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# Science

F I N D I N G S

*“Science affects the way we think together.”*

Lewis Thomas

## TOO EARLY TO TELL, OR TOO LATE TO RESCUE? ADAPTIVE MANAGEMENT UNDER SCRUTINY

Photo credit: B. Bormann



▲ *With parts of many federal forests converted to plantations, managers must consider which strategies will work best to transform plantations to meet NWFP objectives of late-successional structure and riparian area improvement. Adaptive management techniques are well-suited to solving this challenge.*

*“The Forest Service’s definition of adaptive management does not emphasize experimentation but rather rational planning coupled with trial and error learning. Here ‘adaptive’ management has become a buzzword, a fashionable label that means less than it seems to promise.”*

Kai Lee, 1999

**P**ortland, Oregon, 1993. FEMAT (Federal Ecosystem Management Assessment Team) is in process. Spotlight is blazing, tempers are flaring, time is running out. Two things are alarmingly clear: there is an inordinately low level of understanding of how complex ecological systems actually work, and there are high

levels of risk and uncertainty involved in making decisions about how to manage them.

“It seemed terribly clear that we needed new knowledge in order to implement a new forest plan, and we needed a lot of it, and we needed it fast,” recalls George Stankey, a research social scientist at the PNW Research Station in Corvallis, Oregon. “To some of us, it appeared that adaptive management, in its truly experimental and incremental sense, could best help create that new knowledge.”

A key element of the FEMAT mission statement read: “Your assessment should include suggestions for adaptive management that would identify high-priority inventory, research, and monitoring needed to assess success over time, and essential or allowable modifications in approach as new information becomes available.”

Under the Northwest Forest Plan (NWFP) that emerged from FEMAT, adaptive

### I N S U M M A R Y

*Key to the long-term success of implementing the Northwest Forest Plan (NWFP) is adaptive management—the idea of treating management policies as experiments, learning from them, and using them as a basis for changes and adjustments. Although much of the NWFP involves standards and guides that prescribe future management, and restrictive allocations such as terrestrial and aquatic reserves, it also identifies 10 adaptive management areas (AMAs), where managers, citizens, and scientists are encouraged to seek innovative approaches to identifying problems, conducting research, applying results, and promoting learning. A local sense of priority and need should guide adaptive management activities, but research also should be considered within the context of the region and across the AMA network. Meanwhile, research within the AMAs can help establish improved understanding of, and bases for, standards and guides prescribed by the NWFP. A recent report on AMA efforts reveals a need for institutional changes if such an approach is to be successful. Research has also been done on the role of the AMAs in creating innovative collaborative links between citizens and their manager and scientist partners, including examples of success as well as barriers to progress.*

management was to be the engine that drove the plan's long-term evolution. Ten adaptive management areas (AMAs) were created in Washington, Oregon, and northern California. The AMAs were designated real estate on which new approaches to the research-management partnership, new ways of "learning how to learn," could be tested. Specifically, according to the FEMAT report, they were "to encourage the development and testing of technical and social approaches to achieving desired ecological, economic, and other social objectives."

Nearly a decade later, Stankey has just completed a comprehensive review of the AMAs. Ruefully, he observes, "It is not out of the question that adaptive management could die on the vine. Despite its intuitively compelling simplicity, it could be that it just ain't gonna work."

## IN THE BEGINNING...

With hindsight, of course, another thing that comes clear is that adaptive management—not a concept created by FEMAT—was never clearly defined, nor were the duties and responsibilities of AMA coordinators ever spelled out, or even really suggested, Stankey says.

Adaptive management—although not widely understood at the time—had in the literature gathered itself under a multifaceted description: it treats management policies as experiments from which learning occurs; it explicitly mimics the scientific method; it highlights uncertainties, specifies hypotheses or questions, structures actions to test the hypotheses, evaluates results, and adjusts subsequent actions accordingly.

"Ideally, the learning process becomes ongoing, iterative, and self-correcting," Stankey says. "It does not result in a postponement of action until enough is known, but acknowledges that time and resources are often too short to defer at least some action."

KEY FINDINGS

- A new approach to the research-management relations is required. The natural tension between the two arenas can produce strengthened relations and improved learning, particularly with focussed input from lead scientists and AMA coordinators.

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- The AMA research effort is an important complement to PNW Research Station direction and priorities. The AMAs represent an additional research setting, one that offers important opportunities to test, validate, and possibly revise standards and guides contained within the NWFP.

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- The AMA research must be grounded in a local sense of priority and need, established by strong links between management and research. At the same time, designing research to maximize its applicability across the whole AMA system is also productive.

Once the FEMAT process had revealed how little was known about both ecological systems and the human communities that depend on them, Stankey recalls, AMAs were seen as a means to work out some of the details, even to help keep the most threatened and endangered communities afloat.

In theory at least, the 10 AMAs provided settings where citizens, managers, and scientists could seek—together—innovative and creative approaches to identifying problems, conducting research, and applying results, all driven by the basic objective of enhancing learning.

"In contrast to management of other allocations (reserves, matrix areas) in the NWFP, where uniform standards and guides regulate all action, the AMAs offered opportunities to seek localized, idiosyncratic, and particularistic solutions," Stankey explains. "More importantly, they provided an opportunity to test ways to achieve ecosystem management objectives across the region."

But in an unfolding of events he describes as "metaphorically reminiscent" of the convergence of grim circumstances in "The Perfect Storm," Stankey now recognizes various forces that have proven almost insurmountable for AMAs.

### *Purpose of PNW Science Findings*

To provide scientific information to people who make and influence decisions about managing land.

*PNW Science Findings* is published monthly by:

**Pacific Northwest Research Station  
USDA Forest Service  
P.O. Box 3890  
Portland, Oregon 97208  
(503) 808-2137**

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## A TURBULENT CONTEXT

Chief among these forces, he says, are ever-broadening demands and concerns for a diverse range of environmental goods and services, a continued decline in forest habitat and species, continued downsizing of the workforce and operational budgets, and a growing recognition of the limits of knowledge.

“Traditional emphases for commodities have not disappeared, but they have been joined by demands for amenity, environmental, spiritual, subsistence, and other values and uses that have dramatically altered the dynamic of forest management,” Stankey notes. “Furthermore, because of the high levels of uncertainty surrounding our actions, the law of unintended consequences continues to plague us. For example, concerns about the impact of the Endangered Species Act have prompted many private landowners to accelerate rates of harvest, thus further diminishing critical habitat for many species.”

Many other factors combine and interact to create a highly dynamic, and often fractured, environment in which natural resource managers and scientists are required to work. Stankey cites among these the limits of science as a means of solving problems; the level of distrust between those who govern and those who are governed, and hence distrust of legisla-

## DESIGNING AND PRODUCING A REPORT CARD

“Because adaptive management and the AMAs are such a critical element of the NWFP, there has been a growing sense of the need to critically evaluate just how well—and whether—they are working,” Stankey says. “Evaluations are always difficult and contentious; they involve judgements, about people, about programs, about priorities.”

But Stankey’s study did not focus solely on shortcomings. The objectives of the study were to provide an historical context, clarify the assumptions on which the AMAs were created, evaluate the application of adaptive management in these areas, identify facilitating factors and constraints, and offer conclusions and recommendations.

### LAND MANAGEMENT IMPLICATIONS

- Research in the AMAs, and its application to them and other allocations in the NWFP, reveals needed changes in institutional structures and processes. These include budgetary processes, cross-agency relations, integration of different forms of knowledge and their use in decisionmaking, feedback processes, and monitoring.
- The AMA research can help establish improved understanding of, and bases for, standards and guides in the NWFP. The tentative and preliminary nature of many standards and guides makes their testing and validation essential, with significant potential impacts on land management across the region.
- Increased attention to formal specification of learning objectives must occur. Formal research need not accompany every management action, but including explicit problem formulation, assumptions, expected outcomes, results, and analysis of differences between the latter two, will increase learning levels and highlight areas needing further research.

tion and its effects; and the growth in real-time communications that enable protest and political action to be mobilized rapidly.

While the competitive funding process was in place for two years, in 1998 a decline in funding for regional ecosystem management activities triggered a decision by both the PNW Region and the PNW Research Station to end their support of the AMA program. This situation continues today.

“On top of all this there is the requirement built into the NWFP that we change our

way of doing business,” he says. “While we may well understand the need to change, the actual business of changing is extremely difficult. It has been well said that it’s not change itself, but the transition to it that kills you.”

With such turbulence as background to any attempts to get productive results out of AMAs, it is perhaps a wonder that there are indeed achievements to report.

Stankey began by interviewing a broad range of people in various relations with AMAs: AMA coordinators and lead scientists, forest supervisors and Bureau of Land Management area managers; some regulatory agency representatives, researchers studying or helping implement adaptive management, and citizens. In addition, he interviewed Jack Ward Thomas, who led the FEMAT process and was later Chief of the Forest Service; as well as the principal authors of the adaptive management chapter in the FEMAT report.

The study also incorporated an intensive review of existing surveys of citizens involved with AMAs, and a literature review to provide context for the picture he was putting together.

Existing literature suggested that adaptive management, as attempted in various settings, was inevitably tied closely to risk and uncertainty, and that these factors often operated to suppress an adaptive approach, he says.

“It is a Catch-22 phenomenon: experimentation is not permitted until sufficient evidence is available to predict confidently that the treatment will not have an adverse impact, but until such experiments can be undertaken, it is not possible to generate such knowledge.”

The literature further notes that effective adaptive management rests on the key elements of increasing knowledge acquisition, effective information flow, and processes for creating shared understandings.

## WRITER’S PROFILE

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"For all three elements, the experience reported suggests limited or only modest achievements," Stankey says. "For example, the costs of experimentation are usually immediate and often high, whereas the benefits are much farther down the road.

## BARRIERS AND BATTLES

Perhaps the most notable group of comments concerned cultural clashes—on the one hand, between the existing organizational structure and the innovation-oriented concept of adaptive management, and on the other, between researchers and managers, whose worlds tend to be driven by different forces, Stankey observes.

"The natural organizational tendency to impose controls through prescriptive approaches and standardized rules and limits was seen as a major threat to efforts to be innovative. There was also a sense that few incentives exist, and in fact, some significant disincentives exist, to undertake creative approaches."

And then there is the world of the scientist, who wants controls, and replications, and

Or an institution will lack the ability to cultivate and sustain internal champions and advocates of adaptive management. Or there is a lack of forums for transmitting complex new understandings."

specific ways of formulating hypotheses, versus the world of the manager, who wants action, no "wasted" space for controls, and an assurance that any experiment carries no risk for threatened or endangered species. Stankey concludes that the natural tension between collecting knowledge and taking action, both needed components of adaptive management, appears not to have been widely resolved.

A second major problem area concerned the lack of institutional capacity. "As the AMA coordinators so succinctly put it, they are mostly one deep," Stankey says. "They received no training at the start, they have little, if any, backup, and there is no ongoing training or mentoring. There is often sharp conflict over resources, priorities, and funds, that is, both locally and across units."

## CHANGING WAYS OF DOING BUSINESS

With what reads like a list of insurmountable obstacles in the way, have AMAs had any significant effect on how business is done in the forest resource world?

"The answer really ranges from absolutely, to none at all, depending on which area you're talking about," Stankey says. "About half the interviewees said it had not, and the other half said it had particularly influenced the way public involvement was conducted."

The flagship of AMA achievement is perhaps the Central Cascades AMA's Augusta Creek and Blue River landscape design plan. There, an alternative management strategy to the conservation-reserve system established in the NWFP has been proposed, focused on managing according to natural disturbance regimes. Both the basic assumptions of the NWFP and specific standards and guides have been tested, Stankey points out.

In the Little River and North Coast AMAs, study of the roles of proportional thinning

and burning to foster old-growth composition and structure has revealed significant differences between Coast Range and Cascade Range forests in terms of ages, development histories, composition, and structure. On the Olympic AMA, studies are investigating the utility of measures of biotic integrity in various vertebrate, plant, and fungal communities and soil food webs as indices of success in accelerating development of late-seral forest conditions in second-growth managed forests.

The Cispus and Applegate AMAs are examining the underlying validity and appropriateness of the standards and guides for riparian management. In the North Coast AMA, monitoring as a key element of the NWFP is being acknowledged in the attempt to develop improved prediction of the long-term effects of alternative silvicultural prescriptions. Simple field protocols and digitized air photos will help characterize horizontal and vertical complexity at the stand level.

"This use of AMAs provides research with a venue where testing, validation, and possible

Given this background, how far did the 10 AMAs depart from the norm?

Coordinators usually find themselves unable to fulfill AMA tasks because the job is perceived as an "add-on"—something to be done after all the other important tasks are completed. "The phrase I heard most often about the status of AMAs and adaptive management in general, was 'not on the radar screen,'" Stankey says.

The reference here touches on another area of concern: the lack of leadership. Ironically, early decisions at the regional level to avoid direction or guidance in order to encourage a "bottom-up" or emergent process to evolve, has largely been interpreted as a lack of interest in, or commitment to, AMAs and all they might have been.

revision of standards and guides contained within the NWFP can be conducted," Stankey says. "In this way, they provide a complementary research setting that offers important opportunities to undertake work relative to Station priorities."

Several AMAs, the Central Cascades and Olympic in particular, are developing innovative approaches to foster learning among citizens, managers, and scientists through improved problem definition, communication of findings, and promotion of a collaborative approach to management and research.

In the area of citizen involvement, surveys of "attentive publics" also offered some insights, Stankey notes. "There was a general consensus among citizens that it's simply too early to assess whether the AMA experiment has been a success or not. There are, however, lingering concerns that despite the rhetoric of AMAs and adaptive management as 'new ways of doing business' that in fact it's more like 'business as usual.'"

## SO, IS THE CONCEPT WORKING?

Clearly, all is not gloom and doom, but Stankey concluded that there are two broad, and significant, categories of challenge to the ultimate success of an adaptive approach.

The first category includes fundamental, systemic barriers: the conventional scientific-rational planning paradigm centers on a centralized, top-down, expert-driven model of planning, which runs counter to what Stankey perceives as an increased need for establishing local priorities.

In the same category is the current statutory and regulatory environment, which has shifted the burden of proof logic and turned it into a “Catch-22.” And finally, there has been a shift in perception of AMAs as simply one of the new allocations under the NWFP, all of which must compete for limited funding and resources.

The second area of challenge is operational, starting with lack of shared meaning. “The range of notions of what AMAs are goes from economic enterprise zones where we can get the cut out to help hard-hit communities, to a continuation of the experimental forest concept, to a new term for an old practice,” Stankey says. “The diversity of ideas on it could be a strength, but has instead tended to divide the already thin ranks of supporters.” He also believes the PNW Research Station could have done more to use AMAs in undertaking certain research priorities, particularly the testing and validation of standards and guides.

Burnout among coordinators is common. And despite the central place of the idea of learning in adaptive management, Stankey’s investigations found little evidence across the region where rigorous, documented, or deliberative processes to facilitate it were in place.

In the end, Stankey draws no final conclusion. Yes, this study may have been done too early. Yes, it may be too late. Without knowing exactly where we are in the development of adaptive management as an active approach—are we 5 years into a 100-year process, or 10 into a 12-year phase?—that question has no clear answer. He does believe that we have not yet closed the door on adaptive management as an option.



Photo credit: B. Bormann

▲ *Landscape-scale adaptive management strategies can help evaluate alternative strategies for maintaining extensive road systems. The Five Rivers Landscape Study in the Oregon Coast Range represents one such investigation.*

What he does see as rather ironic is the kind of “spurious certitude” that informs current management. “In the case of the NWFP, there is a curious presumptive assumption that the kind of conservative, prescriptive, and reserve-based system of management in place is the best way to ensure long-term protection of key species and values. But unless we are willing to test

and validate these assumptions, we may be locked into a course of action that will ultimately doom the very values we seek to sustain.”

*“Most policies are really questions masquerading as answers.”*

Stephen Light, 1999

### FOR FURTHER READING

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