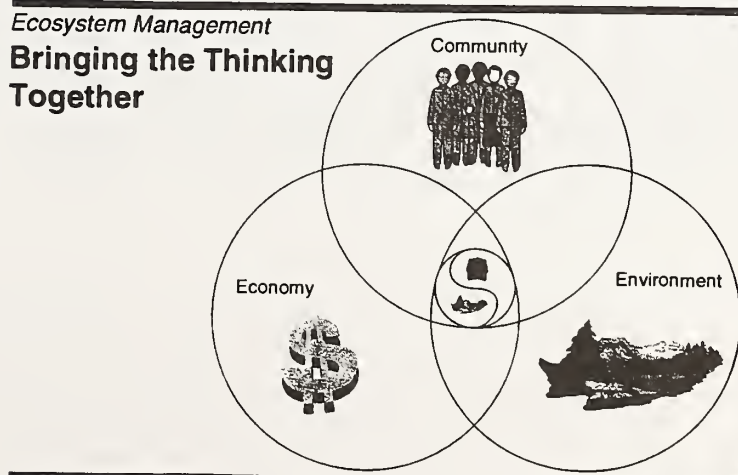
Figure 2

---

**Desired Future Conditions: Land, People, & Resources**

- What exists now -- inventory
  - How it got that way -- history
  - What is ecologically possible -- capability
  - What is economically feasible -- analysis
  - What is socially desirable -- end results
  - How to get from here to there -- actions
- 

Figure 3



IMPLEMENTING ECOSYSTEM-BASED ASSISTANCE  
FOR THE MANAGEMENT OF NATURAL RESOURCES  
IN THE SOIL CONSERVATION SERVICE -  
WHAT DOES IT MEAN FOR LAND USERS?

Diane E. Gelburd, Ph.D.  
Associate Deputy Chief for Programs  
Soil Conservation Service

With telecommunications weaving us into a network with the rest of the world, we are constantly reminded of how we are part of a much larger system - one on a global scale. So it is with natural resources. The air we breathe today may be inhaled by an Icelandic tomorrow, and was inhaled by an Ohioan yesterday. We realize that our vast resources in the United States are not limitless and they are interdependent. We in the Soil Conservation Service (SCS) have become acutely aware of how important it is to conserve natural resources as elements of an ecosystem. Our emphasis on highly erodible land and wetlands, required by the Food Security Act during these past 8 years, has made us very aware of the need for a more holistic approach for a healthier, sustainable environment. Many other agencies and organizations are concluding that a fragmented approach to environmental protection does not work well. We need to consider all the resources - soil, water, air, plants and animals, as well as ecosystem processes and social and economic viability.

As with the Forest Service and many other agencies, the Soil Conservation Service is preparing to deliver to its customers a new and better way of managing natural resources. This new service blends the latest ecosystem science principles with the sound conservation fundamentals of previous years. Termed "ecosystem-based assistance for the management of natural resources", this assistance focuses on managing the natural systems and processes that sustain resources.



An ecosystem is defined as a biological community and its interactions with its environment. Ecosystems can be delineated at many different levels, according to space and time. An agricultural field, with its plants, animals, and the soil, water, and air supporting the crop, can be an ecosystem. Ecosystems can occur at much larger scales, such as the Mississippi River watershed, with all its cities, tributary rivers, and myriad of land cover and water flows. Ecosystem management is the appropriate integration of ecological, economic, and social factors in order to maintain and enhance the quality of the environment to best meet our current and future needs. Ecosystem management means keeping natural communities of plants, animals, and their environments healthy and productive so people can benefit from them year to year. To a farmer, it may mean maintaining a healthy balance in his or her agricultural field by using crop rotations to reduce pests and disease and increasing soil fertility with a nitrogen-fixing crop. The farmer may decide to use a number of conservation practices to improve the water quality of the family drinking well, the downstream water supply, and fish population. He or she could plant a grassed waterway to prevent gullies, and practice better range or pasture management for increased and sustainable economic returns.

SCS ecosystem-based assistance to clients will continue to use and build upon the SCS planning process and Field Office Technical Guide, which addresses the interactions among resources. Ecosystem-based assistance provides an interdisciplinary approach to many resource goals, such as soil conservation and water quality improvement. This approach is more effective and will help avoid conflicts that occasionally occur when individual solutions are developed to address resource problems and legal requirements. Examples include the National Environmental Policy Act, the Clean Water Act, the Food Agriculture Conservation Trade Act, the Endangered Species Act, and the Watershed Protection and Flood Prevention Act.

SCS is providing this service for four reasons:

- o It recognizes people as part of the ecosystem. Often, we develop decision-making models of specific animal or plant ecosystems without people in the equation. People are frequently considered third-party observers. We cannot remove the people factor from our management decisions. We must consider the social, economic, and cultural components as equal subsystems of an ecosystem.

- o It is systems-oriented rather than single resource oriented. This allows land users and planners to address all resource concerns with less potential for conflicts. A systems approach can often mean looking at a broader area, and involving more participants. Therefore, more partners may work together to solve resource problems, reducing the burden on any one group. The Chesapeake Bay Program is an example. It was established 10 years ago to address the declining water quality of the Bay. The District of Columbia, Maryland, Pennsylvania, and Virginia joined forces with 12 federal agencies to develop plans for improvement within the bay watershed. At first air was not factored in as a controllable source of nitrogen. Recent research and sophisticated computer modeling now indicate otherwise. In fact, we now know that roughly 30 percent of the nitrogen comes to the bay from atmospheric deposition. And, 10 to 20 percent of that pollutant load is now considered controllable within the region. As a result, the states are developing a more comprehensive ecosystem approach that includes air in their management strategies.
- o It focuses on sustainable use. Our objective is to assist land users with managing their natural resources for the benefit of families, their communities, and future generations. This approach should help avoid resource crises. If we consider all our resources and how management of one affects the others, we can achieve a more balanced approach. When we have focused on one resource, it has sometimes led to unintended adverse effects on another. Then we often take a band-aid approach and never quite catch up. It may not be possible to sustain all resource uses at the same level, but we can weigh the pros and cons up front and make wise decisions as to which is best for the environment and society.
- o It contributes to the goals of public land ecosystem management by providing compatible assistance to those who wish to participate voluntarily on private, non-forested lands. Federal agencies, such as the U.S. Forest Service and Bureau of Land Management, are implementing ecosystem management. In some cases, they will need help from private landowners to meet their objectives. We will be assisting in voluntary partnerships to meet the objectives of both public and private land users.

What Does This Mean for Land Users? The best way I can answer this question is with an example. That example is the Greenville community in Plumas County, northern California. The community began a major effort to solve a host of resource problems when the Pacific Gas and Electric Company determined that it would have to spend \$64 million in dredging fees or close their Rock Creek Dam hydroelectric powerhouse which was up to its intakes in sediment. In addition, a lower water table and other land use changes were causing Wolf Creek and Red Clover Creek to undercut its banks and flood, threatening businesses, homes, and some surrounding farm land. The Feather River trout population had dropped drastically due to mining, sediment, dams, and trash deposits. Timber harvests had been reduced due to endangered species protection and other factors. The 26 percent unemployment rate was a major concern. In 1987, 13 agencies and organizations, including the U.S. Forest Service and SCS, signed an agreement to create a broad erosion control mission to stop the source causing some of the problems. They decided to use the Coordinated Resource Management (CRM) process.

CRM is a formal problem-solving, concensus-building process involving all concerned participants. No action is taken until everyone agrees to it. The community agreed that their natural resources were their economic capital. If they could not keep them healthy, as an ecosystem, their own economic returns would be reduced. With Leah Wills, Associate Director of the Plumas Corporation, as a coordinator, they have raised \$2.5 million and conducted 33 projects and studies. The community focuses on cumulative effects, rather than single polluter problems. The community decides what problems and objectives to address. They have worked on streambank erosion, water table enhancement, fish habitat restoration and economic development. Their natural resources conservation work has led to a Watershed Management Certification Program at Feather River College. Students from two local high schools gain training and experience by monitoring the resource improvements. Wolf Creek no longer threatens Greenville's homes and businesses, jobs are being created, and all lifestyles, cultural values, and economic needs are being addressed.

Moving from the community and watershed level, let's telescope to the individual land user. One rancher recently stabilized a streambank on his property by restoring riparian vegetation with assistance from SCS and federal cost-share money. This stabilization reduced the stream's sediment load by 1,000 tons a year. That means less sediment to clog the hydroelectric dam, and reduced cost of an estimated \$6,000 per 1,000 tons to dredge. It also means fertile pasture land saved. The trout and bird populations have increased. Bank swallows have taken up residence at no inconvenience to the landowner and may someday become so plentiful that they will no longer be a state endangered species. It also means better pasture use and fishing to the land user.

This is a model of how environmental issues will be increasingly addressed in 1994 and beyond. It is based on ecosystem principles, involves all concerned participants in the decision-making process, provides incentives, focuses on sustainability for current and future use, and insures a productive nation in harmony with a quality environment. The Greenville community is one model. They worked a long time to meet their challenges and resolve some of the issues. And they will continue to have challenges. An ecosystem-based approach is not easy. It requires a more comprehensive way of looking at the world, and people working together. It is a more effective approach for protecting our environment for the benefit of all.