**Forest Productivity Council
of British Columbia**

Biodiversity/Habitat Working Group

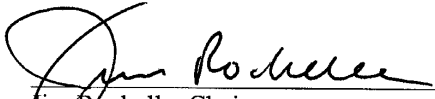# Strategic Plan
2001 - 2005

*for incorporating biodiversity in forest management
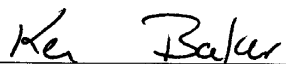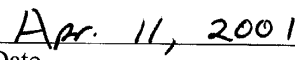planning in British Columbia*

April 11, 2001

Secretariat
c/o Ministry of Forests Executive
4th Floor, 595 Pandora Street
Victoria, B.C.

April 11, 2001

The Biodiversity/Habitat Working Group submits B*iodiversity/Habitat Strategic Plan: 2001-02 Update* to the BC Forest Productivity Council for approval.

Jim Rochelle, Chair
Biodiversity/Habitat Working Group

Ken Baker, Chair
BC Forest Productivity Council

Apr. 11, 2001
Date

APPROVED/ NOT APPROVED

1. Introduction

Our ability to predict over time the ecological consequence of most forest management practices in British Columbia (BC) on indicators of biodiversity and wildlife habitat is poor. There are many reasons for this general inability to predict ecological outcomes. In some cases we simply are ignorant of the ecological functions and habitat interactions of species. In other cases, we have not adequately managed to synthesize, extend, model, and integrate our knowledge into our decision processes.

In BC, government, academia, and industry all contribute to the development of the information and tools necessary to better understand forest management practices and to predict their ecological consequences over time. At present however, no provincial strategy exists to assist agencies in identifying needs and directions, although there is some interaction between agencies on an individual basis. A strategic plan is therefore required, in part to guide the Ministry of Environment, Lands, and Parks (MELP), Ministry of Forests (MOF), the forest industry and Forest Renewal BC whose business activities require coordination.

The Biodiversity Working Group (BWG) of the Forest Productivity Council (FPC) has been charged by the Chief Forester, Ministry of Forests, with the development of a strategy that addresses biodiversity and habitat needs relative to forest productivity. To meet this objective, the BWG has prepared this strategic plan to address the short- and long-term provincial needs for information and tools.

This plan is intended to enable organizations, including the BWG, to develop goals within a framework of overall needs. This plan is not intended to be solely implemented by the BWG. The specific role of the BWG in relation to the strategic plan and their mandate from the FPC is identified in Appendix A. The plan will also provide the means for enhanced communications among and within organizations.

1.1 The FPC Biodiversity Working Group

The FPC is charged with providing recommendations to the MOF Chief Forester on strategic, technical and budgetary direction for the development and implementation of a provincial forest productivity program. The FPC recognized the need for an integrated approach to forest productivity issues and established working groups to provide coordination within focus areas, as well as to provide integration across these areas. The following working groups have been established to date:

- Site Productivity Working Group (SPWG)
- Stand Level Working Group (SLWG)
- Biodiversity /Habitat Working Group (BWG)

The broad mandate of the BWG is to support the development and implementation of tools that predict habitat and biodiversity consequences of forest management practices. The techniques and tools include:

- models for habitat supply and other indicators of biodiversity;
- components within stand and forest level management models that provide linkages to models of habitat supply and indicators of biodiversity; and
- collection of the data required to develop and use models of habitat supply and indicators of biodiversity.

Further information on the BWG is available on the FPC website at http://www.forestproductivity.gov.bc.ca/working/bio/.

2. Strategic Plan

Forest resource management requires planning for non-timber resources such as wildlife and their habitats. Most certification schemes based on sustainable forest management principles require that habitat for native species be considered and maintained; provincial and federal legislation on endangered species requires forest planners to acknowledge and maintain listed species and habitats; and Forest Renewal BC surveys identify biodiversity concerns as a priority.

Unfortunately, there are gaps in the wildlife habitat knowledge base and the modelling capability necessary for comprehensive planning.

The focus of this strategic plan is the development of improved biodiversity planning tools related to forest productivity. While the strategy considers biodiversity broadly, its vision and goals focus on specific needs related to forest productivity.

This strategy has been prepared for the FPC. It is intended that this strategy will also be used by other planning agencies that are trying to address forest biodiversity concerns in concert with the FPC.

This strategic plan is a dynamic document that will be regularly revised to incorporate new information, resources and needs.

2.1   Vision and Goal

The vision of the BWG is that natural resource decision-makers are more reliably and accurately informed about the impacts of forest practices on BC's forest habitat and biodiversity. This requires essential knowledge to support management decisions that considers all values of society.

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┌─────────────────────────────────────────────────────┐
│                      VISION                          │
│                                                      │
│   Natural  resource  decision-makers  are  more      │
│   accurately  informed  about  the  impacts of forest│
│   practices on British Columbia's forest habitat and │
│   biodiversity.                                      │
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Realizing this vision requires that information, techniques and tools that predict consequences for habitat and indicators of biodiversity of forest management regimes in BC need to be made available and training on their appropriate use undertaken. The validity of this information and the accuracy of the outputs of these tools and techniques are risks that must be acknowledged in management decisions.

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┌─────────────────────────────────────────────────────┐
│                      GOAL                            │
│                                                      │
│   Information, techniques and tools will be available│
│   and continually improved to accurately predict and │
│   portray consequences for habitat and indicators of │
│   biodiversity  of  forest  management  regimes  in  │
│   British Columbia.                                  │
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2.2   Strategic Objectives

1. Maintain up-to-date information on current and future client information needs.

Modelers, researchers and managers must develop modelling tools that address client needs. The many linkages and uses of habitat supply/biodiversity indicator modelling suggest that a wide range of possible organizations may be developing these tools. However, these organizations may not necessarily be directly linked to the various end users. By maintaining current information on client needs and ongoing projects, efficiencies in modelling effort and use of resources will be possible.

2. Acquire needed information on both coarse and fine filter relationships.

Information on habitat relationships is needed at both coarse and fine filter scales. Knowledge is also needed about the habitat use patterns of many species. Unfortunately, knowledge is captured from many sources (e.g., scientific literature, unpublished data, personal experiences) and may not be easily accessible.

3. Develop and implement appropriate habitat modelling tools across a variety of spatial and temporal scales in managed and natural forests.

Current modelling of wildlife habitat in BC is very limited. Unlike growth and yield modelling, which is supported by relatively reliable data and an established provincial program, habitat relationships for most wildlife species are supported by a much less rigorous knowledge base and a coordinated provincial modelling program is non-existent.

For most species, we are not certain of the value of specific landscape patterns or stand attributes. We are however able to model landscape patterns (e.g., forest age, edge, patch sizes) and stand attributes (e.g., big trees, dead trees, down wood, crown cover) to which many vertebrates are known to respond. These characteristics can then be used to develop coarse level indicators of biodiversity to be applied in forest management planning.

At the same time, the development of modelling tools must include consideration of the decision process for which they are to be used. For example, stand level silvicultural planning tools differ from tools used for landscape level decisions. Even models developed for similar purposes may differ between decision processes depending upon the detail needed and the acceptable level of risk.

Habitat models can utilize or be incorporated into existing forest planning models (e.g., growth and yield models, forest estate models). Current growth and yield models project some aspects of forest stands but could consider more forest attributes (e.g., dead trees, shrub layers, herb layers) that link to habitat models. Information from habitat models can be incorporated into some forest estate models but other models require modification to enable the inclusion of such information.

The development of models also leads to a better understanding of systems of interest and any data gaps and weaknesses. Because models can serve as a basis for comparison of new information, it is important that the process of habitat model building not be isolated from research and management.

4. Assess the habitat consequences of current forest management practices.

The effectiveness of forest practices that are intended to protect an environmental value must be evaluated. However, because effects occur over decades—if not centuries, the evaluation of such practices is not simple. Effects are also dependent on many site factors. Consequently, field evaluation is often of limited use and modelling becomes the only practical method of evaluating impacts. In short-term, models can be employed as gaming tools for exploring alternative scenarios in order to suggest improvements in guidelines or current standard practices.

Models are valuable for evaluating forest practices and likewise such evaluation serves a useful role in the development of models. It is through an iterative process of assessing forest practices and improving the tools for the next assessment that we can gain greater confidence that our resources are being protected.

2.3 Steps to Achieve the BWG Strategic Objectives

The steps outlined in the following section describe a course of action for achieving the vision, goal and strategic objectives of the BWG. Although these actions are applicable over the long term, they need to be regularly revisited to ensure that they remain appropriate.

1. **Maintain up-to-date information on client information needs.**

   1.1. Develop and monitor a process for obtaining and maintaining up-to-date information needs (e.g., assess efficacy of FPC biodiversity questionnaire, obtain feedback through workshops, interviews, and synthesis of other scoping efforts).

   1.2. Track emerging needs for new information (e.g., indicators for certification, criteria and indicators for certification, threatened and endangered species) and identify priorities.

2. **Acquire needed information on both coarse and fine filter relationships.**

   2.1. Identify priorities for information.
      2.1.1. Synthesize existing data/knowledge.
      2.1.2. Identify data/knowledge gaps and develop criteria for ranking.
      2.1.3. Evaluate options for filling gaps (e.g., research, adaptive management, improved inventories, expert opinion).

   2.2. Improve methods of capturing and disseminating knowledge. Models provide one method of assimilating knowledge and it is important that the information upon which the models are based is accurate.
      2.2.1. Ensure broad awareness of available information and relevant research initiatives.
      2.2.2. Improve database structure, availability and management.
      2.2.3. Make "common knowledge" explicit (e.g., species accounts, expert systems), identify associated assumptions and document reliability.

3. **Develop and implement appropriate habitat modelling tools across a variety of spatial and temporal scales in managed and natural forests.**

   3.1. Improve predictions of forest, landscape and stand level attributes resulting from different forest management activities.
      3.1.1. Evaluate growth and yield and forest estate models for usefulness in predicting habitat attributes.
      3.1.2. Improve growth and yield and forest estate model linkages for habitat modelling in areas that current models are weak (e.g., stochastic events, old stands, complex stands).
      3.1.3. Create new models and calibrate and validate existing models where needed (e.g., non-tree vegetation models).

3.2. Improve interpretation of habitat values from relevant forest, landscape and stand level attributes.

    3.2.1. Identify and evaluate available habitat supply models relevant to flora and fauna in BC and suggest priorities for projecting forest and stand attributes.

    3.2.2. Develop species habitat models for red- and blue-listed species, identified wildlife and other priority species. Encourage consideration of a disparate selection of wildlife species requirements (from poor dispersers to good dispersers, from species with low rates of increase to those with high ones, etc.).

3.3. Increase level of habitat modelling effort in government, academia, industry and consulting organizations.

3.4. Increase use of models by providing extension, demonstration and training for key users in government, academia, industry and consulting organizations. Equally important to developing models is the ability of those who need habitat information to understand and use the information provided by the models and their related connections (e.g., linked growth and yield models). A poor model used properly can result in better decisions than a good model used poorly.

    3.4.1. Identify and clarify decision-making processes and applications for key users of habitat information.

    3.4.2. Increase level of resources and effort in habitat modelling extension for key users.

    3.4.3. Develop a comprehensive website as an information source for habitat modelling in BC.

3.5. Develop criteria and protocols to ensure the appropriate use of habitat supply models. Because a number of habitat supply models will be required in BC, information on appropriateness of the various models is necessary. Users may not have the modelling expertise and/or the time to figure out which model to use. It is also important that the reliability and statistical validity of the models be known in addition to its intended purpose.

    3.5.1. Develop protocols for habitat supply model documentation.

    3.5.2. Establish criteria and procedures for testing and evaluating habitat supply models and their applications.

4. Assess the habitat consequences of current forest management practices.

4.1. Identify potential gaps in the procedures for evaluating the consequences for biodiversity and habitat supply of forest management decisions.

4.2. As necessary, identify tools and procedures to evaluate the consequences for biodiversity and habitat supply of forest management decisions.

3. Delivery

The Strategic Objectives Matrix in Appendix I indicates the role of the BWG in implementing this strategic plan. The primary role of the BWG is to ensure that various organizations are aware of the needs and the work being carried out by each other, as well as to encourage the allocation of sufficient resources for such work. The BWG, consisting of members from government, academia, industry, and the consulting community, does not anticipate taking the lead on specific technical projects. However, the BWG will initiate synthesis projects that provide necessary information for the development of this annually updated, five-year strategic plan.

This strategic plan is to be presented to the FPC which will, in turn, bring the plan to the attention of the Chief Forester and appropriate government decision makers.

Once approved by Council, the BWG will deliver the strategic plan to appropriate agencies and individuals. The plan will be posted on the FPC website and general awareness will be promoted through various listservers and announcements. Feedback on the plan will also be encouraged via these avenues.

4. Projects and Funding

Specific projects to achieve our strategic objectives will not be identified in this year's strategy. The BWG will develop a provincial project plan during fiscal year 2001-02 for inclusion in the next strategic plan.

5. Summary

There is clearly a need for improvements in the ability of resource managers to predict the ecological consequences of forest management practices in BC for biological diversity and wildlife habitat supply. Limiting factors include basic information on the ecological functions and processes involved, the habitat requirements of species and procedures for integrating existing knowledge into the decision processes used in forest planning.

Government, academia and industry all contribute to the acquisition of information and development of tools to predict the short- and long-term ecological consequences of forest management practices. In the past, there has been good interaction between agencies and organizations but there has been an absence of province-wide guidance to assist agencies in identifying needs and directions. The BWG strategic plan has been developed as an initial step to assist with the coordination of efforts at developing information and processes needed to improve our understanding and management of forests for the protection and sustainability of habitats and biodiversity.

In developing this strategy, the BWG identified some of the key limitations in available information and tools and established priorities for addressing them. These needs are outlined in Section 2 of the strategy and in Appendix I, Strategic Objectives Matrix. Recognizing that the needs exceed available resources, the following priority items were identified.

1. Identify the potential gaps in procedures for evaluating management and planning approaches relative to maintenance of biodiversity and habitat supply. To identify priorities, this effort should evaluate the perspectives of managers and other resource interests relative to: what are the perceived limitations in resource protection and which are the most significant; and, what is the strongest interaction between timber supply[1] and habitat supply?

2. Document available resources and tools to clarify the timber supply/ habitat supply relationships and necessary improvements in information to facilitate the use of these tools.

3. Develop a process for reporting on and disseminating information on biodiversity/ habitat supply needs, activities and emerging issues.

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[1] We use the term timber supply in the generic sense of the level of harvesting and related silviculture activities. For the specific modelling process we use the term timber supply analysis.

APPENDIX I
Strategic Objectives Matrix

The following matrix lists the BWG's strategic objectives and indicates the role of the Biodiversity Working Group in implementing this strategic plan. During the 2001-02 fiscal year, the BWG plans to have appropriate agencies and interest groups review the Strategic Plan and provide input to this matrix.

Note: In the "Priority" column, the first number refers to the priority given to the main category and the second number refers to the priority given to the items within the category.

OBJECTIVE		Priority	Organization Role			Activity	
			Lead	Support/ Participate	Recommend/ Monitor	Organization	Example Activity
1.	*Maintain up-to-date information on client information needs*	3					
1.1	Develop and monitor a process for obtaining and maintaining up-to-date information needs	3-1			BWG		
1.2	Track emerging needs for new information and identify priorities	3-2	BWG	BWG			
2.	*Acquire needed information on both coarse and fine filter relationships*	4					
2.1	Identify priorities for information	4-2		BWG	BWG		
	2.1.1 Synthesize existing data/knowledge			BWG (coarse needs support)	BWG (fine needs coordination)		
	2.1.2 Identify gaps; develop criteria for ranking		BWG (ranking criteria)		BWG		
	2.1.3 Evaluate options for filling gaps			BWG			
2.2	Improve methods of capturing and disseminating knowledge	4-1					
	2.2.1 Ensure broad awareness of available information and relevant research initiatives				BWG		
	2.2.2 Improve database structure, availability and management				BWG		
	2.2.3 Make "common knowledge" explicit, identify associated assumptions and document reliability				BWG		

OBJECTIVE		Priority	Organization Role			Activity	
			Lead	Support/ Participate	Recommend/ Monitor	Organization	Example Activity
3.	***Develop and implement appropriate habitat modelling tools across a variety of spatial and temporal scales in managed and natural forests***	2					
3.1	Improve predictions of forest-, landscape- and stand-level attributes resulting from different forest management activities	2-1					
	3.1.1 Evaluate growth and yield and forest estate models for usefulness in predicting habitat attributes				BWG (decides later if more work needed)		
	3.1.2 Improve growth and yield and forest estate model linkages for habitat modeling in areas that current models are weak.				BWG (decides later if more work needed)		
	3.1.3 Create new models where needed				BWG (decides later if more work needed)		
3.2	Improve interpretation of habitat values from relevant forest, landscape and stand level attributes	2-4					
	3.2.1 Identify and evaluate available habitat supply models relevant to flora and fauna in BC and suggest priorities for projecting forest and stand attributes				BWG		
	3.2.2 Develop species habitat models for red- and blue-listed species, identified wildlife and other priority species				BWG		
3.3	Increase level of habitat modeling effort in government, academia, industry, and consulting organizations	2-5			BWG		
3.4	Increase use of models by providing extension, demonstration, and training for key users	2-2					

OBJECTIVE		Priority	Organization Role			Activity	
			Lead	Support/Participate	Recommend/Monitor	Organization	Example Activity
	3.4.1 Identify and clarify decision processes and applications for key users of habitat information				BWG		
	3.4.2 Increase level of resources and effort in habitat modeling extension for key users			BWG (as peer group review for Biodiversity (Sustainable Harvest) or by using FPC as peer group to other FRBC component)			
	3.4.3 Develop a comprehens-ive website as an information source on habitat modelling in BC			BWG (by developing a linkage and content)			
3.5	Develop criteria and protocol to ensure the appropriate use of habitat supply models.	2-3					
	3.5.1 Develop protocols for habitat supply model documentation			BWG			
	3.5.2 Establish criteria and procedures for testing and evaluating habitat supply models and their applications			BWG			
4.	***Assess the habitat consequences of current forest management practices***	1					
4.1	Identify potential gaps in the procedures for evaluating the consequences for biodiversity and habitat supply of forest management decisions	1-1			BWG		
4.2	As necessary, identify tools and procedures to evaluate the consequences for biodiversity and habitat supply of forest management decisions	1-2					

APPENDIX II
INFORMATION NEEDS

The BWG has assembled a preliminary list of client needs. This data was assembled from a questionnaire survey, information from several workshops specific to modelling habitat supply, a review of a recent analysis of forestry-wildlife models, input from the FPC, and BWG member experience with forestry-biodiversity interactions.

The review of current programs allowed the BWG to develop an initial list of knowledge gaps. These gaps, outlined below under broad subject categories, served as a starting point for establishing objectives and priorities for recommendations within the strategic plan.

Research/basic information:
- Natural disturbance regimes
- Structural definitions of seral stage
- Criteria for seral stage designations
- Understanding of seral stage distributions associated with past disturbance patterns
- Information on coarse woody debris—amounts, distribution, size, recruitment and decomposition rates, variability and other characteristics by forest type and BEC zone
- Data that are easily incorporated into existing models
- Data to address certification criteria
- Wildlife data (natural history information)

Inventory:
- Links between habitat requirements and inventory/structural attribute data that can be measured and modelled over time

Modelling/predictive tools:
- Stand successional dynamics and the capability to forecast future stand structure/habitat conditions
- Modelling stand development patterns and linkage with seral stage targets in managed stands
- Successional dynamics of habitat attributes
- Spatially explicit habitat supply models
- Linkages between growth and yield modelling and habitat supply modelling
- Modification of growth and yield models to provide habitat information as outputs (e.g., snags, coarse woody debris)
- Assessment of capabilities of available models for evaluating implications of incremental silviculture activities for habitat
- Assessment of habitat implications of current harvest levels and harvesting systems

- Model validation—objective assessments of their capabilities and operational utility
- Maintenance and continual improvement of current models
- Model/GIS linkages
- FSSIM outputs for use in habitat supply determinations

Monitoring and audit:
- Procedures for assessing reliability of existing procedures
- Designation of biodiversity variables (what to monitor)

Communication and technology transfer:
- Extension—training and communication on models, their uses, capabilities and weaknesses
- Coordination of habitat supply model development efforts
- Communication of biodiversity/habitat information needs to modellers for model modification

APPENDIX III
BWG Work Plan 2000/01

The Biodiversity Working Group work plan for the remainder of fiscal year 2000/01 consists of the following activities:

1. Seek approval for the BWG Strategic Plan from the Forest Productivity Council and the Chief Forester.

2. Have appropriate agencies and interest groups review the Strategic Plan and provide input on the Strategic Objectives Matrix (Appendix I). Agencies will include: University of British Columbia (UBC), Forest Renewal BC, Southern Interior Forest Extension and Research Partnership (SIFERP), industry, Land Use Coordination Office (LUCO), Habitat Modelling Steering Committee (HMSC), Ministry of Forests (MOF), Ministry of Environment, Lands and Parks (MELP), Non-Government Organizations (NGOs), Environmental Non-Government Organizations (ENGOs), First Nations.

3. Develop a work plan for fiscal year 2001/02.

APPENDIX IV
Biodiversity/Habitat Working Group Members - 2000/01

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