Current Condition Report for Old Growth Forest: Thompson Okanagan – Merritt TSA 2019 Analysis

July 2024

BRITISH COLUMBIA | Ministry of Water, Land and Resource Stewardship

CEF Cumulative Effects Framework

Companion Documents

This assessment uses the following companion documents:

Province of British Columbia. (2016). Cumulative Effects Framework Interim Policy for the Natural Resource Sector. https://www2.gov.bc.ca/assets/gov/environment/natural-resource-stewardship/cumulative-effects/cef-interimpolicy-oct_14_-2_2016_signed.pdf

Province of British Columbia. (2017). Interim Assessment Protocol for Old Growth Forest in British Columbia Version 1.1. https://www2.gov.bc.ca/assets/gov/environment/natural-resource-stewardship/cumulative-effects/interim_old_growth_protocol_v11_jan2018_final.pdf.

Additional background context is also provided:

Ministry of Water, Land and Resource Stewardship (WLRS). (2024). Old Growth Forests in British Columbia: Cumulative Effects Assessment Backgrounder. Victoria, British Columbia. https://www2.gov.bc.ca/assets/gov/environment/natural-resource-stewardship/cumulative-effects/protocols/cef-old-growth-ce-assessment-backgrounder-final-2024.pdf

Ministry of Water, Land and Resource Stewardship (WLRS). (2024). Old Growth Forest Management in British Columbia: Provincial Backgrounder. Victoria, British Columbia. https://www2.gov.bc.ca/assets/gov/environment/natural-resource-stewardship/cumulative-effects/protocols/cef-old-growth-backgrounder-final-2024.pdf

A Note on the Development of this Report

B.C. is committed to collaboration with Indigenous partners on issues related to conservation of biodiversity. This report, and the western science information collected by the Province of B.C. within, seeks to address the questions posed in this assessment. It is intended to be a starting point in supporting and informing future work and collaboration between the Province and First Nations, and engagement with stakeholders, on the management of cumulative effects. First Nations with traditional territories overlapping this assessment area were provided this report for review.

This report is available to government-to-government tables working on strategic landscape planning initiatives so that these tables can evaluate if and how any of the data, results, or other information contained in this report can support their planning.

Disclaimer

Current condition reports for old growth forest are being prepared by the provincial Cumulative Effects Framework (CEF) within the Ministry of Water, Land and Resource Stewardship (WLRS). These reports require standardized assumptions and methodologies (described in the Interim Assessment Protocol for Old Growth Forest in British Columbia (2017)) that can be consistently applied across the province. The reports address specific questions about the current condition of indicators for old growth forest, mature-plus-old forest, and old growth management areas (OGMAs). At this stage of reporting, the assessment does not incorporate the consideration of implementation policies such as the application of the rules-based approach from the Landscape Unit Planning Guidebook, OGMA amendment policies, and the contributions of other conservation designations in meeting old growth forest targets.

In this report, the colour scale used for reporting the current condition of old growth forest and mature-plus-old forest does not distinguish between legal and policy targets, as described in the Cumulative Effects Framework Interim Policy for the Natural Resource Sector (2016) and the Old Growth Forests in British Columbia: Cumulative Effects Assessment Backgrounder (2024). This has occurred for several reasons and the decision was based on local discussions. Please see section 4 of this report for further details on the assessment methodology.

Most of the data used in this assessment is publicly accessible information from the BC Government Warehouse (BCGW) and was extracted in February 2019. One dataset used in this analysis is the provincial Vegetation Resource Inventory (VRI), which is a spatial dataset used to describe where a vegetation resource (i.e., timber volume, tree species) is located and how much of a given resource is within an inventory unit. There are limitations within the vegetation inventory design due to data collection and interpretation methodologies. As such, this dataset is best used for analysis at a strategic and coarse-scale and may present limitations when applied at the operational and site-specific scale. It is recognized that the vintage of this dataset in this assessment may be considered dated (i.e., extracted in 2019); however, it is the starting point for assessing past and present impacts associated with cumulative effects, providing a mechanism for trend analysis going forward.

EXECUTIVE SUMMARY

The Cumulative Effects Framework (CEF) measures the impacts of natural resource activities on values that are important to the people of British Columbia (B.C.). Current condition assessments form the basis for the CEF. These assessments report on the current condition of individual CEF values using indicators to demonstrate the cumulative effects (CE) of multiple natural resource activities on each value. Old growth forest is a provincial CEF value that is important for the conservation and maintenance of biodiversity at all scales.

The current condition assessment describes and reports on the current condition of old growth forest relative to legally defines objectives and policy targets for mature-plus-old forest. It does not consider whether these objectives are effective at conserving sufficient old growth forest to maintain biodiversity, determine the primary causal factors for the current condition (e.g., forest harvesting, natural disturbance), state if assessment units are in compliance with legal objectives and policy targets, or provide management direction to the province, licensees, or others.

Assessment indicators are used to measure and report on the current condition of old growth forest, mature-plus-old forest, and incursions into old growth management areas (OGMAs). The amount of old growth forest within OGMAs is assessed but is not a formal indicator under the Interim Assessment Protocol for Old Growth Forest in British Columbia (2017). Old growth and mature forests are defined by age, which is determined by the natural disturbance type (NDT) and biogeoclimatic ecosystem classification (BEC). The CE assessment was completed within the Cumulative Effects Crown Forested Land Base (CE-CFLB) using assessment units (AUs) based on the unique combinations of landscape unit (LU), biodiversity emphasis option (BEO), NDT, and BEC subzone or variant.

Assessment Overview

This CE assessment was completed for the Merritt Timber Supply Area (TSA) where old growth forest is generally greater than 140 or 250 years old and mature forest is greater than 80 or 120 years old, depending on the NDT and BEC. Old growth forests are managed through non-spatial legal targets established in the Provincial Non-Spatial Old Growth Order (PNOGO, 2004) with spatial non-legal OGMAS in place, therefore this assessment compares the current condition of old growth forest relative to the legal targets established in PNOGO. The Merritt TSA is unique in the province because it has area-based targets (hectares) defined directly in the Appendix of PNOGO (rather than the percent-based targets). There is no requirement for the management of mature forests; however, the CE assessment does provide current condition reporting on the mature forest that is guided through non-legal policy targets defined in the Biodiversity Guidebook (BDG, 1995).

There is a total of 887,134.2 hectares (ha) of CE-CFLB in the Merritt TSA, the majority of which is managed as Intermediate and Low BEO (56.7% and 29.4%, respectively). For the old growth indicator, there are 80 AUs with a total of 854,146.8 ha of CE-CFLB with legal targets applied in this assessment. There is an additional 32,987.4 ha with no old growth forest targets established because it is within NTD5 (alpine or sparsely forested parkland) or it's a LU-BEC combination where no targets are defined in PNOGO. For the mature-plus-old forest indicator, there are 128 AUs with a total of 864,134.2 ha of CE-CFLB with policy targets applied in this assessment. The difference in total AUs and CE-CFLB with targets between the old growth forest and mature-plus-old forest indicators is due to how the old forest legal target hectares are set directly in PNOGO (Appendix 2 Table 2 which assigns targets by LU-BEC) compared to mature-plus-old forest policy target percentages recommended in the BDG (which assigns targets by NDT-BEO-LU-BEC).

Assessment Results

The Merritt TSA has experienced many changes over the years, in particular due to natural disturbances such as wildfires and mountain pine beetle. Recent wildfires, including the 2021 Lytton Creek, have resulted in large scale shifts in seral stage distribution and ecosystem composition across the TSA. However, age adjustments to seral stage associated with these wildfires are not included in this analysis due to limitations in the Vegetation Resources Inventory dataset.

Old growth forest covers 120,611.7 ha or 13.6% of the CE-CFLB and are generally located in higher elevations and along the southern and western portions of the TSA. Of the 80 AUs, 32 AUs (40%) have sufficient amounts of old growth forest compared to the legal targets (438,617.9 ha of CE-CFLB). All AUs in the ESSFdc2 are meeting the targets (65,146.5 ha of CE-CFLB), however no other BEC subzone and variant (10 out of 11 BEC subzone and variants) has all AUs meeting the targets. Of the 48 AUs not meeting the targets (60% of all AUs with a total CE-CFLB of 415,528.9 ha), eight AUs have no old growth forest (16,913.3 ha of CE-CFLB). The dry, low elevation ecosystems (IDF and PP) are furthest from the targets (358,747.7 ha and 11,731.0 ha of CE-CFLB, respectively). No LU had all AUs meeting the old growth forest targets.

Mature-plus-old forest covers 401,136.5 ha or 45.2% of the CE-CFLB located across the TSA. Of the 128 AUs, 112 AUs (88%) have sufficient amounts of mature-plus-old forest compared to the policy targets (822,958.9 ha of CE-CFLB), most of which have more than 125% of the target being met. There are four BEC variants with all AUs meeting the targets. The 16 AUs not meeting the policy targets account for 41,853.9 ha of CE-CFLB, the majority of which are close to meeting the targets (75-100% of the target met). There is one AU (Lower Nicola LU-High BEO-MSxk BEC variant) not meeting the targets which has a relatively large CE-CFLB (28,260.9 ha), accounting for 68% of the CE-CFLB of AUs not meeting the targets. In addition, there are two AUS with no mature-plus-old forest, however these are relatively small (2.3 ha of total CE-CFLB).

There are 1,305 mapped non-legal OGMAs with a total OGMA area of 114,589.0 ha of which 113,232.1 ha is CE-CFLB. There are 812 OGMAs (62% of all OGMAs) that show some level of disturbance, of which 114 OGMAs (9%) have been disturbed beyond the allowable incursion limit, with 1,730.4 ha of total incurred OGMA area. The Coldwater LU has the largest number of incurred OGMAs (22 OGMAs) and the largest total OGMA area with incurred status (417.9 ha). Most incursions beyond the allowable limits were due to forest harvesting (e.g., cutblocks) (53.0% or 917.1 ha of incurred OGMA area) and road development (41.2% or 713.2 ha) and disturbed less than 5% of the total OGMA area. Some of these incursions are historical and were known and considered acceptable at the time of OGMA delineation.

The majority of OGMAs are mature seral stage (55.6%) forests, followed by old (22.2%), mid (14.7%), and early (3.8%) seral stage. There are three AUs that meet old growth forest targets within non-legal OGMAs, and 77 AUs that do not meet the targets within OGMAs, of which 12 AUs have no old growth forest within non-legal OGMAs boundaries. While there is sufficient old growth forest in most AUs compared to the targets, it is generally not within the non-legal OGMAs. Therefore, there may be old growth forest available outside the non-legal OGMA boundaries that could contribute to old growth forest targets if incorporated into OGMAs.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF ACRONYMS

AAC	Allowable Annual Cut
AU	Assessment Unit
B.C.	British Columbia
BCGW	B.C. Geographic Warehouse
BDG	Biodiversity Guidebook
BEC	Biogeoclimatic Ecosystem Classification
BEO	Biodiversity Emphasis Option
CCR	Current Condition Report
CE	Cumulative Effects
CEF	Cumulative Effects Framework
CFLB	Crown Forested Land Base
CE-CFLB	Cumulative Effects Crown Forested Land Base
FAIB	Forest Analysis and Inventory Branch
FMLB	Forest Management Land Base Indicator
FOR	Ministry of Forests
FPC	*Forest Practices Code of British Columbia Act*
FRPA	*Forest and Range Practices Act*
FSP	Forest Stewardship Plan
ILMB	Integrated Land Management Bureau
LU	Landscape Unit
LUPG	Landscape Unit Planning Guide
NDT	Natural Disturbance Type
OGAA	*Oil and Gas Activities Act*
OGMA	Old Growth Management Area
PEM	Predictive Ecosystem Mapping
PNOGO	Provincial Non-Spatial Old Growth Order
TEM	Terrestrial Ecosystem Mapping
THLB	Timber Harvesting Land Base
TSA	Timber Supply Area
TSR	Timber Supply Review
VRI	Vegetation Resources Inventory
WLRS	Ministry of Water, Land and Resource Stewardship

Biogeoclimatic Ecosystem Classification (BEC) System

BEC Zones

AT	Alpine Tundra
BG	Bunchgrass
CWH	Coastal Western Hemlock
ESSF	Engelmann Spruce-Subalpine Fir
IDF	Interior Douglas-Fir
MH	Mountain Hemlock
MS	Montane Spruce
PP	Ponderosa Pine

BEC Subzones

dc	Dry cold		**un**	Undifferentiated
dcp	Dry cold parkland		**unp**	Undifferentiated and parkland
dk	Dry cool		**xc**	Very dry cold
dm	Dry mild		**xcp**	Very dry cold parkland
mm	Moist mild		**xh**	Very dry hot
ms	Moist submaritime		**xk**	Very dry cool
mw	Moist warm		**xw**	Very dry warm
mwp	Moist warm parkland			

BEC Variants

1	Nicola
	Okanagan
	Southern
	Thompson
2	Cascade
	Leeward
	Thompson

BEC Phases

a	Grassland
b	Steep South

GLOSSARY

The following glossary terms are provided for clarity and to aid in understanding the Cumulative Effects Framework. These terms are provided for all CE Assessments and are not specific to the land base identified in this report.

Assessment Units (AU)
Assessment units (AUs) are used to describe the current state of old growth forest on the CE-CFLB in Cumulative Effects reporting. Assessment units are based on the combinations of Landscape Unit (LU), Natural Disturbance Type (NDT), Biodiversity Emphasis Option (BEO), and Biogeoclimatic Ecosystem Classification (BEC) subzone and/or variant.

Biodiversity Emphasis Option (BEO)
A range of management alternatives that emphasize different levels of natural biodiversity within forested landscapes. There are three options for emphasizing biodiversity at the landscape level: high, intermediate, and low. Each option is designed to establish a level of natural biodiversity and a different risk of losing elements of natural biodiversity (Province of B.C., 1995). Overall, the BEO informs the amount of old growth to be retained.

Biogeoclimatic Ecosystem Classification (BEC) system (zone/subzone/variant)
A multi-scaled, hierarchical, ecosystem-based classification system that groups ecologically similar sites based on climate, site, soils, and vegetation, and is widely used as a framework for resource management and scientific research in B.C.

BEC zones have similar patterns of energy flow, vegetation, and soils as a result of a broadly homogeneous macroclimate. There are 16 zones in B.C. which are subdivided into subzones and variants (see List of Acronyms). Subzones reflect differences in regional climate, while variants recognize sub-regional variation (e.g., areas that are slightly drier, wetter, snowier, warmer, or colder than other areas in the subzone) (MFR, 2008).

Crown Forested Land Base (CFLB)
The forested area that the provincial government manages for a variety of natural resources values. This excludes non-vegetated areas (e.g., water, rock, ice), non-forested ecosystems (e.g., grasslands, wetlands), non-productive forest (e.g., alpine, areas with very low productivity), and non-commercial forest (e.g., shrub/brush areas). The CFLB includes provincially and federally protected areas (e.g., provincial and national parks), conservancies, wildlife habitat areas, wildlife management areas, etc., because of their contribution to biodiversity.

Crown Land
Land, whether it is covered by water or not, or an interest in land, recognized in Canadian law as vested in the provincial government of B.C. In B.C., all land categorized as Crown land is also the traditional territory of one or more First Nations (Land Act, RSBC, 1996).

Cumulative Effects
Changes to environmental, social, and economic values caused by the combined effect of past, present, and potential future human activities and natural processes (Province of B.C., 2016).

Cumulative Effects Crown Forested Land Base (CE-CFLB)
Provincial Crown land with forest cover that is managed for timber supply or other forest management objectives. This layer includes all forested Crown land, including Crown Land in area-based tenures (e.g., tree farm licences, woodlots, community forests, First Nations woodland licences), and all forested portions of provincial parks, protected areas, ecological reserves, and federal parks that contribute to the current state of old growth forest.

Cumulative Effects Framework (CEF)	A set of policies, procedures, and decision-support tools that help identify and manage cumulative effects consistently and transparently across B.C.'s natural resource sector.
Current Condition Assessment/Report (CCR)	An assessment/report on the current state or condition of individual CEF values in relation to selected state or pressure indicators (Province of B.C., 2016).
Forest Edge	The boundary between a primary forest and newly harvested areas, roads, or other permanently cleared areas where an edge environment is created. This affects the microclimatic conditions (i.e., temperature, wind, moisture) and other attributes (e.g., species composition; processes such as growth rates) and can impact forests up to 100 to 200 meters within the forested area (depending on topography and vegetation). Some plant and animal species can benefit from the microclimate edge effects, while plant and animal species dependent on the stable environmental condition of the interior forest may be impacted (Province of B.C., 1995, Ministry of Forests Research Branch, 1998b).
Forest Management Land Base (FMLB) Indicator	An attribute field in the Vegetation Resources Inventory (VRI) that indicates whether an inventory polygon is currently forested (or has been forested) and is capable of producing a stand of trees. The FMLB is a coarse-scale indicator of forested areas, whereas the CFLB is a finer-scale management tool (see CFLB definition above).
Forest Stewardship Plan (FSP)	A plan which guides forest operations for a timber tenure required under the Forest and Range Practices Act which is prepared by a forest licensee and approved by government.
Fragmentation	The process of transforming large contiguous patches of forest into smaller and isolated patches surrounded by disturbed areas, either through human activities (e.g., roads, forestry cutblocks) or natural disturbances. Fragmentation may lead to a decline in biodiversity through loss of habitat (conversion of forests from natural to managed stands), increase in microclimatic and forest edge effects, and increase in isolation of the remaining forest patches (Province of B.C., 1995).
Incursion	Anthropogenic (human-caused) disturbance footprints within old growth management areas from resource development activities such as forest harvesting, road construction, or mining. It does not include impacts from natural disturbance, such as forest fires or insects.
Interior Forest Condition	The forest habitat beyond the influence of microclimatic other and forest edge effects that sustains the plant and animal communities that depend on stable environmental conditions. It is generally considered to be 100 to 200 meters from the forest edge and can occur in any forest type and forest age (Ministry of Forests Research Branch, 1998b).
Landscape Unit (LU)	An area used for long-term planning and monitoring of resource management activities. These units contain land and water and are typically at the scale of a watershed or a group of watersheds, with areas ranging from 5,000 to 400,000 hectares (MFR, 2008).
Landscape Unit Planning Guide (LUPG)	A guidance document published by the Ministry of Forests and Ministry of Environment, Lands and Parks (1999) that outlines procedures to implement landscape unit planning throughout B.C. (including the development of objectives and strategies). The guide focuses on the priority of forest biodiversity including the retention of old growth forest and guidance for stand-level biodiversity management through wildlife tree retention (Province of B.C., 1999).

Mature Forest

Stands that have progressed through successional development stages including natural thinning. Vertical structure has developed but stands lack the complex structure typical of old growth forests.

The time required for mature forest to develop varies by ecosystem. In B.C., the minimum age of mature forest is 80 years in productive coastal and cool, northern boreal forests, 120 years in high elevation forests, and 100 years in the remaining forests. Mature forest ages are determined by NDT and BEC zone.

Mature-plus-Old Forest

Biodiversity objectives for mature forest retention are set as a minimum requirement for mature-plus-old forest, meaning that retention targets include the minimum requirements for old growth forest plus additional targets that can be met by mature and/or old forest (Province of B.C., 1995). The additional targets for mature-plus-old forest can be met using mature and/or old forest, but the old forest portion of the target must be met using old growth forest (where available). When the mature-plus-old forest target is the same as the old growth forest target, there are no additional requirements for mature forest area. Mature-plus-old targets are specified in the Biodiversity Guidebook but are not required in many regional land use orders, including the Provincial Non-spatial Old Growth Order.

Old Growth Forest

The Province of B.C. defines old growth forest based on age. Minimum ages for old growth forest are greater than 250 years old in ecosystems with infrequent stand-initiating disturbance (coastal, interior wet and moist climates, and dry, fire-maintained ecosystems; NDT 1, 2, 4) and greater than 140 years old in drier ecosystems with frequent stand-initiating disturbance (NDT 3).

These age definitions are intended to capture forests dominated by old trees. Ecologically, old growth forests contain live and dead trees that vary by size, species, composition, and age class structure, which varies significantly by forest type and by BEC unit (BDG, 1995). They are communities of trees, plants, fungi, animals, and microbes that have lived together long enough to develop complex, interconnected relationships (Old Growth Technical Advisory Panel, 2021). Old growth characteristics vary by ecosystem and tree species, and typically have more large trees with unique characteristics such as forked, dead, or broken tops, cavities, or large lateral branches, and more large standing dead trees (snags) and decomposing wood than younger forests (MFLNRORD, 2017). Trees are large for the ecosystem, and the forest canopy is often layered with openings that allow light and encourage the growth of understory vegetation.

For the purposes of the CEF, the term "old growth forest" is used to describe these ecosystems more broadly (i.e., considering stand attributes), with the awareness that it includes the "old forest" age-based definition currently used in forest management practices.

Old Growth Management Area (OGMA)

Defined areas that contain (or are managed to attain) specific structural old growth forest attributes. These are delineated and mapped as fixed areas (FPB, 2012). An OGMA may be defined as a legal OGMA or a non-legal OGMA:

Legal OGMA- OGMAs that have been declared in an old growth Ministerial Order. Forest licensees must incorporate the legal OGMAs into Forest Stewardship Plans (FSPs).

Non-legal OGMA- OGMAs that have been mapped but not declared in an old growth order. Forest licensees may choose to incorporate the non-legal OGMAs into FSPs as a way of achieving the non-spatial order that is in effect in the management area where they operate.

Natural Disturbance Type (NDT)

A coarse-level classification system that broadly describes disturbance regimes across B.C. based on the long-term average frequency of stand-initiating disturbances such as wildfires, insects, or wind. Five NDT categories form the basis for the old growth forest targets in the Biodiversity Guidebook (Province of B.C., 1995).

Non-Contributing Land Base

Areas on the land base that are excluded from the Timber Harvesting Land Base (THLB) and do not contribute to the allowable annual cut for a specified area. This includes Parks and Protected Areas, no harvest zones within wildlife management areas (e.g., ungulate winter ranges, wildlife habitat areas), riparian reserves, and inoperable forests.

Non-Spatial Old Growth Management

The percentage or amount (in hectares) of old growth forest to be retained within a specified area (i.e., by BEC subzone/variant in a landscape unit) as an alternative management approach from establishing spatial OGMAs. The amount of old growth forest present in forest stands may be noted by stand age using vegetation inventories, but patches of old growth are not delineated and mapped (FPB, 2012). Non-spatial is also referred to as aspatial.

Primary Forest

A naturally regenerating forest of native species, where there are no visible indications of human activities, and the ecological processes of the forest are not significantly disturbed (FAO & UNEP, 2020). This can include forests across all seral stages, from young to old, and any stands remaining after a natural disturbance such as fire, wind, or extensive insect-caused mortality. Not all primary forests are old, but all old growth is primary forest (Old Growth Technical Advisory Panel, 2021).

Recruitment

The act of identifying stands (either spatially or non-spatially) that do not currently meet the requisite old growth characteristics but are intended to develop those characteristics in the future. In some circumstances, recruitment areas can contribute to old growth targets in landscapes where there is not enough old growth forest to meet targets.

Seral Stage

Represents the different stages in the sequence of forest development, from early to mid, mature, and old forests, including successional shifts in species composition and vegetation structure (e.g., see definitions for mature forest and old growth forest above). Stand age, as reported in the provincial Vegetation Resources Inventory, is used to estimate seral stage.

Spatial Old Growth Management

The process of identifying and delineating areas containing old growth forest attributes. Spatially identifying (i.e., mapping) these areas can lead to their designation as legal or non-legal OGMAs (FPB, 2012).

Stand-Initiating Disturbance	Disturbances that significantly alter the ecosystem and largely terminate the existing forest stand and initiate secondary succession to produce a new stand. This may occur through wildfires, windstorms, insects, and landslides (Province of B.C., 1995).
Stand-Maintaining Disturbance	Fairly frequent disturbances that maintain an ecosystem and keep successional processes stable. This typically occurs through understory surface fires that remove some but not all trees and maintain open forests of old trees (Province of B.C., 1995).
Timber Harvesting Land Base (THLB)	A spatial (mapped) estimate of the forested land area where timber harvesting is considered both acceptable and economically feasible given the objectives for all relevant forest values, existing timber quality, market values, and applicable technology. The THLB is derived from an assessment of forest management practices and assumptions described in a Timber Supply Review (TSR).
Timber Supply Review (TSR)	A process that evaluates all forests within a timber supply area for their contribution to the THLB. At the end of the TSR process, the Chief Forester determines an allowable annual cut (AAC) (i.e., the harvest volume appropriate for an area) based on the amount of timber that is forecast to be available for harvesting over a specified time and under a particular management regime.
Values	The things that the people and government of British Columbia care about and see as important for assuring the integrity and well-being of the province's people and communities, economies, and ecological systems, defined in policy, legislation, or agreements with First Nations (Province of B.C., 2016).

1 INTRODUCTION

The Province of British Columbia (the Province) developed the Cumulative Effects Framework (CEF) to measure the impacts of natural resource activities on values that are important to the people of British Columbia (B.C.). The CEF aims to incorporate the combined effects of all activities and natural processes into decision making to help avoid unintended consequences to identified economic, social, and environmental values.[1] Current condition assessments form the basis for the CEF and reports on the current condition of individual CEF values using indicators to demonstrate the cumulative effects (CE) of multiple natural resource activities on each value.

Old growth forest is a provincial CEF value that is important for the conservation and maintenance of biodiversity at all scales. This report describes the current condition of old growth forest as part of the provincial CEF and follows the Interim Assessment Protocol for Old Growth Forest in British Columbia (2017). Supplementary documents have also been developed to provide additional context: Old Growth Forest Management in British Columbia: Provincial Backgrounder (2024), and Old Growth Forests in British Columbia: Provincial Cumulative Effects Assessment Backgrounder (2024).

This CE assessment compares the amount of old growth forest currently on the landscape to old growth forest targets. The current condition is assessed relative to management objectives in legal orders for old growth forest and relative to policy direction for mature-plus-old forest. The management of old growth forest varies across the province. In general, the Provincial Non-Spatial Old Growth Order (PNOGO, 2004) is used as the default for old growth forest legal targets unless a local order or higher-level plan rescinds it, while policy targets from the Biodiversity Guidebook (BDG, 1995) are applied to assess the amount of mature-plus-old forest on the landscape.[2] The specifics of old growth management applicable to this report are described in section 3.

Assessment indicators were developed to understand the current condition of the old growth forest value:

- the current amount of old growth forest relative to legal or policy targets;
- the current amount of mature-plus-old forest relative to policy targets;
- incursions[3] into Old Growth Management Areas (OGMAs) relative to accepted levels of incursion defined by the applicable order or policy; and
- the current amount of old growth forest in OGMAs as compared to legal or policy targets.

This assessment was completed within the Cumulative Effects Crown Forested Land Base (CE-CFLB). Assessment units (AUs) are based on the unique combinations of landscape unit[4] (LU), natural disturbance type (NDT), biodiversity emphasis option (BEO), and biogeoclimatic ecosystem classification (BEC) subzone or variant.

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[1] Under the Cumulative Effects Framework, cumulative effects are defined as changes to environmental, social, and economic values caused by the combined effect of past, present, and potential future human activities and natural processes.

[2] The targets from the PNOGO and the BDG are relatively the same, however there may be some regional variability considered in PNOGO that resulted in modified targets from the BDG (e.g., limiting impact to timber supply).

[3] "Incursions" are defined as alterations to OGMAs caused by permitted activities, such as forestry cutblocks and roads, a range of non-forestry-related industrial activities, and human use features such as recreation sites and trails. To the extent possible, only active, initiated, tenured, and completed developments will be included in the layer and not activities that are conceptual, investigative, or authorized (i.e., project not yet started even though may have permits and/or certificates).

[4] Landscape units (LUs) are planning areas whose boundaries are based on topographic or other landscape geography features.

This report interprets the current condition of old growth forest compared to the legal order targets established for old growth forest, as well as non-legal policy targets for mature-plus-old forest, at a broad level. **It does not consider whether these targets are effective at conserving sufficient old growth forest to maintain biodiversity. If current condition reports indicate that the old growth targets are not being met for a specific area, additional analysis and evaluation should occur.**[5]

The intended audience for these reports includes government natural resource staff and statutory decision makers who can use it to inform decision-making and collaboration with First Nations in co-management. Other users of this information include natural resource industries and community stakeholders to ensure that cumulative effects are identified, considered, and managed appropriately.

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[5] The CE old growth current condition assessment reports on the total amount of Cumulative Effects Crown Forested Land Base without differentiating between the non-contributing land base and timber harvesting land base. It does not provide how much old growth forest is within other no-harvest land use designations.

2 MERRITT TSA OVERVIEW

2.1 Land Base Description

This CE assessment was completed for the Merritt Timber Supply Area (TSA) which is in the southern interior of the province within the Thompson Okanagan Region (the Region) (Figure 1). The TSA is part of the Cascades Natural Resource District and includes the communities of Merritt and Princeton. It covers approximately 1.13 million hectares (ha) or 15% of the Region, from the United States border to the Thompson Plateau to the north and east, and the Cascade Mountains to the west. The Merritt TSA has 17,296.8 ha of area designated in Provincial Parks, Protected Areas, or Ecological Reserves. There are 31 First Nations communities whose traditional territories include areas within the Merritt TSA, including the following First Nations communities located within the TSA: Coldwater, Cooks Ferry, Nooaitch, Shackan, Upper Nicola, Lower Nicola, and Upper Similkameen.

The topography of the Merritt TSA varies from steep river valleys and mountainous terrain in the west, to dry and relatively flat terrain in the east, with the Similkameen River in the south and the Nicola River in the north. This landscape diversity is reflected in the mix of tree species and wildlife habitats present across the TSA. Historically, disturbance events such as wildfires, windthrow, and insects have been the predominant stand-initiating and stand-maintaining natural disturbance events.

There are 26 tree species within the Merritt TSA listed in the provincial Vegetation Resources Inventory (VRI), with large areas dominated by interior Douglas-fir, lodgepole pine, sub-alpine fir, spruce, and ponderosa pine, and smaller components of trembling aspen, black cottonwood, and other deciduous species. In addition, there is 75.1 ha of Whitebark pine leading stands (as designated by the *Species at Risk Act*) in the ESSFdc2 (Engelmann Spruce-Subalpine Fir South Thompson Dry Cold) and ESSFdmw (Engelmann Spruce-Subalpine Fir Moist Warm) ecosystems. This diversity results in habitats that support a variety of wildlife, including mule deer, moose, black bear, grizzly bear, smaller furbearers, as well as many species of birds, fish, and amphibians. Several at-risk species also occur in the TSA, including tailed frog, Williamson's sapsucker, and white-headed woodpecker.

There are different administrative boundaries shown in Figure 1. The CE assessment is based on the Merritt TSA boundary as this is the land base that the old growth forest targets have been established through PNOGO (see section 3.2). However, this administrative boundary is different from the boundary established for the Region (Thompson Okanagan) and the District (Cascades). This difference is most notable in the Similkameen landscape unit (LU) in the southern portion of the TSA. E.C. Manning Park is partially within this LU (12,974.1 ha), as such this area is included in the assessment, however most of the park is outside of the TSA (70,695.9 ha) and is not included in this CE assessment. Similarly, the TSA boundary extends to the south of the Tulameen LU and outside of the Region or District but is part of the TSA and therefore is included in this assessment.

For the purposes of this CE current condition report on old growth forest, the land base for all data and analyses presented is based on the Cumulative Effects Crown Forested Land Base (CE-CFLB) (Figure 1). The Merritt TSA contains 887,134.2 ha of CE-CFLB, which is 78% of the gross TSA area (Table 1).
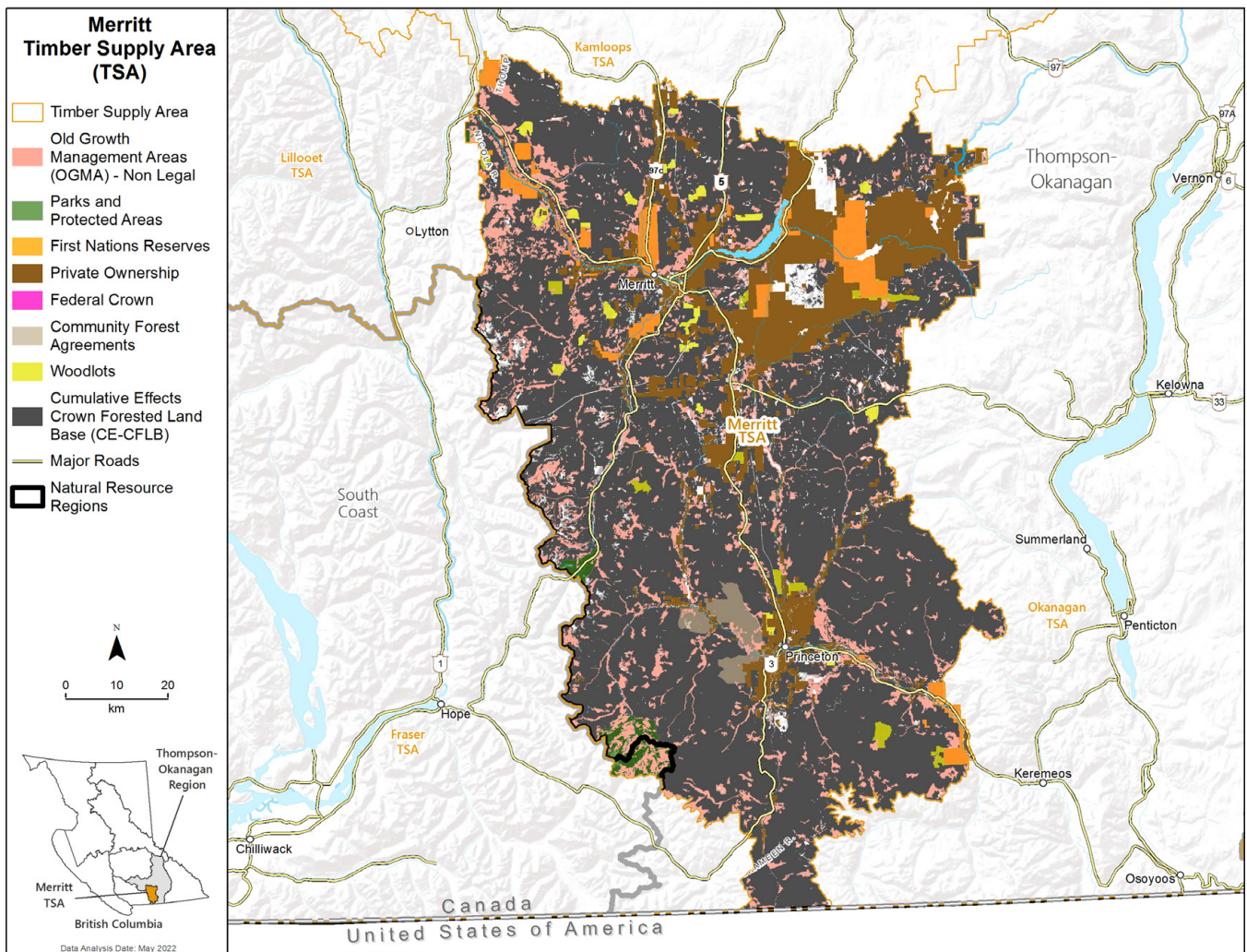
Figure 1. *Ownership and Land Use Classifications in the Merritt Timber Supply Area (TSA).*

Cumulative Effects Crown Forested Land Base (CE-CFLB) Description

The basic definition of the Crown Forested Land Base (CFLB) is the area of Crown land managed for natural resource values that excludes land ownership (e.g., private land). However, the definition of CFLB can differ across the province and from one provincial initiative to another. For example, the CFLB used in Timber Supply Reviews (TSRs) is different than the definition used for Cumulative Effects (CE) assessments.

The old growth forest CE assessments use the Cumulative Effects Crown Forested Land Base (CE-CFLB) as the denominator to calculate whether old growth forest targets are being achieved. The Forest Management Land Base Indicator (FMLB) is the foundation to developing the CE-CFLB and is an attribute of the Vegetation Resource Inventory (VRI) that identifies whether a polygon is forested or capable of producing a stand of trees. Area-based tenures (e.g., Tree Farm Licences and Community Forests) that are more than 600 ha are included in the CE-CFLB, except for Woodlots regardless of area (i.e., all Woodlots are excluded from this assessment).

All CE assessment results for this report are generated using the CE-CFLB except for the OGMA incursion indicator which uses the total OGMA area. For more detailed information on how the CE-CFLB was developed and how it differs from CFLBs calculated for other initiatives, refer to Old Growth Forests in British Columbia: Provincial Cumulative Effects Assessment Backgrounder (2024).

The CE-CFLB for the Merritt TSA is 887,134.2 ha, which is 78% of the gross TSA area (Table 1). For comparison and to demonstrate the difference in CFLB definitions across provincial initiatives, the CFLB used for the 2016 Merritt TSA Timber Supply Review was 805,857 ha (March 2016, page 8).

Table 1. *Summary of Area Designations in the Merritt Timber Supply Area (TSA).*

Land Base	Gross Area (ha)[a]	FMLB Area (ha)	Private Land (ha)	Area-Based Tenures (ha)	Provincial Parks & Protected Areas (ha)	CE-CFLB Area (ha)
Merritt TSA	1,131,145.7	1,013,401.0	159,210.4	28,950.9	17,296.8	887,134.2

[a] There may be overlap between area designations. Therefore, each area value is presented independently of the others in such a way that they do not sum together to equal the gross area of the land base. The information presented is based on the Old Growth Cumulative Effects Crown Forested Land Base (CE-CFLB) and CE Assessment resultant dataset derived from the BCGW VRI (data extracted in 2019).

2.1.1   Natural Disturbance Types

For the purposes of setting old growth forest objectives (i.e., targets), the BDG recognizes five Natural Disturbance Types (NDT) in B.C. The NDTs characterize areas with different natural disturbance regimes and describe the frequency of stand-initiating events that largely terminate the existing forest structure and initiate secondary succession to start a new stand.

Of the five NDTs classified for the province, all occur in the Merritt TSA (Figure 2, Table 2). The most common natural disturbance types are NDT4 (frequent stand-maintaining events) and NDT3 (frequent stand-initiating events). The NDT5 ecosystems include alpine BEC zones and sparsely forested parkland BEC variants. Disturbance return intervals and age-based definitions are not defined for NDT5 ecosystems in the BDG.
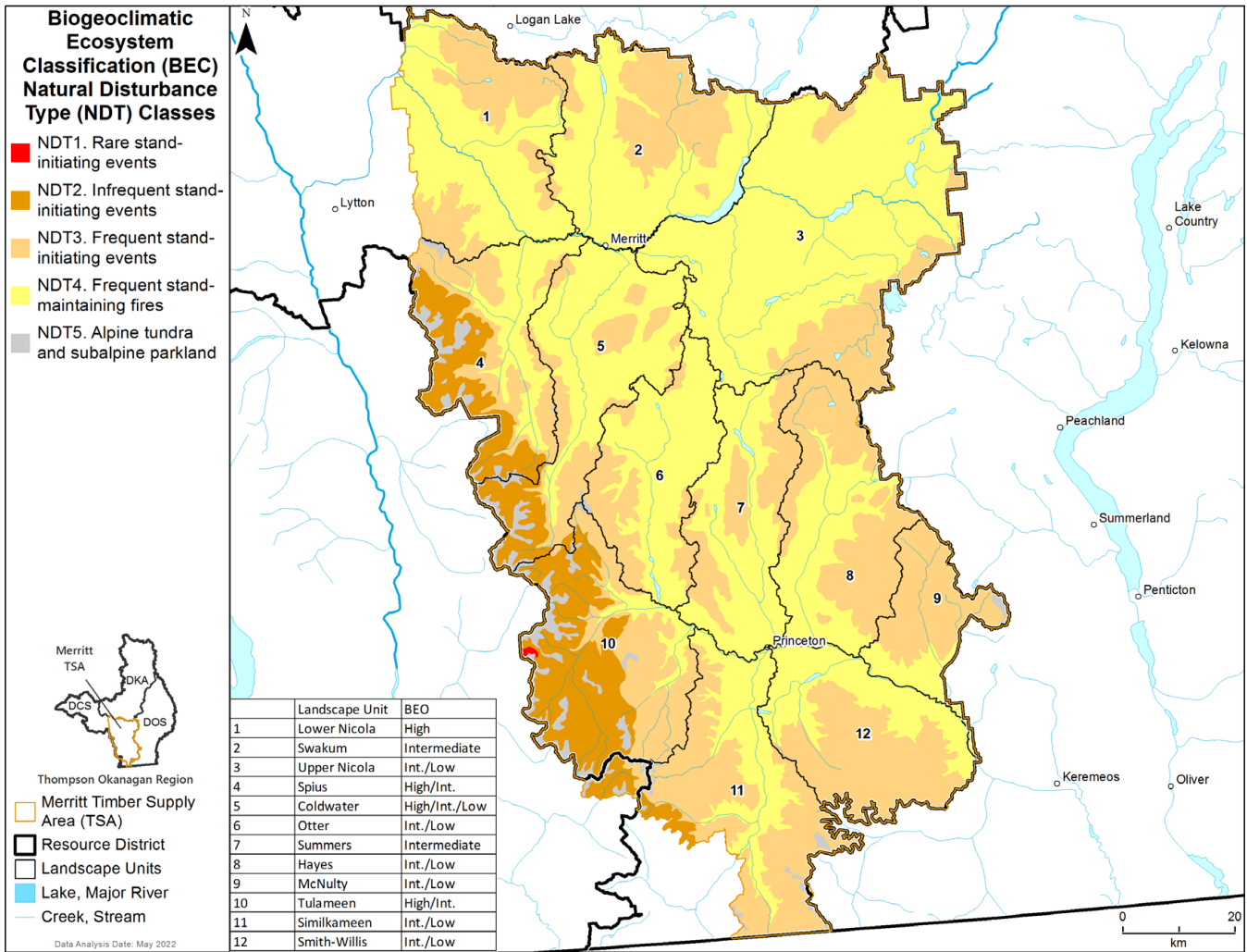
Figure 2. *Distribution of Natural Disturbance Types (NDT) by Landscape Unit (LU) in the Merritt Timber Supply Area (TSA).*

The total area of the CE-CFLB (887,134.2 ha) is classified by NDT in the Merritt TSA (Table 2). However, only NDT 1, 2, 3, and 4 contain old growth forest as defined by the PNOGO. The area associated with NDT5 is reported to show the distribution across the land base, however no age or old growth forest targets are assigned to these ecosystems. The total amount of old growth forest in the CE-CFLB within the TSA is 120,6117 ha.

Table 2. *Distribution of Natural Disturbance Types (NDT) in the Cumulative Effects Crown Forested Land Base (CE-CFLB) in the Merritt Timber Supply Area (TSA).*

NDT	NDT Ecosystem Description	Total Gross Area (ha)	Total CE-CFLB Area (ha)	Total Amount of Old Growth Forest in CE-CFLB (ha)
NDT1	Rare stand-initiating events	369.1	347.0	122.4
NDT2	Infrequent stand-initiating events	87,481.7	84,323.1	6,816.9
NDT3	Frequent stand-initiating events	420,499.6	408,655.3	104,962.7
NDT4	Frequent stand-maintaining events	594,594.8	373,053.7	8,709.7
NDT5	Alpine and subalpine parkland	28,200.5	20,755.0	0.0
Total		**1,131,145.7**	**887,134.2**	**120,611.7**

2.1.2   Biodiversity Emphasis Options

While NDT and BEC provide the ecological basis for natural seral stage amounts and ages expected under the natural disturbance regime, LU and BEO provide an important administrative basis for setting seral stage targets. Biodiversity emphasis was introduced in the BDG to balance socio-economic interests (primarily timber supply) with the risk of losing elements of natural biodiversity. A High BEO emphasizes a higher priority to biodiversity conservation, an Intermediate BEO reflects a trade-off between biodiversity conservation and timber production and a moderate risk to natural biodiversity, while a Low BEO emphasizes commodity production with less emphasis on biodiversity conservation and thus higher risk to natural biodiversity. The BEO designation determines the minimum required amount of early, mature, and old seral stage forest to maintain biodiversity values in each LU.

Landscape Units (LUs) are planning areas whose boundaries are based on topographic or other landscape geography features. There are 12 LUs within the Merritt TSA that were established and assigned a BEO using the Forest Practices Code's Landscape Unit Planning Guidebook (LUPG, 1999) and the BDG through an OGMA project lead by the provincial government in 2002. These established LUs and BEOs were subsequently adopted and made legal in PNOGO in 2004. The majority of LUs in the Merritt TSA are assigned as Intermediate and Low BEO (Figure 3, Table 3), while there are four LUs assigned as High BEO: Lower Nicola, Spius, Coldwater, and Tulameen. In addition, there are nine LUs assigned multiple BEOs to address local management objectives: Upper Nicola, Spius, Coldwater, Otter, Hayes, McNulty, Tulameen, Similkameen, and Smith-Willis (Table 3).
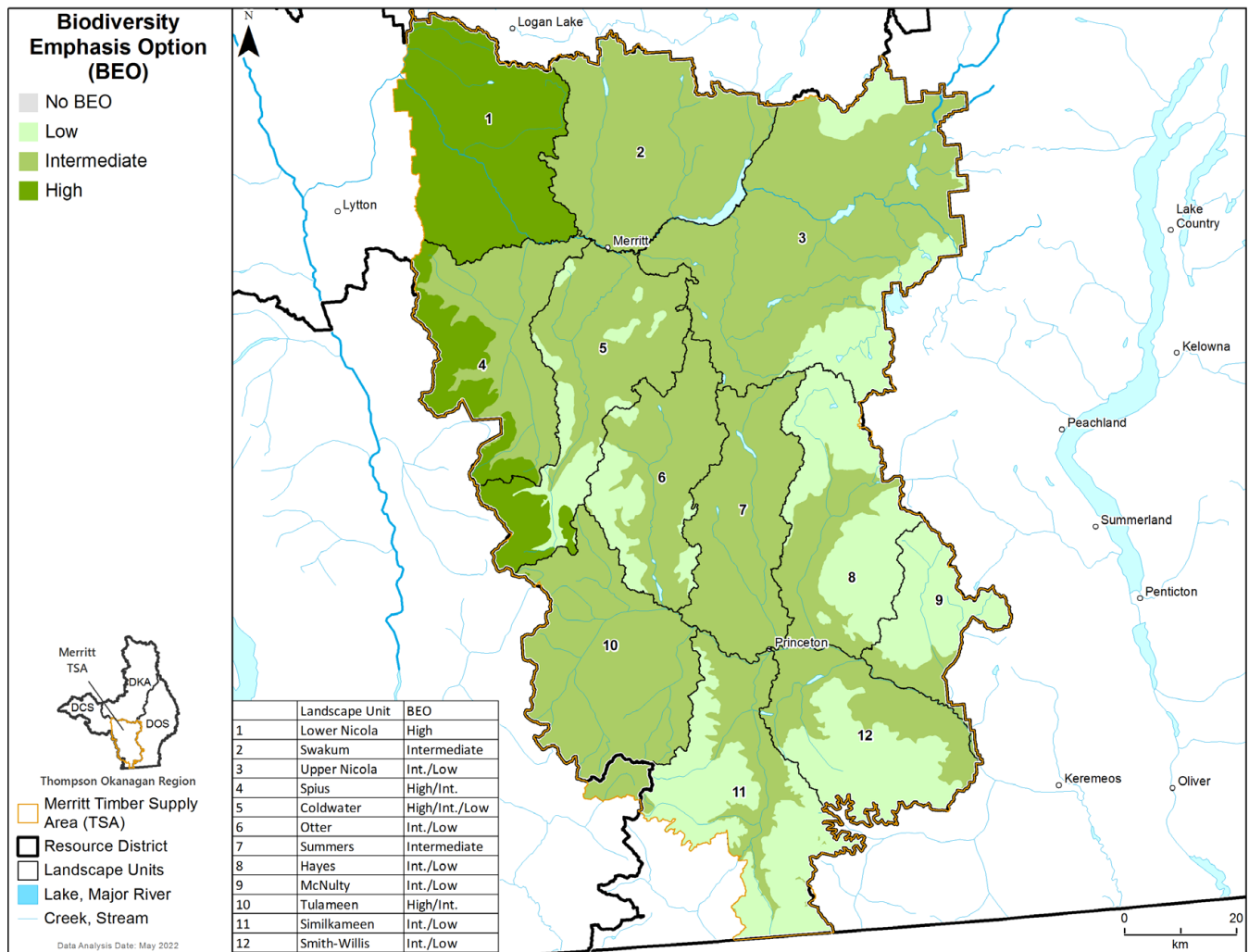
Figure 3. *Biodiversity Emphasis Option (BEO) by Landscape Unit (LU) in the Merritt Timber Supply Area (TSA).*

Table 3. Biodiversity Emphasis Option (BEO) by Landscape Unit (LU) in the Merritt Timber Supply Area (TSA).

Landscape Unit		BEO	Landscape Unit		BEO
1	Lower Nicola	High	7	Summers	Intermediate
2	Swakum	Intermediate	8a	Hayes	Low
3a	Upper Nicola	Low	8b	Hayes	Intermediate
3b	Upper Nicola	Intermediate	9a	McNulty	Low
4a	Spius	High	9b	McNulty	Intermediate
4b	Spius	Intermediate	10a	Tulameen	Intermediate
5a	Coldwater	Low	10b	Tulameen	High
5b	Coldwater	Intermediate	11a	Similkameen	Low
5c	Coldwater	High	11b	Similkameen	Intermediate
6a	Otter	Low	12a	Smith-Willis	Low
6b	Otter	Intermediate	12b	Smith-Willis	Intermediate

2.1.3   Biogeoclimatic Ecosystem Classifications

For setting biodiversity and old growth forest objectives, the BEC system is used to spatially define NDTs, recognizing the natural disturbance regime is influenced by differences in climate, topography, and vegetation cover within an NDT. The BEC system consists of the zone (broadest level of classification), followed by up to three more levels of refinement: the subzone, variant, and phase. The BEC subzone variant is the smallest ecological unit that old growth forest objectives are established. Not all BEC units represent forested ecosystems and therefore certain non-forested BEC units may not be included in the assessment of current condition for old growth forest. Detailed information on each BEC unit is available on the BEC Web . Please note that BEC data changes over time as new information becomes available and ecosystem classifications are better understood.

The old growth forest targets for the Merritt TSA are hectares-based and were made legal at the time of PNOGO establishment (see section 3 for a full description of how targets are established). This means that the BEC version (BEC version 5) at the time of PNOGO establishment was used to define the area-based targets. As a result, this CE assessment used BEC version 5 to compare the current condition relative to the legal (old growth forest) targets in PNOGO. To maintain consistency and compare between indicators in this assessment, BEC version 5 was also used for the mature-plus-old forest and OGMA indicators. However, it is important to note that at the time of this assessment the latest BEC was version 11.

The diversity in the Merritt TSA supports a range of BEC zones. The TSA includes eight regional BEC zones, which is further refined to 19 unique BEC subzone and variant combinations (Figure 4). Within subzones there can be considerable variations in the regional climate as expressed in variants of drier, wetter, snowier, warmer, or colder.

The topography of the TSA ranges from mountainous terrain and river valleys of the Cascade Mountains to the southwest, to the drier and relatively flat, lower elevation forests and grasslands of the Thompson Plateau in the east and north. Most of the TSA is within the Interior Douglas-fir (IDF, 532,757.8 ha or 47% of the TSA) and Montane Spruce (MS, 314,683.8 ha or 28%) BEC zones, with the remainder of the TSA largely within the Engelmann Spruce-Subalpine Fir (ESSF, 200,113.9 ha or 18%).
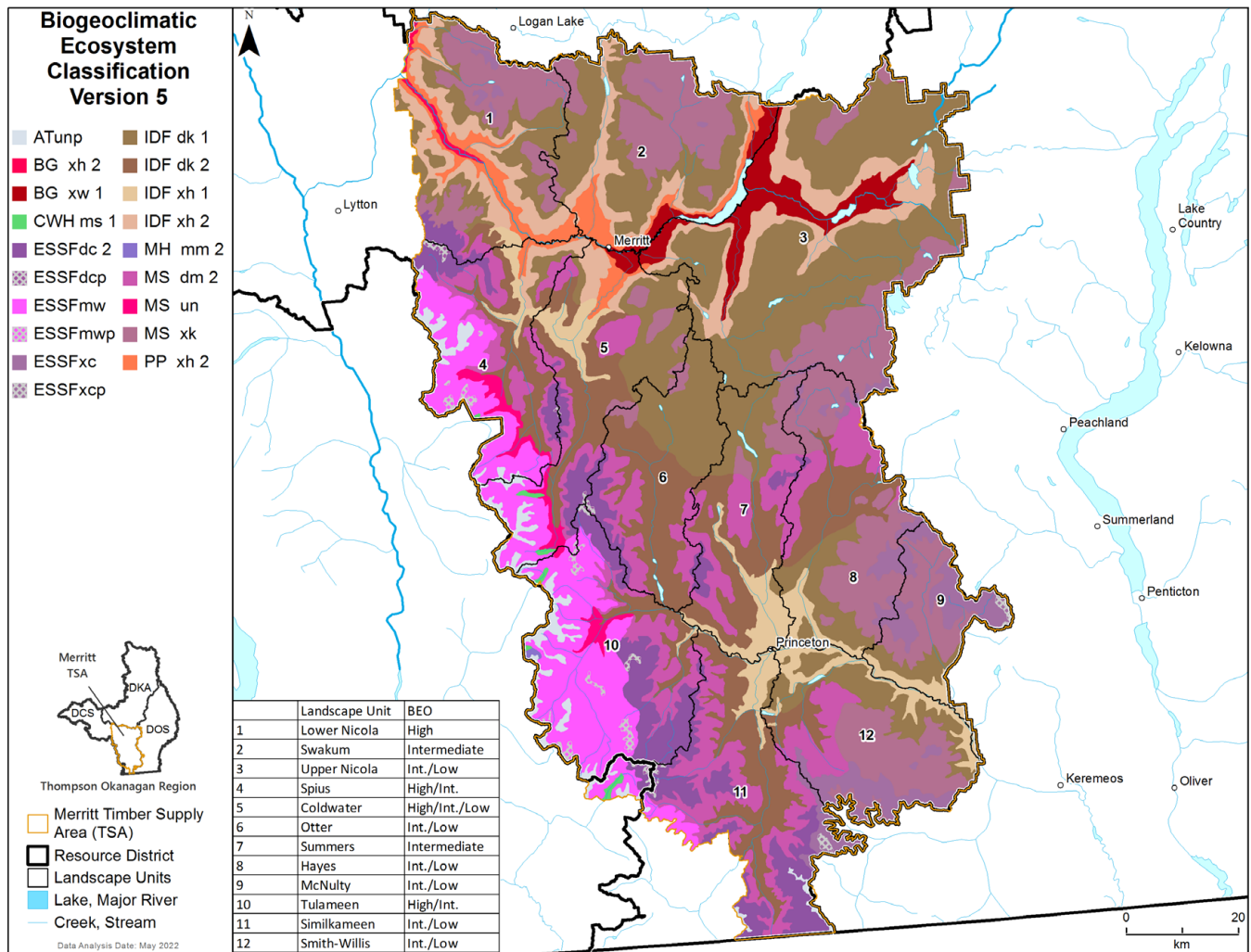
Figure 4. *Distribution of Biogeoclimatic Ecosystem Classification (BEC) Subzone Variant (Version 5) in the Merritt Timber Supply Area (TSA).*

2.1.4   Seral Stage

Seral stages are classified using age-based definitions of the minimum age a forest should be before important structural attributes associated with that seral stage are developed in the forest stand. Seral stages and the associated ranges of tree age are technical definitions required for the assessment of inventory data related to old growth forest biodiversity. In this report, seral stage categories are referred to in short-hand (i.e., old, mature, mid-age, and early forests). Stand ages were derived from the 2019 VRI in order to assign a seral stage.
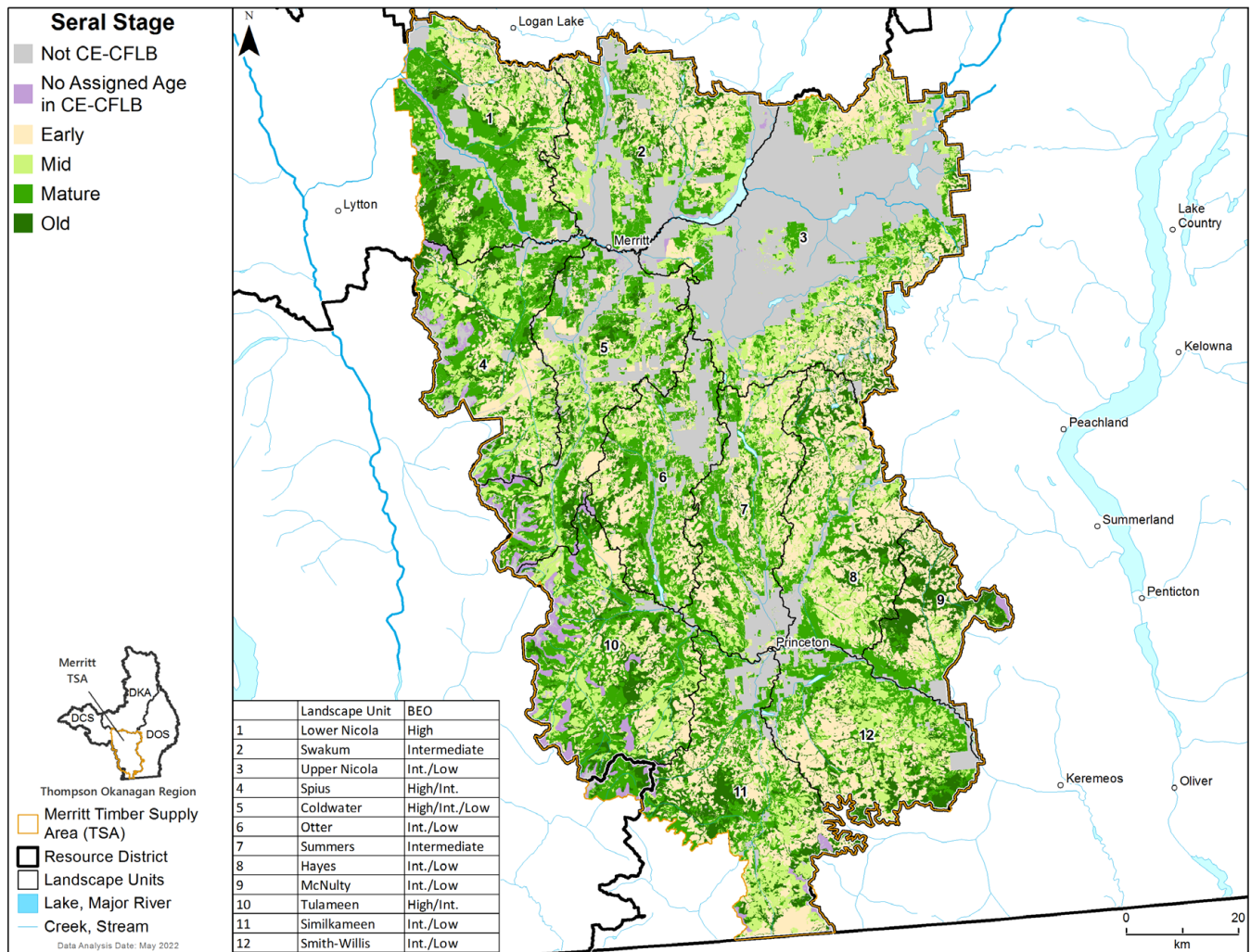
Figure 5. *Current Seral Stage Distribution in the Merritt Timber Supply Area (TSA).*

The seral stage distribution across the Merritt TSA shows general patterns of younger forests across the TSA with pockets of old forest in the mid to higher elevations (Figure 5). Seral stage ages are assigned for 97.5% of the CE-CFLB (Table 4). The remaining 2.5% was either within the bunchgrass BEC zone (NDT4) or the NDT5 (alpine tundra and subalpine parkland above the tree line) being in the CE-CFLB but lacking age-based definitions and targets for old growth forest and mature-plus-old forest (Figure 2, section 2.1.1).

Table 4. *Current Seral Stage Distribution in the Merritt Timber Supply Area (TSA) Cumulative Effects Crown Forested Land Base (CE-CFLB).*

Seral Stage[6]	Total CE-CFLB Area (ha)	% of Total CE-CFLB Area
Early	293,564.2	33.1%
Mid	170,112.1	19.2%
Mature	280,524.8	31.6%
Old	120,611.7	13.6%
No seral stage assigned	22,321.4	2.5%
Total	**887,134.2**	**100.0%**

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[6] Age definitions that are used to define seral stage were taken from the Provincial VRI (2019). There are different age-based definitions for mature and old forest depending on the NDT and BEC.

2.2   Cumulative Effects in the Merritt TSA

Old growth forests are impacted by multiple resource development activities and natural disturbance events, which may result in cumulative effects. A description of different activities and natural disturbance events for the Merritt TSA are outlined below.

2.2.1   Land Use

The economy in the Merritt area is predominately natural resource based, including forestry, mining, range, agriculture, recreation, and tourism, as well as various public agencies (e.g., government). The extensive grasslands and forested areas provide forage for livestock and wildlife while the major river systems of the Similkameen and Nicola rivers provide numerous angling opportunities.

The Region released An Assessment of Old Growth Management Areas Potentially Impacted by Non-Forest Tenure Activities in the Thompson Okanagan Region (MFLNRO, 2014b) to review human-caused (anthropogenic) disturbances within OGMAs across the Region from 2006 to 2013. This report indicated the actual area of disturbance in OGMAs from non-forest activities and the overall risk from these tenures was low. At the regional scale, less than 0.2% of the total OGMA area was disturbed by non-forest activities. Most high-risk areas overlapped with Mines Act notices of work, utility lines, and roads; the greatest disturbances were from linear corridors. Smaller and narrower OGMAs resulted in more frequent disturbances due to their shape and size and were more likely to require replacement as the incursion threshold was exceeded. It is important to note that some disturbances impact values other than trees, such as riparian areas and soils, while other disturbances have less of a biological impact because they occur in open, dry stands which can mimic the natural openings and disturbances in those ecosystems.

2.2.2   Forest Harvesting

The Merritt TSA is the designated area to be managed for a range of objectives including timber production. The TSA has some of the most accessible timber supply in the province as the area is predominately characterized by gently rolling topography. The Allowable Annual Cut (AAC), which sets the maximum rate of timber harvest for the TSA, has been reduced in the most recent Timber Supply Review (TSR) as the response to the mountain pine beetle epidemic was nearing completion and in recognition of the need for sustainable management of other forest values (MFLNRO, 2015). The current AAC was set on March 30, 2016, at 1.5 million cubic metres (m3) until March 29, 2021, at which time the AAC will be reduced to 1.2 million m3 (MFLNRO, 2016). In general, the AAC has been variable in the TSA in response to mountain pine beetle infestations (uplifts in 1999 and 2005) and reflecting new inventory and site productivity information.

In the Region's assessment of OGMAs potentially impacted by non-forest tenure activities from 2006 to 2013, the amount of disturbance due to forest harvesting activities was considered (MFLNRO, 2014a). The assessment showed an overall net increase in total OGMA area (over the Region) due to forestry licensee replacement practices. In general, at the time there had been minimal logging within OGMAs since the non-legal OGMAs were delineated in 2003.

Harvesting forest stands adjacent to old growth forest and OGMAs can have a direct impact to the structure and function of the adjacent old growth forest habitat by increasing the amount of edge forest (Bezzola and Coxson, 2020). Edge effects from forest harvesting can increase the risk of blowdown and invasive species and alter climatic conditions to adjacent ecological communities (i.e., increased light). Forest harvesting patterns can contribute to a fragmented landscape and isolation of OGMAs from other old growth forest patches and reduce connectivity to areas of high biodiversity (e.g., wetland complexes). This can reduce the long-term resiliency of these ecosystems and their ability to adapt to natural disturbances and climate change (Coxson and Werner, 2019).

Non-legal OGMAs were designed in 2003 that were intended to mitigate threats to old growth forest from harvesting. While co-location of old growth forest biodiversity and other non-timber objectives often occurs, the impact of this management decision on old growth forests is yet to be fully understood. In addition, the Independent Old Growth Strategic Panel Report (Gorely, A. & Merkel, G., 2020) commissioned by the Province has recommended a paradigm shift away from the timber-based policies of old growth forest management in B.C. towards prioritizing ecosystem health and resilience.

2.2.3   Natural Disturbances

This Merritt TSA has experienced many changes in recent years, in particular due to natural disturbances such as wildfires and bark beetle infestations (e.g., MPB). There is a history of wildfire disturbances in the TSA which have resulted in large-scale shifts in seral stage distribution and ecosystem composition across much of the Region. Recent wildfires have also affected the TSA resulting in impacts across the land base, including disturbances within OGMAs. Large recent wildfires include the Diamond Creek (2017), Cool Creek (2018), Lytton Creek (2021), July Mountain (2021), and Garrison Lake (2021) wildfires, as well as the Lytton Creek wildfire complex, which included the Lytton Creek (37,312 ha estimated total wildfire area within the Merritt TSA) (B.C. Wildfire Service, 2022).

The Region completed an Analysis of OGMA Areas within Fire Perimeters (MFLNRORD, 2020), and identified that between 2013 and 2019 the total OGMA area impacted by wildfires in the Cascades District (which includes the Merritt and Lillooet TSAs) was 3,419.1 ha. Wildfire disturbance was noted in 107 OGMAs, impacting 3% of all OGMAs in the District. Burn severity ratings for these OGMAs were medium (1,605.5 ha), high (625.0 ha), unburned (527.2 ha), low (468.2 ha), and unknown (193.3 ha), respectively.

How wildfires are represented in this CE assessment is challenging due to the complications of how wildfires are represented in the VRI. The seral stage is based on the ages assigned in the VRI; however, shifts in the age classification of a forested polygon due to natural disturbances (i.e., insects and wildfires) may not be reflected in the assigned ages in the VRI post-disturbance. The seral stage for each forest stand is assigned using the forest age taken from the 'projected age' attribute from the VRI, which is an estimate of the average age of the co-dominant trees in a forested polygon. The 'projected age' is used to represent the time since the last stand-initiating natural disturbance event. Forest inventories are updated annually to revise spatial polygons to include new forest harvesting (e.g., cutblocks) where the age of the forest is reset to a younger age class. However, in the case of natural disturbances, the 'projected age' attribute is not modified until the VRI polygon is re-inventoried. This means that natural disturbances such as fire or insect killed stands that results in a change from old to young forest is only captured in these reports where that has been reflected in the VRI (i.e., once an area is re-inventoried or other forest management activity has occurred).

At this time, there is no Provincial standard or guidance on adjusting stand age based on natural disturbance. Since this CE assessment is reporting the amount of old growth forest against legal and policy targets, it does not attempt to make assumptions or determinations on age adjustments post natural disturbance and uses the stand ages currently reflected in the VRI. **Because changes in age due to natural disturbances are not immediately reflected in the VRI, the amount of old growth forest (or mature-plus-old forest) may be over-estimated, while the amount of early forest may be under-estimated.**

2.2.4   Climate Change

A key area of uncertainty is climate change and the potential rate, amount, and characteristics of climate change impacts that can be anticipated. The Region has already experienced a warming trend of just over 1°C in the last century, with this warming trend greater over the 1951-2009 period (PCIC, 2013). Precipitation has also been increasing in all seasons during this period. However, these trends are regional averages and locations with complex topography could vary considerably with elevation.

Climate change projections suggest the Region will warm on average between 1.6 and 4.4°C by the end of this century (PCIC, 2013; Government of Canada, 2020). Temperatures will warm year-round with hotter summers expected to be more pronounced in valley bottoms. This may result in longer warm seasons, including earlier springs and later fall conditions, and shorter cold seasons over time. Precipitation projections show a modest increase (10%) in all seasons except summer which will remain the driest season (decrease 10%). This, in concert with hotter temperatures, will increase evaporation rates and create even drier, hotter summers than currently experienced. Changes in precipitation are likely to cause more frequent flooding and landslide events, reduced snowpack, and changes to quantity and timing of stream flows, which in turn increases stress to ecosystems and infrastructure.

Forests are vulnerable where the natural disturbance regime is projected to change; for example, from a gap-dynamic dominated system to a stand-replacing disturbance regime. Increased temperatures may result in more frequent and longer insect outbreaks that pose a higher risk to increasingly drought-stressed stands. Tree mortality may increase because of increased forest health risks exacerbated by drought stress and severe disturbance events (e.g., catastrophic wildfire, windstorms). Increased precipitation may result in more frequent and intensification of tree infection by forest pathogens adding to tree stress. Extreme weather events will increase the risk of flooding and potentially trigger mass movements in steep terrain, particularly during rapid melt periods. Given the complexity of variables, the potential for unanticipated outcomes and cumulative effects is high (Sturrock et al., 2011).

3 OLD GROWTH FOREST MANAGEMENT IN THE MERRITT TSA

The PNOGO provides the consistent foundation of non-spatial legal targets for old growth forest management. In the Merritt TSA, old growth forests are managed the following way:

1. Non-spatial old growth forest targets legally established through the Provincial Non-Spatial Old Growth Order (PNOGO, 2004) that set retention targets by total area (hectares); and

2. Spatial non-legal OGMAs intended to manage the old growth forest area targets under PNOGO.

Refer to Appendix 3 (Table 23) for a complete summary of the old growth forest targets by assessment unit (AU) for the Merritt TSA. Management of mature forest for recruitment into old growth forest is guided through non-legal policy targets, as defined in the BDG. Management of mature forest for forest biodiversity on the landscape has not been a priority or legally established in the Merritt TSA or most of the province. The inclusion of mature-plus-old forest as a CE assessment indicator for old growth forest provides additional information and clarification on the current condition of forest seral stages that may contribute to old growth forest values. More information on old growth forest management in B.C. is provided in the Old Growth Forest Management in British Columbia: Provincial Backgrounder (2024). Refer to Appendix 3 (Table 24) for a complete summary of the mature-plus-old forest targets for the Merritt TSA.

3.1   Old Growth Forest Management History

The spatial non-legal OGMAs in the Merritt TSA were identified through a collaborative process with representatives from government, forest industry, and First Nations. The amount of old growth forest to be managed across the TSA was identified in 114,000 ha in 2003 using the BDG. From 2003 to 2004, government staff, forest licensees, and several First Nations participated in identifying the spatial non-legal OGMAs across the 12 LUs in the TSA. This was completed largely through a consensus-based process with some negotiations. Once PNOGO was brought into legal effect in 2004, the targets (Appendix 2, Table 2) guiding the spatial non-legal OGMAs were made legal.

The Landscape Unit Planning Guide's (LUPG, 1999) "rules-based" approach on how OGMAs were to be designed to mitigate impacts on timber supply (i.e., no more than 4% impact to timber supply) was used in the Merritt TSA. This required that all old growth forest retention targets be met (i.e., co-located) in areas with harvesting restrictions first (e.g., Parks, Ecological Reserves, Wildlife Habitat Areas, Ungulate Winter Ranges). Only after the old growth target was co-located could the remaining target area be designed as OGMAs in that LU-BEC. If there was not enough old growth forest in the LU-BEC to meet the target, then the next oldest available forest (generally mature forest) could be recruited.

Predictive ecosystem mapping (PEM) and terrestrial ecosystem mapping (TEM) were used to identify stands based on the presence of old growth stand attributes (i.e., structural stage) and stand selection was not necessarily based on stand age. The northern half of the TSA had little old growth forest identified in the VRI. To achieve targets in some LU-BEC zones where old structural stages were not available, the oldest age class and best available stands were selected. In some areas stands were selected for the ecological location, attributes, habitat, and/or tree species. To fulfill targets where nothing was available, OGMAs were selected in adjacent BECs or LUs. Additionally, some locations may have been selected for cultural or other values in concert with PEM/TEM old growth attributes. This influenced the age of stands selected for OGMAs because they were not solely chosen for being old seral forests. In some areas, OGMAS were co-located in areas of cultural importance at the request of a First Nation community. As a result, cultural sites were added to the OGMA replacement criteria and best practice would include engagement with potentially impacted First Nations.

In general, PNOGO includes the option to reduce old forest retention in LUs with Low BEO by up to 2/3 and full targets do not need to be met for 240 years as a means to avoid impacting timber supply (section 5).[7] This 2/3 "draw down" is described further in the LUPG (1999) with the intent that full targets will be achieved by the end of the third rotation (i.e., 240 years). In the Merritt TSA, the targets were identified and OGMAs were delineated before PNOGO was established. The PNOGO states that for the Merritt TSA, targets are specified in Appendix 2, Table 2, subject to sections 6-8, but does not include section 5 which allows the 2/3 drawdown in Low BEOs. Therefore, it is interpreted that this drawdown does not apply to the Merritt TSA, and this CE assessment compares to the full old growth forest targets.

Since 2018, forest licensees have adopted these spatial non-legal OGMAs in their Forest Stewardship Plans (FSPs) through approved results and strategies that are implemented to meet old growth forest objectives. Licensees that use these non-legal OGMAs in their FSPs have managed OGMA changes over time for due diligence purposes and to ensure that incursion limits are not exceeded (see section 3.2.2).

While this is separate from the OGMA planning process, it is important to note that the total area designated in parks within the TSA is relatively small; there is 17,296.8 ha in Provincial Parks and Protected Areas which is 1.5% of the gross TSA area. The Merritt TSA did not go through the planning processes (i.e., Land and Resource Management Plans) that occurred across the province in the late 1990's and early 2000's. These larger planning processes were the mechanism used to establish parks with the goal of setting aside approximately 12% of the provincial landbase. However, the Merritt TSA did not participate in this landscape planning process and as a result the parks within the Merritt TSA are older, legacy parks.

3.2   Legal Old Growth Forest Order

Section 4 (old growth objectives for the Merritt area) of the PNOGO is specific to the Merritt TSA, with additional provisions on how old growth forest targets can be met outlined in section 6 (use of younger forest to meet old forest objectives), section 7 (recruitment and catastrophic natural disturbances), and section 8 (draft old growth management areas). For the Merritt TSA, old growth forests are maintained by BEC subzone and variant in each LU to the amount specified (area targets by hectare) in Appendix 2, Table 2 (Merritt Old Forest Retention Table).

3.2.1   Old Growth Forest Targets

In the Merritt TSA, old growth forest targets are legally established in the PNOGO Appendix 2 Table 2,[8] and are set by LU and BEC variant unit combinations with **area targets** defined by hectares. The LUs and associated BEOs are established under PNOGO Appendix 1 Table 1; however, Appendix 2 Table 2 does not provide distinct targets for BEO, instead targets are provided by LU-BEC.[9] The age of old growth forest is defined in PNOGO by Natural Disturbance Type (NDT) and BEC zone (Table 5). Section 6 of PNOGO states that for the Merritt TSA,[10] younger stands and preferably mature forests can be used to meet the targets where it can be demonstrated that equal or better conservation benefits would result.

The PNOGO Appendix 2 Table 1 defines specific area-based targets for the Merritt TSA, however the challenge with this is that the targets are based on information at the time of PNOGO establishment. This means that targets are based on the BEC version at the time, which was BEC version 5. Since that time, BEC has been updated with new information resulting

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in shifts in the spatial locations, new classifications of BEC, or BECs being removed entirely. Because Merritt's PNOGO targets are area-based, they are unable to adapt to the updates and change in BEC, impacting the ability to assign old growth forest targets. Recognizing this gap, the CE assessment was required to use BEC version 5 to best represent the objectives and targets at the time of PNOGO.

The PNOGO targets provide a consistent foundation for current condition reporting of old growth forest as it establishes the minimum threshold for old growth forest representation that should be achieved in each AU. Table 5 only includes the NDT/BECs that have targets provided in PNOGO (using BEC version 5 which was the current version at the time of PNOGO establishment). The NDT5 has been excluded as no targets are established for alpine tundra and subalpine parklands. In addition, portions of the BG BEC zone that occur in NDT 4 have also been excluded as no targets are established in these ecosystems.

Table 5. *Age of Old Growth Forest in the Merritt Timber Supply Area (TSA).*

Natural Disturbance Type (NDT)	BEC Zone	Old Growth Forest Age Definition (years)[11]
NDT1	MH	>250
NDT2	CWH	>250
	ESSF	>250
NDT3	ESSF	>140
	MS	>140
NDT4	IDF	>250
	PP	>250

3.2.2   OGMA Incursions and Amendments

It is common for OGMAs to have historic anthropogenic incursions and natural disturbances included within the OGMA boundary at the time of legal establishment.[12] Natural disturbances such as fires, insects, pathogens, and wind will occur in OGMAs and alter forest stand composition within the OGMA over time. These changes are expected to be most evident in ecosystems with frequent stand-initiating events (NDT3); however, disturbances will naturally occur in all ecosystems. OGMA establishment with known incursions was dependent on the process undertaken for OGMA development. In the Merritt TSA, this included working in partnership with forest licensees and First Nations to minimize operational impacts while ensuring future timber supply was not isolated, and that First Nations interests were adequately considered and included in OGMA location selection.

Incursions into OGMAs vary across the province based on objectives in legal orders and regional policies. Guidance for incursions into OGMAs are provided in the Old Growth Management Area Guidance Thompson Okanagan (ILMB, 2007) regional OGMA document. This guidance applies where there are no legal orders with provisions for acceptable OGMA incursions and therefore is the guidance applied to the Merritt TSA. **The regional OGMA policy provides objectives that allow incursions for very specific reasons up to 10 ha or 10% of the area of the OGMA, whichever is less, for any single OGMA.** Any incursion beyond this threshold would likely result in the OGMA being replaced with an ecologically suitable area.

Since 2018, forest licensees have adopted the non-legal OGMAs within their FSPs and are following the approved results and strategies. In many FSPs, the incursion threshold licensees are managing towards are lower than the regional guidance (10 ha or 10%, whichever is less). For example, some FSPs manage for 1.0 ha incursions regardless of the OGMAs size, and any

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[11] Old growth forest age definitions are from PNOGO (2004).

[12] The Interim CE Old Growth Assessment Protocol defines incursions as anthropogenic (human caused) disturbance footprints that are within the legal or non-legal OGMA boundary. These can include roads, cutblocks, and oil and gas developments. Natural disturbances such as fire, insect, and wind events are not considered incursions under this assessment.

disturbance beyond this required a replacement. Prior to approval of these FSPs, licensees were managing OGMA incursions based on the regional guidance. As such, this CE assessment uses the regional guidance thresholds across the TSA (10 ha or 10%, whichever is less) and not the specific strategies committed to by forest licensees in their FSPs.

Throughout this time and continuing today, incursions/replacements are tracked by the forest licensees for due diligence purposes and to ensure that incursion limits are not exceeded. Changes to the spatial boundary of OGMAs are then submitted to the District which is used to update the provincial OGMA dataset in the B.C. Geographic Warehouse (BCGW). This means that OGMA incursions/replacements are not reviewed by the District on an individual OGMA basis because the FSPs include language that replacement OGMAs must be equal to or better in terms of old growth forest biodiversity.

Through the OGMA establishment process, the LUPG included the provision that OGMAs will not have an impact on the status of existing mineral and gas permits and tenures. As such, these related exploration and development activities are permitted in OGMAs. These activities may proceed to the point of significantly impacting old growth forest values within OGMAs, and even though the activities are exempt from the Orders, OGMA amendment and replacement should be considered.

3.3   Non-Legal Old Growth Forest Policy

Provincial direction under the LUPG (1999) prioritized the management of the old growth forest value and at the time of the PNOGO establishment, mature-plus-old forest targets were not to be implemented. Consequently, mature-plus-old forest targets are not legal requirements in the Merritt TSA. Even though mature-plus-old forest policy targets are not legally required, an assessment is provided to better understand the current state of mature forest and where it may be available for recruitment to achieve old forest targets, particularly where old forest is poorly represented, or OGMAs may need to be replaced. The Biodiversity Guidebook (BDG, 1995) provides policy targets used in this assessment. Refer to Appendix 3 (Table 24) for a complete summary of the mature-plus-old forest targets by AU for the Merritt TSA.

3.3.1   Mature-plus-Old Forest Targets

Mature-plus-old forest targets are incremental to old forest targets; additional old forest can be substituted for mature forest to meet targets. Younger stands may be used to meet old or mature-plus-old forest targets provided they have sufficient biological value. **However, this assessment does not report on the ecological and biological effectiveness of these younger stands that may be contributing to mature-plus-old forest targets.**

Mature-plus-old forest policy targets are set in the BDG by LU for each NDT, BEC, and BEO combination with targets defined by forest age (Table 6). As with the old growth forest targets, Table 6 only includes the NDT/BEC/BEOs that have targets provided in the BDG (using BEC version 5 to maintain consistency and compare with the old growth forest indicator). The NDT5 has been excluded from this table as no targets are established for alpine tundra and subalpine parklands.

Table 6. *Mature-plus-Old Forest Policy Targets (%) and Age Definition by Biodiversity Emphasis Option (BEO) and Biogeoclimatic Ecosystem Classification (BEC) Zone in the Merritt Timber Supply Area (TSA).*

Natural Disturbance Type (NDT)	BEC Zone	Policy Target: % Mature-plus-Old Growth Forest Retention			Mature-plus-Old Growth Forest Age Definition (years)[13]
		Low BEO	Intermediate BEO	High BEO	
NDT2	CWH	17	34	51	>80
	ESSF	14	28	42	>120
NDT3	ESSF	14	23	34	>120
	MS	14	26	39	>100
NDT4	IDF	17	34	51	>100
	PP	17	34	51	>100

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[13] Mature-plus-old growth forest age definitions are from BDG (1995).

4 CURRENT CONDITION ASSESSMENT METHODOLOGY

The CEF Interim Assessment Protocol for Old Growth Forest in British Columbia (2017) provides a foundation for a provincially consistent approach to assessing the current condition of old growth forest in B.C. The methodology, data sources, assumptions and limitations for these assessments are provided in the protocol, as well as the Old Growth Forests in British Columbia: Provincial Cumulative Effects Assessment Backgrounder (2024).

The assessment indicators for the old growth forest value are a non-spatial assessment to produce quantitative results that highlight the current condition of old growth forest compared to legal or policy targets. The results and discussion presented in this report are based on the data and information at the time of the assessment (2019). Changes have occurred on the land base since which may have had significant impacts that are not represented in these assessment results.

The non-spatial area (hectares) of old growth forest is a numerical reporting that does not reflect the ecological integrity of the old growth forest biodiversity in the AU. Further inquiry into the ecological integrity and function of the remaining old growth forest is recommended.

Additionally, this current condition reporting does not quantify the specific anthropogenic disturbance (ha) contributing to the seral stage assessment for old growth and mature-plus-old forest. The assessment information presented in the following sections is reporting on specific indicators in an objective and transparent manner to support future planning processes and decision making regarding old growth forest management.

4.1 Assessment Indicators

The current condition of old growth forest was assessed using the indicators from the Interim Assessment Protocol for Old Growth Forest in British Columbia (2017) (Table 7). Each indicator provides specific information to inform the assessment of the current condition of old growth forest in the CE-CFLB. An additional assessment of the amount of old growth forest in OGMAs and the proportion of this old growth forest that meets the legal (PNOGO) target is reported to provide the current condition of OGMAs. The results from this assessment are reported by AUs (a combination of LU, NDT, BEO and BEC to the subzone or variant) at multiple scales (Table 7).

In this report, the colour scale used for reporting the current condition of old growth forest and mature-plus-old forest does not distinguish between legal and policy targets, as described in the Cumulative Effects Framework Interim Policy for the Natural Resource Sector (2016) and the Old Growth Forests in British Columbia: Cumulative Effects Assessment Backgrounder (2024). This has occurred for several reasons and the decision was based on local discussions. There was a desire from Region to use a consistent colour scheme across all land bases and indicators, regardless of whether the targets were established through a legal or policy mechanism. As a result, the "red-green" colour scale identified in the Assessment Backgrounder has been used for the current condition of old growth forest and mature-plus-old growth forest indicators.

Table 7. *Cumulative Effects Assessment Indicators used to Assess the Current Condition of Old Growth Forest in the Cumulative Effects Crown Forested Land Base (CE-CFLB) by Assessment Unit (AU).*[14]

Indicator	Assessment Questions
Current Condition of Old Growth Forest Retention	
Amount of Old Growth Forest	• What is the current amount of old growth forest in the CE-CFLB? Where is old growth forest located on the land base? • Which AUs meet the targets for old growth forest? • Which AUs are flagged for further consideration? • What are some of the possible reasons for the current condition?
Amount of Mature-plus-Old Forest	• What is the current amount of mature-plus-old forest in the CE-CFLB? Where is mature-plus-old forest located on the land base? • Which AUs meet the targets with mature-plus-old forest? • Which AUs are flagged for further consideration? • What are some of the possible reasons for the current condition?
Incursions into Old Growth Management Areas (OGMAs)[14]	
Incursions into Legal and Non-Legal OGMAs	• Are there anthropogenic incursions in OGMAs? What is the current amount of incursion into OGMAs in the CE-CFLB? • Do incursions exceed the order threshold? • What is the type of incursion into OGMAs? • What is the magnitude of incursions into OGMAs (total % incurred)?
Current Condition of Old Growth Management Areas (OGMAs) – additional indicator	
Amount of Old Growth Forest in Legal and Non-Legal OGMAs	• What is the current amount of old growth forest in OGMAs in the CE-CFLB? What is the seral stage breakdown? Where is old growth forest located within OGMAs? • Which OGMAs meet and do not meet targets by BEC subzone or variant within each LU?

[14] For this assessment indicator, incursions into OGMAs are defined as anthropogenic disturbance footprints resulting from resource development activities and do not include natural disturbance like wildfires and insects.

4.2   Assessment Units

Assessment units (AUs) are defined by combinations of LU, NDT, BEO, and BEC to the subzone or variant. These units reflect the scale at which legal or policy targets for old growth retention are applied (e.g., in PNOGO or BDG). In this report, these AUs are used to report on the current state of old growth forest on the CE-CFLB as per the indicators described in section 4.1. This report summarizes the results by LU, BEO and BEC subzone/variant, to aid in understanding the current state of old growth forest at multiple scales. A gradient colour scale is used to illustrate the current condition of the old growth forest and mature-plus-old forest indicators (Table 8).

Table 8. Colour Scale for Interpreting Current Condition Maps and Target Status Categories as a Percentage of Legal (PNOGO) or Policy (BDG) Targets Met.

Gradient Scale for Old Growth and Mature-plus-Old Forest Indicators: Legal and Policy Targets	Indicator Condition Interpretation	Current Condition Status (% of Target Met with Old or Mature-plus-Old Forest)	Analysis Definition (% of Target Met with Old or Mature-plus-Old Forest)
	Below Target	0 – 30%	0 – 29.99%
	Below Target	30 – 50%	30 – 49.99%
	Below Target	50 – 75%	50 – 74.99%
	Below Target	75 – 100%	75 – 99.99%
	Target Met	100 – 110%	100 – 109.99%
	Above Target	110 – 125%	110 – 124.99%
	Above Target	125+%	125+%

4.3   Assessment Data

Consolidating all resource developments was necessary to assess the current condition of old growth forests on the landscape. As such, consolidated disturbance layers were developed specifically to address CE on all Provincial CEF values, including old growth forest. The source of data to support this analysis is from the 2019 BC Cumulative Effects Human Disturbance with Baseline Thematic Mapping (also known as CE Human Disturbance Layer) and the 2019 BC Cumulative Effects Integrated Road (also known as CE Road Layer) datasets.[15] These datasets were developed from publicly accessible data repositories, mainly the BC Geographic Warehouse (BCGW). The assessment did not consider natural disturbances (i.e., wildfires or insect outbreaks) that were not included in the VRI at the time of data extraction from the BCGW (2019).

4.3.1   OGMA Incursions

The CE assessment compares the area of anthropogenic (human-caused) disturbance footprint (i.e., incursions) in OGMAs relative to allowable incursions specified in the applicable order, policy, or guidance. Incursions are defined as alterations to OGMAs caused by resource development activities that permanently alter the forested land base or that convert forests to an early seral stage (i.e., less than 40 years old). Resource development activities include permitted forestry activities (i.e., cutblocks and roads), non-forestry-related activities (e.g., pipelines, oil and gas, mining, fire guards, urban development, land tenuring), and other human use features (i.e., recreation sites and trails).

In the assessment, disturbances include only active, initiated, tenured, and completed developments, and does not consider proposed or anticipated projects and activities at the time of the assessment. The exception to this is roads due to variation in accuracy of spatial road data. For example, there may be roads represented in the data that were

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[15] The 2021 version of these CE data layers can be found here: BC Cumulative Effects Human Disturbance with Baseline Thematic Mapping and the BC Cumulative Effects Integrated Roads.

not built on the ground or had variable road widths based on the local terrain. In the analysis, roads were applied various buffer widths, ranging from 5 to 60 metres, depending on the source data attributes, input from Regional staff, existing methodology, and satellite imagery. As a result, the road dataset may be incorrect or incomplete as all roads are represented in the data regardless of whether the road was developed or not.

Road disturbances are sourced from a variety of road-related datasets including Forest Tenures (FTEN), Digital Road Atlas (DRA), Reporting Silviculture Updates and Land Status Tracking System (RESULTS), and the Oil and Gas Commission. These inputs were combined into the CE Integrated Roads Layer (2019). These source datasets include other linear features, such as fire guards, operational skid trails, and some recreational trails. As a result, road disturbances used in this CE Assessment include these additional linear features (i.e., fire guards and some trails).

Disturbances in OGMAs were identified from the CE Human Disturbance Layer (2019) and the CE Integrated Roads Layer (2019). Some source data does not include a disturbance date; therefore, it was not possible to remove disturbances that occurred prior to OGMA establishment. Due to data limitations most disturbances (e.g., roads) do not have dates provided, except for forest harvesting (e.g., cutblocks). Cutblocks that were more than 20 years old or pre-date the legal establishment of the OGMA were removed. This means that the 'cutblocks' incursion category represents forest harvesting that occurred between 1999 and 2019, and any forest harvesting within an OGMA that occurred prior to 1999 or after 2019 is not included in this assessment. As a result, all disturbances were included in this assessment with the exception of historical cutblocks (i.e., 20 years and older). **Consequently, this may skew the assessment results to show incursions that were known and accepted at time of OGMA establishment. At the very least, all OGMA incursions beyond the threshold limits should trigger further inquiry.**

5 ASSESSMENT RESULTS

This section presents the assessment results for each CE Indicator by AU and summarizes the results at multiple scales and combinations of LU, NDT, BEO, and BEC through maps and tables, followed by regional commentary to support further discussion. Many of the tables presented in this section have additional information available in the Appendices. The regional commentary interprets, as best as possible, the meaning of results, possible contributing or causal factors, and limitations. The amount and age of old and mature forests is derived from the Provincial B.C. Geographical Warehouse (BCGW) VRI dataset (data extracted in 2019). **The results and discussion are based on the data and information at the time of the assessment (2019). Any activities or disturbances that have occurred since that time are not captured in this assessment.** With the limitations of the assessment, it is possible that the amount of old growth forest for an AU could be overestimated or underestimated.

The results of the current condition reporting for old growth forest are not a determination or judgement of compliance or non-compliance with legal orders or policy. These assessments provide an interpretative reporting of current conditions based on indicators and thresholds as guided by legal orders or policy.

In the Merritt TSA, there are different AUs assigned for the old growth forest and mature-plus-old forest indicators due to how targets are set within the PNOGO and BDG. For old growth forest, target hectares are legally established in PNOGO by LU-BEC (Appendix 2 Table 2), while policy target percentages for mature-plus-old forest come from the BDG by NDT-BEO-LU-BEC. As a result, there are 80 AUs included in the assessment for old growth forest, and 128 AUs included in the assessment for mature-plus-old forest. With the consideration of BEO in the mature-plus-old forest indicator assessment, the amount of AUs increase due to the multiple assignments of BEO within a single LU. A table summarizing the denominator (total area (ha) and total CE-CFLB considered) used for each CE indicator is presented in Appendix 2.

5.1 Amount of Old Growth Forest

This non-spatial indicator determines the current amount of old growth forest within each AU in relation to the legal targets for old growth forest. In the Merritt TSA, the old growth forest targets used to guide the amount of old growth forest required originated from PNOGO. The PNOGO legal targets provide a consistent foundation for current condition reporting of old growth forest as it establishes the minimum amount (hectares) threshold for old growth forest representation that should be achieved in each AU.

Old growth forest targets are set in PNOGO by LU for each BEC variant with targets defined by forest age. Refer to Table 5 (section 3.2.1) for the age-based definitions of old growth forest. Appendix 3 (Table 23) provides a complete listing of the old growth legal targets (ha) applied to each AU (by LU-BEC) and reported by the total amount in the CE-CFLB to determine the current condition. It also provides a summary of the current amount of old growth forest compared to the PNOGO legal targets for all AUs in the Merritt TSA.

5.1.1 Total Amount of Old Growth Forest in the CE-CFLB

Overall, 13.6% (or 120,611.7 ha) of the total CE-CFLB across the TSA are old growth forests. Areas of the CE-CFLB with greater than 50% old growth forest are predominately in the higher elevations along the southeast portion of the TSA (McNulty LU) and a smaller area in the north (Lower Nicola LU) (Figure 6). However, most of the LUs show less than 10% old growth forest remaining. The LU with the largest amount of old growth forest in the CE-CFLB is the Similkameen LU which has 17,745.6 ha of old growth forest (19.9% of this LU's CE-CFLB); however, the AU with the largest percent of old growth forest in the CE-CFLB is McNulty LU which has 12,570.4 ha of old growth forest (33.5% of the LU's CE-CFLB).

Provincial Parks have been included because the presence of old growth forest in these areas contributes to the overall current condition of old growth forest in the CE-CFLB. Note that more than half of the Upper Nicola LU is not CE-CFLB (e.g., private land, Federal reserves).

For the old growth forest indicator, there is a total of 32,987.4 ha of CE-CFLB with no targets defined (purple in Figure 6) in several locations across the TSA: 9,310.4 ha in NDT3 (no target established for a particular LU-BEC combination),[16] 20,755.0 ha in NDT5 (alpine and parkland), 2,575.0 ha in NDT4 (primarily bunchgrass),[17] and 347.0 ha in NDT1 (no target established for a particular LU-BEC combination).[18]

Percentage Of CE-CFLB That Is Old Forest By Landscape Unit And Biogeoclimatic Zone, Subzone, Variant

- 0 - 10 %
- 10 - 20 %
- 20 - 30 %
- 30 - 50 %
- 50 - 70 %
- 70 - 100 %

- CE-CFLB with no Old Forest Targets
- Not CE-CFLB + Not Private Land
- Private Land
- Merritt Timber Supply Area (TSA)
- Resource District
- Landscape Units
- Lake, Major River
- Creek, Stream

Data Analysis Date: May 2022

	Landscape Unit	BEO
1	Lower Nicola	High
2	Swakum	Intermediate
3	Upper Nicola	Int./Low
4	Spius	High/Int.
5	Coldwater	High/Int./Low
6	Otter	Int./Low
7	Summers	Intermediate
8	Hayes	Int./Low
9	McNulty	Int./Low
10	Tulameen	High/Int.
11	Similkameen	Int./Low
12	Smith-Willis	Int./Low

Figure 6. *Percent of Cumulative Effects Crown Forest Land Base (CE-CFLB) that is Old Growth Forest by Assessment Unit (AU) in the Merritt Timber Supply Area (TSA).*

Of the total CE-CFLB area of 887,134.2 ha, old growth forest targets have been assigned to 854,146.8 ha (Table 9). The total amount of old growth forest in the CE-CFLB is 120,611.7 ha, which is 13.6% of the total CE-CFLB. Old growth forests are distributed in the Low (23.9%), High (13.0%), and Intermediate (8.4%) BEOs.

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[16] The LU-BECs in NDT3 with no target established are Coldwater LU-MSun (1,990.2 ha), Similkameen LU-MSxk (364.3 ha), Spius LU-MSun (4,010.5 ha), Swakum LU-ESSFxc (370.8 ha), and Tulameen LU-MSun (2,574.7 ha).

[17] This also includes the Lower Nicola LU-IDFxh1 (1,008.6 ha) where no target is established.

[18] The LU-BEC in NDT1 with no target established is the Tulameen LU-MHmm2 (347.0 ha).

The BDG policy guidance[19] suggests that 45% of the forest area should be assigned as Low BEO (within a range of 30-55%), 45% as Intermediate BEO (35-60%), and 10% as High BEO (no range provided). In the Merritt TSA, the proportion of the total CE-CFLB area assigned as Low, Intermediate, and High BEO is 29.4%, 56.7%, and 13.8%, respectively. Currently, the amount of CE-CFLB assigned to High BEO (13.8%) in the Merritt TSA is more than the recommended BDG target (10%). This equates to 122,727.2 ha assigned to High BEO in the TSA, 34,013.8 ha over the recommended target of 88,713.4 ha.

Table 9. *Amount of Old Growth Forest in the Merritt Timber Supply Area (TSA) Cumulative Effects Crown Forested Land Base (CE-CFLB) by Biodiversity Emphasis Options (BEO).*

	Merritt TSA	Biodiversity Emphasis Options (BEOs) in the CE-CFLB		
		High BEO	Intermediate BEO	Low BEO
# of Landscape Units (LUs)[a]	12	4	11	7
Gross TSA Area (ha)[b]	1,131,145.7	143,357.2	720,753.6	267,035.0
Total CE-CFLB Area (ha)	887,134.2	122,727.2	503,412.2	260,994.9
% Area of Total CE-CFLB	100%	13.8%	56.7%	29.4%
CE-CFLB Area (ha) with Targets	854,146.8	113,694.4	484,423.8	256,028.6
Old Growth Forest CE-CFLB Area (ha)	120,611.7	15,912.2	42,440.8	62,258.7
% of Old Growth Forest in CE-CFLB by BEO Designation	13.6%	13.0%	8.4%	23.9%

[a] There are nine LUs with multiple BEOs assigned. Therefore, each value in the "# of Landscape Units (LUs)" row is independent of the others in such a way that they do not sum together to equal the total number of LUs shown for the Merritt TSA.

[b] The gross TSA area is provided for information and context only.

5.1.2   Current Condition of Old Growth Forest Compared to Legal Targets

The current condition of old growth forest is one of four assessment indicators, and the following results are presented in the colour scheme and categories as a percentage of the legal PNOGO target met (Figure 7), as described in section 4. The following section provides a high-level summary of the old growth assessment results compared to legal PNOGO targets by AU (LU-BEC) for the Merritt TSA. In this assessment, AUs with less than 100% of the target met are considered to be in deficit of old growth forest.

In general, the distribution of old growth forest as compared to the targets shows more old growth forest in the higher elevations and less in the lower elevations and valley bottoms (Figure 7). There is sufficient old growth forest to meet or exceed the targets in 40% of AUs (32 out of 80 AUs). Approximately one-third of all AUs (28 of 80 AUs, or 35%) have more than 125% of the target amount of old growth forest (see Appendix 3 Table 23). These AUs are in the higher elevations, primarily south (Similkameen and Smith Willis LUs) and east (Hayes and McNulty LUs) around Princeton, along the Cascade Mountains in the west (Tulameen LU), and north of Merritt (Swakum LU).

There is insufficient old growth forest to meet targets in 60% of AUs (48 of 80 AUs). There are large areas with less than 30% of the target met in the lower elevation valley bottoms and along the center of the TSA (Otter and Summer LUs) extending northwards (Coldwater, Upper Nicola and Swakum LUs). In addition, there are large areas with 50-75% of the target met east of the Cascade Mountains in the Lower Nicola, Spius, Coldwater and Similkameen LUs.

[19] Biodiversity Guidebook (1995, Table 1, page 8) states "Table 1 illustrates the proportion of the area of a subregional planning unit that should fall under higher, intermediate, or low biodiversity emphasis. These percentages apply to the provincial forest within the subregional planning unit." For the purposes of this report, the CE-CFLB area within each LU is assumed as the area of provincial forest within the subregional planning unit.
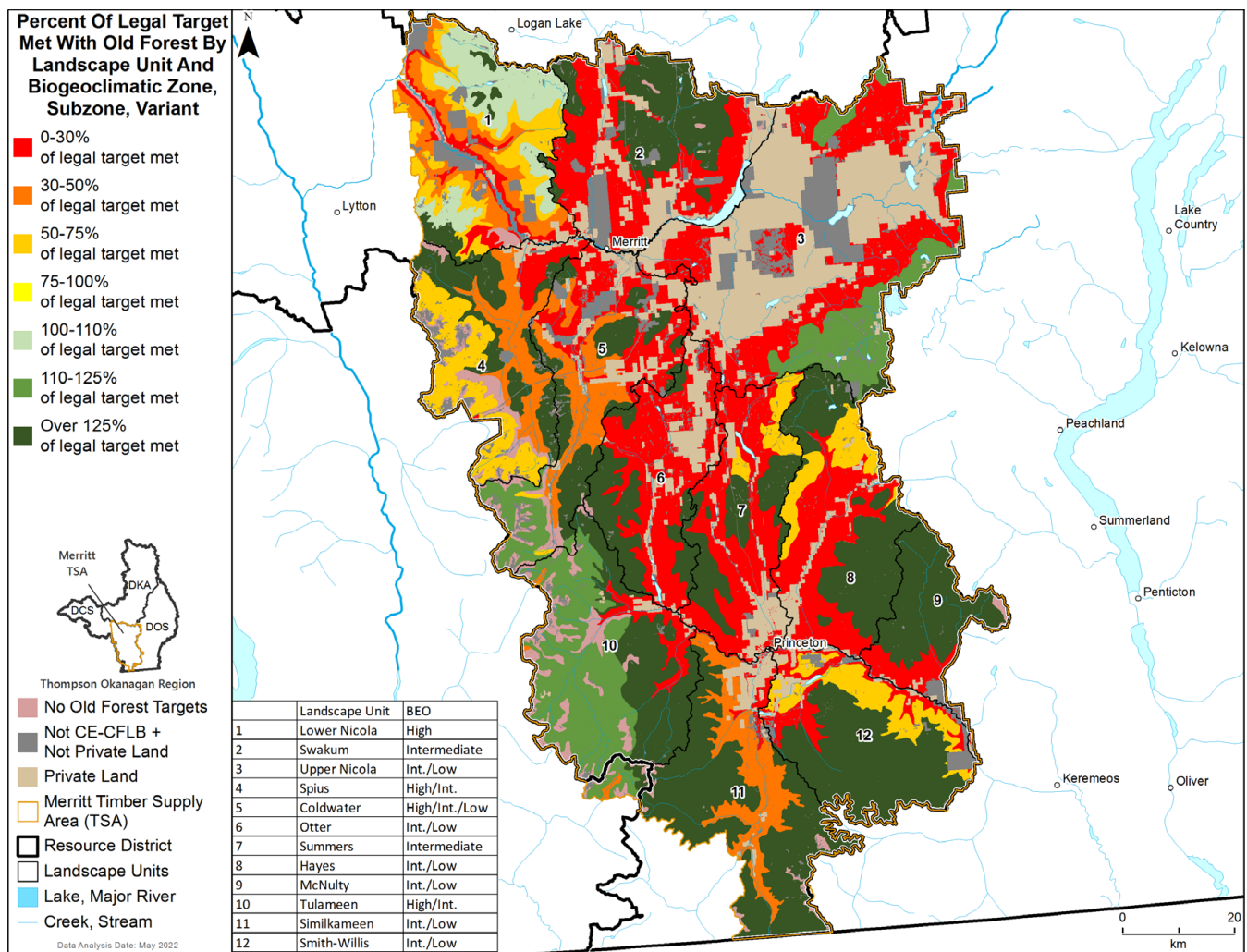
Figure 7. *Current Condition of Old Growth Forest as a Percent of Legal Target Met in the Merritt Timber Supply Area (TSA).[a]*

a Any AUs with less than 100% of the target met are considered to be in deficit of old growth forest.

The 48 AUs with insufficient old growth forest compared to the PNOGO targets cover a total of 415,528.9 ha of CE-CFLB; currently 12,668.3 ha of this CE-CFLB is old growth forest (Table 10). Of these 48 AUs, six AUs have less than 500 ha of CE-CFLB in the LU-BEC. This low amount of CE-CFLB will influence the ability for these AUs to meet the targets in the indicator reporting. The IDF BEC zone contains the largest CE-CFLB area (86% or 358,747.7 ha of CE-CFLB) of AUs that do not meet the legal PNOGO targets.

There are 35 AUs with 0-30% of the target met that cover 258,279.5 ha of CE-CFLB, the majority of which are in the IDF BEC zone (246,015.8 ha of CE-CFLB). There are nine AUs that have more than 10,000 ha of CE-CFLB, with the largest AU in the Upper Nicola IDFdk1 that has 56,030.0 ha of CE-CFLB but currently has 3.9% of the old growth forest target being met (193.4 ha of old growth forest in the CE-CFLB). In addition, eight AUs (16,913.3 ha of CE-CFLB) have no old growth forest remaining to meet the targets.

There are six AUs with 30-50% of the target met that cover 77,278.2 ha of CE-CFLB, the majority of which are in the IDF BEC zone (76,271.2 ha of CE-CFLB). There are seven AUs with 50-75% of the target met that cover 79,971.2 ha of CE-CFLB which are in the IDF (36,460.8 ha of CE-CFLB), ESSF (23,289.7 ha of CE-CFLB), and MS (19,587.1 ha of CE-CFLB) BEC zones. There are currently no AUs with 75-100% of the target amount of old growth forest.

Of the 32 AUs that have greater than 100% of the target met (Appendix 3, Table 23), 28 of these AUs have more than 125% of the target old growth forest amount. Of these, there are six AUs with more than 400% of the target met (31,613.1 ha of CE-CFLB). The majority of the AUs meeting targets have more than 1,000 ha of CE-CFLB, 7 AUs of which have more than 25,000 ha of CE-CFLB each, predominately in the MSxk BEC zone (Hayes, Lower Nicola, Smith-Willis, Swakum, and Upper Nicola LUs). The largest AU meeting the old growth forest targets is in the Tulameen LU-ESSFmw with 46,557.2 ha of CE-CFLB and115.2% of the target being met.

Table 10. Assessment Units (AUs) with 0-125% of Old Growth Forest Compared to Legal Targets in the Merritt Timber Supply Area (TSA).

Column Calculations				A	B	C = B/A	D	E = C/D
Indicator Condition	Assessment Unit (AU)			LU-BEC Area in CE-CFLB (ha)	Existing Old Forest Area in AU (ha)	Existing Old Forest in AU (%)	PNOGO Old Forest Target (%)	% of PNOGO Target Met in AU
	BEC	LU	BEO					
0 – 30%	IDFdk1	Hayes	Int/Low	12,561.9	0.0	0.0%	1,097	0.0%
	IDFdk2	Upper Nicola	Int/Low	77.1	0.0	0.0%	15	0.0%
	IDFxh1	Hayes	Int/Low	2,715.9	0.0	0.0%	330	0.0%
	IDFxh1	Tulameen	High/Int	312.6	0.0	0.0%	18	0.0%
	MSdm2	Upper Nicola	Int/Low	135.5	0.0	0.0%	158	0.0%
	PPxh2	Spius	High/Int	505.8	0.0	0.0%	7	0.0%
	PPxh2	Upper Nicola	Int/Low	50.8	0.0	0.0%	106	0.0%
	IDFdk1	Similkameen	Int/Low	553.8	0.0	0.4%	74	0.0%
	IDFxh1	McNulty	Int/Low	2,117.2	0.7	3.30%	160	0.4%
	IDFxh2	Upper Nicola	Int/Low	1,767.0	4.9	27.9%	734	0.7%
	IDFdk2	Smith-Willis	Int/Low	4,351.1	16.0	36.7%	2,260	0.7%
	IDFxh1	Smith-Willis	Int/Low	5,586.4	8.5	15.3%	839	1.0%
	PPxh2	Swakum	Intermediate	2,560.2	5.1	19.8%	270	1.9%
	IDFxh2	Swakum	Intermediate	5,935.1	32.9	55.4%	1,244	2.6%
	IDFdk2	Lower Nicola	High	1,706.1	18.3	107.4%	534	3.4%
	IDFdk1	Upper Nicola	Int/Low	56,030.0	193.4	34.5%	4,923	3.9%
	IDFxh1	Similkameen	Int/Low	1,791.5	9.7	54.1%	233	4.2%
	IDFdk2	Otter	Int/Low	23,041.7	203.5	88.3%	3,439	5.9%
	IDFdk2	Summers	Intermediate	20,275.6	101.5	50.1%	1673	6.1%
	CWHms1	Spius	High/Int	109.9	0.6	56.4%	10	6.2%
	IDFdk1	Swakum	Intermediate	29,475.0	304.7	103.4%	4,660	6.5%
	IDFxh2	Spius	High/Int	2,625.2	61.6	234.5%	762	8.1%
	IDFdk1	Spius	High/Int	2,173.3	18.3	84.3%	224	8.2%
	IDFdk1	Coldwater	High/Int/Low	11,456.0	209.6	183.0%	2,169	9.7%
	IDFxh2	Coldwater	High/Int/Low	3,120.2	52.4	167.8%	493	10.6%
	ESSFxc	Summers	Intermediate	287.3	27.6	959.9%	215	12.8%
	IDFdk2	Hayes	Int/Low	15,632.9	234.3	149.9%	1,725	13.6%
	PPxh2	Coldwater	High/Int/Low	1,162.6	15.2	131.1%	110	13.9%
	IDFdk2	Tulameen	High/Int	6,368.1	145.1	227.9%	919	15.8%

Column Calculations				A	B	C = B/A	D	E = C/D
Indicator Condition	Assessment Unit (AU)			LU-BEC Area in CE-CFLB (ha)	Existing Old Forest Area in AU (ha)	Existing Old Forest in AU (%)	PNOGO Old Forest Target (%)	% of PNOGO Target Met in AU
	BEC	LU	BEO					
0 – 30%	IDFdk1	Summers	Intermediate	11,064.7	473.3	427.8%	2,451	19.3%
	IDFxh1	Summers	Intermediate	3,906.5	135.9	347.8%	644	21.1%
	IDFdk1	Otter	Int/Low	12,344.0	239.6	194.1%	1,063	22.5%
	IDFxh1	Coldwater	High/Int/Low	4,004.0	179.1	447.4%	754	23.8%
	PPxh2	Lower Nicola	High	7,451.7	245.1	328.9%	1002	24.5%
	IDFdk1	McNulty	Int/Low	5,022.7	123.1	245.1%	445	27.7%
30 – 50%	IDFxh2	Lower Nicola	High	18,952.3	1,560.9	823.6%	4,784	32.6%
	IDFdk2	Similkameen	Int/Low	23,413.7	1,041.2	444.7%	2,782	37.4%
	IDFdk2	Coldwater	High/Int/Low	17,306.6	646.1	373.3%	1,673	38.6%
	IDFdk2	Spius	High/Int	13,532.0	817.6	604.2%	1814	45.1%
	IDFxh1	Spius	High/Int	3,066.5	23.6	76.8%	51	46.2%
	CWHms1	Tulameen	High/Int	1,007.1	40.8	405.5%	88	46.4%
50 – 75%	IDFdk1	Smith-Willis	Int/Low	15,484.8	186.8	120.6%	367	50.9%
	IDFdk1	Lower Nicola	High	20,976.0	1,399.1	667.0%	2,561	54.6%
	CWHms1	Coldwater	High/Int/Low	633.7	74.4	1173.3%	132	56.3%
	ESSFmw	Spius	High/Int	23,289.7	1,383.8	594.2%	2410	57.4%
	MSdm2	Hayes	Int/Low	11,906.1	1,536.2	1290.3%	2,533	60.6%
	MSxk	Summers	Intermediate	6,384.6	494.3	774.2%	763	64.8%
	MSdm2	Lower Nicola	High	1,296.4	403.3	3110.9%	618	65.3%
100 – 110%	MSxk	Lower Nicola	High	28,260.9	5,870.1	2077.1%	5,591	105.0%
110 – 125%	MSxk	Upper Nicola	Int/Low	29,825.4	5,181.1	1737.1%	4,657	111.3%
	ESSFmw	Tulameen	High/Int	46,557.2	3,997.0	858.5%	3,471	115.2%
	ESSFmw	Coldwater	High/Int/Low	9,459.1	990.6	1047.2%	794	124.8%

Of the CE-CFLB with targets (854,146.8 ha), 51.4% (438,617.9 ha) is meeting or exceeding old growth forest targets, the majority of which (38.0% or 324,515.3 ha of CE-CFLB) has greater than 125% old growth forest compared to the targets (Figure 8). Of the CE-CFLB that does not have enough old growth forest as compared to the targets, 9.4% (79,971.2 ha of CE-CFLB) falls within the 50-75% target met category, 9.0% (77,278.2 ha of CE-CFLB) within the 30-50% category, and 30.2% (258,279.5 ha of CE-CFLB) within the 0-30% category. There are currently no AUs with 75-100% of the target amount of old growth forest.

CE-CFLB Area (ha) by Cumulative Effects Indicator Condition

Legend:
- 0–30% of target met
- 30–50% of target met
- 50–75% of target met
- 75–100% of target met
- 100–110% of target met
- 110–125% of target met
- 125+% of target met

258,279.5 / 30%
324,515.3 / 38%
77,278.2 / 9%
79,971.2 / 10%
28,260.9 / 3%
85,841.6 / 10%
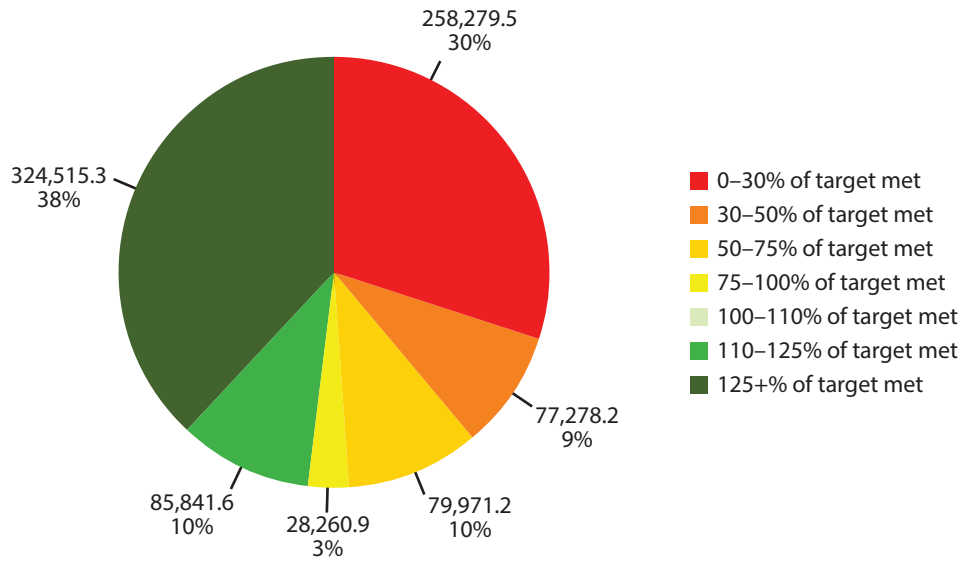
Figure 8. Amount of Cumulative Effects Crown Forested Land Base (CE-CFLB) in each Cumulative Effects Indicator Condition as a Percentage of Old Growth Forest Legal Targets Met in the Merritt Timber Supply Area (TSA).

5.1.1.1   Landscape Unit and Old Growth Forest Distribution Compared to Legal Targets

This section provides an overview of the assessment results summarized by LU; Table 11 shows the status of old growth forest as compared to the PNOGO legal targets for all LUs. Overall, 40% of the LUs are meeting the old growth forest target. There are no LUs in their entirety that have sufficient amounts of old growth forest compared to the PNOGO targets; the Otter LU is the closest with 60% of its AUs meeting the targets. There are four LUs that contain less than 30% of the AUs meeting old growth targets: Spius (22%), Swakum (25%), Summers (29%), and Upper Nicola (29%) LUs.

Table 11. Summary of Assessment Units (AU) by Landscape Unit (LU) that are Meeting Legal Targets in the Merritt Timber Supply Area (TSA).

Assessment Unit (AU)		Total # of Assessment Units (AUs)	# of AUs Meeting Old Growth Forest Targets	% of AUs Meeting Old Growth Forest Targets[a]
Landscape Unit	**BEO**			
Coldwater	High/Int/Low	10	4	40%
Hayes	Int/Low	7	3	43%
Lower Nicola	High	8	3	38%
McNulty	Int/Low	4	2	50%
Otter	Int/Low	5	3	60%
Similkameen	Int/Low	7	4	57%
Smith-Willis	Int/Low	6	3	50%
Spius	High/Int	9	2	22%
Summers	Intermediate	7	2	29%
Swakum	Intermediate	4	1	25%
Tulameen	High/Int	6	3	50%
Upper Nicola	Int/Low	7	2	29%
Total	**12 LUs**	**80**	**32**	**40%**

[a]   AUs with less than 100% of the legal target are considered to be in deficit of old growth forest.

5.1.1.2   Biodiversity Emphasis Option and Old Growth Forest Distribution Compared to Legal Targets

This section would provide an overview of the assessment results summarized by the BEO assigned to LUs. However, in the Merritt TSA, old growth forest targets are defined in PNOGO as area-based targets (hectares) by LU-BEC and do not provide targets defined by LU-BEO-BEC. This means that old growth forest targets are not established by BEO in the Merritt TSA, unlike elsewhere in the province. As a result, this section is not relevant for this assessment.

Table 12. Not Applicable to this Report.

5.1.1.3   Biogeoclimatic Ecosystem Classification and Old Growth Forest Distribution Compared to Legal Targets

This section provides an overview of the assessment results summarized by BEC. In general, the amount of old growth forest is at or exceeding targets in high elevation forests (ESSF and MS BEC zones) and furthest from the targets in low elevation valley bottoms (IDF and PP BEC zones).

In the CE-CFLB with targets, there is a total of 11 BEC subzone/variants, of which only one BEC variant (ESSFdc2) has 100% of AUs with sufficient amounts of old growth to meet targets (Table 13). The AUs in the ESSFdc2 BEC variant cover 65,146.5 ha of CE-CFLB, of which 31.3% (20,412.9 ha of CE-CFLB) is old growth forest. The remainder of the ESSF and MS BEC variants are close to having all AUs meeting the targets: MSxk (89% of AUs are meeting the targets), ESSFxc (86%), ESSFmw (75%), and MSdm2 (70%).

There are six BEC subzone/variants that have 0% of AUs with sufficient amounts of old growth forest to meet targets. These AUs are primarily in the IDF BEC zone (358,747.7 ha of CE-CFLB in the dk1, dk2, xh1, and xh2 variants), with some CE-CFLB in the PP (11,731.0 ha in xh2 variant). There are 34 AUs associated with the IDF (all subzones) and 5 AUs with the PP that are not meeting the targets. More than half (69%) of the CE-CFLB associated with these AUs in the IDF BEC zone have less than 30% of the target met.

Table 13. Summary of Assessment Units (AU) by Biogeoclimatic Ecosystem Classification (BEC) Subzone or Variant that are Meeting Legal Targets in the Merritt Timber Supply Area (TSA).

BEC Variant[a]	Total Area in BEC (ha)	Total CE-CFLB Area (ha) in BEC with Targets	Existing Old Forest in CE-CFLB with Targets (ha)	Existing Old Forest in CE-CFLB with Targets (%)	# of Assessment Units (AUs) in BEC	# of AUs Meeting Target	% of AU Meeting Targets
CWHms1	1,823.2	1,750.6	115.8	6.6%	3	0	0%
ESSFdc2	66,217.9	65,146.5	20,412.9	31.3%	8	8	100%
ESSFmw	85,658.4	82,572.5	6,701.1	8.1%	4	3	75%
ESSFxc	39,226.4	38,980.3	16,313.7	41.9%	7	6	86%
IDFdk1	264,362.2	177,142.3	3,148.0	1.8%	11	0	0%
IDFdk2	142,485.4	125,705.1	3,223.8	2.6%	10	0	0%
IDFxh1	48,565.7	23,500.5	357.5	1.5%	8	0	0%
IDFxh2	76,173.2	32,399.9	1,712.6	5.3%	5	0	0%
MSdm2	121,335.6	119,039.2	28,183.7	23.7%	10	7	70%
MSxk	180,024.7	176,179.0	37,555.8	21.3%	9	8	89%
PPxh2	25,839.9	11,731.0	265.4	2.3%	5	0	0%
Total	**1,055,712.8**	**854,146.8**	**117,990.4**	**13.8%**	**80**	**32**	**40%**

ᵃ   This table demonstrates the distribution of old growth forest across BECs. Only BECs with old growth forest targets are listed in this table.

5.1.3   Limitations

This assessment does not evaluate and address whether targets themselves are sufficient and effective at maintaining biodiversity given the ecological function and complexity of old growth forests. Numerical targets applied to BEC subzones/variants cannot assess the ecological factors (e.g., stand productivity, representation, old growth forest attributes) at the site series and stand level. The age-based definitions of old growth forest are a proxy that assumes the biodiversity and ecological characteristics of old growth stands (e.g., structure, function, composition) will be present.

In addition, the VRI may underestimate the age of old growth forest based on the methodology used for photo interpretation and data updates, misidentifying these stands as mature forest. For example, the IDF/dry-belt fir ecosystems with a long history of partial cutting may not be accurately reflected in the VRI due to the variable retention left influencing how that stand is interpreted and attributed. Another potential situation where this occurs is in high elevation forests with lower productivity; these site conditions can create old growth forests that are shorter in tree height than what would be expected on higher productivity sites. When the VRI is photo-interpreted, these stands can be misclassified as younger due to this perceived stunted growth. As a result, old growth forest may be under-represented in the VRI, which may have influenced the results of this assessment. Lastly, as the reporting of old growth forest relies on the projected age of VRI polygons, there is a possibility that the amount of old growth that is greater than 250 years is under-estimated, as the projected age is not reflective of the true age of the stand due to inventory methods and age projections based on the average age of a stand.

The PNOGO included provisions that allow the use of younger forests to meet old growth forest targets "where equal or better conservation benefits would result" and to recruit from younger stands when there is insufficient old growth forest in a BEC variant. These provisions may have been applied in the AUs that do not have enough old growth forest to meet the targets. Further investigation (outside the scope of this assessment) would be required to examine whether these provisions have been applied appropriately.

5.1.4   Summary and Observations

Old growth forest covers 13.6% of the CE-CFLB (120,611.7 ha), generally located in higher elevations in the western and southern portions of the TSA. Of the 80 AUs in the Merritt TSA, 40% (32 AUs) have sufficient old growth forest compared to the targets, which accounts for 51.4% (438,617.9 ha) of the CE-CFLB area that has targets applied. Of the total 11 BEC subzones/variants, there is one BEC variant (ESSFdc2) where all AUs have sufficient old growth forest compared to the targets, covering 64,146.5 ha of CE-CFLB.

The remaining 48 AUs (60%) that are not meeting the old growth forest targets cover 415,528.9 ha of CE-CFLB. By indicator condition, 35 AUs (258,279.5 ha of CE-CFLB) have 0-30% of the target met, six AUs (77,278.2 ha of CE-CFLB) have 30-50% of the target met, seven AUs (79,971.2 ha of CE-CFLB) have 50-75% of the target met, and no AUs have 75-100% of the target met. There are eight AUs (16,913.3 ha of CE-CFLB) that have no old growth forest remaining to meet the targets. No LU had all AUs meeting the targets.

The AUs with insufficient old growth forest occur across the TSA in all LUs but are especially common in the dry, low elevation valley bottoms (IDF and PP BEC zones). The IDF (all subzones) has 358,747.7 ha of CE-CFLB across 34 AUs that are currently not meeting the targets. More than half (69%) of the CE-CFLB associated with these AUs have less than 30% of the old growth forest targets met.

The current condition of old growth forest is the collective result of current and historic anthropogenic and natural disturbances. There is a history of wildfires and natural disturbances in the TSA, including pest and insect damage, that has impacted and resulted in areas without old growth forest stands. Forest harvesting has occurred across the TSA, including salvage harvest in response to natural disturbances. In general, the gentle rolling terrain makes the TSA easily accessible, meaning that forest harvesting and other land uses are common and widespread. Areas with easier access to timber (i.e., low elevations, existing road networks, closer to population centers) are often further away from meeting the targets.

Under the Forest and Range Practices Act (FRPA) results-based regime, compliance with old growth forest orders is largely dependent on professional reliance. The varying interpretation of orders and policy, as well as approaches to analyzing and tracking old growth forest management by licensees and the Province, presents challenges to accurately track and monitor old growth forest conditions relative to orders over time.

5.2   Amount of Mature-plus-Old Forest

This non-spatial indicator determines the current amount of mature-plus-old forest within each AU in relation to the policy targets for mature-plus-old forest. In the Merritt TSA, the mature-plus-old policy (i.e., non-legal) targets used in this CE assessment originated from the BDG. As mature forest will become old growth forest over time, knowing the current condition of mature forest is important to determine where forest is available to recruit towards old growth forest targets, particularly where old growth forest is currently underrepresented.

Mature-plus-old forest targets are set in the BDG by LU for each NDT, BEC, and BEO combination with targets defined by forest age. Refer to Table 6 (section 3.3.1) for the age-based definitions of mature-plus-old forest. Appendix 3 (Table 24) provides a complete listing of the mature-plus-old forest policy targets (%) applied to each AU and the total amount in the CE-CFLB used to determine the current condition.

5.2.1   Total Amount of Mature-plus-Old Forest in the CE-CFLB

In contrast to the old growth forest indicator, there are higher proportions of mature-plus-old forest distributed across the TSA (Figure 9). Overall, 45.2% (or 401,136.5 ha) of the total CE-CFLB is mature-plus-old growth forest. Areas of the CE-CFLB with greater than 50% mature-plus-old growth forest are in the north and west portions of the TSA (Lower Nicola, Otter, Coldwater, and Tulameen LUs) and along the valley southeast of Princeton (McNulty and Smith-Willis LUs).

There is a total of 22,321.4 ha of CE-CFLB with no targets in several locations across the TSA: 20,755.0 ha in NDT5 (alpine and parkland) and 1,566.4 ha in NDT4 (bunchgrass). This is 10,666.0 ha less CE-CFLB than the old growth forest indicator because there are LU-BECs that do not have old growth forest targets applied as per the PNOGO but do have mature-plus-old forest policy targets as per the BDG (i.e., the ESSFxc, MSun and MSxk BEC variants in the NDT3).
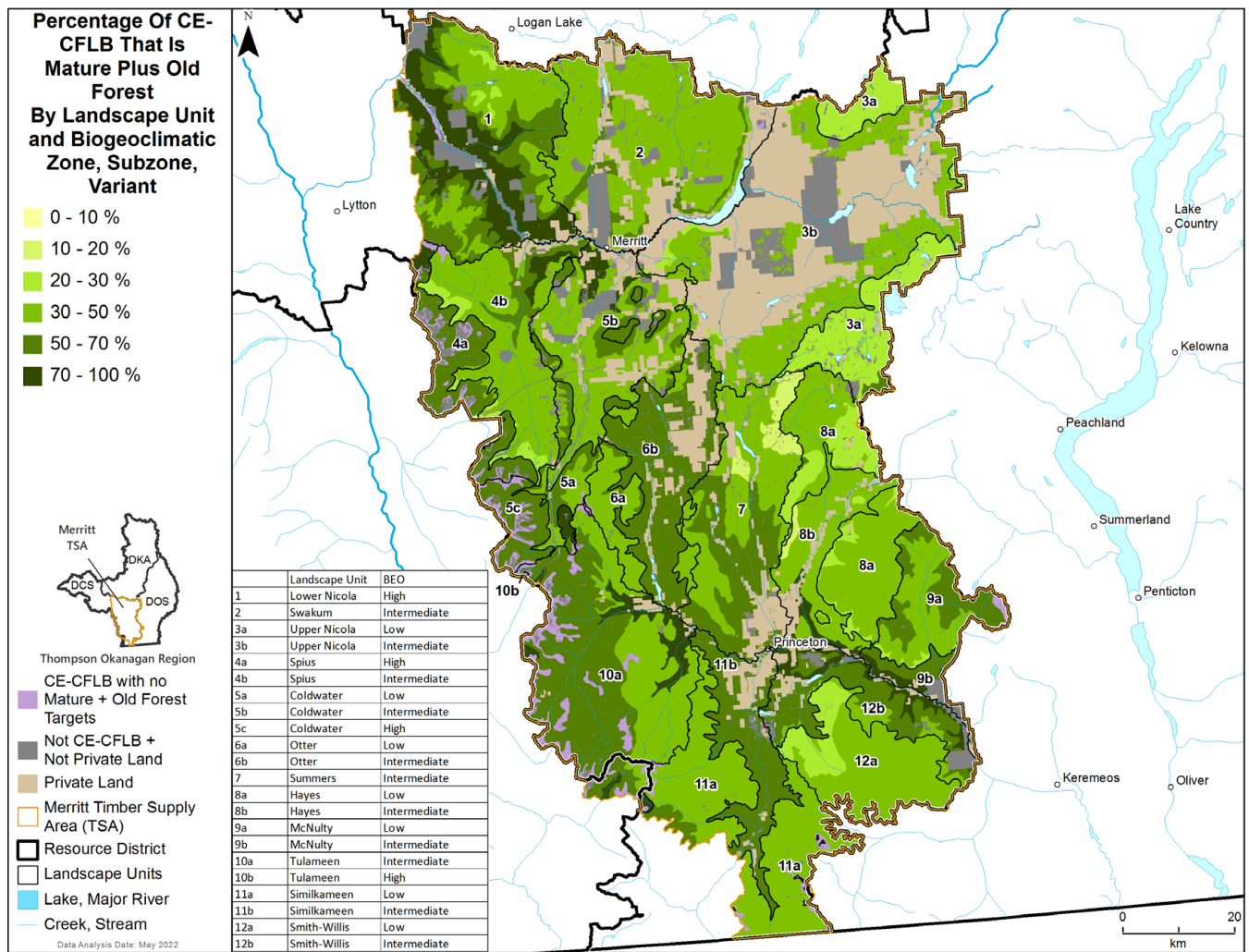
Figure 9. *Percent of Cumulative Effects Crown Forested Land Base (CE-CFLB) that is Mature-plus-Old Forest by Assessment Unit (AU) in the Merritt Timber Supply Area (TSA).*

Of the total CE-CFLB area of 887,134.2 ha, mature-plus-old growth forest targets have been assigned to 864,812.8 ha (Table 14). The total amount of mature-plus-old growth forest in the CE-CFLB is 401,136.5 ha, which 45.2% of the total CE-CFLB. The largest differences between the amounts of old growth forest and mature-plus-old forest occurs in the Intermediate and High BEOs, which have 8.4% and 13.0% old growth forest, and 46.6% and 55.9% mature-plus-old forest in the CE-CFLB, respectively.

Table 14. *Amount of Mature-plus-Old Forest in the Cumulative Effects Crown Forested Land Base (CE-CFLB) by Biodiversity Emphasis Options (BEO) in the Merritt Timber Supply Area (TSA).*

	Merritt TSA	Biodiversity Emphasis Options (BEOs) in the CE-CFLB		
		High BEO	Intermediate BEO	Low BEO
# of Landscape Units (LUs)ᵃ	12	4	11	7
Gross TSA Area (ha)ᵇ	1,131,145.7	143,357.2	720,753.6	267,035.0
Total CE-CFLB Area (ha)	887,134.2	122,727.2	503,412.2	260,994.9
CE-CFLB Area (ha) with Targets	864,812.8	115,695.4	491,125.7	257,991.7
Mature-plus-Old Forest CE-CFLB Area (ha)	401,136.5	68,562.1	234,747.2	97,827.2
% of Mature-plus-Old in CE-CFLB	45.2%	55.9%	46.6%	37.5%

ᵃ There are nine LUs with multiple BEOs assigned. Therefore, each value in the "# of Landscape Units (LUs)" row is independent of the others in such a way that they do not sum together to equal the total number shown for the Merritt TSA.

ᵇ The gross TSA area is provided for information and context only.

5.2.2 Current Condition of Mature-plus-Old Forest Relative to the Policy Targets

The current condition of mature-plus-old growth forest is one of four assessment indicators, and the following results are presented in the colour scheme and categories as a percentage of the BDG policy target met (Figure 10), as described in section 4. The following section provides a high-level summary of the mature-plus-old forest assessment results compared to policy BDG targets by AU (LU-BEO-BEC) for the Merritt TSA. In this assessment, AUs with less than 100% of the target met are considered to be in deficit of mature-plus-old forest.

In general, AUs are meeting the mature-plus-old forest policy targets across the CE-CFLB (Figure 10). There is sufficient mature-plus-old forest to meet or exceed the targets in 88% of AUs (112 out of 128 AUs). Except for areas in a few LUs, such as Lower Nicola and Summers, the majority of the TSA has more than 125% mature-plus-old forest compared to the policy targets (see Appendix 3 Table 24).

There is insufficient mature-plus-old forest to meet targets in 12% of AUs (16 of 128 AU), most of which have 75-100% of the target met. The majority of AUs not meeting the policy targets are within two LUs: Lower Nicola LU in the northwest (31,374.1 ha of CE-CFLB) and Summers LU in the middle of the TSA (6,671.9 ha of CE-CFLB).
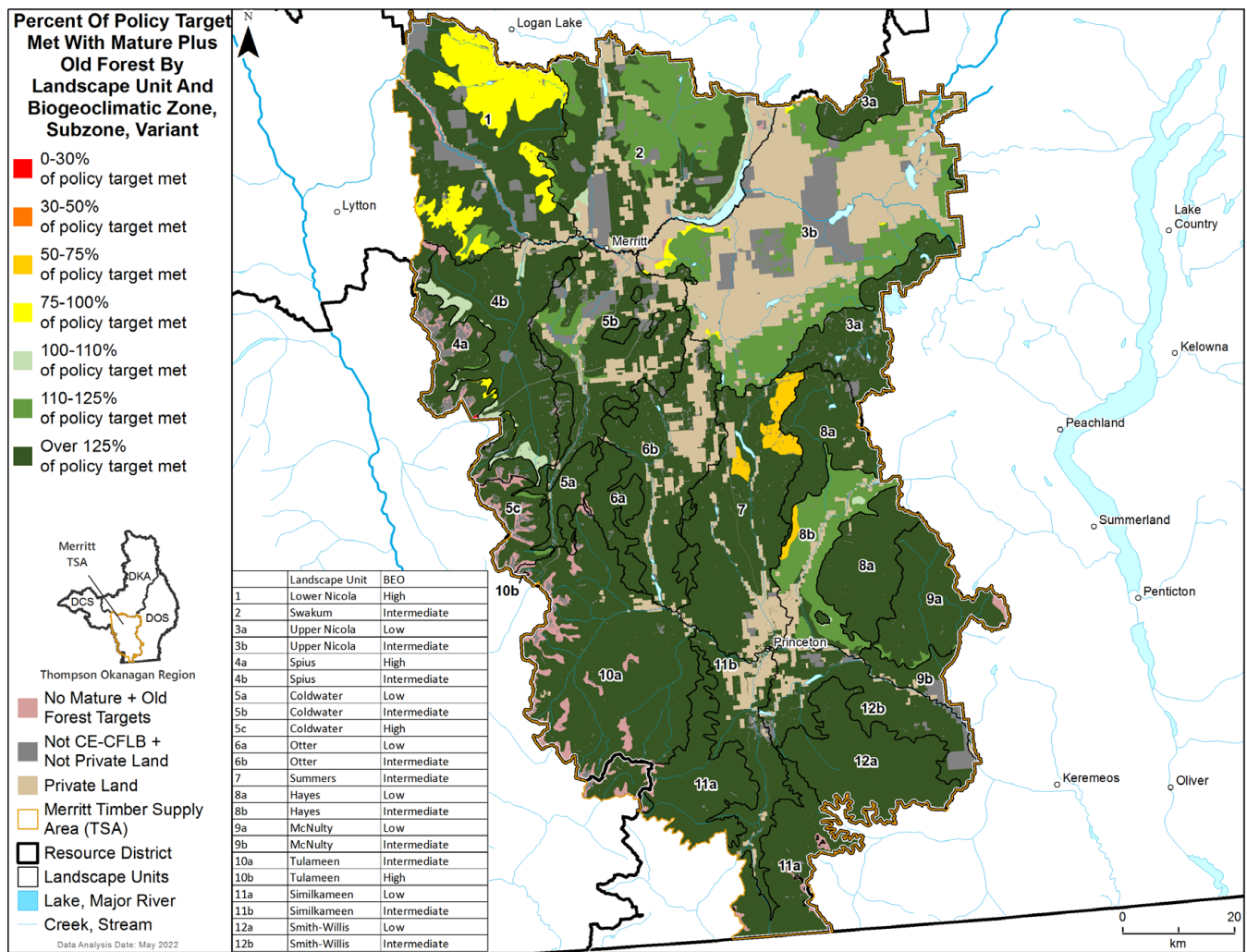
Figure 10. *Current Condition of Mature-plus-Old Forest as a Percent of Policy Target Met in the Merritt Timber Supply Area (TSA).[a]*

a   Any AUs with less than 100% of the target met are considered to be in deficit of mature-plus-old forest.

The 16 AUs with insufficient mature-plus-old forest to meet policy targets cover a total of 41,853.9 ha of CE-CFLB; currently 12,109.0 ha of this CE-CFLB is mature-plus-old forest (Table 15). The majority of the CE-CFLB of these AUs are close to meeting targets (33,837.7 ha of CE-CFLB with 75-100% of the target met). There is one AU with a relatively large CE-CFLB (28,260.9 ha in the Lower Nicola LU-High BEO-MSxk BEC variant), which is 68% of the CE-CFLB of AUs not meeting the targets. There are six AUs with more than 1,000 ha of CE-CFLB, and most of the remaining 10 AUs are relatively small (less than 150 ha). The majority of AUs not meeting the mature-plus-old targets are in the MS BEC zone, in particular the MSdm2 (South Thompson dry mild) and MSxk (very dry cool) variants.

There are four AUs with 0-30% of the target met (total CE-CFLB of 106.3 ha), two AUs with 30-50% of the target met (136.4 ha of CE-CFLB), three AUs with 50-75% of the target met (7,773.4 ha of CE-CFLB), and seven AUs with 75-100% of the target met (33,837.7 ha of CE-CFLB). Of these 16 AUS, there are two AUS with no mature-plus-old forest remaining to meet the targets, however both of these AUs have a small total CE-CFLB for the targets to be applied to (0.2 ha of CE-CFLB in the Tulameen LU-ESSFmw, and 2.1 ha of CE-CFLB in the Smith-Willis LU-ESSFxc).

Of the remaining 112 AUs that have greater than 100% of the target met (Appendix 3 Table 24), 97 AUs have more than 125% of the target met, 10 AUs have 110-125% of the target met, and five AUs have 100-110% of the target met. Of these, there are nine AUs with more than 400% of the target met (19,762.3 ha of CE-CFLB). On average in the TSA, AUs have more than 167% of the target mature-plus-old forest amount.

Table 15. *Assessment Units (AUs) with 0-125% of Mature-plus-Old Forest Compared to Policy Targets in the Merritt Timber Supply Area (TSA).*

Column Calculations				A	B	C = B/A	D	E = C/D
Indicator Condition	Assessment Unit (AU)			LU-BEC Area in CE-CFLB (ha)	Existing Mature-plus-Old Forest Area in AU (ha)	Existing Mature-plus-Old Forest in AU (%)	Mature-plus-Old Forest Policy Target (%)	% of Policy Target Met in AU
	BEC	LU	BEO					
0 – 30%	ESSFmw	Tulameen	High	0.2	0.0	0%	42%	0.0%
	ESSFxc	Smith-Willis	Int.	2.1	0.0	0%	23%	0.0%
	ESSFdc2	Coldwater	Int.	2.3	0.01	0%	23%	0.9%
	CWHms1	Spius	High	101.7	14.8	15%	51%	28.6%
30 – 50%	MSdm2	Upper Nicola	Low	135.5	9.0	7%	14%	47.6%
	MSun	Coldwater	Int.	1.0	0.1	13%	26%	49.9%
50 – 75%	IDFdk1	Smith-Willis	Int/Low	15,484.8	186.8	120.6%	367	50.9%
	IDFdk1	Lower Nicola	High	20,976.0	1,399.1	667.0%	2,561	54.6%
	MSdm2	Lower Nicola	High	1,296.4	403.3	3110.9%	618	65.3%
75 – 100%	ESSFxc	Lower Nicola	High	1,816.7	487.4	27%	34%	78.9%
	IDFxh2	Upper Nicola	Int.	1,767.0	500.6	28%	34%	83.3%
	MSxk	Lower Nicola	High	28,260.9	9,245.6	33%	39%	83.9%
	MSun	Spius	High	602.2	198.0	33%	39%	84.3%
	ESSFdc2	Similkameen	Int.	17.4	3.4	20%	23%	86.3%
	MSdm2	Lower Nicola	High	1,296.4	462.5	36%	39%	91.5%
	IDFdk2	Upper Nicola	Low	77.1	12.5	16%	17%	95.7%
100 – 110%	MSxk	Hayes	Int.	449.4	120.1	27%	26%	102.8%
	ESSFmw	Spius	Int.	5,500.2	1,603.5	29%	28%	104.1%
	CWHms1	Spius	Int.	8.2	2.9	35%	34%	104.3%
	PPxh2	Swakum	Int.	2,560.2	940.8	37%	34%	108.1%
	PPxh2	Spius	Int.	505.8	188.4	37%	34%	109.6%
110 – 125%	IDFdk2	Hayes	Int.	12,225.3	4,585.7	38%	34%	110.3%
	IDFdk2	Lower Nicola	High	1,706.1	987.9	58%	51%	113.5%
	CWHms1	Coldwater	High	548.5	319.5	58%	51%	114.2%
	MSdm2	Spius	High	277.0	125.9	45%	39%	116.5%
	IDFxh1	Coldwater	Int.	4,004.0	1,605.0	40%	34%	117.9%
	IDFdk1	McNulty	Low	881.9	176.9	20%	17%	118.0%
	MSxk	Swakum	Int.	33,943.3	10,470.9	31%	26%	118.6%
	IDFdk1	Upper Nicola	Int.	47,631.5	19,477.4	41%	34%	120.3%
	MSxk	Upper Nicola	Int.	3,503.0	1,109.0	32%	26%	121.8%
	IDFdk1	Hayes	Int.	9,806.4	4,105.3	42%	34%	123.1%

The majority (95.2%) of the AUs have sufficient mature-plus-old forest compared to the policy targets (822,958.9 ha of CE-CFLB); most of which have more than 125% of the target met (699,408.1 ha or 80.9% of the CE-CFLB) (Figure 11). Of the remaining CE-CFLB, 13.2% (114,527.0 ha) has 100-125% of the target met and 3.9% (33,837.7 ha) has 75-100% of the target met. There is a relatively small percentage of CE-CFLB (less than 0.0%) with 0-30% and 30-50% of the target met.

CE-CFLB Area (ha) by Cumulative Effects Indicator Condition
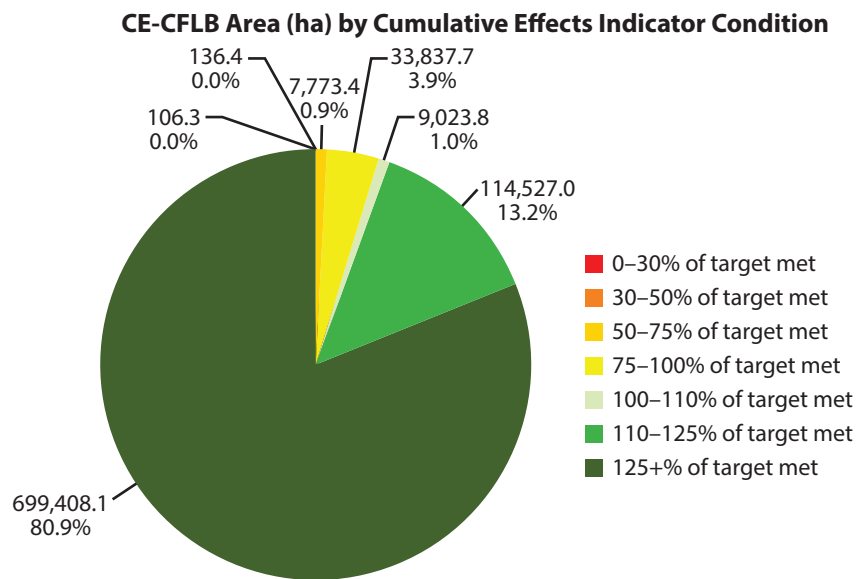
Figure 11. Amount of Cumulative Effects Crown Forested Land Base (CE-CFLB) in each Cumulative Effects Indicator Condition as a Percentage of Mature-plus-Old Forest Policy Targets Met in the Merritt Timber Supply Area (TSA).

5.1.1.4   Landscape Units and Mature-plus-Old Forest Distribution Compared to Policy Targets

This section provides an overview of the assessment results summarized by LU; Table 16 shows the status of mature-plus-old forest as compared to the BDG policy targets for all LUs. Overall, 88% of the LUs are meeting the mature-plus-old forest policy target. Of the 12 LUs with policy targets assigned, three LUs (McNulty, Otter, and Swakum) have all their respective AUs with sufficient mature-plus-old forest compared to policy targets; the McNulty and Otter LUs in the southern half of the TSA are reporting more than 125% of the target met.

The majority of LUs are close to meeting the policy targets, and those LUs not meeting targets are a result of a small number of AUs currently not meeting the target for the entire LU. This is an overall improvement from the old-growth forest indicator where no LU had all AUs meeting the legal targets (now three LUs meet the policy targets), and 40% of LUs had sufficient old forest compared to the legal targets (now 88% of LUs have sufficient mature-plus-old forest compared to policy targets). The LUs furthest from the targets are Lower Nicola (67% of AUs meeting targets), Upper Nicola (67%), and Summers (71%).

Table 16. *Summary of Assessment Units (AU) by Landscape Unit (LU) that are Meeting Policy Targets in the Merritt Timber Supply Area (TSA).*

Landscape Unit (LU)	BEO	Total # of Assessment Units (AUs)	# of AUs Meeting Mature-plus-Old Forest Targets	% of AUs Meeting Mature-plus-Old Forest Targets[a]
Coldwater	High/Int./Low	23	21	91%
Hayes	Int./Low	11	10	91%
Lower Nicola	High	9	6	67%
McNulty	Int./Low	6	6	100%
Otter	Int./Low	10	10	100%
Similkameen	Int./Low	13	12	92%
Smith-Willis	Int./Low	11	10	91%
Spius	High/Int.	15	13	87%
Summers	Intermediate	7	5	71%
Swakum	Intermediate	5	5	100%
Tulameen	High/Int.	9	8	89%
Upper Nicola	Int./Low	9	6	67%
Total	**-**	**128**	**112**	**88%**

[a] AUs with less than 100% of the policy target are considered to be in deficit of mature-plus-old growth forest.

5.1.1.5   *Biodiversity Emphasis Option and Mature-plus-Old Forest Distribution Compared to Policy Targets*

This section provides an overview of the assessment results summarized by the BEO assigned to LUs. There is no BEO that has all their respective AUS with sufficient amounts of mature-plus-old forest to meet the policy targets (Table 17). Most AUs in the Low BEO (95%) and Intermediate BEO (88%) designations are meeting the targets, while the Intermediate BEO has the greatest CE-CFLB of AUs meeting targets (481,562.5 ha).

Table 17. *Summary of Assessment Units (AU) by Biodiversity Emphasis Option (BEO) that are Meeting Policy Targets in the Merritt Timber Supply Area (TSA).*

		Biodiversity Emphasis Options (BEOs) in the CE-CFLB		
	Total	High BEO	Intermediate BEO	Low BEO
# Assessment Units (AUs) in BEO	128	21	68	39
# AUs Meeting Policy Target	112	15	60	37
% AUs Meeting Policy Targets	88%	71%	88%	95%
CE-CFLB Area (ha) in AUs with Targets	864,812.8	115,695.4	491,125.7	257,991.7
CE-CFLB Area (ha) in AUs Meeting Policy Targets	822,958.9	83,617.3	481,562.5	257,779.1

5.1.1.6   Biogeoclimatic Ecosystem Classification and Mature-plus-Old Forest Distribution Compared to Policy Targets

This section provides an overview of the assessment results summarized by BEC. The total number of BEC variants in the mature-plus-old forest indicator differs from the old growth forest indicator due to how targets are established between the PNOGO and BDG. In the old growth forest indicator, PNOGO lists 11 BEC variants in the Merritt TSA with targets established, while the BDG includes 13 BEC variants. As a result, there are two additional BEC variants included in the mature-plus-old forest indicator: MHmm2 and MSun.

In general, the amount of mature-plus-old forest is at or exceeding targets in the low elevation valley bottoms (IDF and PP BEC zones), and furthest from the targets in the higher elevation forests (ESSF and MS BEC zones). While the old growth forest indicator had one BEC variant with 100% of its AUS meeting the targets, there are four BEC variants with sufficient mature-plus-old forest to meet the targets: IDFdk1, IDFxh1, MHmm2, and PPxh2 (Table 18).

In general, the remaining 9 BEC variants are close to meeting the targets (more than 80% of the target met) and generally represented by one or two AUs in each BEC that is currently not meeting the targets. The BEC variants furthest from the targets are the ESSFxc (very dry cold) and the MSun (undifferentiated).

Table 18. *Summary of Assessment Units (AU) by Biogeoclimatic Ecosystem Classification (BEC) Subzone or Variant that are Meeting Policy Targets in the Merritt Timber Supply Area (TSA).*

BEC Variant[a]	Total Area in BEC (ha)	Total CE-CFLB Area (ha)	Existing Mature-plus-Old Forest in CE-CFLB (ha)	Existing Mature-plus-Old Forest in CE-CFLB (%)	# Assessment Units (AUs)	# of AUs Meeting Policy Target	% of AUs Meeting Policy Targets
CWHms1	1,823.2	1,750.6	1,143.3	65%	5	4	80%
ESSFdc2	66,217.9	65,146.5	25,818.7	40%	13	11	85%
ESSFmw	85,658.4	82,572.5	49,389.6	60%	8	7	88%
ESSFxc	39,597.9	39,351.1	19,194.0	49%	9	6	67%
IDFdk1	264,362.2	177,142.3	83,393.8	47%	18	18	100%
IDFdk2	142,485.4	125,705.1	66,241.3	53%	16	15	94%
IDFxh1	49,737.0	24,509.1	16,282.5	66%	9	9	100%
IDFxh2	76,173.2	32,399.8	22,957.4	71%	5	4	80%
MHmm2	369.1	347.0	326.8	94%	1	1	100%
MSdm2	121,335.6	119,039.2	46,964.3	39%	17	14	82%
MSun	8,959.2	8,575.3	3,778.8	44%	6	4	67%
MSxk	184,389.0	176,543.2	58,039.3	33%	16	14	88%
PPxh2	25,839.9	11,731.0	7,606.7	65%	5	5	100%
TOTAL	**1,066,948.1**	**864,812.8**	**401,136.5**	**46%**	**128**	**112**	**88%**

a   This table demonstrates the distribution of old growth forest across BECs. Only BECs with mature-plus-old growth forest targets are listed in this table.

5.2.3   Limitations

The limitations associated with the mature-plus-old forest indicator are largely a result of the interpretation of the old growth forest management policy, as opposed to limitations with the source data itself (as seen with the old growth forest indicator). Much of the province does not have legally established mature-plus-old forest retention targets, and some areas do not have specific targets for mature forest retention (e.g., the percent target retention is the same for old growth forest as it is for mature-plus-old), therefore mature forest is not directly being managed for in the current policy framework.

5.2.4   Summary and Observations

Overall, 45.2% (401,136.5 ha) of the CE-CFLB is comprised of mature-plus-old forest, with high proportions of mature-plus-old forest across the TSA. At the AU scale, including mature forest in the current condition assessment for old growth forest (mature-plus-old) increased the percentage of AUs meeting targets from 40% of AUs (32 out of 80 AUs) meeting the old growth forest targets, to 88% of AUs (112 out of 128 AUs) meeting the mature-plus-old forest targets. At the LU scale, including mature forest increased the percentage of the CE-CFLB meeting targets from 51.4% (438,617.9 ha of CE-CFLB) to 95.2% (822,958.9 ha of CE-CFLB). There are 4 out of the 13 BEC variants that meet the mature-plus-old forest policy targets: IDFdk1, IDFxh1, MHmm2, and PPxh2. The remaining 9 BEC variants are close to meeting the targets (in general, more than 80% of AUs meeting policy targets).

In the PNOGO, there are provisions that allow the use of younger forests to meet old growth forest targets "where equal or better conservation benefits would result" and to recruit from younger stands when there is insufficient old growth forest in a BEC variant. These provisions may have been applied in the AUs with not enough old growth forest to meet the targets to minimize the socio-economic impacts to forest operations. Further inquiry into the assessment results could examine whether these provisions have been applied appropriately.

5.3   Incursions into Non-Legal Old Growth Management Areas

This assessment compares the area of anthropogenic (human-caused) disturbance footprint (i.e., incursions) in OGMAs relative to allowable incursions specified in the applicable order, policy, or guidance. Incursions are defined as alterations to OGMAs caused by resource development activities that permanently alter the forested land base or that convert forests to an early seral stage (i.e., less than 40 years old). Resource development activities include permitted forestry activities (i.e., cutblocks and roads), non-forestry-related activities (e.g., pipelines, oil and gas, mining, fire guards, urban development, land tenures), and other human use features (i.e., recreation sites and trails).

In this assessment, disturbances only include active, initiated, tenured, and completed developments, and does not consider proposed or anticipated projects and activities. The exception to this is roads due to variation in accuracy of spatial road data and available datasets. Incursions into OGMAs were determined using the CE Human Disturbance Layer (2019) and the CE Integrated Roads Layer (2019). Some source data does not include a disturbance date; therefore, it was not possible to remove disturbances that occurred prior to OGMA establishment. As a result, all disturbances were included in this assessment except for historical cutblocks (i.e., 20 years and older). **Consequently, this may skew the assessment results to show incursions that were known and accepted at time of OGMA establishment. At the very least, all OGMA incursions beyond the threshold limits should trigger further inquiry.**

It is common for OGMAs to have historic anthropogenic incursions and natural disturbances included within the OGMA boundary at the time of establishment. This was dependent on the process undertaken at the time of OGMA development. Natural disturbances such as fires, insects, pathogens, and wind will alter forest stand composition within OGMAs over time. **At this time, the OGMA incursions assessment did not consider natural disturbances (e.g., wildfires or insect outbreaks) that were not included in the VRI at the time of data extraction from the BCGW in 2019.** Refer to section 4.3.1 for more information regarding how disturbances were considered in this assessment.

5.3.1   Overview of OGMA Incursions

The Merritt TSA does not have legally established OGMAs, however there are spatial non-legal OGMAs that are currently being managed to and applied in this assessment. The Old Growth Management Area Guidance Thompson Okanagan (2007) regional OGMA guidance applies in absence of a legal order in the Merritt TSA and sets allowable incursion limits. **The regional guidance objectives allow incursions, for very specific reasons up to 10 ha of 10% of an OGMA, whichever is less, for any single OGMA.** Any incursion beyond this threshold would likely result in the OGMA being

replaced with an ecologically suitable area. At the very least, all OGMA incursions beyond the threshold limits should trigger further inquiry. Refer to section 3.2.2 for more information regarding OGMA incursions.

The total incurred percentage is calculated using total OGMA area (ha) and total OGMA incurred area to determine if the allowable incursion threshold has been exceeded within the OGMA. The total incurred percentage is intended to reflect the magnitude or scale of anthropogenic disturbance within OGMAs. It is presented to demonstrate the importance of area incurred relative to OGMA size and reflects the potential impacts to old growth forest biodiversity within the established OGMAs. The CE-CFLB area within OGMAs and the associated incurred area is also provided for information and consistency across the four CE indicators. Appendix 3 (Table 25) provides a complete listing of all OGMA incursion types reported by individual OGMAs.

5.3.2 Total Amount of Incursions into Non-Legal OGMAs

There are 1,305 non-legal OGMAs across all LUs with a total OGMA area of 114,589.0 ha and a CE-CFLB of 113,232.1 ha. Without comparison to the regional guidance allowable incursion thresholds, all LU's with OGMAs have incursions with a total of 812 OGMAs (62% of all OGMAs) with some degree of incursion disturbance (Table 19). There are 493 OGMAs with no incursions being reported in this assessment. The total area of all incursions in OGMAs is 2,709.1 ha which is 2.4% of the total OGMA area. Hayes, Swakum, and Summers LUs have the highest percentage of incurred OGMAs (76%, 74% and 71%, respectively). The two LUs with the greatest total incurred OGMA area are Coldwater (516.7 ha) and Swakum (434.7 ha).

Table 19. *Summary of All Incursions in Non-Legal Old Growth Management Areas (OGMAs) by Landscape Unit (LU) in the Merritt Timber Supply Area (TSA).*

Landscape Unit	Summary of Incursions			Summary by Total OGMA Area			Summary by CE-CFLB Area		
	Total # of OGMAs[a]	Total # of OGMAs with Incursions[b]	% of OGMAs with Incursions	Total OGMA Area in LU (ha)[c]	Total Incurred OGMA Area (ha)	% of Incurred OGMA Area (%)	Total OGMA CE-CFLB Area (ha)	Total Incurred OGMA CE-CFLB Area (ha)	% of Incurred OGMA Area in CE-CFLB (%)
Coldwater	214	112	52%	9,170.4	516.7	5.6%	8,937.3	508.3	5.7%
Hayes	80	61	76%	6,979.8	167.6	2.4%	6,941.1	163.7	2.4%
Lower Nicola	118	56	47%	18,557.3	125.0	0.7%	18,484.5	124.0	0.7%
McNulty	48	23	48%	2,550.0	51.9	2.0%	2,542.7	49.6	1.9%
Otter	110	76	69%	7,473.0	180.9	2.4%	7,337.2	174.5	2.4%
Similkameen	110	72	65%	8,748.3	328.9	3.8%	8,705.6	324.4	3.7%
Smith-Willis	68	35	51%	8,920.2	98.4	1.1%	8,857.4	95.2	1.1%
Spius	119	54	45%	11,048.1	127.8	1.2%	10,685.5	127.0	1.2%
Summers	117	83	71%	7,215.3	191.3	2.7%	7,158.4	187.0	2.6%
Swakum	139	103	74%	8,729.5	434.7	5.0%	8,656.5	428.7	5.0%
Tulameen	92	45	49%	16,442.1	141.0	0.9%	16,296.1	140.2	0.9%
Upper Nicola	185	121	65%	8,755.2	344.8	3.9%	8,629.9	336.7	3.9%
TOTAL	**1305**	**812**	**62%**	**114,589.0**	**2,709.1**	**2.4%**	**113,232.1**	**2,659.2**	**2.3%**

[a] There are OGMAs that span multiple LUs. Therefore, each value in the "Total # of OGMAs" and "# of OGMAs with Incursions" columns are independent of the others in such a way that they do not sum together to equal the total number shown for the Merritt TSA.

[b] Includes all incursions into the OGMA, regardless of any thresholds defined in legal orders or regional policies.

[c] Slivers less than 0.01 ha have not been included in this summary.

5.3.3 Incursions into Non-Legal OGMAs Compared to Allowable Thresholds in Policy

Comparing the incursions into non-legal OGMAs against the allowable thresholds in the regional guidance resulted in 9% of all non-legal OGMAs (114 out of 1,305 total OGMAs) identified as disturbed beyond the acceptable threshold limits (Figure 12, Table 20).
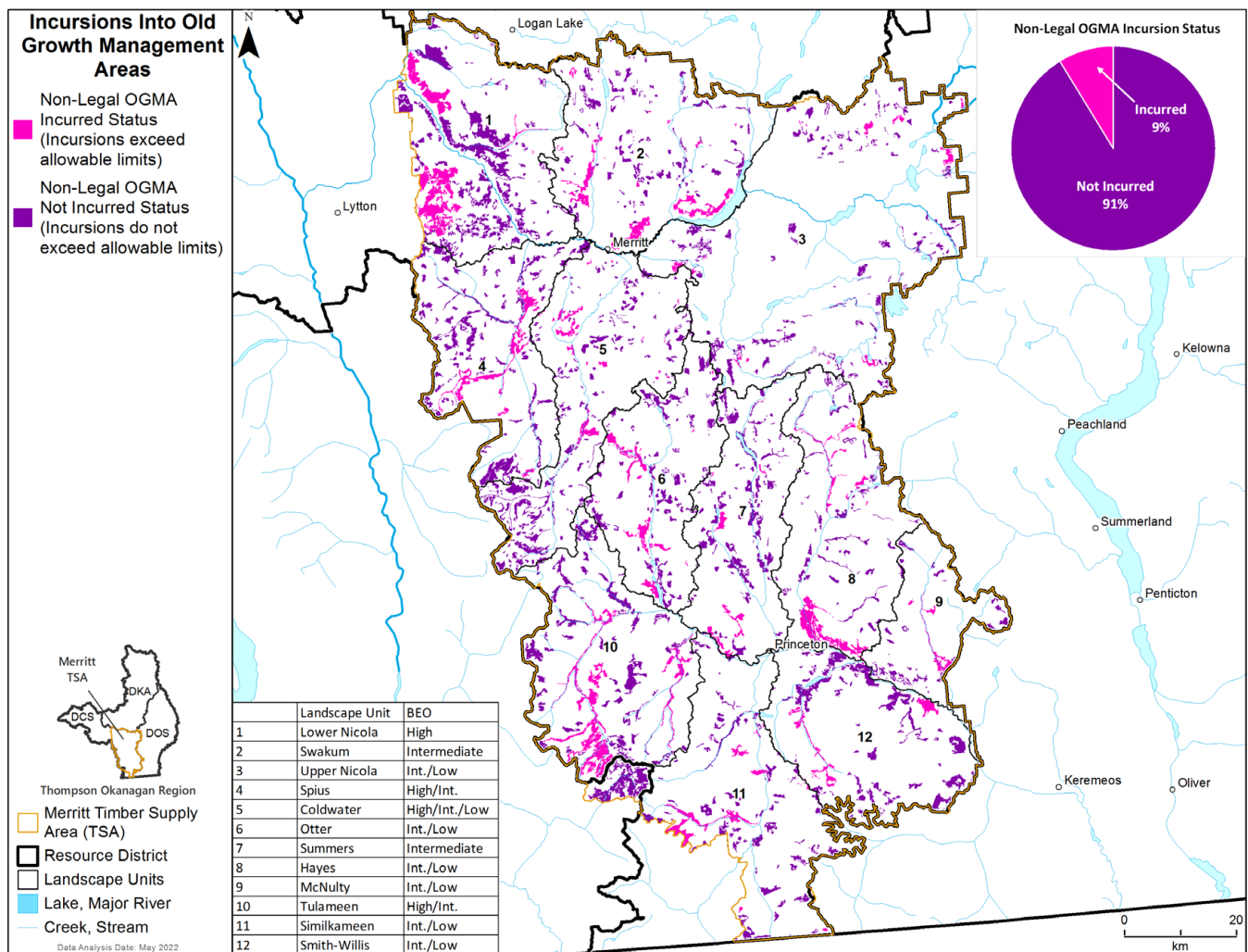
Figure 12. *Incursions in Non-Legal Old Growth Management Areas (OGMAs) that Exceed the Allowable Incursion Threshold in the Merritt Timber Supply Area (TSA).*[a]

[a] The insert pie chart illustrates the proportion of non-legal OGMAs with incursions that exceed the allowable threshold.

There 114 OGMAs with incursions that exceed the allowable limits as per the regional guidance occur across all LUs (Table 20). The total area of OGMAs that are in an incurred status (e.g., above allowable threshold) is 33,309.9 ha with the total incursion footprint in these OGMAs of 1,730.4 ha (5.2% of the total OGMA area). The Coldwater LU has the largest number of occurrences of incurred OGMAs (22 OGMAs) and the largest total OGMA area with incurred status (417.9 ha). There are three additional LUs with more than 100 ha of incurred OGMA status: Swakum (303.0 ha), Similkameen (270.1 ha), and Upper Nicola (221.2 ha).

Table 20. *Summary of Incursions in Non-Legal Old Growth Management Areas (OGMAs) that Exceed the Allowable Incursion Threshold in the Merritt Timber Supply Area (TSA).*

Landscape Unit	Total OGMAs		Total Area (ha)		Total CE-CFLB Area (ha)		Disturbance Type
	# of OGMAs with Incursions Over Threshold	% of OGMAs with Incursions Over Threshold	Total OGMAs area with Incurred Status (ha)	Total Incurred Area in OGMAs (ha)[a]	Total OGMAs CE-CFLB Area with Incurred Status (ha)	Total Incurred OGMAs CE-CFLB Area (ha)	
Coldwater	22	10%	1,646.2	417.9	1,588.6	415.1	Forest Harvesting, Roads, Mining and Extraction, Agriculture & Clearing, Rights of Way, Urban, Power
Hayes	6	8%	3,520.5	100.0	3,505.0	99.8	Roads, Forest Harvesting, Urban, Mining and Extraction
Lower Nicola	5	4%	6,237.4	45.6	6,208.1	45.5	Roads, Forest Harvesting, Rights of Way, Power
McNulty	8	17%	788.7	40.2	785.0	38.1	Forest Harvesting, Roads, Power, Rights of Way
Otter	11	10%	2,268.2	79.2	2,223.1	75.4	Roads, Forest Harvesting, Agriculture & Clearing, Urban, Rights of Way, Mining and Extraction
Similkameen	12	11%	2,371.6	270.1	2,355.7	266.6	Forest Harvesting, Roads, Mining and Extraction
Smith-Willis	5	7%	1,481.0	44.0	1,468.9	43.5	Roads, Forest Harvesting, Mining and Extraction, Rights of Way, Agriculture & Clearing
Spius	8	7%	2,727.7	69.2	2,677.2	69.1	Roads, Forest Harvesting, Agriculture & Clearing
Summers	11	9%	1,139.6	69.5	1,133.1	68.9	Roads, Forest Harvesting, Rights of Way, Urban, Agriculture & Clearing, Mining and Extraction
Swakum	18	13%	3,781.9	303.0	3,738.9	298.6	Roads, Forest Harvesting, Mining and Extraction, Urban, Power, Rights of Way, Agriculture & Clearing
Tulameen	4	4%	5,946.9	70.5	5,826.5	70.0	Roads, Forest Harvesting
Upper Nicola	14	8%	1,400.3	221.2	1,384.6	215.5	Forest Harvesting, Roads, Mining and Extraction, Power, Rights of Way, Urban
TOTAL	**114**	**9%**	**33,309.9**	**1,730.4**	**32,894.7**	**1,706.1**	

[a] Incursion areas that are less than 0.01 ha was not included in the disturbance type summary.

5.1.1.7   Disturbance Type of Incursions in Non-Legal OGMAs

A total area of 1,730.4 ha (1,706.1 ha of CE-CFLB) of incursions in non-legal OGMAs was identified in this assessment that are beyond the allowable incursion limits (Table 20). Most incursions that exceeded the allowable threshold were due to forest harvesting (917.1 ha or 53.0%) followed by road development (713.2 ha or 41.2%) (Figure 13). See Appendix 3 Table 25 for further details regarding disturbance types by LU.

Total Area (ha) and Disturbance Type of Incursions into Non-Legal OGMAs
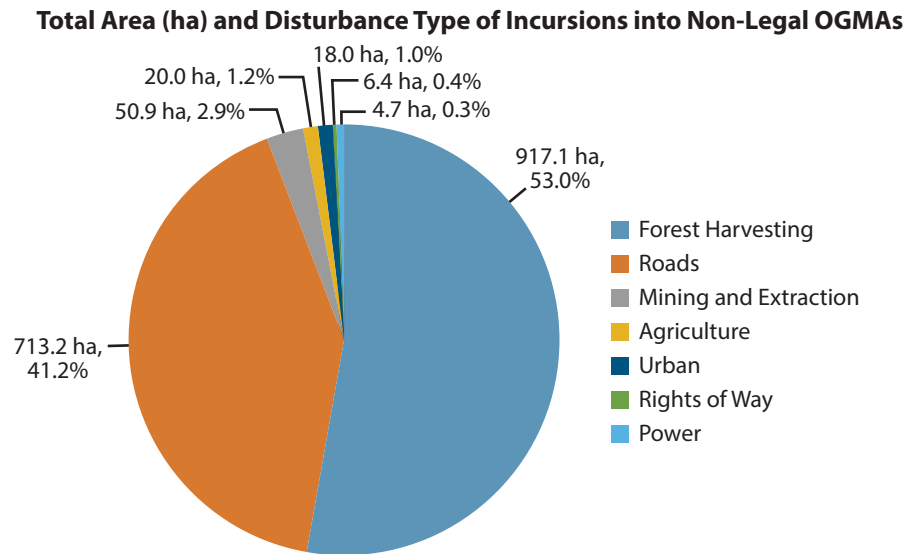
Figure 13. *Distribution of Incursions in Non-Legal Old Growth Management Areas (OGMAs) that Exceed the Allowable Incursion Threshold by Disturbance Type in the Merritt Timber Supply Area (TSA).*

5.1.1.8   Incursion Magnitude in Non-Legal OGMAs

Magnitude of incursions in OGMAs is assessed to determine the overall impact based on the size of the OGMA and the scale of disturbance within the OGMA (e.g., the smaller the OGMA, the greater the potential impact to the OGMA, including the indirect impacts of disturbances on interior forest condition habitat from edge effect).

In the Merritt TSA, most non-legal OGMAs (606 out of 1,305 total OGMAs) have incursions that disturb less than 5% of the total OGMA area (Figure 14), followed by incursions that disturb 5 to 10% of the total OGMA area (125 out of 1,305 OGMAs). There are 14 OGMAs with incursions that disturb 25 to 50% of the total OGMA area, two OGMAs with 50 to 75% of the OGMA incurred, and six OGMAs with more than 75% of the OGMA incurred. The OGMAs with larger incursions (over 75% in Figure 14), are southwest and east of Merritt, as well as northwest to southwest of Princeton.

The largest incursion occurs in the Coldwater LU with 248.2 ha of total incurred area within an individual OGMA (73% of the OGMA) due to forest harvesting, roads, and right-of-way (Table 25). There are two LUs with more than 100 ha of incursions into a single OGMA: Similkameen LU (134.4 ha incurred area, 73% of total OGMA area) and Swakum (124.8 ha incurred area, 10.4% of total OGMA area), both of which are also due to forest harvesting and road development. In addition, an OGMA that overlaps the Coldwater and Upper Nicola LUs has 54.2 ha of incurred OGMA area, which is 78% of the total OGMA area.

Incursions Into Non-Legal Old Growth Management Areas (OGMA) - Percent Disturbed

- Over 75%
- 50-75%
- 25-50%
- 5-25%
- Less Than 5%

Merritt TSA

Thompson Okanagan Region

Merritt Timber Supply Area (TSA)

Resource District

Landscape Units

Lake, Major River

Creek, Stream

Data Analysis Date: May 2022

	Landscape Unit	BEO
1	Lower Nicola	High
2	Swakum	Intermediate
3	Upper Nicola	Int./Low
4	Spius	High/Int.
5	Coldwater	High/Int./Low
6	Otter	Int./Low
7	Summers	Intermediate
8	Hayes	Int./Low
9	McNulty	Int./Low
10	Tulameen	High/Int.
11	Similkameen	Int./Low
12	Smith-Willis	Int./Low

Figure 14. *Magnitude of Incursions into Non-Legal Old Growth Management Areas (OGMAs) in the Merritt Timber Supply Area (TSA).*

5.3.4 Limitations

This report assesses the amount of incursions into OGMAs due to anthropogenic (human-caused) disturbances. At this time, they do not report on incursions due to natural disturbances for the OGMA incursion indicator due to limitations with the VRI (as discussed in section 2.2.3).

In this assessment, all incursions were included regardless of when they occurred (e.g., prior to or after the OGMA was established), except for cutblocks. All cutblocks that pre-dated the establishment of the non-legal OGMA and those that occurred more than 20 years before the assessment were removed. As a result, this assessment may over-estimate the amount of incursions due to the inclusion of incursions that were known and considered acceptable at the time of OGMA delineation.

In addition, road widths applied in the assessment were not verified on the ground and instead represent a best estimation based on the available information and input from government staff. Due to the variation in accuracy of spatial road data (e.g., roads represented in the data that were not built on the ground, varying road widths based on local terrain), it is possible that some OGMA incursions due to roads are a result of incorrect road data and not necessarily an actual incursion into the OGMA.

Assessing how OGMAs were designed and implemented as per the provincial policy or guidance was outside the scope of this assessment. The LUPG provided the direction for OGMA delineation based on a rigorous rules-based approach that focused on managing timber supply impacts, ensuring biodiversity conservation was within the timber supply impact levels set by government (i.e., no more than a 4% impact to timber supply). As a result, there may have been unintended outcomes to biodiversity objectives and old growth forest management.

5.3.5   Summary and Observations

There are 1,305 mapped non-legal OGMAs across the Merritt TSA with a total OGMA area of 114.589.0 ha and a CE-CFLB of 113,232.1 ha. Of these, 812 OGMAs (62%) show some level of disturbance impacting a total OGMA area of 2,709.1 ha (without comparison to the allowable incursion threshold). Hayes, Swakum, and Summers LUs have the highest percentage of incurred OGMAs (76%, 74% and 71%, respectively). The two LUs with the greatest total incurred OGMA area are Coldwater (516.7 ha) and Swakum (434.7 ha). Most OGMA incursions disturb less than 5% of the total OGMA area (606 OGMAs).

There are 114 OGMAs (9% of all OGMAs) with incursions that exceed the allowable limits as per the regional guidance, impacting 33,309.9 ha of total OGMA area with the total incursion footprint in these OGMAs of 1,730.4 ha. The LUs with the greatest incurred OGMA area are Coldwater LU (417.9 ha), Swakum (303.0 ha), Similkameen (270.1 ha), and Upper Nicola (221.2 ha). Most incursions that exceeded the allowable limit were due to forest harvesting (i.e., cutblocks) (917.1 ha or 53.0%) and road development (713.2 ha or 41.2%). Incursions were also due to mining and extraction (50.9 ha or 2.9%), agriculture and clearing (20.0 ha or 1.2%), urban (18.0 ha or 1.0%), rights-of-way (6.4 ha or 0.4%), and power (4.7 ha or 0.3%) developments.

Incursions into OGMAs may have occurred for several reasons and may have been known at the time of OGMA establishment. It is recommended that further inquiry be completed to better understand the amount, type, and magnitude of OGMA incursions to determine if the intent of the regional guidance is being maintained and if OGMAs need to be replaced or monitored. In addition, OGMAs were intended to have long-term monitoring, however, such monitoring of effectiveness and incursions has not occurred in the Merritt TSA to date. These OGMA incursion assessment results are the beginnings for future monitoring opportunities.

5.4   Amount of Old Growth Forest in Non-Legal OGMAs Relative to Legal Targets

OGMAs (legal and non-legal) are the implementation strategy used to meet old growth forest retention targets. Identifying how much old growth forest exists within OGMAs relative to legal targets can assess whether OGMAs are currently achieving old growth retention targets in the CE-CFLB. In addition, assessing how much mature forest exists within OGMAs can help identify the amount of potentially eligible stands available for future recruitment to achieve old growth forest and biodiversity objectives.

The LUPG provided a strict "rules-based" approach to designing OGMAs while mitigating impacts to timber supply. Old growth forest retention targets were to be met first in areas with harvesting restrictions (i.e., parks, wildlife habitat areas) before identifying areas for spatial OGMAs in the LU-BEC. If there was not enough old growth forest in the LU-BEC to meet the target, then the next oldest available forest (generally mature forest) could be recruited.

While this assessment includes the amount of old growth forest within other protected areas as part of the overall old growth forest available in each AU (LU-BEC), it does not specifically report on the area and amount of old growth forest co-located within these other no-harvest designation areas (e.g., wildlife habitat areas, ungulate winter ranges, parks). Therefore, where the results indicate that the area or amount of old growth forest in OGMAs is not sufficient to meet legal targets, it may be because the remaining amount of old growth forest needed to meet those targets is captured in other protected areas, and further inquiry is required.

The regional OGMA policy states that OGMAs are to be managed to the polygon (area) to meet the distribution of old growth forest for each LU-BEC. The regional guidance does not require the management of the seral stage within OGMAs. The intent of OGMAs was to meet the target amount of old growth forest under PNOGO. If OGMAs are legally established, the assumption is that the total area within OGMAs meets the old growth forest seral stage targets under PNOGO. **This assessment is intended to provide a starting point for further analysis and inquiry to examine how OGMA designations are meeting legal targets for old growth forest retention.**

5.4.1   Overview of Old Growth Forest in Non-Legal OGMAs

The seral stage in non-legal OGMAs shows a general pattern of old seral stage forest dispersed across the TSA (Figure 15), particularly in higher elevation forests south of Princeton (Smith-Willis LU) and along the Cascade-Coquihalla (Similkameen and Tulameen LUs) mountains northward to Lytton (Lower Nicola LU).

There are 1,305 mapped non-legal OGMAs across all LUs with a total OGMA area of 114,589.0 ha and a CE-CFLB of 113,232.1 ha. Overall, half of the total area of OGMAs are mature seral stage (55.6% or 63,697.9 ha) followed by old (22.2% or 25,433.6 ha), mid (14.7% or 16,900.9 ha), and early (3.8% or 4,371.2 ha) seral forests, as well as 4,185.6 ha (3.7%) with no seral stage was assigned.
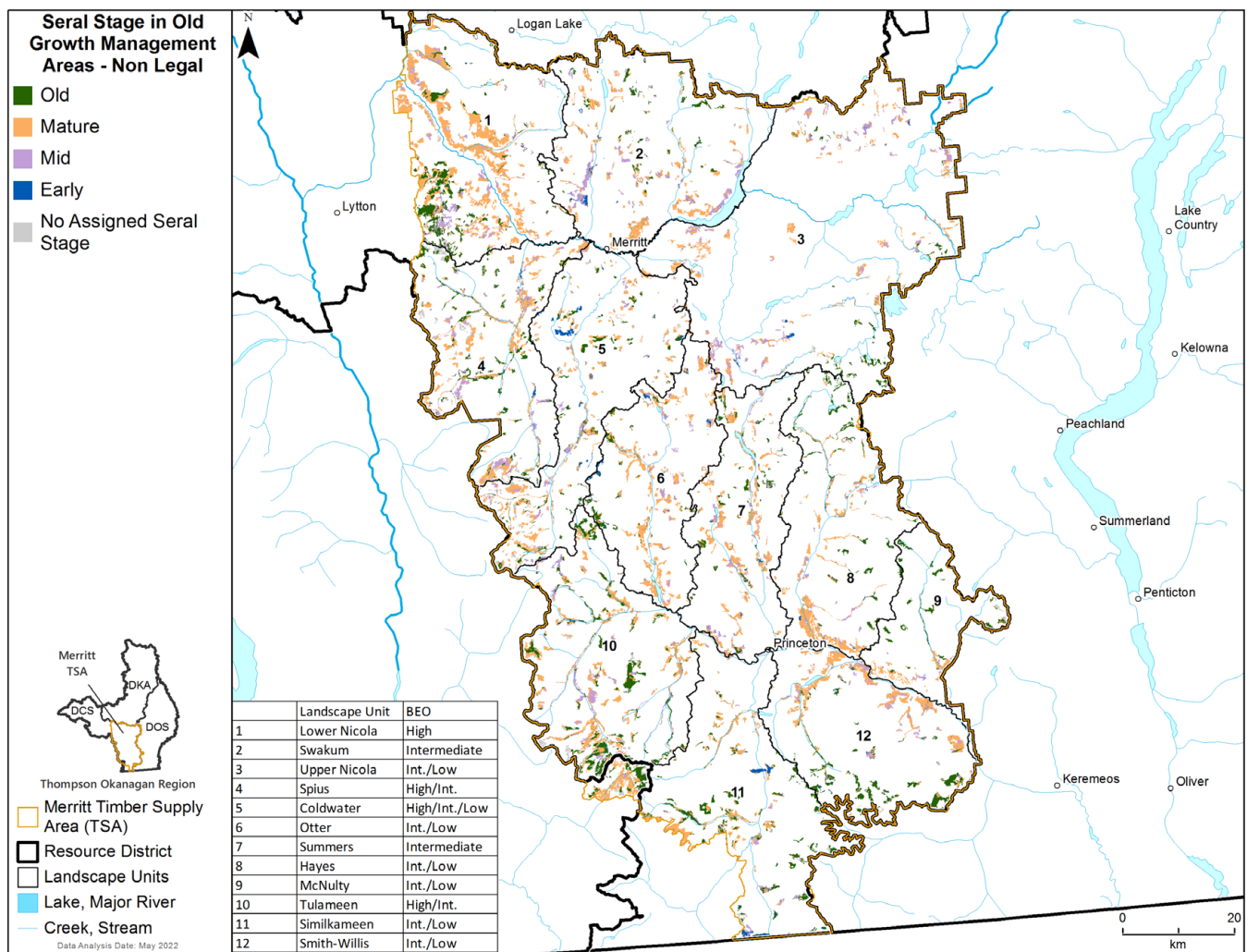
Figure 15. *Current Seral Stage of Forests in Non-Legal Old Growth Management Areas (OGMAs) in the Merritt Timber Supply Area (TSA).*

5.4.2   Amount of Old Growth Forest in Non-Legal OGMAs

Appendix 4 Table 26 provides a summary of the entire Merritt TSA with the current amount of old growth forest compared to the legal targets for all AUs (LU-BECs) and established OGMAs. The total CE-CFLB area in OGMAs identified here (108,533.1 ha) differs from the OGMA incursion indicator (113,232.1 ha in Table 19) by 4,699.0 ha because there is area within OGMAs that does not have old growth targets (e.g., BG BEC zone or NDT5).

Of the 80 AUs, there are three AUs meeting the old growth forest legal targets within non-legal OGMAs (2,682.4 ha of CE-CFLB in OGMAs). All these AUs are in an ESSF BEC variant with a total CE-CFLB of 17,035.9 ha of which 4,690.2 ha is old growth forest. The three AUs meeting the targets within the non-legal OGMAs occur in the three LUs: Similkameen (ESSFmw), Smith-Willis (ESSFxc), and Summers (ESSFdc2).

In contrast, there are 77 AUs that do not meet the targets (105,850.7 ha of CE-CFLB in OGMA). Of these, there are 12 AUs with no old growth forest in non-legal OGMAs boundaries, however five of these AUs have no CE-CFLB within the OGMA. Of the 77 AUs not meeting the targets, three AUs have no old growth forest identified within the OGMAs but have some old growth forest available elsewhere on the landscape that could be contributing to targets (i.e., old growth forest is in the CE-CFLB just outside of currently OGMA boundaries).

The general trend across the Merritt TSA indicates on average there are enough old growth forests available across the CE-CFLB (average 109% of the target being met) than there are currently within non-legal OGMAs (average 22% of the target being met). **This suggests there are old growth forests available across the land base to contribute to the legal targets that are currently not within the non-legal OGMA boundaries**. However, this is also stated with caution as this is an average of all AUs with a range of variation between AUs (e.g., 810% of the target met to 18% of the target met). Regardless, there is risk in managing just enough old growth forest in an AU compared to the targets as a single activity or incursion could cumulatively cause the AU to no longer meet the targets.

5.4.3   Limitations

It is unclear if the non-legal OGMAs in the Merritt TSA will be converted to legal designations. While there are many AUs with a surplus of old and mature seral stage forests, these areas tend to be located outside of the existing non-legal OGMAs. If these areas are not included in future OGMA designations, they will not be excluded from harvesting opportunities and therefore these areas are less likely to effectively contribute to biodiversity objectives in the near-term.

The provincial policy and guidance put limitations on OGMAs to mitigate impacts to timber supply. For example, OGMA design and locations were prioritized in areas considered uneconomical for forest harvesting or in areas that were managed for other values such as wildlife habitat. This process may have resulted in a trade-off of old growth forest biodiversity for areas that didn't impact timber supply, causing the policies themselves to become a barrier to having old growth forest in OGMAs. As a result, the application of the provincial policy and guidance may have resulted in or contributed to the targets not being met within OGMAs.

5.4.4   Summary and Observations

There is a general pattern of old seral forest in higher elevation OGMAs across the TSA and along the western TSA mountains from Lytton to Princeton. Overall, most of the area in OGMAs are mature (55.6%) seral stage forests followed by old growth (22.2%) and mid (14.7%) forests.

There are three AUs that are meeting old growth targets within non-legal OGMAs (i.e., total old growth in OGMAs is enough to meet targets); these are in three LUs: Similkameen, Smith-Willis, and Summers. All these AUs are in the ESSF BEC zone. There are 77 AUs not meeting the targets within OGMAs. Of these, 12 AUs have no old growth forest within non-legal OGMA boundaries.

While there are enough old growth forests in most LUs compared to the legal targets, it is generally not occurring within the non-legal OGMAs (average 22% of the target being met). Old growth forest available in the CE-CFLB outside of the established OGMA boundaries could contribute to these targets (average 109% of the targets met). The lack of old growth forest within OGMAs in the majority of LU-BECs suggests that current placement of non-legal OGMAs is not fully capitalizing on the available old growth forest on the landscape to meet the legal targets.

6 OPPORTUNITIES FOR IMPROVEMENT

The following opportunities related to old growth forest management are identified for consideration:

1. Review current non-legal OGMA locations and seral stage within OGMAs in AUs that do not contain sufficient old growth forest to meet legal targets. The establishment of OGMAs was intended to retain old growth forest attributes and should be reviewed to better understand if the intended outcomes are being achieved. Further investigation into the values being managed for within these OGMAs is required (i.e., areas may have been selected for cultural values).

2. This assessment shows a general trend of sufficient old growth forest available across many AUs (i.e., the CE-CFLB across the TSA) but not necessarily within the non-legal OGMAs. Determine if there is an opportunity to adjust the non-legal OGMA boundaries to capture more old growth forest that will better support old growth forest biodiversity objectives.

3. Review the current process in place for the tracking and monitoring of OGMA incursions and amendments to ensure the original intent of the OGMAs are maintained.

4. Identify opportunities to integrate the findings of this report, including the CE assessment results and data into planning and decision-making processes.

5. Old growth forest targets for the Merritt TSA are set directly within PNOGO as area-based (i.e., hectares) targets based on information at the time (2004). A thorough review of the PNOGO targets for the management of old growth forest on this land base should be completed to consider new information since PNOGO was established, such as changes to the BEC. In addition, it is unclear how PNOGO is being monitored and implemented over time, which presents an opportunity for reviewing the original intent of this provincial order for the Merritt TSA.

Additional considerations to improve old growth forest management includes:

- CE assessments present the opportunity to develop trend analyses over time to support the monitoring and tracking of current condition of old growth forest. Consider re-assessing the TSA when new information becomes available or when there are significant changes on the land base.

- When available, consider reviewing the results of the Forest Biodiversity CE assessment to determine how hazards to forest biodiversity could potentially be mitigated through the legal management of old growth (e.g., are non-legal OGMAs ecologically intact old growth forest ecosystems, are there opportunities to ensure recruitment for continued representation of old growth forest by maintaining intact mature forest).

- Complete OGMA impact assessments to better understand the direct and indirect implications of disturbances in OGMAs to determine if the intent of the OGMAs are still being maintained and to identify appropriate mitigation strategies. This includes:
  - o Anthropogenic disturbances directly within the OGMA;
  - o Residual impacts of resource management activities in the landscape adjacent to the OGMA (e.g., edge effects and isolated OGMAs); and
  - o Natural disturbance events within OGMAs as well as the surrounding landscape.

- Review and update the regional OGMA amendment policy to ensure rigour and transparency around tracking and monitoring of incursions into OGMAs. This update should include how the policy will recognize cumulative impacts in OGMAS and incorporate improved knowledge and science regarding old growth forest.

- Communicate the results of this report to enable consideration of cumulative impacts to old growth forest in natural resource sector permitting and authorizations, where appropriate.

- Although this assessment may indicate surplus amounts (hectares) of old growth and mature forest to sufficiently meet legal or policy targets in several ecosystems, the remaining old growth forest may be highly fragmented or retained in small patches. The presence and location of these old growth forests should be reviewed further to understand what attributes are being maintained in these landscapes and how they contribute to the current state of the land base.

- Consider how old growth management can support climate resilience, mitigation, and adaptation. Remaining patches of old growth forest may provide refugia at the landscape level and support ecosystem resilience as the climate changes. Although small, fragmented patches of old growth forest are not ideal for maintaining functional biodiversity, these areas should become a management priority, particularly in ecosystems with no other old growth forest representation. Additionally, it is well supported in the literature that old growth forests store large amounts of carbon, and their preservation can support carbon management and climate mitigation strategies.

7 CONCLUSION

Overall, 13.6% (120,611.7 ha of CE-CFLB) has been identified as old growth forests across the Merritt TSA. The greatest representation of old and mature forests is in higher elevations and along the southern and western portions of the TSA. The higher elevation forests tend to have lower landscape level disturbances which should allow old growth forest to persist over time.

Currently 40% of assessment units (AUs) meet the legal targets for old growth forest (32 out of 80 AUs), while 48 AUs are not meeting old growth forest targets, eight of which have no old growth forest remaining. The dry, low elevation forests (typical of the IDF BEC zones) are generally not meeting targets (34 AUs with 358,747.7 ha of CE-CFLB), more than half of which have less than 30% of the old growth forest target met. There are no landscape units (LUs) with all AUs meeting the legal old growth forest targets. There are generally more mature-plus-old forests in the CE-CFLB (45.2%) distributed across the TSA (401,136.5 ha of CE-CFLB). These mature seral forests could contribute as recruitment forest in addition to meeting the mature-plus-old forest policy targets. Currently 88% of AUs (112 out of 128 AUS) meet the policy targets for mature-plus-old forest.

The Merritt TSA does not have legally established OGMAs, however spatial non-legal OGMAs are available to manage old growth forest biodiversity. There are 1,305 non-legal OGMAs, of which 812 OGMAs (62%) have some level of disturbance, while 114 OGMAs (9%) have incursions that exceed the allowable limits, impacting 1,730.4 ha of OGMA area within 33,309.9 ha of the total OGMA area. The majority of incursions disturbed less than 5% of the OGMA and were primarily due to forest harvesting (e.g., cutblocks) (53.0%) followed by road development (41.2%). In addition, OGMAs have been impacted by wildfires across the land base, however this was not included in the assessment as a disturbance type.

There is a general pattern of old seral forest in higher elevation OGMAs across the TSA and along the western TSA mountains from Lytton to Princeton. Overall, most of the area in OGMAs are mature (55.6%) seral stage forests followed by old growth (22.2%) and mid (14.7%) forests. In general, there appears to be more old growth forest available across the land base (average 109% of the target met) than within the non-legal OGMA boundaries (average 22% of the target met). This suggests that current OGMA placement may not be fully capitalizing on the available old growth forest on the landscape. Old growth forests identified outside of current non-legal OGMA locations should be considered to meet legal targets and account for natural disturbances over time.

Old growth forest, mature-plus-old forest, and OGMAs are subject to impacts from a range of resource development activities outside of forestry, as often those sectors are not legally required to mitigate or manage for old growth forest (e.g., mines, land conversion, oil and gas). This assessment provides the first attempt at reporting the cumulative disturbance from all sectors regardless of legal obligations. The results can be considered in context of how new permitting and authorization decisions may contribute to further cumulative impacts and can support the review of current condition of OGMAs to determine if additional management strategies (e.g., amendment, replacement) is required.

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9 APPENDICES

Appendix 1 – Summary of Assessment Results

To understand the current condition of old growth forest, the following assessment questions were developed to identify the amount of old growth forest, amount of mature-plus-old forest, incursions into OGMAs, and the amount of old growth forest within OGMAs. Table 21 summarizes the results of the current condition assessment of old growth forest in the Merritt TSA.

Table 21. *Summary of Current Condition Assessment Results by Cumulative Effects (CE) Indicator in the Merritt Timber Supply Area (TSA).*

Assessment Questions
Amount of Old Growth Forest
What is the current amount of old growth forest in the CE-CFLB? Where is old growth forest located on the land base? ▪ 13.6% of CE-CFLB is old growth forest, which covers 120,611.7 ha of total CE-CFLB. ▪ Generally found in higher elevations in the western and southern portions of the TSA.
Which AUs meet the legal targets with old forest? ▪ 32 out of 80 AUs (40%) meet the legal targets. These AUs account for 51.4% (438,617.9 ha) of the total CE-CFLB. One-third of these AUs have more than 125% of the target being met. ▪ Generally found in higher elevations, south and east around Princeton, and along the Cascade Mountains north towards Merritt. ▪ 1 out of 11 BEC subzones/variants have all units meeting the legal targets. The ESSFdc2 has all AUs meeting the targets, which covers 65,146.5 ha of CE-CFLB, of which 31.3% (20,412.9 ha) is old growth forest.
Which AUs are flagged for further consideration? ▪ 48 out of 80 AUs (60%) do not meet old growth forest targets. These AUs cover a total of 415,528.9 ha of CE-CFLB. ▪ 8 AUs have no old growth forest to meet targets, which covers a total of 16,913.3 ha of CE-CFLB. ▪ 6 out of 11 BEC variants have no AUs meeting the targets. ▪ Dry, low elevation ecosystems (IDF and PP BEC zones) are furthest from targets, with 34 AUs in the IDF and 5 AUs in the PP zones, the majority of which have less than 30% of the target met. ▪ No LUs have all AUs meeting the targets.
What are some of the possible reasons for the current condition? ▪ Natural disturbance – history of insect and pest damage as well as recent and historical wildfires that burnt extensive areas, leaving large areas without old growth stands. ▪ Land use history – forest harvesting, including salvage in response to natural disturbances, particularly in lower elevation valley bottoms that are easily accessible.
Amount of Mature-plus-Old Forest
What is the current amount of mature-plus-old forest in the CE-CFLB? Where is mature-plus-old forest located on the land base? ▪ 45.2% of CE-CFLB is mature-plus-old growth forest, which covers 401,136.5 ha of total CE-CFLB ▪ Mature-plus-old forest is generally found in the north and western portions of the TSA, and along the valley southeast of Princeton.
Which AUs meet the policy targets with mature-plus-old forest? ▪ 112 out of 128 assessment units (88%) meet policy targets. These AUs account for 95.2% (822,958.9 ha) of the total CE-CFLB. These units are found across the TSA. ▪ Except for a few LUs (i.e., Lower Nicola, Summers), most of the TSA has more than 125% of the target met (97 out of 128 AUs). ▪ 4 out of 13 BEC variants have all units meeting the policy targets. ▪ At the AU scale, including mature forest in the current condition assessment increased the percentage of AUs meeting targets from 40% to 88% in the CE-CFLB. ▪ At the LU scale, including mature forest in the current condition assessment increased the percentage of the CE-CFLB meeting targets from 51.4% to 95.2%.

Assessment Questions

Which AUs are flagged for further consideration?
- 16 out of 128 assessment units (12%) do not meet targets. These AUs account for 4.8% (41,853.9 ha) of the total CE-CFLB.
- The majority of the CE-CFLB associated with these AUs (7 AUs with a total of 33,837.7 ha of CE-CFLB) are close to meeting the targets (75-100% of the target met).
- The majority of CE-CFLB that is not meeting the targets (68%) is within 1 AU (Lower Nicola LU-High BEO-MSxk BEC variant) which contains a relatively large CE-CFLB (28,260.9 ha).
- There are 4 AUs with 0-30% of the target met (total CE-CFLB of 106.3 ha), of which 2 AUs have no mature-plus-old forest remaining the meet the targets, however the total CE-CFLB of these AUs is very small (2.3 ha total).

What are some of the possible reasons for the current condition?
- In general, targets are being met across the TSA for mature-plus-old forest.

Incursions into Non-Legal OGMAs

Are there anthropogenic incursions in OGMAs? What is the current amount of incursion into OGMAs in the CE-CFLB?
- There are 1,305 spatial non-legal OGMAs in the TSA with a total OGMA area of 114,589.0 ha of which 113,232.1 ha is CE-CFLB.
- 812 OGMAs (62% of all OGMAs) have some level of incursion (no incursion threshold applied), impacted a total OGMA incursion area of 2,709.1 ha (2.4% of the total OGMA area).
- The LUs with the highest percentage of incurred OGMAs are Hayes (76%), Swakum (74%), and Summers (71%). The LUs with the greatest incurred OGMA area are Coldwater (516.7 ha) and Swakum (434.7 ha).

Do they exceed the Order threshold?
- 114 OGMAs (9%) have incursions exceeding the allowable incursion limits, impacting a total OGMA incursion area of 1,730.4 ha (5.2% of the total OGMA area) over a total OGMA area of 33,309.9 ha.
- The Coldwater LU has the largest number of incurred OGMAs (22 OGMAs) and the largest total OGMA area with incurred status (417.9 ha).
- Some of these incursions are historical and were known and considered acceptable at the time of OGMA establishment.

What is the type of incursion into OGMAs?
- Majority of incursions that exceed the allowable incursion limits were due to forest harvesting (917.1 ha or 53.0%) and road development (713.2 ha or 41.2%); however, roads may have already been present when the OGMAs was established.
- Incursions were also due to mining and extraction (50.9 ha or 2.9%), agriculture and clearing (20.0 ha or 1.2%), urban (18.0 ha or 1.0%), rights-of-way (6.4 ha or 0.4%), and power (4.7 ha or 0.3%) developments.
- OGMAs have also been impacted by wildfires (outside scope of assessment).

What is the magnitude of incursions into OGMAs (total % incurred)?
- Most incursions disturb less than 5% of the total OGMA area.
- 493 OGMAs had no incursions.
- 606 OGMAs fall within the <5% magnitude category.
- 184 OGMAs fall within the 5-25% magnitude category.
- 14 OGMAs fall within the 25-50% magnitude category.
- 2 OGMAs fall within the 50-75% magnitude category.
- 6 OGMAs fall within the >75% magnitude category.

Amount of Old Forest in Non-Legal OGMAs

What is the current amount of old growth forest in OGMAs in the CE-CFLB? What is the seral stage breakdown? Where is old growth forest located within OGMAs?
- The majority of non-legal OGMAs are mature seral stage (55.6% or 63,697.9 ha total OGMA area) followed by old (22.2% or 25,433.6 ha), mid (14.7% or 16,900.9 ha), and early (3.8% or 4,371.2 ha) seral forests, as well as 4,185.6 ha (3.7%) with no seral stage assigned.
- The general pattern of old seral stage forests in OGMAs is dispersed across the TSA, particularly in high elevation forests south of Princeton and along the Cascade-Coquihalla mountains towards Lytton.

Which OGMAs meet and do not meet PNOGO targets by BEC subzone or variant within each LU?
- 3 AUs are meeting the targets in non-legal OGMAs (2,682.4 ha of CE-CFLB); all these AUs are in an ESSF BEC variant with a total OGMA CE-CFLB of 4,690.2 ha.
- 77 AUs are not meeting the targets in non-legal OGMAs. Of these, there are 12 AUs with no old growth forest within the non-legal OGMA boundaries.
- Despite this, there is old growth forest available outside the non-legal OGMA boundaries that could contribute to these targets if incorporated into OGMAs.

Appendix 2 – Denominator Table

For all CE Indicators, the Cumulative Effects Crown Forested Land Base (CE-CFLB) is the denominator used for the assessment with the exception of Indicator 3 (Incursions into Old Growth Management Areas (OGMAs)) that is based on the gross area of the OGMA. The sub-totals are provided in Table 22 to show how areas contribute to the total CE-CFLB area and an area breakdown for non-legal OGMAs for CE Indicators 3 and 4.

Table 22. Denominators used in the Current Condition Assessment by Cumulative Effects (CE) Indicator in the Merritt Timber Supply Area (TSA).

CE Indicator	Results Section	Description	Sub-totals (ha)	Totals (ha)
		Total Gross Area in TSA		**1,131,146**
		Total CE-CFLB in TSA		**887,134**
Old Growth Forests (Indicator 1)	5.1	CE-CFLB with No Targets (NDT5)[20]	20,755.0	
		CE-CFLB with No Targets (NDT4)[21]	2,575.0	
		CE-CFLB with No Targets (NDT3)[22]	9,310.4	
		CE-CFLB with No Targets (NDT1)[23]	347.0	
		Total CE-CFLB with No Targets		32,987.4
		Total CE-CFLB with Legal Targets		**854,146.8**
Mature-plus-Old Forests (Indicator 2)	5.2	CE-CFLB with No Targets (NDT5)	20,755.0	
		CE-CFLB with No Targets (NDT4)[24]	1,566.4	
		Total CE-CFLB with No Targets		22,321.4
		Total CE-CFLB with Policy Targets		**864,812.8**
Incursions into OGMAs (Indicator 3)	5.3	Gross Area in Non-Legal OGMAs	114,589.0	
		Gross Area in Legal OGMAs	-	
		Total Gross Area in OGMAs (ALL)		**114,589.0**
Old Growth in OMGAs (Indicator 4)	5.4	CE-CFLB Area in Non-Legal OGMAs	113,232.2	
		CE-CFLB Area in Legal OGMAs	-	
		Total CE-CFLB Area in OGMAs (ALL)		**113,232.2**

[20] The BECs in NDT5 with no old growth forest and mature-plus-old forest targets are ATunp, ESSFdcp, ESSFmwp, and ESSFxcp

[21] The BECs in NDT4 with no old growth forest targets are: BGxh2, BGxw1, and IDFxh1.

[22] The LU-BECs in NDT3 with no old growth forest targets are: Coldwater LU-MSun (1,990.2 ha), Similkameen LU-MSxk (364.3 ha), Spius LU-MSun (4,010.5 ha), Swakum LU-ESSFxc (370.8 ha), and Tulameen LU-MSun (2,574.7 ha).

[23] The LU-BEC in NDT1 with no old growth forest target is the Tulameen LU-MHmm2 (347.0 ha).

[24] The BEC in NDT4 with no mature-plus-old targets is the BG.

Appendix 3 – Indicator Tables

A gradient colour scale is used to illustrate the current condition of the old growth forest and mature-plus-old forest indicators (a duplicate of Table 8 is shown below for reference).

Gradient Scale for Old Growth and Mature-plus-Old Forest Indicators: Legal and Policy Targets	Indicator Condition Interpretation	Current Condition Status (% of Target Met with Old or Mature-plus-Old Forest)	Analysis Definition (% of Target Met with Old or Mature-plus-Old Forest)
	Below Target	0 – 30%	0 – 29.99%
	Below Target	30 – 50%	30 – 49.99%
	Below Target	50 – 75%	50 – 74.99%
	Below Target	75 – 100%	75 – 99.99%
	Target Met	100 – 110%	100 – 109.99%
	Above Target	110 – 125%	110 – 124.99%
	Above Target	125+%	125+%

In the old growth forest and the mature-plus-old forest indicators, an additional colour theme is presented that also illustrates the current condition of old growth forest or mature-plus-old forest by showing the percent of the CE-CFLB that is old growth or mature-plus-old forest by LU and BEC subzone or variant (a duplicate of the legend in Figure 6 is shown below for reference).

Gradient Scale for Existing Old Forest and Mature + Old Forest	Current Amount of Old Forest or Mature + Old Forest (% of CE-CFLB)
	0 - 10 %
	10 - 20 %
	20 - 30 %
	30 - 50 %
	50 - 70 %
	70 - 100 %

Amount of Old Growth Forest

Table 23 compares the CE-CFLB area (column A), the old growth forest target (column C and column A*C), and the amount of old growth forest (column B) relative to the legal targets for all AUs. The amount of CE-CFLB that is old growth forest within that AU (LU, BEO, and BEC) is shown as a percentage of the total CE-CFLB for that AU (column B/A) using the gradient scale from Figure 9 above. The current condition of that AU (column B/(A*C)), meaning the percentage of the old growth forest target that is currently being met in that AU, is then shown using the gradient scale from Table 8 above.

Table 23. Assessment Units Compared to the Old Growth Forest Legal Targets by Landscape Unit (LU) and Biogeoclimatic Ecosystem Classification (BEC) Subzone or Variant in the Merritt Timber Supply Area (TSA).

COLUMN CALCULATIONS:			A	B	C	B/A	C/A	C/B
Landscape Unit	BEO	BEC Variant	CE-CFLB Area (ha)	Target Old (ha)	Existing Old (ha)	Target Old (%)	Existing Old (%)	% of Target Met
Coldwater	High/ Int/ Low	CWHms1	633.7	132.0	74.4	21%	11.7%	56.3%
		ESSFdc2	5,365.4	721.0	1,748.6	13%	32.6%	242.5%
		ESSFmw	9,459.1	794.0	990.6	8%	10.5%	124.8%
		IDFdk1	11,456.0	2,169.0	209.6	19%	1.8%	9.7%
		IDFdk2	17,306.6	1,673.0	646.1	10%	3.7%	38.6%
		IDFxh1	4,004.0	754.0	179.1	19%	4.5%	23.8%
		IDFxh2	3,120.2	493.0	52.4	16%	1.7%	10.6%
		MSdm2	10,275.6	705.0	3,078.7	7%	30.0%	436.7%
		MSxk	4,104.1	567.0	980.0	14%	23.9%	172.8%
		PPxh2	1,162.6	110.0	15.2	9%	1.3%	13.9%
Hayes	Int/ Low	ESSFdc2	244.1	3.0	37.3	1%	15.3%	1242.8%
		ESSFxc	6,407.3	732.0	2,482.2	11%	38.7%	339.1%
		IDFdk1	12,561.9	1,097.0	0.0	9%	0.0%	0.0%
		IDFdk2	15,632.9	1,725.0	234.3	11%	1.5%	13.6%
		IDFxh1	2,715.9	330.0	0.0	12%	0.0%	0.0%
		MSdm2	11,906.1	2,533.0	1,536.2	21%	12.9%	60.6%
		MSxk	29,943.6	4,055.0	7,027.2	14%	23.5%	173.3%
Lower Nicola	High	ESSFdc2	3,376.7	606.0	1,858.0	18%	55.0%	306.6%
		ESSFxc	1,816.8	150.0	322.6	8%	17.8%	215.1%
		IDFdk1	20,976.0	2,561.0	1,399.1	12%	6.7%	54.6%
		IDFdk2	1,706.1	534.0	18.3	31%	1.1%	3.4%
		IDFxh2	18,952.3	4,784.0	1,560.9	25%	8.2%	32.6%
		MSdm2	1,296.4	618.0	403.3	48%	31.1%	65.3%
		MSxk	28,260.9	5,591.0	5,870.1	20%	20.8%	105.0%
		PPxh2	7,451.7	1,002.0	245.1	13%	3.3%	24.5%
McNulty	Int/ Low	ESSFxc	13,236.0	1,519.0	7,048.7	11%	53.3%	464.0%
		IDFdk1	5,022.7	445.0	123.1	9%	2.5%	27.7%
		IDFxh1	2,117.2	160.0	0.7	8%	0.0%	0.4%
		MSxk	16,330.9	1,574.0	5,397.8	10%	33.1%	342.9%
Otter	Int/ Low	ESSFdc2	4,679.4	407.0	1,149.0	9%	24.6%	282.3%
		IDFdk1	12,344.0	1,063.0	239.6	9%	1.9%	22.5%
		IDFdk2	23,041.7	3,439.0	203.5	15%	0.9%	5.9%
		MSdm2	13,091.5	1,770.0	3,261.9	14%	24.9%	184.3%
		MSxk	2,097.5	153.0	361.4	7%	17.2%	236.2%

COLUMN CALCULATIONS:			A	B	C	B/A	C/A	C/B
Landscape Unit	BEO	BEC Variant	CE-CFLB Area (ha)	Target Old (ha)	Existing Old (ha)	Target Old (%)	Existing Old (%)	% of Target Met
Similkameen	Int/ Low	ESSFdc2	22,673.6	2,552.0	6,249.3	11%	27.6%	244.9%
		ESSFmw	3,266.6	35.0	329.7	1%	10.1%	942.1%
		ESSFxc	4,880.3	1,360.0	1,843.1	28%	37.8%	135.5%
		IDFdk1	553.8	74.0	0.0	13%	0.0%	0.0%
		IDFdk2	23,413.7	2,782.0	1,041.2	12%	4.4%	37.4%
		IDFxh1	1,791.5	233.0	9.7	13%	0.5%	4.2%
		MSdm2	29,826.3	4,388.0	8,098.3	15%	27.2%	184.6%
Smith-Willis	Int/ Low	ESSFxc	10,765.6	961.0	3,766.0	9%	35.0%	391.9%
		IDFdk1	15,484.8	367.0	186.8	2%	1.2%	50.9%
		IDFdk2	4,351.1	2,260.0	16.0	52%	0.4%	0.7%
		IDFxh1	5,586.4	839.0	8.5	15%	0.2%	1.0%
		MSdm2	10,668.3	880.0	1,645.7	8%	15.4%	187.0%
		MSxk	25,288.6	3,836.0	6,155.5	15%	24.3%	160.5%
Spius	High/ Int	CWHms1	109.9	10.0	0.6	9%	0.6%	6.2%
		ESSFdc2	5,848.5	1,162.0	2,049.9	20%	35.1%	176.4%
		ESSFmw	23,289.7	2,410.0	1,383.8	10%	5.9%	57.4%
		IDFdk1	2,173.3	224.0	18.3	10%	0.8%	8.2%
		IDFdk2	13,532.0	1,814.0	817.6	13%	6.0%	45.1%
		IDFxh1	3,066.5	51.0	23.6	2%	0.8%	46.2%
		IDFxh2	2,625.2	762.0	61.6	29%	2.3%	8.1%
		MSdm2	14,196.6	1,715.0	4,361.3	12%	30.7%	254.3%
		PPxh2	505.8	7.0	0.0	1%	0.0%	0.0%
Summers	Int	ESSFdc2	3,003.7	93.0	546.7	3%	18.2%	587.8%
		ESSFxc	287.3	215.0	27.6	75%	9.6%	12.8%
		IDFdk1	11,064.8	2,451.0	473.3	22%	4.3%	19.3%
		IDFdk2	20,275.6	1,673.0	101.5	8%	0.5%	6.1%
		IDFxh1	3,906.5	644.0	135.9	16%	3.5%	21.1%
		MSdm2	15,873.0	1,971.0	2,847.8	12%	17.9%	144.5%
		MSxk	6,384.6	763.0	494.3	12%	7.7%	64.8%
Swakum	Int	IDFdk1	29,475.0	4,660.0	304.7	16%	1.0%	6.5%
		IDFxh2	5,935.1	1,244.0	32.9	21%	0.6%	2.6%
		MSxk	33,943.3	3,048.0	6,088.5	9%	17.9%	199.8%
		PPxh2	2,560.2	270.0	5.1	11%	0.2%	1.9%
Tulameen	High/ Int	CWHms1	1,007.1	88.0	40.8	9%	4.1%	46.4%
		ESSFdc2	19,955.0	2,437.0	6,774.1	12%	33.9%	278.0%
		ESSFmw	46,557.2	3,471.0	3,997.0	7%	8.6%	115.2%
		IDFdk2	6,368.1	919.0	145.1	14%	2.3%	15.8%
		IDFxh1	312.6	18.0	0.0	6%	0.0%	0.0%
		MSdm2	11,769.8	1,840.0	2,950.5	16%	25.1%	160.4%

COLUMN CALCULATIONS:			A	B	C	B/A	C/A	C/B
Landscape Unit	BEO	BEC Variant	CE-CFLB Area (ha)	Target Old (ha)	Existing Old (ha)	Target Old (%)	Existing Old (%)	% of Target Met
		ESSFxc	1,587.2	163.0	823.5	10%	51.9%	505.2%
		IDFdk1	56,030.0	4,923.0	193.4	9%	0.3%	3.9%
		IDFdk2	77.1	15.0	0.0	19%	0.0%	0.0%
Upper Nicola	Int/ Low	IDFxh2	1,767.0	734.0	4.9	42%	0.3%	0.7%
		MSdm2	135.5	158.0	0.0	117%	0.0%	0.0%
		MSxk	29,825.4	4,657.0	5,181.1	16%	17.4%	111.3%
		PPxh2	50.8	106.0	0.0	208%	0.0%	0.0%
		Total	854,146.8	110,252.0	117,990.4			

Amount of Mature-plus-Old Forest

Table 24 compares the CE-CFLB area (column A), the mature-plus-old forest target (column B), and the amount of mature-plus-old forest (column C) relative to the policy targets for all AUs. The amount of CE-CFLB that is mature-plus-old forest within that AU (LU, BEO, and BEC) is shown as a percentage of the total CE-CFLB for that AU (column C/A), using the gradient scale from Figure 9 above. The current condition of that AU (column C/B), meaning the percentage of the mature-plus-old forest target that is currently being met in that AU, is then shown using the gradient scale from Table 8 above.

Table 24. *Assessment Units Compared to the Mature-plus-Old Growth Forest Policy Targets by Landscape Unit (LU) and Biogeoclimatic Ecosystem Classification (BEC) Subzone or Variant in the Merritt Timber Supply Area (TSA).*

COLUMN CALCULATIONS:			A	B	C	-	C/A	C/B
Landscape Unit	BEO	BEC Variant	CE-CFLB Area (ha)	Target Mat+Old (ha)	Existing Mat+Old (ha)	Target Mat+Old (%)	Existing Mat+Old (%)	% of Target Met
		CWHms1	548.5	279.7	319.5	51%	58.3%	114.2%
		ESSFdc2	702.4	238.8	543.8	34%	77.4%	227.7%
	High	ESSFmw	8,782.5	3,688.7	5,959.8	42%	67.9%	161.6%
		IDFdk2	30.1	15.3	29.1	51%	96.9%	189.9%
		MSdm2	482.9	188.3	435.8	39%	90.2%	231.4%
		MSun	390.3	152.2	221.6	39%	56.8%	145.6%
Coldwater		ESSFdc2	2.3	0.5	0.0	23%	0.2%	0.9%
		IDFdk1	11,418.8	3,882.4	5,283.4	34%	46.3%	136.1%
		IDFdk2	15,159.2	5,154.1	7,334.9	34%	48.4%	142.3%
		IDFxh1	4,004.0	1,361.4	1,605.0	34%	40.1%	117.9%
	Int.	IDFxh2	3,120.2	1,060.9	2,294.4	34%	73.5%	216.3%
		MSdm2	3,560.8	925.8	2,124.6	26%	59.7%	229.5%
		MSun	1.0	0.3	0.1	26%	13.0%	49.9%
		MSxk	2,650.6	689.2	1,400.6	26%	52.8%	203.2%
		PPxh2	1,162.6	395.3	540.5	34%	46.5%	136.7%

COLUMN CALCULATIONS:			A	B	C	-	C/A	C/B
Landscape Unit	BEO	BEC Variant	CE-CFLB Area (ha)	Target Mat+Old (ha)	Existing Mat+Old (ha)	Target Mat+Old (%)	Existing Mat+Old (%)	% of Target Met
Coldwater	Low	CWHms1	85.2	14.5	55.6	17%	65.3%	383.9%
		ESSFdc2	4,660.7	652.5	1,627.6	14%	34.9%	249.4%
		ESSFmw	676.6	94.7	346.1	14%	51.2%	365.4%
		IDFdk1	37.3	6.3	27.0	17%	72.5%	426.3%
		IDFdk2	2,117.3	359.9	1,134.7	17%	53.6%	315.2%
		MSdm2	6,232.0	872.5	3,357.6	14%	53.9%	384.8%
		MSun	1,598.9	223.8	559.9	14%	35.0%	250.1%
		MSxk	1,453.5	203.5	854.7	14%	58.8%	420.0%
Hayes	Int.	IDFdk1	9,806.4	3,334.2	4,105.3	34%	41.9%	123.1%
		IDFdk2	12,225.3	4,156.6	4,585.7	34%	37.5%	110.3%
		IDFxh1	2,715.9	923.4	2,245.9	34%	82.7%	243.2%
		MSdm2	1,101.5	286.4	147.6	26%	13.4%	51.5%
		MSxk	449.4	116.9	120.1	26%	26.7%	102.8%
	Low	ESSFdc2	244.1	34.2	137.0	14%	56.1%	400.8%
		ESSFxc	6,407.3	897.0	2,925.0	14%	45.7%	326.1%
		IDFdk1	2,755.5	468.4	679.8	17%	24.7%	145.1%
		IDFdk2	3,407.6	579.3	1,074.8	17%	31.5%	185.5%
		MSdm2	10,804.5	1,512.6	3,172.1	14%	29.4%	209.7%
		MSxk	29,494.1	4,129.2	10,046.6	14%	34.1%	243.3%
Lower Nicola	High	ESSFdc2	3,376.7	1,148.1	2,180.3	34%	64.6%	189.9%
		ESSFxc	1,816.8	617.7	487.4	34%	26.8%	78.9%
		IDFdk1	20,976.0	10,697.7	13,534.9	51%	64.5%	126.5%
		IDFdk2	1,706.1	870.1	987.9	51%	57.9%	113.5%
		IDFxh1	1,008.6	514.4	792.2	51%	78.5%	154.0%
		IDFxh2	18,952.3	9,665.7	15,433.9	51%	81.4%	159.7%
		MSdm2	1,296.4	505.6	462.5	39%	35.7%	91.5%
		MSxk	28,260.9	11,021.8	9,245.6	39%	32.7%	83.9%
		PPxh2	7,451.7	3,800.4	5,906.0	51%	79.3%	155.4%
McNulty	Int.	IDFdk1	4,140.8	1,407.9	2,625.3	34%	63.4%	186.5%
		IDFxh1	2,117.2	719.9	1,900.0	34%	89.7%	263.9%
		MSxk	215.8	56.1	117.7	26%	54.6%	209.8%
	Low	ESSFxc	13,236.0	1,853.0	7,819.6	14%	59.1%	422.0%
		IDFdk1	881.9	149.9	176.9	17%	20.1%	118.0%
		MSxk	16,115.1	2,256.1	6,184.9	14%	38.4%	274.1%
Otter	Int.	ESSFdc2	5.4	1.2	3.8	23%	71.1%	309.2%
		IDFdk1	12,318.7	4,188.4	6,468.0	34%	52.5%	154.4%
		IDFdk2	21,295.6	7,240.5	13,439.0	34%	63.1%	185.6%
		MSdm2	2,860.3	743.7	1,580.6	26%	55.3%	212.5%
		MSxk	1,095.2	284.8	432.7	26%	39.5%	152.0%

COLUMN CALCULATIONS:			A	B	C	-	C/A	C/B
Landscape Unit	BEO	BEC Variant	CE-CFLB Area (ha)	Target Mat+Old (ha)	Existing Mat+Old (ha)	Target Mat+Old (%)	Existing Mat+Old (%)	% of Target Met
Otter	Low	ESSFdc2	4,674.1	654.4	1,602.8	14%	34.3%	244.9%
		IDFdk1	25.3	4.3	17.2	17%	68.0%	400.0%
		IDFdk2	1,746.1	296.8	884.6	17%	50.7%	298.0%
		MSdm2	10,231.1	1,432.4	3,949.9	14%	38.6%	275.8%
		MSxk	1,002.3	140.3	327.8	14%	32.7%	233.6%
Similkameen	Int.	ESSFdc2	17.4	4.0	3.4	23%	19.8%	86.3%
		ESSFmw	457.0	127.9	365.1	28%	79.9%	285.4%
		IDFdk1	548.5	186.5	334.0	34%	60.9%	179.1%
		IDFdk2	19,592.4	6,661.4	10,914.5	34%	55.7%	163.8%
		IDFxh1	1,791.5	609.1	1,169.8	34%	65.3%	192.0%
		MSdm2	3,170.8	824.4	1,695.7	26%	53.5%	205.7%
	Low	ESSFdc2	22,656.3	3,171.9	8,294.6	14%	36.6%	261.5%
		ESSFmw	2,809.6	393.3	1,891.2	14%	67.3%	480.8%
		ESSFxc	4,880.3	683.2	2,313.4	14%	47.4%	338.6%
		IDFdk1	5.3	0.9	4.6	17%	86.8%	510.4%
		IDFdk2	3,821.3	649.6	1,439.7	17%	37.7%	221.6%
		MSdm2	26,655.6	3,731.8	11,578.0	14%	43.4%	310.3%
		MSxk	364.3	51.0	273.9	14%	75.2%	537.1%
Smith-Willis	Int.	ESSFxc	2.1	0.5	0.0	23%	0.0%	0.0%
		IDFdk1	14,749.3	5,014.8	7,985.0	34%	54.1%	159.2%
		IDFdk2	4,038.9	1,373.2	2,089.4	34%	51.7%	152.2%
		IDFxh1	5,586.4	1,899.4	4,399.3	34%	78.8%	231.6%
		MSdm2	960.0	249.6	382.3	26%	39.8%	153.2%
		MSxk	4,416.1	1,148.2	1,781.9	26%	40.4%	155.2%
	Low	ESSFxc	10,763.5	1,506.9	4,591.1	14%	42.7%	304.7%
		IDFdk1	735.5	125.0	227.3	17%	30.9%	181.8%
		IDFdk2	312.3	53.1	95.7	17%	30.6%	180.2%
		MSdm2	9,708.4	1,359.2	2,260.2	14%	23.3%	166.3%
		MSxk	20,872.6	2,922.2	7,872.2	14%	37.7%	269.4%
Spius	High	CWHms1	101.7	51.9	14.8	51%	14.6%	28.6%
		ESSFdc2	1,142.8	388.5	888.6	34%	77.8%	228.7%
		ESSFmw	17,789.4	7,471.6	10,794.6	42%	60.7%	144.5%
		MSdm2	277.0	108.0	125.9	39%	45.4%	116.5%
		MSun	602.2	234.8	198.0	39%	32.9%	84.3%

COLUMN CALCULATIONS:			A	B	C	-	C/A	C/B
Landscape Unit	BEO	BEC Variant	CE-CFLB Area (ha)	Target Mat+Old (ha)	Existing Mat+Old (ha)	Target Mat+Old (%)	Existing Mat+Old (%)	% of Target Met
Spius	Int.	CWHms1	8.2	2.8	2.9	34%	35.5%	104.3%
		ESSFdc2	4,705.7	1,082.3	1,537.7	23%	32.7%	142.1%
		ESSFmw	5,500.2	1,540.1	1,603.5	28%	29.2%	104.1%
		IDFdk1	2,173.3	738.9	1,654.0	34%	76.1%	223.8%
		IDFdk2	13,532.0	4,600.9	6,173.9	34%	45.6%	134.2%
		IDFxh1	3,066.5	1,042.6	1,829.9	34%	59.7%	175.5%
		IDFxh2	2,625.2	892.6	1,747.2	34%	66.6%	195.7%
		MSdm2	13,919.6	3,619.1	5,343.4	26%	38.4%	147.6%
		MSun	3,408.3	886.2	1,363.0	26%	40.0%	153.8%
		PPxh2	505.8	172.0	188.4	34%	37.3%	109.6%
Summers	Int.	ESSFdc2	3,003.7	690.9	939.0	23%	31.3%	135.9%
		ESSFxc	287.3	66.1	44.8	23%	15.6%	67.8%
		IDFdk1	11,064.8	3,762.0	4,813.1	34%	43.5%	127.9%
		IDFdk2	20,275.6	6,893.7	11,227.0	34%	55.4%	162.9%
		IDFxh1	3,906.5	1,328.2	2,077.7	34%	53.2%	156.4%
		MSdm2	15,873.0	4,127.0	5,235.9	26%	33.0%	126.9%
		MSxk	6,384.6	1,660.0	982.6	26%	15.4%	59.2%
Swakum	Int.	ESSFxc	370.8	85.3	120.9	23%	32.6%	141.7%
		IDFdk1	29,475.0	10,021.5	13,688.7	34%	46.4%	136.6%
		IDFxh2	5,935.1	2,017.9	2,981.3	34%	50.2%	147.7%
		MSxk	33,943.3	8,825.2	10,470.9	26%	30.8%	118.6%
		PPxh2	2,560.2	870.5	940.8	34%	36.7%	108.1%
Tulameen	High	ESSFmw	0.2	0.1	0.0	42%	0.0%	0.0%
	Int.	CWHms1	1,007.1	342.4	750.5	34%	74.5%	219.2%
		ESSFdc2	19,955.0	4,589.6	8,060.2	23%	40.4%	175.6%
		ESSFmw	46,557.0	13,036.0	28,429.4	28%	61.1%	218.1%
		IDFdk2	6,368.1	2,165.2	4,818.1	34%	75.7%	222.5%
		IDFxh1	312.6	106.3	262.7	34%	84.1%	247.2%
		MHmm2	347.0	124.9	326.8	36%	94.2%	261.5%
		MSdm2	11,769.8	3,060.2	5,103.0	26%	43.4%	166.8%
		MSun	2,574.7	669.4	1,436.2	26%	55.8%	214.5%
Upper Nicola	Int.	IDFdk1	47,631.5	16,194.7	19,477.4	34%	40.9%	120.3%
		IDFxh2	1,767.0	600.8	500.6	34%	28.3%	83.3%
		MSxk	3,503.0	910.8	1,109.0	26%	31.7%	121.8%
		PPxh2	50.8	17.3	31.0	34%	60.9%	179.2%
	Low	ESSFxc	1,587.2	222.2	891.8	14%	56.2%	401.3%
		IDFdk1	8,398.6	1,427.8	2,291.9	17%	27.3%	160.5%
		IDFdk2	77.1	13.1	12.5	17%	16.3%	95.7%
		MSdm2	135.5	19.0	9.0	14%	6.7%	47.6%
		MSxk	26,322.4	3,685.1	6,817.9	14%	25.9%	185.0%
		Total	864,812.8	240,282.2	401,136.5			

Incursions into Non-Legal OGMAs

Table 25 is provided as additional detail for the OGMA indicator to show a summary of incursions into non-legal OGMAs that exceed the allowable incursion threshold by disturbance type. An OGMA may have multiple incursions reported within them; these are represented in the table below with multiple records for an individual OGMA ID. For example, the OGMA "KAM_TME_579" has four recorded instances of incursions that create a total disturbance of 34.9 ha. Where multiple incursions are reported, a "total disturbance" row is provided that summarizes all incursions within that individual OGMA.

Table 25. Detailed Breakdown of Incursions in Non-Legal Old Growth Management Areas (OGMAs) that Exceed the Allowable Incursion Threshold by Disturbance Type in the Merritt Timber Supply Area (TSA).

Landscape Unit	OGMA ID	Total OGMA Area (ha)	Total OGMA CE-CFLB Area (ha)	Incurred OGMA Area (ha)	Incurred OGMA %	Incurred CFLB Area (ha)	Incurred CFLB %	Disturbance Type
Coldwater	KAM_TME_579	584.1	539.3	10.1	2%	10.1	2%	Mining and Extraction
				23.6	4%	22.5	4%	Roads
				0.3	0.1%	0.3	0.1%	Rights of Way
				0.9	0.2%	0.01	0%	Urban
				34.9	6%	32.8	6%	Total Disturbance
	KAM_TME_687	23.9	23.9	2.4	10%	2.4	10%	Forest Harvesting
	KAM_TME_692	16.4	15.6	2.5	15%	2.4	16%	Forest Harvesting
				0.1	1%	0.1	1%	Roads
				2.6	16%	2.5	16%	Total Disturbance
	KAM_TME_709	16.6	14.6	3.2	19%	2.9	20%	Forest Harvesting
				0.1	1%	0.0	0%	Roads
				3.3	20%	2.9	20%	Total Disturbance
	KAM_TME_719	100.6	100.6	0.1	0.1%	0.1	0.1%	Forest Harvesting
				9.4	9%	9.4	9%	Roads
				1.2	1%	1.2	1%	Rights of Way
				10.7	11%	10.7	11%	Total Disturbance
	KAM_TME_732	16.8	16.8	3.5	21%	3.5	21%	Mining and Extraction
				1.2	7%	1.2	7%	Roads
				4.8	28%	4.7	28%	Total Disturbance
	KAM_TME_747	100.9	93.6	11.6	12%	11.6	12%	Forest Harvesting
				5.4	5%	5.4	6%	Roads
				17.1	17%	17.0	18%	Total Disturbance
	KAM_TME_767	5.8	5.6	0.2	4%	0.2	4%	Power
				1.0	18%	1.0	18%	Roads
				1.3	22%	1.3	22%	Total Disturbance
	KAM_TME_783	13.7	13.7	2.2	16%	2.2	16%	Roads
	KAM_TME_786	12.2	12.1	5.0	41%	5.0	41%	Agriculture & Clearing
				0.5	4%	0.5	4%	Forest Harvesting
				0.03	0.2%	0.03	0.2%	Roads
				0.2	2%	0.2	2%	Rights of Way
				5.8	47%	5.7	47%	Total Disturbance

Landscape Unit	OGMA ID	Total OGMA Area (ha)	Total OGMA CE-CFLB Area (ha)	Incurred OGMA Area (ha)	Incurred OGMA %	Incurred CFLB Area (ha)	Incurred CFLB %	Disturbance Type
Coldwater	KAM_TME_788	340.2	340.0	234.6	69%	234.6	69%	Forest Harvesting
				13.5	4%	13.5	4%	Roads
				0.1	0%	0.1	0%	Rights of Way
				248.2	73%	248.2	73%	Total Disturbance
	KAM_TME_796	5.7	5.7	0.05	1%	0.05	1%	Power
				1.4	25%	1.4	25%	Roads
				1.5	26%	1.5	26%	Total Disturbance
	KAM_TME_815	298.2	297.5	14.5	5%	14.5	5%	Forest Harvesting
				7.6	3%	7.5	3%	Roads
				0.01	0%	0.01	0%	Rights of Way
				22.1	7%	22.0	7%	Total Disturbance
	KAM_TME_820	19.0	19.0	17.1	90%	17.1	90%	Forest Harvesting
	KAM_TME_827	17.0	17.0	17.0	100%	17.0	100%	Forest Harvesting
	KAM_TME_856	15.8	15.0	4.8	31%	4.7	32%	Forest Harvesting
				0.1	0.4%	0.1	0.4%	Power
				0.9	6%	0.9	6%	Roads
				5.8	37%	5.7	38%	Total Disturbance
	KAM_TME_926	27.1	26.9	4.8	18%	4.7	17%	Agriculture & Clearing
				0.3	1%	0.3	1%	Roads
				5.2	19%	5.0	19%	Total Disturbance
	KAM_TME_933	12.7	12.3	2.6	20%	2.6	21%	Agriculture & Clearing
Hayes	KAM_TME_421	743.3	738.1	0.6	0.1%	0.6	0.1%	Forest Harvesting
				23.5	3%	23.5	3%	Roads
				24.1	3%	24.1	3%	Total Disturbance
	KAM_TME_461	34.5	34.2	4.3	12%	4.1	12%	Roads
				0.7	2%	0.7	2%	Urban
				5.0	15%	4.9	14%	Total Disturbance
	KAM_TME_485	175.1	174.9	0.04	0%	0.04	0%	Forest Harvesting
				0.1	0.03%	0.1	0.03%	Mining and Extraction
				10.8	6%	10.8	6%	Roads
				0.1	0.1%	0.11	0.1%	Urban
				11.0	6%	11.0	6%	Total Disturbance
	KAM_TME_578	2.4	2.4	0.5	23%	0.5	23%	Forest Harvesting
				0.1	3%	0.1	3%	Roads
				0.6	26%	0.6	26%	Total Disturbance
	KAM_TME_1307	13.5	13.5	1.5	11%	1.5	11%	Roads
Lower Nicola	KAM_TME_994	15.2	14.8	4.3	28%	4.3	29%	Roads
	KAM_TME_996	3,994.7	3,970.4	1.1	0%	1.1	0%	Forest Harvesting
				0.5	0%	0.5	0%	Power
				14.7	0.4%	14.7	0.4%	Roads
				1.1	0%	1.10	0%	Rights of Way
				17.5	0.4%	17.5	0.4%	Total Disturbance

Landscape Unit	OGMA ID	Total OGMA Area (ha)	Total OGMA CE-CFLB Area (ha)	Incurred OGMA Area (ha)	Incurred OGMA %	Incurred CFLB Area (ha)	Incurred CFLB %	Disturbance Type
Lower Nicola	KAM_TME_1123	9.8	9.7	0.2	2%	0.2	2%	Forest Harvesting
				1.6	17%	1.6	17%	Roads
				1.8	18%	1.8	18%	Total Disturbance
	KAM_TME_1129	207.9	207.7	0.1	0.1%	0.1	0.1%	Forest Harvesting
				0.02	0%	0.02	0%	Power
				9.9	5%	9.9	5%	Roads
				10.1	5%	10.1	5%	Total Disturbance
	KAM_TME_1200	2,010.6	2,005.5	11.9	1%	11.9	1%	Roads
McNulty	KAM_TME_173	3.6	3.6	0.5	14%	0.5	14%	Power
				0.1	4%	0.1	4%	Rights of Way
				0.6	18%	0.6	18%	Total Disturbance
	KAM_TME_175	5.0	5.0	0.2	5%	0.2	5%	Power
				0.4	9%	0.4	9%	Roads
				0.1	1%	0.1	1%	Rights of Way
				0.7	15%	0.7	15%	Total Disturbance
	KAM_TME_216	722.4	722.4	15.0	2%	15.0	2%	Forest Harvesting
				11.0	2%	11.0	2%	Roads
				26.0	4%	26.0	4%	Total Disturbance
	KAM_TME_223	2.0	1.6	0.03	2%	0.0	0%	Forest Harvesting
				0.8	40%	0.7	47%	Roads
				0.01	1%	0.01	1%	Rights of Way
				0.8	42%	0.8	48%	Total Disturbance
	KAM_TME_232	5.0	3.2	1.5	30%	0.03	1%	Roads
	KAM_TME_292	40.5	40.5	9.6	24%	9.6	24%	Forest Harvesting
Otter	KAM_TME_285	2.1	1.9	2.1	100%	1.9	100%	Urban
	KAM_TME_297	417.5	400.5	0.05	0%	0.05	0%	Forest Harvesting
				0.1	0%	0.0	0%	Mining and Extraction
				11.1	2.7%	8.9	2.2%	Roads
				0.1	0%	0.11	0%	Rights of Way
				11.4	2.7%	9.1	2.3%	Total Disturbance
	KAM_TME_337	16.4	16.4	1.8	11%	1.8	11%	Roads
	KAM_TME_358	618.6	613.3	1.1	0%	1.0	0%	Agriculture & Clearing
				0.01	0%	0.01	0%	Forest Harvesting
				14.1	2%	13.8	2%	Roads
				15.3	2%	14.8	2%	Total Disturbance
	KAM_TME_361	179.7	179.7	0.5	0%	0.5	0%	Agriculture & Clearing
				0.01	0%	0.01	0%	Forest Harvesting
				10.7	6%	10.7	6%	Roads
				11.2	6%	11.2	6%	Total Disturbance
	KAM_TME_459	15.7	15.7	3.3	21%	3.3	21%	Forest Harvesting
				0.1	1%	0.1	1%	Roads
				3.4	22%	3.4	22%	Total Disturbance

Landscape Unit	OGMA ID	Total OGMA Area (ha)	Total OGMA CE-CFLB Area (ha)	Incurred OGMA Area (ha)	Incurred OGMA %	Incurred CFLB Area (ha)	Incurred CFLB %	Disturbance Type
Otter	KAM_TME_512	35.8	35.8	9.1	25%	9.10	25%	Forest Harvesting
	KAM_TME_568	7.9	7.9	1.2	15%	1.2	15%	Roads
	KAM_TME_598	14.4	14.3	1.6	11%	1.52	11%	Forest Harvesting
	KAM_TME_710	15.8	15.3	2.1	14%	2.1	14%	Roads
Similkameen	KAM_TME_6	35.2	35.2	12.3	35%	12.3	35%	Forest Harvesting
	KAM_TME_11	41.3	41.3	14.0	34%	14.0	34%	Forest Harvesting
	KAM_TME_28	1,591.2	1,589.7	1.8	0.1%	1.8	0.1%	Forest Harvesting
				14.9	1%	14.9	1%	Roads
				16.7	1%	16.7	1%	Total Disturbance
	KAM_TME_32	189.4	189.4	57.9	31%	57.9	31%	Forest Harvesting
				8.8	5%	8.8	5%	Roads
				66.7	35%	66.7	35%	Total Disturbance
	KAM_TME_88	185.2	185.2	131.8	71%	131.8	71%	Forest Harvesting
				2.6	1%	2.6	1%	Roads
				134.4	73%	134.4	73%	Total Disturbance
	KAM_TME_107	233.3	233.3	1.3	1%	1.3	1%	Forest Harvesting
				14.9	6%	14.9	6%	Roads
				16.1	7%	16.1	7%	Total Disturbance
	KAM_TME_131	2.8	2.8	0.3	11%	0.3	11%	Roads
	KAM_TME_140	27.4	19.8	5.2	19%	2.97	15%	Mining and Extraction
	KAM_TME_141	5.7	5.7	0.7	12%	0.7	11%	Mining and Extraction
				0.5	8%	0.5	8%	Roads
				1.2	20%	1.1	20%	Total Disturbance
	KAM_TME_149	15.2	8.5	0.3	2%	0.2	2%	Mining and Extraction
				2.7	17%	1.5	18%	Roads
				2.9	19%	1.7	20%	Total Disturbance
Smith-Willis	KAM_TME_76	896.9	886.4	0.3	0%	0.3	0%	Forest Harvesting
				14.6	2%	14.6	2%	Roads
				20.5	2%	18.2	2%	Total Disturbance
	KAM_TME_159	560.0	558.8	0.1	0%	0.0	0%	Agriculture & Clearing
				17.9	3%	17.9	3%	Roads
				0.1	0%	0.1	0%	Rights of Way
				18.1	3%	18.0	3%	Total Disturbance
	KAM_TME_229	9.8	9.4	0.8	8%	0.6	6%	Mining and Extraction
				0.7	7%	0.6	6%	Roads
				1.5	15%	1.2	12%	Total Disturbance
	KAM_TME_239	3.9	3.9	0.6	17%	0.65	17%	Roads
Spius	KAM_TME_534	139.2	133.6	16.2	12%	16.2	0%	Forest Harvesting
				0.01	0%	0.01	0%	Roads
				16.2	12%	1.2	1%	Total Disturbance

Landscape Unit	OGMA ID	Total OGMA Area (ha)	Total OGMA CE-CFLB Area (ha)	Incurred OGMA Area (ha)	Incurred OGMA %	Incurred CFLB Area (ha)	Incurred CFLB %	Disturbance Type
Spius	KAM_TME_553	3.9	3.9	0.04	1%	0.04	1%	Forest Harvesting
				0.8	22%	0.8	22%	Roads
				0.9	23%	0.9	23%	Total Disturbance
	KAM_TME_627	108.2	107.1	4.07	4%	4.07	4%	Forest Harvesting
				6.6	6%	6.6	6%	Roads
				10.7	10%	10.7	10%	Total Disturbance
	KAM_TME_656	2,388.1	2,345.1	28.8	1%	28.7	1%	Roads
	KAM_TME_751	5.2	4.5	0.8	15%	0.8	18%	Roads
	KAM_TME_843	45.7	45.7	7.9	17%	7.9	17%	Forest Harvesting
	KAM_TME_865	37.2	37.2	3.8	10%	3.8	10%	Agriculture & Clearing
Summers	KAM_TME_257	6.2	6.2	0.9	14%	0.9	14%	Roads
	KAM_TME_258	365.1	364.6	11.5	3%	11.3	3%	Forest Harvesting
				12.7	3%	12.7	3%	Roads
				24.3	7%	24.0	7%	Total Disturbance
	KAM_TME_351	2.2	2.2	2.2	100%	2.2	100%	Forest Harvesting
	KAM_TME_393	290.3	288.9	8.9	3%	8.6	3%	Roads
				1.1	0.4%	1.1	0.4%	Urban
				10.0	3%	9.7	3%	Total Disturbance
	KAM_TME_524	13.7	12.5	1.6	12%	1.6	13%	Roads
	KAM_TME_543	58.8	57.7	0.5	1%	0.5	1%	Agriculture & Clearing
				4.1	7%	4.1	7%	Forest Harvesting
				1.9	3%	1.9	3%	Roads
				6.4	11%	6.4	11%	Total Disturbance
	KAM_TME_614	2.8	2.7	0.3	11%	0.3	11%	Roads
	KAM_TME_652	5.6	5.6	0.7	12%	0.7	12%	Roads
	KAM_TME_657	9.1	9.1	1.3	14%	1.3	14%	Roads
	KAM_TME_679	2.8	2.8	0.3	11%	0.3	11%	Roads
				0.01	0.3%	0.0	0%	Urban
				0.3	11%	0.3	11%	Total Disturbance
Swakum	KAM_TME_957	1,204.9	1,198.1	83.2	7%	81.3	7%	Forest Harvesting
				1.5	0.1%	1.5	0.1%	Power
				39.5	3.3%	39.4	3.3%	Roads
				0.6	0%	0.6	0%	Rights of Way
				124.8	10.4%	122.9	10.3%	Total Disturbance
	KAM_TME_1024	782.1	767.2	14.9	2%	14.5	2%	Roads
				0.1	0%	0.02	0%	Urban
				15.0	2%	14.5	2%	Total Disturbance
	KAM_TME_1026	385.8	378.4	0.1	0%	0.1	0%	Forest Harvesting
				21.9	6%	21.1	6%	Roads
				22.0	6%	21.2	6%	Total Disturbance

Landscape Unit	OGMA ID	Total OGMA Area (ha)	Total OGMA CE-CFLB Area (ha)	Incurred OGMA Area (ha)	Incurred OGMA %	Incurred CFLB Area (ha)	Incurred CFLB %	Disturbance Type
Swakum	KAM_TME_1037	977.1	970.8	0.6	0%	0.6	0%	Agriculture & Clearing
				0.1	0%	0.1	0%	Forest Harvesting
				24.2	2%	23.7	2%	Mining and Extraction
				55.3	6%	55.0	6%	Roads
				0.3	0%	0.3	0%	Rights of Way
				80.6	8%	79.8	8%	Total Disturbance
	KAM_TME_1052	47.1	47.1	2.2	5%	2.2	5%	Mining and Extraction
				4.5	10%	4.5	10%	Roads
				6.7	14%	6.7	14%	Total Disturbance
	KAM_TME_1062	38.6	35.8	4.5	12%	4.5	13%	Forest Harvesting
				1.6	4%	1.5	4%	Roads
				6.1	16%	6.0	17%	Total Disturbance
	KAM_TME_1115	2.6	1.2	0.4	16%	0.4	34%	Roads
	KAM_TME_1128	4.7	4.7	0.5	10%	0.5	10%	Forest Harvesting
	KAM_TME_1135	30.4	30.3	3.5	12%	3.5	12%	Forest Harvesting
				2.0	7%	2.0	7%	Roads
				5.5	18%	5.5	18%	Total Disturbance
	KAM_TME_1145	106.0	103.5	0.03	0%	0.03	0%	Forest Harvesting
				4.0	4%	3.9	4%	Roads
				12.4	12%	12.3	12%	Urban
				16.4	15%	16.3	16%	Total Disturbance
	KAM_TME_1152	55.1	55.1	5.7	10%	5.7	10%	Roads
	KAM_TME_1185	7.9	7.9	0.8	10%	0.8	10%	Forest Harvesting
				1.0	12%	1.0	12%	Roads
				1.7	22%	1.7	22%	Total Disturbance
	KAM_TME_1189	20.8	20.8	2.1	10%	2.1	10%	Roads
				0.2	1%	0.2	1%	Rights of Way
				2.3	11%	2.3	11%	Total Disturbance
	KAM_TME_1192	11.7	11.7	0.6	5%	0.6	5%	Forest Harvesting
				0.6	5%	0.6	5%	Roads
				1.2	10%	1.2	10%	Total Disturbance
	KAM_TME_1204	9.4	8.8	1.0	10%	0.7	8%	Roads
	KAM_TME_1259	92.3	92.1	10.3	11%	10.3	11%	Forest Harvesting
				2.0	2%	2.0	2%	Roads
				12.3	13%	12.3	13%	Total Disturbance
	KAM_TME_1262	1.8	1.8	0.1	6%	0.1	6%	Agriculture & Clearing
				0.2	12%	0.2	12%	Roads
				0.3	18%	0.3	18%	Total Disturbance
	KAM_TME_1266	3.7	3.7	0.6	16%	0.6	16%	Roads
Tulameen	KAM_TME_83	4,401.7	4,298.5	0.9	0%	0.9	0%	Forest Harvesting
				40.3	1%	39.7	1%	Roads
				41.1	1%	40.5	1%	Total Disturbance

Landscape Unit	OGMA ID	Total OGMA Area (ha)	Total OGMA CE-CFLB Area (ha)	Incurred OGMA Area (ha)	Incurred OGMA %	Incurred CFLB Area (ha)	Incurred CFLB %	Disturbance Type
Tulameen	KAM_TME_134	1,066.1	1,050.1	5.6	1%	5.6	1%	Forest Harvesting
				11.5	1%	11.5	1%	Roads
				17.2	2%	17.2	2%	Total Disturbance
	KAM_TME_188	478.9	477.5	0.03	0%	0.03	0%	Forest Harvesting
				12.2	3%	12.2	3%	Roads
				12.2	3%	12.2	3%	Total Disturbance
Upper Nicola	KAM_TME_715	104.7	102.3	19.0	18%	18.5	18%	Forest Harvesting
				4.9	5%	4.9	5%	Roads
				23.9	23%	23.4	23%	Total Disturbance
	KAM_TME_726	18.2	18.0	3.6	20%	3.4	19%	Mining and Extraction
				0.1	0.5%	0.1	0.5%	Roads
				3.7	20%	3.5	19%	Total Disturbance
	KAM_TME_728	185.5	177.6	11.9	6%	7.9	4%	Forest Harvesting
				0.4	0.2%	0.4	0.2%	Power
				0.6	0.3%	0.6	0.4%	Roads
				12.9	7%	8.9	5%	Total Disturbance
	KAM_TME_733	26.6	26.6	3.1	11%	3.1	11%	Forest Harvesting
	KAM_TME_941	13.6	13.4	2.4	18%	2.2	17%	Forest Harvesting
				0.7	5%	0.7	5%	Roads
				3.1	23%	2.9	22%	Total Disturbance
	KAM_TME_1107	318.7	318.5	0.01	0%	0.01	0%	Forest Harvesting
				14.3	4%	14.3	4%	Roads
				14.3	4%	14.3	4%	Total Disturbance
	KAM_TME_1175	191.4	189.5	0.02	0%	0.02	0%	Forest Harvesting
				16.0	8%	16.0	8%	Roads
				16.1	8%	16.1	8%	Total Disturbance
	KAM_TME_1184	6.9	6.7	0.8	12%	0.8	12%	Roads
	KAM_TME_1191	10.4	9.4	0.4	4%	0.3	3%	Power
				1.4	14%	1.4	15%	Roads
				0.8	7%	0.8	8%	Rights of Way
				0.3	3%	0.2	3%	Urban
				3.0	28.4%	2.6	28.1%	Total Disturbance
	KAM_TME_1196	124.9	124.6	0.01	0%	0.01	0%	Forest Harvesting
				10.3	8%	10.3	8%	Roads
				10.3	8%	10.3	8%	Total Disturbance
	KAM_TME_1221	145.1	144.3	10.6	7%	10.5	7%	Roads

The following OGMAs span multiple LUs and are reported below to demonstrate the total incursion within that OGMA, rather than individually by LU as shown above. These OGMAs are not reported in the table above.

Landscape Unit	OGMA ID	Total OGMA Area (ha)	Total OGMA CE-CFLB Area (ha)	Incurred OGMA Area (ha)	Incurred OGMA %	Incurred CFLB Area (ha)	Incurred CFLB %	Disturbance Type
Coldwater / Otter	KAM_TME_522	944.5	922.6	0.8	0.1%	0.3	0%	Agriculture & Clearing
				19.1	2%	19.0	2%	Roads
				0.1	0%	0.1	0%	Rights of Way
				20.0	2%	19.3	2%	Total Disturbance
Coldwater / Spius	KAM_TME_834	12.9	12.9	11.1	86%	11.1	86%	Forest Harvesting
Coldwater / Upper Nicola	KAM_TME_907	69.9	69.5	47.8	68%	47.8	69%	Forest Harvesting
				6.1	9%	6.0	9%	Roads
				0.3	0.5%	0.1	0.1%	Urban
				54.2	78%	53.8	77%	Total Disturbance
Coldwater / Upper Nicola	KAM_TME_916	190.9	190.8	65.8	34%	65.8	35%	Forest Harvesting
				2.1	1%	2.1	1%	Roads
				67.9	36%	67.9	36%	Total Disturbance
Hayes / McNulty	KAM_TME_233	2,561.9	2,550.7	22.3	1%	22.3	1%	Forest Harvesting
				36.3	1%	35.6	1%	Roads
				58.6	2%	58.0	2%	Total Disturbance
Similkameen / Summers / Tulameen	KAM_TME_234	383.3	381.3	0.01	0%	0.0	0%	Mining and Extraction
				0.7	0.2%	0.7	0.2%	Power
				19.7	5.1%	19.7	5.2%	Roads
				1.1	0.3%	1.1	0.3%	Rights of Way
				21.5	5.6%	21.5	5.6%	Total Disturbance
Similkameen / Smith-Willis	KAM_TME_74	55.3	55.3	8.4	15%	8.4	15%	Forest Harvesting
				0.7	1%	0.7	1%	Roads
				9.1	16%	9.1	16%	Total Disturbance

Appendix 4 – Amount of Old Growth Forest in OGMAs

The following presents the current condition of CE-CFLB within non-legal OGMAs at the landscape (AU defined by LU-BEC) and OGMA (old growth forest within OGMA boundaries) level. Reporting is on how the OGMA itself is meeting the targets, not whether the AU is meeting the targets. Table 26 compares the amount of old growth forest (column D), the total CE-CFLB area of non-legal OGMAs (column E), and the amount of old growth forest within OGMAs (column F) relative to the target for old growth forest (column B) for all AUs with targets and established OGMAs (i.e., AUs with no old growth targets or without OGMAS are not included in the indicator).

The landscape level (column D and D/B) provides the amount of old growth forest within the CE-CFLB portion of each AU that contains OGMAs and indicates how much old growth forest is currently available as compared to the legal target. This provides context for the amount of old growth forest within and outside of OGMAs in the same BEC subzone/variant and represents the future potential of that LU-BEC to improve old growth forest retention, conservation, distribution, and management on the landscape.

> For example: in the Coldwater LU-ESSFdc2, there is currently 1,771.3 ha of old growth forest in the CE-CFLB which equates to 246% of old growth forest compared to targets. This translates to this AU having 2.46 times more old growth forest available than required by PNOGO.

The OGMA polygon level (column E and E/C) provides the total amount of CE-CFLB (ha) within the OGMA and compares that CE-CFLB area to the legal target. This explores the original intent of OGMAs to contain old growth forest and provides an indication of how OGMAs are meeting or exceeding targets if total CE-CFLB area is assumed to be old growth forest. Although the order (PNOGO) is to manage the total area of the OGMA polygon (which could include non-forested area), the amount of CE-CFLB (ha) in the OGMA reflects the current amount of forest within that OGMA available to meet targets. This provides context for evaluating if OGMA delineation captured enough area to meet the targets, regardless of forest age.

> For example: in the Coldwater LU-ESSFdc2, there is currently 291.4 ha of CE-CFLB in OGMAs which equates to 40% of old growth forest compared to targets. This means if all the CE-CFLB in OGMAs was old growth forest, it would account for 40% of the target being met.

The old growth forest within OGMAs (column F and F/B) provides the actual amount of old growth forest within the OGMA and compares that CE-CFLB area to the legal target. It is important to note that if column F/C is 0% but there is CE-CFLB area and OGMAs associated with that LU-BEC, this means that there is currently no old growth forest within the OGMAs but may exist outside of the OGMA boundary. As a result, the OGMAs with 0% are currently not contributing to the old growth forest targets.

> For example: in the Coldwater LU-ESSFdc2, there is 131.8 ha of old growth forest in the CE-CFLB within OGMAs which equates to 18% of the target met with old growth forest. This means that only 18% of the target is being met within the OGMA with old seral stage forests.

By reporting on both the CE-CFLB area in OGMAs (column E and E/B) and the amount of old in OGMAs (column F and F/B), the results provide a clearer depiction of current condition and old growth management in LU-BECs (AUs) with OGMAs and where there are opportunities for improvements in the future at the landscape level (column D and D/B*100).

Table 26. *Total Area of Old Growth Forest within Non-Legal Old Growth Management Areas (OGMAs) Compared to Legal Targets by Assessment Unit (AU) in the Merritt Timber Supply Area (TSA).*

COLUMN CALCULATIONS:		Old Targets			Current Amount and Percents of Old					
		A	B	B/A*100=C	D	D/B*100	E	E/B	F	F/B
Landscape Unit, BEO	BEC Variant	Total BEC CE-CFLB (ha)	Target Old (ha)	Target Old CE-CFLB Area (%)	Current CE-CFLB Area of Old (ha)	Current CE-CFLB Area of Old (% of Target)	Current CE-CFLB Area in OGMA (ha)	Current CE-CFLB Area in OGMA (% of Target)	Current CE-CFLB Area of Old in OGMA (ha)	Current CE-CFLB Area of Old in OGMA (% of Target)
Coldwater, High/Int./Low	CWHms1	633.7	132	21%	78.7	60%	133.3	101%	11.7	9%
	ESSFdc2	5,365.4	721	13%	1,771.3	246%	291.4	40%	131.8	18%
	ESSFmw	9,459.1	794	8%	1,003.0	126%	2,587.4	326%	338.4	43%
	IDFdk1	11,456.0	2,169	19%	215.8	10%	774.4	36%	30.9	1%
	IDFdk2	17,306.6	1,673	10%	665.9	40%	2,099.4	125%	272.7	16%
	IDFxh1	4,004.0	754	19%	186.1	25%	774.5	103%	87.8	12%
	IDFxh2	3,120.2	493	16%	52.6	11%	382.1	77%	37.1	8%
	MSdm2	10,275.6	705	7%	3,144.3	446%	716.8	102%	412.1	58%
	MSxk	4,104.1	567	14%	1,003.1	177%	311.5	55%	183.2	32%
	PPxh2	1,162.6	110	9%	16.7	15%	89.9	82%	12.5	11%
Hayes, Int./ Low	ESSFdc2	244.1	3	1%	38.0	1265%	-	0%	-	0.0%
	ESSFxc	6,407.3	732	11%	2,531.6	346%	293.1	40%	262.7	36%
	IDFdk1	12,561.9	1,097	9%	0.0	0%	1,923.8	175%	0.0	0.0%
	IDFdk2	15,632.9	1,725	11%	241.8	14%	1,422.0	82%	79.1	5%
	IDFxh1	2,715.9	330	12%	0.0	0%	1,355.6	411%	0.0	0.0%
	MSdm2	11,906.1	2,533	21%	1,563.0	62%	637.7	25%	367.7	15%
	MSxk	29,943.6	4,055	14%	7,136.1	176%	1,308.9	32%	978.2	24%
Lower Nicola, High	ESSFdc2	3,376.7	606	18%	1,862.6	307%	921.3	152%	581.0	96%
	ESSFxc	1,816.8	150	8%	323.5	216%	0.5	0%	0.5	0.3%
	IDFdk1	20,976.0	2,561	12%	1,414.8	55%	3,849.1	150%	513.9	20%
	IDFdk2	1,706.1	534	31%	18.3	3%	394.2	74%	11.4	2%
	IDFxh2	18,952.3	4,784	25%	1,591.0	33%	7,538.2	158%	861.5	18%
	MSdm2	1,296.4	618	48%	414.1	67%	65.9	11%	61.5	10%
	MSxk	28,260.9	5,591	20%	5,993.8	107%	2,356.5	42%	1,426.5	26%
	PPxh2	7,451.7	1,002	13%	245.1	24%	2,959.0	295%	234.0	23%
McNulty, Int./ Low	ESSFxc	13,236.0	1,519	11%	7,162.8	472%	626.2	41%	526.5	35%
	IDFdk1	5,022.7	445	9%	123.6	28%	839.5	189%	38.3	9%
	IDFxh1	2,117.2	160	8%	0.7	0%	376.9	236%	0.7	0.4%
	MSxk	16,330.9	1,574	10%	5,491.4	349%	565.3	36%	507.8	32%
Otter, Int./ Low	ESSFdc2	4,679.4	407	9%	1,161.2	285%	605.1	149%	340.6	84%
	IDFdk1	12,344.0	1,063	9%	241.1	23%	1,899.9	179%	78.5	7%
	IDFdk2	23,041.7	3,439	15%	209.0	6%	4,322.8	126%	131.0	4%
	MSdm2	13,091.5	1,770	14%	3,328.9	188%	299.3	17%	183.8	10%
	MSxk	2,097.5	153	7%	369.8	242%	168.4	110%	68.5	45%

COLUMN CALCULATIONS:		Old Targets			Current Amount and Percents of Old					
		A	B	B/A*100=C	D	D/B*100	E	E/B	F	F/B
Landscape Unit, BEO	BEC Variant	Total BEC CE-CFLB (ha)	Target Old (ha)	Target Old CE-CFLB Area (%)	Current CE-CFLB Area of Old (ha)	Current CE-CFLB Area of Old (% of Target)	Current CE-CFLB Area in OGMA (ha)	Current CE-CFLB Area in OGMA (% of Target)	Current CE-CFLB Area of Old in OGMA (ha)	Current CE-CFLB Area of Old in OGMA (% of Target)
Similkameen, Int./Low	ESSFdc2	22,673.6	2,552	11%	6,321.4	248%	1,582.7	62%	880.1	34%
	ESSFmw	3,266.6	35	1%	336.9	962%	989.9	2828%	73.8	211%
	ESSFxc	4,880.3	1,360	28%	1,886.8	139%	871.9	64%	714.9	52.6%
	IDFdk1	553.8	74	13%	0.0	0%	2.9	4%	0.0	0.0%
	IDFdk2	23,413.7	2,782	12%	1,064.1	38%	2,675.8	96%	324.4	11.7%
	IDFxh1	1,791.5	233	13%	10.2	4%	263.7	113%	8.0	3%
	MSdm2	29,826.3	4,388	15%	8,264.4	188%	1,988.6	45%	1,168.5	27%
Smith-Willis, Int./Low	ESSFxc	10,765.6	961	9%	3,796.5	395%	1,503.4	156%	1,303.5	136%
	IDFdk1	15,484.8	367	2%	194.2	53%	2,712.3	739%	89.8	24%
	IDFdk2	4,351.1	2,260	52%	16.2	1%	729.8	32%	10.9	0.5%
	IDFxh1	5,586.4	839	15%	8.5	1%	2,102.6	251%	7.8	1%
	MSdm2	10,668.3	880	8%	1,684.8	191%	461.8	52%	368.3	42%
	MSxk	25,288.6	3,836	15%	6,155.5	160%	1,347.4	35%	899.1	23%
Spius, High/ Int.	CWHms1	109.9	10	9%	0.6	6%	-	0%	-	0.0%
	ESSFdc2	5,848.5	1,162	20%	2,060.7	177%	635.0	55%	457.5	39%
	ESSFmw	23,289.7	2,410	10%	1,395.3	58%	3,879.3	161%	379.5	16%
	IDFdk1	2,173.3	224	10%	18.3	8%	331.1	148%	0.3	0.1%
	IDFdk2	13,532.0	1,814	13%	842.9	46%	1,571.2	87%	280.7	15%
	IDFxh1	3,066.5	51	2%	23.6	46%	786.6	1542%	2.3	5%
	IDFxh2	2,625.2	762	29%	64.3	8%	937.5	123%	1.0	0.1%
	MSdm2	14,196.6	1,715	12%	4,426.8	258%	1,086.7	63%	774.8	45%
	PPxh2	505.8	7	1%	0.0	0%	125.6	1794%	-	0.0%
Summers, Int.	ESSFdc2	3,003.7	93	3%	556.8	599%	189.1	203%	122.2	131%
	ESSFxc	287.3	215	75%	27.9	13%	-	0%	-	0.0%
	IDFdk1	11,064.8	2,451	22%	477.3	19%	1,775.1	72%	342.5	14%
	IDFdk2	20,275.6	1,673	8%	105.4	6%	3,260.9	195%	77.2	5%
	IDFxh1	3,906.5	644	16%	138.7	22%	1,144.9	178%	132.5	21%
	MSdm2	15,873.0	1,971	12%	2,915.3	148%	589.9	30%	406.8	21%
	MSxk	6,384.6	763	12%	504.6	66%	198.6	26%	107.5	14%
Swakum, Int.	IDFdk1	29,475.0	4,660	16%	316.2	7%	3,664.8	79%	96.2	2%
	IDFxh2	5,935.1	1,244	21%	34.0	3%	2,024.9	163%	30.2	2%
	MSxk	33,943.3	3,048	9%	6,226.8	204%	1,646.0	54%	938.2	31%
	PPxh2	2,560.2	270	11%	5.3	2%	1,286.8	477%	4.9	2%

COLUMN CALCULATIONS:		Old Targets			Current Amount and Percents of Old					
		A	B	B/A*100=C	D	D/B*100	E	E/B	F	F/B
Landscape Unit, BEO	BEC Variant	Total BEC CE-CFLB (ha)	Target Old (ha)	Target Old CE-CFLB Area (%)	Current CE-CFLB Area of Old (ha)	Current CE-CFLB Area of Old (% of Target)	Current CE-CFLB Area in OGMA (ha)	Current CE-CFLB Area in OGMA (% of Target)	Current CE-CFLB Area of Old in OGMA (ha)	Current CE-CFLB Area of Old in OGMA (% of Target)
Tulameen, High/Int.	CWHms1	1,007.1	88	9%	40.8	46%	506.4	575%	26.4	30%
	ESSFdc2	19,955.0	2,437	12%	6,841.3	281%	2,553.9	105%	2,101.0	86%
	ESSFmw	46,557.2	3,471	7%	4,045.7	117%	9,110.7	262%	2,040.9	59%
	IDFdk2	6,368.1	919	14%	147.5	16%	1,560.9	170%	63.4	7%
	IDFxh1	312.6	18	6%	0.0	0%	145.9	810%	-	0.0%
	MSdm2	11,769.8	1,840	16%	3,016.0	164%	779.9	42%	419.8	23%
Upper Nicola, Int./Low	ESSFxc	1,587.2	163	10%	833.3	511%	116.6	72%	100.2	61%
	IDFdk1	56,030.0	4,923	9%	195.2	4%	6,594.9	134%	56.3	1%
	IDFdk2	77.1	15	19%	0.0	0%	-	0%	-	0.0%
	IDFxh2	1,767.0	734	42%	5.1	1%	444.5	61%	-	0.0%
	MSdm2	135.5	158	117%	0.0	0%	-	0%	-	0.0%
	MSxk	29,825.4	4,657	16%	5,270.7	113%	1,443.8	31%	857.5	18%
	PPxh2	50.8	106	208%	0.0	0%	19.5	18%	-	0.0%
TOTAL		854,146.8	110,252.0		119,875.4	109%	108,533.1	98%	24,440.7	22%