

An aerial photograph of a vast, dense forest, likely a temperate rainforest, with a river winding through the landscape. The forest is a deep, dark green, and the river is a lighter, blueish-green. In the top left corner, there is a vertical strip showing a topographic map with red contour lines. The title 'ADAPTIVE MANAGEMENT' is centered in the upper half of the image. The word 'ADAPTIVE' is in a white, serif font, with a large, stylized white 'A' that overlaps a purple circular graphic. Below 'ADAPTIVE' is a thin white horizontal line. The word 'MANAGEMENT' is in a white, sans-serif font, positioned below the line. Another thin white horizontal line is positioned below 'MANAGEMENT'.

**A** D A P T I V E  
M A N A G E M E N T

*LEARNING FROM OUR FORESTS*

*"One must learn by doing the thing;  
for though you think you know it,  
you have no certainty until you try."*

*Sophocles (ca. 450 B.C.)*

**F**orest ecosystems are complex and their dynamic nature inherently unpredictable. As a result, our understanding of ecosystems and our ability to predict their responses to human interventions are limited. Together with changing social values, this knowledge

gap leads to uncertainty and controversy over how best to manage British Columbia forests. What are the cumulative effects of management actions? What types of management are sustainable over the long term? British Columbia's

resource managers cannot adequately answer all these questions: they must constantly learn and adapt.

Adaptive management, a promising approach to learning and changing, is particularly well suited to managing ecosystems. The British Columbia Forest Service is encouraging adaptive management of British Columbia's forests and is planning some specific projects to evaluate its potential.



## **What is Adaptive Management?**

Adaptive management is a systematic, rigorous approach for learning from our actions, improving management, and accommodating change.

Adaptive forest management is treated as a continuous process of discovery. Objectives and actions are adjusted to reflect new information and actual outcomes that differ from predictions. Wherever possible, management actions are *deliberately designed to*:

- provide reliable feedback about outcomes of actions;
- compare management alternatives; and
- improve our understanding of ecosystems.

Adaptive management considers the ecosystem as a whole—the long-term, large-scale, and cumulative effects of management actions.

Adaptive management can be either passive or active. Both carefully synthesize existing information about the system, monitor responses, and then adjust future actions and objectives.

With passive adaptive management, managers implement the best management alternative, based on existing understanding of the system.

With active adaptive management, managers compare plausible alternatives by designing management interventions as experiments. Uncertainty about which is the best alternative is acknowledged from the outset.

Active adaptive management provides managers with more reliable results than passive, non-experimental approaches.

Note that adaptive management does not eliminate uncertainty, surprising outcomes, or “mistakes”; however, it does allow us to learn from them.

## **What are the Benefits of Adaptive Management?**

Adaptive management can lead to better decisions and, in the long run, better outcomes. Managers can:

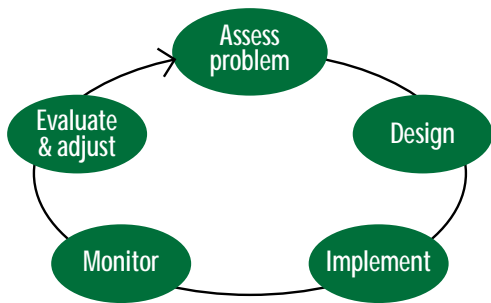
- adjust programs in response to changes in social values and the environment;
- learn which alternative practices or policies most effectively meet objectives;

*"Adaptive management serves as a compass for us to use in searching for a sustainable future." Lee (1993)*

- detect cumulative, long-term, and large scale effects of management actions;
- improve understanding of how ecosystems function; and
- share information and experiences about common problems.

**How is Adaptive Management Applied?**

Adaptive management involves a five-step cycle:



1 *Assess problem*  
Define the problem and select indicators. Based on predictive models (which may be mental, graphical, or computerized), explicitly forecast the outcomes of

management alternatives.  
2 *Design a management plan*  
Develop management actions and monitoring programs carefully in order to improve the clarity and reliability of information. In designing management experiments, consider:

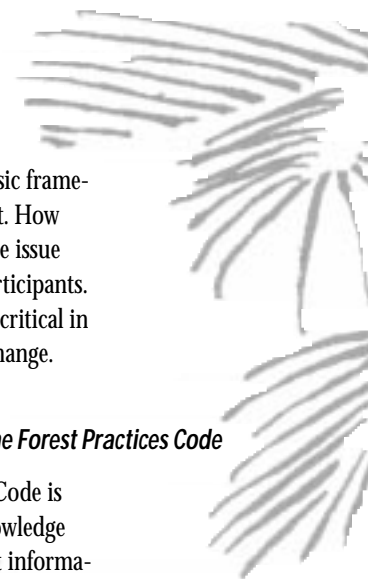
- their ability to meet management objectives;
- their ability to provide useful information;
- cost (ecological and economic); and
- risk of undesirable outcomes.

3 *Implement management plan*  
4 *Monitor the result*  
Measure key indicators to determine how well the plan met objectives, and to validate relationships defined in the model.



5 *Evaluate and adjust:*  
Analyze and evaluate results from the monitoring programs. Compare actual outcomes to forecasts. Update models, adjust actions, and re-evaluate objectives, as necessary. Documenting actions and communicating results are also critical elements of adaptive management.  
Adaptive management is an on-going process. Objectives, forecasts, and assumptions must be revisited and adjusted routinely.

Alex Inselberg



These five steps form the basic framework for adaptive management. How they are applied depends on the issue and on the creativity of the participants. Imagination and creativity are critical in dealing with complexity and change.

**Adaptive Management and the Forest Practices Code**

Although the Forest Practices Code is based on the best available knowledge and professional expertise, that information is still limited. The Code requires managers to adopt many new, previously untested strategies.

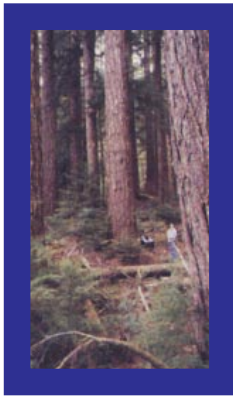
Although scientific investigations can contribute to the Code, practical and budgetary constraints typically limit research. Often, management actions are implemented before the research results are available. Adaptive management offers a valuable approach for monitoring, evaluating, and improving the Code.

*"Adaptive management embodies a simple imperative: policies are experiments; learn from them." Lee (1993)*

## How is Adaptive Management being Applied in British Columbia?

"Adaptive management is not really much more than common sense. But common sense is not always in common use."

C.S. Holling (editor, 1978)



Alex Inselberg

Managers are already applying some elements of adaptive management. To encourage and demonstrate adaptive management, as well as evaluate its potential, the British Columbia Forest Service is supporting various projects. These include:

- managing Forest Service Recreation Sites in the near-urban forest (Merritt Forest District);
- managing coastal grizzly bear habitat to maintain forage on important sites

(Vancouver Forest Region); and

- comparing alternative silvicultural systems (Prince George Forest Region).

Other high-priority issues that could benefit from adaptive management include:

- watershed and ecosystem restoration;
- management of riparian zones;
- wildlife trees; and
- thinning regimes.



Stefan Himmer

## What Role can you Play in Adaptive Management?

Adaptive management involves people who make, implement, or are affected by forest management decisions, such as: members of local communities, First Nations, environmental groups, forest workers, forest managers and scientists. Some adaptive management projects may be linked to regional or local planning processes (e.g., Land and Resource Management Plans, Local Resource Use Plans).

You can become involved in several ways:

- participate in problem assessment and help to develop creative solutions;

- provide and help to synthesize local knowledge about the ecosystem;
- help with monitoring (e.g., work with managers to initiate a community-run monitoring program);
- help to disseminate results and information;
- support agencies in the search for better solutions;
- encourage innovation; and
- expect learning and improvement, not "perfect" answers, quick fixes, or certainty.

## FURTHER READING

lee, k.n. 1993. *Compass and gyroscope: integrating science and politics for the environment*. Island Press, Washington, D.C.

holling, c.s. (editor). 1978. *Adaptive environmental assessment and management*. John Wiley and Sons, London, Eng.

taylor, b., l. kremsater, and r. ellis. 1996. *Adaptive management of British Columbia's forests*. B.C. Ministry of Forest, Victoria, B.C. In press.

walters, c.j. 1986. *Adaptive management of renewable resources*. McGraw-Hill, New York, N.Y.



Alex Inselberg



Ministry of Forests

For more information, contact:

Manager, Adaptive Management  
Ministry of Forests  
Integrated Resources Policy Branch  
PO Box 9520 Stn Prov Govt  
Victoria, B.C. V8W 9C2

Or visit our Worldwide Web site at:  
<http://www.for.gov.bc.ca/irpb/am/amhome/amhome.htm>

Cover photo courtesy of Tourism British Columbia

PLEASE RECYCLE



QP# 20534