

WHERE DO WE GO FROM HERE?

AT THIS POINT, WE HAVE COMPLETED a basic survey of a number of different adaptive approaches from different fields and conservation projects. Based on these, we have developed a basic definition of adaptive management. We have described the conditions that warrant taking an adaptive management approach. We have outlined the steps involved in doing adaptive management in conservation projects. And we have determined principles for doing effective adaptive management. In this final section, we consider future directions to further refine our framework for effective adaptive management. Specifically, we focus on:

- Discussing the benefits and costs of an adaptive management approach.
- Applying adaptive management to other scales.
- Proposing a way in which we can test the framework outlined in this guide.



Balancing the Benefits and Costs of Adaptive Management

At this point, we hope it's clear what the potential benefits of adaptive management can be. In particular, benefits of adaptive management are that it provides:

- **A Framework for Better Management** — By systematically testing assumptions and seeing what works and what doesn't, you can change and improve your project.
- **An Opportunity to Learn** — Adaptive management provides a mechanism to learn in an organized and efficient manner about what works, what doesn't, and why. And it can help build learning projects and organizations.

As much as we believe in adaptive management, however, it is also important to understand that adaptive management is not a magic bullet that will automatically cure all problems. Adaptive management has clear benefits, but it also has real costs. It is thus important to understand these costs and benefits so that you can decide when to use adaptive management, and when you should not. Specific costs of adaptive management include:¹¹⁶

- **Consequences of Failure** — Adaptive management is about trying different management options to see what works and why. Almost by definition, adaptive managers may end up implementing actions that will be proved not to work. If they are not in an organization that values failure, then the practitioner may be “blamed” for the failure and be subject to reprimands, sanctions, or even lose their job or the confidence of their partners. To this end, it is vital that adaptive managers involve all stakeholders in the process and strive to ensure they are in an environment in which people understand the broader context in which they are working.
- **Bias in Interpreting Results** — By definition, adaptive managers are interested in the outcome of their work. As a result, adaptive managers must beware of what Kai Lee terms “vulnerability to self-interest.” There is a moral hazard that managers will consciously or unconsciously bias their results to make themselves look better and achieve the results that they are looking for.
- **Ethical Issues** — Adaptive managers must also beware of the potential impact of their experiments on people's lives. In many cases, people's welfare and lives depend on the natural resources generated by ecosystems. It is thus important to consider the implications of withholding treatment that is presumed to be beneficial or trying “second best” practices in control groups — a problem akin to the ethical challenges faced by medical researchers experimenting with human subjects. It is also important to realize that “failed” policy experiments cannot always be easily abandoned. For example, if a project appoints a group of people to be leaders and later realizes that this is a mistake, it may not be possible to give the leadership role to someone else without a major loss of face for the original leaders.
- **Financial Costs** — There are many steps involved in the adaptive management process. These steps require an investment of money, resources, and especially project staff time. It is expensive to hold meetings to develop a model or to collect and analyze data. It is a lot cheaper (at least in the short run) to just manage by trial-and-error.
- **Need for Long-Term Time Frames** — Experimentation in conservation projects typically requires long periods of time effects to become apparent. It thus also requires patience on the part of all the stakeholders in



the resource. As Norm Bilodeau of the BC FORESTRY INITIATIVE said, “Be patient. Not all experimentation can provide quick answers. Some of most important experiments may take a long time.”

Unfortunately, there is no simple cost-benefit equation that can be used to compute whether you should use an adaptive management approach. We can't guarantee that spending an additional \$20,000 on adaptive management will

buy \$50,000 worth of knowledge. However, we hope that with an understanding of both the costs and benefits, you will be in a position to judge for yourself whether this approach makes sense for you.

Applying Adaptive Management at Other Scales

For the most part, in this guide we have focused on applying adaptive management to conservation projects and organizations. Many of these same concepts, however, can be applied to two other scales — portfolios of projects and the discipline of conservation as a whole.

Learning Portfolios

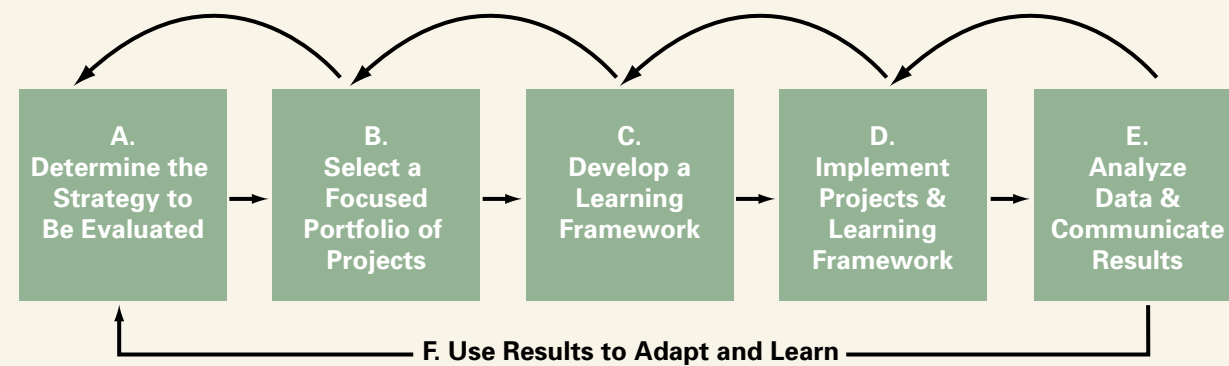
A *learning portfolio* is a group of projects that are all focused on a specific conservation strategy and are dedicated to understanding the conditions under which that strategy is most effective. In a sense, all projects in the learning portfolio work together to evaluate the selected strategy. By including multiple projects at different sites encompassing different biological, social, political, and economic conditions, portfolio participants can compare a variety of experiences to more easily determine what works, what doesn't, and why. A portfolio of projects focused on evaluating the same strategy serve as a sample that provides for a more robust learning experience. Because the projects are all focused on similar problems, there is also much greater potential for cross-project information exchange. As a result, a learning portfolio can be used to test assumptions that are common across multiple projects making it a powerful tool to help the conservation community determine specific and yet non-trivial principles for using these strategies. The process of doing adaptive management in learning portfolios is similar to

the process of doing adaptive management in conservation projects. Figure 6 shows the specific steps in a learning portfolio cycle.

The Discipline of Conservation

Conservation is a truly complex endeavor. While the conservation community has made great progress over the past few years, we have yet to discover the secret to an effective process or “science” of conservation. As a field, we need to have greater understanding of the factors that directly and indirectly affect conservation outcome. We need to know where we are going—what our collective goals are. We have to know how to get there or at least have some way of knowing if we are on the right track. And we need to learn from what we do and from one another and adapt over time. In short, we need to grow the field of conservation.

FIGURE 6. The Steps in Portfolio-Level Adaptive Management



- A. Determine the Strategy to Be Evaluated** — Determine what strategy you want to evaluate with your portfolio, how you will structure your portfolio, and how you will monitor it over time.
- B. Select a Focused Portfolio of Projects** — Establish and implement the specific process that you will use for reviewing and selecting the projects in your portfolio.
- C. Develop a Learning Framework** — With all the project managers in the portfolio, determine general assumptions that all projects will be able to test as well as more specific ones that are relevant to subsets of the overall portfolio. Determine common indicators to be collected and standardized data collection methods to be employed across all projects. Figure out how you and your partners will collect the data necessary to test these assumptions.
- D. Implement Projects & Learning Framework** — Work with your partners to undertake the projects and monitoring work.
- E. Analyze Data & Communicate Results** — Analyze your data and communicate the results to your key audiences.
- F. Use Results to Adapt and Learn** — Use results to make changes across the portfolio and beyond.

Source: Adapted from Salafsky & Margoluis, 1999.

Adaptive management can help us do this. It can provide the necessary framework for individuals and institutions to come together and find common ground. It can give us a common currency and language we can use. And it can make learning across institutions more efficient and productive.

Practicing What We Preach

As you might guess by now, we are strong believers in the power of adaptive management to help conservation be more successful over the long term. And we believe that our definition and the framework of conditions, steps, and principles for effective adaptive management that we have synthesized are sound. But can we be sure? Is adaptive management really the best way forward? Is it the most efficient and effective way to learn? Will practitioners find it useful? Are the steps we outlined and the principles we proposed both necessary and sufficient to achieve conservation through adaptive management?



In thinking about how to answer these questions, the obvious thing to do is to take our own advice and evaluate the adaptive management framework outlined in this guide using the same steps and principles that we have presented in this guide. To this end, we have followed the first few steps in the adaptive management process as shown in Figure 7, making explicit our goal, model, and assumptions behind this guide.

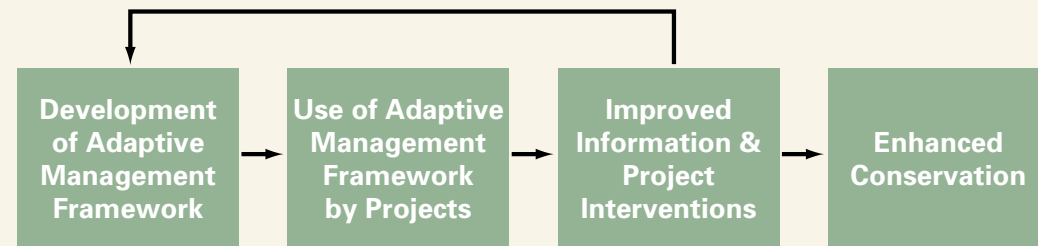
In order to realize the potential of adaptive management, we must

test it in projects, institutions, and portfolios, and across the entire field of conservation. Practitioners who wish to learn more about adaptive management and under what conditions it is most useful must find ways to collaborate, learn together, and document what they have learned. For improvements in conservation to occur through adaptive management, there must be broad participation by not only practitioners, but also non-governmental organizations, donors, foundations, academic institutions, and government agencies.

We have not written this guide to be the last word on adaptive management. Our work is based on the work of those who have gone before us. We see this guide as one step in the process of collectively developing a better understanding of adaptive management. We hope you use it to generate new and useful insights into adaptive management and document what you learn along the way so that others may benefit as well.

FIGURE 7. The Goal, Model, and Underlying Assumptions in This Guide

Our Goal: Promote enhanced biodiversity conservation by helping practitioners understand the concepts of adaptive management and how to use it.

Our Model:**Assumptions in This Model:****Development of Adaptive Management Framework**

- Development of a framework based on many disciplines is useful to conservation.
- The steps and principles in the framework that we have developed are sufficient.
- This framework can be applied to all project conditions throughout the world.

Use of Adaptive Management Framework by Projects

- Practitioners have access to this guide and other required sources.
- Practitioners find this framework understandable and useful.
- Practitioners have the capacity, time, and resources to apply this framework.

Improved Information and Project Interventions

- Use of the framework leads to projects having better information.
- Having better information enables projects to be more effective and cost-effective.
- We can develop indicators to assess whether projects have better information.
- As practitioners learn about adaptive management, they will contribute to improving the understanding and practice of adaptive management.

Enhanced Conservation

- Improved projects lead to reductions of threats to biodiversity.
- By reducing threats to biodiversity, conservation is achieved.
- We can develop indicators to measure whether conservation is being achieved.

Suggested Readings

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Lee, K. 1993. *Compass and gyroscope: Integrating science and politics for the environment*. Washington D.C.: Island Press.

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Specific Citations

What Is This Guide About? (pp. 4-7)

- 1 Margoluis & Salafsky 1998.
- 2 Salafsky & Margoluis 1999.

Sources for This Guide (pp. 16-29)

- 3 Funtowicz & Ravetz 1991 and 1994.
- 4 Pirsig 1974, p. 116.
- 5 Pirsig 1974, p. 93.
- 6 Pirsig 1974, p. 93.
- 7 Pirsig 1974, p. 92.
- 8 Adapted from Pirsig 1974, pp. 93-94.
- 9 Funtowicz & Ravetz 1994, p. 197.
- 10 This section is drawn from Friedmann 1987.
- 11 Dewey 1920 cited in Friedmann 1987.
- 12 Tse-tung 1937 cited in Friedmann 1987.
- 13 Argyris & Schön 1978, p. 13.
- 14 Argyris & Schön 1978, p. 9.
- 15 Argyris & Schön 1978, p. 29.
- 16 Hughes 1965, Granger 1970, McConkey 1972.
- 17 Drucker 1964, Odiorne 1965, Morrisey 1970.
- 18 Aguayo 1991.
- 19 Brinkerhoff & Ingle 1989.

- 20 Senge 1990, p. 68.
- 21 Senge 1990, p. 69.
- 22 Senge 1990, p. 71.
- 23 Senge, 1990, pp. 7-10.
- 24 Schön 1983, pp. 42-43.
- 25 Schön 1983, p. 40.
- 26 Schön 1983, p. 68.
- 27 Schön 1983, p. 147.
- 28 Introduction adapted from Lee 1993.
- 29 The four conditions presented here are adapted from Holling 1978 and 1985.
- 30 Lee 1993, p. 58.
- 31 Lee 1993, p. 9.
- 32 Lewis 1999, p. 1.
- 33 Lewis 1999, p. 1.
- 34 Materials in this section adapted from the Ministry of Forests Web site www.gov.bc.ca/for (12/20/00)
- 35 Nyberg 1999.

Steps in the Process of Adaptive Management (pp.30-65)

- 36 Margoluis & Salafsky 1998, p. 16.
- 37 Pirsig 1974, p. 93.
- 38 Schön 1983, p. 40.

- 39 Senge 1990, pp. 172 and 226.
- 40 Senge 1990, p. 9.
- 41 Margoluis & Salafsky 1998, p. 28.
- 42 Senge 1990, p. 175.
- 43 Senge 1990, p. 315.
- 44 Schön 1983, p. 40.
- 45 Lee 1993, p. 61.
- 46 Lee 1993, p. 61.
- 47 Argyris & Schön 1978, p. 11.
- 48 Pirsig 1974, p. 94.
- 49 Lee 1993, p. 62.
- 50 Lee 1993, p. 62.
- 51 Senge 1990, p. 175.
- 52 Argyris & Schön 1978, p. 17.
- 53 Margoluis & Salafsky 1998, p. 64.
- 54 Margoluis & Salafsky 1998, p. 73.
- 55 Senge 1990, pp. 303-304.
- 56 Argyris & Schön 1978, p. 160.
- 57 Senge 1990, p. 64.
- 58 Holling 1995, p. 27.
- 59 Senge 1990, p. 64.
- 60 Lee 1993, p. 53.
- 61 Walters 1986, p. 73.
- 62 Schön 1983, pp. 145-146.
- 63 Schön 1983, p. 147.
- 64 Schön 1983, pp. 149-150.
- 65 Lee 1993, p. 75.
- 66 Margoluis & Salafsky 1998, pp. 84-103.
- 67 Pirsig 1974, p. 93.
- 68 Argyris & Schön 1978, p. 11.
- 69 Senge 1990, p. xix.
- 70 Pirsig 1974, p. 95.
- 71 Lee 1993, p. 53.
- 72 Schön 1983, p. 68.
- 73 Schön 1983, p. 147.
- 74 Pirsig 1974, p. 93.
- 75 Lee 1993, p. 62.
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- 77 Pirsig 1974, pp. 238-239.
- 78 Pirsig 1974, p. 96.
- 79 Schön 1983, p. 62.
- 80 Senge 1990, p. 22.
- 81 Pirsig 1974, p. 95.

- 82 Pirsig 1974, p. 96.
- 83 Argyris & Schön 1978, pp. 2-3.
- 84 Pirsig 1974, pp. 92-93.
- 85 Schön 1983, pp. 132.

Principles for the Practice of Adaptive Management (pp. 66-91)

- 86 Lee 1993, pp. 80-81.
- 87 Lee 1993, p. 81.
- 88 Senge 1990, p. 4.
- 89 Senge 1990, p. 299.
- 90 Pirsig 1974, p. 95.
- 91 Lee 1993, p. 53.
- 92 Senge 1990, p. 154.
- 93 Senge 1990, p. 226.
- 94 Senge 1990, p. 172.
- 95 Pirsig 1974, p. 106.
- 96 Schön 1983, p. 68.
- 97 Kuhn 1962, p. 75.
- 98 Holling 1995, pp. 21-22.
- 99 Gunderson et al. 1995, p. xi.
- 100 Holling 1995, pp. 21-22.
- 101 Argyris & Schön 1978, p. 4.
- 102 Senge 1990, p. 139.
- 103 Senge 1990, p. 4.
- 104 Senge 1990, p. 172.
- 105 Lee 1993, pp. 4-5.
- 106 Argyris & Schön 1978, p. 9.
- 107 Argyris & Schön 1978, p. 16.
- 108 Senge 1990, p. 10.
- 109 Senge 1990, p. 234.
- 110 Pirsig 1974, p. 49.
- 111 Schön 1983, p. 130.
- 112 Pirsig 1974, p. 293.
- 113 Pirsig 1974, p. 240.
- 114 Schön 1983, p. 63.
- 115 Schön 1983, p. 18.

Where Do We Go From Here? (pp.92-96)

- 116 The following section adapted in part from Lee 1994.