



FSC BC Guidance

***A companion document to the
FSC- Regional Standards
for British Columbia***

Forest Stewardship Council Canada
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Questions or suggestions for revision can be sent to FSC Canada at:

**400-70 The Esplanade
Toronto, Ontario M5E 1R2
Tel: 1-877-571-1133
Fax: 416-778-0044
Email: standards@fscCanada.org**

www.fscCanada.org

**BECAUSE
FORESTS
MATTER**

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Introduction

This is a companion document of guidance materials intended for use by forest managers, FSC-accredited certifiers and anyone else interested in using the **FSC Regional Certification Standards for British Columbia**. **The information provided in this document is NOT a requirement for meeting the FSC regional standards for BC**, rather it is information designed to assist forest managers and certifiers to better understand the intent of the regional standards and to provide some helpful guidance on how to apply them.

This Guidance Material should be read in conjunction with the **FSC Regional Certification Standards for British Columbia**, copies of which are available at no charge on the FSC Canada web site at <http://www.fsccanada.org>

1.0 Guidance on Applicable Legislation and Guidebooks

Relevance: Criterion 1.1, Indicator 4.1.4 and Criteria 4.3 and 4.4

This section outlines legislation and guidebooks that may apply to operations associated with a management unit in British Columbia as of June 1, 2002. It is intended to assist the manager in meeting the requirements under Criterion 1.1, Indicator 4.1.4, and Criteria 4.3 and 4.4. The manager should consult with qualified professionals to determine the manager's specific legal obligations and should be aware that: a) the legislation listed may have been subject to amendment since June 1, 2002; and, b) legislation listed may have been the subject of judicial decisions which are relevant to interpreting the manager's legal obligations.

1.1 Provincial Statutes and Associated Regulations

Provincial statutes are available on-line at: <http://www.qp.gov.bc.ca/statreg>

For consolidated versions of forestry statutes, see also:
<http://www.for.gov.bc.ca/tasb/legsregs/comptoc.htm>

Statute: *Agrologists Act, S.B.C. 2003, c. 13.*

Comments: Regulates the practice of agrology in BC including registration, standards of conduct, complaints from the public and discipline. Provides for the continuation of the British Columbia Institute of Agrologists.

Statute: *Assessment Act, R.S.B.C. 1996, c. 20.*

Comments: Part of the legal framework for forest management on private managed forest land.

Regulations: *Managed Forest Land and Cut Timber Values Regulation, B.C. Reg. 90/2000.*

Statute: *College of Applied Biology Act, S.B.C. 2002, c. 68.*

Comments: Regulates professional biologists in BC including registration, standards of conduct, complaints from the public and discipline. Establishes the College of Applied Biology as a governing body.

Statute: *Community Charter, S.B.C. 2003, c. 26.*

Comments: Regulation empowers municipalities to undertake environment and wildlife protection measures. However, these would apply only to private land forestry operations not subject to the *Private Managed Forest Land Act*, s.21 of which prohibits local governments from passing by-laws or issuing permits that would directly or indirectly restrict forestry activities.

Regulations: *Spheres of Concurrent Jurisdiction – Environment and Wildlife Regulation, B.C. Reg. 144/2004.*

- Statute:** *Drinking Water Protection Act, S.B.C. 2001, c. 9.*
- Comments:** Prohibits unauthorized contamination of drinking water sources and addresses matters such as reporting of threats to drinking water and hazard abatement/prevention orders.
- Regulations:** *Drinking Water Protection Regulation, B.C. Reg. 200/2003.*
-
- Statute:** *Ecological Reserve Act, R.S.B.C. 1996, c. 103.*
- Comments:** May be relevant to access planning or if management unit borders on an ecological reserve.
- Regulations:** *Ecological Reserve Regulations, B.C. Reg. 335/75.*
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- Statute:** *Employment Standards Act, R.S.B.C. 1996, c. 113.*
- Comments:** Relevant to Principle 4.
- Regulations:** *Employment Standards Regulation, B.C. Reg. 396/95.*
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- Statute:** *Engineers and Geoscientists Act, R.S.B.C. 1996, c. 116.*
- Comments:** Regulates professional engineers and geoscientists in BC including registration, complaints from the public and discipline. Establishes the Association of Professional Engineers and Geoscientists of the Province of British Columbia.
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- Statute:** *Environment and Land Use Act, R.S.B.C. 1996, c. 117.*
- Comments:** Orders “necessary or advisable respecting environment or land use” made by Lieutenant Governor in Council (Cabinet) may be applicable.
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- Statute:** *Environmental Assessment Act, S.B.C. 2002, c. 43.*
- Comments:** Does not apply to forest practices, but may require an environmental assessment to evaluate the impacts of certain proposed projects prior to construction; for example, applies to sawmills, pulp mills, veneer and plywood facilities, and wood preservation facilities of the nature and size listed in *the Reviewable Projects Regulation*.
- Regulations:** *Concurrent Approval Regulation, B.C. Reg. 371/2002*
Prescribed Time Limits Regulation, B.C. Reg. 372/2002.
Public Consultation Policy Regulation, B.C. Reg. 373/2002.
Reviewable Projects Regulation, B.C. Reg. 370/2002.
Transition Regulation, B.C. Reg. 374/2002.
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- Statute:** *Environmental Management Act, S.B.C. 2003, c. 53.*

Comments: Among other things, deals with permits, approvals and Codes of Practices re: introduction of waste into the environment.

Regulations: *Environmental Impact Assessment Regulation*, B.C. Reg. 330/81.
Hazardous Waste Regulation, B.C. Reg. 63/88.
Open Burning Smoke Control Regulation, B.C. Reg. 145/93.
Permit Fees Regulation, B.C. Reg. 299/92.
Public Notification Regulation, B.C. Reg. 202/94.
Pulp Mill and Pulp and Paper Mill Liquid Effluent Control Regulation, B.C. Reg. 470/90.
Rebate of Waste Management Fees Regulation, B.C. Reg. 267/2000.
Spill Reporting Regulation, B.C. Reg. 263/90.
Waste Discharge Regulation, B.C. Reg. 320/2004.
Wood Residue Burner and Incinerator Regulation, B.C. Reg. 519/95.

Statute: *Fish Protection Act, S.B.C. 1997, c. 21.*

Comments: May have limited application to private land forestry operations adjacent to fish-bearing waterways if they require local government approval or are otherwise regulated in some way by local government. However, s.21 of the *Private Managed Forest Land Act* prohibits local governments from passing by-laws or issuing permits that would directly or indirectly restrict forestry activities on lands classified as private managed forest lands pursuant to the *Assessment Act*.

Regulations: *Riparian Areas Regulation*, B.C. Reg. 376/2004.
Sensitive Streams Designation and Licensing Regulation, B.C. Reg. 89/2000.

Statute: *Forest Act, R.S.B.C. 1996, c. 157.*

Comments: Among other things, provides for the classification of Crown forest land and designation of Provincial Forests, determination of allowable annual cut, disposition of timber in the Provincial Forest through various forms of tenures, timber marking and scaling, payment of stumpage, road permits raw log export restriction and designated areas.

Regulations: *Advertising, Deposits And Disposition Regulation*, B.C. Reg.277/2004.
Allowable Annual Cut Proportionate Reduction Regulation, B.C. Reg. 156/94.
Annual Rent Regulation, B.C. Reg. 122/2003.
BC Timber Sales Business Areas Regulation, B.C. Reg. 243/2003.
BC Timber Sales Regulation, B.C. Reg. 265/88.
Christmas Tree Regulation, B.C. Reg. 166/2000.
Community Tenures Regulation, B.C. Reg. 352/2004.
Credit To Stumpage Regulation, B.C. Reg. 385/81.
Cut Control Regulation, B.C. Reg. 578/2004.
Designated Area Regulations (various)
Effective Director Regulation, B.C. Reg. 243/94.
Forest Accounts Receivable Interest Regulation, B.C. Reg. 406/98.
Forest Regions and Districts Regulation, B.C. Reg. 123/2003.
Free Use Permit Regulation, B.C. Reg. 335/99.
Innovative Forestry Practices Regulation, B.C. Reg. 197/97.
Interest Rate Under Various Statutes Regulation, B.C. Reg. 386/92.
Log Salvage Regulation for the Vancouver Log Salvage District, B.C. Reg. 220/81.
Manufactured Forest Products Regulation, B.C. Reg. 240/2003.
Minimum Stumpage Rate Regulation, B.C. Reg. 354/87.
Performance Based Harvesting Regulation, B.C. Reg. 175/95.
Scaling Regulation, B.C. Reg. 446/94.
Special Forest Products Regulation, B.C. Reg. 241/2003.
Timber Definition Regulation, B.C. Reg. 401/87.
Timber Harvesting Contract And Subcontract Regulation, B.C. Reg. 22/96.
Timber Marking And Transportation Regulation, B.C. Reg. 253/97.
Transfer Regulation, B.C. Reg. 351/2004.
Tree Farm License Area-based Allowable Annual Cut Trial Program Regulation, B.C. Reg. 482/2004.
Woodlot Licence Regulation, B.C. Reg. 190/99.

Statute: *Forest and Range Practices Act, S.B.C. 2002, c. 69.*

Comments: Applies to the government or holders of agreements (tenures) under the *Forest Act* or *Range Act*. Among other things, provides for Forest Stewardship plans, site plans,

woodlot license plans, regulation of forest practices, protection of forest resources, compliance and enforcement, and the creation and mandate of the Forest Practices Board.

- Regulations:** *Administrative Orders and Remedies Regulation*, B.C. Reg. 101/2005.
Administrative Review And Appeal Procedure Regulation, B.C. Reg. 12/2004.
Forest Planning and Practices Regulation, B.C. Reg. 14/2004.
Forest Practices Board Regulation, B.C. Reg. 15/2004.
Forest Recreation Regulation, B.C. Reg. 16/2004.
Forest Service Road Use Regulation, B.C. Reg. 70/2004.
Government Actions Regulation, B.C. Reg. 582/2004.
Invasive Plants Regulation, B.C. Reg. 18/2004.
Range Planning and Practices Regulation, B.C. Reg. 19/2004.
Security For Forest Practice Liabilities Regulation, B.C. Reg. 20/2004.
Woodlot Licence Planning and Practices Regulation, B.C. Reg. 21/2004.

Statute: *Forest Practices Code Of British Columbia Act, R.S.B.C. 1996, c.159.*

Comments: As of October 2005, most sections of the *Forest Practices Code* have been repealed and replaced by the *Forest and Range Practices Act (FRPA)*. The remaining Code provisions and the transition sections of FRPA should be consulted for specifics.

Regulations: *Provincial Forest Use Regulation*, B.C. Reg. 176/95.
Strategic Planning Regulation, B.C. Reg. 180/95.

Statute: *Forest Stand Management Fund Act, R.S.B.C. 1996, c. 161.*

Comments: Addresses stumpage levies.

Regulations: *Forest Stand Management Fund Regulation*, B.C. Reg. 3/99.

Statute: *Foresters Act, S.B.C. 2003, c. 19.*

Comments: Regulates the forestry profession including registration, certification and discipline. Provides for the creation and mandate of the Association of British Columbia Forest Professionals.

Statute: *Freedom of Information and Protection of Privacy Act, R.S.B.C. 1996, c.165.*

Comments: Relevant if government is manager.

Regulations: *Freedom of Information and Privacy Regulations*, B.C. Reg. 323/93.

Statute: *Health Act, R.S.B.C. 1996, c. 179.*

Comments: Orders made under the *Health Act* to terminate a condition or thing that does or is likely to endanger public health (e.g. condition presenting a hazard to drinking water) may apply. *Industrial Camps Health Regulation* is relevant where manager provides living quarters for personnel.

Regulations: *Industrial Camps Health Regulation, B.C. Reg. 427/83.*

Statute: *Heritage Conservation Act, R.S.B.C. 1996, c. 187*

Comments: Relevant where heritage objects or sites are present in the management unit (e.g., culturally modified trees). The *Application Regulation* provides that particular provisions of the Park Act apply to Crown land designated as Provincial heritage property.

Regulations: *Application Regulation, B.C. Reg. 373/94.*

Statute: *Human Rights Code, R.S.B.C. 1996, c. 210*

Comments: Relevant to Principle 4.

Regulations: *Human Rights Code Regulation, B.C. Reg. 373/96.*

Statute: *Integrated Pest Management Act, S.B.C. 2003, c. 58.*

Comments: Among other things, places restrictions on the application, storage, transport or possession of pesticides, and provides for permits for the use and sale of pesticides and requirements of pest management plans. Outlines enforcement and appeal procedures.

Regulations: *Integrated Pest Management Regulation, B.C. Reg. 604/2004.*

Statute: *Labour Relations Code, R.S.B.C. 1996, c. 244.*

Comments: Relevant to Principle 4.

Regulations: *Labour Relations Regulation, B.C. Reg. 7/93.*

Statute: *Land Amendment Act, 2003 amending Land Act, R.S.B.C. c. 245.*

Comments: Part 7.1 “Land Designation and Establishment of Objectives” creates a framework for legally establishing objectives and targets from strategic land use plans such as LRMPs (Land and Resource Management Plans). Results and strategies in operational forestry plans must be consistent with designations and orders under this part of the *Land Act*. As of October 2005, Part 7.1 is not yet in force although higher level plan orders under the *Forest Practices Code* with similar effect may be.

Statute: *Logging Tax Act, R.S.B.C. 1996, c. 277.*

Comments: Applies to taxes payable on income derived from logging operations in BC.

Regulations: *Logging Tax Act Interest Regulation, B.C. Reg. 53/2003.*

Statute: *Occupiers Liability Act, R.S.B.C. 1996, c. 337.*

Comments: Establishes the duty of care owed by occupier of land to people who enter on it (e.g. for recreational purposes).

Statute: *Park Act, R.S.B.C. 1996, c. 344.*

Comments: May be relevant to access planning or if management unit borders on a provincial park or other protected area.

Statute: *Plant Protection Act, R.S.B.C. 1996, c. 365*

Comments: Relates to prevention of deleterious spreading or pests or diseases harmful to plants. Does not apply to matters specifically regulated under the *Plant Protection Act (Canada)*.

Regulations: *Balsam Woolly Adelgid Regulation, B.C. Reg. 414/92.*

Statute: *Private Managed Forest Land Act, S.B.C. 2003, c. 80.*

Comments: Sets out the legal framework for forest management on untenured private managed forest land.

Regulations: *Private Managed Forest Land Council Matters Regulation, B.C. Reg. 372/2004.*

Private Managed Forest Land Council Regulation, B.C. Reg. 336/2004.

Private Managed Forest Land Regulation, B.C. Reg. 371/2004.

Statute: *Water Act, R.S.B.C. 1996, c. 483.*

Comments: Among other things, applies to persons making changes in or about streams. See provisions in the *Water Regulation* that apply to forestry operations, particularly 38(2) 41 and 42.

Regulations: *Groundwater Protection Regulation, B.C. Reg. 299/2004.*

Water Regulation, B.C. Reg. 204/88.

Statute: *Wildfire Act, S.B.C. 2004, c. 31.*

Comments: Regulates the use of open fires in and near forest land. Outlines the government's rights and duties in case of a wildfire.

Regulations: *Wildfire Regulation, B.C. Reg. 38/2005.*

Statute: *Wildlife Act, R.S.B.C. 1996, c. 488.*

Comments: Among other things, provides for the establishment of wildlife management areas, and for hunting and angling licences, registration of traplines, guide outfitter's licenses, fur trader's licenses and the administration of the Habitat Conservation Trust Fund.

Regulations: *Wildlife Management Area Regulations* (various).

Statute: *Woodworker Lien Act, R.S.B.C. 1996, c. 491.*

Comments: Establishes that a person performing labour or services in connection with logs or timber in British Columbia, or his or her assignee, has a lien on them for the amount due for the labour or services.

Statute: *Workers Compensation Act, R.S.B.C. 1996, c. 492.*

Comments: Relates to Principle 4.

Regulations: *Occupational Health and Safety Regulation, B.C. Reg. 296/97.*

Reports of Injuries Regulation, B.C. Reg. 713/74.

1.2 Provincial Forest Practices Code Guidebooks

Forest Practices Code Guidebooks are available on-line at:

<http://www.for.gov.bc.ca/tasb/legsregs/fpc/FPCGUIDE/Guidetoc.htm>

<ul style="list-style-type: none">• Bark Beetle Management• Biodiversity• Boundary Marking• Channel Assessment Procedures• Channel Assessment Procedure Field Guidebook• Community Watersheds• Defoliator Management• Dwarf Mistletoe Management• Establishment to Free Growing<ul style="list-style-type: none">• Cariboo Forest Region• Kamloops Forest Region• Nelson Forest Region• Prince George Forest Region• Prince Rupert Forest Region• Vancouver Forest Region• Fish Stream Crossing• Fish Stream Identification (Second edition)• Forest Development Plan (Second edition)• Forest Fertilization• Forest Road Engineering• Generic Forest Health Surveys Guidebook	<ul style="list-style-type: none">• Landscape Unit Planning Guide• Mapping and Assessing Terrain Stability• Management of Terminal Weevils in BC• Pine Stem Rust Management• Pruning• Public Consultation• Range Use Plan Guidebook• Regional Lake Classification and Lakeshore Management<ul style="list-style-type: none">• Kamloops Forest Region• Nelson Forest Region• Prince George Forest Region• Riparian Management Area• Root Disease Management• Seed and Vegetative Material• Silviculture Prescription• Silviculture Surveys• Silvicultural Systems• Soil Conservation• Soil Conservation Surveys• Soil Rehabilitation• Stand Management Prescription
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<ul style="list-style-type: none"> • Green-up • Gully Assessment Procedure • Hazard Assessment Keys for Evaluating Site Sensitivity to Soil Degrading Processes • Identified Wildlife Management Strategy (see http://wlapwww.gov.bc.ca/wld/identified/strategy_info.htm) 	<ul style="list-style-type: none"> • Trail and Recreation Facility • Tree Wounding and Decay • Visual Impact Assessment • Watershed Assessment Procedure Guidebook
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1.3 Federal Statutes and Regulations

Federal legislation is available on-line at: <http://laws.justice.gc.ca/en/>

Statute: *Canada National Parks Act, S.C. 2000, c. 32.*

Comments: May be relevant to access planning or if management unit borders on a National Park.

Statute: *Canada Water Act, R.S.C. 1985, c. C-11.*

Comments: Addresses water quality management in areas where there is a federal provincial water quality management program or where water quality management is a matter of urgent national concern.

Statute: *Canada Wildlife Act, R.S.C. 1985, c. W-9.*

Comments: Includes measures for conservation of wildlife on federal lands or lands administered by the federal government.

Statute: *Canadian Environmental Assessment Act, S.C. 1992, c. 37.*

Comments: Applies to harvesting on Indian Reserve lands, and to other forestry activities on federal land that require a permit under the federal *Timber Regulations* (see federal *Forest Act* below).

Regulations: *Exclusion List Regulations, SOR/94-639, s. 31.*

Inclusion List Regulations, SOR/94-637, ss. 67 and 74.

Law List Regulations, SOR/94-636.

Statute: *Canadian Environmental Protection Act, 1999, S.C. 1999, c. 33.*

Comments: Among other things, addresses animate products of biotechnology and protection of the marine environment from land based sources of substances harmful to living

resources.

Regulations: New Substances Notification Regulations, SOR/94-260 (applies to certain biotechnology products).

Disposal At Sea Regulations, SOR/2001-275.

Pulp and Paper Mill Defoamer and Wood Chip Regulations, SOR/92-268.

Pulp and Paper Mill Effluent Chlorinated Dioxins and Furans Regulations, SOR/92-267.

Statute: *Constitution Act, 1982, being Schedule B to the Canada Act 1982 (U.K.), 1982, c. 11.*

Comments: Section 35(1) of the *Constitution Act, 1982* recognizes and affirms the existing aboriginal and treaty rights of the aboriginal peoples of Canada.

Statute: *Fisheries Act, R.S.C. 1985, c. F-14.*

Comments: Among other things, provides that no person shall carry on any work or undertaking that results in the harmful alteration, disruption or destruction of fish habitat, and prohibits depositing deleterious substances of any type in water frequented by fish. Provides for authorizations to alter fish habitat.

Regulations: *Fishery (General) Regulations, SOR/93-53.*

Pulp and Paper Effluent Regulations, SOR/92-269.

Statute: *Forestry Act, R.S.C. 1985, c. F-30.*

Comments: Generally relates to forestry development and research. *Timber Regulations* have limited application to Forest Experimental Areas or land for which the Department of Natural Resources is responsible.

Regulations: *Timber Regulations 1993, SOR/94-118.*

Statute: *Indian Act, R.S.C. 1985, c. I-5.*

Comments: *Indian Timber Regulations* apply to forest management on Indian Reserve lands.

Regulations: *Indian Timber Regulations, C.R.C., c. 961.*

Indian Timber Harvesting Regulations, SOR/2002-109.

Statute: *International Boundary Waters Treaty Act, R.S.C 1985, c. I-17.*

Comments: Relevant to Criterion 1.3.

Regulations: *International Boundary Waters Regulations, SOR/2002-445.*

Statute: *Migratory Birds Convention Act, 1994, S.C. 1994, c. 22.*

Comments: Relevant to Criterion 1.3.

Regulations: Migratory Birds Regulations, C.R.C., c. 1035.
Migratory Birds Sanctuary Regulations, C.R.C., c. 1036.

Statute: *Navigable Waters Protection Act, R.S.C. 1985, c. N-22.*

Comments: Among other things, applies to dumping of fill and to structures or bridges on navigable waters.

Regulations: Navigable Waters Bridges Regulations, C.R.C., c. 1231.
Navigable Waters Works Regulations, C.R.C., c. 1232.

Statute: *Pest Control Products Act, R.S.C. 1985, c. P-9.*

Comments: Among other things, addresses the registration, manufacture, distribution, labelling and use of pesticides.

Regulations: *Pest Control Products Regulations, C.R.C. c. 1253.*

Statute: *Plant Protection Act, S.C. 1990, c. 22.*

Comments: The purpose of this Act is to protect plant life and the agricultural and forestry sectors of the Canadian economy by preventing the importation, exportation and spread of pests and by controlling or eradicating pests in Canada.

Regulations: *Introduced Forest Pest Compensation Regulations, SOR/2004-113.*
Plant Protection Regulations, SOR/95-212.

Statute: *Species at Risk Act, S.C. 2002, c. 29.*

Comments: The purposes of this Act are to prevent wildlife species from being extirpated or becoming extinct, to provide for the recovery of wildlife species that are extirpated, endangered or threatened as a result of human activity and to manage species of special concern to prevent them from becoming endangered or threatened. Generally protections for species and their habitat apply only to federal lands as defined by the SARA.

Statute: *Timber Marking Act, R.S.C. 1985, c. T-11.*

Comments: Requires any person engaged in the timber or lumbering industry to register a unique mark for timber identification purposes.

Regulations: *Timber Marking Rules, C.R.C., c. 1552.*

Statute: *Wild Animal And Plant Protection And Regulation Of International And Interprovincial Trade Act (Canada), S.C. 1992, c. 52.*

Comments: Relevant to Criteria 1.3 and 6.2.

Regulations: *Wild Animal and Plant Trade Regulations, SOR/96-263.*

2.0 Guidance on International Agreements

Relevance: Criterion 1.3

This document outlines an approach regarding international agreements intended to assist the manager in meeting the requirements under Criterion 1.3. Criterion 1.3 states:

In all signatory countries, the provisions of all binding international agreements such as CITES [Convention on International Trade in Endangered Species of Wild Fauna and Flora], ILO [International Labour Organisation] conventions, ITTA [International Tropical Timber Agreement], and Convention on Biological Diversity, shall be respected.

In the FSC-BC Regional Standards Indicator 1.3.1 states:

The manager demonstrates respect for the spirit and intent of binding international agreements by:

- a) maintaining copies of the agreements (electronic access is acceptable); and,*
- b) demonstrating familiarity and taking action consistent with those aspects of the agreements that are relevant to operations associated with the management unit and the FSC Guidelines on the ILO Conventions. (See Guidance Material on International Agreements).*

2.1 Which Agreements are Covered by Criterion 1.3 and FSC Policy?

The example agreements listed in Criterion 1.3 are treaties, or “international agreement[s] concluded between states in written form and governed by international law” (Vienna Convention on the Law of Treaties, s.2(1)(a)). It does not change the legal nature of a treaty if it is known by another name, such as a convention, protocol, charter or agreement. The treaties given as examples are part of the body of international environmental and human rights law.

Criterion 1.3 covers treaties that are signed by, and binding on Canada. Treaties become binding on the parties who have signed them when they have been ratified and come into force. Each treaty sets its own procedure for how it comes into force, usually requiring a set number of ratifications from signatory states. Once a treaty is in force it is legally binding on the parties in international law, whether or not they have implemented the treaty in domestic law.

In the Canadian/BC context, as of October 2005, binding international agreements relevant to forest management operations include:

- a) Convention on Biological Diversity
- b) Convention on Wetlands of International Importance especially as Waterfowl Habitat (Ramsar Convention)
- c) Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES)
- d) Convention for the Protection of the World Cultural and Natural Heritage
- e) Convention on the Protection of Migratory Birds in Canada and the United States
- f) 1909 Boundary Waters Treaty
- g) Framework Convention on Climate Change
- h) North American Agreement on Environmental Cooperation
- i) ILO C. 87: Freedom of Association and Protection of the Right to Organise Convention, 1948
- j) ILO C.100: Equal Remuneration Convention
- k) ILO C.105: Abolition of Forced Labour Convention
- l) ILO C.111: Discrimination (Employment and Occupation) Convention
- m) ILO 182 Worst Forms of Child Labour Convention

In addition, FSC-POL-30-401 “FSC Certification and the ILO Conventions” states that: “FSC’s policy for voluntary certification expects managers to comply with all conventions listed in Annex 2, in all countries (including countries which are not ILO-members, and have not ratified the conventions).”

Thus, additional ILO Conventions listed in Annex 2 to FSC-POL-30-401 that managers must comply with, despite the fact that Canada or BC have not ratified them are: ILO C. 29 Forced Labour Convention; ILO C.97 Migration for Employment (Revised) Convention; ILO C. 98 Right to Organise and Collective Bargaining Convention; ILO C. 131 Minimum Wage Fixing Convention; ILO C. 138 Minimum Wage Convention; ILO C.141 Rural Workers’ Organizations Convention; ILO C. 142 Human Resources Development Convention; ILO C. 143 Migrant Workers (Supplementary Provisions) Convention; ILO C.155 Occupational Safety and Health Convention; ILO C.169 Indigenous and Tribal Peoples Convention, as well as the ILO Code of Practice on Safety and Health in Forestry Work and Recommendation 135 Minimum Wage Fixing Recommendation, 1970.

Text of or links to these international agreements can be found either at:

http://pubx.dfait-maeci.gc.ca/A_Branch/AES/Env_commitments.nsf (environmental agreements) or <http://www.ilo.org/ilolex/english/newratframeE.htm> (human rights and labour agreements).

2.2 Demonstrating Respect under Criterion 1.3

Criterion 1.3 has different implications for governmental and non-governmental forest managers. If the manager is a government that is legally bound by the agreements listed above, the manager demonstrates respect by complying with those aspects of the agreement that are relevant to forest management.

Without Criterion 1.3 and FSC-POL-30-401 there would be no obligation on non-governmental forest managers in relation to international agreements, unless they formed part of domestic law. This is because treaties are concluded by national governments, and place obligations on governments, not private parties.

However, Criterion 1.3 requires *all* managers to respect “all binding international agreements” in the nature of the examples listed. This is separate Criterion from 1.1 (“forest management shall respect all national and local laws...”), which covers the situation where international agreements have been implemented in domestic law by legislation.

This section translates the obligations in certain international agreements into guidance about specific actions that non-governmental forest managers could take to demonstrate respect for international agreements for the purposes of Criterion 1.3. **Actions taken by the manager may vary depending on the scale and intensity of operations.**

Convention on Biological Diversity

The Convention on Biological Diversity was adopted at the United Nations Conference on Environment and Development in June 1992. It has three objectives: 1) the conservation of biodiversity; 2) sustainable use of biological resources; and 3) the fair and equitable sharing of the benefits arising out of the use of genetic resources. Legal obligations are contained in the Articles of the Convention and subsequent Decisions adopted at the Conference of the Parties.

Compliance with the following aspects of the FSC-BC Regional Standards is also relevant to demonstrate respect for the Convention on Biological Diversity: Criteria 6.1 (Article 7a); 6.2 (Article 8k); 6.3 (Article 8c, 8d and 8i), 6.4 (Article 8a, 8b and 8d), 6.8 (Article 8g); Criteria 3.1, 3.2, 3.3, 3.4 (Article 8j); and, Criteria 8.1 and 8.2 (Article 7b and 7d).

Additional actions the manager could take to demonstrate respect for the Convention on Biological Diversity¹ include:

- taking measures to avoid or minimize threats of significant reduction or loss of biological diversity even where there is lack of full scientific certainty;
- demonstrating knowledge of strategies, plans, programmes and policies through which Canada seeks to meet its biodiversity commitments (e.g. the Canadian Biodiversity Strategy) (Article 6);
- setting measurable targets in relation to conservation of biological diversity in its management plan (Article 7);

¹ Actions identified are informed by the document: UNEP and WCMC, *Measures of Achievement as submitted to SBSTTA by the Executive Secretary* (UNEP/CBD/SBSTTA/5/14), October, 1999.

- using results of biodiversity inventory and monitoring programs at the species, ecosystem or genetic levels, whether carried out by the manager or others, in an ongoing way, at all levels of forest management planning (Article 7);
- establishing geographically defined areas where special measures are taken to conserve biological diversity, and to protect ecosystems, natural habitats and the maintenance of viable populations of species in natural surroundings (Article 8 a and d);
- using biological resources in a manner that avoids or minimizes adverse impacts on biodiversity (Article 10(b)); and,
- incorporating both market and non-market values of biological diversity into plans, policies, investment strategies etc. (Decision III/18).

Convention on Wetlands of International Importance especially as Waterfowl Habitat (Ramsar Convention)

The Convention on Wetlands, signed in Ramsar, Iran in 1971 is an intergovernmental treaty that provides a framework for national action and international cooperation for the conservation and wise use of wetlands and their resources. The wise use provisions of the Ramsar Convention, as elaborated at subsequent Conferences of the Parties, apply to all wetlands and their support systems within the territories of parties to the Convention.

Actions the manager could take to demonstrate respect for the provisions of the Ramsar Convention include:

- identifying and preparing a management plan for any wetlands in the management unit which:
 - a) describes the wetlands;
 - b) defines long-term objectives to ensure that management activities maintain the wetland values; and,
 - c) sets out the actions that will be taken to achieve these objectives; and
- demonstrating that the natural properties of wetlands and their support systems are maintained, including the following natural properties of the ecosystem: physical, biological or chemical components, such as soil, water, plants, animals and nutrients, and the interactions between them, in accordance with Criteria 6.3, 6.5 and 6.5*bis*.

Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES)

The survival of many species of animals and plants has been threatened by over-exploitation for trade. In 1973 an international treaty, CITES, was concluded to protect plant and wildlife species against over-exploitation and to prevent international trade from threatening species with extinction through a world-wide system of controls, including an import/export permit system. Protection is provided for species threatened with extinction which are or may be affected by trade (listed in appendix 1), for those species that although not currently threatened with extinction may become so unless trade is regulated (listed in appendix 2); and for species that are under special management regimes in specific countries and require the cooperation of other parties to assist in controlling trade.

The manager demonstrates respect for the provisions of CITES by complying with the *Wild Animal and Plant Protection and Regulation of International and Interprovincial Trade Act*, S.C. 1992, c. 52, and its regulations.

As of October 2005, no BC trees are included in the appendices to CITES.

Convention for the Protection of the World Cultural and Natural Heritage

This Convention establishes mechanisms for the collective protection, conservation and presentation of cultural and natural heritage of universal value. Although other areas of British Columbia may fit the definition of “natural heritage” as set out in the Convention², properties identified and delineated to date by Canada are primarily parks where FSC management activities will not be occurring.

Actions the manager could take to demonstrate respect for the Convention for the Protection of the World Cultural and Natural Heritage include:

- documenting and mapping any sites that meet the definition of cultural³ and natural heritage under the Convention for the Protection of the World Cultural and Natural Heritage present in the management unit, or which contain the management unit; and,
- taking effective and active legal, scientific, technical, administrative and financial measures for their identification, protection, conservation and rehabilitation.

Convention on the Protection of Migratory Birds in Canada and the United States

The manager demonstrates respect for the Convention on the Protection of Migratory Birds by complying with the *Migratory Birds Convention Act*, 1994, S.C. 1994, c. 22, and its regulations, particularly the *Migratory Birds Regulations*, C.R.C., c. 1035, s. 6(a), which reads: “no person shall (a) disturb, destroy or take a nest, egg, nest shelter, eider duck shelter or duck box of a migratory bird.”

1909 Boundary Waters Treaty

This is a bilateral agreement between Canada and the United States. The manager can demonstrate respect for the Boundary Waters Treaty by ensuring that its forest operations do not

² Article 2 defines: "natural heritage" as follows:

natural features consisting of physical and biological formations or groups of such formations, which are of outstanding universal value from the aesthetic or scientific point of view;

geological and physiographical formations and precisely delineated areas which constitute the habitat of threatened species of animals and plants of outstanding universal value from the point of view of science or conservation;

natural sites or precisely delineated natural areas of outstanding universal value from the point of view of science, conservation or natural beauty.

³ Article 1 of the Convention includes the following in the definition of cultural heritage: “...sites: works of man or the combined works of nature and man, and areas including archaeological sites which are of outstanding universal value from the historical, aesthetic, ethnological or anthropological point of view.”

pollute boundary waters or waters flowing into the United States to the injury of health or property on the United States' side of the boundary.

Framework Convention on Climate Change

The overarching objective of the Framework Convention on Climate Change is to stabilize greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous human interference with the climate system. A variety of processes, including many related to forestry and land use (e.g. land clearing and decay of debris after logging) release carbon dioxide, the main greenhouse gas. On the other hand, carbon dioxide is naturally removed from the atmosphere and stored or sequestered in forests and soils. The nations signing the Framework Convention on Climate Change committed to “promote and cooperate in the conservation and enhancement ... of sinks and reservoirs of all greenhouse gases ... including biomass, forests and oceans.”

Actions the manager could take to demonstrate respect for the Framework Convention on Climate Change include:

- avoiding destruction of large carbon reservoirs (e.g. old growth forests with high biomass);
- developing a carbon budget which indicates that the management unit is a net carbon sink [large operations only];
- taking steps to encourage net carbon uptake and reduce carbon emissions, including:
 - (a) minimizing conversions to non-forest use;
 - (b) minimizing soil disturbance;
 - (c) minimizing damage to remaining vegetation after harvesting;
 - (d) regenerating deforested areas; and,
 - (e) minimizing burning of wood waste.

North American Agreement on Environmental Cooperation

Acknowledging the growing economic and social linkages between the USA, Canada and Mexico, including the North American Free Trade Agreement, in 1993, these parties entered into the North American Agreement on Environmental Cooperation, among other reasons, with the objective of “foster[ing] the protection and improvement of the environment in the territories of the Parties for the well-being of present and future generations” (Article 1).

Actions the manager could take to demonstrate respect for the North American Agreement on Environmental Cooperation include:

- adhering to any voluntary compliance agreements;
- maintaining and publicly releasing non-compliance information;
- acquiring necessary licences, permits and authorizations for management activities; and,
- cooperating when interested persons request the investigation of alleged violations of environmental laws.

International Labour Organisation Conventions

For guidance on how to achieve compliance with ILO Conventions relevant to forestry operations see FSC-POL-30-401, available on-line at:

http://www.fsc.org/en/about/documents/Docs_cent/2,15

3.0 Guidance on Planning

An Approach to Meeting the FSC-BC Regional Certification Standards Based on Ecosystem-Based Management and Conservation Design

Relevance: Principles 6, 7, 9 and 10

3.1 Introduction and Overview

The objective of this guidance material is to describe a forest management planning framework that can assist managers with meeting and integrating the environmental, social and economic objectives of the Forest Stewardship Council (FSC) certification program. The overall guidance related to the various components of FSC planning is comprised of a number of different pieces, some here as guidance, others as appendices within the standards. They are reference in the standards individually, but should be considered pieces of a whole and integrated package.

This piece, the planning approach, is the central framework. It provides an overview of different approaches to ecosystem-based management and how they apply to the FSC-BC Standards. Like many other sorts of planning, EBM includes social, economic and ecological aspects of forest management, however, it is usually defined as differing from other approaches to management by identifying the need to maintain ecological functioning, or ecological integrity, in order to maintain current and future social and economic values. The section on EBM reviews the variety of EBM definitions and provides a framework for a series of action items that have been suggested as integral to an EBM planning. Following sections expand on some of the key ideas in this framework. EBM planning is not a linear process, and so it is difficult to simply lay out a series of linear steps – as a result each of these sections has links to others, and should be undertaken as an iterative process. With this in mind, the following sections are: :

- Ecological Integrity and Ecosystem-based Management – presents an overview of EBM ideas, and how they link to FSC-BC standards.
- An Ecosystem-based Management Planning Framework – outlines key actions that should be part of an EBM framework. This piece focuses primarily on the ecological aspects of EBM planning.
- Economic and Social Objectives in EBM – discusses links to economic and social objectives.
- Planning using Conservation Design – this section outlines how to plan for different management zones. This section has separate headers for different potential zones, and also links to very specific FSC guidance for riparian management (Appendix 6a – Riparian Management) and High Conservation Value Forest ‘zones’ (Appendix 9a - HCVFs). This section specifically addresses the following:
 - Restoration zones
 - Protected reserves (static and dynamic)
 - Managed forest area
 - Plantations

The second piece of Guidance Material summarizes the types of inventory information that may be useful at various stages of planning. The stages considered include:

- Establishing the management unit regional context
- Management unit reconnaissance
- Operational planning at the watershed and/or landscape level
- Stand or cutblock level site specific information

The third piece of Guidance Material is a discussion of Applying Range of Natural Variability (RONV) to Forest Management. This section focuses on the use of natural disturbance information as one of the inputs to formulating management strategies. The various sections are:

- Range of Natural Variability – what is it?
- Natural Disturbance Regimes – what are the common types in BC and what do they mean to forest management?
 - Gap replacement – disturbance regimes where stands are replaced slowly by the death individual or small groups of trees.
 - Stand replacement – disturbance regimes where crown fires, wind or other major disturbances result in periodic events where most or all of a stand is killed at one time.
 - Fire-maintained – disturbance regimes where frequent low intensity fires maintain open stands of fire-resistant tree species
- Preparation of a RONV assessment

A fourth piece of Guidance Material provides information on an approach to Environmental Risk Assessment (ERA). This has two main sections –

- An overview of Environmental Risk Assessment (ERA).
- Use of the Range of Natural Variability (RONV) is as a basecase for ERA. This section outlines an approach for undertaking ERA using RONV in this way. It does not suggest that management must always emulate natural disturbance patterns and rates, but does outline a process to assess potential risks associated with using different management regimes by comparing projected management regime outcomes with estimated natural disturbance outcomes.

Other elements of management planning are dealt with in Appendices attached directly to the FSC-BC Standards. Maintaining functional riparian ecosystems is key to EBM and is dealt with separately under Appendix 6a. Similarly, identification and precautionary management of High Conservation Values is also key in EBM, and is dealt with in Appendix P9a.

3.2 Ecological Integrity and Ecosystem-Based Management

Spellerberg (p. 2, 1996) states that the “aim of conservation in the biological sense is to ensure the continuing existence of species, habitats and biological communities, and the interactions between species, and with ecosystems.” Biodiversity conservation places emphasis on maintaining the diversity of organisms at all levels (genetic variation, species, populations, ecosystems, landscapes) and their physical environments (e.g., Wilson 1992, Spellerberg 1996). The maintenance of ecological integrity goes beyond conserving biodiversity and includes the ecosystem patterns, functions and processes that are responsible for that biological diversity (e.g.,

Grumbine 1994, Quigley et al. 1996, Callicott et al. 1999). Holling and Meffe (1996) also point out the importance of retaining “critical types and ranges of natural variation in ecosystems ... management should facilitate existing processes and variabilities rather than changing or controlling them. By so doing, ecosystem resilience and the organizing processes and structures of ecosystems will be maintained.” Aldo Leopold stated it in simple terms back in 1949: “A thing is right when it tends to preserve the integrity, stability and beauty of the biotic community. It is wrong when it tends otherwise.” Practical applications of conservation theory suggest that in order to achieve these goals, a combination of protected areas, ecosystem-based management of the matrix and/or restoration is needed (e.g., Noss and Cooperrider 1994, Ostfeld 1997, Lindenmayer et al. 2000, Mangel et al. 1996).

“Ecosystem management” is the term most often used in current scientific literature to refer to forest and land management that is compatible with conservation objectives (e.g., Yaffee 1999, Pickett et al. 1997). However, as with most simple concepts, “ecosystem management” is open to a wide variety of interpretations (e.g., Callicott et al. 1999, Bean 1997, Yaffee 1999). To some, the term simply means commodity production systems that acknowledge there are environmental constraints (e.g., environmentally sensitive multiple-use or constrained maximization). In these management systems the primary goal is to sustain the production of forest products (Holling and Meffe 1996, Costanza et al. 2000). Some aspects of forest policy in BC are examples of this approach. Forest Practices Code Landscape Unit Planning and Identified Wildlife Management Strategy are both based on sound biological principles, but their effectiveness is severely reduced by limiting their implementation through application of timber supply impact “caps.”

Increasingly many scientists state that *effective* ecosystem management requires placing emphasis on maintaining ecological integrity, while allowing only compatible human uses on an ecologically sustainable basis (e.g., Grumbine 1994, Yaffee 1999, CIT 2004). In this approach the *primary* focus is on defining ecosystems at various spatial scales (e.g., regional, landscape, watershed, stand), recognizing their complexity and dynamic nature, analyzing cumulative impacts of past development, and defining the necessary restoration plans and management regimes to maintain or restore ecological integrity. The emphasis on maintaining ecological functions and the integrity of the forest in Principle 6, and Criterion 6.3 in particular, implies that FSC-certified management is intended to embody this interpretation of ecosystem management.

Most ecosystem management systems recognize a series of key elements, including many concepts also contained within the FSC Principles and Criteria (adapted from Grumbine 1994 & 1997, Yaffee 1999, Christiansen et al. 1996):

- consideration of variation at a range of spatial (site to landscape) and temporal scales, , plus regional contexts outside the management unit;
- consideration of ecologically derived boundaries for decision-making (often resulting in the need for cooperation across administrative boundaries);
- the need to maintain and/or restore ecological integrity, including identification of sensitive ecosystem components, a proactive approach to address existing conservation problems, the maintenance of diversity while focusing on what to retain rather than what to remove, and the use of a precautionary approach where appropriate;
- inventory and data collection that includes not only the composition and structure of ecosystems, but also processes, functions and interrelationships, (e.g., Wall and Moore 1999, Palmer et al. 2000); uncertainty and information gaps are acknowledged, but the best available information is always used ;

- monitoring of implementation, effectiveness and efficiency, including establishment of reference areas;
- employing active adaptive management;
- systems thinking that recognizes the complexity and dynamism of ecological and social systems; and
- cooperation with other managers and interested and affected parties, using collaborative decision-making.

3.3 An Ecosystem-Based Management Planning Framework

An ecosystem management approach has similar data requirements to multiple use or integrated resource management planning; however, the synthesis, analysis and priorities assigned to information layers will shift during the planning process. In an ecosystem management approach, ecosystem composition, structure, functions and processes are the first priority for inventory and analysis. Planning begins with an assessment, of the key environmental and biological features of the management area, how they function, the processes linking them in order to determine what will be required to maintain or restore overall ecosystem integrity. Once those requirements have been established, the resulting potential for production of forest products is determined within that context. Given that there will always be information gaps and incomplete understanding, management plans should include a margin of safety, and utilize an adaptive management approach to encourage innovation and allow for the implementation of changes in response to monitoring results.

In contrast, with traditional multiple use management, emphasis is placed on knowing the location and capabilities of specific sites for production of forest products. Other values are inventoried and assessed primarily in terms of their potential to constrain the production of economic forest products.

The following sections and Figure 1 outline a nine-step planning framework for development and implementation of a management plan that is ecosystem based, that considers social and economic factors in that context, and that is compatible with meeting the FSC-BC Standards. Although the components of the framework are listed below in a linear fashion, the order and relationships between the various steps are more fully portrayed in Figure 1. As outlined in the introduction, some of the specific topics are further developed in other guidance pieces or the appendices of the main standards.

Specific application of the framework will vary with management unit size and location, availability of information, ecological values present, and the social and economic context and development history of the management unit. The framework is adapted from a variety of sources including Clayoquot Sound Science Panel 1995, Cissel et al. 1998, Peters et al. 1997.

1. Inventory: collection and/or compilation of the best available information at scales appropriate to the targeted resource or ecosystem component (e.g., ecoregions, BEC units, ecosections, landscapes, watersheds, populations, home ranges), sufficient to characterize the management unit and its context (Criteria 6.1, 6.2, 9.1, see also Guidance on Inventory and Natural Disturbance for more detail).

- Physical environment – climate, topography, geology, terrain, soils, hydrologic features.

- Ecosystems and habitats.
- Natural disturbance regimes and historical distribution of biological communities.
- Current disturbance regimes and human uses.
- Cultural sites, land use patterns and other areas of importance to local communities and First Nations.

2. Characterization of Threats to Ecological Integrity: identification and characterization (including causal agents) of significant current and future threats to biodiversity and to the maintenance and/or restoration of ecological integrity within the management unit and ecological units within which the management unit is included (Criteria 6.1, 6.2, 9.1), based on best available information, with documentation of assumptions and rationale.

- Identification of threats to ecological integrity, including those arising from current management, cumulative impacts of past management and/or proposed future management,
- Identification of species, ecosystems and habitats that are rare, threatened or endangered, and those with potential to become at risk due to present trends in management.
- Identification of sensitive sites (e.g., areas difficult to regenerate; areas with significant hazards related to terrain stability, soil erosion or compaction).
- Inclusion of relevant information on regional, landscape and watershed trends for similar ecosystems outside the management unit (e.g., gap analysis to identify under-represented ecosystems).

3. Analysis: interpretation and evaluation of inventory information to develop an understanding of the composition and structure of the ecosystems on the management unit and the processes that shape the components of those ecosystems through time.

- Development of an environmental base case or benchmark for use in environmental risk assessment and evaluation of monitoring results; development of risk assessment Indicators for assessment of change through time (see ERA Guidance for details).
- Characterization of changes in disturbance regimes, species distributions and ecosystems resulting from past natural events and management activities; comparison of their current condition and projected future trends within the environmental base case(see Guidance on Using Natural Disturbance Regimes in Forest Management for details).
- Characterization of key ecosystem processes and functions, including habitat requirements for selected indicator species and/or species of management concern
- Determination of the role of specific areas in maintaining ecological integrity (e.g., habitat supply, population viability); determination of capability of areas to meet First Nations' requirements and produce forest resources and environmental amenities, and factors that affect the suitability of these areas through time (e.g., ungulate winter range capability, and its suitability with different silvicultural systems).
- Characterization of ecosystem and species' responses to disturbance at multiple scales and through time; determination of the sensitivity of various ecosystem components to change and the implications of changes for ecosystem values (e.g., access-sensitive species and the impacts of roads, projected responses of woodpecker populations to salvage logging, WCB-required snag removal and firewood cutting).

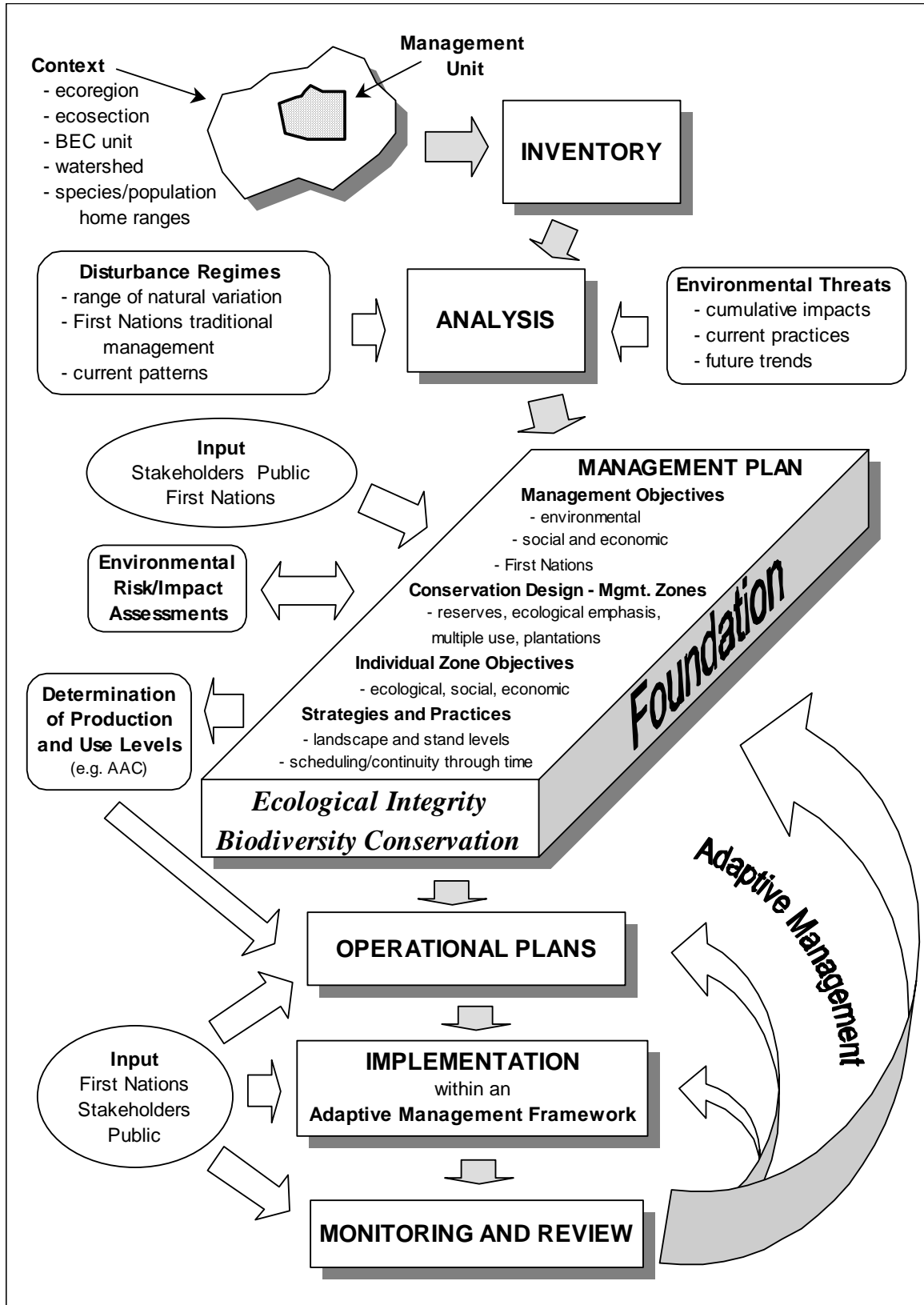


Figure 1: Ecosystem management planning framework.

- Documentation of inventory and knowledge gaps, and the assumptions and hypotheses employed to fill those gaps; characterization of strengths and weaknesses of the input data and products of the analyses.
- Assessment of High Conservation Value Forests and associated conservation attributes at global, regional, landscape/watershed and site levels (see HCVF appendix).
- Definition and mapping of conservation criteria (e.g., under-represented ecosystems, habitat requirements of selected Indicator species) as a basis for designing a reserve network and management regimes for the management unit.

4. Formulation of the Management Plan: with primary focus on maintaining ecological integrity and determining management strategies for the production of ecologically sustainable levels of forest products.

a) Determination of Overall Management Objectives: definition of future desired conditions, consistent with maintaining ecological integrity. Objectives that are developed are SMART (succinctly stated, measurable, achievable, relevant and time bounded); span the full hierarchy of spatial scales (e.g., site, stand, watershed, landscape); and include consideration of an ecological time frame (generally ≥ 250 years).

- Development of environmental objectives that address both coarse filter and fine filter requirements for maintaining ecological integrity in both terrestrial and aquatic ecosystems (Principle 6)
- Collaborative development of objectives with First Nations and/or consultation on management objectives with First Nations, as required by relevant protocol agreements (Principle 3).
- Development of economic and social objectives for the sustainable production of an appropriate mix of timber and non-timber forest products and services, while considering diversification of local economies (Principles 2, 4 and 5).
- Ensuring that economic and social objectives are within ecologically sustainable levels and compatible with maintaining ecological integrity and conserving biodiversity.
- Documentation of assumptions implicit in each objective to allow outside assessment, and testing through adaptive management (e.g., an assumption sets out both the operational objective – *maintain 50% of original marbled murrelet habitat* – and the functional objective – *in order to maintain 70% of the original population*).
- Development of objectives for High Conservation Value Forests.
- Development of objectives for inventory, monitoring and adaptive management to fill information and knowledge gaps.

b) Definition of Management Zones – Conservation Design: spatially locating i) a network of reserves (coarse and fine filter), ii) ecological emphasis managed forest areas, iii) balanced multiple use managed forest areas, and, where applicable, iv) plantation areas, while explicitly acknowledging the dynamic nature of ecosystems and their variability through time and space

- Identification of *reserve areas* required to meet coarse filter conservation goals (e.g., representation, infilling regional protected area gaps, maintenance of riparian functions, reference areas for adaptive management trials).

- Identification of *reserve areas* required to meet fine filter conservation goals (e.g., critical and/or sensitive habitat, including habitat for access-sensitive species; representation; habitat conservation and/or recovery requirements for rare, threatened and endangered species and ecosystems); use of a precautionary approach in identification of reserves required for the management of High Conservation Values (ecological and cultural).
- Identification of *ecological emphasis managed forest areas* (i.e., low intensity management areas) required to provide for coarse filter conservation requirements (e.g., connectivity, interior habitat, maintenance of riparian functions, hydrologic green-up for peak flow moderation); areas where non-consumptive and low impact consumptive uses are compatible with conservation requirements.
- Identification of *ecological-emphasis managed forest areas* required to provide for fine filter conservation requirements for individual species of concern (e.g., ungulate winter ranges; non-reserve habitat areas for threatened or endangered species); use of a precautionary approach in identification of low intensity management areas required for the management of High Conservation Values (ecological and cultural).
- Identification of additional reserves or ecological emphasis areas required to meet social, cultural or economic objectives.
- Linking all of the above as a forest ecosystem network within the management unit to minimize fragmentation and isolation, and to efficiently maintain connectivity within the management unit and beyond the management unit into the landscape and/or regional reserve network.
- Identification of *balanced multiple use managed forest areas* where consumptive and non-consumptive uses are consistent with basic conservation needs (i.e. Principle 6).
- Identification of areas with potential for forest *plantations* (as allowed by FSC in Principle 6 and Principle 10).
- Determination of area-specific management objectives and strategies for each management zone, consistent with its role in the meeting the overall objectives and the intent for its establishment (i.e., for reserves, ecological emphasis areas, multiple use areas and plantations).

c) Management Regimes – Approaches, Strategies and Practices: definition of management strategies and practices for each management zone that are consistent with overall objectives and the objectives specific to each zone.

- Coarse filter management regimes necessary for the management unit to contribute to the maintenance of a) landscape and regional level ecological integrity (e.g., seral stage distribution, interior habitat, connectivity), and b) stand level attributes
- General management measures necessary for avoiding and/or minimizing present and predicted future threats to ecological integrity (identified in Step 3).
- Specific fine filter management regimes for each of the various management zones, consistent with the type of zone and the specific objectives identified for each area; management regimes for High Conservation Value Forests are consistent with a precautionary approach.
- Specific and coordinated management regimes for reserves and/or management areas necessary for the conservation and/or recovery requirements for rare, threatened and endangered species and ecosystems.

- Adaptive management experiments to test whether proposed management systems will indeed achieve stated goals with respect to ecosystem composition and integrity.

d) Temporal Planning: projections of management activity schedules and ecosystem conditions.

- Planning extends over an ecological time frame appropriate to the ecosystems present (generally ≥ 250 years), with explicit acknowledgement of the probable occurrence of stochastic events and increasing uncertainty with increasing length of projections.
- Projections of harvesting patterns, systems and sequences, and predicted resulting patterns of seral stage distributions, connectivity, patch sizes, stand structures, habitat distributions and ecosystem processes through time and space.
- Projections of active and inactive roads and other access structures and patterns (including non-industrial uses).

5. Environmental Risk and/or Impact Assessment and Plan Finalization: assessments of proposed plans for consistency with objectives and the FSC-BC Regional Standards.

- Through the use of risk assessment or an equivalent analysis (Indicators 6.1.7, 6.1.8), determination of the potential impacts of proceeding with the preliminary management plans outlined in Step 4 (e.g., MELP 2000, see also Guidance Material on Environmental Risk Assessment).
- Reviews of knowledge uncertainties, assumptions and sensitivity analyses to ensure they are adequately accommodated in the assessment and addressed via adaptive management experimentation.
- Risk assessment results for proposed management regimes in High Conservation Value Forests are acted on in a manner consistent with a precautionary approach.
- Re-evaluation of objectives and revisions of plans when environmental risks or impacts of the proposed plans are not consistent with the FSC-BC Standards or the objectives and future desired conditions identified in Step 4 (Indicators 6.1.9, 6.1.10).

6. Determination of Sustainable Production Levels: establishment of harvest and use levels consistent with the management plan.

- Determination of a sustainable level of production for the relevant forest products that is consistent with Criterion 5.6 and the objectives, management zones and management regimes defined in the management plan (e.g., allowable annual cut calculations specific to the management unit).
- Projected levels of non-consumptive uses are consistent with achieving management plan objectives (e.g., recreation).
- All assumptions and uncertainties are accounted for when setting production levels (e.g., sensitivity analysis).

7. Adaptive Management – Experimentation and Learning: active and passive approaches.

- Design and implementation of management initiatives that are based on current understanding of ecological processes; include experiments to increase ecological understanding; and test key ecological assumptions against plausible alternatives.

- Designation of sufficient reference areas and experimental treatments to effectively evaluate the results of adaptive management trials.
- Monitoring and evaluation of management outcomes in light of their objectives and in relation to emerging information from sources outside the management unit.
- Inclusion of sufficient flexibility in management plans to allow for timely incorporation of changes required to respond to new information.
- Revisions to objectives, strategies and practices occur when results of ongoing monitoring and assessment and other new relevant information from outside the management unit indicate the need.

8. Operational Level Planning and Implementation: preparation of operational level plans and implementation procedures.

- Within an adaptive management framework, design of site level treatment and harvesting plans is consistent with objectives, strategies and production levels determined in Steps 4-7.
- Consultation on operational plans with directly affected persons and as required by relevant First Nations.
- Operational personnel implementing management measures are aware of relevant plans, constraints and adaptive management programs.

9. Monitoring and Assessment: monitoring to ensure that objectives are being achieved and ecological integrity is maintained and/or restored; ongoing assessment to increase knowledge of processes, functions and responses.

- Design and implementation of a monitoring strategy that is appropriate to the scale and intensity of management operations, and the scale, sensitivity and degree of threat posed to the targeted conservation values or processes (Principle 8 and Criterion 9.4).
- Employment of monitoring results to re-evaluate and, where appropriate, revise inventory and data analysis, environmental assessments, assumptions, management objectives, strategies and implementation measures (Principle 8 and Criterion 9.4).

Use of this planning framework will facilitate meeting the requirements of FSC certification, and provide a certifier with a clear and transparent view of the manager's level of commitment and progress toward meeting the FSC-BC Standards. The following sections provide further detail about some of the components of the planning framework.

3.4 Economic and Social Objectives in an Ecosystem-Based Management Framework

Ecosystem-based management is an approach to managing human activities that seeks to ensure the coexistence of healthy ecosystems and human communities over the long term. The ecosystem-based management approach provides a framework to understand the relationship between the well-being of human communities and the health of ecosystems. Ecosystem-based management recognizes that humans are components of ecosystems, that human activities have pervasive influence on ecosystems, and that human activities must be managed in order to achieve sustainability. The needs and motivations of human communities must also be

considered, as communities must be engaged in ecosystem-based management if it is to be successful.

In order to work within this framework, the manager works with communities, affected persons and other parties to set objectives and develop Indicators for social, cultural and economic factors as well as ecological ones. FSC places a particular emphasis on objectives related to maintaining or enhancing the long-term social and economic well-being of forest workers and local communities, encouraging diversification through the use of a broad range of forest products, and maintaining the environmental amenities and services upon which communities, businesses and human well-being depends. While social and economic objectives and associated Indicators set by the manager should take into account current social and economic conditions, as well as the legal and customary setting affecting the management unit, they ultimately need to be directed at sustaining human communities over the long term. Social and economic objectives describe a future desired condition for people and communities in much the same way this is done for ecosystems.

Ecosystem-based management involves managing the activity of human communities within the limits of ecosystem processes in such a way that both can be sustained through time. While the manager's social and economic objectives may create pressure to maximize ecosystem use, an ecosystem-based management approach requires that sustainability and associated conservation goals not become subordinate to those objectives. The requirements to maintain overall ecosystem integrity must first be established and implemented before the best means to achieve social and economic objectives can be determined.

Articulating social and economic objectives does not bind the manager to meeting them in full; indeed, more often than not some adjustments to the objectives will be necessary. However, once articulated, the manager can quantify impacts associated with meeting objectives under a proposed management strategy and assess the implications of proposed management relative to meeting conservation goals. Where it is found that proposed management would not meet conservation goals or provide for sustainability, social and economic objectives can then be adjusted accordingly. Although an ecosystem-based management approach may involve lower levels of commodity production over the short term, it secures the delivery of such commodities and other environmental amenities and ecosystem services over the longer term.

3.5 Planning Using Conservation Design

Conservation biology theory suggests that maintenance of biodiversity at the landscape level requires an adequate and strategically placed network of reserves, buffers and landscape connectivity, in addition to a forest matrix with retention of habitat features sufficient to allow maintenance of a diverse array of populations throughout the landscape (e.g., Noss and Cooperrider 1994, Lindenmayer 2000, Noss 1992). In the forested context, severely modified areas, such as agricultural fields, urban development or areas under plantation management must be limited in area and also strategically placed to minimize conflict with the availability of critical habitats.

FSC principles and Criteria identify three potential zones within a forest management unit:

- Protected Reserves (Criterion 6.4, and possibly Criterion 6.2 and Principles 3 and 9); may rarely include restoration areas.

- Managed Forest Area (likely subdivided into sub-areas defined on the basis of ecological and cultural values, sensitivity to disturbance and the types and intensity management activities, may include restoration areas).
- Plantation Areas (Principle 10 and Criterion 6.10).

Figure 2 provides an example of the application of zoning and the various management strategies within the managed forest area of a watershed portion of a management unit.

The risks to general biodiversity associated with any specific combination of percentages for each zone depend on ecosystem characteristics, effectiveness of the locations, species of interest, and the level of management in each zone (e.g., Noss and Cooperrider 1994, Poiani et al. 2000, Lindenmayer 2000). Species with highly specialized habitat requirements will likely require fine filter management approaches, supplementing the coarse filter approach described above (Callicott et al. 1999).

Determining suitable amounts of different zones, and different management regimes, can be aided by undertaking an Ecological Risk Assessment (see below), using RONV as a benchmark.

An additional concern is the context within which a management unit is located, particularly small and medium-sized management units that may represent only a small portion of the full extent of the ecosystems they contain. For example, the significance of a 1,000 hectare patch of natural forest that is the only remaining example of a particular forest type is quite different from another 1,000 hectare patch, where many thousands of hectares of similar types are in nearby protected areas. Therefore the minimums and maximums recommended for meeting biodiversity objectives must take into account the management regimes in the surrounding area, especially with regard to existing protected areas and conversions of forest lands. It is proposed that an individual biogeoclimatic subzone variant within an ecosection is the appropriate scale at which to consider the surrounding context. It is detailed enough to reflect relatively uniform conditions at a landscape scale, and yet large enough to allow for local variations in land use designations. Additional consideration should also be given to conditions within the total subzone variant and total ecosection (See example evaluation table in Guidance on Inventory Information).

The regional and landscape context, combined with the characteristics of the ecological values within the management unit, will provide the rationale for determining an appropriate mix of reserves, managed forest area and possible plantations within an individual management unit. Although there is no scientific justification for a universal set of percentages for the three proposed zones, a reasoned approach to biological conservation and maintaining ecological integrity would suggest there should be minimum values set for the amount of area required to be in reserves, and that maximums should be set for plantations (for a discussion, see Noss 1996).

3.5.1 Restoration Areas

Restoration areas are defined as “mapped areas of *poorly managed natural forests or former plantations* that have been designated by the manager for restoration to natural forests that meet the requirements of Criteria 6.3 and/or 6.4.” These will usually fall within the Managed Forest Zone; however, where these areas contain critical or unique habitat features that are not found in a suitable conditions elsewhere on the management unit, portions of these may also fall within Protected Reserve Zones. Areas designated as restoration areas should be delineated on maps and be identified in the management plan with restoration objectives and a specific timetable of activities and milestones to ensure those objectives are met in a timely manner. Determination of harvesting levels should explicitly incorporate the effects of restoration activities.

3.5.2 Protected Reserves (Criterion 6.4)

These are mapped areas designated by the manager for long-term protection from development. The reserves' locations, size, shape and distribution are designed to meet biodiversity objectives (ecosystem representation, protection of critical habitat features, reference areas, requirements for conserving HCVF attributes), and should include an appropriate mix of inoperable and operable lands. Harvesting is generally prohibited in reserves and they are off-limits for road construction, except under very limited circumstances. Forest harvesting may only occur where it is used as part of a restoration plan to mimic natural disturbances (e.g., fuel reduction in association with controlled burning in fire-maintained ecosystems). Other management measures may be required to meet the objectives for specific reserves (e.g., fire control, removal of invasive species). Any other low-intensity uses must be compatible with the biodiversity objectives of the reserve.

To be effective and efficient, reserves should be designed with multiple objectives in mind: representation of the full spectrum of ecosystems, protection of vulnerable or rare habitats and sustaining ecological processes. The amount and distribution of reserves necessary to achieve these goals will vary depending on the complexity and sensitivity of the area, and the intensity of ecosystem modification occurring in the matrix surrounding the reserve network. Individual reserve units less than five hectares in size or less than four tree heights⁴ wide are unlikely to meet the requirements of a reserve for biodiversity, unless it can be demonstrated they meet specific habitat objectives.

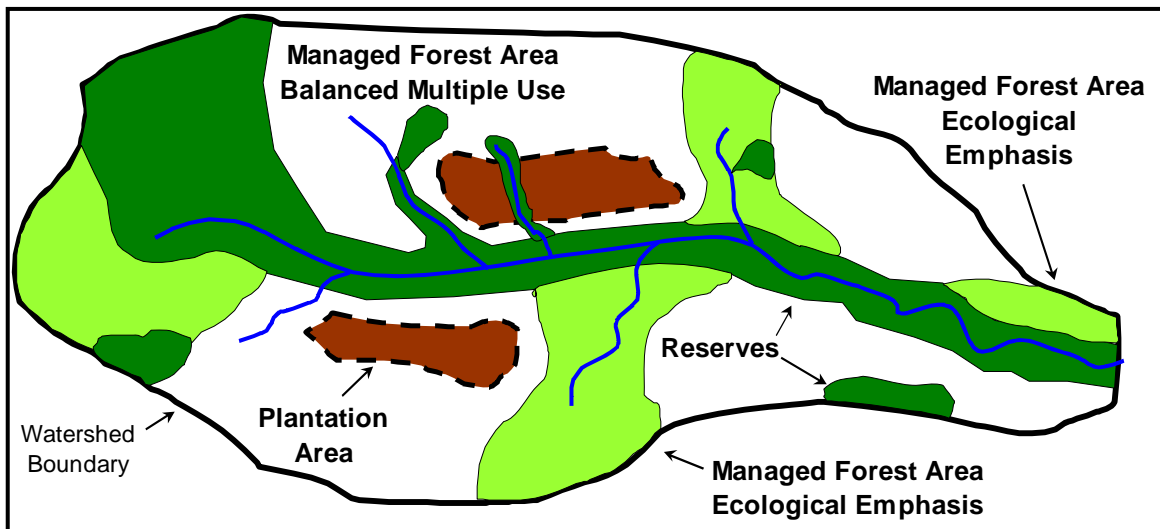


Figure 2. Example of the application of the conservation design and zoning concepts within a management unit.

To provide guidance to managers and certifiers, Indicator 6.4.1 and Table P6-1 outlines a set of minimum levels for reserves that vary depending on the relative amounts of protected areas in similar ecosystems surrounding the management area. The table values are intended to ensure that basic representation needs are met. Note that Table P6-1 refers to reserves that fulfill specific biodiversity objectives; *de facto* reserves resulting from operational constraints that do not meet biodiversity objectives are not to be included. In addition, reserves that are ecologically non-

⁴ One tree height is defined as 50 m on the coast, 40 m in the wet interior and 30 m in the dry interior and boreal.

functional are not included (e.g., reserves that are of insufficient size or composition to meet the objective). Detailed analysis of local conditions (e.g., the results of population viability modeling) or a precautionary approach for protecting High Conservation Value Forests under Principle 9 and meeting other reserve objectives, such as reference areas for adaptive management experimentation, maintenance of basic riparian functions and providing for landscape connectivity and interior habitat, may require reserves above the minimums in the table. Management units in NDT 3 and 4 may include up to half the reserve requirements as *dynamic reserves*.

3.5.3 Dynamic Reserves

Ideally, protected areas and reserves should be of sufficient size and diversity to accommodate the continued operation of natural disturbance regimes. However, in NDT 3 and NDT 4 where stand replacing disturbances are often large and frequent, especially within smaller management units, this may not always be feasible or socially acceptable (see Guidance on Range of Natural Variability). Therefore in NDT 3 and 4 it may be necessary to use management treatments to mimic natural disturbances in a portion of those reserves (e.g., Everett et al. 1994, Covington and Moore 1994), with the intent of maintaining seral stage distribution and other landscape processes compatible with RONV through planned disturbances. This special type of reserve has been called a *dynamic reserve*, and is limited to less than 50% of the total reserve area to ensure there are still significant reserve areas suitable for reference areas without management intervention (See FSC-BC Glossary). Within NDT 3 and 4, the locations of dynamic and non-dynamic reserve areas should be selected to reflect natural disturbance patterns (i.e., non-dynamic in areas with less frequent disturbance; e.g., wetter riparian sites, northerly aspects).

Suggested steps for defining “dynamic reserves” (see Figure 3):

- Identify and map parts of the management unit in NDT 3 and/or 4 that meet the requirements for deployment of dynamic reserves, separating areas of frequent stand-replacing disturbance from those with frequent low intensity stand-maintaining disturbance.
- Through a RONV assessment procedure define the estimated mean return interval for stand-replacing disturbance for those areas of frequent stand-replacing disturbance.
- Identify and map the areas to be designated as “stand-replacing disturbance” dynamic reserves within the protected reserves network. Assuming a 3- or 4-pass harvesting system, the amount of area required, will likely be 3-4 times the dynamic reserve portion of the minimum area required under Indicator 6.4.1, as only one third or one quarter of the area will meet the minimum age criteria at any given time (see Figure 3 and glossary definition of Dynamic Reserves). Define the management regime to be employed.
- Identify and map the areas to be designated “fire-maintained disturbance” dynamic reserves within the protected reserves network.

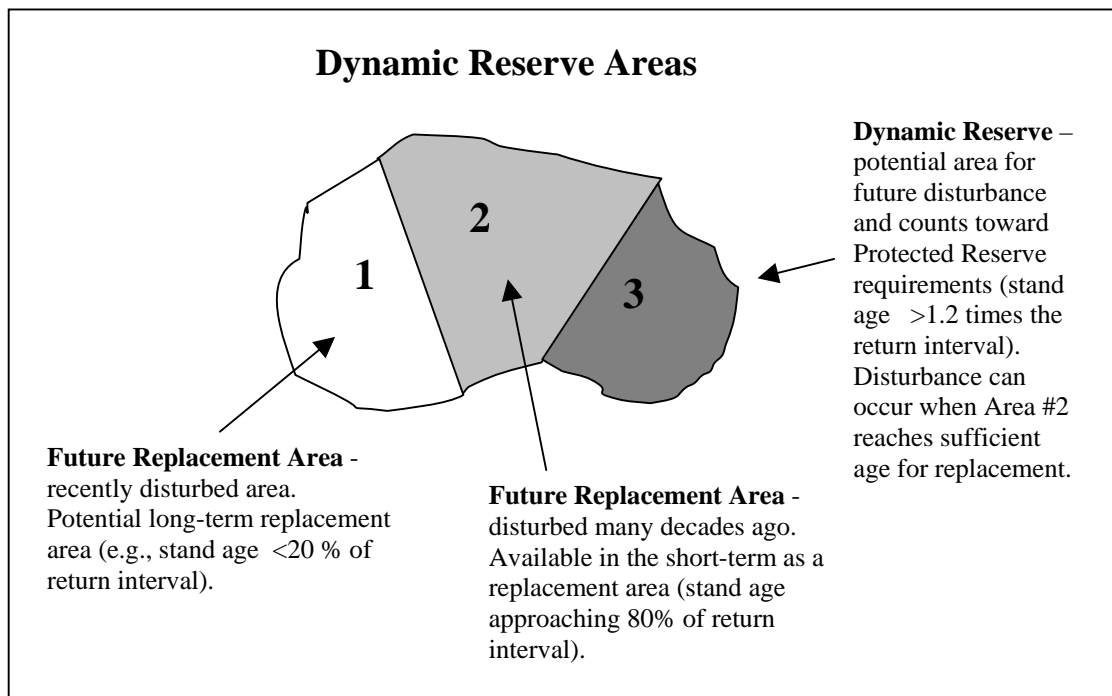


Figure 3. Dynamic reserve management regime layout.

3.5.4 Managed Forest Area

This portion of the forest management unit includes areas where a range of forest management activities occur, potentially including both consumptive and non-consumptive uses. Principle 6 requires that management in these areas “conserves biological diversity and its associated values, water resources, soils and unique and fragile ecosystems and landscapes, and maintains ecological functions and integrity of the forest.” Criteria 6.2 and 6.3 further specify that management “protects rare, threatened and endangered species and their habitats;” and “maintains, enhances or restores ecological functions and values, including forest regeneration and succession; genetic, species and ecosystem diversity; and natural cycles that affect the productivity of the forest ecosystem.”

In adapting the FSC Principles and Criteria to BC, the FSC-BC Standards Team uses the same underlying premise as the FPC Biodiversity Guidebook (BC MoF and MELP 1995) and the Landscape Unit Planning Guide (BC MoF and MELP 1999), assuming that the best way to maintain native species and ecological functions is to maintain managed forests in conditions similar to those created by natural disturbance agents such as fire, wind, insects and disease (BC MoF and MELP 1995, p2). Forests within the managed forest area are expected to maintain many of the characteristics of natural forests, at both the landscape and stand levels, with variation appropriate to the spatial and time scales defined by the range of natural variation (See subsequent section on Disturbance Regimes and Range of Natural Variability).

In most management units, this zone will likely be separated into smaller sub-areas with differing objectives and associated management regimes (within the context described above). These will likely include *ecological emphasis areas* where conservation-related objectives limit management activities to non-consumptive and/or low intensity consumptive uses (e.g., ‘buffer’ zones that

increase the value of core reserve areas, or some High Conservation Value Forests). In other *balanced multiple use areas*, more intensive management practices such as timber harvesting will occur, but are consistent with maintaining ecological integrity at multiple scales, as required under the FSC-BC Indicators and Verifiers under Principles 6 and 9 (i.e., is not a plantation as defined by FSC-BC). Any of these areas may include *restoration areas* where stand or landscape attributes have been lost as a result of historic forest harvesting or development.

3.5.5 Plantations

In the BC context, FSC plantations are mapped and designated areas of the management unit that are planned to be managed over the long term under a plantation management regime. Plantation management regimes are characterized by:

1. a *set of stand characteristics* that are present and observable on site, as a result of past and/or current practices,
2. a long-term *management regime* to maintain or intensify those stand characteristics, and
3. an *intent* to manage for economic or tree growth objectives to the exclusion of others (See FSC-BC Glossary definition of plantations).

Criteria 10.2 and 10.5 define in what context existing plantations (those existing prior to 11/94) are acceptable for certification – i.e. a limited amount of the management unit and located to avoid conflict with conservation of terrestrial and aquatic biodiversity values (e.g., not in riparian areas, rare ecosystem types or critical habitat for old growth dependent species). Criterion 6.10 defines the necessary additional conditions for certifying new plantations (i.e. those created after 11/94). The maximum area for existing plantations and new plantations are defined in Indicators 10.5.1 and 6.10.1, respectively. Although areas under plantation management may not meet all stand level requirements under Criterion 6.3, those areas are still should be considered when assessing the adequacy of landscape level management strategies (e.g., patch size and seral stage distribution).

3.6 References

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4.0 Guidance on Inventory Information

Relevance: Principles 6, 7, 8, 9 and 10.

This document provides information intended to assist managers in meeting requirements under Principles 6, 7, 8, 9 and 10. Collection of inventory information describing the management unit and its regional and landscape context is an essential first step for preparing a management plan, completing the environmental risk assessment required in Criterion 6.1 and determining appropriate landscape and stand level management regimes to meet other components of Principle 6. Inventories also provide information for developing a management plan under Principle 7, for determining allowable harvest levels under Criterion 5.6, baselines for monitoring under Principle 8, for the assessment of High Conservation Value Forests under Principle 9 and, where applicable, planning management regimes for plantations under Principle 10.

4.1 Inventory Approach

The general approach is to require information at various levels of detail, each appropriate to the level of planning they are intended to inform (See Figure 1). The broadest level of information is intended to provide a regional and landscape context for the management unit; the second level to provide information for management plan development and landscape level planning; the third for operational planning; and the fourth for development of site specific prescriptions. The second and third levels may be combined in smaller management units or larger ones with well developed inventory programs. The following four levels of inventory information are referred to in the FSC-BC Regional Standards:

1. Regional and/or landscape level context information for relevant areas outside the management unit – generally defined as BEC variants and ecosections that are not completely contained within the management unit, or planning level watersheds (approx. 5,000-50,000ha) in similar circumstances..
2. Reconnaissance level information for portions of larger management units (e.g., > 5,000 ha) that are not planned for development activities within the next five years – includes information appropriate for setting management objectives, preliminary delineation of management and reserve zones, developing strategies, and landscape level planning. Where more detailed information is unavailable, this may be based on remote sensing, airphoto interpretation, low intensity ground surveys or GIS-based modelling.
3. Moderate to detailed level information (generally at 1:20,000, up to 1:50,000) appropriate for operational planning at the landscape or watershed level (e.g., at the FDP stage) – including identification of sensitive sites, delineation of reserves, and layout of harvesting patterns and access corridors.
4. Site specific and stand level information suitable for developing detailed treatment prescriptions and assessing potential environmental risks of specific proposed management activities.

Table 1 describes the various types of information required or recommended at each level and potential sources for acquiring the information. Table 2 provides an example of a regional context

summary with regard to representation of protected reserves at the ecosection and BEC variant levels. Table 3 displays a similar summary for the extent of existing conversions in a similar area.

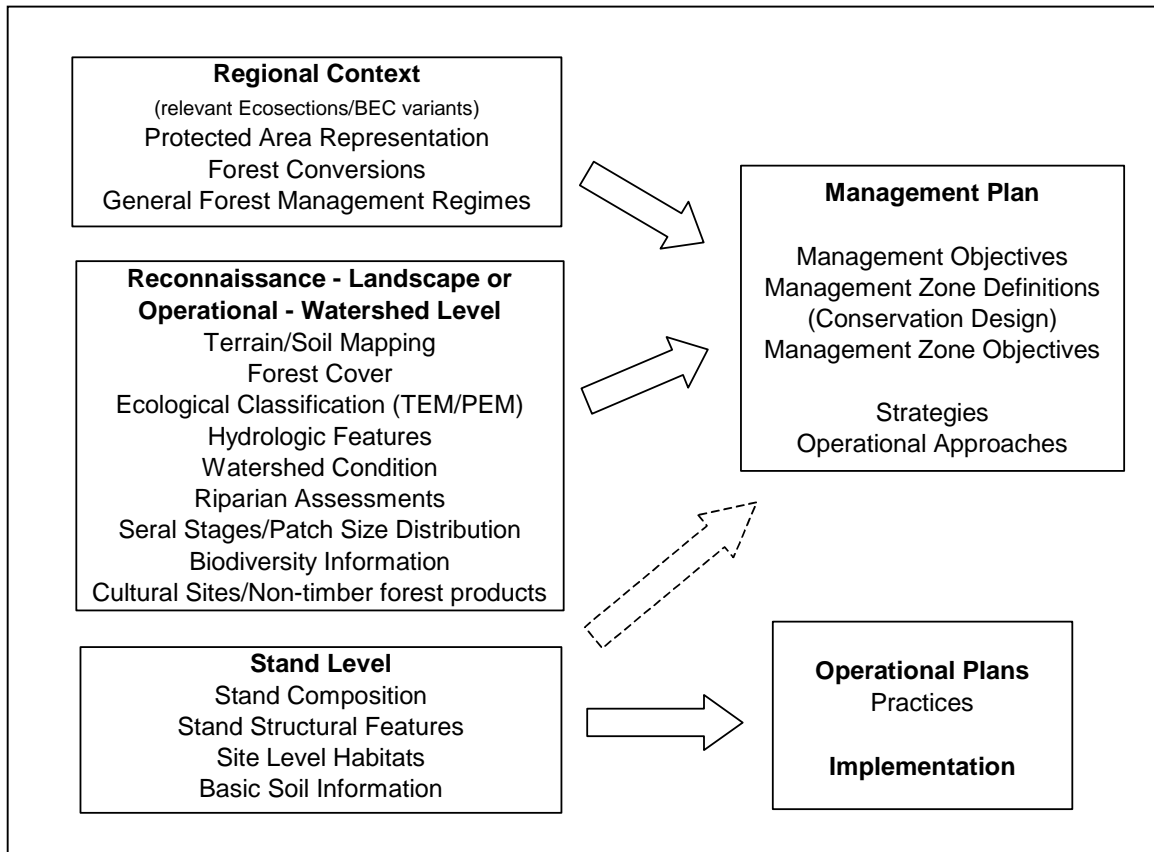


Figure 1. Inventory levels and their relationship to planning levels.

Table 1. Inventory levels as described under Principle 6.

Level	Inventory Information	Structure of Information	Potential Sources of Information
1. Regional Context Indicator 6.1.1	Protected area representation by BEC variant and ecosection	Database/spreadsheet (See example in Table 2)	MSRM website
	Forest conversions summarized by BEC variant and ecosection	Estimated percentage areas of natural forest converted to non-forest uses; database/ spreadsheet (See example in Table 3)	MSRM website; forest cover information
	General descriptions of management in remaining areas of BEC variants and ecosections	Landscape level habitat indicators (e.g., fragmentation, seral stage distribution); database/ spreadsheet or written description	Tenure status and management plans of relevant lands; aerial photographs/ satellite imagery; forest cover

Level	Inventory Information	Structure of Information	Potential Sources of Information
2. Management Unit Level Inventories (reconnaissance) Indicator 6.1.2 and 6.1.7 (this level may be combined with next level in small management units or where more detailed information is available)	Same types of inventories as Operational Planning below	Maps, generally 1:20,000 to 1:250,000 with minimal ground checking (e.g., FPC Level D or E terrain mapping); accompanying databases	Same sources as Operational Planning below
	Natural Disturbance Regime Information (see Guidance on RONV)	Identification and distribution of the natural disturbance regime(s) present in the management unit; and a description of the regimes that includes information on frequency, size, distribution and degree of heterogeneity of natural disturbances at the landscape, ecosystem and stand levels	FPC Biodiversity Guidebook; LMHB 53; other relevant studies on natural disturbance regimes
3. Operational Planning - Landscape and/or Watershed Level Inventories (1:20,000 – 1:50,000) Indicators 6.1.3, 6.1.4 and 6.1.5	Terrain/soil mapping	Maps (with 30-50% of polygons field checked); accompanying databases including terrain type, terrain texture, slope, drainage, soil texture (similar to FPC Level B or C)	Existing terrain and soil mapping; BC Gov't websites
	Terrain Hazards/ Soil Conservation Hazards	Maps and accompanying databases; including: terrain stability, landslide induced stream sedimentation, waterborne erosion and sediment delivery	Derived from Terrain/Soil base mapping
	Forest cover	Maps and accompanying databases, including at a minimum, species composition, height class, age class, stocking and crown closure	MoF
	Ecological classification below BEC variant	Maps (TEM or PEM); where TEM is unavailable, preliminary PEM developed from existing information combined with a strategy for field verification over time	MSRM and MoF
	Habitat capability/suitability interpretative maps	Maps and accompanying databases	Derived from TEM/PEM or other information, MSRM, MWLAP, CDC
	Hydrologic features	Maps and accompanying databases including watershed and sub-basin boundaries, H60 lines, streams, wetlands, lakes and springs; and classification of stream reaches, lakeshores and wetlands; domestic and irrigation water intakes	TRIM and Forest Cover maps; stream surveys; BC watershed atlas; watershed assessments; MSRM, MWLAP and MoF
	Watershed condition	Maps and accompanying databases including, where applicable, hydrologic recovery, equivalent clearcut area (ECA), channel assessments, channel stability ratings, riparian condition (see below), road density, and trends in flow regimes and water quality based on available information	Watershed assessments; channel assessments; sediment source surveys; GIS analysis of forest cover maps
Riparian Assessments; completed on riparian assessment units	As outlined in Appendix P6a: Requirements for Riparian Management	See Annex P6a: Requirements for Riparian Management	

Level	Inventory Information	Structure of Information	Potential Sources of Information
3. (cont'd) Operational Planning - Landscape and/or Watershed Level Inventories (1:20,000 – 1:50,000) Indicators 6.1.3, 6.1.4 and 6.1.5	Seral stages, patch size distribution	Maps and accompanying databases	MoF, MSRM and MWLAP; GIS analysis of forest cover and/or TEM/PEM maps combined with structural stage lookup tables
	Biodiversity information	List of focal species (including presently occurring and previously extirpated); maps and/or databases of ecosystems and ecosystem components required by those species (including critical habitats , geographic distribution and sensitivities such as access), preferably based on a reconnaissance field survey appropriate to the size and complexity of the management unit and other available studies or, at a minimum, based on information available from the BC and Canadian governments	MSRM and MWLAP (see also sources listed in Appendix 9a HCVFs)
	Access-sensitive species (e.g., grizzly bears, ungulate winter range)	Assessments to determine the presence and distribution of access-sensitive species, and to design measures for the protection of those species and/or habitats, including measures for access management and incorporation of habitat areas for those species in the protected reserve network	MSRM and MWLAP
	Cultural Sites and Non-timber forest products use	Location maps and accompanying databases (with due consideration of confidentiality issues)	First Nations and other local sources of traditional knowledge
4. Stand and/or Cutblock Level Inventories Indicator 6.1.6	Stand composition and characteristics	Tree species composition by layer, height, age, stand age, tree age ranges (i.e., stand and stocking tables plus age information); insect and disease factors	Cruising and silvicultural surveys; stand and stocking tables; forest cover
	Stand structural features	Species/types, frequency and distribution of live wildlife trees; frequency and distribution of snags and coarse woody debris, including decay classes (sufficient detail on snags and CWD to meet management objectives)	Cruising and silvicultural surveys; habitat surveys, including snags and CWD
	Site level - cultural features; terrestrial/aquatic habitats, including rare and critical	Mapped locations and descriptions; red- and blue-listed species and some cultural features may have confidentiality issues	Cruising and silvicultural surveys; detailed habitat surveys
	Basic ecosystem and soil information	Mapped plot locations and data base information; use to update existing inventories; (e.g., site series classification, moisture regime/drainage, slope, soil texture, coarse fragments, LFH and soil depth, depth to unfavourable layers)	Cruising and silvicultural surveys; site disturbance surveys

Table 2: Example of regional context summary of Protected Areas by relevant ecosection and BEC variant. Protected area percentages for total ecosection, total BEC unit and ecosection by BEC unit (area near Chetwynd, BC).

BEC Units		Ecosections					
		Hart Ranges	Hart Foothills	Peace Foothills	Halfway Plateau	Peace Lowland	Kiskatinaw Plateau
Total BC PA%		0.14	4.76	6.50	0.06	2.54	2.56
AT p	20.76	29.94	3.23	13.18			0.00
ESSFwk 2	10.25	13.09	0.98	2.00			
ESSFmv 2	7.64	0.00	5.80	4.67	24.34	0.00	0.00
ESSFmv 4	6.15			7.70	0.00		
SBS vk	3.57	5.49					
SBS wk 1	3.77	0.00					
SBS wk 2	2.96	13.17	2.14	0.00			
SBS mk 2	0.18	0.00					
BWBSwk 1	5.73		10.09	4.81	1.05		4.81
BWBSwk 2	2.40			8.56	0.00		
BWBSmw 1	1.27		6.09	3.07	0.05	2.53	2.03
BWBSmw 2	2.21				0.00		

Table 3: Example of regional context summary of conversions by relevant ecosection and BEC variant. In this case conversions are primarily agricultural clearing, urban areas, coal mines and clearings related to the oil and gas industry (area near Chetwynd, BC).

BEC Units		Ecosections					
		Hart Ranges	Hart Foothills	Peace Foothills	Halfway Plateau	Peace Lowland	Kiskatinaw Plateau
Total BC Conversions %		0.03	0.88	0.14	11.08	38.77	5.34
AT p	0.02	0.00	0.74	0.00			0.00
ESSFwk 2	0.01	0.02	0.00	0.00			
ESSFmv 2	0.40	0.00	0.73	0.00	0.00	0.00	0.07
ESSFmv 4	0.00			0.00	0.00		
SBS vk	0.38	0.00					
SBS wk 1	0.59	0.00					
SBS wk 2	0.24	0.27	0.33	0.14			
SBS mk 2	0.33	0.00					
BWBSwk 1	0.33		0.12	0.00	0.33		0.42
BWBSwk 2	0.85			0.55	1.06		
BWBSmw 1	16.45		3.97	1.09	13.66	38.82	7.70
BWBSmw 2	0.12				0.00		

5.0 Guidance on Environmental Risk Assessment

Relevance: Criterion 6.1 and Principle 9

This document outlines an approach to environmental risk assessment (ERA) intended to assist managers in meeting requirements under Criterion 6.1. Environmental risk assessment may also be useful in evaluating the effectiveness of measures for maintaining or restoring conservation attributes in High Conservation Value Forests under Principle 9. ERA is part of planning for ecosystem-based management, and the following sections should be understood within this broader framework (see Guidance section 4.0). Further information on the use of Range of Natural Variability can be found in Guidance Section 6.0. This piece has two parts –

- An overview of Environmental Risk Assessment
- Using the Range of Natural Variability (RONV) as a base case in ERA

5.1 Environmental Risk Assessment

Criterion 6.1 refers to the need for completion of environmental impact assessments prior to the commencement of site-disturbing operations. Indicators 6.1.7 - 6.1.10 ensure that particular steps have been taken by the manager to meet Criterion 6.1, including: the establishment of a base case against which to assess existing and/or projected impacts (i.e. the “range of natural variability” or RONV); the completion of an environmental risk assessment of the proposed management plan and its projected outcomes (i.e., future desired conditions); and utilization of the results of the assessment in management plan revisions and implementation of operational plans.

The BC Ministry of Environment Lands and Parks recently published a document outlining a framework for completing an Environmental Risk Assessment (MELP 2000), which is compatible with meeting the Indicators under Criterion 6.1. The following sections have been adapted and excerpted from the MELP document and an application of the MELP approach (Utzig and Holt 2002a). The complete MELP document is available in Adobe Acrobat from the MELP website at: <http://wlapwww.gov.bc.ca/habitat/>

What is ERA?

Assessment of the effectiveness of existing or proposed management regimes, environmental guidelines or policies is difficult due to the complex nature of the environment, long timeframes expected for response, the paucity of understanding of relationships between ecological variables and the lack of absolute thresholds. In an attempt to overcome these challenges, scientists have recently begun to employ an environmental risk assessment approach for evaluating effectiveness of management regimes in maintaining or restoring ecosystem integrity. This approach has been widely adopted in BC, and in North America (Morgan et al. 1994, Province of BC 1995; Haynes et al. 1996; Cissel et al. 1998; Cissel et al. 1999; Landres et al. 1999).

In the context of the FSC-BC Regional Standards, Environmental Risk Assessment is a process for estimating the likelihood or probability of an adverse outcome or event due to changes in environmental conditions resulting from management activities. The approach involves identification, analysis and presentation of information in terms of risk to environmental values

(e.g., ecosystem components, functions or processes). This information can then be used in planning and decision-making processes. ERA does not presume to provide all social and economic information relevant to making decisions, nor is the approach intended to supplant planning and management processes.

ERA is a flexible tool that can be applied:

- at a variety of scales and levels of detail appropriate to those scales (e.g., landscape to site-specific, appropriate to the uniqueness and sensitivity of the affected resources);
- for a variety of environmental issues (e.g., from wildlife to water);
- at various levels of funding (i.e., for quick overviews to in-depth comprehensive studies, appropriate to the scale and intensity of operations); and,
- for short, medium or long-term time scales.

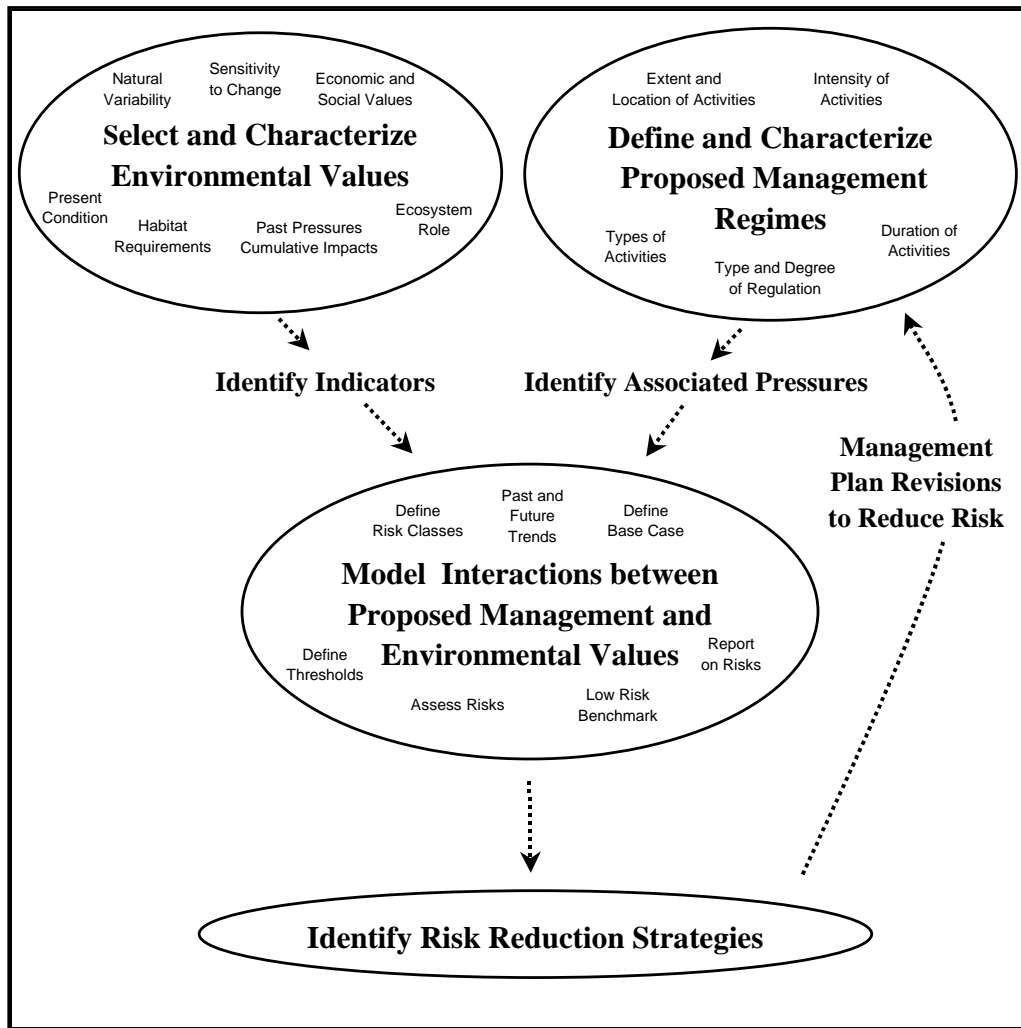


Figure 1. Role of Environmental Risk Assessment in comparing management regimes and revising management actions (adapted from MELP 2000).

At the heart of ERA is an assessment of the interactions between management regimes and environmental values. The assessment and reporting of risk to environmental values can then be used to identify risk reduction strategies. Subsequent revisions to management plans and actions will then — hopefully — be undertaken to reduce risk. The process by which ERA can be used to model and assess management regimes is depicted in Figure 1.

Figure 2 summarizes the conceptual framework for ERA — the assessment of risk to environmental values under past, present and predicted future conditions. The *base case*, (the basis for comparison for past, present and future conditions) is defined in terms of the *range of natural variability* (See also Guidance Material on Disturbance Regimes and the Range of Natural Variability). Current conditions are compared against the base case to establish the level of environmental risk that is due to the cumulative impacts of past management activities. The potential risks of continuing present management regimes can be estimated by determining the projected environmental conditions that would result from continuing present activities in the future. Projected future conditions from alternative management options can also be assessed within the same framework, allowing comparison between options. Assessment of environmental conditions and indicators is summarized in terms of a “risk index.”

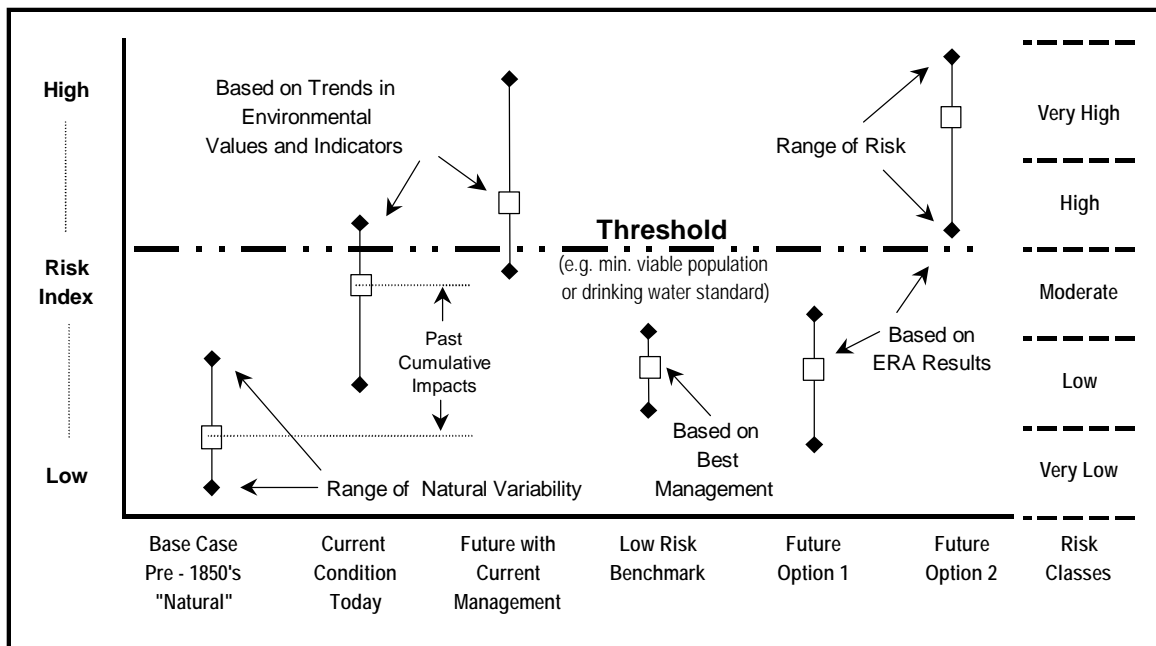


Figure 2. Conceptual framework for environmental risk assessment (adapted from MELP 2000).

In the context of FSC-BC, one of the main advantages of using the risk assessment framework outlined here is that it provides a systematic approach to assessing environmental risk, regardless of the specific ecosystem component, function or process under consideration, and can easily be adapted to a range of situations, including those where resources for the completion of an assessment are limited.

The six main steps in the ERA approach are listed below. The MELP report and Table 1 below provide more detail about each of those steps.

1. Establish the context for ERA.
2. Identify and characterize existing environmental threats and aspects of proposed management that may impact on relevant aspects of ecosystem integrity.
3. Specify environmental indicators for the ERA.
4. Characterize environmental trends and indicator relationships, and establish risk classes.
5. Evaluate potential changes to indicators and risks.
6. Report results and develop risk reduction strategies to incorporate in the management plan and relevant operational plans.

The appendices and exhibits in the report provide examples of various applications that may be directly relevant to managers applying for FSC certification in BC.

5.2 The Range of Natural Variability as a Base Case in ERA

The central tenet of the ERA approach is that the closer the current environment resembles the ‘natural’ environment, the lower the risk to the environment and/or specified environmental values. One of the critical steps in the assessment process is the definition of the base case for comparison. Failure to define the base case will result in uninterpretable environmental assessments (Holt and Utzig 2002; Beasely and Wright 2001). Where the effectiveness of an environmental policy or strategy is being tested, using a ‘natural’ or ‘environmental’ base case for comparison is key to identifying risks to environmental values (Holt and Utzig 2002).

The environmental base case is typically defined as the range of natural variability (Cissel et al. 1998; Landres et al. 1999). Comparing an indicator through time with the environmental base case allows overall risk to be assessed because human-induced stresses already existing on the landscape are factored out. Natural variability in ecosystem patterns and processes is central to the use of this concept, i.e. the environmental base case is not a single point, but a range. Interpretation of the implications of deviation from RONV has received much attention. In particular, focusing management on the rare or extreme ends of the range is unlikely to maintain ecological values (Landres et al. 1999). It has been suggested that a midpoint (mean or median) plus and minus a standard deviation is a more useful application of RONV. Where predicted future landscapes fall to one or other ends of the range, or outside of the range, associated risk can be interpreted. Where forest estate and/or habitat modeling is available, it is useful to compare current and future trends to the mean RONV, while taking into account deviation around the mean (see Guidance Material on Disturbance Regimes and the Range of Natural Variability).

Table 1. Summary of steps in environmental risk assessment (adapted from MELP 2000).

<i>Preparation</i>		
1	Establish the Context for ERA	<p>Identify decision processes that would benefit from ERA information (e.g., management unit or landscape level planning).</p> <p>Prepare a preliminary list of what may be at risk in the environment.</p> <p>Confirm the scope and scale of the items for risk assessment.</p> <p>Identify data inputs, assessment methods and presentation opportunities.</p> <p>Identify resources required for ERA (expertise, personnel, time, funding, scheduling).</p>
2	Identify and Characterize Key Environmental Pressures	<p>Determine pressures causing changes in ecosystem processes, functions or attributes that may directly or indirectly impact the environment:</p> <ul style="list-style-type: none"> - macro-scale (e.g., climate change, road density increases); and, - direct and indirect (e.g., point source pollution, fire suppression). <p>Review past and potential future management regimes that influence these pressures, and characterize the “cause-and-effect” relationships (to the extent possible).</p>
3	Specify Environmental Values and Indicators for the ERA	<p>Select environmental values from the preliminary list in Step 1 for risk assessment, based on consideration of:</p> <ul style="list-style-type: none"> - significance of ecosystem role (e.g., keystone species, critical habitats); - economic or social value; - likelihood for increasing risk and strength of relationship to pressures identified; - feasibility (e.g., availability of data, understanding of habitat requirements); and, - scale appropriate to the level of reporting or decision-making. <p>Determine indicators that best link pressures to changes in risk based on:</p> <ul style="list-style-type: none"> - strength of relationship between the indicator and risk to the environmental value; - sensitivity to change from human-caused management-related pressures; and, - availability of data. <p>Provide a rationale for the selected assessment items and indicators.</p>
<i>Assessment</i>		
4	Characterize Environmental Trends, Indicator Relationships and Establish Risk Classes	<p>Describe the range of conditions for the selected environmental values, including:</p> <ul style="list-style-type: none"> - the base case (i.e., the range of natural variability or “natural” conditions); - current condition, with a summary of cumulative impacts of past development; - predicted future status (mid/long term trends with current management); - low risk benchmark (i.e., conditions for sustained maintenance of the value); and, - predicted thresholds (e.g., minimum viable population, drinking water standards). <p>Choose methods for risk analysis based on ability to model relationships, track changes to indicators and describe risks to the environmental values being assessed.</p> <p>Define risk classes, including the types of risks and their specific ranges[(e.g., degree of change from base case).]</p>
5	Evaluate Changes to Indicators and Risks	<p>Assess the range of proposed development options. For each option identify:</p> <ul style="list-style-type: none"> - the intensity, scale and duration of the various management activities; - predicted future pressures resulting from those activities; and, - consequent changes in selected indicators linked to the values being assessed. <p>Assess the degree of risk (by class), at various future times, for the range of management options (including cumulative impacts).</p>
<i>Results</i>		
6	Report Results and Develop Risk Reduction Strategies	<p>Interpret the assessment results; identify low risk options and risk factors.</p> <p>Identify risk reduction strategies:</p> <ul style="list-style-type: none"> - identify actions to decrease pressures linked to high risks, and actions to support or enhance activities linked to low risks; and, - propose management strategies, policy options or development scenarios that could reduce or minimize risk. <p>Report the assessment results; including assumptions, limitations, uncertainty, and a full explanation of the consequences of risk levels.</p>

5.3 References

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6.0 Guidance on Applying Range of Natural Variability (RONV) to Forest Management

Relevance: Principle 6.

This guidance is intended to be considered in the context of the Guidance on planning and environmental risk assessment. Understanding the concepts presented here is integral to interpreting many of the indicators in Principle 6.

6.1 Range of Natural Variability

Variability and dynamic change in natural systems have emerged as important concepts in ecosystem management over the past decade (e.g., Swanson et al. 1994, Barrett and Barrett 1997), based on the recognition that the factors controlling ecosystem composition and function (e.g., climate, geologic processes, biota), and hence the ecosystems themselves, vary through time and space. However, each ecosystem tends to have a limited range of variation, which can be defined at various spatial and temporal scales (e.g., Wimberly et al. 2000, Hann et al. 1997). In the context of landscape planning and ecosystem management, the scope of variation is commonly referred to as the *range of natural variability* (RONV). Swanson et al. (1994, p89) describe RONV as: “the composition, structure and dynamics of ecosystems before the influence of European settlers..., characterized by: the range of ecosystem conditions such as the extent of particular seral classes of vegetation, and the disturbance regime (defined in terms of frequency, spatial arrangement, and severity of disturbances) that produced such conditions.” Landres et al. (1999) define natural variability as “the ecological conditions, and the spatial and temporal variation in these conditions, that are relatively unaffected by people.” The FSC-BC use of the term explicitly includes First Nations' historic management systems (e.g., burning) as an integral part of RONV. Other terms used to refer to similar concepts include natural variability, historical range of variability and reference variability (Landres et al. 1999).

Holling and Meffe (1996) point out the importance of retaining “critical types and ranges of natural variation in ecosystems ... management should facilitate existing processes and variabilities rather than changing or controlling them. By so doing, **ecosystem resilience** and the organizing processes and structures of ecosystems will be maintained, thus better serving not only the natural functions and species diversity of those systems but also the long term (although not necessarily short-term) interests of humanity.”

However, the application of RONV concepts in the context of ecosystem management is not without difficulties (Zielke 2000, Landres et al. 1999), the first of which is defining the time frame being considered. Consistent with Hann et al. (1997), in their assessment of the ecosystem components of the Interior Columbia Basin, the FSC-BC Standards have selected approximately the 2,000 years before European settlement as a reference period for RONV. Hann et al. (1997) report that temperate climates, ecosystems and their disturbance regimes have been relatively stable during this period, except for some cooling during the Little Ice Age from about AD 1450 to 1850. Given the relative longevity of individual trees and forest stands in some of the wetter parts of the province, this 2,000-year period may account for as few as one or two stand-replacing disturbance cycles for some areas (e.g., Gower 1993, Gavin 2000). Most research attempting to define the RONV in Western Canada and the Pacific Northwest has employed analysis of tree

rings, fires scars, stand age distributions and charcoal and pollen sediment profiles to define or model past disturbance histories (e.g., Wimberly et al. 2000, Brown and Hebda 1999, DeLong 1998, Cissel et al. 1999, Agee 1993, Rogeau 1996, Gavin et al. 1996 and 1997, Gavin 2000, Hallett et al. 1999, Hallett and Walker 2000). Although somewhat incomplete, the information base is constantly improving.

When applying this concept, it is assumed that native species that occur in these ecosystems today have evolved under habitat conditions defined by the range of natural variability. Therefore, management regimes whose objectives include the maintenance of landscape patterns and processes within RONV are more likely to maintain the habitat conditions necessary for the survival of the full diversity of native species (e.g., Bunnell 1995, Cissel et al. 1998, Swanson et al. 1994, Walker 1995). Given that changes in climate and stochastic disturbance events caused changes in ecosystems in the past, RONV is probably the best source of information for understanding how ecosystems will respond to proposed management regimes and future climate change and disturbance events (Landres et al. 1999, Millar and Woolfenden 1999).

In the context of the FSC-BC Standards (Indicator 6.1.7), RONV is primarily intended to be used as a method for establishing a reference, benchmark or base case against which to measure change and assess risks of future proposed management options (e.g., Hann et al. 1997, MELP 2000).

RONV also provides a broad set of goal posts to aim between (See Figure 1, e.g., Indicators 6.3.4, 6.3.7, 6.3.8, 6.3.10, 6.5.1). When RONV is used in the FSC-BC Standards with reference to a particular management outcome, it is used in combination with the phrase “**compatible with RONV** or **compatible with natural disturbance regimes.**” As defined in the Glossary, this means the desired management outcomes are similar in form and function, or at least not in conflict, with the conditions described in RONV, when considered at appropriate spatial and temporal scales (e.g., Hessburg et al. 1999). Although RONV defines a range of habitat conditions and spatial configurations that may have existed in the past, it does not precisely define what would be optimal conditions to maintain ecosystem integrity and meet social and economic objectives in the future. Using the concept of RONV does not imply that management must restore primeval forests. Conditions today are not necessarily the same as the past. In some parts of BC, modern development has altered natural disturbance regimes, caused the extinction and extirpation of species, brought in new diseases and invasive species, and likely contributed to significant climatic change yet to be realized.

In limited circumstances, future desired conditions may fall outside RONV (e.g., the plantations and some protected areas in Figure 1). However, acceptance of such a management strategy should be contingent on an assessment of the risks and costs that may be necessary to support the activity, and a carefully developed rationale that demonstrates how such a strategy is consistent with maintenance of ecological integrity and socially acceptable levels of risk (Landres et al. 1999). Management activities to support future desired conditions outside RONV should only occur where it is clear that such divergence would not compromise ecosystem integrity, function or resilience (Indicator 6.1.10).

Using RONV as an Indicator threshold for assessing the acceptability of particular management strategies offers a manager significant flexibility. This flexibility should not be misused. For example, a disturbance type that operates on return intervals at one temporal scale should not be used to justify using a management strategy that mimics that disturbance type at completely different time scales (Landres et al. 1999, DellaSala et al. 1995, Cumming et al. 2000). Natural variation in indicators such as seral stage distribution must be applied at appropriate regional and landscape scales, rather than on small areas where the variation will almost always range from 0-100%. Management strategies should attempt to fill a significant portion of the range of natural

variability, not concentrate management at one end of the range (See Figure 1). Management planning should also take into account the continued occurrence of stochastic natural disturbance events, especially extreme disturbances that occur only rarely (e.g., hurricanes, large fires in drought years).

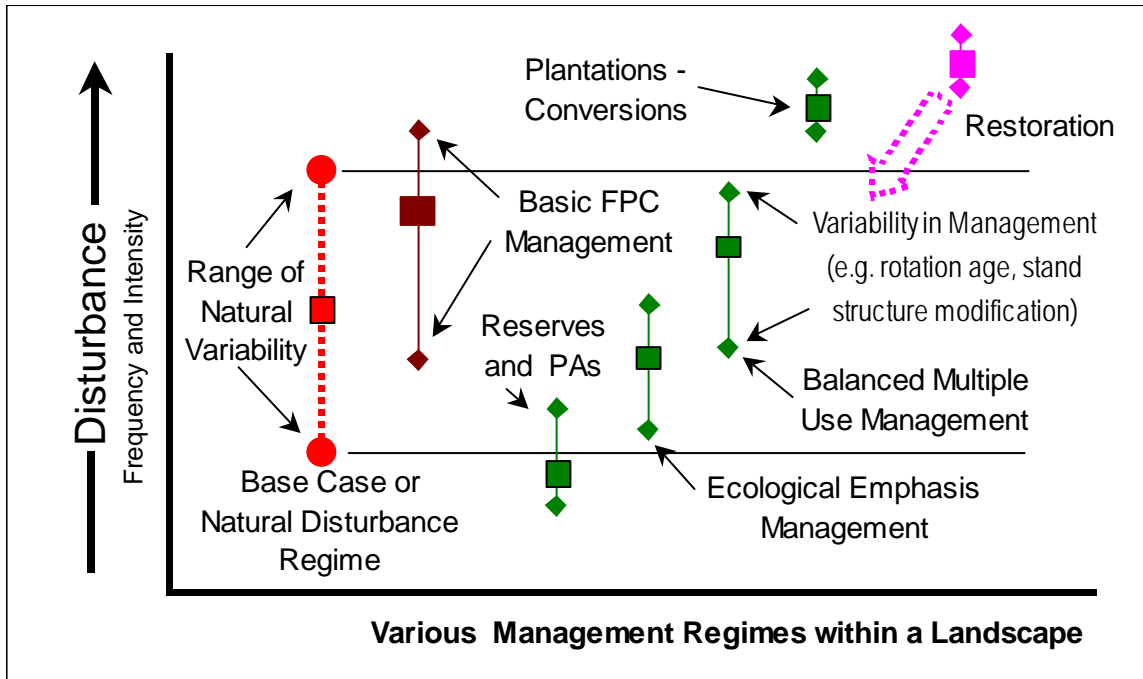


Figure 1. Various management regimes within the context of a natural disturbance regime and the range of natural variation.

An excellent example of utilizing RONV information within a management unit planning exercise is the landscape plan for the Augusta Creek area of the Willamette National Forest in western Oregon (Cissel et al. 1998). The authors summarized fire history information for the various ecosystems of the management unit, defined natural disturbance regimes, and then designed various management strategies compatible with the natural disturbance patterns. The results are then compared with a more traditional planning approach with regard to commodity outputs and ecological indicators. Another example of translating the application of RONV into simple concepts for application in the field is provided by Ehnes and Sidders (2000) in a report for the Manitoba Model Forest.

6.2 Natural Disturbance Regimes

The Forest Practices Code Biodiversity Guidebook (BC MoF and MELP 1995) defines five natural disturbance types (NDTs) for BC on the basis of type and relative frequency of disturbance. Because certification is focused on areas of productive forests, NDT5 (Alpine Tundra and Subalpine Parkland ecosystems) will not be discussed. Figure 2 illustrates the relationship of the NDTs and three broad classes of natural disturbance processes. Because the NDTs are broadly defined, there will be site specific variation within the NDTs, as well as transitional areas between them, hence the overlap in the figure.

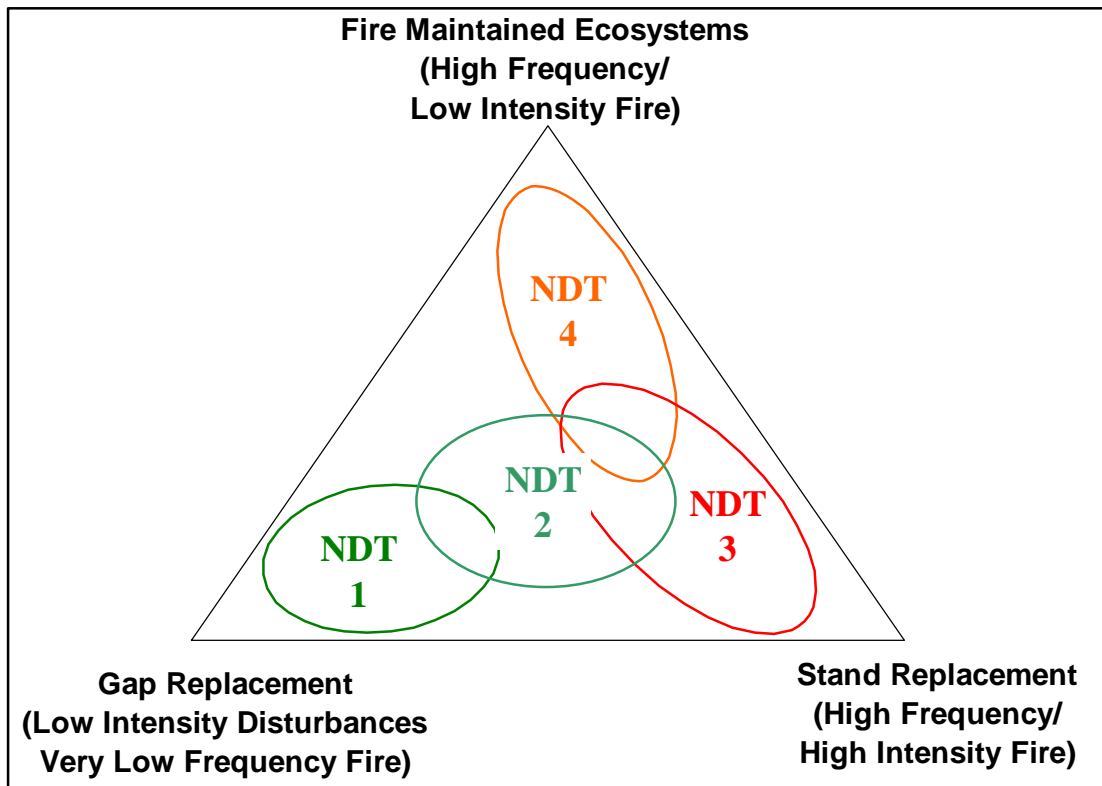


Figure 2. Disturbance regimes and their relationship to BC Forest Practices Code Natural Disturbance Types (NDT).

Definitions for each of the three types are provided below:

Gap-replacement disturbance regime: a disturbance regime where the dominant disturbance mechanism is the sporadic creation of small scale forest openings, often resulting from the mortality single trees or clumps of trees; stand-replacing disturbances are infrequent to rare (~250-1000+ year return intervals); the small openings can result from various disturbance agents (e.g., insects, root rot, wind, snow press); areas or landscapes subject to this regime are usually dominated by old forests of shade-tolerant species, where stand age often exceeds the age of the oldest tree; early or mid seral stands are relatively rare; generally equivalent to NDT1 of the FPC Biodiversity Guidebook; older forests of NDT2 (and in rare situations NDT3 and 4) are also dominated by gap-replacement disturbance.

Stand-replacing disturbance regime: a disturbance regime where the dominant disturbance mechanism is infrequent to frequent (~75-200 year return intervals) high-intensity crown fires or other disturbance factors (e.g., intense wind, disease, epidemic insect attack, landslides, floods) that result in mortality of the majority of the forest canopy (but generally not complete) over a short period of time; the disturbances can often be extensive in area (10,000-100,000+ ha); areas or landscapes subject to this regime are usually characterized by relatively even-aged forest stands of seral tree species (e.g., lodgepole pine, Douglas-fir, western larch); old forests of shade-tolerant species occupy a relatively smaller portion of the landscape, and are often in areas more protected from the major disturbance agent (e.g., wetter sites or northern aspects in fire-prone areas); generally equivalent to NDT3 of the FPC Biodiversity Guidebook; NDT2 generally includes areas where stand replacement intervals 150-250 years, with significant areas of older forests are dominated by gap-replacement disturbance.

Stand-maintaining-fire disturbance regime: a disturbance regime where the dominant disturbance mechanism is very frequent low-intensity fires (~5-100 year return intervals); areas or landscapes subject to this regime are usually characterized by fire-resistant herbs and shrubs (e.g., bunch grasses, willows, ceonothus) and open stands of large diameter fire-resistant trees (e.g. yellow pine, Douglas-fir, western larch); generally equivalent to NDT4 of the FPC Biodiversity Guidebook

Table 1 provides a summary of the potential mix of the various disturbance types that may occur for each of the NDTs (based on expert opinion), and the types of silvicultural systems that are potentially similar with regard to impacts on stand structural elements. The values in Table 1 provide a basis for designing management regimes appropriate to the natural disturbance types and range of natural variation that may be found on a management unit, but are NOT intended as specific recommendations for silvicultural planning. Indicators 6.3.10, 6.3.11 and 6.3.13 provide standards related to seral stage distribution and the implementation of stand replacement and gap replacement management regimes.

The Forest Practices Code Biodiversity Guidebook also defines four seral stages for each NDT based on stand ages, and then recommends specific distributions of those seral stages by NDT and/or biogeoclimatic unit, depending on an assigned Biodiversity Emphasis Option. While the concepts used by FSC-BC are similar, the Principle 6 requirement to maintain **forest integrity** means that recommendations related to the higher biodiversity emphasis options are more likely to be compatible with FSC requirements at the landscape level. In addition the Guidebook makes further recommendations on old seral representativeness, patch size, connectivity, species composition and wildlife tree retention (no direction is provided regarding retention of coarse woody debris). Although the Biodiversity Guidebook provides some general recommendations regarding the use of a mix of partial cutting and even-age silvicultural systems, there are no clear recommendations regarding an appropriate mix of silvicultural systems for each NDT. Given the assumptions about attempting to minimize negative environmental impacts by utilizing management regimes that are compatible with natural disturbance patterns, it also follows that the silvicultural systems employed in a given NDT should also vary accordingly.

The following three sections describe examples of possible approaches to management for each of the three disturbance regimes. It is important that success in emulating disturbance regimes be tested through an adaptive management framework rather than simply assumed. Anthropogenic disturbances often have effects that are different from those of natural disturbances. Experimentation and monitoring should be designed accordingly to continually improve emulation of natural disturbances.

Table 1. Estimated percentage proportions of the three main disturbance regimes within each FPC Natural Disturbance Type (NDT), and examples of silvicultural systems that may result in similar types stand structures and distributions. This table is NOT intended to provide specific silvicultural recommendations.

Disturbance Regimes	Gap Replacement	Stand Replacement	Stand Maintaining Fires
	individual tree death due to various causes—minor windthrow, spot fires, endemic levels of insects or disease	stand initiating events - crown fire, major windthrow event, epidemic disease or insect infestation, landslide	high frequency, low intensity ground fires
NDT	(%)	(%)	(%)
1	65-90	10-30	0-5
2	35-60	20-55	5-20
3	10-25	50-80	10-25
4	0-10	10-40	60-90
Predominant Stand Types and Structures	Multi-aged, complex canopied stands with significant presence of large older trees, large coarse woody debris, and canopy gaps at the single to few tree scale. Stands generally dominated by climax and/or long-lived tree species.	Commonly even-aged, simple canopied stands of seral species with moderately uniform to dense stocking; and/or multi-aged stands with two or rarely three distinct age classes and canopy layers reflecting survivors of the most recent disturbance events.	Open savanna stands dominated by large, fire-resistant veterans intermixed with dense thickets of young trees. Where fire has been excluded, the savanna stands are often infilled with a dense secondary canopy of even-aged younger trees.
Examples of Potentially Compatible Silvicultural Systems	Partial cutting with >75% basal area retention designed to maintain old growth structural attributes (single tree or group selection with entries every 100+ years); mixed with very limited areas of clearcut with retention (15-75%) and very long rotations (350-1000+ years)	Openings with variable retention (15-75%); with a range of rotation ages approaching the natural range of stand-replacement return intervals (i.e. not limited to economic or culmination rotation ages)	Partial cutting with large/old tree retention; mixed with minor areas of short rotation clearcut with reserves and/or variable retention (5-50%); controlled burning

6.2.1 Management for Gap Replacement

To be compatible with natural disturbance patterns, management units occurring within NDTs 1, 2 and 3 should include an appropriate portion of the management unit designated for long-term management that attempts to mimic gap replacement disturbance. In wetter areas gap replacement

operates on a more-or-less continuous basis, while in drier, warmer areas it may operate for long intervals between major stand-replacing events (centuries or even a millennium).

An example of a silvicultural system that is similar to disturbance regimes in areas dominated by gap replacement would be partial cutting that maintains most structural components of mature and old seral stands (e.g., 60-75% basal area retention favouring large stems) with long periods between entries (e.g., 100-200+ years). Areas managed for gap replacement are designed and located to meet specific biodiversity and habitat objectives (e.g., reserve buffers, landscape level connectivity). Ideally, they would include portions of the landscape and ecosystems that were often missed by stand-replacing disturbances (e.g., wet sites or north-facing slopes). Table 2 provides examples of retention levels that would maintain old and mature stand attributes following partial cutting to mimic gap replacement disturbance.

Table 2: Recommended average stand level retention levels within cutblocks in gap replacement management regimes (% of average basal area for natural mature and old stands on similar ecosystems, including retention of dominant and co-dominant trees in Indicator 6.3.9)

NDT 1		NDT 2		NDT 3		NDT 4	
ESSF	Other	ESSF	Other	ESSF	Other	PP	Other
70	75	65	70	60	65	Not Applicable	

6.2.2 Management for Stand Replacement

An example of a silvicultural systems that are similar to disturbance regimes in areas dominated by moderate to high intensity, stand-replacing natural disturbances would be variable retention applied in irregular blocks with variable sizes to maintain a natural pattern of patch size distribution. At a landscape level these areas should contain a wide range and broad distribution of seral stages. Stand structures that normally remain following stand-replacing events (e.g., snags, veterans, residual green tree patches, coarse woody debris) should be retained in appropriate amounts, and in varied configurations (patches and single trees). Table 3 provides an example of appropriate minimum retention amounts (based on data for wildlife trees present in natural stands). A significant portion of the area, appropriate to the ecosystems and disturbance regimes present, should have rotations similar to the modal stand-replacement interval of that disturbance regime. Increased areas with shorter rotations should be balanced by proportional increases in areas managed with rotations above the modal return interval, with due consideration of the context of the management unit.

Table 3: Recommended minimum stand level retention levels (m²/ha) within cutblocks in stand replacement management regimes (including retention of dominant and co-dominant trees in Indicator 6.3.9).

NDT 1		NDT 2		NDT 3		NDT 4	
ESSF	Other	ESSF	Other	ESSF	Other	PP	Other
12	18	8	12	4	5	1	3

6.2.3 Management for Fire-Maintained Ecosystems

To be compatible with natural disturbance patterns, management units occurring within NDT 4 and drier areas of NDT 3 (and rarely in NDT2) should include an appropriate portion of the management unit designated for long-term management that attempts to mimic high frequency, low intensity ground fires (e.g., Covington and Moore 1994). Under natural conditions, which sometimes included burning by First Nations' peoples, major portions of NDT 4 were characterized by open savanna stands of fire-resistant large old ponderosa pine, Douglas-fir and western larch, interspersed with thickets of dense younger stands. Selection harvesting of a cross-section of age and size classes, combined with controlled burning, would be an example of a silvicultural system suitable for maintaining this disturbance type. However, due to extensive fire control over the last few decades, many of these areas have in-filled with dense young stands and require restoration (over-grazing may also be an issue). Under these circumstances, to reduce fuel loading, partial cutting with emphasis on retention of widely-spaced large older stems may be appropriate. Further reduction of fuels immediately adjacent to the large veterans may be required prior to re-introducing fire.

6.3 Preparation of a RONV Assessment

Example of an Approach to RONV Assessment

Establishing an environmental base case based on RONV entails four broad components (listed below, adapted from Utzig and Holt 2002). The specific tasks and outputs of the approach are summarized in Table 2.

1) Characterization of the natural disturbance regimes

- Identify main natural disturbance types, relative amounts and distributions of each (gap replacement, stand replacement, fire-maintained) and the disturbance agents associated with each
- Summarize existing RONV information, including information on various disturbance agents (fire, wind, insects, disease, floods, landslides, snow avalanches, etc.)
- Fine tune FPC provincial NDTs to units appropriate to the management unit (see examples below)
- Describe the broader context of the study area
- Describe aquatic disturbance regimes (riparian ecosystems, landslides, sediment events, flood events)

2) Characterization of the landscape level implications of the disturbance regimes

- Landscape characteristics – variation by aspect, elevation, topographic position, geology, landform
- Reliability/ sensitivity analyses

3) Characterization of the ecosystem and stand level implications of the disturbance regimes

- Site/stand level variability within NDTs
- Description of stand structural characteristics

4) Relating the disturbance regimes and the range of natural variability for various ecosystem components to the selected environmental risk assessment indicators

- Coarse filter indicators (see examples below)
- Fine filter indicators

When describing and assessing the natural disturbance regime it is necessary to emphasize that each type of disturbance has four key aspects that must be evaluated: frequency, intensity, spatial extent and heterogeneity (Lertzman et al. 1997). For example, hurricane disturbances on the coast occur relatively infrequently, have a high intensity (kill most or all trees), have limited spatial extent and are relatively homogeneous (i.e. all trees in the impact area are broken off or tipped over). In contrast, fires in the dry interior are often frequent, moderate to low intensity (do not kill all trees), usually have a limited spatial extent (large ones are less frequent) and are relatively non-homogenous (i.e. they often include extensive missed areas and variable intensities).

Determination of the environmental base case is dependent on data availability. Where appropriate data are available, a quantitative environmental base case can be determined. Where data are sparse and do not adequately represent the range of natural conditions, natural disturbance patterns and processes can be qualitatively described and used as a qualitative environmental base case. In the examples presented below, return intervals for stand-replacing events, and percentage ranges for comparative purposes were based on a literature review and expert opinion due to a lack of sufficient data in the study area.

Defining an appropriate range of natural variability for any specific indicator is an important step in the process of environmental risk assessment. There is no single ‘correct’ time period for an analysis of range of natural variability (see discussion above). However, the function of a description of natural variation is to define the bounds of system behaviour that remain relatively constant over time (Morgan et al. 1994), and therefore the relevance of the description is decreased if the time period considered is too long (Landres et al. 1999). The spatial scale used for an analysis of range of variability is also critical, and should depend on the scale of interaction of the attribute being measured. Using the wrong scale can result in meaningless measures of variation. The scale used should depend on the scale at which the attribute functions, and on the management scale being considered.

Table 3 and Figures 3 and 4 provide examples of output from an Environmental Risk Assessment that has utilized RONV as a base case for the assessment.

Table 2. A summary of an approach to defining the range of natural variation suitable for use as an environmental base case (adapted from Utzig and Holt 2002).

Components	Steps and Tasks	Outputs
1. Natural Disturbance Characterization		
a) Identify FPC NDTs and disturbance agents	<ul style="list-style-type: none"> • Identify primary natural disturbance agents present in ecosystem – by Biodiversity Guidebook (BGB) NDT / variant (stand replacing and non-stand replacing) • Comment on other significant natural disturbance agents at work (secondary agents) • Compile summary overview of potential extensive natural disturbance agents not included by BGB NDTs • Describe the relative frequencies, sizes, patterns and types of non-stand replacing natural disturbances • Describe: types, frequency, distribution and changes in natural disturbance regimes due to past and current management 	<ul style="list-style-type: none"> • Mapped and tabular output of current breakdown of NDTs • written description of disturbance regimes and rationale related to potential modification of NDTs
b) Summarize existing RONV information	<ul style="list-style-type: none"> • Review literature and other existing data for information on fire return intervals, insect/disease outbreaks, flooding etc. • Review archival maps and data, and where available, First Nations and other sources of traditional knowledge regarding ecosystem and forest stand characteristics prior to European settlement and non-aboriginal management interventions • Where possible, reconstruct pre-management landscape maps 	<ul style="list-style-type: none"> • Written descriptions, possibly maps
c) Describe the broader ecosystem of the study area (i.e. the context)	<ul style="list-style-type: none"> • Look at management unit context in broader landscape – i.e. by ecoregion and BEC unit – identify other management regimes outside the unit - this will help in setting targets for further use in recommendations after analysis 	<ul style="list-style-type: none"> • Written description, possibly maps
d) Fine tune FPC NDTs	<ul style="list-style-type: none"> • Prepare maps demonstrating the spatial distribution of BEC units; site series (or SS groupings, landforms, drainage classes/moisture regimes); age classes/structural stages of forests; harvesting and fire history (based on TEM/PEM, forest cover and/or terrain/soils) • Analyze TEM/PEM, landform and forest cover data to identify areas of wet/ dry systems (see Site/Stand variability below) • Identify areas atypical of modal NDT disturbance regimes (warm aspects, steep slopes/ areas adjacent to BECs with higher/lower frequency fire regimes etc.) • Modify NDT lines and stand replacement return intervals, as appropriate, where justified by landscape/ landform/biotic features and summary from steps above (see also site/stand level variation below) • Map any necessary subdivisions of existing BEC units where potential significant differences in stand replacing return intervals are identified • Prepare a revised NDT map and accompanying table describing stand replacing disturbance return intervals, estimated natural seral stage distributions and rationale (see tables below for examples) 	<ul style="list-style-type: none"> • Maps and tabular summaries of existing NDT/BEC unit characteristics • Maps and tabular summaries of revised NDT characteristics • Written descriptions
2. Landscape Level Components		
a) Landscape Characteristics	<ul style="list-style-type: none"> • Based on estimated disturbance return intervals for revised NDTs and the exponential equation, predict the distribution of age classes, seral stages, and/or structural stages • Based on landscape reconstruction determine patch size parameters 	<ul style="list-style-type: none"> • tabular and/or graphic outputs • could demonstrate outputs by map in

Components	Steps and Tasks	Outputs
	by ecosystem and/or management units	finals
b) Reliability/ sensitivity analyses	<ul style="list-style-type: none"> • To recognize the potential for variation over time and demonstrate the potential for errors in the estimation of disturbance return intervals, provide a range of data outputs for calculations based on the return intervals (e.g. +/- 20% or +/-30%) • Consider analysis of potential trends that may effect disturbance regimes (e.g. increased or decreased fire control, climate change) 	<ul style="list-style-type: none"> • tabular outputs • could demonstrate outputs by map in finals
3. Site and Stand Level Components		
a) Site/stand level variability within NDTs	<ul style="list-style-type: none"> • Describe potential site level variation that may affect stand replacing disturbance return intervals within an NDT (e.g. wet/dry sites, localized aspect changes, cold air pockets, windthrow) • Describe stand variations that may affect disturbance regimes (e.g. differential tree spp susceptibility to insect/disease attacks, windthrow or fire behaviour– frequency of stand replacing crown fires vs. low-moderate intensity ground fires) • Analyze affects of site/stand variation on distribution of seral/ structural stages and provide feedback to NDT revisions where appropriate (e.g., increasing return interval in areas with a preponderance of wet sites and decreasing it where dry sites are dominant) • Create a table that qualitatively outlines severity/ size of disturbance and links to stand diversity (e.g., veterans, surviving islands or clumps within more extensive stand replacement areas) • Describe non-stand replacement disturbance patterns and their impacts on stand structure (see next step) • Describe aquatic system disturbance regimes and links to terrestrial disturbance regimes (loss of LOD, sediment inputs) 	<ul style="list-style-type: none"> • Written and/or tabular descriptions
b) Description of stand structural characteristics	<ul style="list-style-type: none"> • Based on available mensuration and ecosystem data, summarize stand structural attributes by site series or SS groupings and structural stages: e.g. density of large snags; density large trees, CWD, species composition/distribution • Use data to provide bounds for qualitative patterns identified in # 4 • Identify ranges using data, or by using means +/- X% (where feasible from theory or data) 	<ul style="list-style-type: none"> • Written and/or tabular descriptions
c) Successional pathways	<ul style="list-style-type: none"> • Outline successional pathways for units identified above – particularly endpoint – climatic/ edaphic climax • Describe stand level structural features based on the best available information • Consider interface between landscape and stand level parameters (implications of former on latter) , spp changes with succession, understory spp of significance, 	<ul style="list-style-type: none"> • Written and/or tabular descriptions
4. Relate Disturbance Regimes to Coarse and Fine Filter Environmental Accounts		
a) Coarse filter	<ul style="list-style-type: none"> • Describe how disturbance regimes are related to the occurrence and distribution of selected coarse filter indicators (e.g. old growth, snags, CWD, ECA for aquatic habitats) 	<ul style="list-style-type: none"> • Written and/or tabular descriptions
b) Fine filter	<ul style="list-style-type: none"> • Describe how disturbance regimes are related to habitat supply for fine filter environmental indicators (aspen snags for woodpeckers, willow brush fields for moose, LOD supply and sedimentation events for fish habitat) 	<ul style="list-style-type: none"> • Written and/or tabular descriptions

Table 3. An example of characterizing natural disturbance regimes in the East Kootenays of BC. Ranges selected were +/-20% for ESSFwm, wmu and wmp and +/-30% for other BEC units (adapted from Utzig and Holt 2002).

BEC Unit (subdivision)	Biodiveristy Guidebook		Environmental Base Case		
	NDT	Return Interval	Rtn Interval Mean	Range (+/-20/30%) Min. Max.	
IDFdm2	4	250	200	140	260
MSdk	3	150	150	105	195
ESSFdk(a)	3	150	160	112	208
ESSFdk(b)	3	150	175	122.5	227.5
ESSFdku	3	150	200	140	260
ESSFdkp	5	na	250	175	325
ICHmk1	3	150	160	112	208
ICHmw1	2	200	180	126	234
ESSFwm(a)	2	200	250	200	300
ESSFwm(b)	2	200	300	240	360
ESSFwmu	2	200	325	260	390
ESSFwmp	5	na	375	300	450
AT	5	na	na	na	na

Example rationale for fine tuning:

IDFdm2 - near northern limit, not in main RM Trench, but entrance to a valley; mainly PI stands and few dry sites - likely has more of an NDT3 disturbance regime

MSdk - likely typical NDT3

ICHmk1 - slightly wetter than MS

ICHmw1 - southern edge of range, located in Trench above IDF and MS, therefore likely a higher frequency of stand-replacing disturbances than typical NDT 2

ESSFdk(a) - northern limit of ESSFdk in Purcells; immediately upslope or near IDF/MS, but wetter than MS

ESSFdk(b) - northern limit of ESSFdk in Purcells; not immediately upslope or near IDF/MS, adjacent to or surrounded by wetter types (ESSFwm); or in an isolated smaller side valley

ESSFwm(a) - ESSFwm is on wetter side of NDT2's in general; (a)'s located on the transition to drier types and/or above or near MS

ESSFwm(b) - ESSFwm is clearly on the wetter side of NDT2's in general; (b)'s located on the transition to wetter types (ESSFwc4) and/or located in isolated side valleys

ESSF_u - transitional to parklands (Biod. Guidebook recommends 85% old in parklands)

ESSF_p - open parkland and krumholtz stands, low fuel loadings, few stand replacing fires (Biod Guidebook recommends 85% old in parklands)

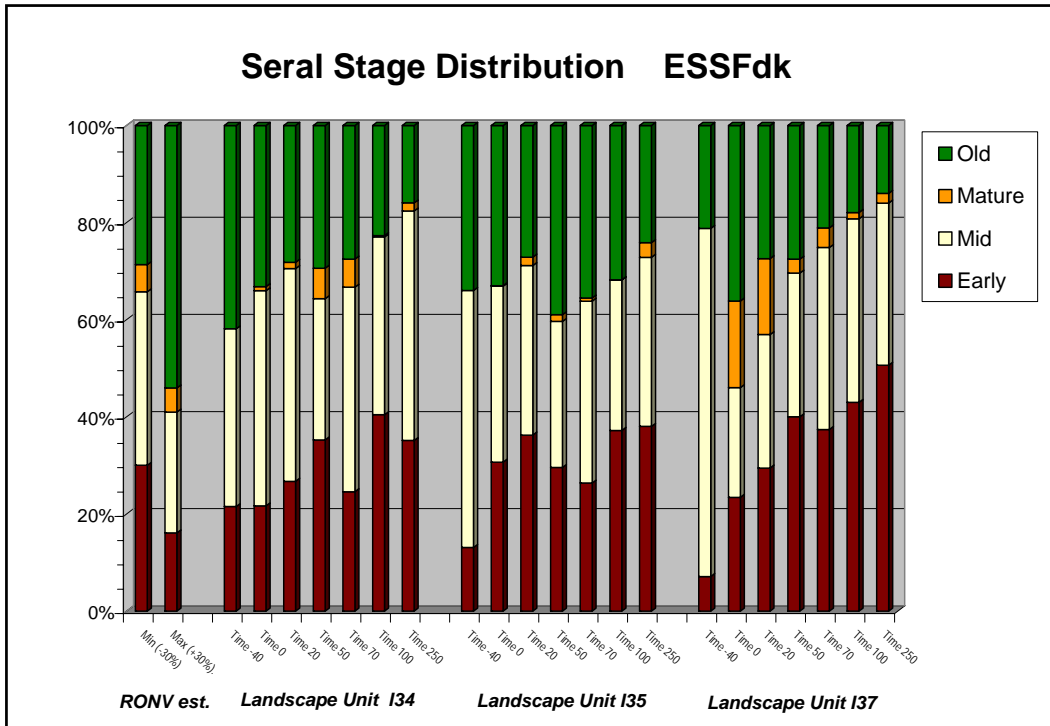


Figure 3. An example of comparing past, present and predicted seral stage distribution with the estimated range of natural variability (adapted from Utzig and Holt 2002).

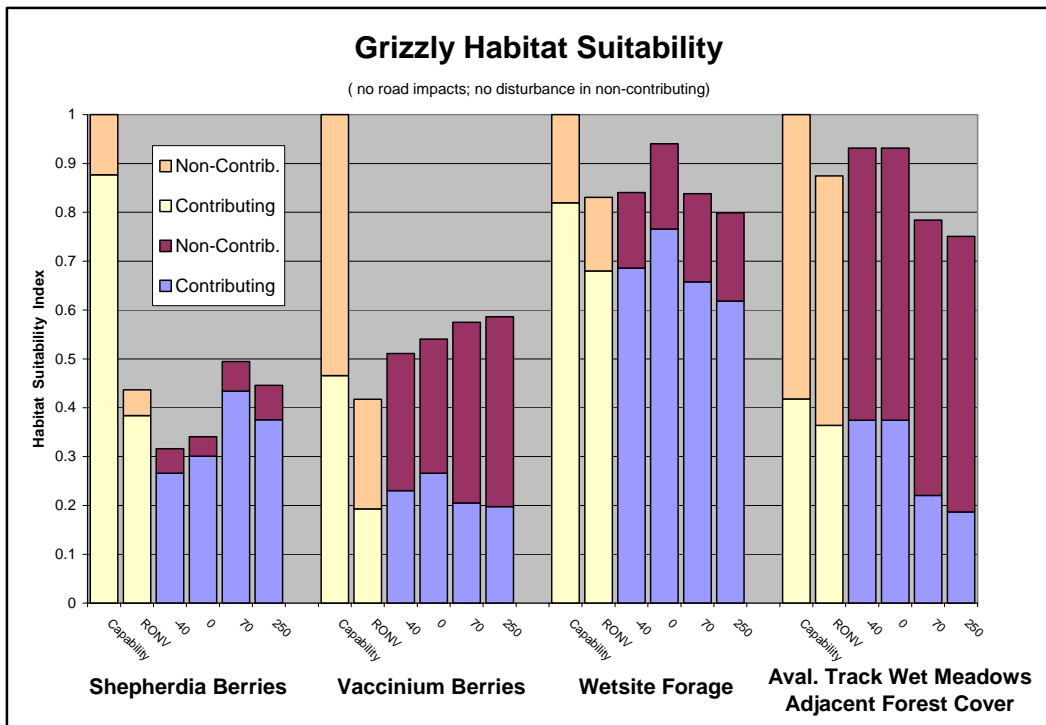


Figure 4. An example of using RONV structural stage estimates to assess predicted habitat supply for grizzly bears (adapted from Utzig and Holt 2002).

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7.0 Guidance Material for Small Operations:

FSC-BC Management Plan Framework for Small Operations

This guidance material describes a framework for a “FSC-compatible” Management Plan for Small Operations seeking FSC Forest Certification in British Columbia. This is NOT a required element of the standards, but is offered as information that may be helpful for managers preparing for certification. The framework was adapted from the BC Ministry of Forests’ “Woodlot License Plan” template (Draft 2004-05-28), with some references to information from the “Woodlot Management Plan” template (MoF 1998). The general outline and most of the blue text in the FSC framework described below has been extracted from the MoF Woodlot License Plan template. Any blue text from the MoF Woodlot Management Plan template is specifically noted as from that source. These MoF templates, along with templates for operational plans and accompanying instructions are available on the web at:

<http://www.for.gov.bc.ca/hth/woodlots/woodlot.htm>

To provide a more inclusive framework and make the MoF woodlot templates mesh better with FSC-BC requirements, some sections and subsections of the MoF Woodlot License Plan template have been re-ordered or renamed. In a couple of cases additional sections have been added, as well as notes indicating the information that should be included in each section. In terms of content, the vast majority of topics required for FSC-BC certification are already included in the MoF templates; however, the BC standards require a slightly different format in some cases, or a bit more detail. The intent is that woodlot managers can take an electronic copy of their MoF plans, cut and past them into this template, fill the few missing pieces and easily create an FSC-BC-compatible Management Plan.

Both the MoF templates and the FSC-BC Small Operations framework have been designed to cover the most complex situations. Most management units will not require all the sections listed, and the ones that do not apply can simply be eliminated.

The following background steps should provide all the basic information required to prepare a management plan from the template:

- collating the inventory and planning information for completion of the MoF Woodlot License Plan and MoF Woodlot Management Plan templates,
- completion of Tables 1, 2 and 3 of the Small Operations Toolkit for Principles 6, 9 and 10 (see Appendix 1 above),
- completion of any further assessments flowing from completion of Table 2 or 3,
- consultation with First Nations (as required under Principle 3), other tenure holders, local communities and other interested parties,
- calculation of an allowable annual cut, and
- development of management objectives, management strategies to implement them, and a monitoring plan to ensure their achievement.

WOODLOT LICENCE # [Enter #####]

WOODLOT LICENCE PLAN

First Term

[Enter start Month Day, Year], to
[Enter end Month, Day, Year]

[Enter Licensee Address]

[Enter City, Province Postal Code]

E-mail: [Enter E-mail Address]

Phone: [Enter Phone No.] Fax: [Enter Fax No.]

Authorized Licensee Signature:

[Enter Name]

[Print Name]

[Signature]

[Date]

District Manager Approval:

[Signature]

[Date]

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1.0 PLAN AREA

General description of the of location and boundaries of the Management Unit– includes a map in the report and/or appendix.

1.1 The Management Unit

General description of the Management Unit

Maps and Inventory Information

The section in blue below lists information required for a MoF Woodlot License Plan and the MoF Woodlot Management Plan. Additional requirements for meeting the FSC-BC standards, where applicable, that are not addressed in the MoF plan templates include:

- Ecosection within which the MU is located
- If present, location and type of any overlapping tenures
- If present, location and riparian classification of wetlands and marine shorelines
- If present, other domestic and irrigation watersheds
- If present, critical wildlife habitat, red- or blue-listed species habitat or rare ecosystems not designated as WHAs
- If present, unstable and potentially unstable terrain (Classes U, P, IV or V where mapped, or areas >60% slope)
- If present, areas identified as High Conservation Value Forests (HCVFs)
- If present, areas designated as FSC plantations or restoration areas

The format and presentation of map and inventory information should be appropriate to the scale and intensity of the small operations (i.e. hand-drafted maps and simple tables are acceptable for small operations).

Section 8 of the WLPPR describes the mapping and information that must be included in this plan. This information, as listed below, can be described in text and/or shown on maps. If an item on the list does not apply to the area under the plan, then there is no need to address it either on a map or in text. Where information is being shown on maps, the map legends should clearly reflect the information presented.

Required information:

- *Forest cover;*

Information from the MoF Woodlot Management Plan Template (Section 3.1)

The current forest inventory information for the Crown Land portion (Schedule 'B') and the private land portion (Schedule 'A') of the Woodlot Licence, are shown in Appendix I and are based on the _____ (date) inventory of Woodlot Licence # _____. This inventory will be updated as disturbances and other changes occur on the licence area. Updated information will be provided with the next revision to the Management Plan.

(All re-inventory will be done at the Licensee's expense and all work must be completed to the District Manager's Standards. To determine what standards the District Manager has set the Licensee must contact the Woodlot or Inventory Staff at the district office. If inventory data for the private land portion (Schedule 'A') is not available or of poor quality the collection of new information may be

required by the District Manager. The collection of inventory data by the Licensee is at the direction of the District Manager.)

- *Topography;*
 - *Location and riparian classification of streams and lakes (also required under MoF Woodlot Management Plan);*
 - *Identification of fish streams (**Note:** for areas outside of Community Watersheds, the riparian classification reflects whether the streams are fish streams or not, and no further identification is required. For areas within Community Watersheds, the fish streams must be identified separately.)*
 - *Biogeoclimatic zones and subzones*
 - *Public utilities (transmission lines, gas & oil pipelines, and railways)*
 - *Resource Management Zones, Landscape Units, Sensitive Areas (established under the FPC Act, and continued or established under the Land Act; these may be included in the objectives matrix)*
 - *Wildlife Habitat Areas (**Note:** a WHA is an officially designated area that is set aside to protect the critical habitat of rare and endangered species of wildlife)*
 - *Scenic areas (**Note:** Scenic Areas may have established Visual Quality Objectives (VQO) associated with them, such a “partial retention”, which are designed to protect the scenic values of the area. Where Visual Quality Objectives have not yet been established for a Scenic Area, the sensitivity class (1-5) can be used as guidance on the level of protection desired. A sensitivity class of 1 can be equated to “preservation” VQO, class 2 to “retention”, class 3 to “partial retention”, class 4 to “modification”, and class 5 to “maximum modification”. The sensitivity classes can be found on visual inventory maps, and a description of VQOs and management guidance can be found in the “Visual Impact Assessment Guidebook” (January 2001). For further guidance, contact the MoF District Office.)*
 - *Ungulate Winter Ranges*
 - *Community Watersheds or Fisheries Sensitive Watersheds*
 - *Community and domestic water supply intakes that are licensed under the Water Act and any related water supply infrastructures*
 - *Contiguous areas of sensitive soils*
 - *Existing roads;*
 - *Temporary or permanent barricades to restrict vehicle access;*
 - *Private property within or adjacent to the woodlot licence area;*
 - *Resource features other than wildlife habitat features, archaeological sites, and domestic water intakes licensed under the Water Act; and*
 - *Terrain mapping may also be required under the MoF Woodlot Management Plan*
- [Enter Details]

Natural Disturbance Regime Description

Provide a brief description of the natural disturbance regime of the Management Unit. This should include an indication of the main disturbance agents (e.g., fire, insects, wind), the size and frequency of typical disturbances and the stand types and stand structures that are typical legacies of such disturbances (as required in Indicator 6.1.2).

1.2 The Management Unit Context

Provide a general description of the context of the Management Unit in terms of the locations of surrounding communities, surrounding land use patterns (e.g., private land, protected areas, forest tenures and intensity of management, agriculture, other land uses, etc.; as required in Indicator 6.1.1). If useful, include a context map in the report and/or appendix.

Provide information regarding the percentage of provincial protected areas by BEC unit and protected areas for each BEC unit in the applicable ecosection should be summarized here.

2.0 Management Unit objectives

2.1 Government Objectives

For FSC-BC purposes the objectives that pertain to the Management Unit should be in the main document.

A listing of government objectives is included in the Appendix.

Include in the Appendix a copy of the Objective Matrix received from the MoF.

This matrix identifies all of the official government objectives that pertain to the woodlot licence area, and you must ensure that this WLP is consistent with those objectives.

2.2 Other Objectives

Describe other management objectives that may be additional to Government objectives (e.g., objectives flowing from public input, First Nations agreements, or HCVFs if present).

May include some of the licensee's goals and commitments – Sections 1 and 2 of the MoF Woodlot Management Plan.

3.0 Management Strategies

May include some information from the licensee's goals and commitments – Sections 1 and 2 of the MoF Woodlot Management Plan.

3.1 Protected Reserves

The section below describes MoF Woodlot requirements for describing areas where timber harvesting will be avoided. In addition to meeting those requirements, if required, describe the relationship of any reserve areas to meeting reserve requirements for Criterion 6.4, First Nations consultation, and the presence of HCVFs under Principle 9.

Areas Where Timber Harvesting will be Avoided

Describe where and for what reasons timber harvesting will be avoided over the term of this plan. The prescribed reasons are specified in WLPPR s.8(3), and pertain to protecting resource features, addressing interests of private property owners or aboriginal peoples, and managing resource values. You should also show these areas on the map.

Some examples of such areas are: riparian reserve zones, nesting sites of rare or endangered birds, areas of particularly sensitive soils or steep slopes where you will not harvest, recreation sites and trails, areas that will be left to protect scenic values, and areas that you will keep intact to satisfy concerns of neighbouring property owners.

[Enter Details]

3.2 Other Management Zones

If present, describe other management zones such as HCVFs, restoration areas or plantations (Indicator 6.3.1, Criterion 6.10 and Principle 10). Any stand level management strategies that will be implemented in these zones should be described in the next section.

High Conservation Value Forests

Restoration Areas

Plantations

3.3 Stand Level Strategies for Implementing Management Objectives and Protecting Non-timber Values

The sections in blue below are MoF woodlot requirements for describing stand level strategies, including how MoF performance requirements will be met. The MoF management plan categories cover off many of the FSC management plan requirements. To make the MoF woodlot template mesh better with FSC-BC requirements, some subsections have been re-ordered or moved from one section to another. In a couple of cases additional sections have been added, as well as notes indicating the information that should be included in each section.

May include some information from the licensee's goals and commitments – Sections 1 and 2 of the MoF Woodlot Management Plan.

Stand Level Management and Natural Disturbance Regimes

Briefly describe how stand level retention strategies are compatible with natural disturbance type(s) within which the management unit is located, and stand structural attribute requirements under Criterion 6.3

Areas Where Timber Harvesting will be Modified

Where applicable, describe how these stand level strategies will meet requirements for other wildlife habitat requirements for red- or blue-listed species under Criterion 6.2, other requirements for stand retention under Criteria 6.3 and 6.5, or maintaining or restoring conservation attributes associated with High Conservation Values identified under Principle 9.

Describe where and for what reasons timber harvesting will be modified. The prescribed reasons are specified in WLPPR s.8(3) (same as above for where harvesting will be avoided). You should also show these areas on the map.

Some examples of such areas are: riparian management zones, areas with sensitive soils that will require different harvesting and road building techniques, scenic areas where harvesting will be modified, Mule deer winter range, and Community Watersheds.

[Enter Details]

If applicable, stand level strategies in: High Conservation Value Forests, Restoration Areas and/or Plantations

Protecting and Conserving Cultural Heritage Resources

Where applicable, include any areas where special measures are required to meet First Nations' requests under Principle 3, or areas resulting from the identification Category 6 HCVFs under Principle 9.

WLPPR Section 9(1)(d).

Describe the consultation that was undertaken with first Nations in the preparation of this WLP, and the subsequent results or strategies that will be implemented to conserve and protect cultural heritage resources that are the focus of a traditional use by an aboriginal people and of continuing importance to them. These do not include

archaeological sites or other such features regulated under the Heritage Conservation Act. You should contact the District Manager or Aboriginal Liaison Officer for guidance and assistance.

[Enter Details]

Wildlife Tree Retention Strategy

Describe how the wildlife tree retention strategy will meet the requirements for stand level retention under Criterion 6.3.

WLPPR s.11

Note: the proportion of the Woodlot Licence area that is occupied by wildlife tree retention areas (8% or an alternate proportion) is specified in the “PERFORMANCE REQUIREMENTS” section of this plan.

In developing a strategy, you should refer to Section 2 of the “Schedule – Factors” found at the back of the WLPPR.

Guidance on developing a wildlife tree retention strategy can be found in the Biodiversity Guidebook (Sept. 1995). Local guidelines may also be available from the MoF District office or from the local Ministry of Water Land and Air Protection office.

In specifying your strategy, you may use the format shown immediately below, or you may present the information in a table format. An example of a strategy in table format is shown at the end of this section. If you use a table format, delete the individual sub-sections below and insert your table.

Performance Requirements

You have a choice of accepting the default performance requirements listed and described below (WLPPR Part 3), or proposing alternatives. If accepting the default performance requirement, check the “default” box.

If you are proposing alternative performance requirements, check the “alternative” box and describe the performance requirement. The proposed alternative requirements must be consistent with Section 13(2) of the WLPPR, namely that you must specify the location(s) where the alternative applies, and you must submit a rationale for how the alternative is consistent with the established objectives described in Section 9 of the WLPPR. In developing rationale, you should consider the “Factors” found at the end of the WLPPR. NOTE: The rationale should be submitted under separate cover and not included in this WLP.

Rationale for each alternative should include the following:

- Alternative proposed and how the alternative is consistent with the objectives set by government (described in Section 9 of the WLPPR);*
- Description of areas that the rationale applies to;*
- If available, citation of research or trials where the alternative has been applied;*
- Timeline for and performance measures of the alternative;*
- A mitigation plan in the event the measures are not achieved.*

Individual Wildlife Trees

a) Species and Characteristics:

Describe the species and characteristics of individual trees that will be saved from harvesting as wildlife trees..

[Enter Details]

a) Conditions Under Which Individual Wildlife Trees May Be Removed:

Describe the conditions or circumstances under which they may be removed.

[Enter Details]

b) Replacement of Individual Wildlife Trees:

Describe how individual wildlife trees will be replaced if they are removed under part b) above.

[Enter Details]

Wildlife Tree Retention Areas

Default: WLPPR s.52(1)

- The proportion of the Woodlot Licence area that is occupied by wildlife tree retention areas is a minimum of 8%.*

Alternative:

a) Forest Cover Attributes:

Describe the forest cover attributes of areas that will be saved from harvesting as wildlife tree patches.

[Enter Details]

b) Conditions Under Which Trees May Be Removed from Wildlife Tree Retention Areas:

Describe the conditions under which trees may be removed from within the wildlife tree patches.

[Enter Details]

c) Replacement of Trees Removed from Wildlife Tree Retention Areas:

Describe how trees removed from wildlife tree retention areas will be replaced. The intent is to describe how the integrity and usefulness of the wildlife tree patch will be maintained.

[Enter Details]

Below is an example of a Wildlife Tree Retention Strategy in table format:

<i>Species & Characteristics of Individual Wildlife Trees</i>	<i>Forest Cover Attributes of Wildlife Tree Retention Areas</i>	<i>Conditions under which Wildlife Trees (individual and from retention areas) may be removed</i>	<i>How removed Wildlife Trees (individual and from retention areas) will be replaced.</i>
<i>A range of trees and wildlife tree classes* representing the profile of species (Fdi, Pli, Sx, Bl, At, Ep) across the woodlot area will be selected for individual wildlife trees as well as trees that provide special wildlife habitat values, including nest trees, veterans and other large trees.</i>	<i>The riparian reserve zone along W5 wetland, aged 150 years, Sx 50%, At 30% and Fdi/Pli 20% is the only wildlife tree retention area within the woodlot.</i>	<i>Individual trees and trees within retention areas may be removed if they are considered a safety hazard. Individual trees and/or individual trees within retention areas may be removed if they are infested with insects which threaten the health of adjacent trees or stands.</i>	<i>Alternate trees meeting the characteristics and species of individual trees will be selected to replace individual wildlife trees. If the individual trees removed from the W5 reserve zone are of high habitat value (nest or roost trees), individual replacement wildlife trees outside the reserve</i>

			zone will be recruited.
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** refer to Appendix 6, Biodiversity Guidebook, Sept. 1995.*

Forest Regeneration Strategies

Describe regeneration strategies and how they are compatible with requirements under Criterion 6.3.

Stocking Standards

Default: WLPPR s.35(1)

- *Adoption of the stocking standards described in the MoF publication “Reference Guide for Forest Development Plan Stocking Standards”, as amended from time to time, which are in effect at the time of harvest for each Cutting Permit.*

Option: Use of the current stocking standards (as of WLP submission date) described in the MoF publication “Reference Guide for Forest Development Plan Stocking Standards”, the pertinent sections (including footnotes) of which are shown in the Appendix. These standards apply to the term of this WLP.

Notes:

a) Under the “Free Growing Guide” heading on the reference guide tables are shown the “earliest” and “latest” years from start of harvesting when a free growing assessment can be conducted. Under the WLPPR, it is only the “latest” column that applies. Thus, a free growing assessment can be conducted at any time before the latest date, so long as the trees have reached the minimum height specified in the adjacent column.

b) Under the WLLPR, there is no maximum density criteria specified in the stocking standards.

Alternative:

Stocking Information for Specified Areas

Under Sections 12 and 34(3) of the WLPPR, this WLP must specify stocking standards for areas where harvesting is limited to commercial thinning, removal of individual trees, or a similar type of intermediate cutting, and for harvesting special forest products. Such areas, which are essentially stocked after harvesting, are exempted from the requirement of Section 29(3) of the Forest and Range Practices Act to establish a free growing stand according to the normal stocking standards for even-aged stands specified in this WLP (shown in the “Stocking Standards” section under “Alternative Performance Requirements”). These exempted stands must conform to the separate stocking standards specified in this WLP for a period of 12 months after completion of harvesting.

The MoF publication “Reference Guide for FDP Stocking Standards” contains “Uneven-aged Stocking Standards” that can be adopted for this purpose. It is found on the MoF, Forest Practices Branch website. If you choose to accept these standards, check the box below. You may include a copy of the one-page document in the Appendix for your own information.

The Uneven-aged Stocking standards for single-tree selection, as found in the MoF Publication “Reference Guide for FDP Stocking Standards”, are adopted for specified areas (Section 12 WLPPR).

If you wish, you may design you own stocking standards for this purpose. Check the box below and attach a copy of your standards in the Appendix.

- The stocking standards for specified areas are found in the Appendix.*

Use of Seed

- Default: WLPPR s.32*
- *Adoption of Chief Forester's Standards for Seed Use (these Standards contain the seed transfer rules)*
- Alternative approved by the Chief Forester. A copy of the approved alternative must be kept on file.*

Coarse Woody Debris

Describe how the coarse woody debris management strategy is compatible with Criterion 6.3.

- Default: WLPPR s.54(1)*
- *Area on Coast – minimum retention of 4 logs per ha ≥ 5 m in length and ≥ 30 cm in diameter at one end.*
- *Area in Interior – minimum retention of 4 logs per ha ≥ 2 m in length and ≥ 7.5 cm in diameter at one end.*
- Alternative:*

Riparian Management

Describe the riparian management strategy, demonstrating that it is compatible with the requirements of Principle 6 Annex on riparian management.

Width of Stream Riparian Areas

- N/A*
- Default: as specified in Section 36(4) of the WLPPR.*
- Alternative:*

Width of Wetland Riparian Areas

- N/A*
- Default: as specified in Section 37(3) of the WLPPR.*
- Alternative:*

Width of Lake Riparian Areas

- N/A*
- Default: as specified in Section 38(2) of the WLPPR.*

Alternative:

Restrictions in a Riparian Reserve Zone

N/A

Default: WLPPR s.39(1)

- *Cutting, modifying or removing trees in a riparian reserve zone is limited to the purposes described in Section 39(1) of the WLPPR.*

Alternative:

Restrictions in a Riparian Management Zone

N/A

Default: WLPPR s.40(1)

- *Construction of a road in a riparian management zone is limited to the conditions described in Section 40(1) of the WLPPR.*

Alternative:

Management in Marine Shoreline Areas

Describe how management in marine shoreline areas is consistent with P6 Annex on riparian management.

Resource Features and Wildlife Habitat Features

Describe any measures to be taken to protect wildlife habitat associated with red- or blue-listed species under Criterion 6.2, High Conservation Value habitats recognized under Principle 9, and any other critical habitats identified under Criterion 6.1

Default: WLPPR s.56

- *ensure that forest practices do not damage or render ineffective a resource feature or wildlife habitat feature (WLPPR s.56).*

Alternative:

Detrimental Soil Disturbance

Describe strategies and measures that will be employed to keep soil disturbance in compliance with requirements under Criterion 6.3.

Soil Disturbance Limits

Default: WLPPR s.24(1)

- *8% of Net Area to be Reforested*

Alternative:

Permanent Access Structures

Default: WLPPR s.25

- *the maximum area occupied by permanent access structures is as follows:*
 - *Cutblocks ≥ 5 ha – 7% of cutblock area*
 - *Cutblocks < 5 ha – 10% of cutblock area*
 - *Total Woodlot Area – 7% of Woodlot Licence area*

Alternative:

Measures to Prevent Introduction or Spread of Invasive Plants

Exempted *If an exemption was received from the District Manager (WLPPR Section 78(1)(a), check the box. A copy of the exemption letter must be kept on file.*

Exemptions may be granted where there are no invasive plants in the Woodlot Licence area or on land immediately adjacent to it. The plants of concern are those listed in the Invasive Plants Regulation.

If no exemption received, describe the measures or activities that will be undertaken to prevent the spread of invasive plants.

Operational guidelines for prevention strategies may be available from the local MoF District office. Measures may include the following:

- *identifying high risk areas,*
- *minimizing soil disturbance,*
- *seeding disturbed areas in a timely manner with an appropriate mix of fast, early growing species of grasses and legumes,*
- *minimizing the transport of seed by removing burrs from clothing and equipment, and by checking the undercarriage of vehicles and removing weeds before leaving a weed infested area.*

[Enter Details]

Measures to Mitigate Effect of Removing Natural Range Barriers

Exempted *If an exemption was received from the District Manager (WLPPR Section 78(1)(b), check the box. A copy of the exemption letter must be kept on file.*

Exemptions may be granted where there is no range tenure over the Woodlot Licence area.

If no exemption received, describe the measures or activities that will be carried out to mitigate the effect of removing natural barriers.

The most common measure is erecting short drift fences to prevent the movement of cattle outside of range units or between pastures.

You may also describe how your activities will maintain natural barriers by not operating close to range unit boundaries and not building roads or creating cattle movement corridors through them.

[Enter Details]

Note: Only the performance requirements in Part 3 of the WLPPR for which an alternative can be proposed are shown in this Woodlot Licence Plan. The remaining performance requirements in Part 3 are not shown, nor are the performance requirements in Part 4.

Pesticide Use on the Management Unit

If applicable, describe pesticide use on the Management Unit and how it conforms to Criteria 6.6 and 6.7.

4.0 Monitoring Strategy

For each management objective, specify the indicator(s) that will be monitored to determine if the objective is being achieved. Describe how monitoring will be implemented, how monitoring information will be stored, and how that information will provide feedback to management plans.

5.0 Allowable Annual Cut Calculations

Describe the process used to calculate the annual allowable cut and the outcome, demonstrating that the process and outcome are in compliance with Criterion 5.6.

Proposed Allowable Annual Cut (AAC) for Woodlot Licence # ???? is:

The following is from the MoF Management Plan Template:

Schedule A lands:	m ³ per year
Schedule B lands:	m ³ per year

A Volume Calculation report has been attached in Appendix I using the model WOODLOT for Windows Version 2.1.

(A detailed description and rationale of the method of calculating the AAC, the data inputs, source of the data, data outputs, growth & yield tables generated, net downs used, management factors considered, etc. should be provided. In the case of an initial Management Plan where the advertised AAC is being accepted by the licensee and a conservative estimate of the AAC provided from Schedule A land is acceptable to the District Manager, the detailed information above may not be required. It is recommended that this is a separate report that would be attached as an appendix. The alternative is to provide the information within this section.

A digital copy of the data base used in the volume calculations should also be provided except for the initial Management Plan scenario outlined above. This detail is required so that the District Manager may make a determination of the AAC for the Woodlot Licence under Section 8(6) of the Forest Act.)

6.0 REVIEW AND COMMENT

If applicable, include any results of consultation with First Nations, as required under Principle 3, other tenure holders, local communities and other interested parties.

a) Advertising

A copy of the advertisement is included in the appendix.

Include a copy of the ad in the Appendix.

Section 17 of the WLPPR specifies that a notice must be published in a newspaper, and that an opportunity for review and comment must be provided for at least 30 days from the date that the notice first appears in the newspaper.

b) Referrals

Describe when and to whom this WLP was referred (if any), including any referrals to government agencies required by the District Manager (if any).

A copy of the draft WLP is normally sent to those parties who may be affected by operations on the woodlot, namely ranchers who have grazing rights in the woodlot licence area, to trappers and guide outfitters with an interest in the area, First Nations, major licence holders, and private landowners if the woodlot is immediately adjacent to private land. However, the only legal requirement for referrals is to specific government agencies, if directed by the District Manager.

[Enter Details]

c) Revisions made as a result of Comments Received

Describe what revisions you made to this WLP as a result of written comments received from advertising and referrals. Include a copy of all written comments in the Appendix.

[Enter Details]

APPENDICES

List all the items included in this appendix.

[Enter Details]

The following items should be included in this appendix:

- *Map. This is a mandatory content requirement of a WLP. The information that must be shown on the map, or otherwise described in the text of this WLP, is listed in section 8 of the WLPPR.*
- *The Objectives Matrix provided to you by the Ministry of Forests.*
- *(optional) Copy of all Exemptions received under sections 78 and 79 of the WLPPR.*
- *Stocking Standards that apply to this WLP (if the “Lock-in” option is chosen or alternatives are proposed; be sure to include both the appropriate tables and the pertinent footnotes).*
- *Stocking Standards for Specified Areas that apply to commercial thinning, removal of individual trees, intermediate cuttings, and harvesting special forest products (WLPPR Sections 12 and 34(3)). Note: if the Uneven-aged Stocking Standards for single-tree selection, contained in the document Reference Guide for FDP Stocking Standards, are chosen for this purpose, they need not be included in this appendix.*
- *Copy of the newspaper advertisement by which this WLP was advertised to meet the Review and Comment requirements in section 17 of the WLPPR.*
- *Copy of all written comments received during the review and comment period.*