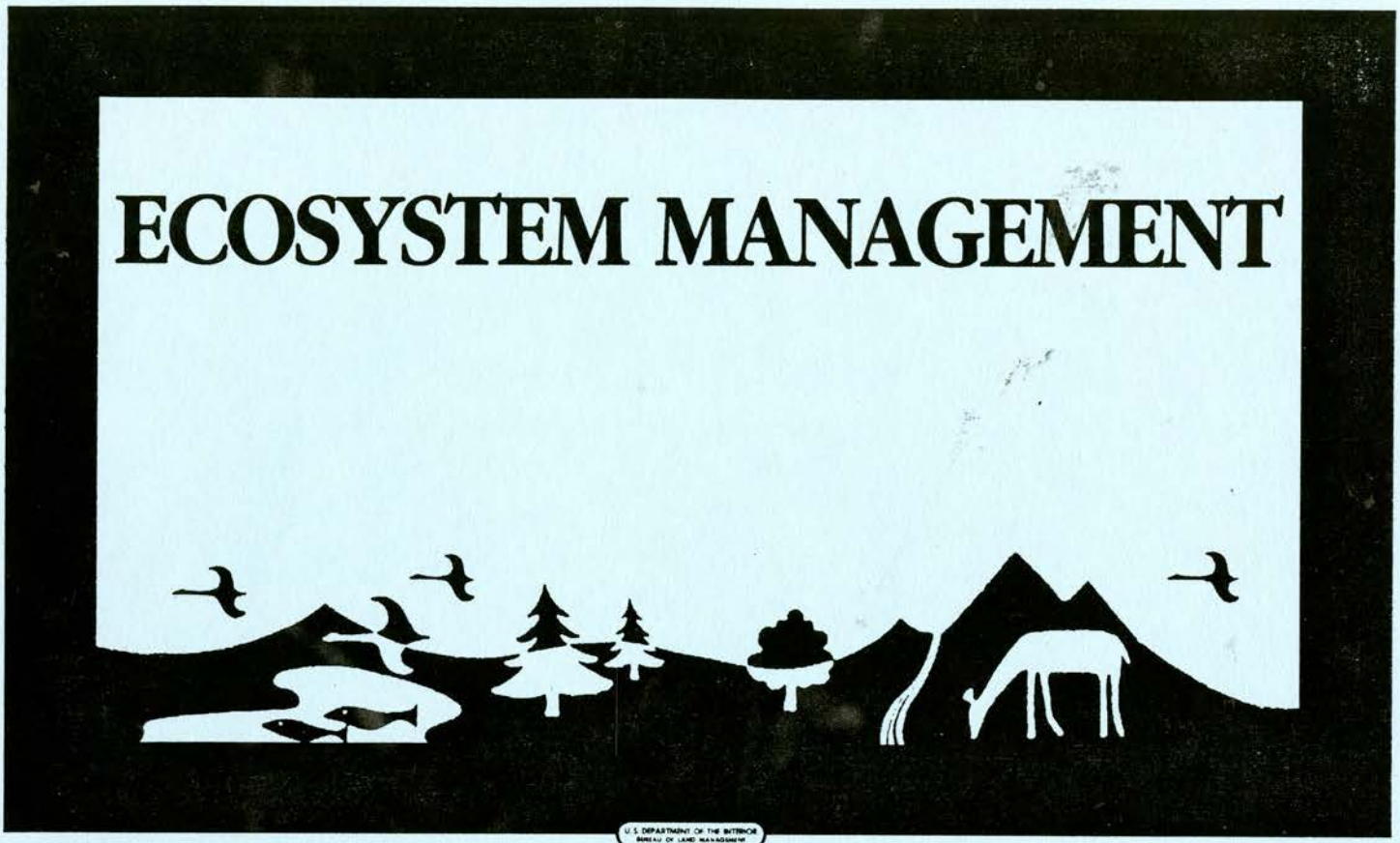
ECOSYSTEM MANAGEMENT



What Is It?

by
Allan E. Thomas

Achieving the New Land Ethic

by
Christopher A. Wood

A Framework Towards Ecosystem Management Performance Standards

by
Karl A. Gebhardt

IDAHO BUREAU OF LAND MANAGEMENT TECHNICAL BULLETIN NO. 94-5 APRIL 1994

The three following articles on the meaning of Ecosystem Management and how to do it are not "official" nor agency policy. They are being circulated to stimulate your thinking about what agencies and individual should be doing to recover and maintain sustainable ecosystems and increase biological diversity.

The Idaho Technical Bulletin series has been suggested as a forum to further discussions and help forge the future directions of Ecosystem Management in a form that can be rapidly and inexpensively distributed among interested resource specialists and managers. The Technical Bulletin series, begun in 1985, is presently circulated to all BLM state and district offices, most U.S. Forest Service regional offices and research stations, and numerous other federal and state agencies and libraries. Additions to the mailing list will be made upon request, and copies of back issues are available.

We welcome your comments and encourage you to develop articles on this important subject. Please send your responses/manuscripts to either:

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ECOSYSTEM MANAGEMENT: WHAT IS IT?

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April 1994

Before you decide to read the following pages on Ecosystem Management, you should know that there is nothing "Official" about it. Although members of the Bureau's Ecosystem Management Team have asked me for comments on the topic, these are ramblings and thoughts based upon my past experiences, readings, attendance at various ecosystem management workshops, and observations during the developing of Idaho's proposed plan. While I helped in several roles in the development of that plan and strongly support the direction being forged, I have seen examples of organizational planning going ahead of the ecological thought process. I think most of these problems are now being corrected, but I throw out these comments in hopes that they will assist the Idaho and Bureau efforts as we enter this new and very important era.

Ecosystem Management has become the latest "buzz" term, especially with the Bureau of Land Management (BLM) and the U.S. Forest Service (USFS). It has all but replaced terms such as "Biodiversity" and "New Perspectives" as the politically right way to be managing natural resources. Although Ecosystem Management had its beginning in the waning months of the Bush Administration, it has taken a rapid forward thrust under the leadership of Vice President Gore, Secretary of the Interior Babbitt, and BLM Directors Baca and Dombeck.

And who am I to complain; it's the greatest thing since sliced bread! After all, I did graduate studies in Ecology back in the late-1950's before most people had ever heard the term. In the last 40 years since my first paid job as an "ologist", I have worked for a state wildlife agency, two university systems, as a consultant, for the USFS, some 19 years with the U.S. Fish and Wildlife Service, and with the BLM for nearly 17 years. Throughout those years it seems I was always getting in trouble with somebody because my views of the ways nature worked came in conflict with the tunnel vision of some administrator. If you cared to look over my 85 or so scientific publications, you would find the subjects quite varied, keeping me from becoming known as an expert on

anything. Working at a salmon laboratory, I sneaked in studies of sculpin movements within gravel. Working on catfish, I developed a technique to mark tree frogs. While doing trout genetic studies, I also studied activities of yellowbellied marmots. When I joined BLM, I thought I had found my calling.

As a fisheries biologist recently arrived in Alaska from Arkansas, they made me an instant expert on reindeer and musk oxen. As the Idaho Wildlife Program Leader, I have responsibilities over a broad spectrum of fish, wildlife, and special status plants. Generally, I have thrived while many around me strive to fit their jobs into neat boxes or models. So I loudly proclaim "Hooray" for ecosystem management!

I managed to get on Idaho's Ecosystem Management Task Force last spring to help design the state priorities. These were later endorsed by the Idaho Management Team. I even helped developed the ecosystem maps of Idaho and the West (later in this report) based mainly on watershed basins. This task force pioneered the concept of solving ecosystem problems with interdiscipline teams of specialists at the field, region, and even Bureau-wide or global scales. Our artificial boundaries are becoming flexible, and the team makeup will vary over time as problems are solved or new disciplines and expertises are needed. It looks like we were headed in the right direction, and I hope we are. We hear that the "Idaho" plan of Ecosystem Management has been accepted in concept by the Bureau Management Team, and may even be the model for Bureau-wide strategies looking for management by ecoregions.

Then I started hearing the comments. "We are going full steam into ecosystem management, whatever that is!" "We've always been doing ecosystem management." "What definition for ecosystem management are we going to use?" "Our managers will keep doing the same things, only they'll call it ecosystem management now." "I don't know what is, but I'll know it when I see it?" "This is just another buzz term that will shift to something else as political pressures come and go -- just wait it out and do what you always have done." "Nobody knows what it is so how will we know when we are doing it." "It won't work because we can't afford to change boundaries, move people around and fight local pressures everytime a new crises comes up." "Your ecosystems designed by watershed basins may work great for fish, but are no good at all for critters that cross watershed boundaries such as wolves, neotropical migratory birds, or migrating elk." Etc., etc.!

What really hurt was to see comments from an Idaho Management Team meeting in early March where numerous managers stated essentially the same comments that had been listed a year earlier at Idaho's initial Ecosystem Management meeting. The solution to doing Ecosystem Management was to move the majority or all of the State Office Resource Specialists to field offices, and have no coordinated technical assistance, guidance, or tracking of performance measures. After a year of talking "Ecosystem Management", I had hoped that we were beyond kingdom building and thinking that reorganizing people into different blocks and locations was Ecosystem Management.

Some of the above concerns -- maybe most of these concerns -- are valid considerations. However, I think that I know what Ecological Management is and I believe that we can and must make it work. Otherwise, more and more plant and animal species will become threatened, endangered, or go extinct. The natural resources which we are responsible for and paid to manage wisely will continue to decline. Desertification will accelerate with permanent loss of water, vegetation, and soils, and the quality of life that most of us love will be gone. The publics that we work for may just take the responsibility of making management decisions for public lands away from us, much as the New Zealand publics took away this responsibility from their forestry agency when it ignored that publics' desire to save native trees.

Anyway, I'm going to try to explain what I think Ecosystem Management is and how it should be done. At first you will think it is too simple and abstract. Then you will try to find situations where my ideas won't work. And you may find some! Finally, I hope that I will stimulate you beyond artificial boundaries, beyond definitions to fit every problem, and into thinking ecologically.

WHAT ECOSYSTEM MANAGEMENT IS

Ecosystem Management is a state of mind. It is a way to view things so that you consider what effects your actions may have on other organisms and parts in the ecosystem you are in.

It can't be that simple, you say. Give us some definitions.

Alright! But you will see that it all comes back to a state of mind. The whole Western World culture has been developed with "tunnel vision." The vision was on getting a job done, a commodity exploited, and a work ethic satisfied. Not that this was bad! We had relatively small human populations in the West and seemingly unlimited nature resources. Now the truth of what was often resource neglect or abuse has become obvious, and increased populations with diverse values are showing us that we haven't taken the time to think much about what we have been losing.

A straight line may be the shortest distance between point A and point B, but it may not be the best way to get to point B within an ecosystem.

Larry Kaiser, an "Eco-Forester" from Idaho's Coeur d'Alene District, recently gave me a definition I really like. It won't mean much to someone who doesn't know about the work of artist Bev Dolittle. Larry says that "Ecosystem Management is a Bev Dolittle painting where you can see all the Indians." (It could be wolves or eagles.) I told Larry that if you can't see all the Indians, you at least have the faith that they are there.

The word ecology is derived from the Greek oikos, meaning "house" or "place to live." Probably the best definition for ecology is that used by Eugene Odum and others in the early 1950's. It is the study of the relationship of organisms or groups of organisms to their environment.

Ecosystems are harder to define, and to understand. A definition I like is the one our team came up with for the Idaho plan. "An ecosystem is comprised of all living organisms (including human), their non-living environment, and the interacting functional processes that connect these components. The interactions result in a whole that is greater than the sum of the parts. Ecosystems vary in size and are interconnected."

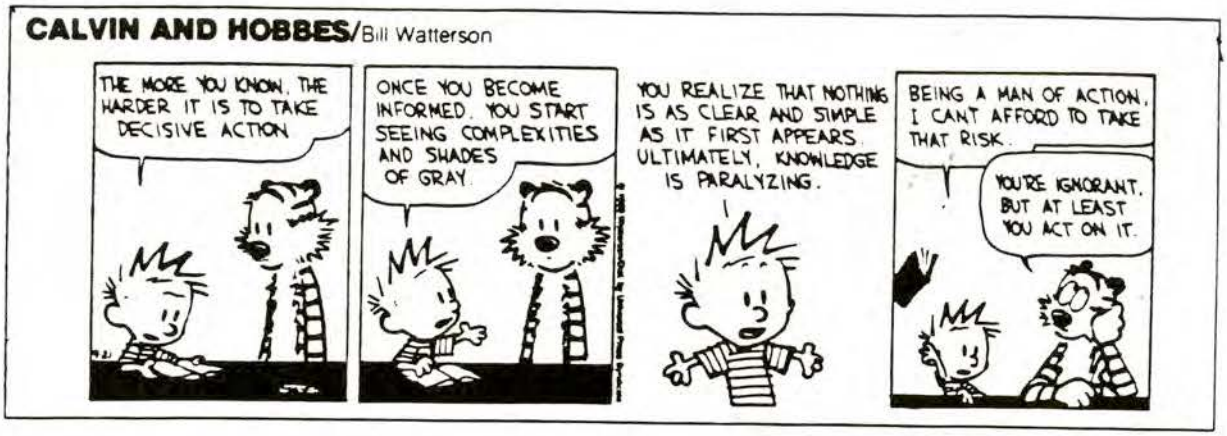
Most definitions are somewhat the same as this, and we can argue over the exact wording of definitions until the cows come home (and in some places some cows probably will be coming home), but I still say that the management of ecosystems is a state of mind.

UNDERSTANDING ECOSYSTEMS

Understanding of processes within an ecosystem and the interrelationships between organisms may be the hardest thing that we are facing. We will probably fail in that understanding. Dr. Jack Ward Thomas, the Forest Service's former wildlife biologist from La Grande, Oregon, and the new Chief with that agency, has been quoted as stating that "Ecosystems are not only more complex than we think, they are more complex than we can think. This should lead us to be cautious, and a little bit humble." (Jack will point out that this saying did not originate with him, but like his new quote, "Obey the law and tell the truth", these are words to live by.)

And of course he is right! When the only boundaries on the ecosystems are those which we impose, and our perspective of what is happening within an ecosystem is limited to our past experiences and poorly developed senses. How could we understand everything going on there? Every action we undertake should be done with the caution that we may be causing adverse reactions that we have not anticipated. However, just because these systems are so complicated does not mean that we should not try to learn as much about them as possible, or do no management actions for fear of what we may do to the ecosystem.

This seems to be a logical spot to insert a recent Calvin and Hobbes cartoon (acknowledgements and thanks to Bill Watterson) which hopefully will not be the reaction of the Bureau and our managers to ecosystem management.



An appropriate quote for here is from William Bryant Logan of the New York Times. "Trying to understand soil by submitting it to chemical tests is like trying to understand the human body by cutting off a finger, grinding it to a paste, and performing the same sort of tests. You may learn a lot about the chemistry of the soil -- as you would about the body's chemistry -- but you would learn nothing at all about the intricate linkage of systems, or how the soil -- or the body -- functions as a whole."

Dr. William C. Krueger of Oregon State University has pointed out that the need for Ecosystem Management comes back to scarcity verses abundance, when conflicts arise over scarce resources. He thinks managers should assume that there are enough resources for everyone to get some -- if management is changed and cooperation increased.

Dr. David M. Freeman of Colorado State University also points out that boundaries to Ecosystem Management efforts are necessary to key in on knowledge about issues and remove confounding items. No one is neutral about social issues, so we should use science to isolate important "facts" and develop the rationale for our "wisdom" used in our management activities.

If you don't think that preserving diverse ecosystems is important, read the chilling booklet, "Conquest of the Land Through Seven Thousand Years", by Dr. W. C. Lowdermilk. In 1938 and 1939, he studied the record of agriculture around the world and found that soil erosion, deforestation, overgrazing, neglect, and conflicts between cultivators and herdsmen have helped topple empires and wipe out entire civilizations. He also learned that careful stewardship of the earth's resources, through terracing, crop rotation, and other soil conservation measures, has enabled other societies to flourish for centuries. Although Dr. Lowdermilk didn't use the term "riparian", the protection of these areas were key to survival.

ECOSYSTEM MANAGEMENT IS NOT NEW

There have been many visionaries of Ecosystem Management, although none called it that. I won't take the time to list them all or quote all, nor do I know them all. However, there are a few too important to overlook.

First there was Aldo Leopold who said (among many choice sayings) that "the most important part of intelligent tinkering is to save all the pieces."

One who said it very well was Chief Seattle in his address to President Franklin Pierce in 1855. "Humankind has not woven the web of life. We are but the thread of it. Whatever we do to the web, we do to ourselves. All things are bound together. All things connect. Whatever befalls the earth befalls also the children of the earth."

And finally, let's go even further back to Isaiah (5:8). "Woe to those who join house to house. Who add field to field, until there is no more room, and you are made to dwell alone in the midst of the land."

WHAT ECOSYSTEM MANAGEMENT IS NOT

Former President Ronald Reagan said "When you've seen one redwood tree, you've seen them all." Former Secretary of the Interior James Watts said so many "outstanding" statements related to sustainable ecosystems -- and they seemed to be tied to his reported religious belief that the Rapture or Second Coming would soon be here and it didn't matter what mankind did to the natural systems. Another Former Secretary, Manuel Lujan, continued in the tradition of quotable quotes such as "Nobody can show me the difference between a red squirrel (Mount Graham in Arizona) and a brown one" or "Don't overlook the value of extinction." Still another Former Secretary, Wally Hickel, said "....." Enough already, you get the idea! You're right, these statements do not propose ecosystem management.

Ecosystem management is not the same old state, district, and resource area boundaries that BLM has used for years. Nor is it new artificial boundaries such as we may draw to gain "management units" or "ecosystem management areas" (EMAs), even if based upon watershed drainage basins as my maps suggested for "ecoregions." In addition, it is not a new system of budgeting, and it is not the formation of interdiscipline teams. As I said earlier, it is a state of mind and a way of viewing things.

Ecosystem management can be done without any changes in budgets, staffing, and boundaries. The designated ecosystem and ecoregions proposed in the Idaho plan along watershed boundaries are a better way to direct our management efforts than our

present structure to solve most resource problems, if we remember that some resources pay no attention to watershed boundaries. Directing budgets to solve resource problems in an ecologically sound manner appears to be a more logical way to manage funds than purely along the traditional subactivity route, if we can assure our partners that funding they helped us gain really is being used for the purpose intended. Finally, just by having interdiscipline teams does not ensure that (1) various specialists are the correct mix of resource disciplines (will vary depending upon the resource problems), (2) that all appropriate specialists work as a team to solve the problems before it (training and practice needed), and that unit managers (whatever that unit becomes) are aware that they manage people and are not usually the team leader on efforts to solve problems (to avoid "group think" and results being tied to pleasing the manager). Again, these are tools in doing ecosystem management, but <u>they are not ecosystem management</u>.

<u>ECOSYSTEM MANAGEMENT: WHAT WE THOUGHT IT WAS WHICH IT PROBABLY ISN'T</u>

Believe or not, I don't know everything about ecosystem management -- and neither does anyone else. There aren't many of us who understand such things as microrhyzon function, energy transfers, health of microenvironments, clines, etc. Occasionally, we have made fairly large blunders, usually with the best of intentions, which must be changed to prevent adverse impacts to ecosystems. Examples of such blunders include:

* Teaching in universities that old growth forests were biological deserts which needed to be opened up to let light in, when in truth, old growth contains rich and diverse faunal and floral components.

* Assisting in the replacement of African big game populations with cattle to help native people and then discovering that the wildlife was more productive as far as protein produced, caused less habitat damage, and had a higher economic value.

* Managing for even-aged and single species tree stands in our forests and then discovering that selective cutting of timber and replacement with uneven-sized and aged trees is a more effective and ecologically sound use of the land as opposed to clear cutting trees and replanting with single-species seedlings.

* A belief among conservation biologists that areas rich in one or more groups of plants or animals will therefore be rich in other groups (What's good for General Motors is good for the Country), and leading to mislocation in the establishment of some preserves intended to preserve some species.

These examples can go on and on; hopefully, we can learn from our earlier biases with the help of good science.

My major professor, ecologist Charles H. Lowe, Jr., of the University of Arizona used a technique called an aspection study to show students how little we really knew about ecosystems. Once a month from September through December, he herded our Ecology class up the Santa Catalina Mountains to the 4,000 foot elevation and the oak woodland zone. He then turned us loose to collect or make close observations on every animal we found. Vertebrates were recorded by being located on the ground or on trees. As expected, numbers decreased as the weather became cooler. What blew our minds was that the kinds of animals and their locations within the environment often changed. Side-blotched lizards on the ground in September were replaced by tree lizards on the trees and Clark's spiny lizards on the ground in October. Canyon tree frogs were on large rocks in September and what few were still out in October were on trees. Ant numbers decreased over the four months, but each time they were different kinds. Mainly large black ants in September became large red ants in October, medium black ants in November, and small light-black ants in December. Grasshoppers not only changed in types, but also decreased in size as it became cooler. What would we have found if we had made more frequent visits, at various times of the day, or even at night? And what was happening below the ground? Had I seen the previous Calvin and Hobbes cartoon in those days I might have quit school right then.

ECOSYSTEM MANAGEMENT: HOW DO WE DO IT

Again, I don't have all the answers. The important thing is to remember what it is (State of Mind) and to get out and start doing something.

There are certain legal and priority topics to be addressed in any planning effort. However, don't start with fixing ecosystem management areas into rigid boundaries using GIS mapping, developing of cost codes for activities within those artificial boundaries, and develop planning documents or amendments saying you are now going to do ecosystem management. Start with an interdiscipline brainstorming session of what are the resource issues eating BLM alive within your area of expertise. What candidate plants and animals are in danger of going extinct if threats are not removed? What riparian areas have not recovered and can we really protect and enhance them with a true effort? How do we balance the impacts of visitors, agriculture, livestock grazing, wildfires, exotic plants, and military use on the Snake River Birds of Prey Conservation Area? Are we doing what is best to recover Pacific salmon or just what the National Marine Fisheries Service tells us we must do? You know the problems -- don't wait for a memo from the Washington Office to tell you what to do in your ecosystem. Just do it!

Here is a real life example. Bull trout are probably about to be listed as threatened or endangered species unless efforts with an Interagency Conservation Agreement can convince the U.S. Fish and Wildlife Service (USFWS) that threats will be removed and

the species conserved. An isolated, relic population is known to exist in the Jarbidge River in Boise District. The population is known to migrate to U. S. Forest Service (USFS) lands in Nevada when water conditions degrade, especially with high water temperatures in the summer. The USFWS is aware of the population and will probably place strong restrictions on BLM management if bull trout are listed.

The Resource Manager, using the Jarbidge Resource Area wildlife biologist as team leader, has initiated an Interdiscipline Team of appropriate specialists. The Team will review maps, photos, and visit the area, and discuss all aspects of what the problems are and what may be done to reduce the threats. Local land owners and permittees have been contacted and are included in the team efforts. The BLM and USFS in Nevada have also be contacted. Both the Idaho Dept. of Fish and Game and the Nevada Dept. of Wildlife Resources, which have done studies on streams in their states are included. The Team Leader will keep in contact with ecoregional expertise on bull trout and include them (and me) in ongoing efforts as needed. Finally, the USFWS also is part of the process, not just an agency waiting to criticize what is going on. I expect good result from this effort to help the bull trout, and it will be done using ecological principles.

And guess what! This effort is being done without being in an Ecosystem Management Area (EMA), has no special cost coding, and has no special funding or detailed planning effort. It is just a bunch of interested people trying to solve a problem, and I think it will work.

ECOSYSTEM MAPPING

You will recall that I said that Ecosystem Management is not artificial boundaries. However, humans must use some sort of borders to bracket their horizons and to measure progress. Sort of like wolves marking the boundaries of their territories and home ranges with urine, but that's another story.

First, let's look at an Idaho map (figure 1) showing current BLM boundaries of Districts and Resource Areas. These were established and are maintained by tradition and for political reasons, and they will not allow us to manage the nearly 12 million acres in Idaho that we have management responsibilities for in an ecologically or even logical way. They have to change or at least become flexible to meet the challenges facing BLM and the other federal and state agencies today.

Figure 2 is the Columbia River Watershed; a map used for years by the Army Corps of Engineers. It took me a while to find this map, but I built a similar one from the ground up. I reasoned that water is the key to life in the West and Idaho's major challenges today are related to rare stocks of salmonid fishes in the Columbia River

Drainage. Some of these fishes have been listed as threatened or endangered (sockeye and chinook salmon) and other species are not far behind (bull trout, redband trout, westslope cutthroat trout, etc.).

I quickly drew up a map similar to figure 3 based on manageable segments of the Snake, Salmon-Clearwater, and Upper Columbia rivers, and suggested that BLM should cluster our people and efforts around these boundaries and solve our problems using an ecosystem approach. Southeastern Idaho portions would have logical management ties to Utah and Wyoming BLM. There are many similarities within these boundaries in soils, climate, vegetation, vegetation, etc. However, they are management-type boundaries, and certainly are not intended to replace the detailed classification systems by Kuchler, Bailey, or even "GAP" analysis. Such "Ecomapping Efforts" will likely improve our boundaries. Idaho's managers liked these initial efforts and I gained local, but short-lived, fame as a map maker.

Next, I was asked to expand these watershed drainages throughout the West and figure 4 was developed. The results were too many drainages to establish offices for each one. It would not be an improvement over our present 12 State Offices. Jack Peterson, a Boise-based assistant to the BLM Director, and I grouped the drainages into Management-based Ecoregions (figure 5). Such a scheme would allow the grouping of resource specialists near similar habitats, and the reduced number of "regional" offices to about six or seven would reduce BLM's administration and operational costs. This plan has been well received by top BLM management, although everyone recognizes that it would be a long process to switch from state boundaries to regional boundaries.

When the Interior Department was considering a proposal to move all personnel offices and other administration staffs to Sacramento, California, or Atlanta, Georgia, I was asked to develop a map of ecoregions for the whole "lower 48". The hope was that clustering such offices by similar ecoregions would be a logical improvement over present locations and would still reduce administration costs. With the help of our botanist, Roger Rosentreter, figure 6 was completed. It appears that this proposal is no longer being considered, but the map may be of use to those agencies with ecosystem management responsibilities and with offices throughout the Country.

Finally, figure 7 shows 10 Ecosystem Management Areas (EMA's) as developed by the Idaho field offices as key areas to concentrate staffing and funding to solve problems using an ecological approach. You will notice that the boundaries are fixed and they have codes for cost charging. These were not my idea! However, they should work if the boundaries become flexible so that these concentration areas can contract and expand as needs and issues dictate, the needs of areas outside EMA's are not ignored, and good communications and exchange of needed technical skills are maintained. I have some doubts, but the whole process can work if we all remember (have I said this before?) that Ecosystem Management is a state of mind.

THE WEST BY ECOSYSTEMS

CURRENT FIELD ORGANIZATION

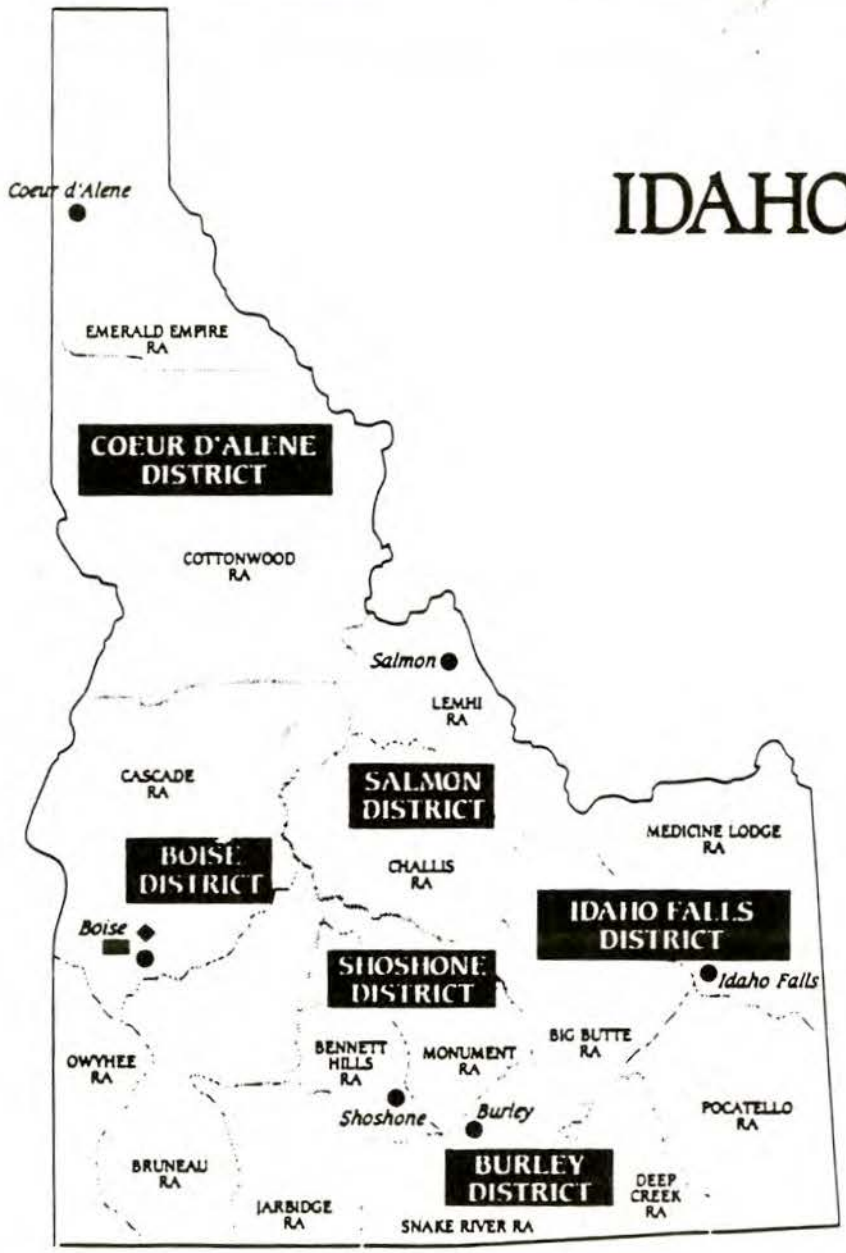


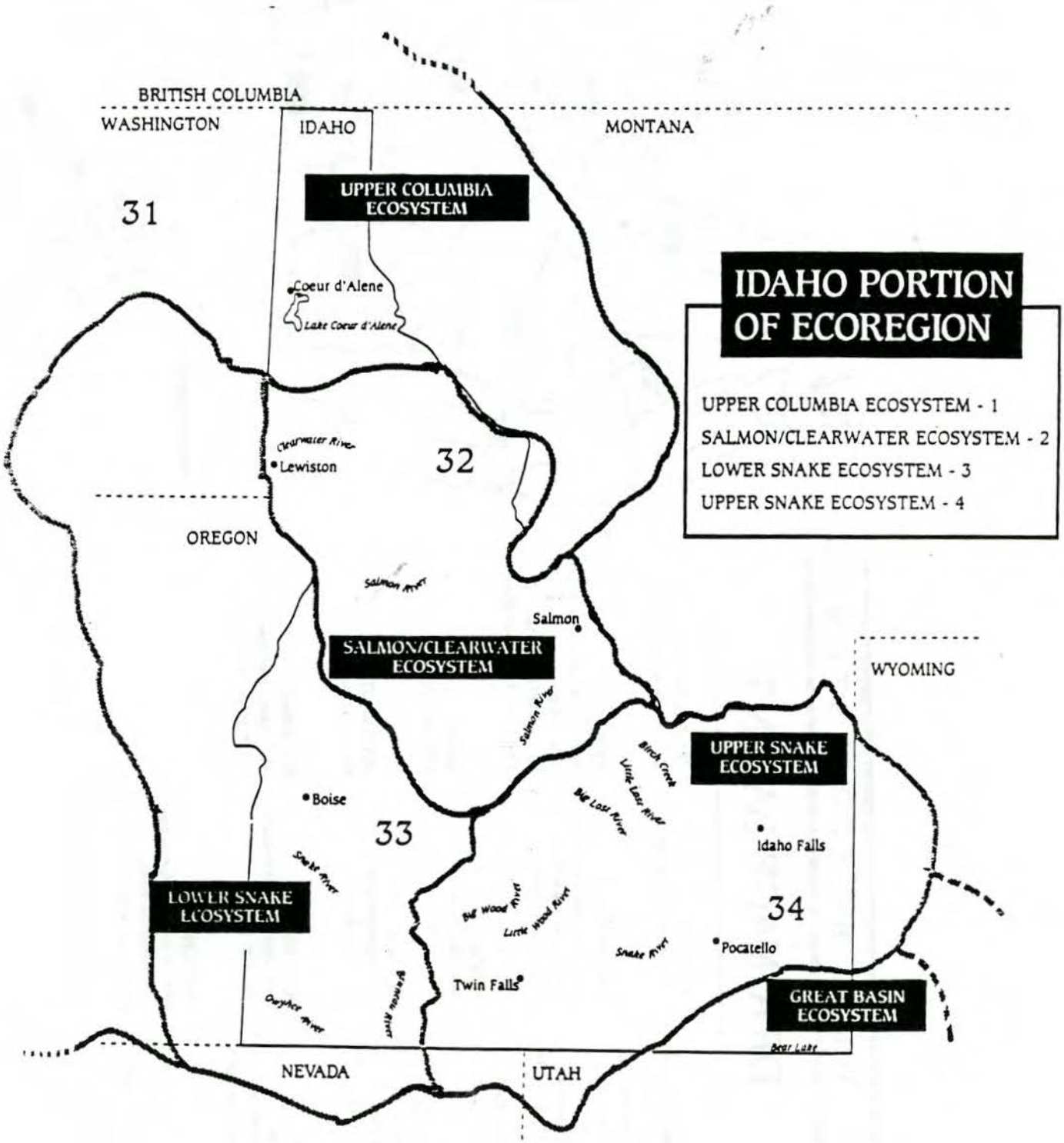
FIGURE 1

The Columbia River Watershed

FIGURE 2

THE WEST BY ECOSYSTEMS

COLUMBIA BASIN ECOREGION - 3



Continuation of Ecoregion Boundary

FIGURE #3

THE WEST BY ECOSYSTEMS

DRAINAGE BASINS

ALASKA
AK1 North Slope, Colville River
AK2 Kotzebue Sound, Noatak/Kobuk Rivers
AK3 Norton Sound
AK4 Yukon River
AK5 Alaskan Peninsula
AK6 Cook Inlet, Susitna River
AK7 Copper River
AK8 Southeastern Alaska

ARIZONA
AZ1 Colorado Plateau
AZ2 Colorado River
AZ3 Upper Gila River
AZ4 Lower Gila River

CALIFORNIA
CA1 Sacramento/ San Joaquin Rivers
CA2 Owens Rivers/Aqueducts

IDAHO
ID1 Upper Columbia River
ID2 Salmon/Clearwater Rivers
ID3 Lower Snake River
ID4 Upper Snake River

KANSAS
KS1 Upper Arkansas River

MONTANA
MT1 Upper Missouri River
MT2 Lower Yellowstone/ Powder Rivers

NEBRASKA
NE1 Platt River

NEVADA
NV1 Humboldt River
NV2 Great Basin

NEW MEXICO
NM1 Upper Rio Grande River
NM2 Pecos River

OREGON
OR1 Lower Columbia/Cowlitz/ Willamette Rivers
OR2 Oregon/Northern California Coastal Rivers
OR3 Deschutes/John Day Rivers

SOUTH DAKOTA
SD1 Middle Missouri River

TEXAS
TX1 Cimarron/Canadian Rivers
TX2 Red River
TX3 Texas Coastal Plain
TX4 Lower Rio Grande River

UTAH
UT1 Green River

WASHINGTON
WA1 Puget Sound

WYOMING
WY1 Upper Yellowstone/ Bighorn Rivers

FIGURE 4

THE WEST BY ECOSYSTEMS

ECOREGIONS

ALASKA	AK1 — AK8
NORTHWESTERN COASTAL	WA1, OR1 & OR2
COLUMBIA BASIN	ID1 — ID4, OR3
CALIFORNIA/GREAT BASIN	CA1 & CA2, NV1 & NV2
COLORADO/RIO GRANDE	UT1, AZ1 — AZ4 NM1 & NM2, TX4
GREAT PLAINS	NE1, KS1, TX1 — TX3, MT1 & MT2, SD1, WY1

FIGURE 5

FIGURE 6

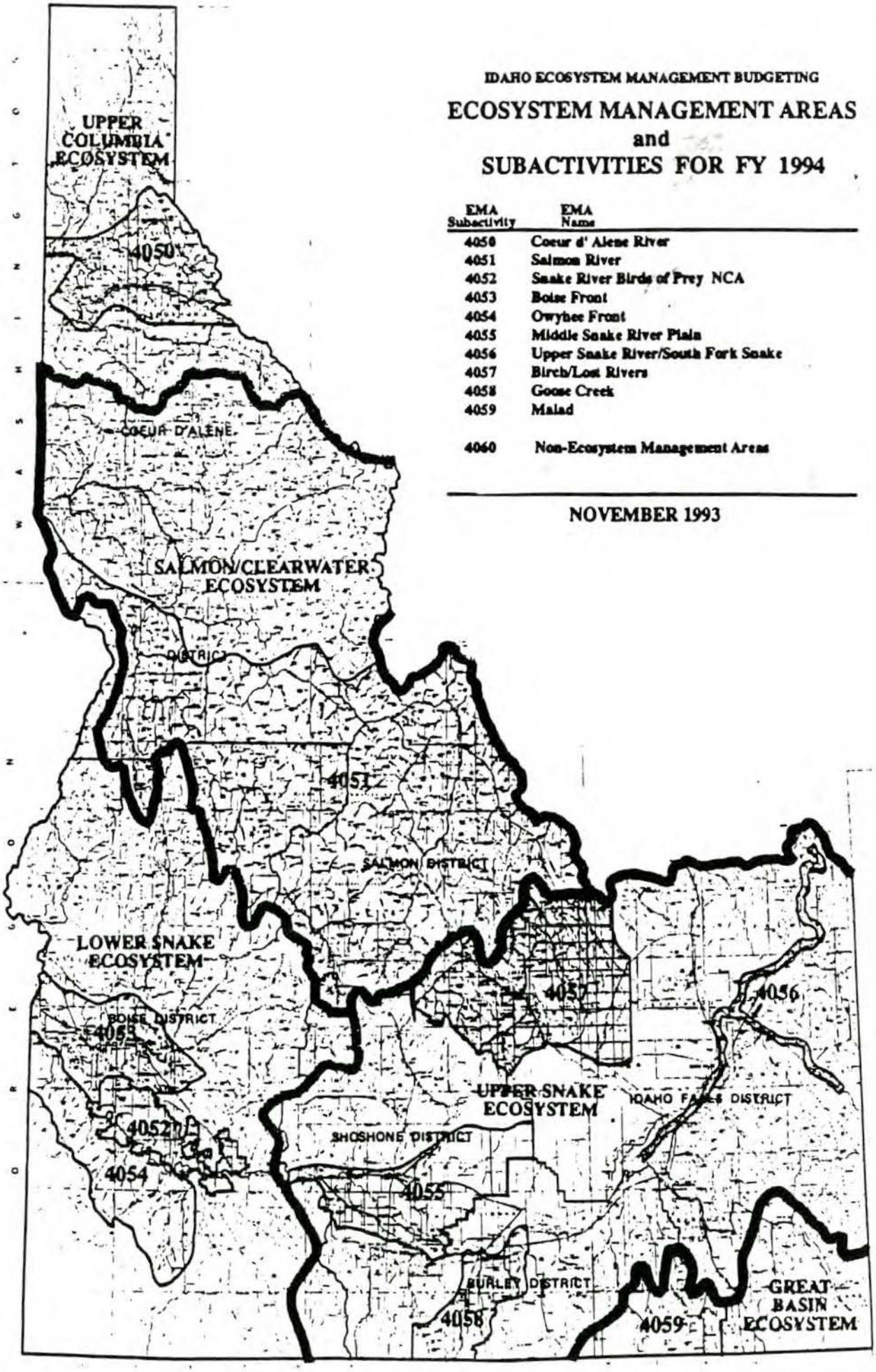

IDAHO ECOSYSTEM MANAGEMENT BUDGETING
ECOSYSTEM MANAGEMENT AREAS
and
SUBACTIVITIES FOR FY 1994
EMA Subactivity
EMA Name
4050 Coeur d' Alene River
4051 Salmon River
4052 Snake River Birds of Prey NCA
4053 Boise Front
4054 Owyhee Front
4055 Middle Snake River Plain
4056 Upper Snake River/South Fork Snake
4057 Birch/Lost Rivers
4058 Goose Creek
4059 Malad
4060 Non-Ecosystem Management Areas
NOVEMBER 1993
UPPER COLUMBIA ECOSYSTEM
4050
COEUR D'ALENE
SALMON/CLEARWATER ECOSYSTEM
DISTRICT
4051
SALMON DISTRICT
LOWER SNAKE ECOSYSTEM
BOISE DISTRICT
4053
4052
4054
4057
4056
UPPER SNAKE ECOSYSTEM
IDAHO FALLS DISTRICT
SHOSHONE DISTRICT
4055
BURLEY DISTRICT
4058
4059
GREAT BASIN ECOSYSTEM
WASHINGTON
OREGON

FIGURE 7

ECOSYSTEM MANAGEMENT: ACHIEVING THE NEW LAND ETHIC[1]

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April 1994

> *No important change in human conduct is ever accomplished without an internal change in our intellectual emphases, our loyalties, our affections, and our convictions.*
>
> Aldo Leopold, *The Ecological Conscience*, 1947

The two largest federal land management agencies, the USDI Bureau of Land Management and the USDA Forest Service (jointly referred to as the agencies) are responsible for the administration of 461 million acres of federal land in the United States — nearly one—fifth of the nation's land base. The agencies have committed to using the principles of ecosystem management to guide their administration of federal lands. Many segments of the general public, agency employees, and other resource professionals greet the move toward ecosystem management in similar manners — with anxiety, skepticism, or confusion. Anxiety and skepticism may be provoked by fear of change and a pervasive distrust of all large, government sponsored enterprises. Public confusion is fueled by the lack of discussion about the meaning and implications of implementing an ecosystem approach to land management.

This paper has two purposes: (1) to describe distinctions between ecosystem management and traditional agency approaches to administration of federal lands and (2) to examine challenges and opportunities presented by implementation of ecosystem management. This paper does not represent either proposed or existing agency policy, it is simply intended to facilitate discussion among the public, resource professionals, federal land management agencies, and Congress as the agencies move toward implementation of ecosystem management.

ECOSYSTEM MANAGEMENT: WHAT IS IT?

Ecosystem management is the integration of ecologic, economic, and social principles to

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[1] A slightly different version of this article first appeared in the *Renewable Resources Journal*, Spring, 1994.

manage biological and physical systems in a manner that safeguards the ecological sustainability, natural diversity, and productivity of the landscape. The following principles, as described in *Ecosystem Management in the BLM: From Concept to Commitment*[2], have been developed to guide the Bureau of Land Management's (BLM) implementation of ecosystem management:

- Sustain the productivity and diversity of ecological systems.
- Gather and use the best available scientific information as the cornerstone for resource allocations and other land management decisions.
- Involve the public in the planning process and coordinate with other federal, state, and private land owners.
- Determine desired future ecosystem conditions based on historic, ecologic, economic, and social considerations.
- Minimize and repair impacts to the land.
- Adopt an interdisciplinary approach to land management.
- Base planning and management on long-term horizons and goals.
- Reconnect isolated parts of the landscape.
- Practice adaptive management.

Ecosystem management is not a new strategy or initiative. Rather, it represents a fundamental change in the way the agencies view and manage federal lands. Allan Thomas notes in the preceding article, that "ecosystem management is a state of mind" and can be initiated without changes to budgets, staffing, and boundaries[3]. However, legal, administrative, cultural, and technical assumptions underlie existing agency resource management principles. As a fundamentally new management philosophy, ecosystem management will require the agencies, Congress, and the public to reexamine some of the beliefs, policies, and procedures that have shaped traditional approaches to management of the federal lands.

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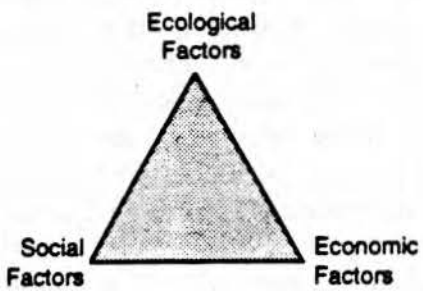
[2] Bureau of Land Management, Information Bulletin 94-191, January 24, 1994.

[3] Allan E. Thomas, *Ecosystem Management: What Is It?*, Idaho Technical Bulletin, Spring, 1994.

RESPECTING LIMITS

Ecosystem management can be used to justify any number of agency administrative processes, from reorganization to budget restructuring. Many of these justifications (e.g., ecological sustainability is good for society) and manifestations (forming partnerships with private land owners, using interdisciplinary teams, agency budget restructuring, etc.) can illustrate the principles of ecosystem management. They do not, however, define the concept. At its root, ecosystem management involves providing values, products, and services from the land in a manner that safeguards ecological sustainability. Expressed another way, ecosystem management entails setting limits on use of the land.

No-one likes to talk about limits; it is almost unethical, if not un-American. However, the simplest distillation of the concept is that *ecosystem management entails setting limits on land use in order to maintain ecological sustainability.* Many have attempted to describe the ecosystem management concept in a manner analogous with the graphic below.



Graphics such as this, merely advance traditional ways of looking at natural resource management issues. Economic, ecologic, and social factors do not share power in an ecosystem triumvirate. Ecosystem management is less a democracy than an autocracy. To embrace the ecosystem management concept is to accept that ecological factors such as maintaining biological diversity, ecological integrity, and resource productivity dictate strict limits on social and economic uses of the land.

Human use has shaped the condition of the land for centuries. W.M. Denevan maintains that by 1492, Native American "[p]opulations were large. Forest composition had been modified, grasslands had been created, wildlife disrupted, and erosion was severe in places. Earth works, roads, fields, and settlements were ubiquitous."[4] Today, society can harness technology to fundamentally change the forms and functions of entire ecosystems overnight. Identifying and respecting limits to land use and acknowledging that we often lack the ability to predict the land's response to management activities are critical points of departure for the

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[4] W.M. Denevan, *The Pristine Myth: The Landscape of the Americas in 1492.* Annals of the Association of American Geographers, 82:3, 1992.

ecosystem management concept.

SETTING OBJECTIVES — MULTIPLE USE

Objectives for management of the federal lands are strongly influenced by two legal mandates — multiple use and sustained yield. BLM's authorizing legislation, the Federal Land Policy and Management Act[5] (FLPMA) defines "multiple use" as

> harmonious and coordinated management of the various resources without permanent impairment of the productivity of the land and the quality of the environment with consideration being given to the relative values of the resources and not necessarily to the combination of uses that will give the greatest economic return or the greatest unit output.

Traditional interpretations of multiple use often emphasize commodity production, commercial use, and intensive development of individual components of the landscape at the expense of "harmonious and coordinated management" of *resources*. Emphasis on the use aspect of multiple use can lead to unsustainable commodity production levels that jeopardize native species of flora and fauna. For example, prior to lawsuits and several court-ordered injunctions against the agencies, the allowable sales quantity of timber (ASQ) from federal lands in the Pacific Northwest that contain habitat for the threatened Northern Spotted Owl was projected at 5 billion board feet per year. After an interagency Forest Ecosystem Management Assessment Team (FEMAT) was convened by President Clinton in 1993 to factor in threatened and endangered species viability requirements, the recommended ASQ fell to 1.2 billion board feet per year.[6]

Ecosystem health and environmental quality are sometimes perceived as ancillary concerns to commodity production for two reasons. First, land managers are often unaware of the incremental and cumulative changes to ecosystem health that result from soil disturbing activities such as timber harvesting, livestock grazing, and mining. Second, objectives for market valued products such as timber and forage may be targeted or strongly influenced by politicians who are expected to deliver a steady flow of goods and services from federal lands to local constituents. In the latter scenario, management objectives developed through agency land use plans are often designed to expedite development, extraction, and/or production of natural resources from federal lands. Uses and values such as wildlife and fish habitats and cultural, scenic, and aesthetic resources may be viewed as constraints on or mitigation for activities

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[5] 43 USC 1701 - 1784 (1976).

[6] USDA Forest Service, USDC National Marine Fisheries Service, USDI Bureau of Land Management, USDI Fish and Wildlife Service, USDI National Park Service, Environmental Protection Agency. *Forest Ecosystem Management: An Ecological, Economic, and Social Assessment. Report of the Forest Ecosystem Management Assessment Team*, July 1993.

designed to maximize commodity production.

Emphasis on the use aspect of natural resource management compels the agencies to parcel out sections of federal land to the most politically connected or the most successfully litigious interest groups. The federal lands often resemble a mosaic of special interest demands — significant grazing allotments, complemented by off-road-vehicle areas, adjoined by wilderness, surrounded by extensive timber harvest management units, with a Wild and Scenic River running through it. The strategy of partitioning the land in an effort to satisfy multiple competing interests places the agencies in an untenable position. By managing uses, rather than systems, the agencies are either positioned as a foil for disagreements between multiple competing interests or as lightning rods for lawsuits.

All of the above-mentioned activities and designations are legislated and valid uses of federal lands, but, the sum of these uses can jeopardize ecological sustainability. The first priority of the agencies under the ecosystem approach to management is to ensure that land use allocations remain within the limits of ecological sustainability. In order to determine appropriate levels of use, agency managers must work closely with researchers, local communities, scientists, and biologists to better understand the effects of management activities on the land.

SUSTAINED YIELD

The second precept that strongly influences the manner by which agencies set resource management objectives is "sustained yield." Sustained yield is defined by FLPMA as "the achievement and maintenance in perpetuity of a high level annual or regular periodic output of the various renewable resources of the public lands consistent with multiple use."

The intent behind the sustained yield concept is readily understood. Fluctuations in the output of goods and services can have a deleterious effect on local communities that are dependent on commodity production from federal lands. Unfortunately, the "perpetuity" aspect of sustained yield sometimes takes a backseat to the "high level or regular periodic output" element of the term. The sustained yield concept values resources for their ability to achieve a politically, socially, or economically defined level of productivity. Although this is considered heresy in some sectors, the very concept of sustained yield may be illusory. Federal land management agencies cannot make ecological systems conform to socioeconomic issues and demands. Natural events such as drought, flood, and fire and anthropogenic effects on the landscape will forever thwart the ability of the agencies to predict a sustained level of resource production. Federal land management agencies and Congress should recognize that sustained production of commodities may sometimes preclude maintaining ecological sustainability, and vice versa.

Socioeconomic objectives may be fixed within agency land use plans (unless affected by extraordinary measures such as lawsuits or injunctions). Meanwhile, the systems that the agencies attempt to define, model, and manage continually evolve over time. Managers are

confronted with the fundamental dilemma of how to achieve commodity output levels while maintaining ecological sustainability. Achieving the first objective often prevents accomplishing the second.

Sustained yield principles require that management of resource uses allows for a predetermined economically or politically influenced level of productivity. In other words, natural resources are managed and marketed as commodities or economic outputs. On the other hand, the ecosystem approach to management ensures long-term ecological integrity and sustainability while conserving biological diversity so that future generations may continue to derive social, economic, cultural, and aesthetic benefits from the land. This is a key element of the ecosystem management concept: short-term socioeconomic gains may be sacrificed to maintain ecological sustainability and long-term resource productivity.

ADAPTIVE MANAGEMENT

Many of the cumulative effects of management activities on public lands that led to degraded aquatic and riparian systems; less productive rangeland conditions; fragmented plant, animal, and fish habitats; and water quality and forest health problems — occurred prior to adoption of the principles of multiple use and sustained yield. These principles have helped improve the condition of some resources. For example, prior to 1936, approximately 16% of the public range was classified as moderately/materially depleted, 48% as severely depleted, and 36% as extremely depleted. By 1992, BLM data considered 38% of the public rangelands in good/excellent condition, 40% in fair condition, 15% in poor condition, and 7% were unclassified. Although the different methods used to measure range condition prevent a direct comparison, the 1992 data demonstrate an improvement in rangeland condition since unrestricted and free grazing was ended by the Taylor Grazing Act[7] in 1934. Despite improved management practices, however, many native species of flora and fauna continue to decline. For this reason, the ecosystem approach to management is inherently cautious and conservative.

The Watershed Analysis procedure envisioned by FEMAT is representative of the "cautious approach" necessitated by ecosystem management. For example, until an analysis deems additional uses appropriate, soil disturbing activities within critically important riparian areas are severely restricted. Pending the findings of an interdisciplinary Watershed Analysis team, more permissive uses can be allowed so long as watershed integrity is preserved.

The Watershed Analysis concept embraces the principles of adaptive management. First, an assessment should be conducted to determine status and trend of a given ecosystem. Second, measurable objectives that reflect the health of the land should be created. Third, management direction should be established to facilitate accomplishment of objectives. Fourth, a comprehensive monitoring plan should be developed to evaluate achievement of ecosystem health

[7] 43 USC 315 and 315(m), 1934.

objectives.

Through the process of adaptive management, monitoring efforts measure movement toward or away from stated ecosystem health objectives. Management direction is regularly refined based on monitoring, natural limits and events, and site-capabilities. Establishing and monitoring measurable ecosystem health objectives are critical to the accomplishment of ecosystem management.

Traditionally, agency objectives are often based on socioeconomic and agency program priorities which influence, but do not measure, the health of the land (e.g., board feet of timber, forage utilization rates, pounds of fish, and Recreation Visitor Days produced on the federal lands). Soil stability, stream channel integrity, and watershed condition all more accurately reflect ecosystem health. Legislation such as the Federal Water Pollution Control Act[8], requires the agencies and states to monitor chemical and toxicological criteria to evaluate water quality. In addition, the Forest Service utilizes indicator species to monitor the effects of management activities on specific biological indicators. As James Carr notes, however, "few attempts have been made to integrate several ... indicators into a single index."[9] Carr's Index of Biological Integrity outlines the sort of monitoring regimen agency managers should look to in developing methods to measure ecosystem health.

Under the ecosystem management framework, providing healthy, diverse, and sustainable ecological systems frames the decision space from which resource allocations and land uses are determined. The ecosystem approach is predicated on the idea that unless the agencies safeguard ecological sustainability, they cannot ensure *any* consistent level of productivity from federal lands. To maintain ecological sustainability, the agencies should commit to developing sound, long-term ecological objectives prior to defining socioeconomic objectives.

The term "ecosystem management" has become a rallying cry for those who oppose federal management intervention on private lands. The relationship between the health of federal lands and the condition of adjoining private lands cannot be overlooked. The agencies cannot dictate the management of private lands, nor can they abrogate private property rights. Thus, every effort should be made to work with private landowners and state land managers to develop mutually acceptable ecosystem condition objectives.

It is critical that the agencies take a "participatory approach" to implementing ecosystem management. Agency managers must clearly communicate to local communities the benefits of maintaining healthy and diverse ecological systems. The difficulties faced by the agencies in

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[8] 33 USC secs. 1251-1387.

[9] James R. Carr, "Biological Integrity: A Long-Neglected Aspect of Water Resource Management", *Ecological Applications*, 1:1, 1991.

moving forward with rangeland reform in 1993 demonstrate the need to involve local communities and state governments at the outset of the decision-making process. At the same time, the public must recognize that the agencies have ultimate responsibility for the health of the federal lands.

SCIENCE-BASED DECISION-MAKING

Land managers require an informed understanding of the status, trend, and condition of the land prior to allocating uses. In the past, due to limited resources and different priorities, the agencies often authorized land uses with insufficient data to support their decisions. For example, the National Research Council, the research branch of the National Academy of Sciences, recently found that current scientific data on the condition of the nation's rangelands is so fragmented and inconsistent that it does "not allow investigators to reach definitive conclusions about the state of rangelands."[10]

Under the ecosystem management paradigm, the agencies' first priority is to maintain healthy, diverse, and sustainable ecological systems. This entails gathering information on the condition and trend of the land prior to allocating resource uses. The overriding objective of ecosystem management in maintaining biological diversity and ecosystem integrity is not to mitigate or constrain commodity production but rather to conserve the ecological sustainability of the land.

Permitted activities and uses of the land must demonstrate that they will not compromise ecosystem health and biological diversity. The burden of proof is placed on those who use the land in ways that are known to degrade ecological sustainability, including livestock grazing, timber harvesting, road construction, mining, and some recreation activities. Implementing ecosystem management will not alleviate the need for managers to make occasional local "trade-offs" in order to accomplish social or economic goals, but these trade-offs should represent the exception, not the rule.

Ecosystem management requires that land use decisions be based on an understanding of the condition of the land and its response to management activities. Multiple federal agencies including BLM, Forest Service, Environmental Protection Agency (EPA), Fish and Wildlife Service, and others are developing ecological assessment protocols for broadly defined ecoregions across the United States. These assessments will provide a contemporary baseline from which future management actions can be evaluated. In addition, the assessments should provide information on the historic condition of the land; evaluate the effects of natural events and management activities that influence ecologic trends, productivity, and sustainability; and provide management with alternatives for future landscape conditions based on ecologic,

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[10] National Research Council, Committee on Rangeland Classification, Board on Agriculture, Rangeland Health: New *Methods to Classify, Inventory, and Monitor Rangelands*, 1994.

economic, social, and cultural demands.

The agencies generally lack the organizational structure and many of the appropriate disciplines to support the commitment to science-based decision-making. Although the Forest Service is equipped with eight regional Research Stations supported by satellite offices with expertise in rangeland, forestry, aquatic, and shrub sciences, their link to management of the National Forest System is often tenuous.

Federal land management agencies should work with EPA, universities, states, and the nascent National Biological Survey (NBS) to integrate existing research and technical capabilities into permanent ecoregion technical teams designed to provide the latest technical information and best available science to federal, state, and private lands. These interagency teams could: facilitate the transfer of information among agency field offices and other federal and state management units; provide regional stations for the distribution of information by NBS to agency field offices; define regional monitoring protocols; provide research and data to NBS; integrate efforts with field offices and other federal, state, and private research units to determine the status and trend of the land; and assist field offices to implement and monitor regional interagency initiatives such as rangeland reform and PACFISH (Pacific Salmon and Steelhead Recovery Strategy).

The staffs of these regional technical centers should include "scarce skills" specialists and other experts who can provide the agencies, states, and interested citizens with information about the condition of the land and its response to management activities. At a minimum, the interagency teams should include personnel expert in the following skills: aquatic, range, and forest ecology; plant ecology; conservation biology/population genetics; hydrology; and soil science/geomorphology. Specialists with more specific expertise may be required for region-specific issues. Other skilled personnel who may be needed include economists, statisticians, computer scientists, and cultural resource specialists. Many of these skills are presently in short supply within the federal land management agencies. The interagency technical teams should be insulated from administrative duties and competitively selected from within agencies, academia, and private industry.

INTERAGENCY COORDINATION

Ecosystems occur at multiple geographic scales and change and evolve in response to both human influence and natural events. The only boundaries to an ecosystem are those that we choose, or are able to, recognize. However, the acceptability of disturbance at one scale must be considered for its effects over time and in the context of larger ecosystems. Agency administrative boundaries and state lines typically do not correspond with noticeable ecological boundaries (e.g., watersheds or landforms) and federal agencies are rarely the sole managers of large, self-contained ecological systems. Thus, the management actions of one agency can compromise the health of adjoining lands.

Consider the following scenario, for example. The Forest Service manages the headwaters of a watershed; downstream, BLM manages lands along the mainstem of the river. BLM determines that the mainstem section of the river possesses "outstandingly remarkable" fisheries habitat and subsequently decides to designate the river for special management under the provisions of the Wild and Scenic Rivers Act[11]. Meanwhile, the Forest Service has contracted a timber sale in the headwaters of the watershed and cuts a road to the site. Following harvest, a large flood event occurs and large amounts of sediment are washed from the road and the slopes of the recently harvested headwater area to the mainstem section of river which is managed by BLM. The fisheries habitat is degraded and the outstandingly remarkable values of the river are lost. In accordance with agency regulations, the Forest Service conducted an analysis to determine the effects of the timber harvest. However, the analysis only evaluated the effect of actions within the borders of the forest. This is not an atypical example of how the "ecologically arbitrary" delineation of administrative boundaries can undermine agency planning at all levels, from endangered species issues to watershed management.

The agencies have developed coordinating mechanisms to initiate interagency efforts such as rangeland reform and PACFISH, however, variations among the agencies' legislative mandates, administrative procedures, and planning regulations sometimes confound interagency planning efforts. For example, during the mid to late 1980s, the agencies took divergent paths on methods of managing old growth forests containing habitat for the threatened Northern Spotted Owl. The difference in management approaches was due in part to definitive Forest Service planning regulations that required individual forests to maintain viable populations of native species, regulations BLM lacked.

The Final Supplemental Environmental Impact Statement[12] (DSEIS) developed by the interagency FEMAT outlines an approach that may finally resolve the Northern Spotted Owl/old growth controversy. The FEMAT report provides an example of the level of coordination necessary to manage broad expanses of land involving multiple agencies. In drafting the DSEIS, a multi-disciplinary, interagency team was convened to develop a series of alternatives for management of old growth forests in the Pacific Northwest. FEMAT's preferred alternative includes management prescriptions for commodity production that are considered unlikely to compromise the viability of native flora and fauna such as the Northern Spotted Owl.

The FEMAT effort is symbolic of the type of crisis management that the ecosystem approach is designed to offset. The decrease in ASQ from federal lands in the Pacific Northwest is more the result of unsustainable timber harvest levels projected in previous years than it is the work

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[11] 16 USC secs. 1271-1287

[12] USDA Forest Service and USDI Bureau of Land Management, *Final Supplemental Environmental Impact Statement on Management of Habitat for Late-Successional and Old-Growth Forest Related Species Within the Range of the Northern Spotted Owl*, 1993.

of FEMAT. DSEIS alternatives were developed in response to lawsuits and judicial injunctions against the agencies that nearly halted timber harvest from old growth forests on federal lands in the Pacific Northwest. In order to avoid the social displacement and economic repercussions typical of "trainwrecks" such as the Northern Spotted Owl/old growth controversy, the agencies must integrate planning and management at all levels and continue to work with interested private landowners and state land managers.

The agencies should coordinate administrative processes and planning regulations to streamline interagency coordination and use comparable data standards and resource classification systems to simplify information exchange. Agency management objectives should be integrated from a watershed, landform, or other ecological perspectives. To safeguard sustainable ecosystems, ecologic, economic, and social factors should be considered to determine appropriate resource uses, cost of uses, products, and services from federal lands.

A more permanent and effective means to facilitate an ecological approach to management of federal lands abides in Congress. Presently, the federal agencies — Forest Service, Soil Conservation Service, Park Service, EPA, and Fish and Wildlife Service — use distinct administrative frameworks to manage their field units. BLM operates within state lines. Interagency coordination would be quickly enhanced were all land management agencies to recognize and operate under the same ecologically-based regions. This would require abolishing state lines as agency borders. Similarly, the degree of interagency coordination, and its associated costs, would be drastically reduced were Forest Service and BLM joined under the same legislative mandate.

THE BURDEN OF SUSTAINABILITY: IS IT ALL WORTH IT?

The wealth of resources from federal lands provides the United States with a strategic advantage over most other industrial nations of the world. Goods and services derived from federal lands insulate the country from price fluctuations in world markets and provide jobs for local communities. Forests, grasslands, rivers, and streams are also a source of income, recreation, and spiritual renewal for millions of Americans.

As the agencies begin to implement an ecosystem approach to management, Congress and the public should reconsider the "customer service" ethos that has traditionally driven resource management practices in the western United States. Charles Wilkinson describes policies governing mining, use of public rangelands and forest lands, hydropower development, and western water law as "the lords of yesterday."[13] In the nineteenth century, with seemingly limitless supplies of wood fiber, forage, and minerals at hand, western land use policies were designed to expedite settlement of the West. These policies are anachronisms of a bygone era and are anathema to ecosystem management.

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[13] Charles F. Wilkinson, *Crossing the Next Meridian*, Island Press, 1992.

No frontiers remain in the American West and progress has come at a great cost to the biological diversity of the nation. We may never know the true extent of incremental and cumulative degradation to the landscape, although its evidence is real and visible through the explosive spread of noxious weeds throughout the West; the multitude of threatened, endangered, and extinct species; degraded rangelands and water quality; and forest health problems. As E.O. Wilson asks, "[I]f enough species are extinguished, will the ecosystems collapse, and will the extinction of most other species follow soon afterward? The only answer anyone can give is 'possibly.' By the time we find out, it might be too late. One planet, one experiment."[14]

The late Speaker of the U.S. House of Representatives, Tip O'Neill once remarked, "all politics is local." Most federal land use issues are as well. Agency managers live and work in communities dependent on the delivery of goods and services from the federal lands. The outdated concepts and equivocal language of the agencies' legal mandates do not empower field managers with a clear charge to maintain ecological sustainability. Political and social pressures often have undue influence on land use allocation decisions. In the absence of solid data to support limits to land use, managers often cannot justify, or even determine, appropriate restrictions to development. Congress should make clear, through new legislation or amendments to existing laws, that the first priority of the agencies is to safeguard the ecological sustainability of the land.

The principles of ecosystem management form the philosophical underpinning of a new land ethic; an ethic designed to safeguard ecological sustainability and biological diversity so that future generations may continue to enjoy benefits from the land. Harkening back to the words of Aldo Leopold, the agencies, states, Congress, and the public should not presume that adoption of ecosystem management will be inexpensive or painless. Implementing an ecosystem approach to management will require the agencies to place greater emphasis on hiring and training employees proficient in assessing and predicting the effect of management activities on the landscape. As noted above, there are too few agency personnel with skills needed for such tasks. Ecological assessments and increased interagency coordination may also require additional short-term agency expenditures. As demonstrated by the FEMAT effort in the Pacific Northwest, the public can also expect that an ecosystem approach to management may check short-term use and development of federal lands in some areas. We have reaped many short-term benefits, it is time now to secure the land's long-term sustainability. One thing is certain: long-term benefits secured by maintaining biologically diverse, healthy, and productive ecological systems will far surpass the short-term costs and sacrifices incurred by implementation of the ecosystem approach to management.

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[14] Edward O. Wilson, *The Diversity of Life*, The Belknap Press of Harvard University Press, 1992.

A Framework Towards Ecosystem Management Performance Standards

by

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Table of Contents

A FRAMEWORK TOWARDS ECOSYSTEM MANAGEMENT PERFORMANCE STANDARDS
compiled by Karl Gebhardt

A FRAMEWORK TOWARDS ECOSYSTEM MANAGEMENT PERFORMANCE STANDARDS

The basic purpose of this report is to propose a substantive implementation to ecosystem management, serve as a start for dialog with the Idaho Management Team and to pass along suggestions from experienced resource specialists, managers, and others who are concerned about the implementation of ecosystem management. This document contains information developed from meetings with resource specialists and a few area managers.

Introduction

The advent of ecosystem management has identified a number of trendy terms and definitions suggesting major changes in the way the BLM does resource management. The Eco-Region Team (ERT) identified the need for developing "performance standards" as a tool in putting some substance into ecosystem management.

The performance standard concept would establish short- and long-term resource management objectives tied to measurable attributes associated with ecosystem management goals.

In discussing the performance standard concept with a group of resource specialists, it became apparent that ecosystem management, as far as it has been presented to BLM employees, is merely a concept, lacking substance toward on-the-ground implementation. It was suggested that a basic framework for how ecosystem management will operate should be developed before performance standards are established. The framework should include the basics of ecosystem management and also include a discussion of constraints, concerns, and suggestions made throughout the information-gathering process.

An open work group was organized on December 17, 1994 and met again on January 10, 1994 to receive input. Other information was sought from several previous "Program Leaders" meeting, an Ecosystem Monitoring/Inventory Workshop held February 8, 1994, the Idaho Ecosystem Management Team report, BLM Director Instruction Memoranda, Oregon's BLM Organizational Proposal, U.S. Forest Service Ecosystem documents, Idaho's Field Ecosystem Management Concept Report, Roles and Functions of Ecosystem Consultant Paper, Field Organization Strategy (February 1994), Building a New Vision for the BLM - Readings on Ecosystem Management Approaches (Dworsky 1993), and discussions with a number of resource specialists and managers in Idaho.

The remainder of this document summarizes what are believed to be the most important findings related to Ecosystem Management and the development of performance standards.

BASICS OF ECOSYSTEM MANAGEMENT

The following bullets and discussion represent what we believe is an acceptable beginning towards implementing ecosystem management. Much of the information was borrowed from Idaho's Ecosystem Management Team Report and other documents mentioned above.

DISCUSSION DEFINITIONS

Since there are a number of definitions for terms floating around, we have included our own to help in the discussion in this paper. Of particular interest is Resource Management, Ecosystem Management, and Ecosystem Analysis.

Ecosystem Management: An attempt to maintain or restore the integrity of a ecosystem. Mostly, it involves a change how how we think about land-use decisions, particularly in the basic goals of biological diversity and sustainability. Ecosystem Management should be a scientifically-based, problem solving process, resulting in land-use decisions as constrained by the various needs of and demands upon the resources.

Routine management: What we must do to accomplish day to day work, at a minimum, to be in compliance with existing laws and regulations, service public land users, and provide the needs of other branches of government (e.g. Washington Office, Department of Interior, State Legislature, Congress). It is clear from many of the comments seen on State Office Role and Functions that some managers do not have a good idea of the current workload that can be called "routine".

Ecosystem Management Planning: A land-use planning process performed by generally looking at ecosystem components within an administrative area that may or may not be ecologically connected. Resource management also recognizes legislative and other mandates that may automatically require certain limitations or exploitations of a resource.

Ecosystem Analysis: A proposed new process to assure there is a good scientific basis for Ecosystem Management decisions. Ecosystem Analysis describes the complex-interrelated components comprising a definable ecosystem and serves as a dynamic process to document scientific ecosystem information. The ecosystem analysis can be easily incorporated into the existing planning system process and can stand alone to serve as the analytical endpoint for inventory and monitoring. Much of the process simply requires documenting the results of monitoring and other scientific studies and using that information in an interdisciplinary team process.

Performance Standards: Measures of success in meeting goals and objectives to account for the implementation of Ecosystem Management. Performance Standards can be developed for almost every area of the Ecosystem Management process including: personnel, ecosystem components, plans, and programs. Examples are given later.

GETTING ON WITH ECOSYSTEM MANAGEMENT

Districts have already begun to implement changes towards Ecosystem Management. The challenge we face is how to develop an Ecosystem Management process, while at the same time conducting routing management. The largest decisions will involve which things will and will not get done. Ecosystem Management will require a great deal more effort than our current management style, so we need to make some hard decisions and resist "doing more with less".

Some of the obvious steps of an Ecosystem Management approach are given below in figure 1. These steps closely follow the existing Resource Management Planning process shown on figure 2, with reliance on the Ecosystem Analysis in providing solid, scientific input to the inventory, analysis of the management situation, estimation of effects, and monitoring and evaluation steps.

Ecosystem Analysis - The Ecosystem Analysis is not a major change in what the BLM has historically done, only a change in how we handle scientific information. Some of the major requirements of Ecosystem Analysis would be:

Frequent interdisciplinary cross-training sessions.Technical interdisciplinary teaming to fully describe ecosystem functions and processes.

Increased emphasis on training and professionalism (training and involvement in professional organization would become a high priority).

Requirements for providing analysis and documentation of inventory and monitoring information.

Access to the latest and best scientific tools and information.

The analysis would continue so long as there is a need to better the understand ecosystem functions and processes, whether or not it is for a major planning initiatives.

The compiled Ecosystem Analysis would be a professional quality document suitable as a library reference. It would also contain indexes to the raw data and the Geographical Information System.

Figure 1. A Possible Ecosystem Management Approach

1. Assemble an Interdisciplinary (ID) Team

2. Train the team on what ID teaming is about

3. Identify where to begin

   Identify types of problems conducive to Ecosystem Management solutions.
   Identify areas having the most important problems that we know about.

4. Develop Ecosystem Analysis

   This requires a lot of inter-education among specialists.
   Literature review and study.
   Data collection.
   Develop conceptual model of ecosystem.
   More literature review and study.
   Data collection.
   Peer review and Validation of conceptual model.
   Limiting factor analysis.
   Report preparation.
   Continue to update and improve incorporating new information such as from the ecosystem monitoring and feedback loop.

5. Ecosystem Management Planning/Problem Solving

   Merge ecosystem analysis and resource management constraints.
   Problem solving,
   Technical arbitration/appeal.
   Plan finalization.
   Development of standards and accountability.
   Plan implementation.

6. Ecosystem Monitoring and Feedback Loop

   Identify key monitoring attributes (this includes resource components and management action).
   Conduct monitoring.
   Document results and incorporate into some type of statewide useable database.
   Management modification.

THINKING THROUGH THE PLANNING PROCESS

LOGIC	RMP PROCESS STEPS
	○ PREPLANNING CONTRACT
	○ ISSUE NOTICE OF INTENT
WHAT IS THE PROBLEM?	● ISSUE IDENTIFICATION
	● PLANNING CRITERIA (PC)
	○ ANNOUNCE AVAILABILITY OF PC
WHAT IS OUT THERE NOW?	● INVENTORY/DATA COLLECTION
	● ANALYSIS OF THE MANAGEMENT SITUATION
WHAT ARE THE OPTIONS?	● ALTERNATIVE FORMULATION
	● ESTIMATION OF EFFECTS
MAKE THE BEST CHOICE.	● SELECT THE PREFERRED ALTERNATIVE
	○ PUBLISH DRAFT RMP/ DRAFT EIS
GO WITH IT!	● SELECT R.M.P.
	○ PUBLISH PROPOSED RMP/ FINAL EIS
	○ RESOLVE PROTESTS
	○ PUBLISH ARMP/ROD
	○ IMPLEMENT ARMP
KEEP PLAN CURRENT!	● MONITOR AND EVALUATE
	○ PLAN MODIFICATION

B

The overall ecosystem management process must recognize the constraints of political structure, while the ecosystem analysis shouldn't, and should only be concerned with physical and biological limitations, as this limits the potential number of solutions to various problems. The first step in attaining ecosystem management is to develop an ecosystem analysis and the constraints/opportunities available through each resource management component. To do this requires a great deal of time for specialists to educated one another on their particular component of the ecosystem. This is the basis for Interdisciplinary Teams.

INTERDISCIPLINARY (ID) TEAMING

Interdisciplinary Teaming is the key in solving resource problems and establishing meaningful objectives.

Two levels of ID teams should be established - Field Level and Regional Level. In addition, special teams should exist for special problems, such as those that overlap established ecosystem boundaries.

Composition of the teams should generally include expertise in biology, hydrology, geology, soils, recreation, economics and other areas where appropriate. The correct team mix is most appropriate. Guidelines for team composition should be developed for various types of ecosystems and special projects.

These team must have some autonomy from the decision-maker so their product is not biased by the decision-maker. However, it must meet the product requirements of the decision-maker.

It may take a long time to develop a team that can perform well together. Typically there are turf battles, ego problems, specialist that may misrepresent the science, etc. Training and experience will help minimize problems, however, teamwork must be the goal.

Team members must be able to articulate their resource component and to conduct some abstract thinking in developing interactions with other components. This can be called conceptual modeling or charting an ecosystem. If a resource specialist cannot do this or is somehow afraid to represent their concerns, the ID approach may fail (weakest link). The strength of the ID team is directly proportional to its composition.

Teams should demand a scientific process, as best possible. Current science literature or validated experience, and peer review should be the norm. Specialists should learn how to accept questioning and criticism in a professional manner without impacting their ability to make analyses and recommendations.

Interdisciplinary Teams should not be overused. Teams are much less efficient in developing timely products. Guidelines need to be developed to determine when ID teams are most appropriate and when they

are a total waste of time.

RESOURCE MANAGER ROLE

The Resource Manager should make the final resource/ecosystem management decisions. The manager must be accountable for what happens and should be focused on solving the political and social problems associated with Ecosystem Management. The following list of items are provided as important things to consider.

The Resource Manager must demand the best product and science available from the ID team.

The decision-maker must have a solid set of performance standards to serve as a bottom line in offering some protection from social and political pressure. The performance standards should also be coupled to accountability units to track performance both on-the-ground and through the PIPR process.

The need for the Resource Manager to act a supervisor to ID team members appears to be a conflict. The manager/supervisor role may detract from thorough problem-solving, coordination, and interaction with the public.

The Resource Manager and Resource Specialist should have an internal arbitration/appeal process where technical resource disagreements can be analyzed and resolved at a higher level. Professionalism must be maintained throughout this type of process.

RESOURCE SPECIALIST ROLE

The Resource Specialist should be the recognized expert for a particular resource component.

Resource Specialist should develop appropriate accountability units that accurately reflect their job.

Resource Specialist should be encouraged to expand their knowledge and capabilities. (i.e. Training and professional advancement should be a high priority).

Resource Specialist should be required to document their findings, particularly on the effectiveness of management actions to maximize institutional memory.

Resource Specialists should be required to interact, through seminars, team meetings, etc. to maximize institutional memory and interdisciplinary training.

A technical career ladder should exist without regard to location.

Those who are demonstrated to be technically superior should be have an increased grade and should be required to provide expertise at a regional and national level when needed. There needs to be a sufficient level of expertise in the field. Technical levels could include: Entry Level (GS-9), Specialist (GS-11), Master (GS-12), Senior Technical Specialist (GS-13).

Lead Resource Specialists (formally Program Leaders) would be responsible for assisting a cadre of specialists for their particular component throughout the State. This includes identifying and developing training, evaluating technical performance, providing technical assistance, tracking performance standards and units of accountability, technology transfer, developing policy, developing technical procedures, developing performance and training standards, quality control requirements for data, data stewardship, resolving technical disputes, suggesting budgetary needs, and coordinating with State and Federal government agencies, and answering the ever-increasing requests from WO and other levels of government. Much of this is expected to take place using Resource Component ID teams.

PERFORMANCE STANDARDS

Performance Standards are measures of success in meeting goals and objectives to account for the implementation of Ecosystem Management. Performance Standards can be developed for almost every area of the Ecosystem Management process including: personnel, ecosystem components, plans, and programs. Performance standards, when applied thoroughly, become the goal setting, incentive, and accountability process for attaining ecosystem management.

Performance Standards should:

Provide performance guidelines, standards, and minimum requirements for: personnel, components of the ecosystem, components of the planning and management process.

Relate to Ecosystem Management Objectives

Be measurable and within a time limit that can be evaluated over a performance cycle (PIPR, Technical Program Review, etc.),

Be developed for all performance areas where possible (i.e. Public Service, Compliance, Monitoring, Support, Planning, Maintenance, and Development).

Performance Standard Examples:

Components of the Planning and Management Process

Complete the first draft of the Ecosystem Analysis by July 1995.

Complete the Ecosystem Management Plan by July 1997.

Components of the Ecosystem

Increase the available miles of fishing access by 10 percent.

Assure dissolved oxygen levels do not exceed State standards.

Complete the riparian inventory of EMA 3303 by September 1995.

Increase the habitat for threatened and endangered species by 10 percent over the next 3 years.

Assure that regrowth of the woody cover component is increased by 10 percent over last year's monitoring result.

Eliminate mine-related toxic substance problems on all areas containing the Bull trout within the next 4 years.

Personnel

Resource Specialist

Complete the water quality component of the Ecosystem Analysis by July, 1995.

Attend 1 professional meeting.

Present an overview of your concerns about the resource you specialize in to your ID team.

Attend the minimum required training or submit evidence that you have the equivalent of the minimum training by April, 1995.

Attend the PHABSIM course by April, 1995.

Present water quality monitoring data at the 6th Annual Nonpoint Water Quality Monitoring Results Workshop.

Prepare the water quality monitoring documentation for the past year's work by the end of the fiscal year.

Resource Manager

Complete the draft Ecosystem Analysis by July 1995.

Develop and carry out a public participation plan for the Ecosystem Analysis by January 1996.

Ensure all required training is attended or suitable equivalent training is provided.

Encourage employees to attend training and professional meetings.

Meet with concerned public during the formulation of the Ecosystem Management Plan

Complete the Ecosystem Management Plan by July 1997

CHANGES IN ATTITUDE NEEDED

Changing an organizations structure often will create new opportunities, however, many of the perceived constraints, problems, and differences of opinions will remain the the minds of those who undergo the change. Therefore, any organizational change must undergo an attitudinal change as well. List below are a number of attitude changes that were extracted from the many meetings and documents reviewed.

Monitoring and Feedback must be one of the highest priorities.

Managers and Specialists must understand and appreciate each other's role.

Technical training, scientific information acquisition must be high priorities.

Refrain from doing great number of poor quality jobs (do less with less).

Public and employee education in key. More frequent technical employee seminars should be given. Give same emphasis to technical information as we have in Project Pride.

Managers must demand the best information from their specialists and refrain from having a "know it all" or "my way or no way" attitude.

Resource Specialist must develop the best information possible commensurate with the need. Poor quality work and work without meaning should not be tolerated.

Actions and Policy Needs

Provide all employees course in systems ecology.

Define Ecosystem Health - what is acceptable vs. unacceptable?

Develop guidelines for team composition should be developed for various types of ecosystems and special projects.

Establish a Regional Technical Assistance Team to begin working on the technical aspects of ecosystem management process and definition.

Develop an accountability system must be able to accurately reflect what we do on the ground in addition to what we need for WO reports.

Develop guidance/training for identifying ecosystem components, conceptual modeling, ecosystem analysis, and limiting factor analysis.

Policy Need: Performance Standards will establish minimum goals that management will have to meet.

Policy Need: Scientific knowledge sources need to be available to all Resource Specialists. On-line library services needs to be a high priority.

Policy Need: Data collected through inventory and monitoring must be permanently documented. Very experienced specialists should be in charge of the monitoring design and collection efforts. Management outcome must be documented to save our institutional experience.

Policy Need: Lead Resource Specialists should assist the District in developing position descriptions and assessing the qualifications of candidates for their particular area of expertise.

Policy Need: Monitoring results should be evaluated and translated into management recommendations.

Policy Need: The State Office will maintain a technical conflict resolution committee.

Policy Need: An employee will only have one supervisor. Employees serving on ID teams will be evaluated by a team leader and that evaluation will be used by the supervisor. Standard and guidelines for ID participation should be established.

Policy Need: Scarce skills may be located at any level. The supervisor of a "scarce skill" or "senior technical specialist" employee is expected to provide their expertise. Performance on ID teams at various levels will be a requirement on PIPRs of these employees.

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