

Deep Creek
Landscape Unit Plan

BULKLEY/CASSIAR FOREST DISTRICT

September 1999

Pre-amble

On April 21, 1998 the Bulkley Land and Resource Management Plan (LRMP) was approved by cabinet. At the time, MOF and MELP agreed that the best tool to implement the operational practices in the LRMP was through Landscape Unit Plans. As a result, the District Manager established and the DEO approved seven Biodiversity Objectives as landscape unit objectives on May 30, 1999. At the same time, their associated strategies were deemed District Manager (DM) Policy.

Based on LRMP direction, objectives for wildlife, fish, LRMP special management zones, timber, recreation, visual quality and range were developed, reviewed by the public, licensees, and branch staff with comments incorporated and were close to being ready for DM sign off by the beginning of June, 1999. On June 3, 1999 a memo regarding **Strategic Land Use Planning and Landscape Unit Planning** was released, signed by the Chief Forester and the Assistant Deputy Ministers of MELP, MEM, and LUCO. This memo states that Higher Level Plan Resource Management Zone (RMZ) objectives signed by cabinet would have to be established before objectives, other than the approved biodiversity objectives, could be established by the District Manager.

Higher level plan RMZ objectives are currently being developed. In the interim, in order to provide guidance in the development of operational plans, objectives for wildlife, fish, LRMP special management zones, timber, recreation, visual quality and range, and their associated strategies are now DM policy.

November 4, 1998

Re: Rationale for establishing Biodiversity Objectives in Landscape Unit Plans in the Bulkley TSA as Higher Level Plans under the Forest Practices Code of BC Act

The following provides rationale for my establishing objectives 1-7¹ in the following Landscape Units, as Higher Level Plan.

Babine	Chapman	Copper	Corya
Deep Creek	Blunt	Harold Price	Nilkitkwa
Reiseter	Telkwa	Torkelson	Trout Creek

The Bulkley LRMP, approved in March, 1998, by Government, is Ministerial Policy and was seriously considered. The LRMP represents an agreement negotiated by public and agency representatives using current information, scientific knowledge and agency policies. This agreement has been accepted by Government and will be delivered through Landscape Unit Plans which give clear direction to operational plans.

In establishing Landscape Unit Plan biodiversity objectives as Higher Level Plans, it is recognized that the information supporting them will change over time. It is fully expected that the objectives will need some form of revision based on those changes, in order that they continue to reflect current information, knowledge and policy. The Landscape Unit Plan is therefore recognized as a living document that will be subject to periodic revision as and when determined by the District Manager and the Designated Environmental Officer.

At this time, it is known that these objectives will be reviewed:

- In 1999, concurrent with the establishment of objectives for values other than biodiversity
- As more information and knowledge is gained about First Nations values and specific sites of interest through consultation with each First Nation group, at which time these Higher Level Plan objectives may need to be amended, or new objectives added.

In establishing objectives 1-7 (and especially objective #4), I have read and am mindful of the Deputy Minister's directive on achieving acceptable biodiversity impacts. It is believed that biodiversity objectives being established will not materially affect the timber supply impacts that were agreed to through the LRMP and accepted by Government during the LRMP approval process. The Bulkley TSA is, however, currently undergoing Timber Supply Review II, the results of which will provide further information on current timber supply impacts associated with biodiversity objectives 1- 7. Upon completion of TSR II, these objectives will be reviewed.

Original Signed

Guenter Stahl, District Manager
Bulkley/Cassiar Forest District

Original Signed

Reid White
Designated Environment Official

Note: These objectives have been renumbered such that they read 1.1 to 1.7

I approve of this rationale

Order to Establish the Deep Creek Landscape Unit and Objectives

Pursuant to Section 4 of the *Forest Practices Code of British Columbia Act*, I hereby order that the Crown land portion of the Thompson, Deep Creek, and Vanderven watersheds, including all waters flowing into Deep Creek to the boundary of the Bulkley Landscape Unit and the Bulkley Timber Supply Area will be established, as a landscape unit effective May 30, 1999. The objectives, which are numbered 1 to 7 and attached to this Order, will be established as landscape unit objectives effective May 30, 1999.

The boundaries of the Deep Creek Landscape Unit are shown on the 1:750,000 scale map, attached as Map 1.

note: Landscape Unit maps are available at a 1:50,000 scale at the Bulkley/Cassiar Forest District Office.

Original Signed November 4, 1998

Guenter Stahl, District Manager,
Bulkley/Cassiar Forest District

Date

File Number 12500-25/dee

Note: These objectives have been renumbered such that they read 1.1 to 1.7

Statement of District Manager’s Policy

Under section 41(1) of the *Forest Practices Code of British Columbia Act* (the “Act”) I am required to approve an operational plan or amendment that has been prepared and submitted in accordance with the Act, the regulations and the standards, and that I am satisfied will adequately manage and conserve the forest resources to the area to which it applies.

I have reviewed the strategies for objectives 1 through 7³ of the Deep Creek Landscape Unit Plan and believe they are relevant to, and will provide appropriate guidance in, the development of operational plans and amendments which pertain to the area covered by the Deep Creek Landscape Unit Plan. I therefore recommend that these strategies be considered and incorporated into operational plans and amendments where possible.

I will continue to evaluate each operational plan or amendment on its own merit prior to making a decision on whether or not it should be approved. To assist me in this process where an operational plan or amendment does not incorporate the strategies I will expect an adequate explanation of the circumstances which justify their omission.

Approval:

Original Signed November 4, 1998

Guenter Stahl, District Manager
Bulkley/Cassiar Forest District

Date

File Number 12500-25/dee

Note: These objectives have been renumbered such that they read 1.1 to 1.7

November 8, 1998

File: 47250-35/Bulkley

Guenter Stahl
District Manager, Bulkley/Cassiar Forest District
Bag 6000
Smithers BC V0J 2N0

Dear Guenter:

Re: Approval of Biodiversity Objectives for the Bulkley Landscape Unit Plans

I was pleased to receive from the district's landscape unit planning team the biodiversity objectives for the landscape units in the Bulkley TSA for my approval under section 5.18.3 of *Higher Level Plans: Policy and Procedures*.

It is my understanding that the Bulkley TSA has a cabinet approved Land and Resource Management Plan and that these biodiversity objectives are consistent with this plan.

As the designated environment official (DEO), and in accordance with Section 5.18.3 of *Higher Level Plans: Policy and Procedures*, and under section 4(2) of the *Forest Practices Code of British Columbia Act*, I declare my approval for the District Manger of the Bulkley/Casşiar Forest District to formally establish the biodiversity objectives numbered 1 to 7 for the following landscape units:

Nilkitkwa	Babine	Torkelson	Harold Price
Blunt	Chapman	Reiseter	Deep Creek
Corya	Trout Creek	Copper	Telkwa

Yours truly,

Original signed November 8, 1998

Reid White, R.P.Bio., P.Eng.

Note: These objectives have been renumbered such that they read 1.1 to 1.7

Regional Manager, Fish, Wildlife, and Habitat
Ministry of Environment, Lands and Parks - Skeena Region

Statement of District Manager’s Policy

Under section 41(1) of the *Forest Practices Code of British Columbia Act* (the “Act”), I am required to approve an operational plan or amendment that has been prepared and submitted in accordance with the Act, the regulations and the standards, and that I am satisfied will adequately manage and conserve the forest resources in the area to which it applies.

I have reviewed the following objectives and connected strategies of the Deep Creek Landscape Unit Plan and believe they are relevant to, and provide appropriate guidance in, developing operational plans and amendments which adequately manage and conserve the forest resources of the area covered by the Deep Creek Landscape Unit Plan:

Wildlife objectives	2.1 to 2.2
Fish objective	3.1
Timber objectives	5.1 to 5.3
Visual Quality objective	7.1

Accordingly, where an operational plan or amendment does not incorporate these applicable strategies, I will expect an adequate explanation of the circumstances which justify the omission of, or deviation from, any applicable strategy.

Approval:

Original Signed September 23, 1999

Guenter Stahl, District Manager
Bulkley/Cassiar Forest District

Date

File Number 12500-25/Dec

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Introduction

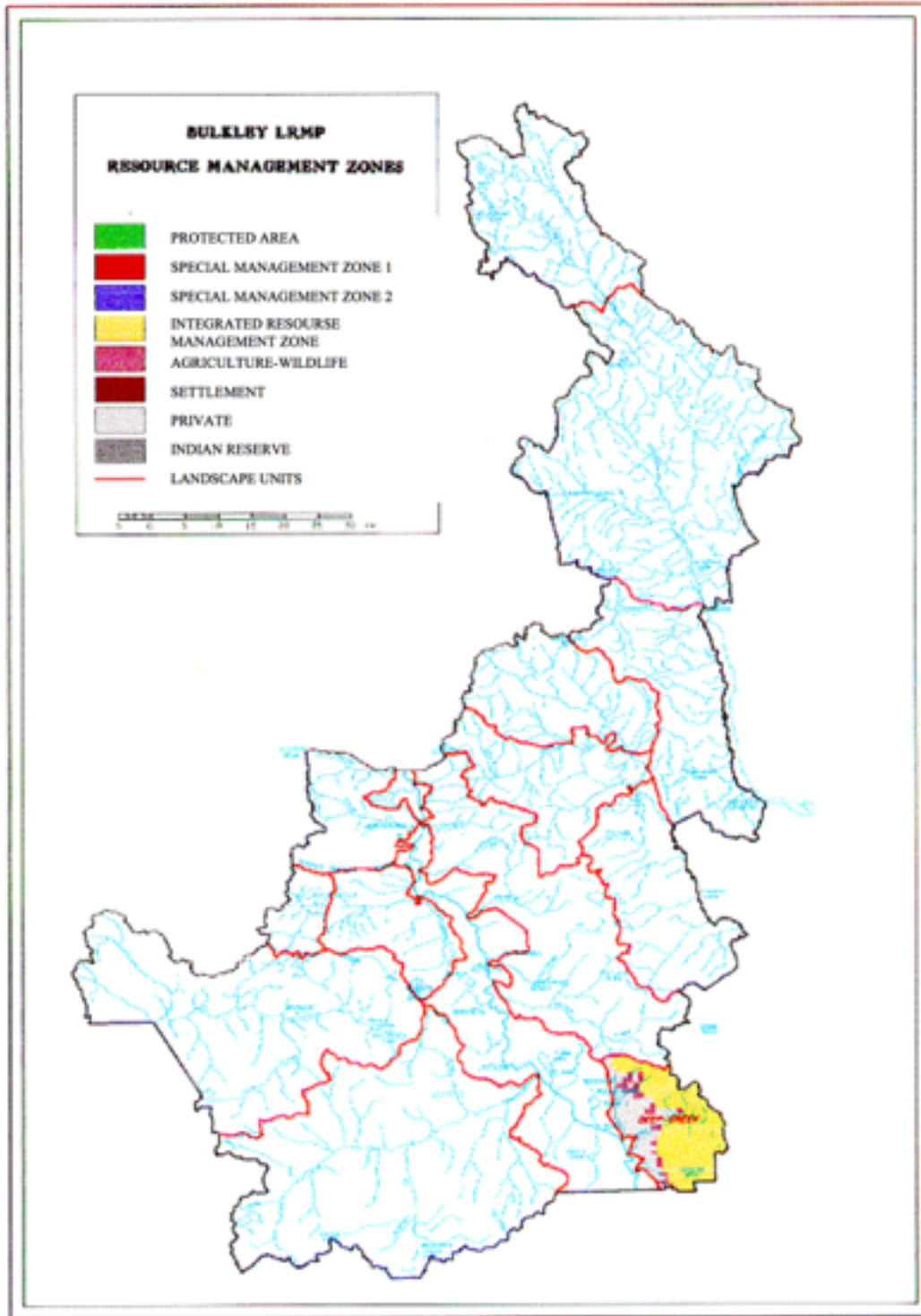
The Deep Creek Landscape Unit Plan (LUP) outlines the objectives and the strategies for the resource management of Thompson Creek, Deep Creek, Robin Creek, McDowell Creek, and Round Lake watersheds, plus Coppermine, McQuarrie and Farwell Lakes within the Bulkley portion of the Bulkley/Cassiar Forest District (Map 1) . These objectives and strategies have been developed by the Ministry of Forests (MOF), BC Environment (BCE), and operational foresters involved with managing the forest resources in this landscape. This plan follows Ministerial Policy as stated in the signed Bulkley Land and Resource Management Plan (LRMP) signed by the Chief Forester and the Prince Rupert Regional Landscape Unit (RLUP) planning strategy signed by the District Manager, Regional Manger, and Regional Director. Additionally, the Biodiversity Guidebook was used to guide the development of this LUP.

The Deep Creek Landscape Unit and its objectives are established by the District Manager of the Bulkley/Cassiar Forest District pursuant to Section 4.0 of the *Forest Practices Code of British Columbia Act* (the “Act”). Prior to establishment under the Act, the landscape unit and objectives will be approved by the Designated Environment Official for the Ministry of Environment, Lands and Parks. The objectives form the Higher Level Plan and provide direction for operational plans. The objectives for the Deep Creek Landscape Unit provide sufficient detail to provide direction to operational plans, yet remain flexible to allow creative solutions for meeting land management objectives. The objectives may be amended with appropriate rationale. The strategies presented in this plan provide detail on how these objectives can be met.

The March, 1996 timber supply analysis of the Bulkley LRMP was a major consideration used in bringing a consensus to the LRMP. The analysis showed that the cumulative timber supply impact resulting from the LRMP management direction was up to approximately 10% of the Bulkley Timber Supply Area (TSA). The impacts summarized in this analysis were considered closely when establishing the following landscape unit objectives. Where objectives were established to meet a special management intent and where this caused greater impact to the timber supply in one area, objectives were modified elsewhere in the plan to lighten timber supply impacts, always with the goal of maintaining the 10% (“LRMP budget”) accepted timber supply impact. In the future, when new objectives and/or additional resource constraints are incorporated into the LUP, the LRMP budget will be considered and the goal will be to attempt to keep cumulative impacts to less than 10% for the Bulkley TSA.

The Deep Creek Landscape Unit was assigned a low biodiversity emphasis based on analysis of timber, biodiversity, recreation, mining values and LRMP zonation.

Map 1. Landscape Units in Bulkley Timber Supply Area



The Planning Area

The Deep Creek Landscape Unit covers 24,013 hectares and has domestic water licenses on most of the major creeks.

This landscape unit comprises a small portion (3%) of the Bulkley Timber Supply Area operable landbase. Thirty percent of this landscape unit is considered operable forest, of which most is comprised of good quality sawlog stands. A large portion of this this landscape unit is comprised of immature forests resulting from recent fires. Only 2% of the operable forest has been logged and planted to date.

The relative importance for wildlife values is moderate in this planning unit. Grizzly bears frequent the eastern portion of this unit from Grouse Mountain to Mount McKendrick and moose enjoy the high quality winter range along the lower elevations. Wildlife are found in abundant numbers, as are fur-bearers; trapping is therefore active.

Important habitat types include streamside riparian areas and adjacent upland forests, lakeshore riparian areas, wetlands, dry southerly slopes, deciduous forest types, moist forest types, and avalanche chutes.

The relative importance for fisheries values are considered moderate for spawning, rearing, and water quality until a future assessment is complete. Some of the lakes contain sport fish and because access is difficult, they receive use by backcountry enthusiasts.

This unit is part of the traditional territory of the Wet'suwet'en chiefs Woos, Wah Tah Kwets and Smogelgem.

The main recreational features include a variety of creeks, lakes such as McQuarrie and Farewell, and scenic values from Highway 16. Trails include the Dome Mountain snowmobile trail and cabin, which are highly used, and a portion of the Canyon Creek cross-country ski trails. Hunting, ski touring, and snowmobiling are moderate uses within the unit.

The landscape unit is underlain by roughly equal portions of bedrock provincially assessed as having either extreme or fair probability of hosting mineable metal deposits. The lands with extreme mineral potential are found in the east and south portions of the unit, mostly in higher elevation areas where bedrock is locally exposed. All known mineral occurrences and reported exploration activity lie within the area of extreme mineral potential.

Mineral exploration is focused in the headwaters of Deep Creek and in a widespread area around Grouse Mountain. In both areas, mineral exploration activity dates back to 1915 and current mineral tenures cover active exploration areas. Roads accessing active tenures pass through private land, and as such, see very little public use. In the Deep

Creek area, mineral exploration was minimal and sporadic up to the late 1960's. From the late 1960's to the present, numerous exploration programs, including trenching and diamond drilling, have been conducted. Interest in the Grouse Mountain initially focused on copper-zinc-silver mineralization near Coppermine Lake, but is now spread over a broad area. Several open cuts and underground workings were developed and minor production of ore occurred in 1938 and 1940. In the mid to late 1980's, the entire mountain and side slopes were covered by mineral tenures actively being explored. Recent activity is lower, with mineral tenures only covering an area of known mineral reserves.

Objectives and Strategies

Biodiversity

The Bulkley LRMP is founded on the principles of biodiversity and sustainability. Key to delivering the biodiversity component is the ecosystem network (Objectives #1.1 and 1.2). The ecosystem network provides for old growth retention, protection of the diversity of ecosystems (including rare ecosystems) present in the Deep Creek Landscape Unit, forest interior conditions, and habitat connectivity. The ecosystem network is intended to be flexible and will be modified as new information and inventories become available. The ecosystem network will also accommodate new initiatives such as wildlife habitat areas and sensitive areas.

Further direction for biodiversity is accommodated through varying cutblock sizes (Objective #1.5), retaining old growth (Objectives #1.3 and #1.4), retaining attributes of older forest (Objective #1.7) and managing for a diverse timber landbase (Objective #1.6).

Core Ecosystems

Objective # 1

Maintain a representative cross-section of ecosystems, retain representative examples of old seral age classes (age classes 8 and 9), provide some areas with forest interior conditions, and retain representative examples of rare and endangered plant communities within the core areas indicated on Map 2.

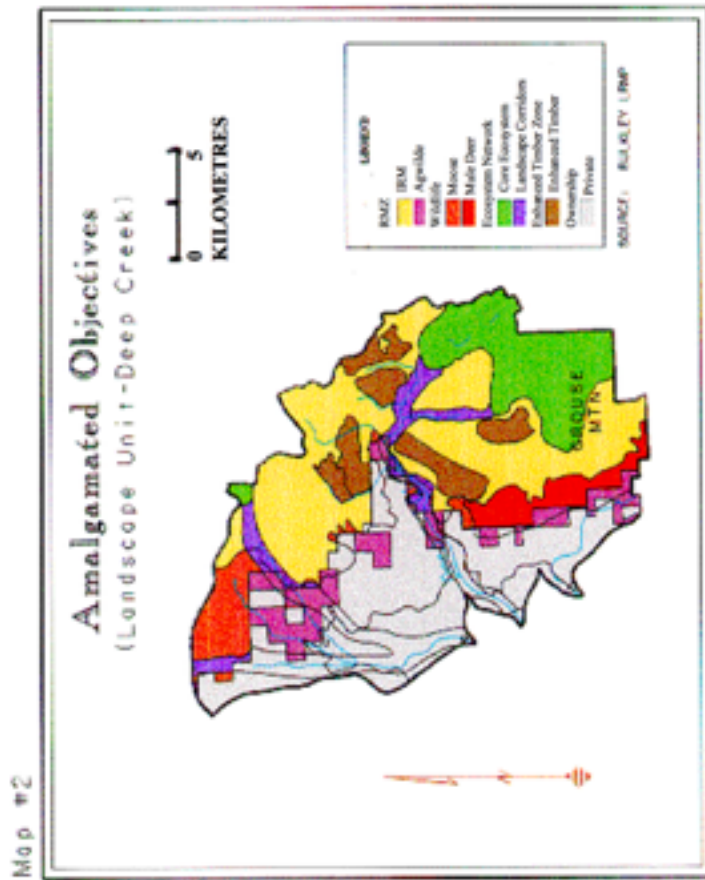
Strategies

1. Allow natural processes of insect feeding or disease to occur within core ecosystems unless infestations or infections threaten to spread into areas outside the core ecosystem. If intervention is required, then low impact treatments such as fall and burn or modified harvesting are acceptable.
2. Do not permit harvesting in core ecosystems unless harvesting is necessary for the following reasons:
 - 2.1. to address forest health problems (Figure 1), or
 - 2.2. to permit incidental tree cutting for mining and exploration purposes.
3. If harvesting does occur, no roads can be built (employ long skids or helicopter logging) and modified harvest practices such as single tree selection (to maintain old growth structure) or small openings (<2 hectares to create or maintain early seral conditions) should be utilized (Figure 1).
4. Where alternative access is not possible, roads can be built through a core ecosystem to avoid alienating operable timber outside the core ecosystem.
5. Do not issue new grazing opportunities or boundary changes of existing grazing tenures in core ecosystems.

6. Allow natural processes to occur within core ecosystems, including the natural succession of existing early seral areas.

Figure 1. Decision Matrix for Harvesting in Core Ecosystems

Map 2. Amalgamated Map



Landscape Corridors

Objective # 1.2

Maintain, within a managed forest setting, landscape corridors (Map 2) dominated by mature tree cover and containing most of the structure and function associated with old forest for:

- i. providing habitat connectivity within the landscape, and
- ii. permitting movement and dispersal of plant and animal species.

Strategies

1. Operational plans for harvesting within landscape corridors should consider the harvest pattern adjacent to the corridor. For example, clearcuts adjacent to the corridor will constrain harvesting strategies within the corridor. Conversely, modified harvesting adjacent to the corridor will increase the flexibility for harvesting in a corridor (Table 1).
2. Inoperable forested areas within landscape corridors contribute to landscape connectivity. This area will be considered when determining the amount of area to be harvested, and in analyzing the impacts to determine whether harvest plans meet the corridor objectives.
3. Access into landscape corridors should be temporary unless no other alternative is reasonable for ecological or economic reasons.

Table 1. Decision matrix for harvesting options in landscape corridors.

	Timber Type	Maximum Block Size Adjacent to Clear Cuts	Maximum Block Size Adjacent to Partial Cuts	Silviculture System/Mgt. Strategy	Objective	Adjacency
I	Pine (No understory)	1.5 ha. max. 0.3 to 1.5 ha.	3.0 ha. max. 1.5 ha. ave.	Patchcuts or Clearcut with reserve if operationally feasible (i.e., in larger openings)	Artificial Regeneration (Pine major)	No harvest until the block is 50 years old
II	Pine (Bl/Sx Pole size understory of good quality)	1.5 ha. - 3.0 ha. dependent on amount of pole size saplings (5 - 15 cm.)	1.5 ha. - 3.0 ha. dependent on amount of pole size saplings (5 - 15 cm.)	Overstory Removal with reserves where operationally feasible (i.e. in larger openings)	Natural Succession to Spruce/ Balsam stand	No harvest until opening provides sufficient forested attributes.
III	Hemlock Spruce/ Balsam (little or no understory)	Groups 0.3 - 1.5 ha. dependent on the snag component in the stand	3.0 ha. max. 1.5 ha. ave.	Patchcuts or clearcut with reserve if operationally feasible (i.e. in larger openings)	Mainly artificial regeneration Spruce/ Balsam	No harvest until opening provides sufficient forested attributes.
IV	Spruce/ Balsam with good quality varied stand structure	Single Tree or Group selection (0.3 to 1.5 ha.) maintaining approx. 70 % basal area . Single Tree if low snag %. Groups if high snag %.	Single Tree or Group selection (0.3 to 1.5 ha.) maintaining approx. 70 % basal area . Single Tree if low snag %. Groups if high snag %.	Retain approx. 70% of the unit. If the area outside the corridor is a partial cut, flexibility will be considered.	Natural Regeneration Site may be fully stocked after harvest .	Few constraints.

Seral Stage

Objective # 1.3

Achieve representation of ecosystems in old seral condition over time. Apply old seral retention targets as follows:

Table 2. Old Seral Stage Targets ⁶

NDT	BEC Subzone	Min Age	% Forested Area
2	ESSF	>250	>9
3	SBSdk	>140	>7
3	SBSdk	>120	>4
3	SBSmc2	>140	>11

Strategies

1. Consider old forested areas that are inoperable or in core ecosystems, SM1, or parks as contributing to old seral targets.
2. Show through analysis or mapping that old seral targets are met following planned forestry activities.

Objective # 1.4

Maintain the natural age class distribution across the landscape unit. Apply mature plus old retention targets as follows:

Table 3. Mature plus old forest targets

NDT	BEC Subzone	Min. Age	% Forested Area
2	ESSFmc	>120	>14
3	SBSdk	>100	>11
3	SBSmc2	>100	>11

Strategies

1. Consider mature and old forested areas in inoperable, core ecosystems, SM1, or parks as contributing to the mature plus old seral targets.

2. Show through analysis that mature plus old seral targets will be met following planned forestry activities.

Patch Size Distribution

Objective # 1.5

Attain a landscape pattern of development that represents the natural disturbance types in the landscape unit.

Strategies

1. Provide a range of opening sizes at the end of a rotation, as per Table 4.

Table 4. Percent of forested area by NDT

	Patch Sizes	Patch Sizes	Patch Sizes
	<40 ha	40-80 ha	80+ ha
NDT 2	30-40%	30-40%	20-40%
	<40 ha	40-250 ha	250-1000 ha
NDT 3	10-20%	10-20%	60-80%

2. Target larger (>60 hectares) early seral patches in Enhanced Timber Development areas.
3. The preferred order for achieving large cutblocks (>60 hectares) is:
 - 3.1. to amalgamate existing blocks;
 - 3.2. to enlarge existing cutblocks;
 - 3.3. to create new cutblocks greater than 60 hectares.
4. Retain structural attributes in or adjacent to cutblocks by retaining wildlife tree patches and leave areas. Give consideration to increased retention in larger openings.
5. For larger blocks (>60 hectares), consider a group of blocks within 600 metres and 20 years of each other to be a single patch. For smaller blocks (<40 hectares), consider a group of blocks within 100 metres and 20 years of each other to be a single patch. These guidelines may vary based on other considerations.
6. Size range of leave areas should be the same as that for adjacent openings.

Coniferous and Deciduous Diversity

Objective #1.6

Maintain a diversity of coniferous and deciduous species, across the Deep Creek Landscape Unit and throughout the rotation, that represents the natural species composition of each biogeoclimatic subzone.

Strategies

1. Site prescriptions should retain advanced regeneration, poles and saplings.
2. Where hemlock and balsam are not planted but are a primary or secondary species, as per the *Establishment to Free Growing Guidebook for the Prince Rupert Forest Region*, facilitate natural regeneration by ensuring these species are a component of wildlife tree patches scattered throughout larger openings.
3. Incremental silviculture activities should ensure that all existing ecologically acceptable species on site will be represented.
4. Where the preharvest stand has a major component (greater than 20%) of deciduous species, retain a portion of these species as either wildlife tree patches and/or reserve patches (wildlife tree patches can include the retention of single trees).
5. Where the preharvest stand had little or no deciduous component, but deciduous species have invaded naturally, design control measures so the presence of deciduous species will not be eliminated from the site while also recognizing that free-growing requirements must be achieved. Preferably, retain deciduous in a clumpy distribution.
6. Do not assist conversion of natural deciduous stands to coniferous species.

Stand Structure

Objective #1.7

Provide structural diversity within managed stands by retaining attributes of old forests such as coarse woody debris, standing dead trees, and standing live trees.

Strategies

1. Retain wildlife tree patches (WTP) containing suitable wildlife trees at the time of harvest and during silviculture activities. Locate wildlife tree patches to provide a range of old forest stand structural attributes such as standing dead trees, standing live trees, coarse woody debris, and root wads. Patches should be distributed throughout the block with distances between patches (or other suitable leave areas outside the block) not normally exceeding 500 metres.
2. Retain wildlife tree patches with each block, independent of silviculture system, and approximately in the percentages in Table 5

Table 5. Targets for Wildlife Tree Patch retention in cutblocks

BEC Subzone	% of cutblock to be retained as WTP
ESSFmc	1
SBSdk	1
SBSmc2	3

3. Allow natural processes to occur within wildlife tree patches unless infestations or infections threaten to spread to non-wildlife tree patch areas. Where intervention is required, treatment will retain a diversity of structural attributes or a suitable replacement wildlife tree patch will be located.
4. Where possible, plan wildlife tree patches:
 - 4.1. to retain deciduous as well as coniferous trees,
 - 4.2. to retain some large, old trees,
 - 4.3. to provide connectivity within the cutblock,
 - 4.4. to provide structure in riparian management areas, and
 - 4.5. in areas already constrained.
5. Retention of coarse woody debris outside identified wildlife tree patches, core ecosystems and riparian reserve zones should not exceed utilization standards.

Wildlife

Moose Winter Range

Objective # 2.1

Ensure forage is retained and available in identified moose winter range identified on Map 2.

Strategies

1. Relaxed stocking standards or increased free to grow windows should be considered to allow for deciduous forage in conifer leading stands.
2. Retain woody forage species (e.g. willow, dogwood, saskatoon, mountain ash, highbush cranberry, etc.) where not inhibiting crop tree growth or where they occur in and around riparian areas.
3. Maintain deciduous patches throughout larger blocks, particularly in locations where conifer establishment is poor or deciduous patches are dominated by high value forage species (e.g. willow, dogwood, saskatoon, mountain ash, highbush cranberry, etc.).
4. In large, existing cutblocks, leave or manually brush the deciduous component that is close to forested cover and away from roadsides.
5. Limit livestock grazing on shrubs in late summer, whether it be for range purposes or vegetation management.

Objective # 2.2

Provide for security, visual, thermal and snow interception cover within identified moose winter range shown on Map 2.

Strategies

1. Clearcuts should have a high edge ratio (perimeter to area) and retain reserves and unmerchantable trees to provide security cover.
2. Retain visual screening along roads and within blocks adjacent to roads to protect moose from view if blocks to be harvested contain high-value forage species (e.g. willow, dogwood, saskatoon, mountain ash, highbush cranberry, etc.).
3. Maintain visual screening along road right-of-ways (when accessible by four wheel drive) when spacing, pruning and/or brushing. Once the interior of the block offers visual cover, the buffers can be treated.
4. Locate roads away from riparian areas and natural openings. If operational constraints require roads to be located close to these areas, then provide visual screening to reduce vulnerability of moose in the winter and to avoid alienating the habitat.
5. Windrows and brush piles should be discontinuous to avoid constraining wildlife movement.

6. Maintain conifer groups in deciduous dominated stands.
7. Distribute harvest throughout the winter range to provide forage through a rotation.

Fish

Fish Habitat

Objective # 3.1

Retain structure within the riparian management zone to reduce the risk of windthrow to the reserve zone. Retain structure within the riparian management zone to provide shade and maintain natural channel and bank stability.

LRMP Special Management Zones

The Deep Creek Landscape Unit has no LRMP Special Management Zones within its boundary.

Timber

The Deep Creek Landscape Unit contains approximately 3% of the Timber Supply Area (TSA) contributing landbase.

The LRMP identified Enhanced Timber Development (ETD) areas within the operable landbase where the intent is to increase the available timber supply and to improve timber quality. Management of the timber resource is a high priority within these areas. Therefore, they are located where there is low conflict with other values and where there is high potential for timber growth (Map 2). It is anticipated these areas may provide a framework for an intensive silviculture strategy and that they will be targeted for available intensive management funding.

Timber Supply

Objective # 5.1

Produce a long term, secure supply of timber that is economically achievable, and ensure productive ground, in the timber harvesting landbase, is actively growing timber.

Strategies

1. Slow growing, poor quality balsam and hemlock stands on productive sites should be targeted for harvesting and replaced with thrifty growing managed stands.
2. All backlog Not Sufficiently Re-stocked (NSR) areas must be reforested as soon as possible.
3. Prescriptions will encourage a reduction in the time to regenerate harvested areas.

Objective # 5.2

Maintain the health and productivity of the timber resource.

Strategies

1. Salvage of damaged or diseased timber should occur as soon as possible in an economic and efficient manner according to objectives of the area.
2. Identify and use harvesting and silviculture techniques that limit the spread of forest disease and pests which reduce the value and volume of forest stand.
3. Results of annually monitored beetle activity shall be used to identify high priority harvesting blocks in five year development plans.

Enhanced Timber Development Areas

Objective # 5.3

Intensively manage the timber resource in all Enhanced Timber Development (ETD) areas shown in Map 2, to reduce the rotation and/or increase yield per hectare over time, in accordance with approved funding allocations

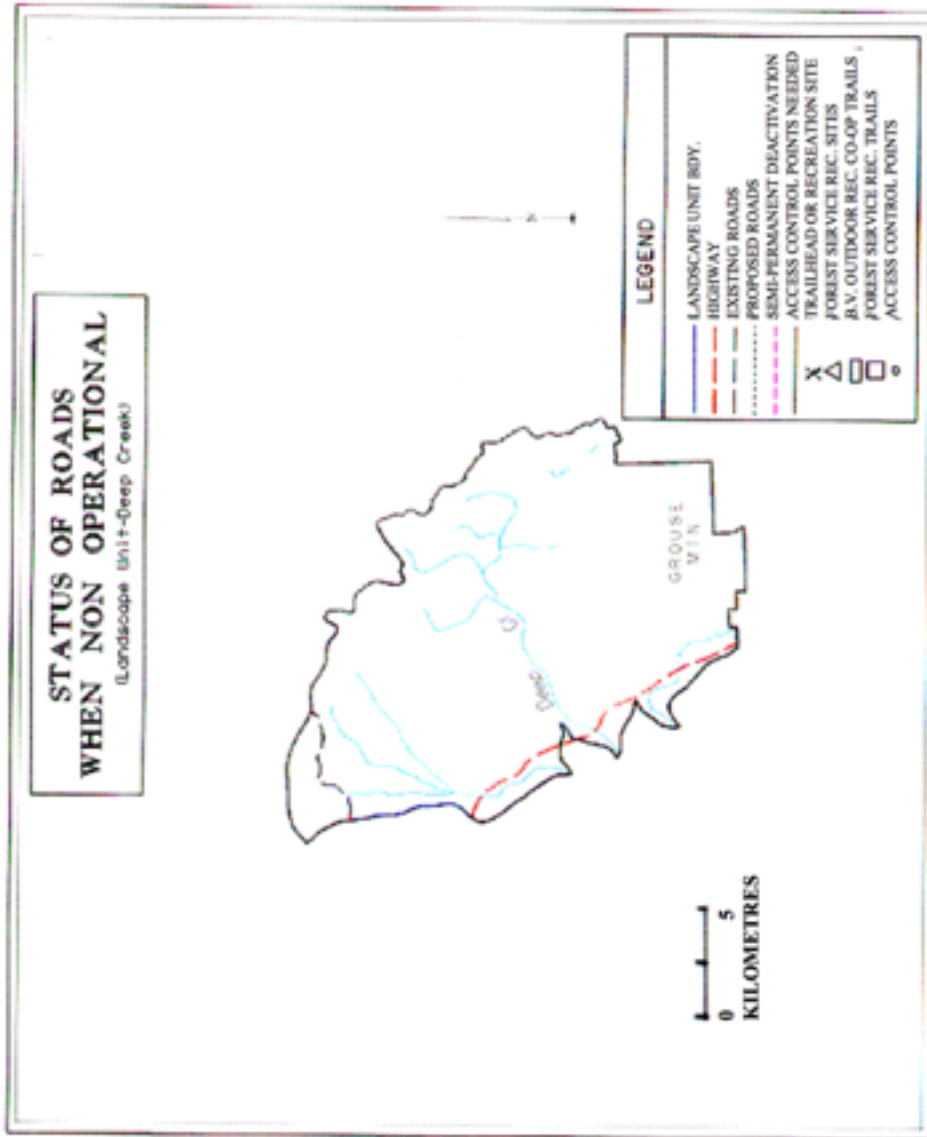
Strategies

1. Target ETD areas for some or all of the following intensive silviculture treatments:
 - 1.1. using genetically improved seed or superior planting stock;
 - 1.2. pre-commercial and commercial thinning;
 - 1.3. pruning;
 - 1.4. fertilizing; and,
 - 1.5. intensive brushing and weeding.
2. Uphold visual quality objectives where noted in ETD areas.
3. Identify high wildlife use areas (e.g. goshawk nests, mineral licks) at the stand level and either develop management techniques that maintain their specific values or consider for deletion from ETD area.

Recreation

There aren't any recreation objectives for this landscape unit.

Map 3. Status of Non-operational Roads



Visual Quality

Operational forestry in the Deep Creek Landscape Unit has been ongoing, starting in the 1940's with small portable sawmills. This type of harvesting created an uneven aged forest now suitable for partial cutting. Visual aesthetics in this unit are a moderate priority. The landscape unit has several large scenic areas visible from Highway 16.

The Bulkley LRMP states that the scenic resources in the district are critical to the viability of the tourism/recreation sector and to the quality of life of area residents. Applying creative block design and alternative silviculture prescriptions to create an interesting landscape is the preferred management strategy.

The LRMP recommends that the following scenic resources be addressed in the landscape unit plan as part of the normal planning process, with special attention given to the following: major corridors, recreation focus points, and specific viewpoints.

It is important to manage the visual resources from the viewpoints that were specified in the Bulkley LRMP (Map 4). Hence, visual quality objectives are being established for the scenic areas that were identified using visual landscape inventories (VLI) from those specified viewpoints.

Visual Quality Objectives (VQOs) are acceptable degrees of change from the natural appearing landscape caused by land-use alterations, such as logging or road building. Operational Plans such as Forest Development Plans and Access Management Plans must show they are consistent in achieving these VQOs.

Partial Retention

Objective #7.1

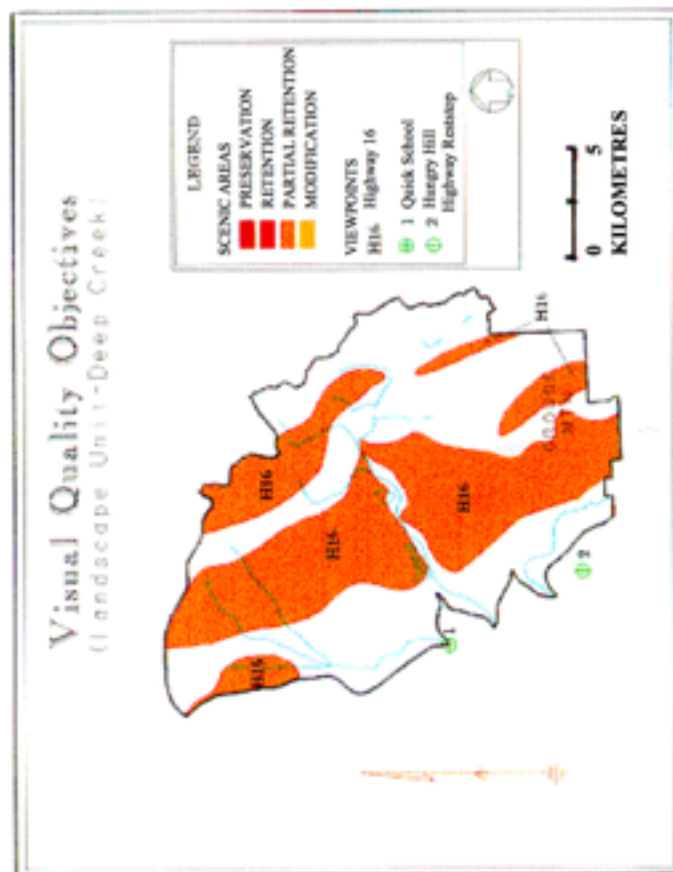
Forest management activities in partial retention areas, as identified on Map 4 may be noticeable but must blend well with the natural appearance of the landscape.

Strategies

1. Alterations must borrow from natural line and form to such an extent and on such a scale that they are comparable to natural occurrences.
2. Openings will exhibit elements of good block design including: strategic placement of leave trees and patches, feathered edges, and borrowing lines from the natural character of the landscape.
3. Alternative systems will be considered where stand structure is suitable.
4. Where visible openings are created, silviculture prescriptions will incorporate treatments to reduce the time to visually effective green-up (5 metres).
5. Select a technique (i.e. photographic manipulation or computer model (DTM)) and prepare a Visual Impact Assessment (VIA) for each design option. Consult the forest district if there is any doubt as to the technique necessary for a given operation.

6. VIA's must be done from viewpoints as identified on Map 4.

Map 4. Visual Quality Objectives



Access

Objectives and strategies relating to access are in various sections throughout the Deep Creek Landscape Unit Plan. Table 6 is a comprehensive list of all objectives and strategies relating to access in the Deep Creek Landscape Unit.

Ministry of Energy and Mines must be consulted on permanent deactivation plans at the forest development planning stage, to determine current use under permit for mineral exploration and development.

Table 6. Objectives and Strategies Relating to Access

SECTION	OBJECTIVE TITLE	OBJECTIVE #	STRATEGY #'s
Biodiversity	Core Ecosystems	1.1	3, 4
Biodiversity	Landscape Corridors	1.2	3
Wildlife	Moose Winter Range	2.2	2-4

Implementation, monitoring and review

Implementation

Compliance with the LRMP

1. The landscape unit plan will be sent to appropriate government agencies to ensure compliance with the Bulkley Land and Resource Management Plan.
2. Future amendments to the plan must take direction from the LRMP.
3. No additional constraints to timber supply will be applied without considering the LRMP budget (see “Introduction” section for explanation of ‘LRMP budget’).

Plan implementation and transition strategy

1. Once approved by the District Manager (DM) of the Bulkley/Cassiar Forest District and the Designated Environment Official (DEO), the plan will be distributed to appropriate stakeholder groups and government agencies (Pacific Inland Resources, Skeena Cellulose Inc., Northwood Pulp and Timber Ltd., First Nations, the Ministry of Agriculture, Fisheries and Foods, the Ministry of Environment, Lands and Parks and the Ministry of Employment and Investment, Mines Division).
2. Agencies will work with licensees and other resource users on incorporating the guidelines of this plan into operational planning.

Transition strategy

The landscape unit plan establishment process includes a public review and comment period, approval of the plan by the Designated Environment Official, sign off by the District Manager (Ministry of Forests) and filing of the plan with the Regional Manager (Ministry of Forests). The objectives of the landscape unit plan are *legally established* as per the establishment date stated in the *Order to Establish* pages found at the beginning of each landscape unit plan.

The Forest Practices Code of British Columbia Act (FPC Act) includes several sections with higher level plan requirements including FPC Act s. 9.1, s.10(1)(d), s.11(c), s.12(b) and (c), s. 13(b) and s.16(b) and under Operational Planning Regulations sections 20, 21, 22 and 23. Table 7 represents a summary of transition requirements for Operational Plans in this landscape unit.

Table 7. Summary of transition requirements for Operational Plans

Stage of approval	Requirement for compliance with the plan
Awarded Timber Sale Licences/ issued Cutting Permits	Exempt (as per OPR s. 22 (1))
Category A-blocks and roads in an approved Development Plan (prior to 4 months after objective has been established)	Exempt (note: with this section of the table the DM is exempting these plans from OPR s. 21(1).)
Non-Category A blocks and roads and other new plans.	Must be in compliance

First Nations

The Bulkley Forest District recognizes that Landscape Unit Planning may be an effective level of planning for addressing many First Nations forest management concerns. At this stage, however, the Landscape Unit objectives and strategies in the Bulkley Forest District do not include First Nations input. These objectives and strategies have been developed strictly to implement the Bulkley LRMP. First Nations have been advised of the LUP process and have been invited to comment on draft Landscape Unit Plans, but have not been actively involved in their development.

This is now changing and there is currently interest in exchanging information between MOF and First Nations at the landscape unit level of planning. It is hoped that recurring forest planning issues can be dealt with at this level to diminish concerns encountered at the Operational Planning level.

The Wet’suwet’en First Nation’s traditional territory covers the majority of the Bulkley Timber Supply Area, occupying area in all landscape units except the Babine and Nilkitkwa landscape units. Currently the Bulkley Forest District is working with the Wet’suwet’en on a landscape unit planning project to gather information on Wet’suwet’en historical and current values associated with the land in their traditional territory. Integrating these values into Landscape Unit Plans may result in a future amendment to the Landscape Unit Plans.

Interaction with the Gitksan and Fort Babine First Nations is less involved. Currently they are aware that objectives and strategies are being established and are invited to submit comments. As well, the Gitksan are discussing involvement in landscape unit planning at the Land and Resources working group meetings. The option to add on and amend Landscape Unit Plans to accommodate new information as it becomes available (eg., cultural heritage resource values) remains open.

Monitoring

MOF and MELP commit to best efforts in developing a monitoring strategy for each type of landscape unit objective to determine if the objectives are being met. MELP will be responsible for developing a monitoring methodology for wildlife, biodiversity and fish objectives. MELP and MOF will be responsible for developing a monitoring methodology for the LRMP Special Management Zone objectives and MOF will be responsible for developing the methodology for the timber, recreation, visual quality and range objectives. This monitoring will be done in conjunction with the Interagency Management Committee's (IAMC) strategy for monitoring the Bulkley's LRMP. The Community Resources Board (CRB) is expected to be an active participant in the monitoring and amendment phases.

In the interim it is recognized that monitoring, in a more simple sense, will be ongoing, and that issues may arise at any time that may warrant revisiting these objectives.

Plan review and amendment

This landscape unit plan will be amended as required to reflect new information from monitoring and experience from operational plans as landscape unit objectives and strategies are implemented. Amendments may be required to incorporate new information (e.g. inventories, details for single species management), lake classification, First Nations interests, watershed assessments, etc. Amendments may also be required to provide further detail in strategies to meet objectives. Future amendments of the landscape unit plans will include the details of the monitoring strategies once they are developed. Amendments will be completed as per the Forest Practices Code and Higher Level Plan procedures.

The District Manager will consider amending the boundary of ETD areas if other objectives or values have a significant impact. Possible reasons include significant wildlife use areas and significant impacts due to visual quality objectives. Any such deleted and replacement areas will be itemized and submitted with operational plans for tracking purposes .

Ecosystem network amendments will be by joint agreement between the district manager and the MELP district biologist. For example, amendments to the ecosystem network may be necessary when:

1. more specific ecological information about an area is acquired,
2. rare and endangered species habitat is identified but not already well represented by the ecosystem network (Appendix I)
3. mine exploration or development affects the existing core ecosystem objectives and attributes,
4. monitoring indicates a need for a boundary change.

Changes to the ecosystem network will include an appropriate transition strategy and impact on a licensee's operating area.

A future amendment will be required to incorporate the results from the work with the Wet'suwet'en and other First Nations. As well, a complete review of the objectives will occur within 3 years of the establishment date. An interagency team (including affected Licensees) will be assembled to review the plan, to review the results of monitoring these objectives and to recommend improvements.

Appendices

Appendix I. Red and Blue Listed Species Likely in the Deep Creek Landscape Unit

Common Name	BEC Site series	Provincial Rank
Subalpine Fir/Lodgepole Pine - Juniper - Lichen	ESSFmc/02	Blue
Subalpine Fir - Huckleberry - Crowberry	ESSFmc/03	Blue
Saskatoon-Slender Wheat Grass	SBSdk/81	RED
Black Spruce/Lodgepole Pine - Feathermoss	SBSmc2/03	Blue
Lodgepole Pine - Juniper - Ricegrass	SBSdk/02	Blue
Bluegrass - Slender Wheatgrass	SBSdk/82	RED
Cottonwood - Dogwood - Prickly Rose	SBSdk/08	RED
Douglas-Fir - Feathermoss - Stepmoss	SBSdk/04	Blue
Timber Oatgrass dry grassland	SBS/ESSF	RED(Blue)
Mesic (montane) forb meadows - variable spp. Composition	all interior zones except AT	RED(Blue) ⁸
Cow parsnip - large leaved avens - stinging nettle - brome lush meadows	SBS/ICH/CWH	<i>Blue</i> ⁸

Appendix II. Ecosystem Network Summary of the Deep Creek Landscape Unit

Core Ecosystems

Location	Area (ha)	Rationale					
		Biophysical	Species	Age Class	NP Description	Wildlife	Comment
McQuarrie	2850	SF/EF	Balsam Pine Spruce	4/5/8 4/5 5			- maintains lake in a wilderness setting
Burbridge Ck headwaters	35	EF	Balsam	4	Alpine Forest		- several small lakes at headwaters to Robyn Ck.

Landscape Riparian Corridors

Location	Rationale
Robin Creek	- connectivity between Bulkley Valley and Burbridge Creek headwaters core
Deep Creek	- connectivity between Bulkley Valley and McQuarrie core

Appendix III. Acronyms

AAC	allowable annual cut
BEC	Biogeoclimatic Ecosystem Classification
CORE	Commission on Resources and Environment
FENs	forest ecosystem networks
LRMP	Land and Resource Management Plan
MELP	Ministry of Environment, Lands and Parks
MOF	Ministry of Forests
NDT	natural disturbance type
OGMAs	old growth management area
RMZ	resource management zone
VQO	visual quality objective

Natural disturbance types described in this report:

NDT1	Ecosystems with rare stand-initiating events
NDT2	Ecosystems with infrequent stand-initiating events
NDT3	Ecosystems with frequent stand-initiating events
NDT5	Alpine tundra and subalpine parkland

Appendix IV. Glossary of Resource Planning Terms

age class

An interval into which the age range of trees, forest, stands or forest types is divided for classification. Forest inventories commonly group trees into 20-year age increments up to age 140 years, then a single class for trees between 141 and 250 years old, and a single class for those older than 250 years.

biodiversity (biological diversity)

The diversity of plants, animals and other living organisms in all their forms and levels of organization, including genes, species, ecosystems, and the evolutionary and functional processes that link them.

biogeoclimatic ecosystem classification (BEC)

A hierarchical classification scheme having three levels of integration: regional, local and chronological; and combining climatic, vegetation and site factors.

biogeoclimatic zone

A geographic area with a broadly homogenous macroclimate. Each zone is named after one or more of the dominant climax species of the ecosystems in the zone, and a geographic or climatic modifier (e.g. Interior Douglas Fir). British Columbia has 14 biogeoclimatic zones.

blue-listed species

Sensitive or vulnerable species as identified by the Ministry of Environment, Lands and Parks. Blue-listed species are considered to be vulnerable and “at risk” but not yet endangered or threatened. Populations of these species may not be declining but their habitat or other requirements are such that they are sensitive to disturbance. The blue list also includes species that are generally suspected of being vulnerable, but for which information is too limited to allow designation in another category.

coarse woody debris

Sound and rotting logs and stumps that provide habitat for fungi, plants, animals and insects and their predators, and that provide a source of nutrients for soil development. Material generally greater than eight to ten centimetres in diameter.

connectivity

A qualitative term describing the degree to which late-successional ecosystems are linked to one another to form an interconnected network. The degree of interconnectedness and the characteristics of the links vary in natural landscapes based on topography and natural disturbance regime. Breakage of these links results in fragmentation.

cultural heritage resource

For the purposes of the *Forest Act*, a cultural heritage resource is an object, site, or the location of a traditional societal practice that is of historical, cultural or archaeological significance to the province, a community or an aboriginal people. Cultural heritage resources include archaeological sites, structural features, heritage landscape features, and traditional use sites.

cutblock

Defined in the *Forest Practices Code of British Columbia Act* as a specific area of land identified on a forest development plan, or in a license to cut, road permit, or Christmas tree permit, within which timber is to be or has been harvested.

ecosystem

A functional unit consisting of all the living organisms (plants, animals and microbes) in a given area, and all the non-living physical and chemical factors of their environment linked together through nutrient cycling and energy flow. An ecosystem can be of any size - a log, pond, field, forest or the earth's biosphere - but it always functions as a whole unit. Ecosystems are commonly described according to the major type of vegetation, for example, forest ecosystem, or range ecosystems.

forest development plan (FDP)

An operational plan, guided by the principles of integrated resource management, which details the logistics of timber development, usually over a period of five years. Methods, schedules and responsibilities for accessing, harvesting, renewing and protecting forest resources are set out to enable site-specific operations to proceed.

forest ecosystem network (FEN)

A zone that serves to maintain or restore the natural connectivity within an area.

forest interior conditions

Conditions achieved at a point where edge effects no longer influence environmental conditions within a patch of forest. For interior B.C. forests, the edge effect is generally felt for a distance equivalent to 100-200 metres into the stand. The conditions changed usually involve light intensity, temperature, wind, relative humidity and snow accumulation and melt.

forest resources

Defined in the *Forest Practices Code of British Columbia Act* as resources and values associated with forests and range including, without limitation, timber, water, wildlife, fisheries, recreation, botanical forest products, forage, and biological diversity.

guidebooks

Guidebooks are sets of guidelines and recommendations on how to best achieve requirements of the *Forest Practices Code of British Columbia Act*. The guidebooks are not legally enforceable. However, specifications and procedures recommended by the guidebooks may be incorporated into plans, prescriptions and contracts, in which case those specifications and procedures may become legally enforceable.

identified wildlife

Defined in the *Forest Practices Code of British Columbia Act* Operational Planning Regulation as those species at risk that the Deputy Minister of Environment, Lands and Parks or a person authorized by that Deputy Minister, and the Chief Forester, agree will be managed through a higher level plan, wildlife habitat area or general wildlife measure.

inoperable areas

Defined in the *Forest Practices Code of British Columbia Act* as areas unavailable for harvest for terrain-related or economic reasons. Characteristics used in defining inoperability include slope, topography (e.g. the presence of gullies or exposed rock), difficulty of road access, soil stability, elevation and timber quality. Operability can change over time as a function of changing harvesting technology and economics.

land and resource management plan (LRMP)

An integrated sub-regional consensus-based process requiring public participation that produces a land and resource management plan for review and approval by government. The plan establishes direction for land use and specifies broad resource management objectives and strategies.

landscape unit

Planning areas established under the *Forest Practices Code of British Columbia Act* by the District Manager, that are up to 100 000 hectares in size and are based on topographic or geographic features such as a watershed or series of watersheds.

natural disturbance types (NDTs)

A term used to characterize areas with different natural disturbance regimes. Five natural disturbance types are recognized as occurring in B.C.:

- NDT1 Ecosystems with rare stand-initiating events
- NDT2 Ecosystems with infrequent stand-initiating events
- NDT3 Ecosystems with frequent stand-initiating events
- NDT4 Ecosystems with frequent stand-maintaining fires
- NDT5 Alpine Tundra and Sub-Alpine Parkland ecosystems

Northwest Weed Committee

Members include: Ministry of Forests, Ministry of Environment, BC Ministry of Agriculture, Fisheries, and Foods, Coalition for Alternatives to Pesticides, Bulkley-Nechako Regional District, Canadian National Railway, and Bulkley Valley Cattlemen’s Association.

old growth management area (OGMA)

Defined in the *Forest Practices Code of British Columbia Act* Operational Planning Regulation as an area established under a higher level plan which contains or is managed to replace structural old growth attributes.

operable forest

That portion of the production forest that, under current market conditions, can be harvested at a profit.

operational plan

The *Forest Practices Code of British Columbia Act* states that within the context of area-specific management guidelines, operational plans detail the logistics for development. Methods, schedules, and responsibilities for accessing, harvesting, renewing and protecting the resource are set out to enable site-specific operations to proceed. Operational plans include forest development plans, access management plans, range use plans, silviculture prescriptions, and stand management prescriptions.

patch

A stand of similar-aged forest that differs in age from adjacent patches by more than 20 years. When using the term patch in designing landscape patterns, it refers to the size of either natural disturbance openings which lead to even-aged forests or those openings created by cutblocks.

protected area

A designation of areas of land and water set aside to protect natural heritage, cultural heritage or recreational values (may include national park, provincial park or ecological reserve designations).

range use plan

An operational plan that describes the range and livestock management measures that will be implemented to ensure that range resources are protected and that the management objectives for other identified resource values are achieved.

rare ecosystem

Plant communities listed as red or blue with the B.C. Conservation Data Centre.

red-listed species

Threatened or endangered species as identified by the Ministry of Environment, Lands and Parks. The taxa on the red list are either extirpated, endangered or threatened or are being considered for such status. Any indigenous taxon (species or sub-species) threatened with imminent extinction or extirpation throughout all or a significant portion of its range in British Columbia is endangered. Threatened taxa are those indigenous species or sub-species that are likely to become endangered in B.C. if conditions are not altered.

regional land use plan

A plan identifying land use strategies at a regional level (e.g., a plan resulting from one of the CORE regional processes).

resource management zone (RMZ) - from regional or sub-regional plan:

A division or zone of the planning area that is distinct from other zones with respect to biophysical characteristics, resource issues or resource management direction. Resource management zones (in land and resource management planning [LRMP] these include settlement, agriculture, high intensity resource development, general resource development, low intensity resource development and protection) may be drawn on a map to describe general management intent. The zones are usually further defined using descriptive objectives and strategies to explain future land use and resource management activities.

riparian area

Areas of land adjacent to wetlands or bodies of water such as swamps, streams, rivers or lakes including both the area dominated by continuous high moisture content and the adjacent upland vegetation that exerts an influence on it.

riparian reserve zone

Defined in the *Forest Practices Code of British Columbia Act* Operational Planning Regulation as that portion, if any, of the riparian management area or lakeshore management area located adjacent to a stream, wetland or lake of a width determined in accordance with Part 10 of the regulation.

rotation

The planned number of years between the formation or regeneration of a stand and its final cutting at a specified stage of maturity.

scenic area

Defined in the *Forest Practices Code of British Columbia Act* Operational Planning Regulation as any visually sensitive area or scenic landscape identified through a visual landscape inventory or planning process carried out or approved by the District Manager.

sensitive areas

Small areas established under the *Forest Practices Code of British Columbia Act* by the District Manager to manage or conserve unique or locally significant resource values.

seral stages

The stages of ecological succession of a plant community, e.g., from young stage to old stage. The characteristic sequence of biotic communities that successively occupy and replace each other by which some components of the physical environment become altered over time.

site series

Sites capable of producing the same late seral or climax plant communities within a biogeoclimatic subzone or variant.

species composition:

The percentage of each recognized tree species comprising the forest type based upon the gross volume or the relative number of stems per hectare or basal area.

stand structure

The distribution of trees in a stand, which can be described by species, vertical or horizontal spatial patterns, size of trees or tree parts, age, or a combination of these.

timber harvesting landbase

Crown land within an area that is currently considered feasible and economic for forest management. Areas 100% constrained to timber harvesting--for example protected areas, riparian reserves or old growth management areas--do not contribute to the timber harvesting landbase.

visual quality objective (VQO)

A resource management objective established by the District Manager or contained in a higher level plan that reflects the desired level of visual quality based on the physical characteristics and social concern for the area. Five categories of VQO are commonly used: preservation, retention, partial retention, modification, and maximum modification (note: another category, “aesthetic”, has been added for this plan).

wildlife trees

Defined in the *Forest Practices Code of British Columbia Act* Operational Planning Regulation as a tree or group of trees that are identified in an operational plan to provide present or future wildlife habitat. A wildlife tree is a standing live or dead tree with special characteristics that provide valuable habitat for the conservation or enhancement of wildlife. Characteristics include large diameter and height for the site.