Dawson Creek Timber Supply Area
Old Growth Management Project.

Introduction

Biological diversity (biodiversity) is the array of all plants animals and other living organisms found in all dynamic ecosystems. This includes the evolutionary and functional processes that link all organisms as well as the genetic diversity found within each species. (Biodiversity Guidebook. 1995).

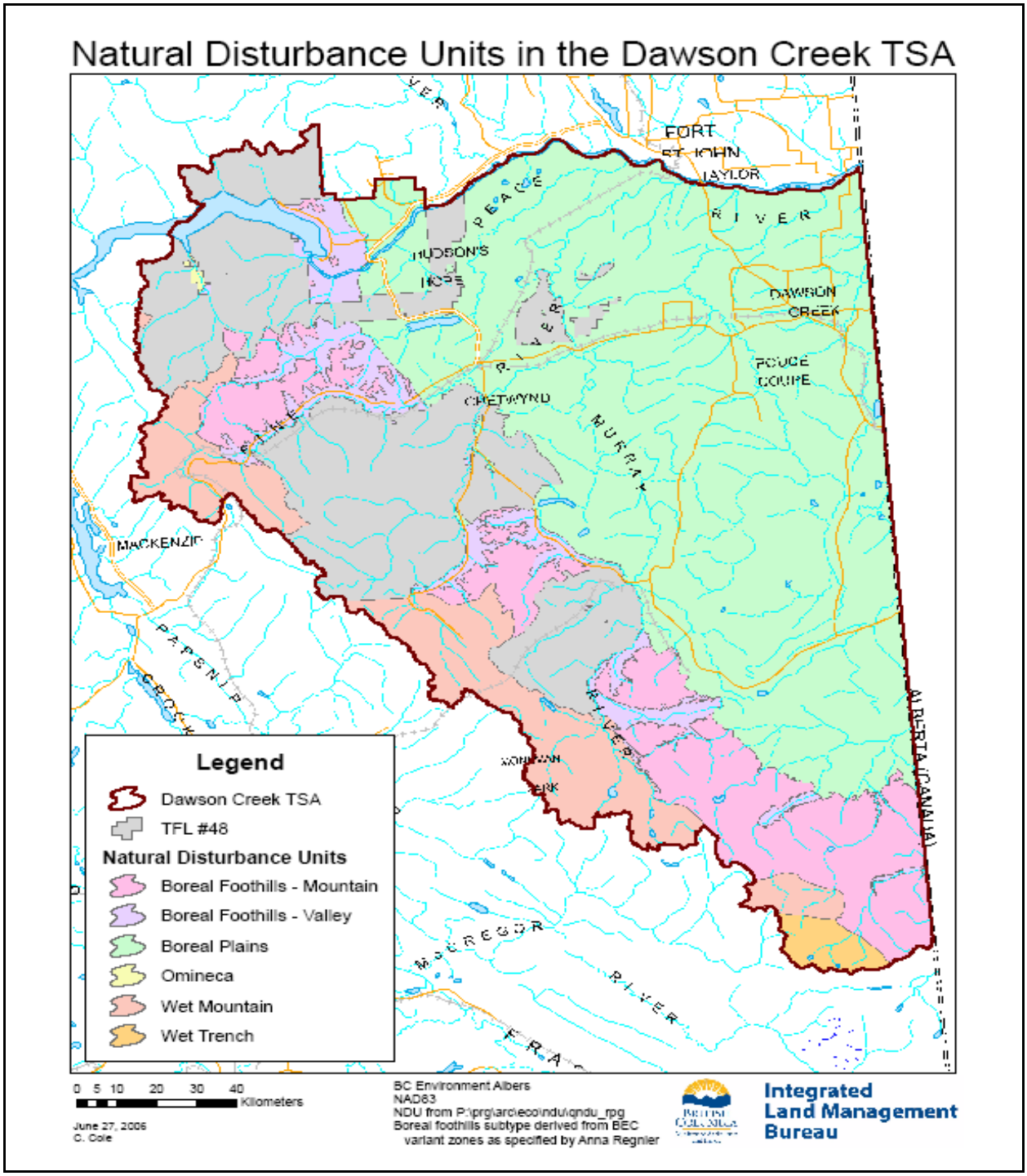
In the 1990's retention of old forests within all forested landscapes was recognized as important for maintaining biodiversity. The basic principle being that all landscapes (ecosystems) have some level of old forests and the more a managed forest resembles the forests that were established as a result of natural processes the more likely that all native species and ecological processes will be maintained.

In the Forest Practices Code era of the late 1990's, old growth management direction was provided through the Biodiversity Guidebook (1995) and the Landscape Unit Planning Guide (1999). These guidebooks were based on the best available scientific evidence and informed professional judgement. There was recognition that the direction in these guidebooks had limitations and as scientific understanding and social values change over time there would be a need to revisit the management direction of the past.

In 2002, Craig DeLong, a Ministry of Forests and Range (MOFR) ecosystem ecologist, developed a paper entitled *"Natural Disturbance Units of the Prince George Forest Region: Guidance for Sustainable Forest Management"*. This document is a synthesis of the most current scientific information and regional professional judgement and is based on the concept of the natural range of variability. The Natural Disturbance Unit (NDU) guidance uses the updated local research and separates areas based on differences in disturbance processes, stand development, and temporal and spatial landscape patterns.

On April 29, 2002, the guidance in *"Natural Disturbance Units of the Prince George Forest Region"* was endorsed by the MOFR Regional Manager and Regional Director for the Ministry of Sustainable Resource Management (MSRM) as the best available information for developing operational and landscape level plans. This memorandum states "In the future, MSRM will be guided by the NDU information in establishing legal biodiversity objectives through MSRM sponsored planning processes in partnership with forest licensees and others." The Integrated Land Management Bureau (ILMB) is now the government agency responsible for establishing legal old growth management objectives. Figure 1 shows the NDUs in the Dawson Creek Timber Supply Area.

Figure 1. Natural Disturbance Units in the Dawson Creek Timber Supply Area (TSA).



A Provincial Non-Spatial Old Growth Order (PNOGO) was established in 2004 and is based on the Biodiversity Guidebook and Landscape Unit Planning Guide. It was intended to be temporary direction until local objectives for old growth could be established.

Old Growth Management Targets in the Dawson Creek TSA

All major forest licensee's in the Dawson Creek TSA had been implementing Delong's guidance to varying degrees and expressed concern about the PNOGO as it is not based on the NDU guidance. In 2004 MSRM formed a technical working group of major licensees, BC Timber Sales (BCTS), the Ministry of Environment (MOE), MOFR Peace District and MOFR regional ecologist Craig Delong to determine how to implement the NDU guidance within timber impact policy. The working group focused on implementing those aspects of NDU guidance related to the quality and quality of old forest retention. A two phase approach was agreed upon with phase one establishing the amount of old forest retention required and phase two establishing spatial Old Growth Management Areas.

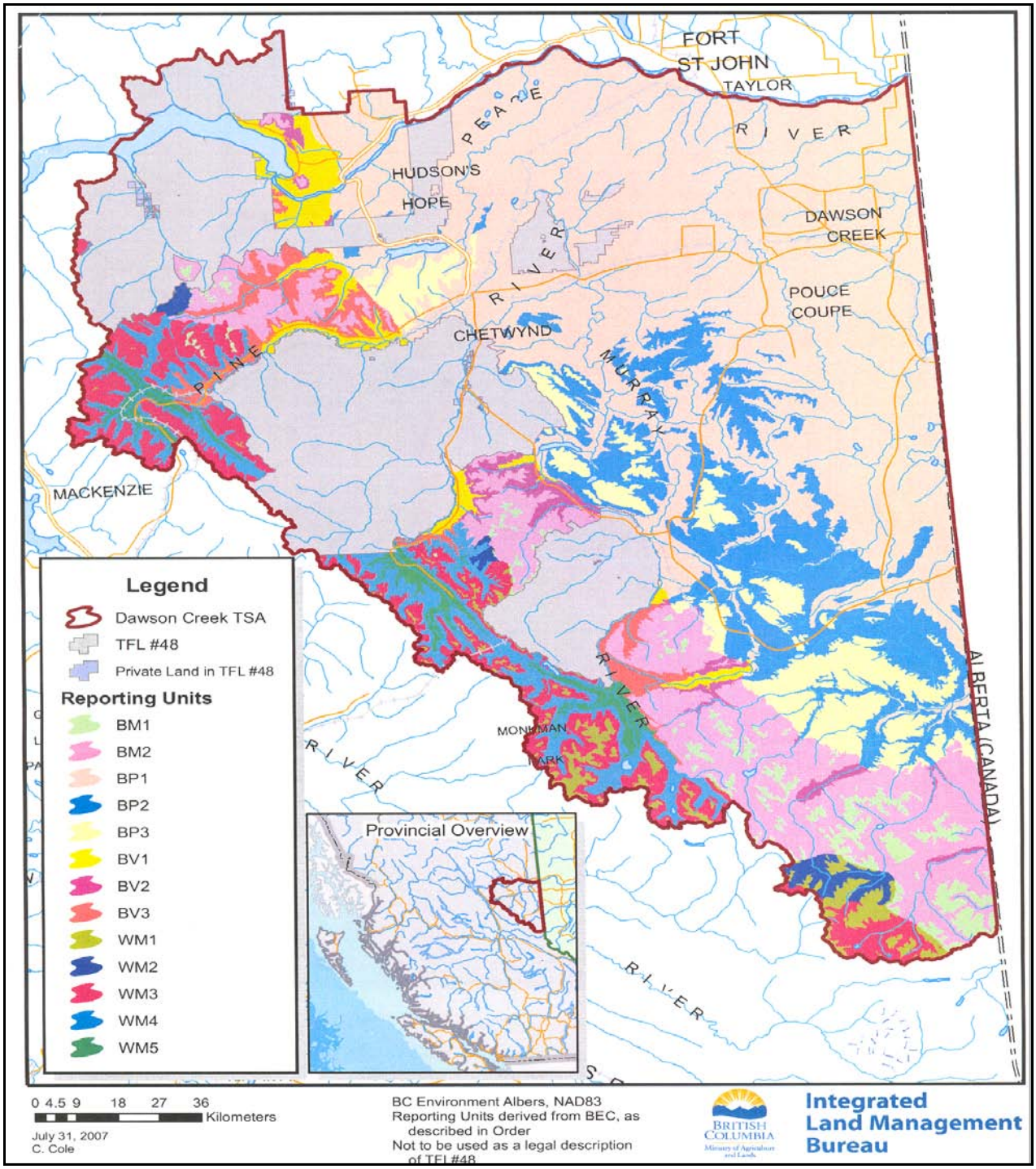
In phase one the NDUs were split by grouped biogeoclimatic ecosystem classification (BEC) units to account for differences in old ecosystems. The purpose of this objective is to ensure old habitat is further maintained across the TSA. The resultant BEC groupings are referred to as reporting units. Figure 2 shows the reporting units within the Dawson Creek TSA.

It is recognized that "old growth characteristics" such as large diameter trees, snags, coarse woody debris and complex canopy structure are crucial stand components that we are trying to maintain on the landscape. Recent studies have found that mapped forest age class is generally well correlated with functionally important old forest characteristics.(DeLong 2002) Based on this information and expertise from local professional foresters, the age for "old" forests in the Dawson Creek TSA was determined to be 140 years in the conifer dominated NDUs.(Boreal Foothills-Mountain, Boreal Foothills-Valley and Wet Mountain) Within reporting units BP1 and BP2, the analysis further splits the area into conifer forests (stands with 80% or greater confer component), deciduous forests (stands with 80% or greater deciduous component) and mixed wood forests (stands with greater than 20% but less than 80% conifer). The intent of this objective is to ensure the retention of representative levels of old forest through out all of the diverse ecosystems found in the Boreal Plains NDU. The age criteria for old in this NDU is 140 years for conifer, 100 years for deciduous and 120 for mixed wood stands.

Table 1. Age Criteria for Old Forest Retention in the Dawson Creek TSA.

Species Criteria	**Description**	**Minimum Age of Old**
Coniferous	stands 80-100% coniferous	140
Deciduous	stands 80-100% deciduous	100
Mixed	stands greater than 20% but less than 80% coniferous	120

Figure 2. Reporting Units in the Dawson Creek Timber Supply Area.



Current forest management policy allows a 3.6% short term and 3.9% long term impact on provincial timber supply for landscape level biodiversity objectives. Initial timber supply impact assessments showed that meeting the NDU recommendations for the minimum amount of old retention had a 10.9% short term and 14% long term impact. Impact analyses were run on several additional scenarios until the impacts were reduced to the policy allowance of 3.6 % and 3.9% respectively. (Armstrong 2006)

In order to meet the criteria for timber supply impacts, 7 out of 13 reporting units were dropped below the natural range of variation (NRV) as identified in the NDU guidance. Table 2 indicates the old growth retention target endorsed by the technical working group compared to the NVR.

Table 2. Natural Range of Variation compared to final old growth retention targets.

NDU	NRV (%) at 140 yrs.	Reporting Units	Old Growth Retention %
Boreal Foothills - Mountain	33 - 49	BM1, BM2	33
Boreal Plains	17 - 33	BP1, BP2	16
		BP3	17
Boreal Foothills-Valley	23 - 40	BV1,BV2 BV3	23
Wet Mountain	84 – 89	WM1, WM2, WM3, WM4, WM5	55
Wet Trench	80 - 88		

While the old growth retention targets had to be lowered to meet the allowable timber harvesting impacts it should be noted that the end result is an equivalent or greater level of old growth protection than is required by the Provincial Non-Spatial Old Growth Order. A comparison of the age and % retention criteria of the Provincial Order and the Dawson Creek TSA OGMA project can be found in Appendix 1.

The old growth targets apply to the Crown Forest Land base (CFLB) within the Dawson Creek TSA. The CFLB is the productive forested crown land which does not include area that is non-crown, non-forest, and non-productive forest. Area within TFL 48 and Woodlots do not contribute to meeting the old forest retention targets. Area within Parks and Protected Areas will contribute to maintaining old forest retention in accordance with the Landscape Unit Planning Guide.

In determining the old growth area targets, it was discovered that six of the reporting units have less old forests than the old growth target. (See Table 3) The reporting units that are short of old forests are mainly the boreal plateau and the low elevation valleys of the adjacent foothills. A further review of the data indicates two reasons for the shortfall. The primary reason is the considerable amount of pine forest in these reporting units and the pine stands in the Dawson Creek TSA rarely survive to the age of 140 years. The second factor is the level of natural and man made disturbances in the area. These reporting units have a high incidence on natural forest fires and have an extensive history of industrial development.

In order to offset the shortfalls; younger forests have been included in the spatial old growth areas to act as recruitment areas. The principle behind recruitment stands is to protect the sites from disturbance to allow the natural aging process to develop mature and old forests that contain the old forest attributes.

Table 3. Old Growth Area Targets by Reporting Units

Reporting Unit	Forest Type	CFLB	Old Growth Target %	Old Growth Area Target (ha.)
BM1	Conifer	1,112	33	367
BM2	Conifer	188,943	33	62,351
BP1	Conifer	162,370	16	25,979
BP1	Deciduous	246,353	16	39,416
BP1	Mixed wood	96,056	16	15,369
BP2	Conifer	159,344	16	25,495
BP2	Deciduous	13,612	16	2,178
BP2	Mixed wood	23,297	16	3,727
BP3	Conifer	126,592	17	21,521
BV1	Conifer	41,693	23	9,589
BV2	Conifer	29,744	23	6,841
BV3	Conifer	48,717	23	11,205
WM1	Conifer	95	55	52
WM2	Conifer	13,255	55	7,290
WM3	Conifer	42,974	55	23,636
WM4	Conifer	68,217	55	37,519
WM5	Conifer	28,559	55	15,707
Total Area		**1,290,933**		**308,242**

Note: Reporting Units in yellow do not have sufficient old forest to meet the old growth target and will require recruitment of younger stands to meet the targets.

Spatial OGMA Identification Process for the Dawson Creek TSA.

First step in identifying spatial OGMAs is to determine the amount of old forest on the land base that is already constrained from harvesting. Four broad criteria of constraint were considered to directly contribute to old forest retention; old forests in parks, old forest in high elevation Ungulate Winter Range (UWR) and Wildlife Habitat Areas (WHA), riparian reserve zones and old forest in wildlife tree patches (WTP) in existing and proposed cut blocks.

Parks. While parks are not part of the crown forested land base, the area of old forest within parks is counted as contributing to the old growth target. Old forests found in Parks that are

located within TFL 48 were not included in this project as there are considered to be contributing the old forest targets for the TFL.

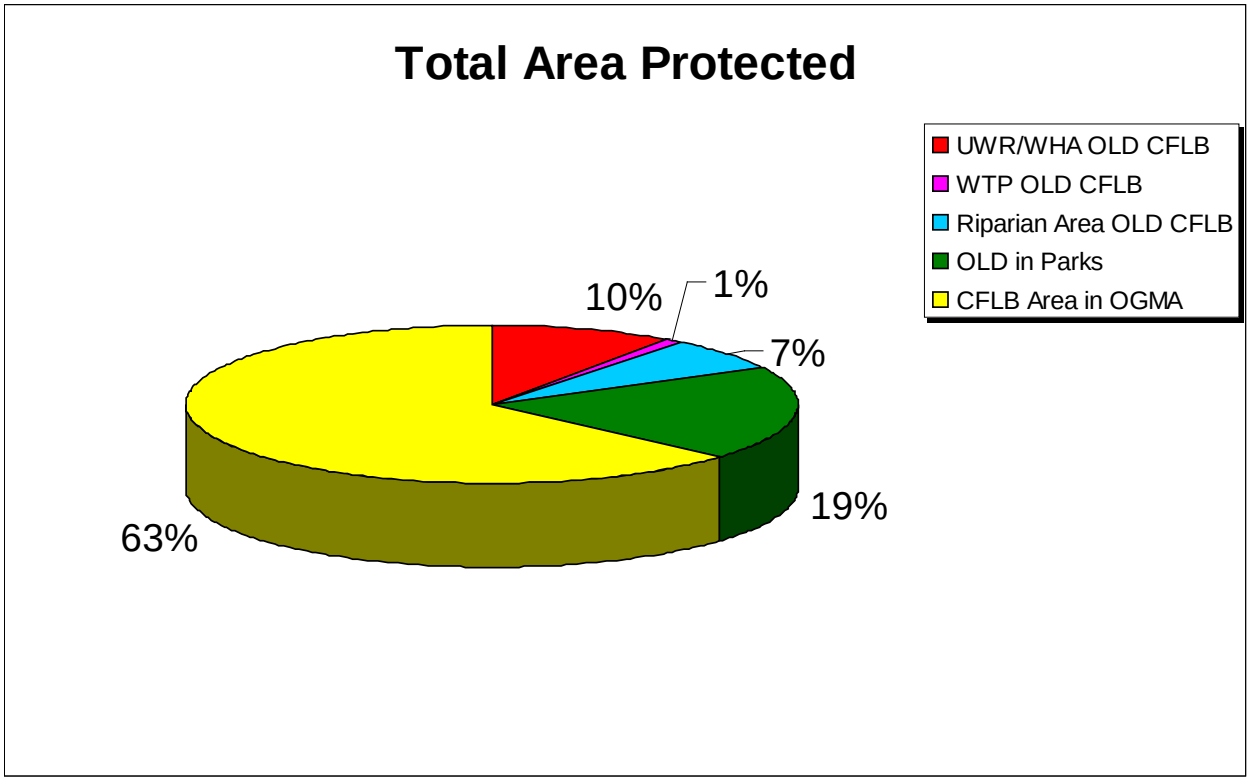
Ungulate Winter Range. The high elevation UWR in the Dawson Creek TSA has established objectives that restrict forest harvesting and road building. Therefore, any old forests within the URW are expected to remain undisturbed and have been recorded as contributing to the old growth targets.

Riparian Reserves. Current forest management practices preclude harvesting of riparian forests along many streams. The current timber supply review for the Dawson Creek TSA produced a coverage that removed riparian forests from the timber harvesting land base. This data has been used to determine the amount of old forest reserved along streams and these riparian reserve areas have been recognized as contributing to the old growth targets.

Wildlife Tree Patch. WTPs form part of the stand level objectives for the maintenance of biodiversity. Any WTP that meets the age criteria for old forests and is greater than 2 hectares in size is also considered to contribute to the old growth targets.

There are approximately 117,780 hectares of old growth forests that are protected from forest harvesting through these four existing forest management constraints. This constitutes approximately 37% of the total target for old forest retention in the Dawson Creek TSA.

Figure 3. Constrained areas contributing to the old forest retention target.



After accounting for old forests that are already protected, the revised target for spatial old growth areas is approximately 190,460 ha. Specific OGMAs were selected using age class themed Vegetation Resource Inventory (VRI) mapping. Areas with forest harvesting constraints such as steep slopes and visually sensitive areas were included in OGMAs where possible to minimize the impacts on the timber harvesting land base. Habitat features, such as significant mineral licks, low elevation caribou winter habitat, wildlife travel corridors and social values were also a consideration in the selection of draft OGMAs. The avoidance of approved and proposed cut blocks and areas with short term forest harvesting interest was a priority to reduce the impacts to the timber supply. OGMA polygons were delineated using boundaries that will be readily identified in the field (roads, cut blocks, streams and heights of land). Many include areas of mature and immature forests that are considered to contribute to the old growth target as recruitment areas. Some polygons also include areas of non CFLB; while this area does not contribute to the old growth targets they are included in the OGMA for simplification of boundary identification.

Forest licensees, MOFR, MOE, First Nations and stakeholders all worked closely with ILMB to review and revise several versions of draft OGMAs.

Table4. Total old growth protected by reporting unit.

Reporting Unit	Forest Type	CFLB	Old Growth Target %	Old Growth Area Target (ha.)	Old Growth Area Protected* (ha.)	% of Old Growth Target Protected
BM1	Conifer	1,112	33	367	1,382	376
BM2	Conifer	188,943	33	62,315	64,370	103
BP1	Conifer	162,370	16	25,979	26,418	102
BP1	Deciduous	246,353	16	39,416	43,893	111
BP1	Mixed wood	96,056	16	15,369	18,367	120
BP2	Conifer	159,344	16	25,495	22,544	88
BP2	Deciduous	13,612	16	2,178	2,902	133
BP2	Mixed wood	23,297	16	3,727	2,707	73
BP3	Conifer	126,592	17	21,521	20,113	93
BV1	Conifer	41,693	23	9,589	8,963	93
BV2	Conifer	29,744	23	6,841	7,376	108
BV3	Conifer	48,717	23	11,205	11,489	103
WM1	Conifer	95	55	52	195	375
WM2	Conifer	13,255	55	7,290	8,177	112
WM3	Conifer	42,974	55	23,636	38,779	164
WM4	Conifer	68,217	55	37,519	36,965	99
WM5	Conifer	28,559	55	15,707	12,120	77
Total Area		**1,290,933**		**308,242**	**326,760**	**106**

*includes Parks, UWR/WHA, Riparian reserves, WTP and OGMAs.

Implementation

Craig DeLong identifies two strategies for OGMA replacement that are appropriate for the Dawson Creek TSA.

In the areas with natural disturbance cycle of <150 years (reporting units BP1-3; and BV1-3) a system of rotating reserves is recommended. These reserves would be scheduled to be cut when reserve areas of relatively equal size have been identified that can take their place. The intent would be to always have some large reserves of forest that are old but not so old as to be unnatural and highly susceptible to stand replacement forest insect or disease outbreaks.

In the remaining reporting units (BM1, 2 and WM1-5) a strategy of irregularly dispersed large semi-permanent reserves is recommended. The more uneven-aged forests in these reporting units are less susceptible to stand replacement events and therefore have a higher likelihood of maintaining old forest structure over long periods of time. Replacement may be necessary but not on a continuous basis as in the rotating reserve strategy.

Many of the OGMAs are drawn adjacent to proposed cut blocks; however, there has been little or no ground verification of these proposed blocks. The legal order allows for some flexibility to address this type of operational issue; up to 10% in OGMAs less than 50 ha. or 5% or 40 ha., whichever is less, in OGMAs of 50 ha. or greater. The intent of the flexibility is to allow for minor adjustment s to OGMA boundaries to minimize the impacts to the forest industry while maintaining the biological integrity of the OGMA.

An amendment process has been developed to address the rotating reserve concept for Boreal Plains and Boreal Valley reporting units. This process will also address any changes to OGMAs that are greater than the flexibility permitted in the legal order. Amendment proposals will be compiled and reviewed on an annual basis to reduce the frequency of changes to the legal order and associated maps.

Monitoring and Review

Adaptive management principles will apply to this process, with periodic monitoring of the data used, objectives and implications to future timber supply. Elements that are uncertain or require additional analysis will be the focus of the monitoring program. The elements of this project that could be reviewed and/or revised fall into two categories; those that could affect the old growth targets and those that affect specific OGMAs.

Elements that could affect the old growth targets include:

- new or better forest inventory information;
- improved qualitative definition of old growth; (particularly with regard to pine forests and the Mountain Pine Beetle infestation.)
- timber supply impacts.

The elements that could affect specific OGMAs include:

- Near old (stands within 20 years of the old criteria).
    - As near old stands in the contributing constrained area (Parks, UWR, riparian reserves and WTPs) reach the old criteria there is a reduction in the area of spatial OGMA required.
- Mountain Pine Beetle.
    - The value of dead pine OGMAs will need to be addressed to determine if they continue to meet biodiversity objectives.
    - OGMAs specific to low elevation caribou winter use of pine stands will need to be monitored to determine if caribou use remains similar to the use found prior to the MPB impacts.

As a minimum, a review of old growth management objectives should coincide with Timber Supply Review process in the Dawson Creek TSA.

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Definitions

"***Crown Forest Land Base***" (CFLB) means land which is Provincial publicly owned land which is forested. It has generally been divided into: non-contributing land base (e.g. parks, inoperable forest and environmentally sensitive areas); and, timber harvesting land base (i.e. suitable and available for timber harvesting). It does not include excluded land base, such as private land, federal land, municipal land and woodlots licenses.

"***Licensee***" means a party required to prepare a forest development plan under *the Forest Practices Code of B.C. Act* or a forest stewardship plan under the *Forest and Range Practices Act*.

"***Merged Biogeoclimatic Units***" means a grouping of Biogeoclimatic Units that were combined to facilitate implementation of the old forest objective. The grouping was based on size of unit, geographic location and similar ecological characteristics.

"***Natural Disturbance Units***" (NDU) mean geographic areas that are outlined in *Natural Disturbance Units of the Prince George Forest Region: Guidance for Sustainable Forest Management, by Craig DeLong, 2002* (see Map #3). These units are based on natural disturbance regimes which are the historic patterns (frequency and extent) of fire, insects, wind, landslides and other natural processes in an area.

References

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Appendix 1. Old Forest Retention Requirements

Reporting Unit	Natural Disturbance Unit	Biogeo-climatic Units	Min age of old (yrs)	Target-old forest retention (%)	NDT	Min age of old (yrs)	Target-old forest retention (%)		
							BEO		
							L	I	H
BM1	Boreal Foothill-Mountain	ATun	**140**	**33**	**5**	**na**	**na**	**na**	**na**
BM2	Boreal Foothills-Mountain	ESSFmv2, ESSFmvp, ESSFmv4	**140**	**33**	**2**	**250**	**9**	**9**	**13**
BP1	Boreal Plains-Upland	BWBSmw1	**Conifer 140 Deciduous 100 Mixedwood 120**	**16**	**3**	**Conifer 140 Deciduous 100**	**11 13**	**13 13**	**16 19**
BP2	Boreal Plains-Upland	BWBSwk1	**Conifer 140 Deciduous 100 Mixedwood 120**	**16**	**3**	**Conifer 140 Deciduous 100**	**11 13**	**11 13**	**16 19**
BP3	Boreal Plains-Upland	ESSFmv2, SBSwk2, ESSFmvp	**140**	**17**	**2**	**250**	**9**	**9**	**13**
BV1	Boreal Foothills-Valley	BWBSmw1	**140**	**23**	**3**	**Conifer 140 Deciduous 100**	**11 13**	**11 13**	**16 19**
BV2	Boreal Foothills-Valley	BWBSwk1, BWBSwk2	**140**	**23**	**3**	**Conifer 140 Deciduous 100**	**11 13**	**11 13**	**16 19**
BV3	Boreal Foothills-Valley	SBSwk2	**140**	**23**	**2**	**250**	**9**	**9**	**13**
WM1	Wet Mountain, Wet Trench-Mountain	Atun	**140**	**55**	**5**	**na**	**na**	**na**	**na**
WM2	Wet Mountain	ESSFmv2, ESSFmvp	**140**	**50**	**2**	**250**	**9**	**9**	**13**
WM3	Wet Mountain, Wet Trench-Mountain	ESSFwc3, ESSFwcp ESSFmv2, ESSFwk2, ESSFmvp,	**140**	**55**	**1**	**250**	**19**	**19**	**28**
WM4	Wet Mountain, Boreal Foothills-Mountain	ESSFwk2	**140**	**55**	**1**	**250**	**19**	**19**	**28**
WM5	Wet Mountain	SBSwk2	**140**	**55**	**2**	**250**	**9**	**9**	**13**

Note:

Constrained areas contributing to the old forest retention target.

Reporting Unit	Forest Type	Forest Type Old Age	Old in Parks	UWR/WHA Old in CFLB	Riparian Area Old in CFLB	WTP Old in CFLB
BM1	Conifer	140	986	267	-	-
BM2	Conifer	140	16,253	14,994	3,307	247
BP1	Conifer	140	680	-	1,951	132
BP1	Deciduous	100	3,357	-	2,876	1,446
BP1	Mixed wood	120	554	-	1,641	181
BP2	Conifer	140	3,336	-	1,596	178
BP2	Deciduous	100	601	-	27	17
BP2	Mixed wood	120	267	-	81	46
BP3	Conifer	140	1,294	172	638	180
BV1	Conifer	140	-	-	629	45
BV2	Conifer	140	-	-	579	42
BV3	Conifer	140	47	7	1,245	104
WM1	Conifer	140	154	36	-	-
WM2	Conifer	140	362	4,117	407	7
WM3	Conifer	140	19,097	8,954	2,282	74
WM4	Conifer	140	13,119	2,283	2,714	322
WM5	Conifer	140	2,132	246	1,398	72
			62,239	31,076	21,371	3,093