ECOLOGY AND SOCIETY

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Kevin Rogers. 1998. "Managing science/management partnerships: a challenge of adaptive management". Conservation Ecology [online] **2**(2): R1. Available from the Internet. URL: http://www.consecol.org/vol2/iss2/resp1/

Response to Walters 1997. "Challenges in adaptive management of riparian and coastal ecosystems"

Managing Science/Management Partnerships: A Challenge of Adaptive Management

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Although Walters' synthesis was not encouraging for those embarking on programs of adaptive management, it is good to see the sorts of problems many of us experience emerging from unpublished practice. This can only lead to increased implementation of adaptive management.

As Walters (1997) points out, many of the problems experienced are institutional in nature and relate to how scientists and managers behave, and how the interaction between them is managed. I believe an important root of the problem is divergent operational philosophies and reward systems (Rogers 1997). Scientists have a propensity to seek problems of intellectual difficulty rather than immediate usefulness (Cullen 1990), and managers have a drive to be pragmatic and serve their institutional hierarchy. Although each group needs to adopt these approaches among their peers, they equally need to find common process and purpose when interacting.

In trying to set up programs in South Africa, under severe resource and expertise constraints, I have found that managing these issues of process and purpose is central to constructive progress. I will address three problem areas raised by Walters (1997) and by Baskerville (1997) in his earlier perspective.

ECOLOGY IS NOT SERVING MANAGEMENT WELL, AND ADAPTIVE MANAGEMENT IS NOT BEING ACCEPTED AND APPLIED IN PRACTICE

Baskerville (1997) admonished scientists for explaining the relevance, or potential usefulness, of their science to managers but failing to make it useful. I fully concur. Too many ecologists operate under what, in technology transfer circles, is called the "strategy of hope": the hope, or even expectation, that managers will find their work useful (Hamel and Prahalad 1989).

Management by experiment is a way in which scientists have tried to make science useful, and is the fundamental premise underlying adaptive management. I wonder if problems with operationalizing this approach might not arise because it tries to make scientists out of managers and managers out of scientists. I have argued (Rogers 1997,

Rogers and Bestbier 1997) that it is better to recognize the divergent operational philosophies and build an effective interface that promotes and supports a lasting science/management partnership. If the interface is staffed and managed effectively, it should provide appropriate reward systems to all sides and increase the overall chance of success (Rogers 1997).

Such an interface needs to be built on sound principles of technology transfer, which recognize that the problem has not been solved until the desired end point of management has been met, and that it won't be solved without a durable partnership between service provider (science) and client (management). This is not trite! Without a clear end point, the partners will not stay focused. Too often, adaptive management is reactive crisis management, because the partnership has not committed itself to a clear goal.

I will focus on the partnership first. The stability of the partnership will depend on its form and how it functions. I don't think we have spent enough time thinking, or at least publishing, about how to structure workable and durable interfaces between the partners. When we do, we need to be wary of some basic misconceptions about, and principles of, technology development and transfer (see discussions by van Vliet and Gerber 1992, Rogers 1997), which will be central to managing the partnership.

There are two important misconceptions. First, that scientific products have intrinsic value and that the best possible product must be developed if it is to influence user choice. In reality, the client determines value and choice is determined by what is good enough to do the job. Second, that the power of the technology determines its success. In reality, it is often the infrastructure required to support the technology that determines its success.

The "battle of the models," as Walters (1997) calls the misguided pursuit of the ultimate model, is a good example of "best-possible-product" and "power-of-technology" syndromes. Scientists who recognize this will put much more effort into developing scientific products that specifically meet manager's, rather than other scientist's, needs to do the job. They will also seek compatibility between the institutional structures and processes needed to support their products, and the potential for the institution to provide these.

The problems of management falling into the comfort zone of "best use policies" and "passive adaptive use of improved monitoring," (Walters 1997) rather than embracing an experimental approach, are typical consequences of management making the choice of what they feel is good enough to do the job.

We really do need to pay much more attention to restructuring our institutions to help them operate more effectively in science/management partnerships. The purpose of the partnership should be to develop consensus on institutional purpose, culture, and structure, and to neutralize the adverse consequences of divergent operating philosophies and reward systems. Without this, the products and solutions from science are doomed to the bottom drawer once they enter an isolated world of management trade-offs to achieve what is good enough to do the job.

INACTION IS A MOST COMFORTABLE OPTION FOR MANAGERS (Walters 1997)

Although I recognize this symptom, I think that the diagnosis is rather harsh and counter to developing win-win partnerships. My experience suggests that the root of this problem is that too few ecologists and managers spend enough time in collaborative efforts to unambiguously define the end points (Costanza 1992) or desired conditions (Christensen 1997, Rogers 1997) of the system being managed; in other words, coming to consensus on the job to be done and goals to be achieved.

As Robert Olson (1986) pointed out, "The better we know where we are going the more likely we are to get there." For some reason, this simple logic seems to elude many in environmental management, and they lapse into a reactive mode, under the guise of being "adaptive." Given the many surprise events nature throws at us, management soon spirals into a never-ending series of ad hoc actions that keep its officers busy impressing their bosses.

The notion of aiming management at a desired end point may seem counter to adaptive management, but it need not be. Experiments can be conducted to determine the best path toward that end point. The value of having defined the end point is that the partners have a common goal. Without this, they either don't know, or they disagree on, the purpose of management: a recipe for a standoff and inaction.

THE KRUGER NATIONAL PARK SCIENCE/MANAGEMENT PARTNERSHIP

Here, I can introduce an example from the science/management partnership for management of rivers that flow through the Kruger National Park, South Africa. A tool that we use to translate policy into action and, thus, to

promote a more end-point-orientated partnership, is to develop an objectives hierarchy, which services management's institutional hierarchy with acceptable and achievable goals (Rogers and Bestbier 1997, Rogers and Biggs 1999). A higher level "vision" and objectives serve upper levels of management with statements of strategic intent, which, although scientifically acceptable, largely reflect the societal values embedded in broad policy. Low-level goals provide on-the-ground managers with two types of targets: institutional and conservation goals.

Conservation goals are scientifically rigorous, spatially and temporally bounded targets of flux in ecosystem condition. The value of this hierarchy is that each goal can be traced back to its origin in both policy and science, as well as to the institutional structure responsible for its achievement. This transparent system gives on-the-ground managers a better sense of connection to higher levels of management and to ecologists, and a better sense of ownership of both the problem and the solution. In this way, we neutralize vested interests and make inaction the uncomfortable option.

Each time I have helped an organization to develop an objectives hierarchy, it has been impossible to set conservation goals until managers have exhausted their concerns about the institutional constraints and needs that the higher level statements of intent mandate them to achieve. Only when these have been satisfied, or institutional goals have been developed to overcome them, have managers felt comfortable discussing ecosystem targets in any detail. So my advice to others is, help the managers overcome their problems if you want them to help you reach your adaptive management goals.

Although the objectives hierarchy provides institutional memory of the reasoning behind goals and actions, a Goal Maintenance System (GMS) provides an internal auditing system to ensure that, once acceptable goals have been set, they are met, revised, audited, and where necessary, reintegrated into an adaptive management process. Without this, management can slip into old ways or become hijacked by conservative vested interests. The GMS is, in many ways, analogous to the Balanced Scorecard that helps business managers to link today's actions to tomorrows goals (Kaplan and Norton 1996). Because the GMS is an iterative process of testing goal achievement, it provides both managers and scientists with a system for cross-referencing their intentions and actions, and for staying "on top of the job" in a flexible and adaptive manner.

MONITORING BECOMES TOO EXPENSIVE FOR MANAGEMENT TO PURSUE

Is this because the scientists' expectations or demands are too high? Are they falling foul of the second misconception about technology transfer? What are the implications for the science/management partnership? In management of the rivers of the Kruger National Park (Rogers and Bestbier 1997), much emphasis is placed on the achievability of goals and the auditing of their achievement. Indeed, by our definition, a goal is not a goal unless some indicator can be monitored and achievement of the goal audited, within the resource constraints of the institutions involved.

Pragmatism is fundamental to designing a parsimonious set of achievable ecosystem end points and criteria with which to measure their achievement. Modeling to define end points is useful and desirable, but not mandatory. If the expertise does not exist, creative and strategic thinking is enough to set sensible hypotheses of the desired end point. The basic philosophy is that if we can achieve consensus at step one, we can enter an iterative, adaptive management cycle (Rogers and Biggs 1999) in which both science and management can learn and improve the depth and rigor of their contributions in tandem.

CONCLUSION

The basic concept of adaptive management is so intuitive to ecologists that it belies the complexity of instutionalizing and operationalizing the process. We need a wider array of tools to support and facilitate adaptive management in the rapidly evolving, multidimensional world of environmental decision making. I suggest that these are developed within carefully nurtured partnerships of science and management, which focus on pragmatic, goal-orientated adaptive management that grows at each cycle. We call this "strategic adaptive management" (SAM) to emphasise its goal orientation. Both sides of the partnership will need to understand the basics of successful technology development and transfer, but first-off, they need consensus on what they are trying to achieve. This will lead them to develop the appropriate infrastructure and interpersonal relations to ensure a durable partnership in pursuit of goals they both want to achieve.

RESPONSES TO THIS ARTICLE

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