Adaptive Management

An Approach for Evaluating Management Effectiveness

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Overview

Over the past few decades, many different fields dealing with complex systems have developed convergent approaches for deciding how to take action in the face of risk and uncertainty; we use the term "adaptive management" to refer to this type of approach within conservation. Adaptive management incorporates research into action. Specifically, it is the continuous integration of design, management, and monitoring to systematically *test assumptions* in order to *adapt* and *learn*. In this paper, we:

1. Describe the conditions that require an adaptive management approach,
2. Provide a definition of adaptive management, and
3. Outline the steps in an adaptive management process that can be used to evaluate management effectiveness.

Conditions that Require an Adaptive Management Approach

Conservation takes place in complex systems. Systems theory holds that there are two main sources of complexity. Detail complexity refers to the large number of variables in the system. For example, conservation practitioners must deal with ecological, geophysical, social, demographic, economic, political, and institutional factors. Dynamic complexity refers to the unpredictable ways in which these factors interact with one another. In the systems in which conservationists operate, change is not only constant, but also often non-linear and not predictable, and takes place over many different time scales. Since conservation involves combining both natural ecosystems and human societies, we are dealing with systems that are extremely complex both in detail and in dynamic.

As conservationists, we are also dealing with competitors for access to natural resources who are constantly changing their tactics and strategy. Furthermore, with rare exceptions, conservation projects are most often managed by governmental agencies or non-governmental

organizations that have far fewer financial and human capital resources than their competitors. We thus have to be smarter and more flexible to get and stay ahead of our competition.

Finally, the urgent need to stop current rates of biodiversity loss demands that we take immediate action despite the risks inherent in our lack of certainty about how best to proceed. We may not have the best available information. We may not know exactly what the outcomes of our proposed actions will be. But we can't wait to take action until we do know for sure. We need to act now.

Over the past few decades, different fields dealing with complex systems have developed convergent approaches for deciding how to take action in the face of risk and uncertainty. Examples of these approaches include adaptive management of ecosystems (Gunderson et al. 1995; Lee 1993), reflective practice (Schön 1984), social learning (Argyris & Schön 1978) and the theory of learning organizations (Senge 1994). We use the term "adaptive management" to refer to this type of approach within conservation.

In a book written with Kent Redford, *Adaptive Management: A Tool for Conservation Practitioners* (Salafsky, Margoluis, & Redford 2001), we used these different sources to develop a definition and preliminary framework for adaptive management. We then tested this framework with conservation projects in Canada, Zambia, and Papua New Guinea. The final framework that we developed is presented in Table 1 and summarized in the remainder of this section.

Definition of Adaptive Management

Adaptive management has recently begun to gain popularity in the mainstream conservation community. But what is it?

Some people ask, "Isn't adaptive management simply good management? Doesn't it merely involve trying something and then if it doesn't work, using your common sense to adapt and try something else – trial and error?" We believe that adaptive management is good management, but that not all good management is adaptive management. We also believe that adaptive management requires common sense, but that it is not a license to just try whatever you want. Instead, adaptive management requires an explicitly experimental – or "scientific" – approach to managing conservation projects.

On the other hand, although early proponents of adaptive management (e.g. Holling 1978, Gunderson et al., 1995) tended to use sophisticated ecological modeling techniques, adaptive management does not require an advanced degree in science or mathematics. Instead, we propose the following definition:

Adaptive management incorporates research into action. Specifically, it is the continuous integration of design, management, and monitoring to systematically ***test assumptions*** *in order to* ***adapt*** *and* ***learn.***

Table 1. Framework for Adaptive Management of Conservation Projects

Source: Salafsky, Margoluis & Redford (2001)

Definition of Adaptive Management

Adaptive management incorporates research into conservation action. Specifically, it is the continuous integration of design, management, and monitoring to systematically test assumptions in order to adapt and learn.

Conditions That Warrant an Adaptive Management Approach

Condition 1. Conservation Projects Take Place In Complex Systems

Condition 2: The World is a Constantly and Unpredictably Changing Place

Condition 3: Our "Competitors" are Changing and Adapting

Condition 4: Immediate Action is Required

Condition 5: There is No Such Thing as Complete Information

Condition 6: We Can Learn and Improve

Steps in the Process of Adaptive Management

START: Establish a Clear and Common Purpose

STEP A: Design an Explicit Model of Your System

STEP B: Develop a Management Plan that Maximizes Results and Learning

STEP C: Develop a Monitoring Plan to Test Your Assumptions

STEP D: Implement Your Management and Monitoring Plans

STEP E: Analyze Data and Communicate Results

ITERATE: Use Results to Adapt and Learn

Principles for the Practice of Adaptive Management

Principle 1: Do Adaptive Management Yourself

Principle 2: Promote Institutional Curiosity and Innovation

Principle 3: Value Failures

Principle 4: Expect Surprise and Capitalize on Crisis

Principle 5: Encourage Personal Growth

Principle 6: Create Learning Organizations and Partnerships

Principle 7: Contribute to Global Learning

Principle 8: Practice the Art of Adaptive Management

This definition can be expanded:

- ***Testing assumptions*** is about systematically trying different actions to achieve a desired outcome. It is not, however, a random trial-and-error process. Instead, it involves first thinking about the situation at your project site, developing a specific set of assumptions about what is occurring and what actions you might be able to use to affect these events. You then implement these actions and monitor the actual results to see how they compare to the ones predicted by your assumptions. The key here is to develop an understanding of not only which actions work and which do not, but also why.

- ***Adaptation*** is about taking action to improve your project based on the results of your monitoring. If your project actions did not achieve the expected results, it is because either your assumptions were wrong, your actions were poorly executed, the conditions at the project site have changed, your monitoring was faulty – or some combination of these problems. Adaptation involves changing your assumptions and your interventions to respond to the new information obtained through monitoring efforts.

- ***Learning*** is about systematically documenting the process that your team has gone through and the results you have achieved. This documentation will help your team avoid making the same mistakes in the future. Furthermore, it will enable other people in the broader conservation community to benefit from your experiences. Other practitioners are eager to learn from your successes and failures so that they can design and manage better projects and avoid some of the hazards and perils you may have encountered. By sharing the information that you have learned from your project, you will help conservation efforts around the world.

Perhaps the key feature of adaptive management is its incorporation of research into action (Salafsky et al 2002). If one were to define a spectrum with pure research at one end, and pure practice at the other, then adaptive management is in the center. Pure researchers seek to understand how the world works and are successful if knowledge increases, regardless of what happens to the system they are studying. Pure practitioners seek to change the world but do not have the time or inclination to invest in trying to understand the system in which they are working. Adaptive managers attempt to reconcile these viewpoints – they are people who want to change the world and achieve a defined goal, but who are also willing to invest in systematically learning about whether their actions work or do not work, and why.

Steps in the Adaptive Management Process

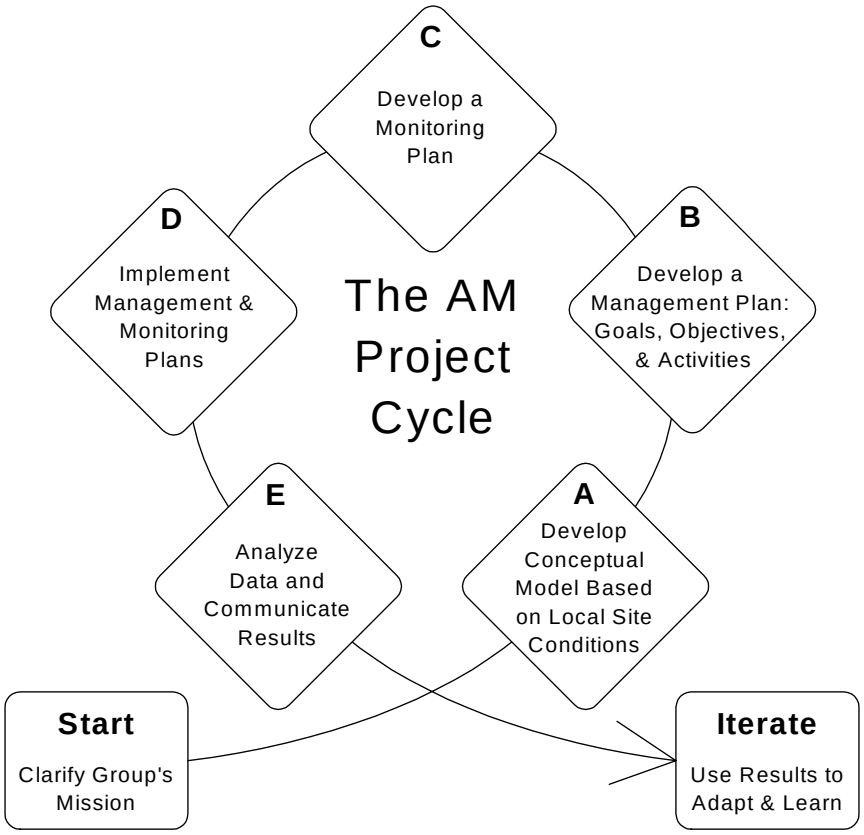
A project can be defined as a group of people interested in taking action to achieve defined goals and objectives. Projects thus range from actions taken by villagers on a small island to restore their traditional resource management systems to a large multi-lateral funded initiative. There are many different systems that have been developed for going through the project cycle. Figure 1 presents the steps involved in doing adaptive management at a project level using the steps and terminology from one such system (Margoluis & Salafsky 1998).

The starting point of the cycle involves determining who will participate in your project and your overall mission. Once these are clear, Step A involves assessing the conditions and determining the major threats to biodiversity at your project site. Using a *conceptual model,* your project team defines the conditions and relationships between key factors at your project site. Step B involves using this model to develop a project *management plan* that outlines the results that your team would like to accomplish and the specific actions that your team will undertake to reach them. Step C involves developing a *monitoring plan* for assessing your progress in implementing the project. Step D involves implementing your actions and monitoring plan. Step E involves analyzing the data collected during your monitoring efforts and communicating the information that you obtain to the appropriate audiences. Finally, you use the results of this analysis to change your project and learn how to do projects better in the

future. Based on feedback information, you may want to modify your conceptual model, management plans, or monitoring plans.

The key to this process is that project design, management, and monitoring cannot be separated. Instead, monitoring must be integrated into the overall project cycle because it is essential for generating sound information upon which management decisions are made. By systematically moving through the cycle, practitioners can test different assumptions about their actions to adapt and learn thereby increasing their effectiveness and efficiency over time.

Figure 1. The Adaptive Management Project Cycle
Source: (Margoluis & Salafsky 1998)



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