

Forests for Tomorrow

INTRODUCTION TO ADAPTIVE MANAGEMENT

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INTRODUCTION

Forests for Tomorrow (FFT) was established by the BC Ministry of Forests and Range in an effort to ensure that stewardship issues associated with disturbed forest land without any tenure holder's regeneration obligations, are addressed. The program's key objective is to reduce the amount of Not Satisfactorily Restocked (NSR) Crown forest land in BC that lies outside industry obligations, in an effort to improve future timber supply, while also reducing risks to biodiversity, water, fish, wildlife, and habitat.¹ Traditionally, reforestation activities (site prep, planting, brushing etc.) are done on harvested areas, but FFT is reforesting in areas with standing dead pine, where no harvesting is planned in the immediate future. This raises new questions about the best methods of treating these sites to achieve successful future stands. *What are the effects of different silvicultural systems treatments of MPB impacted stands on tree regeneration, understory, vegetation, forest structure and non-timber values?*

Forests for Tomorrow is in a position to experiment with silviculture practices and learn which approaches are more effective in achieving program objectives.

DEFINING ADAPTIVE MANAGEMENT

In the suite of tools available to resource managers, there is one that is intended for operational situations where there is considerable uncertainty. Adaptive Management is a *systematic process for continually improving management policies and practices by learning from the outcomes of operational programs.*² This Extension Note explores the definition and conceptual framework of adaptive management and discusses Forests for Tomorrow's plans to use it to address some key management uncertainties associated with reforestation activities in mountain pine beetle impacted areas. British Columbia is the birthplace of adaptive management theory, originally called Adaptive Environmental Assessment and Management. It was developed by C.S. Holling and several colleagues at the University of British Columbia's Institute of Resource Ecology in the late 1960s. Interest in AM heightened in the BC Forest Service more than 10 years ago with the development of the Forest Practices Code. A number of pilot projects were started around the Province, some of which are still ongoing.

Adaptive Management is a systematic process for continually improving management policies and practices by learning from the outcomes of operational programs.

The concept of adaptive management has been widely debated and different definitions exist. This presents a challenge to practitioners who must reach a common understanding with partners,

¹ *Forests for Tomorrow Program Management Plan (2007).*

² *Ministry of Forests and Range adaptive management website (<http://www.for.gov.bc.ca/hfp/amhome/amhome.htm>).*

stakeholders, managers, scientists and decision makers. In order to bring some consistency to what the BC Forest Service means by “adaptive management”, the standard working definition given above was adopted. The adaptive management approach assumes natural resource management policies and management actions are not static but adjusted based on the combination of new scientific and socio-economic information in order to improve management by learning from the ecosystems being affected. Often people think adaptive management simply means “trial and error”, in which management policies and practices evolve in response to past performance and changing priorities, but in fact this misses an essential element of the concept which is deliberate experimentation.



Although definitions of adaptive management vary by source, several key characteristics of the concept are universal and fundamental:

- Learning; reducing key uncertainties

There is explicit acknowledgement of uncertainties and knowledge gaps about the response of the system to management actions. Reducing these uncertainties (i.e. learning) becomes one objective of management.

- Using what is learned to change policy and practice

Process in place to make certain that what is learned informs decisions (i.e. closing the loop). It is essential to have a good idea at project design stage of what policies and practices may change and what institutional mechanisms are in place to support that change.

- Focus is on improving management

AM integrates the worlds of science and management, ensuring applied science is well directed to key uncertainties and scientific advances are transferred to managers (i.e. this is where the learning is applied)

- Often called experimental management

AM is about thoughtfully applying management activities as experiments to see which are most effective in achieving desired goals.

- It is formal, structured, systematic

AM is a deliberate process, not ad-hoc or simply reactionary. However, flexibility in the approach is important to allow the creativity that is crucial to dealing with uncertainty and change.

Adaptive management is visualized as a cyclical and iterative process. The BC Forest Service identifies 6 steps: Assess, Design, Implement, Monitor, Evaluate and Adjust (Figure 1). Within each of the steps, several elements are identified such as defining the management objectives, identifying stakeholders, articulating hypotheses and developing conceptual models.³ Although the full suite of elements may not be implemented for every AM project, it is important to understand them and the implications of omitting any.

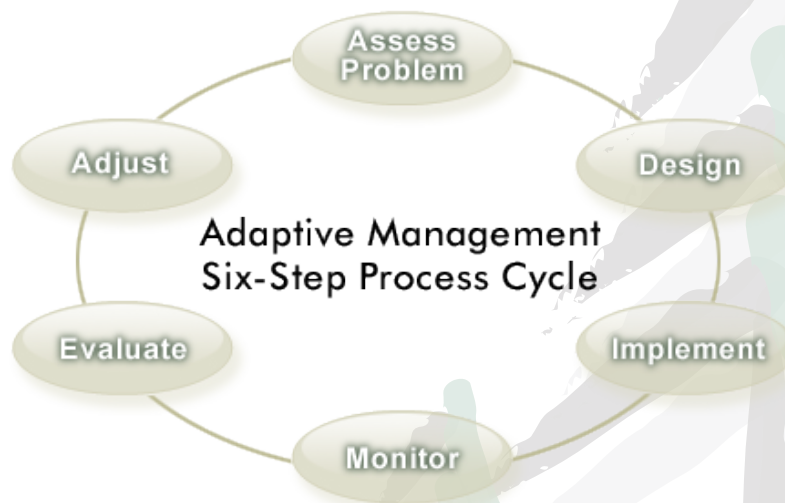


figure 1. The six-step adaptive management cycle (MFR Adaptive Management Website).

³ For a complete list of the steps and elements see the Understanding and Enabling Adaptive Management in Natural Resource Management course material – http://www.for.gov.bc.ca/hfp/amhome/training_workshops.htm.

Adaptive Management
is not 'trial and error',
it involves deliberate
experimentation with
the intention to make
changes to practices
and/or policies.

PASSIVE AND ACTIVE ADAPTIVE MANAGEMENT

Passive AM is an approach whereby, faced with uncertainty, managers implement the alternative they think is 'best' (with respect to meeting management objectives), and then monitor to see if they were right, making adjustments if desired objectives are not in fact met (Figure 2a). **Active AM** is an experimental approach whereby, when faced with uncertainty, managers implement more than one alternative as concurrent experiments to see which will best meet management objectives. It is characterised by "actively probing" the system in order to distinguish between competing hypotheses (where the different hypotheses suggest different "optimal" actions). The key is that there are alternatives that can be more confidently compared (Figure 2b).

Passive AM

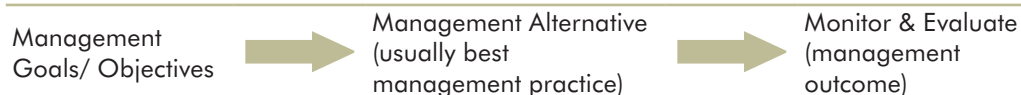


figure 2a. Passive adaptive management

Active AM

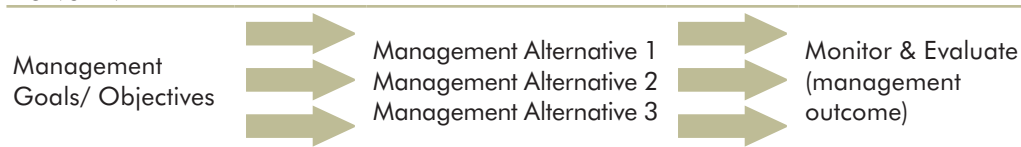


figure 2b. Active adaptive management

Active AM is the preferred approach to use when there is a high level of uncertainty about the effectiveness of the management actions to meet the management goals and objectives and when learning quickly is more important. Passive AM is a less costly choice that may be most practical when there is little uncertainty about the management action, or when the institutional structure prevents management experimentation.



CHOOSING ADAPTIVE MANAGEMENT

Understanding adaptive management as a concept and translating that understanding into practice are two very different things. Experience shows that facilitating the use of adaptive management also means recognizing when the tool is or is not the right approach. The following questions can help forest and range managers decide that adaptive management may be applied appropriately to their given management problem.⁴

1. Is there support (institutional, stakeholder, partner) to implement adaptive management?
2. Is there significant uncertainty regarding what management actions will best achieve the desired outcomes?
3. Is a management experiment the best way to reduce this uncertainty? (E.g. can you use retrospective analyses on data previously collected for some other purpose?)
4. Can there be 'safe failures'? (i.e. failure, or unexpected outcomes different from those desired, are acceptable or reversible)
5. Is the response time short enough to learn something in the near-future? (You may have short and long- term objectives and indicators)
6. Is sufficient monitoring feasible (i.e. measuring enough indicators long enough to account for natural variability and confounding factors)?
7. Can you design a powerful enough management experiment to discern the effects of different management actions?

For AM to be successful, there must be a clear, shared comprehension of what adaptive management is and when it is appropriate to use it. The BC Forest Service has a role to play in facilitating adaptive management in BC, through providing education and support. Recognizing that FFT is in a unique position to experiment with silviculture practices to learn what methods are best to achieve program objectives, the FFT sponsor is supportive of the program taking an adaptive management approach.

Adaptive Management is a tool to address uncertainty about the effectiveness of management actions to meet goals.

Forests for Tomorrow will be working with regional and district staff, recipients, Ministry of Environment, First Nations and others to design and implement our adaptive management initiative.

⁴ Marmorek et al., 2006 . *Enabling Adaptive Forest Management – Final Report. Prepared for the National Commission of Science for Sustainable Forestry.*

NEXT STEPS

- In early May, an FFT Adaptive Management Coordinator will be contracted to work with FFT staff, recipients, districts, Ministry of Environment (MOE), First Nations and others to design and implement an adaptive management initiative.
- Further communications will be provided when details are established with the AM Coordinator.
- The intention is for AM design to occur in spring/early summer 2008, followed by a peer-review and implementation.



CONTACTS

The FFT Research and Effectiveness Evaluations Working Group will be working with the AM Coordinator to design and implement the initiative with help from many others in the program. The primary objective of the Working Group is to *develop the framework and strategy for adaptive management and continuous improvement, and coordinate effectiveness evaluations to provide guidance to Forests for Tomorrow activities on areas impacted by fire and the mountain pine beetle.*⁵

Working Group Members:

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Gerald Reichenback	Timber Forester (Kamloops)
Jennifer Plummer	Silviculture Specialist (Smithers)
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⁵ FFT Effectiveness Evaluations and Research Strategy (2008).

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Forests for Tomorrow

EXTENSION NOTE NO 1.
INTRODUCTION TO ADAPTIVE MANAGEMENT

Forests for Tomorrow is strategically reforesting areas hardest hit by the mountain pine beetle and wildfires. With a sound scientific foundation and respect for both human and environmental values, Forests for Tomorrow is helping to ensure sustainable forests that provide multiple benefits for future generations.



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