

Current Condition Report for Old Growth Forest on Vancouver Island – 2019 Analysis

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A Note on the Development of this Report

The Province of British Columbia is in a transition period, as we work towards transforming the management and stewardship of our waters, lands and resources, together with First Nations. The Province acknowledges that this report was not developed in partnership with First Nations. It provides best available information and aims to support and inform future work and collaboration between the Province and First Nations on the management of cumulative effects. The Province also looks forward to working with natural resource industries, and community stakeholders, to ensure that cumulative effects are identified, considered, and managed appropriately.

Disclaimer

Current condition reports (CCRs) for old growth forest are being prepared for some regions in the province under the provincial Cumulative Effects Framework (CEF). This assessment provides insights to where management attention may be needed within the West Coast Region.

This CCR for Old Growth Forest focused on the Vancouver Island portion of the West Coast Region uses standardized assumptions and methodologies from the *Interim Assessment Protocol for Old Growth Forest in British Columbia* (2017). The CCR report addresses specific questions related to the current condition of indicators for old forest and old growth management areas (OGMAs) and is limited to this scope.

The Technical Advisory Panel (TAP) assessment and polygons related to the Old Growth Strategic Review were not incorporated into this report. The TAP analysis was a separate analysis with a different goal – to map rare, at-risk, and irreplaceable forest types to identify recommended areas for deferral. The TAP mapping included: Big-treed old growth, Ancient forest, Remnant old ecosystems, Intact watersheds and Big-treed Recruitment Forest. This CEF reporting is different – it is an accounting of the amount of old growth forest and mature-plus-old forest compared to legal orders and policy targets.

An error in the roads dataset created for this assessment resulted in some road segments not being accounted for in the analysis (see Section 4.3 Assumptions and Limitations for a full description). This does not materially affect the results or conclusions of this report. Future updates to this report will include a corrected roads layer to ensure the entirety of roads in the CE Integrated Roads layer are incorporated into the analysis.

Companion Documents

Interim Assessment Protocol for Old Growth Forest in British Columbia. Version 1.1 (December 2017). Prepared by the Provincial Old Growth Forest Technical Working Group – Ministry of Forests, Lands, Natural Resource Operations and Rural Development. 25 p.

Additional background context is also provided in the Old Growth Forest Management in British Columbia: Provincial Backgrounder (WLRS, 2023a) and the Old Growth Forests in British Columbia: Provincial Cumulative Effects Assessment Backgrounder (WLRS, 2023b).

Acknowledgements

The development of this document involved a coordinated effort from many people at various stages, including the old growth analysis, reporting, interpretation, editing and review. Assessment summaries and observations, including trends identified from datasets, were supported by conversations with regional WLRS staff. The following people are acknowledged for directly supporting this work: Ron Cotton, John Sunde, Brian Cavanagh, Wade Anderson, Rob Gowan, Felice Griffiths, and Melissa Lucchetta.

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EXECUTIVE SUMMARY

This report describes the current condition of old growth forest in the Vancouver Island portion of the West Coast Region as part of the Province of B.C.'s Provincial Cumulative Effects Framework (CEF). This report also provides summary information for the Haida Gwaii and Great Bear Rainforest planning areas to give an overall regional context for old growth management.

This report is directly related to two recommendations made by the Old Growth Strategic Review:

- Provide the public with timely and objective information about forest conditions and trends. (Recommendation #5)
- Bring management of old forests into compliance with existing provincial targets and guidelines for maintaining biological diversity. (Recommendation #7)

The West Coast Region manages 6.7 million hectares of Crown forest land, 38% of this area is on Vancouver Island, 51% in the Great Bear Rainforest, and 11% on Haida Gwaii. This does not include the 800,000 hectares of private managed forest land located mainly on the southeast side of Vancouver Island. The Great Bear Rainforest, Haida Gwaii and Clayoquot Sound are managed under ecosystem-based management regimes, while the Vancouver Island Land Use Plan (excepting Clayoquot Sound) is based on the provincial old growth management regime.

Old growth forests are important to the conservation and maintenance of biodiversity at all scales. Old growth forests are impacted by past, present and future human activities and natural processes, resulting in cumulative effects on old growth forest. It is important to assess and monitor the condition of old growth forests to inform management of this value over time.

This report focuses on the current condition of old growth forest on Vancouver Island relative to legally defined objectives for old growth retention. The current condition report for old growth forest assesses:

- For landscape units that have spatial legal Old Growth Management Areas: The amount of productive forest contained within OGMAs and protected/reserved areas and the proportion of that area that is old growth forest.
- For landscape units that have non-spatial legal targets (including areas with draft OGMAs): The amount of old growth forest by landscape unit (LU) and biogeoclimatic (BEC) variant compared to the objectives for old growth in the Provincial Non-spatial Old Growth Order (PNOGO).
- The total amount of mature-plus-old forest by LU and BEC variant compared to the non-legal targets in the Biodiversity Guidebook.
- The amount of mature forest in the Special Management Zones (SMZ) defined in the Vancouver Island Land Use Plan (VILUP) compared to the objectives for those SMZs.
- The amount of old forest in Watershed planning units in Clayoquot Sound compared to targets.
- Total incursions in spatially defined Old Growth Management Areas (OGMAs)

Key findings of this current condition report for old growth forests on Vancouver Island include:

- On Vancouver Island, (outside of Clayoquot Sound) 67% of the assessment units managed under the PNOGO currently have equal or greater amounts of old forest compared to the old forest retention target. This covers 88% of the CFLB managed under PNOGO.
- Within Clayoquot Sound, all Watershed Planning Units currently have amounts of old forest greater than or equal to the targets for old forest retention.

- In 45% of assessment units managed with legal OGMA, the area within OGMA and protected/reserved areas is 75-100% old forest. In 30% of units managed with legal OGMA, less than half of the area within OGMA and protected/reserved areas consists of old forest.
- In all LUs with legal OGMA, the total area of OGMA incursion was 5% or less of the total OGMA area across the LU, with most being under 2%. Large incursions (5ha or 5% of an individual OGMA) occur in OGMA in four LUs and make up less than 1% of the OGMA area across the LU.
- In LUs with non-legal OGMA all but three had less than 5% of the total OGMA area across the LU incurred; of the remaining three LUs, one had 6%, one had 7.5% and one had 24.6% of its total OGMA area incurred. Large incursions (5ha or 5% of an individual OGMA) occur in three LUs and make up less than 2% of the total OGMA area across the LU in two of those LUs, and 17.5% of the total OGMA area in the third.
- Roads account for most of the incurred area in legal OGMA (84.1%), followed by cutblocks (7.8%). In non-legal OGMA cutblocks accounted for most of the incurred area (66.4%), followed by roads (28.5%)

The dry forest ecosystems located on the south of Vancouver Island have experienced the most development impacts and therefore have the least old growth forest available for selection to meet the targets. Areas on eastern Vancouver Island around Campbell River and Sayward also have low amounts of old growth due to a long history of forest harvesting and historical natural disturbance. Retention of younger forests (less than 250 years) for old growth recruitment are needed in these areas to meet the targets.

Opportunities related to old growth management on Vancouver Island include:

- Ensure that appropriate recruitment strategies are in place, particularly for assessment units that have less old forest than target amounts,
- Improve the currency and accuracy of the spatial OGMA layer to ensure accurate analysis of incursions, and transparent reporting of OGMA condition.
- Pursue opportunities to use LiDAR data in OGMA establishment to increase the accuracy of old forest identification.
- Improve the currency and accuracy of disturbance data (e.g., resource roads data) to improve the accuracy of this analysis.
- Review existing spatial OGMA to assess if they are best capturing Old Forest values and amend them as necessary to improve the capture of Old Forest values.

LIST OF ACRONYMS

AAC	Allowable Annual Cut
B.C.	British Columbia
BCGW	BC Geographic Warehouse
BDG	Biodiversity Guidebook
BEC	Biogeoclimatic Ecosystem Classification
BEO	Biodiversity Emphasis Option
BMTA	Biodiversity, Mining and Tourism Area
CCR	Current Condition Report
CDF	Coastal Douglas Fir (biogeoclimatic zone)
CEF	Cumulative Effects Framework
CFLB	Crown Forest Land Base
CS	Clayoquot Sound
CWH	Coastal Western Hemlock (biogeoclimatic zone)
DCR	Campbell River District
DNI	North Island District
DSI	South Island District
FAIB	Forest Analysis Inventory Branch
FPC	Forest Practices Code
FRPA	Forest and Range Practices Act
FSP	Forest Stewardship Plan
GBRO	Great Bear Rainforest Order
LU	Landscape Unit
MH	Mountain Hemlock (biogeoclimatic zone)
NDT	Natural Disturbance Type
OGAA	Oil and Gas Activities Act
OGC	Oil and Gas Commission
OGMA	Old Growth Management Area
PNOGO	Provincial Non-spatial Old Growth Order
RMZ	Resource Management Zone
SFMA	Special Forest Management Area
SMZ	Special Management Zone
TEM	Terrestrial Ecosystem Mapping
TFL	Tree Farm License
THLB	Timber Harvesting Land Base
TSA	Timber Supply Area
TSR	Timber Supply Review
UWR	Ungulate Winter Range
VILUP	Vancouver Island Land Use Plan Higher Level Plan Objectives Order
VRI	Vegetation Resources Inventory
WLRS	Ministry of Water, Lands and Resource Stewardship

GLOSSARY

Assessment Unit (AU):	Assessment units (AUs) are used to describe the current state of old growth forests in Cumulative Effects Framework reporting. Assessment Units are based on the combinations of LU, NDT, BEO, and BEC subzone and/or variant.
Benchmarks:	Reference points that support interpretation of the condition of an indicator or component. Benchmarks are based on scientific understanding of a system and may or may not be defined in policy or legislation. For the purpose of the CEF, benchmarks are identified to support assessment and reporting in relation to broad objectives (Province of British Columbia, 2016).
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:	<p>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.</p> <p>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).</p>
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 Framework (CEF):	A set of policies, procedures and decision-support tools that helps identify and manage cumulative effects consistently and transparently across British Columbia's natural resource sector. The CEF was established in 2016 by the Province of British Columbia and is led by the Ministry of Land, Water, and Resource Stewardship.

Ecosystem-Based Management (EBM):	An adaptive approach to managing human activities that seeks to ensure the coexistence of healthy, fully functioning ecosystems and human communities (Province of BC, n.d.).
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).
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.
Indicator(s):	The metrics used to measure and report on the condition and trend of a component. There are two main types of indicators: state indicators and pressure indicators. State indicators that directly measure and report on the condition of a component, and pressure indicators that measure and report on the processes that act upon or influence the condition of a component (Province of B.C., 2016).
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.
Mature Forest	<p>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.</p> <p>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.</p>
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 (BDG, 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.
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 Timber Harvesting Land Base:	Includes Parks and Protected Areas, no harvest zones within wildlife management areas (e.g., ungulate winter ranges, wildlife habitat areas), riparian reserves, inoperable forests, and other areas that are completely removed from the Timber Harvesting Land Base (THLB) and do not contribute to allowable annual cut for a specified area.
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 OGMA's. 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.
Old Growth Forest:	<p>The Province of B.C. defines old growth forest based on age. Minimum ages for old growth forests 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 forests with frequent stand-initiating disturbance (NDT 3).</p> <p>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 (Province of B.C., 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 (FLNRORD, 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.</p> <p>For the purposes of the CEF, the term "old growth forests" 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.</p>
Old Growth Management Area (OGMA):	<p>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 draft (non-legal) OGMA:</p> <p>Legal OGMA- OGMA's that have been declared in an old growth Ministerial Order. Forest licensees must incorporate the legal OGMA's into Forest Stewardship Plans (FSPs).</p> <p>Draft (non-legal) OGMA- OGMA's that have been mapped but not declared in an old growth order. Forest licensees may choose to incorporate the non-legal OGMA's into FSPs as a way of achieving the non-spatial order that is in effect in the management area where they operate (FPB, 2012).</p>
Private Forest:	Forest located on privately owned lands, including Private Managed Forest Lands, Indian Reserves, Federal lands and Treaty settlement lands. These forests are not subject to most provincial forest legislation, regulations, or policy.

Protected/Reserved Forest:	Forest that is legally excluded from harvest (e.g., Parks and protected areas) that include young and old forest.
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.
Site Association/ Site Series:	A site association can contain ecosystems from several different climates and therefore be variable in actual site conditions. Dividing the association into site series using subzones and variants produces site units that are climatically, and therefore usually edaphically (i.e., influenced by the soil), more uniform (Meidinger & Pojar, 1991).
Site Index:	A measure of forest productivity relating to the height of main canopy of trees on at site at age 50.
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).
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.
Value(s):	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 (B.C.) is committed to sustainable resource management. As resource demands grow, we must be able to measure the effects of natural resource activities, large and small, on the values important to the people of British Columbia. To meet this need, the Province of B.C. (the Province) established a [Cumulative Effects Framework](#) (CEF) in 2014 to guide the assessment of cumulative effects across natural resource sectors and support the integration of assessment results in natural resource decision-making.

As part of the CEF, the Province carried out a provincial assessment of the current condition of several resource values of importance to British Columbians, using indicators for each value that illustrate the cumulative effects of natural resource activities on these identified values.

This report provides the results of the Old Growth Forest assessment conducted under the CEF for the Vancouver Island portion of the West Coast Region. The West Coast Region manages a total of 6.7 million hectares¹ of Crown forest land, 38% of this area is on Vancouver Island, 51% in the Great Bear Rainforest, and 11% on Haida Gwaii. The Great Bear Rainforest, Haida Gwaii and Clayoquot Sound are managed under an ecosystem-based management regime, while the Vancouver Island Land Use Plan (excepting Clayoquot Sound) is based on the provincial old growth management regime.

This current condition assessment interprets the current condition of old growth forest compared to legal orders and Biodiversity Guidebook targets for the Vancouver Island portion of the West Coast Natural Resource Region at a broad level. It includes a series of maps with interpretations, report trends and key drivers of patterns through an assessment of the following indicators:

- For landscape units that have spatial legal old growth management areas (OGMAs): The amount of productive forest contained within OGMAs and protected/reserved areas and the proportion of that area that is old growth forest.
- For landscape units that have non-spatial legal targets (including areas with draft OGMAs): The amount of old growth forest by landscape unit (LU) and biogeoclimatic (BEC) variant compared to the objectives for old growth in the Provincial Non-spatial Old Growth Order (PNOGO).
- The total amount of mature-plus-old forest by LU and BEC variant compared to the non-legal targets in the Biodiversity Guidebook.
- The amount of mature forest in the Special Management Zones (SMZ) defined in the Vancouver Island Land Use Plan (VILUP) compared to the objectives for those SMZs.
- The amount of old forest in Watershed planning units in Clayoquot Sound compared to targets.
- Total incursions in spatially defined Old Growth Management Areas (OGMAs)

This current condition assessment does not consider whether these objectives are effective at conserving old growth forest to maintain biodiversity. If current condition reports indicate that management may not be achieving legal old growth objectives, additional analysis and evaluation should occur.²

The intended audience for this report includes government natural resource staff and statutory decision makers who can use it to inform collaborative discussions with First Nations, natural resource industries, and community stakeholders to ensure that cumulative effects are identified and managed appropriately.

¹ This does not include the 800,000 hectares of private managed forest land located mainly on the southeast side of Vancouver Island.

² This current condition assessment reports on the total amount of Crown Forested Landbase without differentiating between the non-contributing landbase and timber harvesting landbase.

2 WEST COAST REGION OVERVIEW

2.1 Land Base Description

The West Coast Region includes four distinct planning areas: Haida Gwaii, Great Bear Rainforest (GBR) (partially overlapping the Skeena Region), Clayoquot Sound and the remainder of Vancouver Island (including other small nearby islands). This report focuses on Vancouver Island, including Clayoquot Sound. The assessment area for Vancouver Island is presented in Figure 1. Summary information is provided for GBR and Haida Gwaii planning areas to provide an overall regional context of old growth management.

Vancouver Island covers about 3.35 million hectares and represents about 3.5% of the land area of B.C. A northwest-southeast mountain range divides Vancouver Island into generally western windward and generally eastern leeward portions with different physiography. These mountains represent enduring features that will shape ecosystems in any climatic regime. Current average precipitation ranges from over 3500mm on the western side of the island to less than 750mm near Victoria.

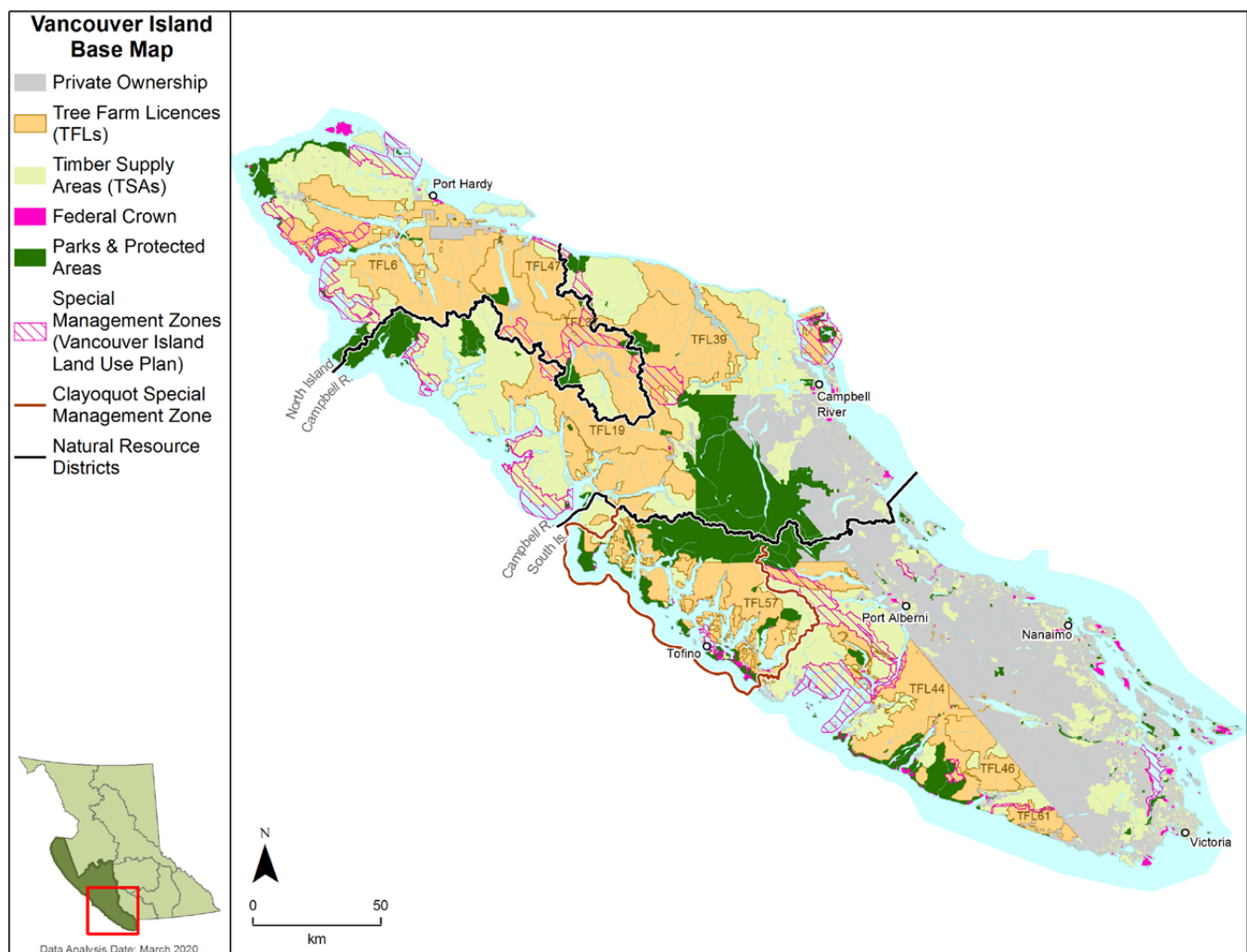


Figure 1. Map of Vancouver Island in the West Coast Region.

The West Coast Region overlaps with four Natural Resource Districts: South Island (DSI), Campbell River (DCR), North Island – Central Coast (DNI), and Haida Gwaii.

Timber supply areas (TSAs) overlap with natural resource districts: TSA 48 lies within both the DCR and DNI, TSA 44 overlaps DCR and DSI, TSA 38 is entirely within the DSI. Clayoquot Sound, Haida Gwaii, and the Great Bear Rain Forest are separate planning units.

Several large tree farm licenses (TFLs) cover large portions of Crown land throughout Vancouver Island, Haida Gwaii and the GBR. TFLs can include private land managed as part of the licenses. Most of the south-east of Vancouver Island is privately owned and most residents live on the east coast of the island, with over half concentrated in Victoria, Nanaimo and Campbell River. This assessment focuses on the Crown Forest Landbase (CFLB) on Vancouver Island, and covering nearly 2 million hectares, including Clayoquot Sound.

2.1.1 Biogeoclimatic Ecosystem Classifications on Vancouver Island

The western Coast and Mountain ecoprovince includes some of the wettest ecosystems in the province, dominated by the Coastal Western Hemlock (CWH) and Mountain Hemlock (MH) biogeoclimatic zones. The drier Georgia Depression ecoprovince includes Coastal Western Hemlock and Coastal Douglas Fir (CDF) BEC zones. The CDF zone, originally covering less than 5% of Vancouver Island, has been modified extensively by settlement, cultivation, and forest harvesting. The CWH covers more than 80% of Vancouver Island, from sea level to about 900m elevation, and the MH lies on high slopes up to 1,800m in elevation. BEC zones, subzones and variants and LUs for Vancouver Island are shown in Figure 2.

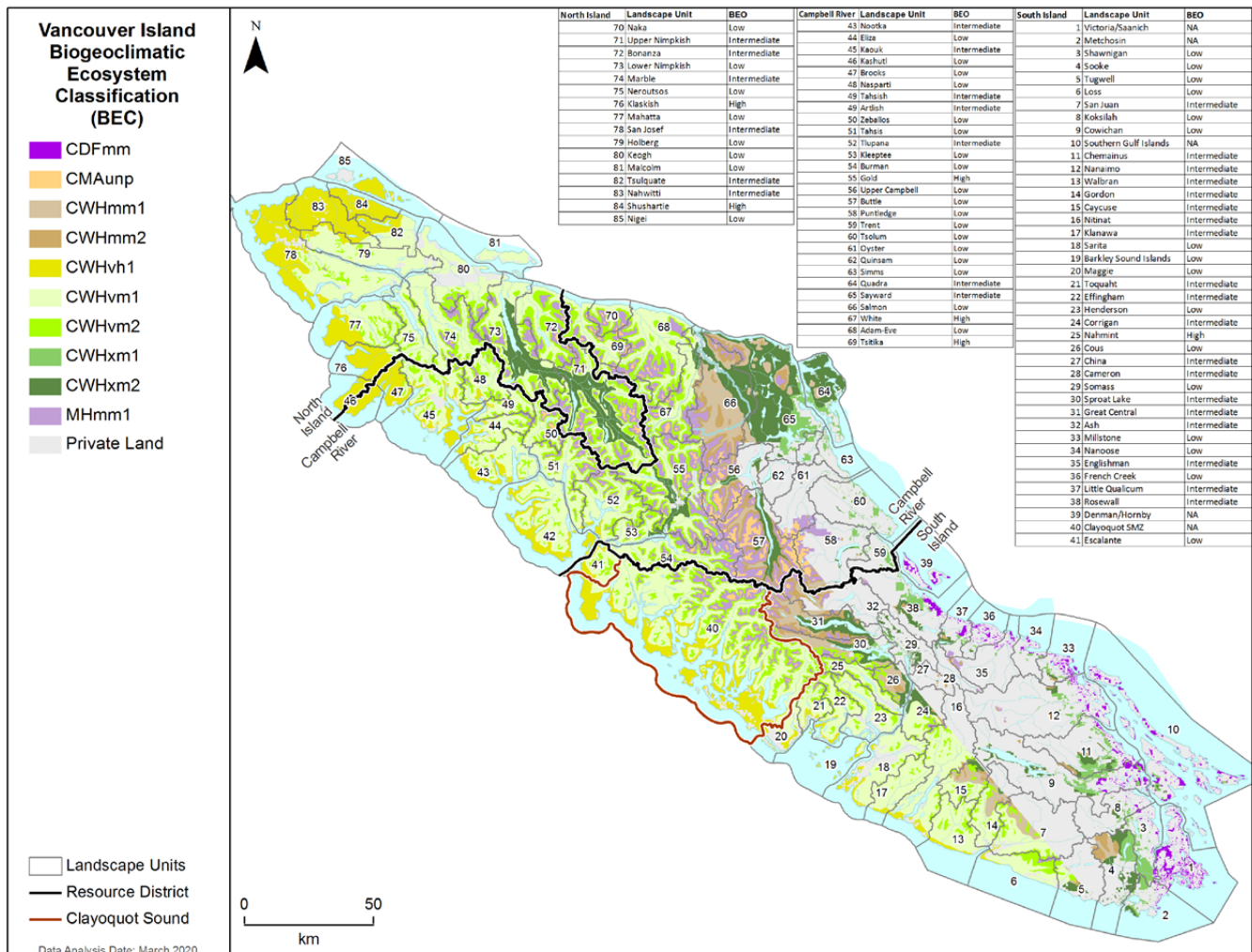


Figure 2. BEC subzone/variant by Landscape Unit on Vancouver Island.

2.2 Cumulative Effects on Vancouver Island

Natural disturbances and human activities have changed the landscape of Vancouver Island over time, impacting forests, and will continue to do so in the future. Cumulative effects from various sources may contribute to the loss, alteration, and fragmentation of old growth forests over time, potentially resulting in loss of habitat and reduction in overall ecological values of old growth forest. Conversely, changes to forest management policy may result in increased areas of old growth forest management.

Impacts to forest lands on Vancouver Island include private land ownership, Crown land conversion, other land tenures, forest harvesting and climate change, as discussed in detail below.

2.2.1 Private Land Ownership and Crown Land Conversion

A total of approximately 800,000 ha of forest land on Southeast Vancouver Island is private managed forest land; this includes 325,000 ha to the Esquimalt and Nanaimo Railway Company, which is known as the E&N lands. This area of Vancouver Island's privately-owned agricultural, land-development and forest lands has limited opportunities for old growth management as they are exempt from Provincial land and forest management regimes. The continuing conversion of provincial Crown land to private holdings for municipal growth, industrial development and commercial tourism expansion reduces the amount of forest, including old growth, remaining on the land base as well as the amount available for recruitment to old growth.

2.2.2 Other Land Tenures

The management of old growth forest under Old Growth Orders only applies to tenure holders under FRPA. All other industries including mining, Land Act tenures, non-replaceable forest licenses and oil and gas activity are exempted from the legal orders for old growth, except where OGMA's have been designated under the OGAA. As such, old growth forest is subject to the impacts of multiple industries that are not legally required to manage for old-growth forest under legal orders.

2.2.3 Forest Harvesting

Old growth forests provide important ecological values and habitats, while being an economic driver generating provincial revenue and employment in the forest industry. As such, forest harvesting can impact the amount of old forest remaining on the landbase.

2.2.4 Climate Change

Current climate projections for this region suggest general warming in all seasons, with wetter winters and drier summers. Snowfall is projected to decrease considerably. Projected changes in extreme weather events may lead to increased risk of natural disturbances, with more severe winter storms influencing flooding, landslides and windthrow, and periods of relative summer drought for the drier southeast of Vancouver Island influencing fire hazard and drought stress. Increased temperatures may result in increased forest pest outbreaks.

In response to climate changes, ecosystems are projected to shift geographically with localized changes in species composition and structure. For example, the Coastal Douglas Fir dry forested ecosystems in the southern parts of Vancouver Island may shift northward and to higher elevations and may be replaced in their southern range by open forest and grassland ecosystems after severe fires and/or insect and disease outbreaks. Some species have experienced declines in some parts of their range due to drought (red cedar) and loss of winter snowpack (yellow cedar). Other climate-mediated impacts having uncertain or variable effects to ecosystem function include site productivity (linked to moisture inputs), adaptability and provenance of seed sources and competition from invasive species.

The interaction of climate-influenced changes to old growth forest from abiotic as well as biotic factors, is complex and has the potential to change disturbance regimes sufficiently to change the age at which a forest is considered old.

3 OLD GROWTH FOREST MANAGEMENT IN THE WEST COAST REGION

Several sources, including four large planning processes and five overarching legal Orders, guide old growth forest management in the West Coast Region (Figure 3). These planning processes and legal Orders that define targets for old growth management are described below.

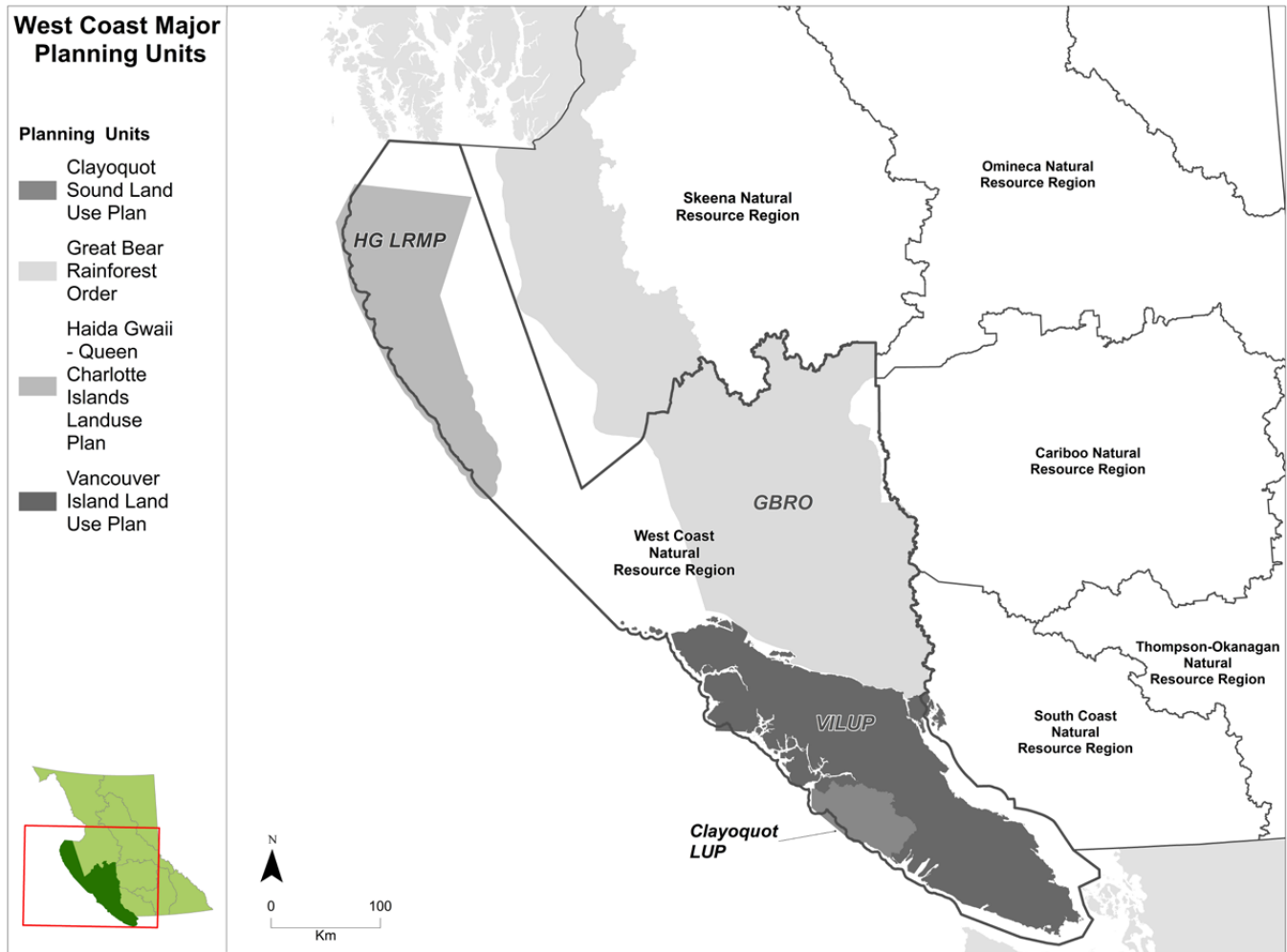


Figure 3. Planning units in the West Coast Region.

3.1 Vancouver Island Summary Land Use Plan, Vancouver Island Land Use Plan Higher Level Order (VILUP) & Special Management Zones

The Vancouver Island Summary Land Use Plan (Province of BC, 2000a) defines management zones and management intent for the entire island except for Clayoquot Sound. In 2000, the Vancouver Island Land Use Plan Higher Level Order (VILUP) (Province of BC, 2000b) legalized a portion of the objectives from the land use plan, including a mature forest target for special management zones.

The VILUP defines special management zones (SMZ) as areas with regionally significant values that require management tailored to “*minimize development impacts*” to stated values. VILUP provides specific direction for these SMZs but leaves development of old growth forest targets to subsequent landscape unit planning. In some cases, VILUP directs that the retention target is distributed across site series with emphasis on rare and under-represented ecosystems.

VILUP Objective for SMZ 8, 13 and parts of zones 1, 3 and 11

B.4. Maintain late-successional habitat elements and attributes of biodiversity in forested ecosystems with emphasis on regionally rare and underrepresented ecosystems, by retaining old seral forest at the site series/surrogate level of representation.

Although the VILUP includes an objective for old growth forests to be concentrated in SMZs (“*the intent is for SMZs to become focal areas for the placement of old growth management areas required at the landscape unit scale*”), this objective was not legalized. Hence no targets for old growth forest are defined for SMZs. In the LU planning process, OGMAs are concentrated in the SMZ portion of the LU as per the advice in the VILUP.

Mature forest targets are legally defined for SMZs within the VILUP. They apply to the entire SMZ, not by BEC variant. The VILUP includes “mature” forest targets ranging between “one quarter to one third” (i.e., 25 to 33%) of forested area in designated SMZ:

VILUP Objectives for SMZ 1 – 14 and 17 – 22

A.1. Sustain forest ecosystem structure and function in SMZs, by:

(a) creating or maintaining stand structures and forest attributes associated with mature¹ and old² forests, subject to the following:

i. the target for mature seral forest should range between one quarter to one third of the forested area of each SMZ³; ...

1 The mature seral forest is defined as generally 80 to 120 years old or older, depending on species and site conditions. The structure of mature seral forests generally includes canopies that vary vertically or horizontally, or both. The age and structure of the mature seral stage will vary significantly by forest type and from one biogeoclimatic zone to another.

2 The old seral forest is defined as generally greater than 250 years old, containing live and dead (downed and standing) trees of various sizes, including large diameter trees, and of various tree species, including broad-leaved trees. The structure of old seral forests varies significantly by forest type and from one biogeoclimatic zone to another.

3 Mature seral targets will be established through landscape unit planning.

3.2 Old Growth Targets: Provincial Non-Spatial Old Growth Order (PNOGO)

Subsequent to the Vancouver Island Summary Land Use Plan & Vancouver Island Land Use Plan Higher Level Order, the PNOGO (Province of BC, 2004) provided legal targets for old growth forest by LU and BEC variant across the province, including Vancouver Island. These legal targets also apply to LU and BEC variants contained in SMZs. As SMZs are portions of LUs, the target applies to the LU/BEC combination which will overlap the SMZ. The PNOGO provides age definitions and non-spatial targets for BEC variants based on their natural disturbance regime and biodiversity emphasis option. The PNOGO old age definition and targets for the BEC variants occurring on Vancouver Island are presented in Table 1.

Table 1. Legal non-spatial targets and old age definition for Vancouver Island from the PNOGO.

NDT*	BEC	PNOGO Target (% old)			Old Age Definition
		Low BEO	Int BEO	High BEO	
1	CWH	13	13	19	>250
1	MH	19	19	28	>250
2	CDF	9	9	13	>250
2	CWH	9	9	13	>250

*NDT = Natural Disturbance Type

The 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 to avoid impacting timber supply.³ While the PNOGO does not include the reduced targets in the legal objective (some regions in B.C. include the reduced targets in legal orders objectives), the drawdown was considered in the designing and planning of OGMA on Vancouver Island. Many low BEO LUs have more than 1/3 of the old growth target established in OGMA as there was no timber supply impact. This drawdown is not applied to intermediate or high BEOs.

Across the CFLB, outside Clayoquot Sound, 42% of the CFLB on Vancouver Island is managed for low BEO, 48% for Intermediate BEO and 9% of the CFLB is managed for high BEO (Figure 4).

³ Implementation of the Biodiversity Guidebook was limited to a 4% impact on Provincial timber supply as outlined in the 1996 Forest Practices Code Timber Supply Analysis. The old growth targets in the Biodiversity Guidebook (Ministry of Forests & Ministry of Environment, Land and Parks, 1995) were a negotiated outcome that deviated from expected natural conditions.

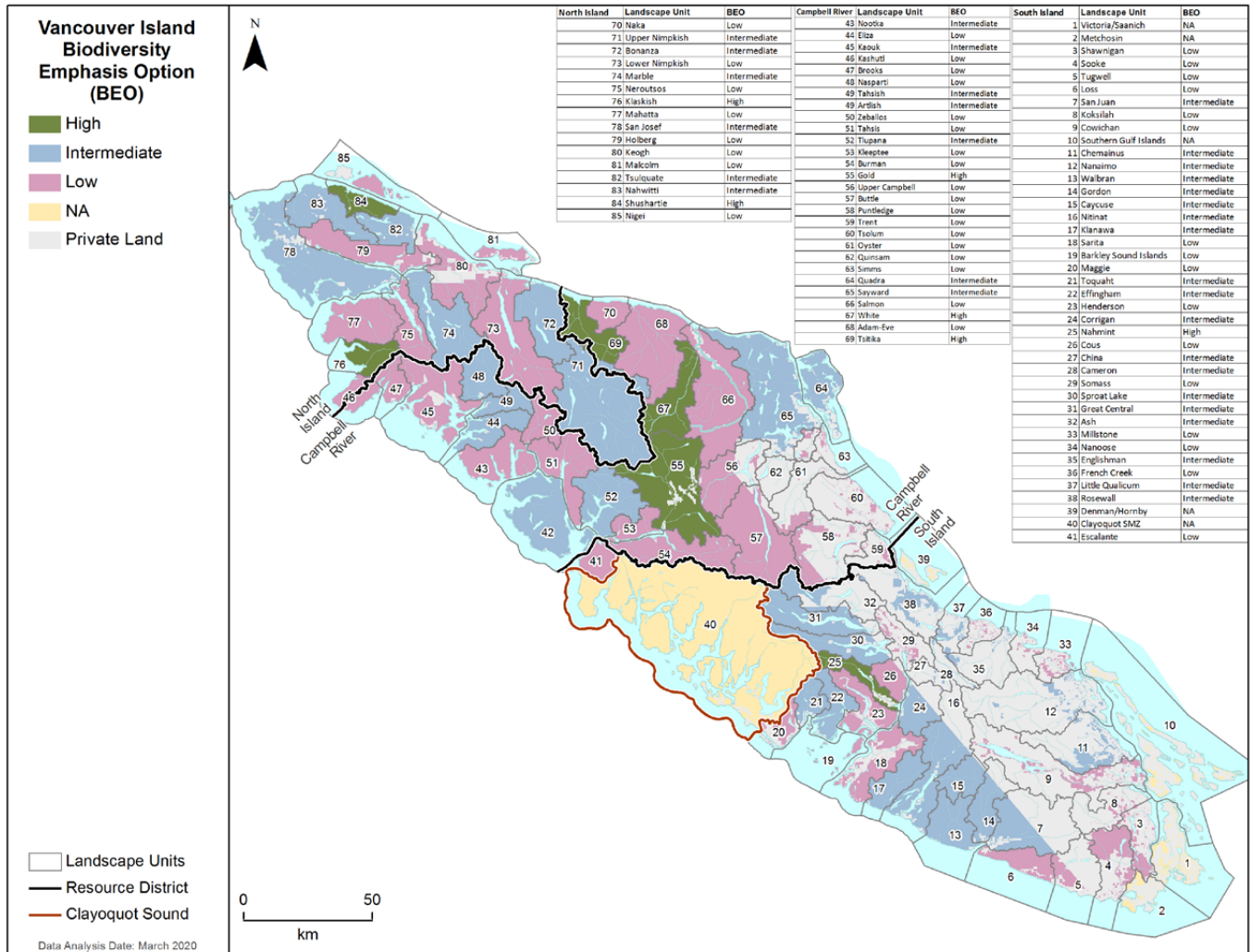


Figure 4. Landscape Unit Biodiversity Emphasis Options on Vancouver Island.

The old growth forest targets used to guide the design of legal OGMA Orders and draft OGMA's originate from the PNOGO. Where there are legal OGMA Orders, the PNOGO is rescinded (i.e., not applicable), as the OGMA polygon is designed to meet the intent of PNOGO and the management of non-spatial PNOGO targets is no longer legally required.

The PNOGO remains the legal direction in LUs where there are no legal OGMA. This includes LUs with non-legal (draft) OGMA. Figure 5 identifies where old growth forest is managed by legal OGMA or where the PNOGO is still the prevailing legal direction.

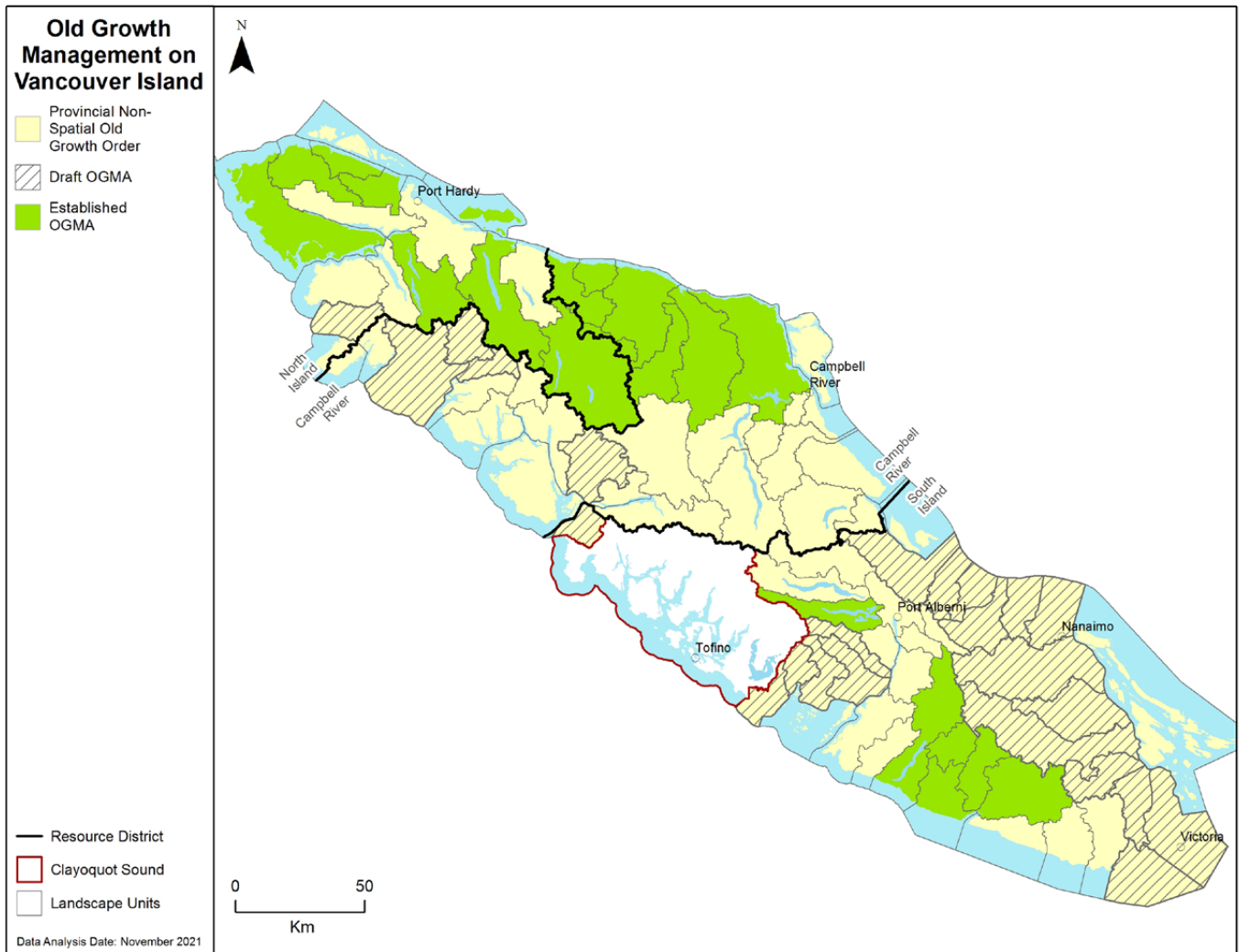


Figure 5. Application of the PNOGO across Vancouver Island. Beige areas show where the PNOGO remains as the legal direction for old forest retention. Green areas show where the PNOGO has been rescinded by legal OGMA establishment or the Clayoquot Sound.

3.3 Mature-plus-old policy targets: Biodiversity Guidebook

The PNOGO does not provide mature-plus-old retention targets, and there are no legal mature plus old targets in the West Coast Region. The Biodiversity Guidebook provides recommended targets for mature plus old (Table 2). These recommended targets are not legal but can be considered best available guidance for mature plus old retention.

The amount of mature-plus-old is reported against the Biodiversity Guidebook targets to provide information about the state of mature forest. As mature forest will become old forest over time, assessing the amount of mature forest is important to understand where forest is available to recruit towards old forest targets, particularly where old forests are currently poorly represented.

Table 2. Targets for mature-plus-old forest from the Biodiversity Guidebook.

NDT	BEC	Mature-plus-old Age Definition	BDG Target for % mature + old		
			Low BEO	Int BEO	High BEO
1	CWH	>80	18	36	54
1	MH	>120	19	36	54
2	CDF	>80	17	34	51
2	CWH	>80	17	34	51

3.4 Clayoquot Sound Scientific Panel & Clayoquot Sound Land Use Order

The Clayoquot Sound Scientific Panel reports (Clayoquot Sound Scientific Panel, 1995) describe intent and provide recommendations for Clayoquot Sound, a region covering about 8% of Vancouver Island. All these recommendations were subsequently legalized in the Clayoquot Sound Land Use Order (Ministry of Agriculture & Lands, 2008).

The Clayoquot Sound Land Use Order includes objectives to manage old growth forest, defined as late successional forests older than 140 years, within Watershed Plans (rather than LUs). Watershed plans manage old growth through spatially defined watershed reserves and targets for retention by BEC site series, tree species and age class. Watershed Plans base old forest targets on the recommendations of the Clayoquot Sound Scientific Panel, designed to manage ecosystems sustainably, with a minimum of 40% old forest by watershed planning unit. Some old forest is included within defined watershed reserves (at least 20% of every ecosystem as classified by site series/dominant tree species/old age class, including forest between 200 and 600 years old). The remaining old forest may be inside or outside mapped reserves. Watershed level plans have been completed for 11 watersheds; the other two watersheds are within Strathcona Provincial Park.

3.5 Old Growth Management Areas

Landscape unit planning has delineated spatial OGMA in the Vancouver Island portion of the West Coast Region that met the PNOGO targets for old retention at the time of legal establishment. Once established, the retention of the legal OGMA becomes the legal requirement, rather than meeting the targets specified in the PNOGO. All spatial conservation designations with 100% harvest restriction (e.g., Parks, Ecological Reserves and some WHAs and UWRs) also contributed to meeting the legal objectives for old growth at the time of OGMA establishment. New designations after the OGMA plans were made legal are not incorporated into the OGMA plan and may result in additional old forest retention. These will be adjusted for in the next revision of the OGMA plan which are done periodically to reflect changes to the land base or underlying inventory information. The area and amount of old in new conservation designations was included in this assessment.

Some OGMA are legally designated while others remain as non-legal. If non-legal OGMA are included in an FSP resultant strategy to meet old growth objectives, they must be adhered to. It is the intent that most, though not all, non-legal OGMA will become legalized as planning processes are completed.

The OGMA amendment process requires that all removals from forestry activities are replaced with ecologically equivalent forest of similar age, structure, adjacency to OGMA and in the same BEC subzone variant. All amendments to legal OGMA require District Manager approval. Specifications in the orders allow for limited boundary adjustments and permissible activities (including roads and salvage harvest) within OGMA. These incursion levels are considered triggers for the required amendment process, not an accepted modification level for an OGMA. In some cases, required amendments can be waived if sufficient old forest exists in the OGMA plus other landscape level retention.

Watershed plan reserves in Clayoquot Sound, landscape reserves in the GBR and forest reserves in Haida Gwaii are somewhat analogous to OGMAs, although they are designed, following ecosystem principles, to address multiple values by ecosystem type. As they are designated for multiple values with different objectives than OGMA legal orders, this assessment does not examine incursions within any of these other reserve types.

3.6 Coast Land Use Decision and the Great Bear Rainforest Order

The 2006 Coast Land Use Decision included commitments to protect large areas of temperate rainforest and implement ecosystem-based management (EBM) in the combined area covered under the Central Coast Land and Resource Management Plan and the North Coast Land and Resource Management Plan. EBM objectives, including old growth representation and biodiversity objectives, were legalized in what is now called the GBR Order. The intent of biodiversity objectives is to represent the full range of habitat, structures and ecosystems across the land base to conserve biological diversity.

The GBR Order (FLNRO, 2016) includes objectives for managing old growth representation and retention, with minimum old levels always applying and old forest representation targets intended to be met through old forest retention and recruitment within 250 years. These objectives are applied at the BEC Variant and TEM site series group (SSG) level. Minimum old forest retention targets ensure that old forest in SSGs does not fall below 30% of the range of natural variation, often considered a high-risk threshold for ecosystem integrity. Exceptions occur, mainly in the southern GBR, reflecting long harvest histories that have reduced the amount of old forest to levels below 30% in several SSGs. Long term old forest representation targets were established to work toward achieving ecological low risk levels of 70% old forest by SSG in the future, again with a few exceptions in the south.

Old forest targets in the GBR Order are aspatial but are intended to be spatialized (mapped) in landscape reserves through a mandatory Landscape Reserve Design (LRD) process. Protected areas and other required hard reserves in the GBR serve as anchors for these reserves, covering 40% of the GBR's forests. The remaining areas necessary to meet the old growth targets within the landscape reserves are identified through the LRD process that considers various EBM values in addition to old forest, including indigenous values and features, wildlife habitat, rare and endangered ecosystems, and good ecological reserve design. LRDs will increase the total protection and reserves to 85% of the forest area, to grow old over time.

3.7 Haida Gwaii Strategic Land Use Agreement and the Haida Gwaii Land Use Objectives Order

Like the Coast Land Use Decision in the GBR, the 2007 Haida Gwaii Strategic Land Use Agreement laid the foundation for large new areas of protection and the implementation of EBM on Haida Gwaii in the area covered under the Haida Gwaii / Queen Charlotte Islands Land Use Plan. EBM objectives, including old growth representation and biodiversity objectives, were legalized in the 2010 Haida Gwaii Land Use Objectives Order (HG LUOO).

Old forest targets for Haida Gwaii are applied by BEC variant and individual site series. Unlike in the GBR Order, there is just one set of targets in the HG LUOO. Old forest targets are based on the bioregion but in the order have been implemented by landscape unit for administrative ease and to ensure an even distribution of retention areas.

In the HG LUOO, minimum old forest (ecological representation) targets are expressed as both a percentage and area. These targets have also been largely spatialized in Forest Reserves, which also capture much of the marbled murrelet habitat required by the Order. Combined with parks, conservancies and other EBM reserves, 65% of Haida Gwaii's productive forest land is protected or reserved.

4 CURRENT CONDITION ASSESSMENT METHODOLOGY

The Interim Assessment Protocol for Old Growth Forest in British Columbia (FLNRO, 2017) (the CEF Old Growth Protocol) 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 CEF Old Growth Protocol and its appendices.

4.1 Assessment Indicators

The current condition of old growth forest in the Vancouver Island portion of the West Coast region was assessed using four indicators (Table 3).

Table 3. Old growth forest assessment indicators and questions applied to Vancouver Island, as per the CEF Old Growth Protocol.

Indicator	Assessment Questions
Current Condition of Old Growth Retention	
1. Amount of Old Growth Forest	<ul style="list-style-type: none"> • What is the current amount (%) of old forest in the spatial legal OGMAs and protected and reserved areas for LUs with established OGMAs? • What is the current amount of old forest in the CFLB relative to targets (as defined in the PNOGO) by BEC subzone/variant within each LU managed under PNOGO? • Which units are flagged for further consideration? • What are some of the reasons for the current condition?
2. Amount of Mature-Plus-Old Forest	<ul style="list-style-type: none"> • What is the current amount of mature-plus-old forest relative to non-legal targets (as defined in the Biodiversity Guidebook) by BEC subzone/variant within all LUs? • Which units meet targets with mature-plus-old forest? • Which are flagged for further consideration? • What are some of the reasons for the current condition?
Incursions into Old Growth Management Areas (OGMAs)	
Incursions into:	<ul style="list-style-type: none"> • Are there incursions in OGMAs? Do they exceed the Order threshold? • What is the magnitude of incursion (ha)? • What is the type of incursion?
3. Legal OGMAs	
4. Non-legal OGMAs	

4.2 Assessment Units

Assessment units describing the current state of old growth forest are based on several standard input data layers from the BC Geographic Warehouse (BCGW) and intersected with the Crown Forested Land Base (CFLB) produced for this current condition report:

- BEC zone, subzone, and variant
- Landscape Units (LUs)
- Biodiversity Emphasis Options (BEOs)
- Natural Disturbance Type (NDT)

When available, regional datasets are incorporated to accommodate regionally specific legal Orders and variations to support current condition reporting. In the case of Vancouver Island, this included the Clayoquot Sound Land Use Order and the mature forest targets within the VILUP. See Appendix 3 for more details on the development of these assessment units.

The assessment uses color scales to illustrate the condition of the amount of old growth forest and amount of mature-plus-old forest indicators. Different color scales are used depending on if the assessment is against a legal target (yellow to green scale) or a Biodiversity Guidebook target (blue to green scale) (See Appendix 3).

4.3 Assumptions and Limitations

The assessment results included in this current condition report have been derived from publicly accessible data sources. The assessment uses data available from the BCGW and FAIB, supplemented with regional datasets where available, to inform the assessment. Provincial data layers were used to define The CFLB and the CE Consolidated Human Disturbance layers are provincial datasets developed for the CEF to provide a consistent basis for all CE value assessments. The CE Consolidated Disturbance Layer was intersected into the seral assessment for old forest, mature-plus-old forest, and the OGMA incursion assessment for a more accurate representation of human disturbance than using VRI alone.

An error in the process to convert road lines into polygons resulted in some road segments being missed in this assessment. As a result of this error, the amount of old or mature forest may be slightly overestimated where those road segments were not accounted for in the analysis. In other words, the full footprint of roads was not applied to reset the CFLB Old seral stand to age zero in those areas. An analysis of that error demonstrated for LUs managed with PNOGO, the overestimation in the amount of old or mature forest was generally below 1%, and not greater than 1.25% in any LU. From that, it was concluded that impacts on the other analysis would be similarly small. These would not materially affect the results or conclusions of this report. Future updates to this report will include a corrected roads layer to ensure the entirety of roads in the CE integrated roads layer are incorporated into the analysis.

Limitations and assumptions for this assessment include:

- The VRI and ownership layer to develop the CFLB and data input layers to create the analysis units were extracted from the BCGW in November 2019.
- VRI data was available for most TFL's except where indicated on Figure 6.
- The provincial VRI dataset has known errors in age class definition, particularly in discriminating between age class 8 and 9 which may underestimate forests older than 250 years, especially if growing on low productivity sites or the productive wet ICH subzone variant units.
- The assessment uses coarse level CFLB using the ownership field in VRI (F-OWN) and VRI Forest Management Land Base (FMLB) definitions that is different from Timber Supply Review generated CFLB. CFLB is calculated by selecting "crown" land from F-OWN via the following ownership codes (51, 60, 61, 62C, 63, 64, 65, 66, 67, 68U, 69C, 69U, 70C, 70N, 72B, 74N, 75N, 78, 79B) from VRI and Forest Management Land Base (FOR_MGMT_LAND_BASE_IND = 'Y'). "Non-spatial Old Growth Analysis Methodology" for details in the appendix **
- OGMA amendment policies are complex and vary across the province. The tracking of OGMA amendments and how the OGMA polygons many have changed over time was not considered in this assessment. This may influence the outcomes of the OGMA incursion assessment and require Region or District review.
- The assessment used current BEC (version 11) from the BCGW which may have changed since time of legal OGMA establishment.

- The Provincial CE Consolidated Disturbance Layer incorporates anthropogenic disturbances from forestry and non-forestry activities. Natural disturbances (i.e., wildfires, insects) were not considered as incursions or disturbance footprints in this assessment. The inclusion of forest fire data will be considered in the future once assumptions regarding fire severity and forest age reset has been determined.
- The OGMA incursion assessment attempted to identify any anthropogenic development that pre-dated the establishment of an OGMA and exclude it from the assessment. However, most human caused disturbance types do not have a date specified in the spatial data except for cutblocks. Cutblocks that were 20 years old or older and cutblocks that pre-dated OGMA establishment were excluded as incursions. Cutblocks that occurred after OGMA establishment, and all other disturbances regardless of when they took place, were considered an incursion in the assessment. Therefore, the analysis may over-represent OGMA incursions.
- Most OGMA plans on Vancouver Island have incorporated more detailed level data than the Provincial Inventory data. For example, licensee operability data, LiDAR, habitat suitability mapping for Species at Risk, known locations of rare plants, large trees, First Nation areas of interest; this means OGMA selection was done in consideration of significantly more information than is considered in this assessment.

4.3.1 Human Disturbance in CE Assessments

Various input datasets were compiled that contribute to defining human disturbance and the natural land base. The input data layers and assumptions or limitations associated with each to produce the consolidated human disturbance layer are described further in . Data sources included consolidated cutblocks from a variety of sources (FAIB, VRI, RESULTS, and imagery), consolidated roads (including tenured resource roads) and forest cover seral stage (VRI). Roads are treated differently by different CE values; therefore, they were provided as a separate layer in the analysis.

Human disturbance is also identified using the Baseline Thematic Mapping (BTM) satellite-based land classifications from the mid-1990s augmented with historical and current human disturbance footprints (excluding roads). Additional data was then used to update the BTM classifications in a hierarchical form so that more current and permanent human disturbances will overwrite previous disturbances to avoid double-counting an area. Human disturbance was categorized as current (in the last 20 years) or historical (20+ years ago). The final layer includes non-disturbed natural areas to provide 100% coverage of the province in the dataset.

Additional disturbances include footprint datasets related to mining and extraction, oil and gas, rail and infrastructure, power infrastructure, rights-of-way, urban areas, recreation, forest harvesting, and agriculture and land clearing. Oil and Gas Commission (OGC) related disturbances were updated to 2019 to include activities by that sector as well as non-geophysical disturbances such as pipelines and well sites. However, outside of the Northeast region of the province there have been no geophysical disturbances in B.C. related to oil and gas in recent years that generated a land footprint.

Efforts were made to align the data inputs with human disturbance methodology from other CE-related projects. At the time of the assessment there was no authoritative dataset of mine footprints, therefore a custom mine footprint dataset from BCGW was used to fill this information gap until a complete, authoritative dataset is released.

Crown land tenures were not included as this data does not capture disturbed areas within the tenure, and therefore activity footprints are often not available or are poorly represented, except for cutblocks. This is a major data gap and presents a challenge of either over- or under-representing disturbance footprints on Crown land. To address this, other inventory datasets (e.g., FAIB cutblocks, VRI) were leveraged to fill this data gap.

4.3.2 Crown Forest Land Base and Old Growth CE Assessment

This assessment uses the CFLB⁴ as the denominator to calculate whether targets are being achieved. The Cumulative Effects CFLB (CE CFLB) is developed at a very coarse scale to accommodate standardized reporting across the province.

The CFLB is the most challenging component of reporting old growth targets in a consistently measurable way over time, leading to challenges in consistency for old forest reporting over years and causing significant differences amongst regions. This is due to the absence of defined Provincial standards for the definition of CFLB specific to the purposes of management values that are not related to timber supply. The CFLB definition can change over time from updated thresholds about the type of forest included (e.g., site index, non-forested areas) and to deletions (e.g., for woodlots or First Nations treaty settlements, conversion to private land).

In this assessment, there is no differentiating between the Timber Harvesting Landbase (THLB)⁵ and non-contributing landbase. Reporting is completed for the total amount of old growth forest on the CFLB and includes all no harvest landbase designations like Parks and Protected Areas, Ungulate Winter Ranges, and Wildlife Habitat Areas.

The methodology to determine the CFLB for this assessment differs from what is completed through Timber Supply Reviews (TSRs). The main reason for this is that CEF assessments are designed to include all land use activities and disturbances to understand cumulative effects on old growth forest, whereas the objective in a TSR is to support an Annual Allowable Cut. The CE CFLB and a TSR generated CFLB will have distinct differences. The CE CFLB includes most area-based tenures (Tree Farm Licenses, Community Forests) in the old growth assessment as they contribute to the current state of old growth forest.

In this assessment, CFLB was calculated using the Forest Management Land Base (FMLB) from the 2019 VRI. It is understood that there are known errors in the classification of the VRI FMLB that will introduce some uncertainty into the CE CFLB. It is the role of a CE Assessment to identify these challenges and opportunities for improvements, relative to old-growth forest objectives. It is not within the scope of this CE assessment to address the systemic issues in the VRI or variations with CFLB definitions.

⁴ The CFLB is the forested area of the TSA that the provincial government manages for a variety of natural resources values. This excludes non-forested areas (e.g. water, rock, ice), non-productive forest (e.g. alpine areas, areas with very low productivity), and non-commercial forest (e.g. shrub/brush areas). The CFLB does include federally protected areas (e.g. National Parks) because of their contribution to biodiversity.

⁵ The Forest Analysis Inventory Branch of FLNRORD defines the THLB for the Province. It is defined as an estimate of the 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 the data, forest management practices and assumptions described in a Timber Supply Review (TSR). It is a theoretical, strategic-level estimate used for timber supply analysis and could include areas that may never be harvested or may exclude areas that will be harvested. The Non-contributing Land Base is the difference between the CFLB and THLB and is the landbase that does not contribute to the Allowable Annual Cut (AAC) but does contribute to seral stage and old growth targets. The non-contributing landbase includes parks, riparian reserves, inoperable forest, and other areas 100% removed from the THLB.

5 ASSESSMENT RESULTS

The old growth CE assessment results include a series of maps and tabular summaries. Maps provide a high-level overview of results for each indicator. Each map is accompanied by a description of the indicator and interpretation, including regional commentary and tabular data, identifies potential contributing factors, describes limitations, and lists complementary projects that could clarify the current condition of old growth forest.

This current condition assessment provides information on the condition of an indicator relative to legal or BDG targets. Further investigation based on this assessment may be required by regional specialists and decision-makers to verify and determine potential mitigation or management responses. The results of this reporting should not be interpreted as non-compliance with legal orders.

5.1 Amount of Old Forest in OGMAs and Protected and Reserved Areas for Landscape Units with Legal OGMAs.

OGMAs are an implementation strategy used to meet legal targets for old growth retention. This assessment identifies how much old forest vs. non-old forest (i.e., recruitment) exists within OGMAs and protected and reserved areas. The Landscape Unit Planning Guide (1999) provides rules on how OGMAs were to be designed to mitigate impacts on timber supply. A co-location approach to establishing spatial OGMAs is required and consisted of counting suitable old forest in existing protected areas with 100% harvest restriction (e.g., Parks, Ecological Reserves, wildlife habitat areas (WHAs), ungulate winter ranges (UWRs), and applying towards the target. The remaining target area is what would be defined in spatial OGMAs. This means OGMAs alone do not contain all the forest that contributes to meeting the target. If there is not enough old forest in a BEC subzone variant within a LU to meet the target, then the next oldest available forest (generally mature forest seral stage) is recruited considering all the existing conservation designations.

The selection order for OGMAs is as follows descending in age until the target amount is met:

- Old forest in the Non-Contributing (NC);
- Old forest in the Timber Harvesting Land Base (THLB);
- Mature forest in the NC;
- Mature Forest in the THLB;
- Immature forest in the NC;
- Immature forest in the THLB.

5.1.1 Old forest in OGMAs and Protected and Reserved Areas

Figure 6 shows that some areas have a low level of old forest in the spatial designations. This reflects that at the time of OGMA establishment there was little old forest available for OGMA selection.

Of 84 assessment units managed with legal OGMAs:

- 17% units have <30% of the area in OGMA and Protected/Reserved Areas consisting of old forest
- 13% units have 30-50% of the area in OGMA and Protected/Reserved Areas consisting of old forest
- 25% units have 50-75% of the area in OGMA and Protected/Reserved Areas consisting of old forest
- 45% units have 75-100% of the area in OGMA and Protected/Reserved Areas consisting of old forest

The areas with <30% old (colored yellow in Figure 6) have had a heavy disturbance history resulting in limited old being available for OGMA selection. For example, the Sayward LU, around Campbell River, had a large fire in 1938 resulting in much of the forest in the LU being less than old at the time the OGMA plan was done. Generally, the North part of the Island has a lower disturbance level than the South, so units with lower amounts of old (lighter green/yellow) are more common in the South Island. This same pattern occurs in the aspatial analysis (Section 5.2) with the South Island having more units with significant disturbance resulting in more use of recruitment to meet PNOGO targets. As well, similarly to the patterns for units managed under PNOGO, the dry variants (CWHxm1, CWHxm2) generally have lower amounts of old forest within OGMA and protected/reserved areas compared to the moist and wet variants.

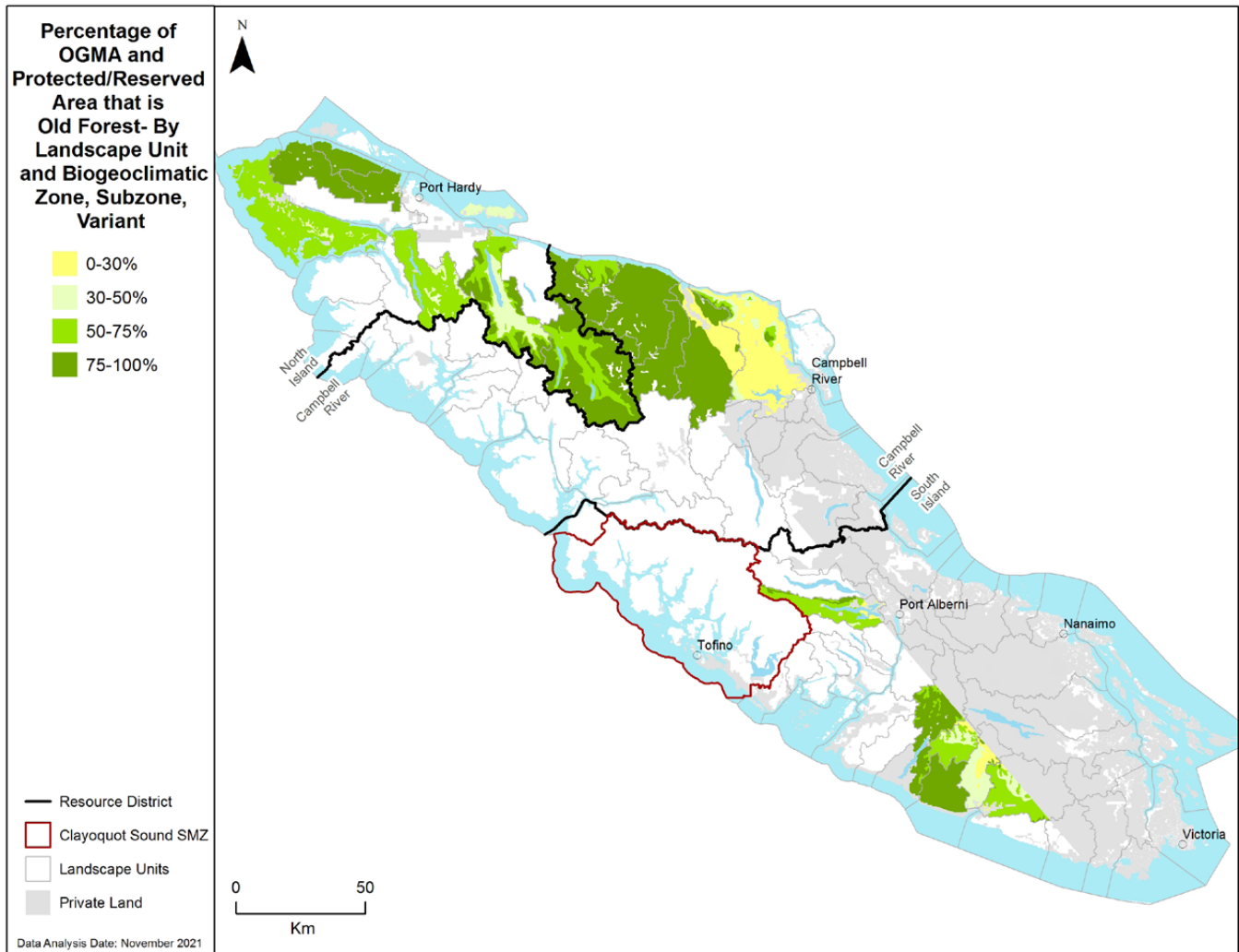


Figure 6. Percentage of OGMA and protected/reserved area that is old forest, by LU and BEC subzone variant.

5.1.2 Limitations

The legal Orders for OGMA do not provide a historic record of the amount of CFLB that is old growth in the LU/BEC or in the OGMA the time of establishment. This information is contained in the OGMA plan that is not part of the legal order but was used to develop the legal OGMA. This can present a challenge in comparing OGMA to the current data layers (e.g., CLFB, BEC, VRI), as these may have changed since OGMA establishment. In some cases, there can be substantial changes to the area of CFLB by BEC due to new BEC line work or the overall CFLB has changed due to withdrawals (e.g., Private land withdrawn from a TFL that previously was part of the CFLB calculation.) Most changes are reductions in the CFLB due to jurisdictional changes.

5.2 Amount of Old Forest for Landscape Units Managed under PNOGO and Clayoquot Sound Land Use Order

This assessment determines the current amount of old forest (as defined in the Legal Orders) for landscape units managed under PNOGO in relation to the targets for old growth forest within each LU and BEC subzone variant, or, in the case of Clayoquot Sound within each Watershed Planning Unit.

The results for this assessment are reported by the total amount of old growth forest in the CFLB which includes all landbase designation like Parks and Protected Areas, and OGMA.

The existing amount of old growth forest in the CFLB across Vancouver Island varies considerably. Figure 7 shows the current distribution of old and other seral stages across Vancouver Island and Figure 8 shows the percentage of old forest by Landscape unit/BEC variant. All private land was excluded from the assessment.

Much of the DSI and eastern portion of the DCR has been impacted by forest harvesting, development, and large natural disturbances resulting in greater amounts of early and mid-seral stages in these areas.

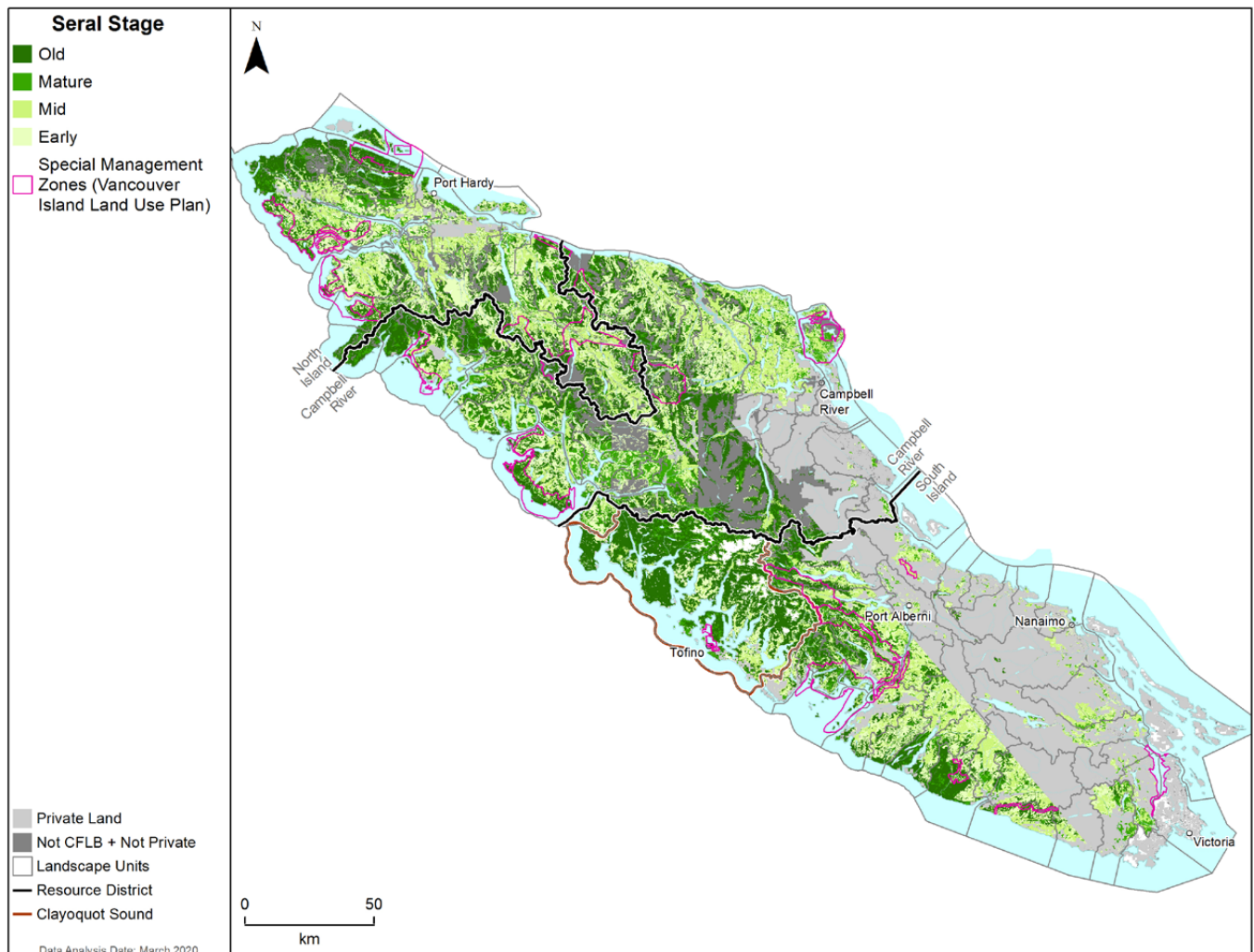


Figure 7. Current seral stage distribution on Vancouver Island. Old defined as >250 outside of Clayoquot Sound and >140 within Clayoquot Sound.

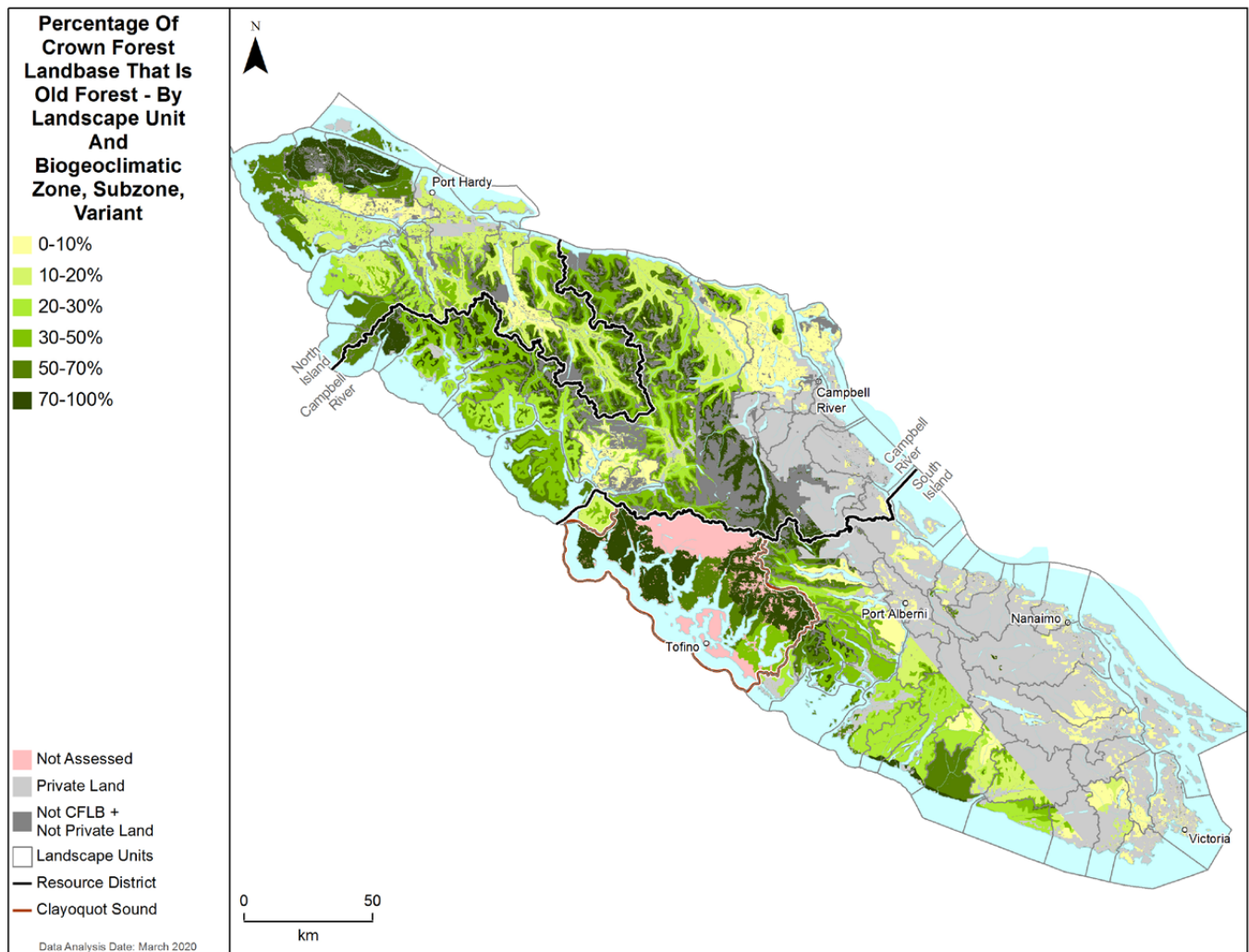


Figure 8. Amount of old forest in the CFLB. Outside of Clayoquot Sound, the percentage of old forest is calculated for each LU/BEC unit; within Clayoquot Sound it is calculated for each Watershed Planning Unit. Pink areas within Clayoquot Sound are areas not within the CFLB or not covered by Watershed Plans and therefore were not assessed.

5.2.1 Old Forest Relative to Targets

5.2.1.1 Assessment Results for Vancouver Island Outside of Clayoquot Sound

For the portion of Vancouver Island managed under PNOGO 67% of assessment units, are meeting the targets with old forest (Figure 9). This covers 88% of the CFLB managed under PNOGO.

Areas with less old growth than the target amounts lie in the southeast portion of the DSI and eastern portions of the DCR. This is largely due to a long history of forest harvesting because the landbase is highly operable, accessible, and close to mills. In the Sayward area in the DCR (north of Campbell River), the lack of old growth forest is a result of natural disturbances (forest fire and wind events) that occurred in the early 1900's, which converted a large portion of the forested area to younger seral stages (Figure 6). In the DSI, historical land use, crownland conversion to support development has also impacted patches of old growth forest based on the proximity and adjacency to private land. Even small areas where old growth is lost can be a large percentage of the overall CFLB for the unit and means old growth targets are not met (e.g., the CWHxm2 in the China LU has 141 ha of CFLB, with an old growth target of 13 ha and only 1 hectare of old growth available – see Appendix 2).

Very little old forest remains in the dry variants (CDFmm, CWHxm1 and CWHxm2) in any landscape units (see Appendix 2 for details). Private land dominates the LUs where these variants occur on Vancouver Island. Conversely, the moist and wet BEC subzone variants have enough old forest available to meet most or all the targets with old forest.

These areas with less than the target amount of old growth will require recruitment (i.e., retention of the oldest available stands to become old growth over time).

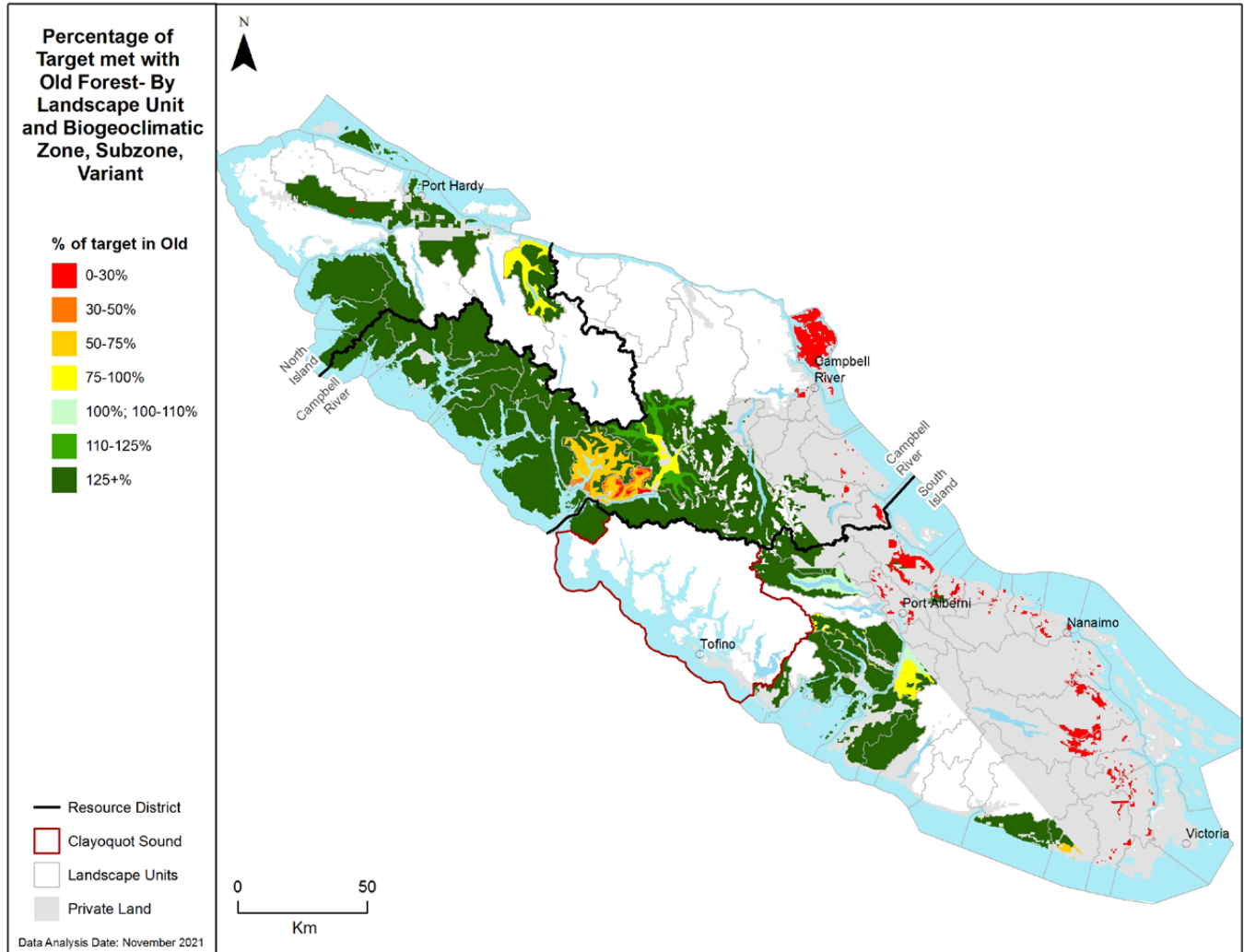


Figure 9. Amount of old forest in aspatially managed LUs compared to legal targets in PNOGO.

5.2.1.2 Assessment Results for Clayoquot Sound

As described in Section 3.4.4, old growth management in Clayoquot Sound is directed by the Clayoquot Sound Land Use Order. The criteria for old forest is to retain 40% of late successional forest (>140 years) within each Watershed Planning Unit.⁶ Currently, all Watershed Planning Units have enough old growth forest to meet targets (Table 4).

⁶ As described in Figure 2.1 and Table 2.1 within the document Watershed Planning in Clayoquot Sound: Volume 1 Principles and Process (Clayoquot Sound Technical Planning Committee, 2006).

Table 4. Amount and percent of old (>250 years), and percent of target met by Watershed Plan unit in Clayoquot Sound.

Watershed Plan	CFLB Area (ha)	Target old (ha)	Existing Old (ha)	% Old	% of Target Met by old
Bedingfield	10161	4064	7218	71.0%	177.6%
Bedwell-Ursus-Bulson	18868	7547	15784	83.7%	209.1%
Clayoquot River	6,269	2,508	6,017	96.0%	239.9%
Cypress	22,859	9,144	14,844	64.9%	162.3%
Flores Island	14,697	5,879	14,209	96.7%	241.7%
Fortune Channel	9,914	3,966	5,554	56.0%	140.1%
Hesquiaht	22,161	8,864	18,782	84.8%	211.9%
Kennedy Lake	20,788	8,315	8,886	42.7%	106.9%
Sydney-Pretty Girl	18,725	7,490	17,288	92.3%	230.8%
Tofino-Tranquil	9,143	3,657	6,579	72.0%	179.9%
Upper Kennedy	17,041	6,816	12,336	72.4%	181.0%

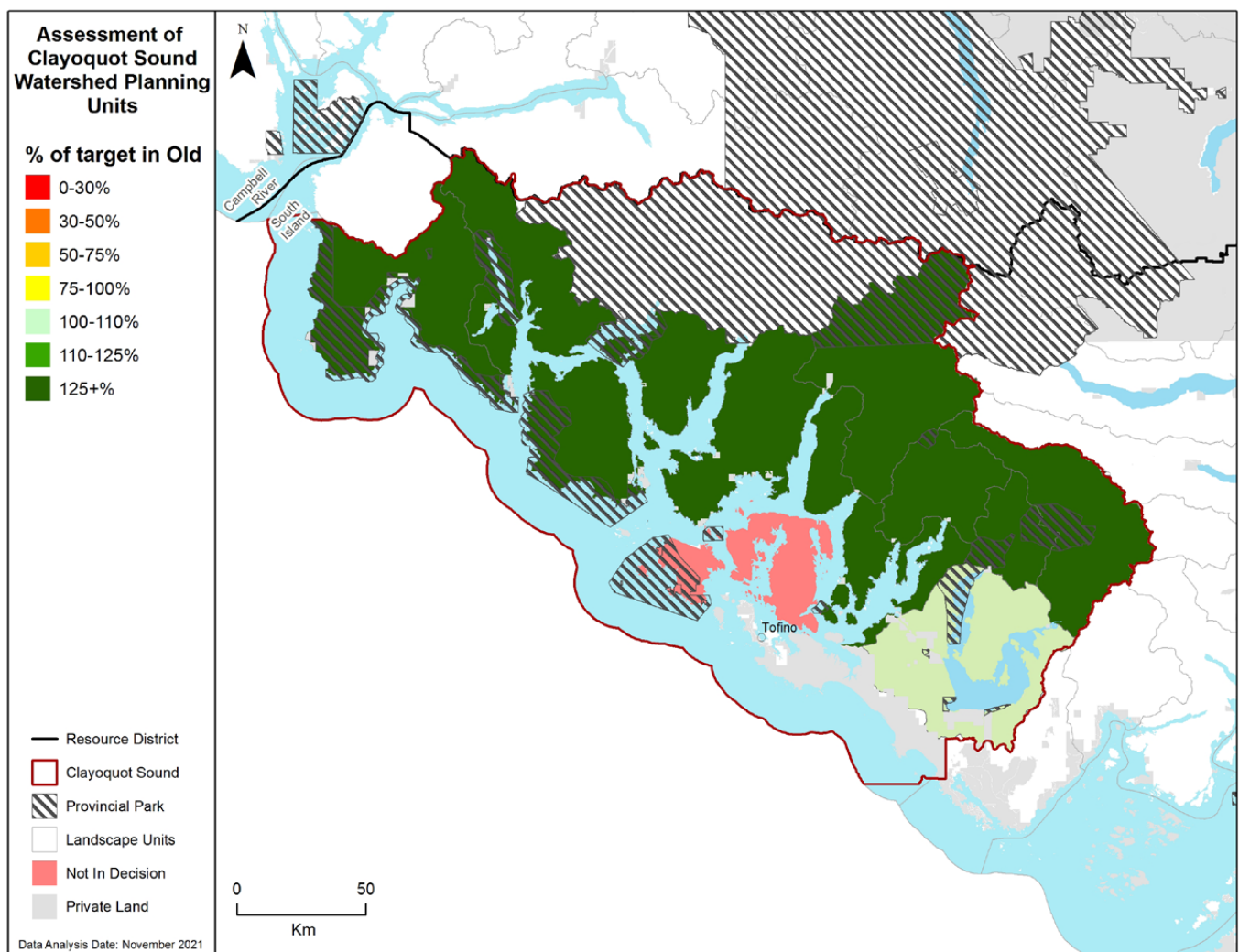


Figure 10. Percent of watershed plan unit target met with Old (>250yrs) in Clayoquot Sound.

5.2.2 Summary of the Amount of Old Forest Indicator

Currently, a third (33%) of LU/BEC units managed under PNOGO do not meet targets with old growth and require recruitment of younger forests. Within Clayoquot Sound, all watershed planning units have enough old growth forest identified in watershed plans to meet targets.

5.3 Amount of Mature-Plus-Old Forest

This indicator assesses the amount of mature-plus-old forest as a percent of non-spatial targets from the Biodiversity Guidebook for retention by BEC subzone/variant within LUs. The indicator is non-spatial and unrelated to existing spatial designations on the land base such as OGMAs. To consistently evaluate current condition across the province, the CEF Old Growth Protocol applies a mature + old indicator as it remains an important seral stage to monitor over time. This indicator is not legally required to be managed on Vancouver Island.

As mature forest will generally become old growth forest over time, assessing the amount of mature forest is important to assess where forest is available to recruit towards old forest targets, particularly where recruitment is currently required to meet the targets. The amount of mature that will move through to old forest will vary by BEC Subzone due to natural disturbance as dry subzones will have more disturbance than wet subzones.

Within Vancouver Island, legal targets for mature forest are included in VILUP for special management zones only. They apply to the area of the SMZ, and not by BEC variant. There are no legal targets for mature-plus-old forest on Vancouver Island. Targets for mature-plus-old that are referenced in the Biodiversity Guidebook are used in this assessment. Mature-plus-old targets are incremental to old forest targets.



5.3.1 Total Mature-Plus-Old Forest Amount in the CFLB

Patterns of mature-plus-old forest resemble those for old growth forest, with high proportions in the northern part of the DNI and western part of the DCR and low proportions in the east and south parts of the DSI (Figure 10). As iterated above, much of the DSI and eastern portion of the DCR has been heavily impacted by forest harvesting and other development, resulting in lower amounts of old-plus-mature forests in these districts. Alternatively, there are greater amounts of mature-plus-old forest in the northern portion of the DNI and western portions of the DCR and DSI.

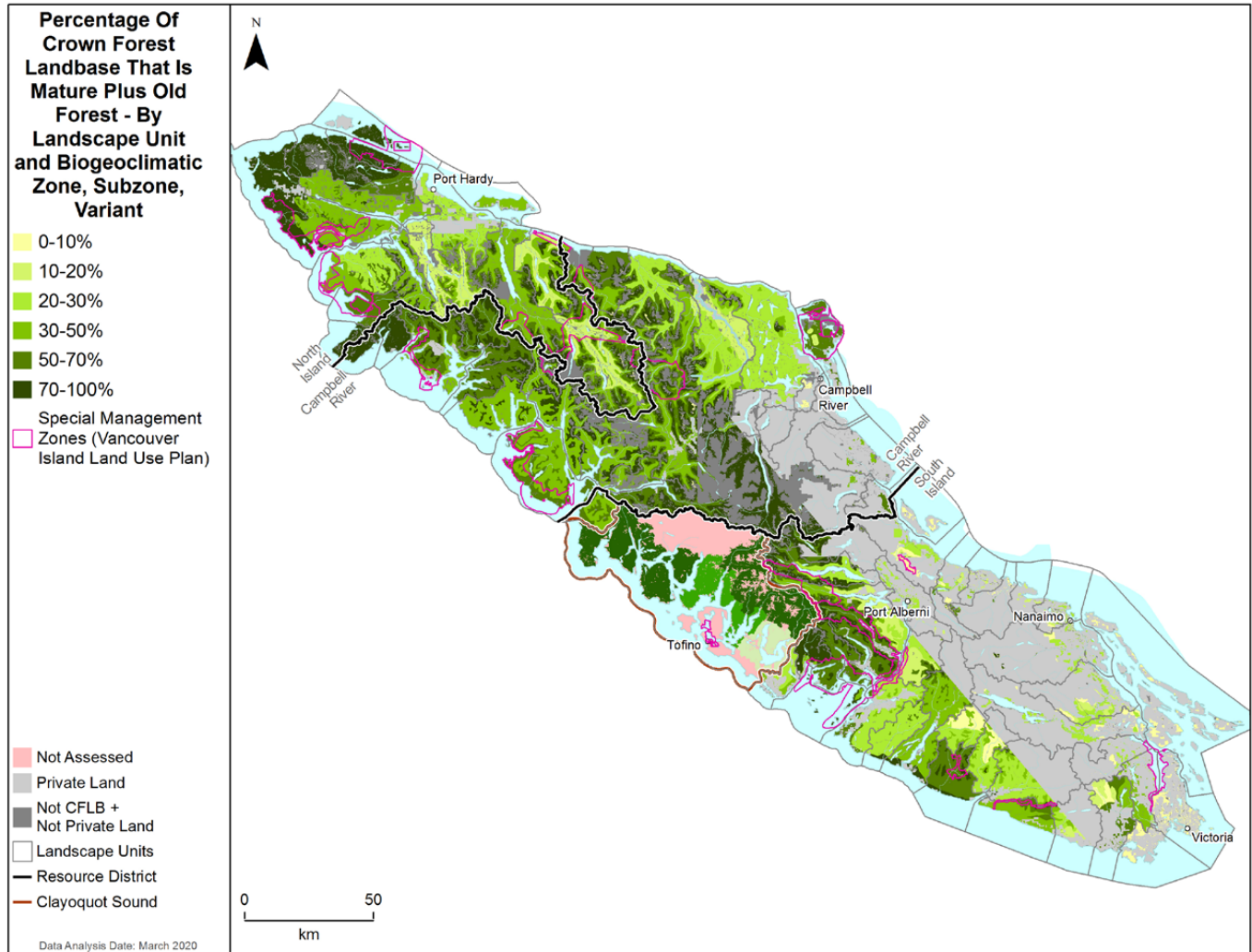


Figure 11. Current percent of mature-plus-old forest in the CFLB on Vancouver Island.

5.3.2 Mature-Plus-Old Forest Relative to Non-Legal Targets

The patterns for mature-plus-old forest relative to non-legal Biodiversity Guidebook targets closely matches that for old growth forest. On Vancouver Island outside Clayoquot Sound, 74% of assessment units currently have sufficient mature-plus-old forest to meet non-spatial BDG targets (Figure 11). Further investigation is required to understand the current state of mature forest as this represents opportunities for recruitment into old forest. Mature-plus-old forest was not assessed for Clayoquot Sound as there are no criteria for the management of this indicator.

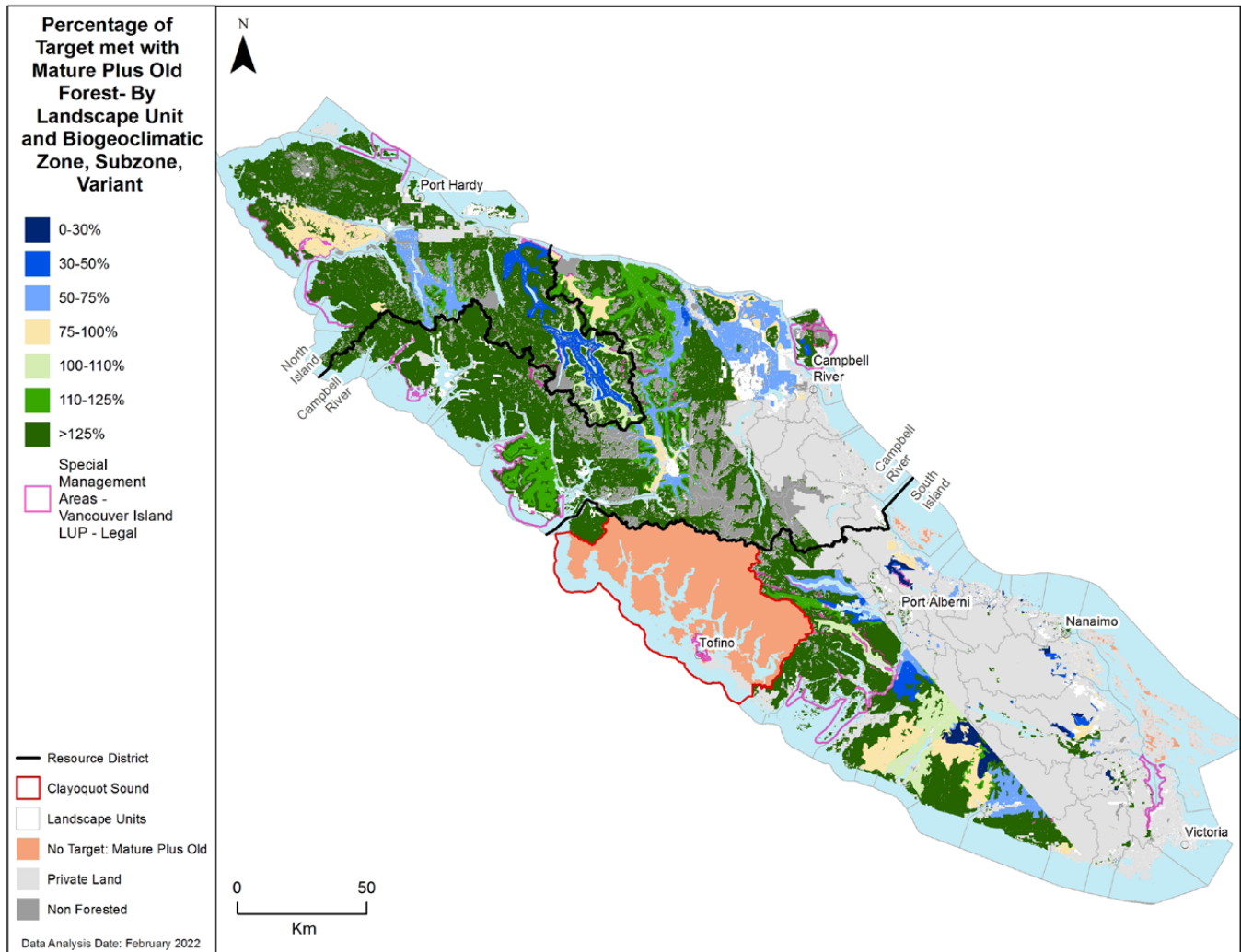


Figure 12. Amount mature-plus-old forest currently on the land base compared to targets from the Biodiversity Guidebook. Clayoquot Sound was not included in the CE assessment for mature plus old as there are no criteria for the management of the indicator.

The amount of mature-plus-old forest (>80 for CWH and CDF; > 120 for MH) relative to targets varies with ecosystem type. Dry and moist ecosystems are furthest from meeting mature plus old targets, with 48% of assessment units meeting targets (see Appendix 2). Only 18% of assessment units within the CDFmm have sufficient mature forest to meet targets, meaning that there is very little mature forest to recruit towards future old forest in this ecosystem. The CWHxm1 is in a better state for recruitment, with about half of the assessment units having sufficient mature forest to meet targets. Most units in the very wet and high elevation variants meet targets.

Implementation of legal targets for mature in the SMZ applies to the entire polygon and not by BEC subzone and variant (Figure 12). All SMZs except for Upper Qualicum contain more than the target amount (25%) of mature-plus-old forest (Figure 12). Upper Qualicum contains 3% mature-plus-old.

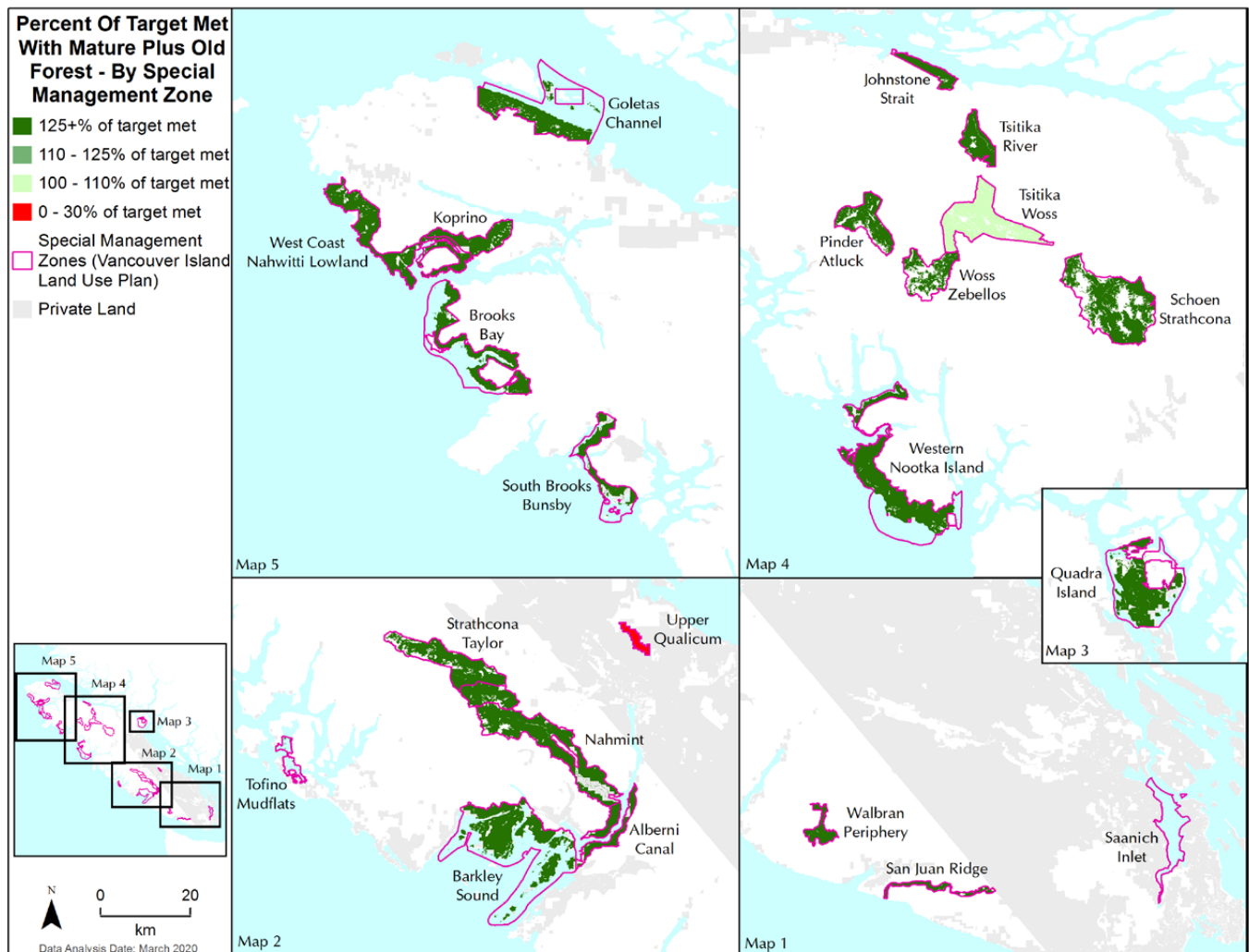


Figure 13. Percent of mature target met with mature-plus-old forest by SMZ.

5.3.3 Summary and Observations of Old and Mature Indicator

On Vancouver Island outside Clayoquot Sound, three-quarters of assessment units currently have sufficient mature-plus-old forest to meet targets from the Biodiversity Guidebook. The amount of mature-plus-old forest relative to targets varies with ecosystem type. Dry and moist ecosystems are furthest from meeting targets, while most very wet and high elevation units meet targets.

Where recruitment is required to meet targets, selecting the oldest suitable mature forest is used for recruitment. In the CDFmm, however, very little mature forest remains. Hence it will be more than 160 years before the areas selected to meet target are mostly old forest. In the CWHxm1, more mature forest exists, leaving the potential to have most areas selected to meet target become old forest in less than 160 years.

5.4 Incursions into Legal and Non-Legal Old Growth Management Areas

This assessment compares the area of human caused disturbance (incursion) in OGMA to any objectives or limits to allowable incursion levels specified in the OGMA Order or in policy. This assessment determines whether OGMA are retained according to the objectives established in Orders or policy.

OGMA orders spatially define boundaries and may include objectives that define maximum allowable levels of disturbance. Incursions are defined as alterations to OGMA caused by permitted activities, such as forestry cutblocks and roads, non-forestry-related activities (e.g., pipelines, oil and gas) and human use features such as recreation sites and trails. Developments or activities included as incursions are those that permanently alter the forested land base or that convert the forest cover to a young seral stage (< 20 years old).

On Vancouver Island, all incursions into legal OGMA requires a replacement through an OGMA amendment process. The size of the incursion determines what OGMA amendment process is required. Vancouver Island has a variety of OGMA amendment approval processes based on trigger levels defined in the OGMA legal orders. Regardless of the amendment process, all OGMA incursions require replacements. As such, all incursions are identified in this current condition reporting.

This analysis shows the amount and type of incursions into OGMA. Disturbance that was present at the time of establishment may show up as an incursion in this analysis because:

- Information on the data of disturbance (i.e., prior to or after OGMA establishment) is not available, so the disturbance is assumed to be an incursion
- Young forest was intentionally included in the OGMA to capture other long term non-OG values such as riparian habitat, connectivity, recreation values and large individual veteran trees.

In addition, incursions may have been replaced (i.e., there has been no net loss in OGMA area), but could still show up in this analysis for the following reasons:

- The OGMA boundary has been amended to include the replacement area, but not exclude the incursion.
- The replacement may be added to another OGMA nearby; and the incursion is not excluded from the original OGMA.
- Time lags in updates to the BCGW for reporting OGMA amendments.

5.4.1 Total Amount of Incursions into OGMA

Vancouver Island has a combination of legal and non-legal OGMA. Currently, 2,381 OGMA have been established. The intent is that most, but not all, non-legal OGMA will be legalized as planning processes are completed.

In this assessment, the total OGMA area and total incursions are summed by landscape unit.

Incursions that are less than 0.01 ha were counted as data slivers and removed from the assessment results.

There are 20 LUs with legal OGMA on Vancouver Island. More than half of these LUs had less than 2% of their total OGMA area incurred and no LUs had more than 5% of their total OGMA area incurred.

There are 24 LUs with non-legal OGMA. Half of these LUs had less than 2% of their total OGMA area incurred. Three LUs had more than 5% incurred – Cowichan (6.0%), Millstone (7.5%) and Shawnigan (24.6%).

Along with the total area of incursions, the sum of incursions of more than 5.0 ha or more than 5% of an individual OGMA area are presented in attempt to illustrate the magnitude of incursions based on the size of OGMA, (Table 5).

Four LUs with legal OGMA had individual OGMA with incursions greater than 5.0ha or 5% of that individual OGMA area, the sum of these incursions was less than 1% of the total OGMA area across the LU.

Three LUs with non-legal OGMA had individual OGMA with incursions greater than 5ha or 5% of the individual OGMA area; the sum of these incursions across the LU was less than 2% for 2 of those LUs and 17.5% for the third LU (Shawnigan).

Table 5. Percent and area of legal and non-legal OGMA with incursion by landscape unit showing all incursions and incursions >5.0 ha or >5% of the OGMA area.

Landscape Unit	OGMA Total Area (ha)	Total area (ha) of incursions within OGMA	Total area (ha) of incursions greater than 5ha or 5% of OGMA area	Percent of OGMA area incurred	Percent of OGMA area with incursions >5ha or 5% of OGMA area
Legal OGMA					
Adam-Eve	6,313	37	0	0.59%	0.00%
Caycuse	2,393	52	0	2.16%	0.00%
Gordon	2,411	120	6	4.98%	0.26%
Lower Nimpkish	6,800	105	0	1.54%	0.00%
Malcolm	817	14	0	1.68%	0.00%
Marble	9,849	241	23	2.45%	0.23%
Nahwitti	2,261	55	0	2.45%	0.00%
Naka	2,036	18	0	0.87%	0.00%
Nitinat	2,522	40	0	1.58%	0.00%
Salmon	8,700	333	0	3.83%	0.00%
San Josef	10,842	267	35	2.46%	0.32%
San Juan	3,331	58	0	1.73%	0.00%
Sayward	7,962	341	11	4.29%	0.14%
Shushartie	1,580	17	0	1.10%	0.00%
Sproat Lake	2,485	30	0	1.21%	0.00%
Tsitika	2,774	21	0	0.74%	0.00%
Tsulquate	2,939	25	0	0.87%	0.00%
Upper Nimpkish	9,782	77	0	0.78%	0.00%
Walbran	1,125	14	0	1.21%	0.00%
White	8,431	100	0	1.19%	0.00%
Non-Legal OGMA					
Artlish	2,226	6	0	0.25%	0.00%
Chemainus	646	29	0	4.53%	0.00%
Cous	1	0	0	0.00%	0.00%
Cowichan	269	16	0	6.01%	0.00%
Effingham	2,363	51	0	2.15%	0.00%
Englishman	6	0	0	2.66%	0.00%
Escalante	303	4	0	1.31%	0.00%
Henderson	372	1	0	0.23%	0.00%
Kashutl	3,990	56	22	1.40%	0.56%
Klaskish	638	2	0	0.25%	0.00%
Koksilah	71	3	0	3.81%	0.00%
Little Qualicum	80	1	0	0.68%	0.00%

Landscape Unit	OGMA Total Area (ha)	Total area (ha) of incursions within OGMA	Total area (ha) of incursions greater than 5ha or 5% of OGMA area	Percent of OGMA area incurred	Percent of OGMA area with incursions >5ha or 5% of OGMA area
Maggie	533	13	0	2.51%	0.00%
Metchosin	39	0	0	0.05%	0.00%
Millstone	12	1	0	7.53%	0.00%
Nahmint	2,510	12	0	0.48%	0.00%
Nanaimo	160	4	0	2.51%	0.00%
Nanoose	26	0	0	1.08%	0.00%
Rosewall	588	15	0	2.61%	0.00%
Shawnigan	120	30	21	24.59%	17.52%
Tahsish	1,276	32	23	2.48%	1.81%
Toquaht	1,885	16	0	0.84%	0.00%

Roads account for the majority of the incursions in legal OGMA (84.1%), followed by cutblocks (7.8%) (Figure 13). In non-legal OGMA cutblocks accounted for the majority of the disturbance (66.4%), followed by roads (28.5%) (Figure 14).

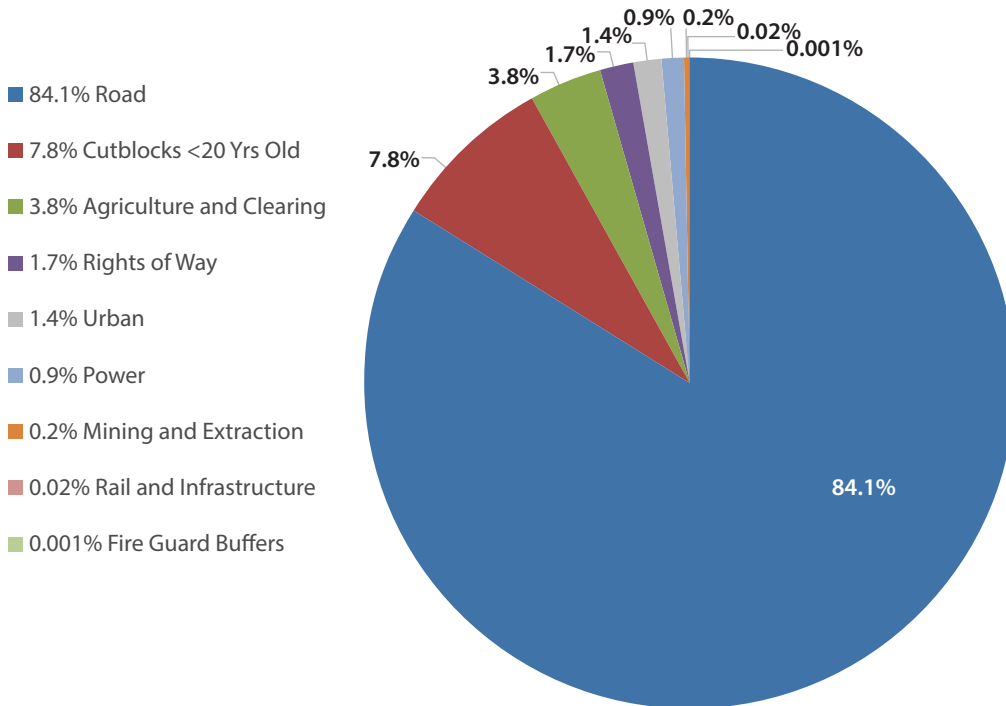


Figure 14. Amount and type of anthropogenic disturbances in Legal OGMA.

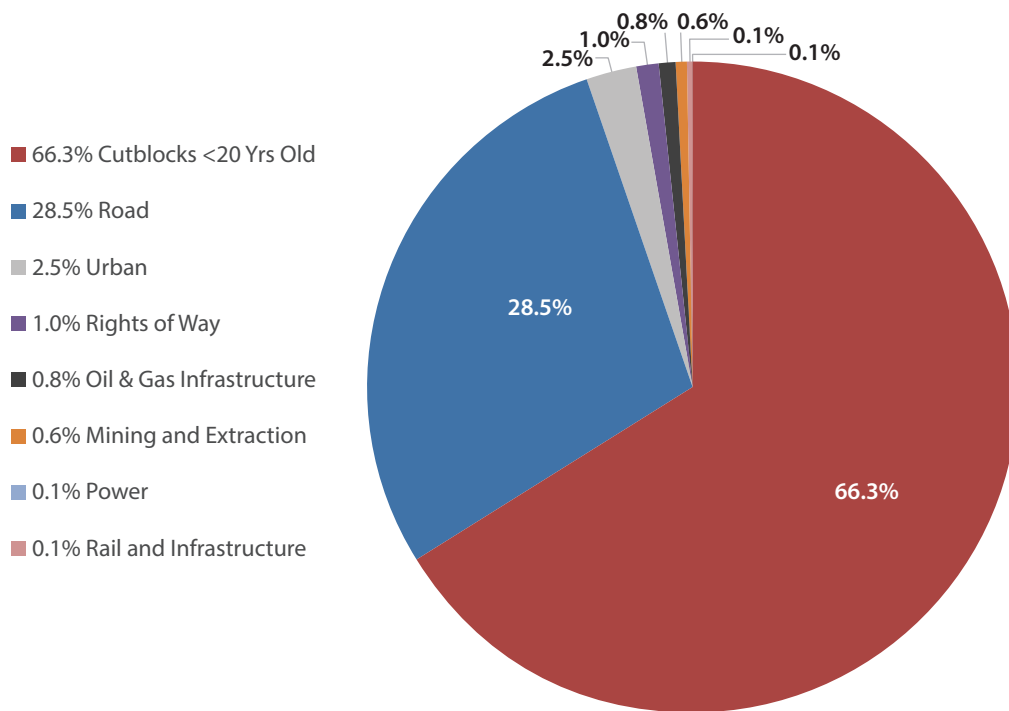


Figure 15. Amount and type of anthropogenic disturbances in Non-Legal OGMA.

5.4.2 Summary of OGMA Incursion Indicator

In all LUs with legal OGMA, the total area of OGMA incursion was 5% or less of the total OGMA area across the LU, with most being under 2%. Large incursions (5ha or 5% of an individual OGMA) occur in OGMA in four LUs and make up less than 1% of the OGMA area across the LU.

In LUs with non-legal OGMA all but three had less than 5% of the total OGMA area across the LU incurred; of the remaining three LUs, one had 6%, one had 7.5% and one had 24.6% of its total OGMA area incurred. Large incursions (5ha or 5% of an individual OGMA) occur in three LUs and make up less than 2% of the total OGMA area across the LU in two of those LUs, and 17.5% of the total OGMA area in the third.

Roads account for most of the incurred area in legal OGMA (84.1%), followed by cutblocks (7.8%). In non-legal OGMA cutblocks accounted for most of the incurred area (66.4%), followed by roads (28.5%)

All incursions are required to be replaced on Vancouver Island unless sufficient area exists elsewhere in the landscape unit (or in excess OGMA) to meet retention targets. **Further analysis is required to determine if the incursions identified in this GIS analysis reflect what has occurred on the ground.** For example, whether those incursions have been replaced but are still retained within the boundary of the OGMA and thus showing up in this analysis or are the result of time-lags in data updates.

5.4.3 Limitations

Non-legal OGMA are managed by forest licensees. Government data on non-legal OGMA amendments is often substantially out of date as licensees are not always required to submit incursions to non-legal OGMA to the government. In some Districts, changes to draft OGMA are submitted to the District as part of an FSP commitment. Many of the incursions showing up in non-legal OGMA may be amendments made by licensees during their management that are not yet added to the dataset.

In this assessment, all incursions (i.e., disturbance footprints) were included regardless of when they occurred (e.g., prior to or after the OGMA was established), except for cutblocks. All cutblocks that were 20 years old or older, or that pre-dated the establishment of the OGMA were removed. Removal of all other incursion types that pre-date an OGMA's establishment could not be completed as the date for disturbance was absent in the available data. As a result, disturbance may show up in this analysis as an OGMA incursion where this incursion may have been 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 Ministry 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), OGMA incursions due to roads may be a result of incorrect data rather than actual incursions into the OGMA.

An initial review of incursions by regional staff suggests that amendments are being made to replace OGMA area, however there is a time lag for these amendments to show up in the OGMA data set. This analysis is useful to check for non-forest sector OGMA changes, as those sectors are not required to amend and replace OGMA area. Currently on Vancouver Island there have been very few of these incursions by non-forest sector activities and they have been reported to the Region via lands referrals replacement OGMA has been found for these incursions. Recently timber theft has impacted OGMA's and other protected areas. These incursions are typically too small to show up as a change in the inventory but have removed very ecologically valuable large diameter trees.

The Landscape Unit Planning Guide provided the direction for OGMA delineation. Assessing how OGMA's were designed and implemented as per provincial policy/guidance was outside the scope of this assessment.

6 CONCLUSION & OPPORTUNITIES

The amount of old growth forest available for retention on the land base varies with forest ecosystem type and proximity to human settlement. The dry forest ecosystems located on the south of Vancouver Island, which has experienced the most development impacts and is mostly private land, have the least old growth forest available. The area on eastern Vancouver Island around Campbell River and Sayward have low amounts of old growth due to a long history of forest harvesting and historical natural disturbance.

In Clayoquot Sound, where the land base is managed under the 2008 Clayoquot Sound Land Use Order, informed by the Clayoquot Sounds Scientific panel, all Watershed Planning Units have enough old forest to meet targets.

The analysis of incursions into OGMA provides an initial assessment of the type and amount of incursion that may have occurred, and that require further examination. Initial reviews of this information suggest that OGMA incursions are being replaced but that there is a time lag in updating the OGMA data layer, highlighting the need for improved data and information to ensure transparency in OGMA replacement and amendments.

The following opportunities related to old growth management are identified for consideration on Vancouver Island (outside of Clayoquot sound):

- Ensure that appropriate recruitment strategies are in place, particularly for assessment units that have less old forest than target amounts,
- Improve the currency and accuracy of the spatial OGMA layer to ensure accurate analysis of incursions, and transparent reporting of OGMA condition.
- Pursue opportunities to use LiDAR data in OGMA establishment to increase the accuracy of old forest identification.
- Improve the currency and accuracy of disturbance data (e.g., resource roads data) to improve the accuracy of this analysis.
- Review existing spatial OGMA to assess if the initial design process was adequate in capturing Old Forest values and amend the process if necessary.

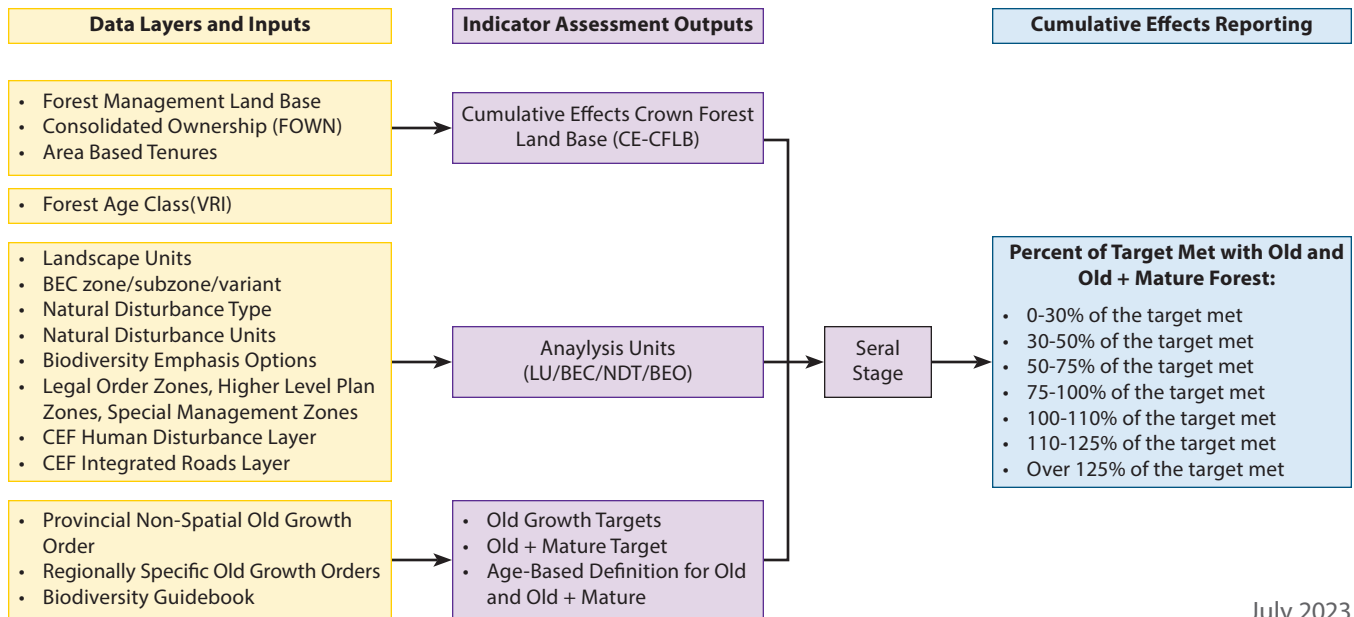
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8 APPENDICES

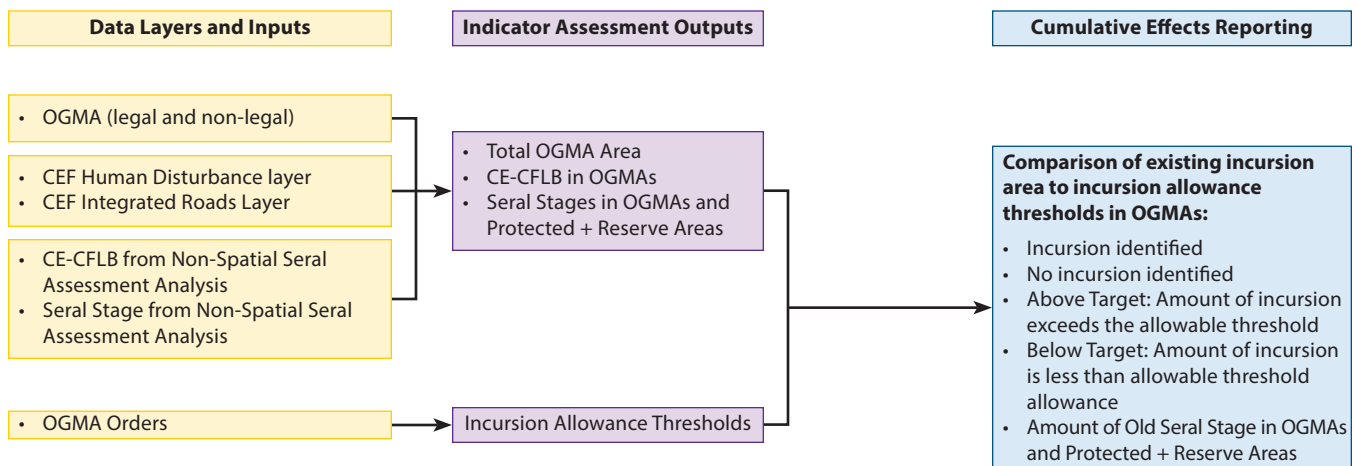
Appendix 1 – Data Inputs to develop Seral Assessment and OGMA Analysis Units

Interim Assessment Protocol for Old Growth Forests in British Columbia: Development Model for the Assessment of Non-Spatial Indicators



July 2023

Interim Assessment Protocol for Old Growth Forests in British Columbia: Development Model for the Assessment of Old Growth Management Areas (OGMAs) Indicators



July 2023

Appendix 2 – Tabular Results

8.1 Amount of Old Forest in OGMA and Protected and Reserved Areas for Landscape Units with Legal OGMA

Table 6. Colour Scale Legend for Percent of CFLB in OGMA and Protected/Reserved that is Old Forest.

Gradient Scale for Old Forest in OGMA and Protected and Reserved Areas	% of OGMA and Protected and Reserved that is Old Forest
	0-30%
	30-50%
	50-75%
	75-100%

Table 7. Percentage of CFLB in OGMA and Protected/Reserved that is old forest by Landscape Unit and BEC Variant.

Landscape Unit	BEC Variant	CFLB Area (ha)	CFLB in Old Forest (ha)	% of CFLB in OGMA and P/R	Old Forest in OGMA and P/R (ha)	% of remaining Old Forest in Assessment Unit that is in OGMA and P/R	% of OGMA and P/R that is old
Gordon	CWHxm2	270	0	8%	0	0%	0%
Nitinat	CWHmm1	199	14	4%	0	0%	0%
Nitinat	CWHxm2	2	0	0%	0	0%	0%
San Juan	CWHmm2	310	118	0%	0	0%	0%
Sayward	CWHxm1	5,038	32	10%	6	19%	1%
Sproat Lake	CWHxm1	1,255	20	20%	6	32%	3%
San Josef	MHmm1	58	2	88%	1	71%	3%
Gordon	CWHvh1	57	0	8%	0	100%	5%
Gordon	CWHmm1	4,761	111	7%	40	36%	11%
San Juan	CWHvh1	193	28	64%	18	65%	15%
Sayward	CWHxm2	33,569	1,129	13%	738	65%	17%
Caycuse	CWHxm2	1,154	31	11%	23	73%	19%
Gordon	MHmm1	454	237	39%	38	16%	21%
Salmon	CWHxm2	15,356	624	14%	453	73%	21%
Caycuse	MHmm1	152	45	36%	19	41%	34%
Lower Nimpkish	CWHxm2	18,178	1,727	10%	692	40%	37%
Malcolm	CWHvm1	2,636	534	31%	309	58%	38%
Sproat Lake	CWHvm1	486	103	14%	25	25%	38%
San Juan	CWHmm1	4,625	601	13%	224	37%	38%
Sayward	CWHmm1	8,286	1,223	10%	332	27%	40%
Gordon	CWHvm1	11,709	1,891	24%	1,130	60%	40%
San Josef	CWHvm2	3,233	754	21%	276	37%	41%
Gordon	CWHvm2	4,094	1,208	23%	440	36%	46%
Caycuse	CWHmm1	4,949	276	9%	214	77%	48%
Marble	MHmm1	3,264	1,510	39%	614	41%	48%
Caycuse	CWHmm2	1,323	54	6%	41	76%	51%

Landscape Unit	BEC Variant	CFLB Area (ha)	CFLB in Old Forest (ha)	% of CFLB in OGMA and P/R	Old Forest in OGMA and P/R (ha)	% of remaining Old Forest in Assessment Unit that is in OGMA and P/R	% of OGMA and P/R that is old
Marble	CWHvm1	27,670	3,558	14%	2,049	58%	52%
Nitinat	MHmm1	471	199	22%	55	28%	53%
San Josef	CWHvm1	36,617	5,629	11%	2,110	37%	53%
Nitinat	CWHvm2	4,646	1,438	18%	466	32%	57%
San Juan	CWHvm1	15,166	2,532	14%	1,256	50%	59%
Sproat Lake	MHmm1	2,430	1,003	11%	161	16%	60%
Naka	CWHvm1	5,049	1,907	14%	445	23%	61%
Marble	CWHvm2	9,560	3,443	17%	1,030	30%	64%
Caycuse	CWHvm2	4,193	997	14%	382	38%	65%
Sproat Lake	CWHvm2	5,755	2,778	11%	417	15%	65%
San Juan	CWHvm2	5,339	1,987	15%	542	27%	67%
Sproat Lake	CWHxm2	4,562	542	12%	357	66%	67%
Sayward	CWHmm2	4,429	1,750	9%	258	15%	68%
Lower Nimpkish	CWHvm1	23,500	4,725	9%	1,446	31%	69%
Sproat Lake	CWHmm1	7,381	2,249	10%	522	23%	70%
Caycuse	CWHvm1	9,107	2,038	13%	852	42%	70%
Naka	CWHvm2	4,284	2,547	12%	370	15%	72%
Upper Nimpkish	CWHxm2	24,011	2,803	11%	2,033	73%	74%
San Josef	CWHvh1	40,468	21,561	44%	13,063	61%	74%
Tsitika	CWHvm1	10,246	3,679	18%	1,373	37%	75%
Nitinat	CWHmm2	322	56	16%	40	71%	75%
Nitinat	CWHvm1	36,743	9,927	25%	6,947	70%	76%
San Juan	MHmm1	735	495	20%	111	22%	76%
Salmon	CWHmm1	29,685	5,847	14%	3,206	55%	77%
Salmon	CWHvm1	1,323	545	31%	322	59%	79%
Naka	MHmm1	2,826	2,284	21%	483	21%	83%
White	CWHmm1	719	170	14%	83	49%	83%
Adam-Eve	CWHvm1	30,262	5,608	10%	2,523	45%	83%
Sproat Lake	CWHmm2	2,510	959	12%	250	26%	83%
Walbran	CWHvm2	4,341	2,856	51%	1,843	65%	84%
Nahwitti	CWHvh1	25,565	19,289	16%	3,531	18%	85%
Lower Nimpkish	CWHvm2	13,632	7,682	11%	1,325	17%	86%
Walbran	CWHvm1	24,407	14,982	56%	11,659	78%	86%
Walbran	MHmm1	113	46	19%	18	39%	86%
Upper Nimpkish	CWHvm1	22,136	7,623	20%	3,802	50%	87%
Tsulquate	CWHvh1	8,166	6,409	16%	1,154	18%	87%
White	CWHmm2	540	274	16%	75	27%	87%
Tsitika	CWHvm2	8,129	5,150	8%	578	11%	87%
Nahwitti	CWHvm1	2,133	887	7%	136	15%	88%
Salmon	CWHvm2	1,018	521	13%	117	22%	88%
Adam-Eve	CWHvm2	18,276	9,700	16%	2,550	26%	89%

Landscape Unit	BEC Variant	CFLB Area (ha)	CFLB in Old Forest (ha)	% of CFLB in OGMA and P/R	Old Forest in OGMA and P/R (ha)	% of remaining Old Forest in Assessment Unit that is in OGMA and P/R	% of OGMA and P/R that is old
Tsitika	MHmm1	5,033	4,070	8%	348	9%	89%
Walbran	CWHvh1	1,907	1,696	99%	1,669	98%	89%
White	CWHvm1	15,585	4,454	22%	2,992	67%	89%
White	CWHxm2	1,465	216	15%	197	91%	90%
Upper Nimpkish	CWHvm2	26,053	13,733	16%	3,712	27%	91%
Shushartie	CWHvh1	13,983	12,031	33%	4,263	35%	92%
Gordon	CWHmm2	704	275	9%	60	22%	93%
Adam-Eve	MHmm1	9,555	7,200	13%	1,174	16%	93%
Tsulquate	CWHvm1	11,655	6,861	14%	1,487	22%	94%
Upper Nimpkish	MHmm1	18,527	14,856	18%	3,051	21%	94%
Nitinat	CWHvh1	2,820	2,514	82%	2,186	87%	94%
Lower Nimpkish	MHmm1	7,377	5,760	13%	906	16%	95%
Sayward	MHmm1	1,558	1,256	21%	316	25%	95%
White	CWHvm2	8,856	5,090	25%	2,089	41%	95%
Salmon	CWHmm2	13,806	5,558	24%	3,169	57%	95%
Salmon	MHmm1	8,146	6,437	45%	3,577	56%	98%
White	MHmm1	4,701	3,853	37%	1,725	45%	99%

8.2 Amount of Old Forest for Landscape Units Managed under PNOGO

Table 8. Colour Scale for interpreting the status of current condition relative to the legal targets for old forest.








Gradient Scale for Old Growth Forest Indicator: Legal Targets	Indicator Condition Interpretation	Current Condition Status (% of Old Forest)
	Below Target	0 – 30%
	Below Target	30 – 50%
	Below Target	50 – 75%
	Below Target	75 – 100%
	Target Met	100 – 110%
	Above Target	110 – 125%
	Above Target	125+%

Table 9. Comparison of PNOGO targets to amount of old forest available for the target.

Landscape Unit	BEC Variant	CFLB Area (ha)	Immature Forest in CFLB (ha)	Mature Forest in CFLC (ha)	Old Forest in CFLB (ha)	OF Target (ha)	% of target in Old	% of target in Recruitment
Burman	CWHxm2	16	0	16	0	0	0%	100%
Chemainus	CDFmm	188	153	35	0	17	0%	100%
Chemainus	CWHmm2	1,395	1,370	25	0	126	0%	100%
Chemainus	CWHxm1	3,545	2,565	980	0	319	0%	100%
Chemainus	CWHxm2	2,525	2,236	289	0	227	0%	100%
Chemainus	MHmm1	24	24	0	0	5	0%	100%
Cowichan	CDFmm	784	698	85	0	24	0%	100%
Cowichan	CWHxm1	4,612	3,462	1,150	0	138	0%	100%
Cowichan	MHmm1	25	25	0	0	2	0%	100%
Englishman	CDFmm	355	321	34	0	32	0%	100%
Englishman	CWHxm1	114	35	79	0	10	0%	100%
French Creek	CDFmm	350	323	27	0	11	0%	100%
French Creek	CWHxm1	60	58	3	0	2	0%	100%
French Creek	CWHxm2	2	2	0	0	0	0%	100%
Holberg	MHmm1	152	16	135	0	10	0%	100%
Kleeptee	CWHvh1	1	0	1	0	0	0%	100%
Koksilah	CDFmm	119	116	3	0	4	0%	100%
Little Qualicum	CWHxm1	444	343	101	0	40	0%	100%
Millstone	CDFmm	755	438	317	0	23	0%	100%
Millstone	CWHmm2	40	40	0	0	1	0%	100%
Millstone	CWHxm1	65	64	1	0	2	0%	100%
Millstone	CWHxm2	3	2	1	0	0	0%	100%
Nanaimo	CDFmm	869	622	248	0	78	0%	100%
Nanaimo	CWHxm2	671	654	17	0	60	0%	100%
Nanoose	CDFmm	289	276	14	0	9	0%	100%
Nanoose	CWHxm1	294	242	52	0	9	0%	100%
Oyster	CWHxm1	3	3	0	0	0	0%	100%
Puntledge	CWHxm1	101	48	53	0	3	0%	100%

Landscape Unit	BEC Variant	CFLB Area (ha)	Immature Forest in CFLB (ha)	Mature Forest in CFLC (ha)	Old Forest in CFLB (ha)	OF Target (ha)	% of target in Old	% of target in Recruitment
Quinsam	CWHxm1	487	416	71	0	15	0%	100%
Shawnigan	CDFmm	601	427	175	0	18	0%	100%
Shawnigan	CWHxm2	80	76	3	0	2	0%	100%
Simms	CWHxm1	11	6	4	0	0	0%	100%
Somass	CWHxm1	440	282	159	0	13	0%	100%
Sooke	CWHxm1	46	42	4	0	1	0%	100%
Trent	CWHxm1	188	136	52	0	6	0%	100%
Tsolum	CWHxm1	136	64	72	0	4	0%	100%
Rosewall	CDFmm	1,288	1,025	263	0	116	0%	100%
Rosewall	CWHxm1	4,142	3,061	1,079	1	373	0%	100%
Somass	CWHxm2	1,308	875	433	0	39	0%	100%
Quadra	CWHxm1	1,403	578	824	1	126	0%	100%
Great Central	CWHxm1	2	1	1	0	0	1%	99%
Sooke	CWHxm2	772	253	519	0	23	1%	99%
Nanaimo	CWHxm1	1,697	1,413	282	3	153	2%	98%
Nahmint	CWHxm2	56	21	35	0	7	3%	97%
Little Qualicum	CWHmm2	332	331	1	1	30	3%	97%
China	CWHxm2	141	120	20	1	13	5%	95%
Koksilah	CWHxm1	887	697	188	2	27	8%	92%
Cowichan	CWHxm2	2,208	1,712	490	6	66	9%	91%
Rosewall	CWHxm2	3,441	3,255	151	34	310	11%	89%
Quadra	CWHxm2	9,491	4,612	4,754	125	854	15%	85%
Quadra	CWHmm1	1,289	1,076	196	17	116	15%	85%
Little Qualicum	CDFmm	994	805	175	14	89	16%	84%
Shawnigan	CWHxm1	1,020	764	250	6	31	19%	81%
Koksilah	CWHxm2	640	610	26	4	19	21%	79%
Nahmint	CWHmm1	8	1	7	0	1	21%	79%
Kleptee	MHmm1	1,163	76	1,069	19	74	25%	75%
Cowichan	CWHmm2	220	209	10	2	7	26%	74%
Bonanza	CWHxm2	105	102	0	3	9	28%	72%
Kleptee	CWHxm2	681	243	432	6	20	29%	71%
Kleptee	CWHvm2	3,167	1,007	2,117	43	137	31%	69%
Tlupana	CWHvh1	1,452	606	767	79	189	42%	58%
Tahsis	CWHvh1	211	53	153	4	9	49%	51%
Koksilah	CWHmm2	37	36	1	1	1	52%	48%
Tlupana	CWHvm1	19,534	10,401	7,474	1,658	2539	65%	35%
Tugwell	CWHxm2	1,635	1,413	188	34	49	69%	31%
Kleptee	CWHvm1	4,548	3,125	1,278	145	197	74%	26%
Nahmint	MHmm1	1,624	294	944	385	455	85%	15%
Cowichan	CWHvm1	152	139	7	6	7	87%	13%
Gold	CWHxm2	6,268	3,248	2,252	768	815	94%	6%
Corrigan	CWHvm1	10,229	8,409	565	1,255	1330	94%	6%
Bonanza	CWHvm1	15,514	12,776	754	1,985	2017	98%	2%

Landscape Unit	BEC Variant	CFLB Area (ha)	Immature Forest in CFLB (ha)	Mature Forest in CFLC (ha)	Old Forest in CFLB (ha)	OF Target (ha)	% of target in Old	% of target in Recruitment
Great Central	CWHxm2	8,869	6,994	1,075	800	798	100%	0%
Corrigan	CWHxm2	3,856	2,941	520	395	347	114%	0%
Upper Nimpkish	CWHxm2	23,829	20,238	1,030	2,561	2145	119%	0%
Gold	CWHvm1	16,498	10,521	2,164	3,813	3135	122%	0%
Ash	CWHxm2	96	71	14	11	9	130%	0%
Rosewall	CWHmm2	709	622	2	85	64	133%	0%
China	CWHmm2	336	273	22	41	30	136%	0%
China	MHmm1	2	1	0	1	0	142%	0%
Artlish	CWHvh1	481	228	163	90	63	144%	0%
Kaouk	CWHvh1	2,880	1,147	1,168	565	374	151%	0%
Nahmint	CWHvm2	5,584	1,253	2,656	1,675	1061	158%	0%
Cous	CWHmm2	1,605	1,147	382	76	48	159%	0%
Tlupana	MHmm1	2,115	252	1,215	648	402	161%	0%
Tlupana	CWHvm2	7,758	1,805	4,305	1,648	1009	163%	0%
Nahmint	CWHvm1	8,274	3,433	2,244	2,597	1572	165%	0%
Holberg	CWHvm1	26,717	18,071	6,674	1,972	1158	170%	0%
Corrigan	CWHmm2	430	262	99	68	39	177%	0%
Klanawa	CWHvm1	23,383	16,487	706	6,190	3040	204%	0%
Cous	CWHxm2	2,436	1,832	451	153	73	209%	0%
Klaskish	CWHvm1	1,520	720	175	625	289	216%	0%
Gold	CWHvm2	20,451	7,360	4,342	8,748	3886	225%	0%
Little Qualicum	CWHxm2	1,105	801	80	224	99	225%	0%
Gold	MHmm1	15,011	2,182	2,998	9,832	4203	234%	0%
Upper Nimpkish	CWHvm1	22,095	14,023	929	7,144	2872	249%	0%
Kaouk	CWHvm1	13,539	6,344	2,620	4,575	1760	260%	0%
Keogh	CWHvm1	24,133	18,208	3,129	2,796	1046	267%	0%
Nootka	CWHvm1	31,691	17,998	2,508	11,184	4120	271%	0%
Holberg	CWHvm2	1,428	689	570	169	62	273%	0%
Effingham	MHmm1	324	40	111	173	62	281%	0%
Klaskish	CWHvh1	15,384	4,753	2,385	8,246	2923	282%	0%
Bonanza	CWHvm2	15,462	7,787	1,830	5,844	2010	291%	0%
Corrigan	MHmm1	683	148	151	384	130	296%	0%
Bonanza	MHmm1	8,476	1,042	2,535	4,898	1610	304%	0%
Cous	CWHmm1	6,133	5,094	471	568	184	309%	0%
Klaskish	MHmm1	14	0	1	13	4	325%	0%
Klanawa	CWHvm2	1,456	564	271	621	189	328%	0%
Klaskish	CWHvm2	908	136	196	577	173	334%	0%
Artlish	CWHvm1	7,927	3,669	789	3,469	1030	337%	0%
Mahatta	CWHvm1	21,820	16,701	1,936	3,183	946	337%	0%
Rosewall	MHmm1	241	81	5	155	46	338%	0%
Great Central	MHmm1	3,135	584	503	2,048	596	344%	0%
Effingham	CWHvm1	12,688	4,724	2,148	5,816	1649	353%	0%
Corrigan	CWHvm2	2,347	856	414	1,077	305	353%	0%

Landscape Unit	BEC Variant	CFLB Area (ha)	Immature Forest in CFLB (ha)	Mature Forest in CFLC (ha)	Old Forest in CFLB (ha)	OF Target (ha)	% of target in Old	% of target in Recruitment
Toquaht	MHmm1	365	39	78	247	69	357%	0%
Toquaht	CWHvh1	821	426	8	388	107	363%	0%
Tahsish	CWHvm1	13,781	5,818	1,389	6,573	1791	367%	0%
Nanaimo	CWHmm2	162	104	2	55	15	379%	0%
Nootka	CWHvh1	14,128	5,352	1,782	6,994	1837	381%	0%
Upper Nimpkish	CWHvm2	26,045	11,881	819	13,345	3386	394%	0%
Tahsish	CWHvh1	889	78	353	458	116	396%	0%
Escalante	CWHvh1	2,612	1,051	1,111	450	113	397%	0%
Nootka	CWHvm2	3,236	1,173	332	1,731	421	411%	0%
Nanaimo	MHmm1	286	12	47	227	54	417%	0%
Upper Nimpkish	MHmm1	18,527	3,416	363	14,748	3520	419%	0%
Kaouk	MHmm1	761	51	97	613	145	424%	0%
Tahsish	MHmm1	1,685	75	245	1,365	320	426%	0%
Tugwell	CWHmm1	348	303	0	45	10	430%	0%
Tugwell	CWHvm1	2,352	1,810	104	439	102	430%	0%
Effingham	CWHvh1	2,270	727	257	1,285	295	436%	0%
Artlish	MHmm1	992	69	99	824	189	437%	0%
Puntledge	CWHxm2	2	1	0	0	0	454%	0%
Ash	MHmm1	2,452	163	150	2,140	466	459%	0%
Escalante	CWHvm1	7,964	5,071	1,296	1,597	345	463%	0%
Maggie	CWHvm1	5,635	4,073	388	1,174	244	481%	0%
Toquaht	CWHvm1	8,750	2,588	685	5,477	1137	482%	0%
Mahatta	CWHvh1	12,076	8,194	1,347	2,535	523	484%	0%
Kaouk	CWHvm2	4,425	712	906	2,807	575	488%	0%
Cameron	MHmm1	36	0	1	34	7	504%	0%
Gold	CWHmm1	8	2	0	5	1	536%	0%
Great Central	CWHmm1	7,631	2,707	1,223	3,701	687	539%	0%
Maggie	CWHvm2	218	163	3	52	9	547%	0%
Effingham	CWHvm2	3,847	318	788	2,741	500	548%	0%
Artlish	CWHvm2	4,181	657	523	3,001	544	552%	0%
Neroutsos	CWHvm1	15,597	9,742	2,086	3,768	676	558%	0%
Sarita	CWHvm1	22,767	16,960	289	5,519	987	559%	0%
Toquaht	CWHvm2	3,235	301	574	2,360	421	561%	0%
Tahsish	CWHvm2	9,033	1,631	634	6,767	1174	576%	0%
Tahsis	CWHvm1	19,976	10,624	4,260	5,092	866	588%	0%
Loss	CWHvm1	12,182	8,366	648	3,168	528	600%	0%
Maggie	CWHvh1	2,172	1,281	312	579	94	615%	0%
Kashutl	CWHvh1	7,943	4,373	1,423	2,146	344	623%	0%
Ash	CWHmm1	3,877	1,446	234	2,197	349	630%	0%
Keogh	CWHvm2	4,799	3,344	119	1,336	208	642%	0%
Eliza	CWHvm1	22,311	11,951	3,944	6,415	967	664%	0%
Klanawa	CWHvh1	876	32	54	790	114	694%	0%
Cous	MHmm1	361	48	153	161	23	702%	0%

Landscape Unit	BEC Variant	CFLB Area (ha)	Immature Forest in CFLB (ha)	Mature Forest in CFLC (ha)	Old Forest in CFLB (ha)	OF Target (ha)	% of target in Old	% of target in Recruitment
Cous	CWHvm2	2,695	1,403	467	824	117	706%	0%
Great Central	CWHmm2	8,517	2,179	871	5,467	767	713%	0%
Cameron	CWHxm2	301	99	0	202	27	747%	0%
Eliza	CWHvh1	6,826	3,580	1,005	2,241	296	758%	0%
Gold	CWHmm2	109	0	0	109	14	769%	0%
Sarita	CWHvm2	2,339	1,416	119	804	101	794%	0%
Holberg	CWHvh1	3,839	2,312	177	1,350	166	812%	0%
Keogh	MHmm1	1,137	443	70	623	72	866%	0%
Ash	CWHmm2	4,996	765	298	3,933	450	875%	0%
Henderson	CWHvm1	17,091	8,410	2,173	6,508	741	879%	0%
Escalante	CWHvm2	3,479	1,071	1,081	1,327	151	880%	0%
Burman	CWHvm1	13,423	4,508	3,713	5,202	582	894%	0%
Henderson	CWHmm1	67	13	35	19	2	938%	0%
Zeballos	CWHvm1	7,215	4,068	138	3,009	313	963%	0%
Barkley Sound Islands	CWHvm1	685	354	45	286	30	964%	0%
Tugwell	CWHvm2	1,625	894	52	679	70	964%	0%
Effingham	CWHmm1	94	0	12	81	8	965%	0%
Loss	CWHvh1	1,037	577	23	437	45	972%	0%
Burman	MHmm1	4,359	593	1,031	2,735	276	991%	0%
Mahatta	CWHvm2	6,782	2,949	868	2,965	294	1009%	0%
Henderson	MHmm1	322	59	53	209	20	1025%	0%
Mahatta	MHmm1	346	19	102	225	22	1029%	0%
Loss	MHmm1	559	166	27	366	35	1033%	0%
Kashutl	CWHvm1	22,878	9,868	2,477	10,533	991	1062%	0%
Henderson	CWHvm2	5,158	1,315	1,366	2,477	224	1108%	0%
Loss	CWHvm2	5,443	2,056	669	2,718	236	1152%	0%
Tahsis	MHmm1	2,567	192	498	1,877	163	1155%	0%
Upper Campbell	CWHxm2	1,025	654	2	369	31	1201%	0%
Eliza	CWHvm2	3,913	855	1,001	2,057	170	1213%	0%
Buttle	MHmm1	7,136	1,037	554	5,544	452	1227%	0%
Neroutsos	MHmm1	77	1	15	61	5	1250%	0%
Puntledge	MHmm1	1,482	111	182	1,188	94	1266%	0%
Neroutsos	CWHvm2	5,123	1,402	871	2,850	222	1284%	0%
Eliza	MHmm1	118	12	8	98	8	1309%	0%
Sarita	CWHvh1	3,685	1,109	453	2,123	160	1329%	0%
Kashutl	MHmm1	382	19	40	324	24	1337%	0%
Tugwell	MHmm1	106	16	0	90	7	1343%	0%
Zeballos	MHmm1	1,903	234	48	1,621	121	1345%	0%
Tugwell	CWHmm2	224	131	2	91	7	1354%	0%
Tahsis	CWHvm2	8,613	1,670	1,699	5,245	373	1405%	0%
Barkley Sound Islands	CWHvh1	2,866	504	567	1,795	124	1445%	0%

Landscape Unit	BEC Variant	CFLB Area (ha)	Immature Forest in CFLB (ha)	Mature Forest in CFLC (ha)	Old Forest in CFLB (ha)	OF Target (ha)	% of target in Old	% of target in Recruitment
Burman	CWHvm2	8,472	1,065	1,979	5,428	367	1479%	0%
Nigei	CWHvh1	7,039	1,484	1,028	4,527	305	1484%	0%
Upper Campbell	MHm1	2,360	74	0	2,285	149	1529%	0%
Brooks	CWHvh1	12,569	68	4,019	8,482	545	1557%	0%
Oyster	MHm1	304	0	0	304	19	1579%	0%
Escalante	MHm1	6	0	0	6	0	1579%	0%
Upper Campbell	CWHvm1	1,537	369	61	1,108	67	1664%	0%
Zeballos	CWHvm2	4,910	1,106	137	3,667	213	1724%	0%
Kashutl	CWHvm2	8,003	750	892	6,361	347	1834%	0%
Nasparti	CWHvm1	1,029	65	109	854	45	1916%	0%
Upper Campbell	CWHvm2	1,000	16	136	847	43	1956%	0%
Nasparti	CWHvh1	12,037	284	1,509	10,244	522	1964%	0%
Nasparti	CWHvm2	946	0	102	843	41	2058%	0%
Buttle	CWHxm2	8,358	2,114	225	6,019	251	2401%	0%
Buttle	CWHmm2	10,834	1,257	1,137	8,441	325	2597%	0%
Buttle	CWHmm1	3,223	202	466	2,555	97	2643%	0%
Puntledge	CWHmm1	1,372	117	108	1,147	41	2785%	0%
Upper Campbell	CWHmm1	1,206	51	112	1,044	36	2885%	0%
Puntledge	CWHmm2	1,670	45	178	1,447	50	2889%	0%
Upper Campbell	CWHmm2	3,318	73	67	3,178	100	3193%	0%
Oyster	CWHmm2	9	0	0	9	0	3333%	0%

8.3 Mature-Plus-Old Forest Relative to Non-Legal Targets

Table 10. Colour Scale for interpreting the status of current condition relative to the policy targets for mature-plus-old forest.

Gradient Scale for Mature-plus-Old Forest Indicator: Policy Target	Indicator Condition	Current Condition Status (% of Old or Mature-plus-Old Forest)
	Below Target	0 to 30%
	Below Target	30 to < 50%
	Below Target	50 to < 75%
	Below Target	75 to < 100%
	Target Met	100 to < 110%
	Above Target	110 to < 125%
	Above Target	≥ 125%

Table 11. Comparison of Biodiversity Guidebook targets to the amount of mature-plus-old forest available for the target by assessment unit (landscape unit and biogeoclimatic variant).

Landscape Unit	BEC Variant	CFLB Area (ha)	M + O Forest Target (ha)	M + O Total (ha)	% of policy target met by Mature+Old
Chemainus	MHmm1	24	9	0	0%
Cowichan	MHmm1	25	5	0	0%
French Creek	CWHxm2	2	0	0	0%
Millstone	CWHmm2	40	7	0	0%
Nitinat	CWHxm2	2	1	0	0%
Oyster	CWHxm1	3	1	0	0%
Gordon	CWHxm2	270	92	1	1%
Little Qualicum	CWHmm2	332	113	1	1%
Chemainus	CWHmm2	1,395	474	25	5%
Nanaimo	CWHxm2	671	228	17	7%
Bonanza	CWHxm2	105	36	3	7%
Gordon	CWHmm1	4,761	1,619	144	9%
Millstone	CWHxm1	64	11	1	9%
Koksilah	CDFmm	116	20	3	14%
Rosewall	CWHxm2	3,441	1,170	186	16%
Caycuse	CWHmm1	4,948	1,682	299	18%
Caycuse	CWHmm2	1,324	450	88	20%
Nitinat	CWHmm1	199	68	14	20%
Caycuse	CWHxm2	1,154	392	80	20%
Koksilah	CWHmm2	37	6	1	21%
Shawnigan	CWHxm2	80	14	3	23%
French Creek	CWHxm1	61	10	3	26%
Nanoose	CDFmm	286	49	13	28%
Englishman	CDFmm	355	121	34	28%
Koksilah	CWHxm2	639	109	31	28%
Cowichan	CWHmm2	220	37	12	31%
White	CWHxm2	1,465	747	250	33%

Landscape Unit	BEC Variant	CFLB Area (ha)	M + O Forest Target (ha)	M + O Total (ha)	% of policy target met by Mature+Old
Chemainus	CWHxm2	2,525	859	290	34%
Rosewall	CWHmm2	708	241	87	36%
China	CWHxm2	141	48	21	43%
French Creek	CDFmm	351	60	27	46%
Sooke	CWHxm1	46	8	4	46%
Sproat Lake	CWHxm2	4,561	1,551	713	46%
Upper Nimpkish	CWHxm2	24,007	8,162	3,758	46%
Cowichan	CWHvm1	152	27	13	47%
Quadra	CWHmm1	1,289	438	213	49%
Bonanza	CWHvm1	15,513	5,585	2,740	49%
Nanaimo	CWHxm1	1,698	577	285	49%
Corrigan	CWHvm1	10,229	3,682	1,822	49%
White	CWHmm1	718	366	189	51%
Nitinat	CWHmm2	322	109	57	52%
Sproat Lake	CWHxm1	1,256	427	225	53%
Marble	CWHvm1	27,671	9,961	5,471	55%
Chemainus	CDFmm	183	62	34	55%
China	CWHmm2	337	115	64	56%
Little Qualicum	CDFmm	992	337	190	56%
White	CWHvm1	15,585	8,416	4,933	59%
Rosewall	CDFmm	1,285	437	264	60%
Sayward	CWHxm1	5,038	1,713	1,064	62%
Great Central	CWHxm2	8,868	3,015	1,877	62%
Salmon	CWHxm2	15,362	2,612	1,631	62%
Cowichan	CDFmm	778	132	84	64%
San Juan	CWHmm1	4,624	1,572	1,020	65%
Gold	CWHvm1	16,498	8,909	5,981	67%
Little Qualicum	CWHxm1	443	151	102	67%
San Juan	CWHvm1	15,166	5,460	3,779	69%
Corrigan	CWHxm2	3,856	1,311	917	70%
Sayward	CWHxm2	33,566	11,412	8,413	74%
Gordon	CWHvm1	11,708	4,215	3,167	75%
Tugwell	CWHmm1	348	59	45	76%
Rosewall	CWHxm1	4,137	1,406	1,082	77%
Ash	CWHxm2	96	32	25	78%
Sayward	CWHmm1	8,286	2,817	2,204	78%
Caycuse	CWHvm1	9,107	3,278	2,598	79%
Tugwell	CWHxm2	1,634	278	222	80%
Little Qualicum	CWHxm2	1,107	376	306	81%
Chemainus	CWHxm1	3,544	1,205	981	81%
Klanawa	CWHvm1	23,386	8,419	6,911	82%
Nanaimo	CDFmm	874	297	247	83%
China	MHmm1	2	1	1	85%

Landscape Unit	BEC Variant	CFLB Area (ha)	M + O Forest Target (ha)	M + O Total (ha)	% of policy target met by Mature+Old
Quinsam	CWHxm1	487	83	71	86%
Tsitika	CWHvm1	10,246	5,533	4,795	87%
San Josef	CWHvm1	36,619	13,183	11,954	91%
Caycuse	CWHvm2	4,193	1,510	1,376	91%
Gold	CWHxm2	6,267	3,196	3,022	95%
Klaskish	CWHvm1	1,520	821	802	98%
Nitinat	CWHvm1	36,742	13,227	13,360	101%
Upper Nimpkish	CWHvm1	22,136	7,969	8,114	102%
White	CWHmm2	540	275	287	104%
Nanaimo	CWHmm2	162	55	57	105%
Nanoose	CWHxm1	295	50	53	105%
Great Central	CWHxm1	1	0	0	108%
Nahmint	CWHvm1	8,272	4,467	4,843	108%
Sproat Lake	CWHmm1	7,379	2,509	2,801	112%
Millstone	CWHxm2	3	0	1	112%
Corrigan	CWHmm2	430	146	168	115%
White	CWHvm2	8,854	4,781	5,508	115%
Gordon	CWHvm2	4,094	1,474	1,737	118%
Adam-Eve	CWHvm1	30,264	5,447	6,442	118%
Marble	CWHvm2	9,561	3,442	4,076	118%
Gold	CWHvm2	20,452	11,044	13,097	119%
Nootka	CWHvm1	31,691	11,409	13,699	120%
Tsitika	CWHvm2	8,130	4,390	5,382	123%
Nahmint	CWHxm2	56	29	35	123%
Koksilah	CWHxm1	886	151	190	126%
Salmon	CWHmm1	29,685	5,046	6,413	127%
Gordon	CWHmm2	704	240	305	127%
Klaskish	CWHvh1	15,385	8,308	10,634	128%
Tugwell	CWHvm1	2,352	423	543	128%
Tlupana	CWHvm1	19,538	7,034	9,150	130%
Mahatta	CWHvm1	21,821	3,928	5,124	130%
Cowichan	CWHxm2	2,205	375	497	132%
Toquaht	CWHvh1	819	295	396	134%
Gold	CWHmm1	8	4	5	136%
Keogh	CWHvm1	24,129	4,343	5,929	137%
San Juan	CWHvm2	5,338	1,922	2,636	137%
Sayward	CWHmm2	4,429	1,506	2,074	138%
Bonanza	CWHvm2	15,462	5,566	7,677	138%
Nitinat	CWHvm2	4,646	1,672	2,342	140%
Maggie	CWHvm2	217	39	55	141%
Sarita	CWHvm1	22,764	4,097	5,816	142%
Nahmint	CWHvm2	5,584	3,015	4,333	144%
Sproat Lake	CWHvm1	486	175	253	145%

Landscape Unit	BEC Variant	CFLB Area (ha)	M + O Forest Target (ha)	M + O Total (ha)	% of policy target met by Mature+Old
Artlish	CWHvh1	481	173	253	146%
Nahwitti	CWHvm1	2,132	768	1,125	147%
Cowichan	CWHxm1	4,614	784	1,152	147%
Kaouk	CWHvm1	13,540	4,874	7,198	148%
Shawnigan	CWHxm1	1,023	174	257	148%
Artlish	CWHvm1	7,926	2,853	4,260	149%
San Josef	CWHvm2	3,234	1,164	1,744	150%
Upper Nimpkish	CWHvm2	26,058	9,381	14,179	151%
Quadra	CWHxm2	9,492	3,227	4,885	151%
Marble	MHmm1	3,264	1,175	1,780	151%
Nahmint	MHmm1	1,623	877	1,329	152%
Maggie	CWHvm1	5,635	1,014	1,562	154%
White	MHmm1	4,699	2,537	3,921	155%
San Juan	CWHmm2	310	105	165	157%
Klaskish	CWHvm2	908	491	773	158%
Gold	MHmm1	15,011	8,106	12,832	158%
Tahsish	CWHvm1	13,780	4,961	7,967	161%
Sproat Lake	CWHmm2	2,510	853	1,372	161%
Tlupana	CWHvh1	1,452	523	847	162%
Tsitika	MHmm1	5,033	2,718	4,453	164%
Trent	CWHxm1	187	32	52	165%
Nahmint	CWHmm1	8	4	7	166%
Kaouk	CWHvh1	2,880	1,037	1,733	167%
Keogh	CWHvm2	4,798	864	1,457	169%
Klanawa	CWHvm2	1,456	524	893	170%
Shawnigan	CDFmm	598	102	174	171%
Gordon	CWHvh1	57	20	35	172%
Shushartie	CWHvh1	13,983	7,551	12,984	172%
Nootka	CWHvh1	14,127	5,086	8,778	173%
Quadra	CWHxm1	1,404	477	827	173%
Kleptee	CWHvm1	4,548	819	1,425	174%
Loss	CWHvm1	12,182	2,193	3,821	174%
Effingham	CWHvm1	12,688	4,568	7,973	175%
Corrigan	CWHvm2	2,347	845	1,492	177%
Nootka	CWHvm2	3,237	1,165	2,064	177%
Mahatta	CWHvh1	12,076	2,174	3,884	179%
Holberg	CWHvm1	26,717	4,809	8,655	180%
Caycuse	MHmm1	152	55	100	182%
Lower Nimpkish	CWHxm2	18,183	3,091	5,637	182%
Rosewall	MHmm1	241	87	160	184%
Ash	CWHmm1	3,877	1,318	2,432	185%
Klaskish	MHmm1	14	8	14	185%
Lower Nimpkish	CWHvm1	23,503	4,231	7,950	188%

Landscape Unit	BEC Variant	CFLB Area (ha)	M + O Forest Target (ha)	M + O Total (ha)	% of policy target met by Mature+Old
Effingham	CWHvh1	2,267	816	1,543	189%
Great Central	CWHmm1	7,631	2,595	4,925	190%
Sproat Lake	CWHvm2	5,755	2,072	3,935	190%
Somass	CWHxm2	1,343	228	434	190%
Walbran	CWHvm1	24,407	8,787	17,077	194%
Tsulquate	CWHvm1	11,654	4,196	8,207	196%
Toquaht	CWHvm1	8,750	3,150	6,167	196%
Gold	CWHmm2	109	56	109	196%
Cameron	CWHxm2	301	102	202	198%
San Josef	CWHvh1	40,470	14,569	29,443	202%
Escalante	CWHvm1	7,964	1,434	2,898	202%
Englishman	CWHxm1	114	39	79	205%
Neroutsos	CWHvm1	15,597	2,808	5,858	209%
San Juan	CWHvh1	192	69	146	211%
Nitinat	MHmm1	471	169	360	212%
Somass	CWHxm1	441	75	159	213%
Upper Campbell	CWHxm2	1,024	174	371	213%
Tlupana	CWHvm2	7,759	2,793	5,956	213%
Corrigan	MHmm1	683	246	535	218%
Great Central	CWHmm2	8,518	2,896	6,341	219%
Sarita	CWHvm2	2,339	421	925	220%
Holberg	CWHvh1	3,838	691	1,528	221%
Great Central	MHmm1	3,134	1,128	2,550	226%
Upper Nimpkish	MHmm1	18,527	6,670	15,115	227%
Tahsish	CWHvm2	9,032	3,252	7,403	228%
Maggie	CWHvh1	2,169	390	890	228%
Sproat Lake	MHmm1	2,430	875	2,002	229%
Nahwitti	CWHvh1	25,563	9,203	21,390	232%
Kaouk	CWHvm2	4,426	1,593	3,714	233%
Artlish	CWHvm2	4,182	1,505	3,526	234%
Walbran	CWHvm2	4,341	1,563	3,690	236%
Simms	CWHxm1	11	2	4	238%
Sayward	MHmm1	1,558	561	1,340	239%
Millstone	CDFmm	770	131	317	242%
Zeballos	CWHvm1	7,215	1,299	3,149	242%
Walbran	MHmm1	113	41	99	244%
Bonanza	MHmm1	8,476	3,051	7,435	244%
Effingham	MHmm1	324	117	284	244%
Tlupana	MHmm1	2,114	761	1,863	245%
Tugwell	CWHmm2	224	38	94	246%
Loss	CWHvh1	1,036	187	460	247%
Toquaht	MHmm1	364	131	325	248%
Ash	CWHmm2	4,996	1,698	4,232	249%

Landscape Unit	BEC Variant	CFLB Area (ha)	M + O Forest Target (ha)	M + O Total (ha)	% of policy target met by Mature+Old
Kashutl	CWHvh1	7,939	1,429	3,569	250%
Tugwell	CWHvm2	1,625	292	732	250%
Tsulquate	CWHvh1	8,165	2,940	7,370	251%
San Juan	MHmm1	735	265	664	251%
Toquaht	CWHvm2	3,235	1,165	2,934	252%
Tahsish	CWHvh1	889	320	811	253%
Effingham	CWHvm2	3,848	1,385	3,529	255%
Gordon	MHmm1	454	164	418	256%
Eliza	CWHvm1	22,312	4,016	10,369	258%
Artlish	MHmm1	992	357	923	258%
Malcolm	CWHvm1	2,633	474	1,226	259%
Kaouk	MHmm1	761	274	710	259%
Ash	MHmm1	2,452	883	2,290	259%
San Josef	MHmm1	58	21	54	260%
Tahsis	CWHvm1	19,978	3,596	9,359	260%
Nitinat	CWHvh1	2,821	1,015	2,657	262%
Salmon	CWHmm2	13,806	2,347	6,166	263%
Eliza	CWHvh1	6,827	1,229	3,249	264%
Tahsish	MHmm1	1,684	606	1,610	265%
Puntledge	CWHxm2	1	0	1	266%
Nanaimo	MHmm1	286	103	274	266%
Klanawa	CWHvh1	876	315	845	268%
Barkley Sound Islands	CWHvm1	685	123	331	269%
Walbran	CWHvh1	1,906	686	1,906	278%
Cameron	MHmm1	36	13	36	278%
Naka	CWHvm1	5,050	909	2,561	282%
Henderson	CWHvm1	17,084	3,075	8,691	283%
Holberg	CWHvm2	1,428	257	739	288%
Salmon	CWHvm1	1,323	238	698	293%
Effingham	CWHmm1	93	32	93	294%
Adam-Eve	CWHvm2	18,277	3,290	9,970	303%
Salmon	CWHvm2	1,018	183	565	308%
Puntledge	CWHxm1	101	17	53	309%
Tsolum	CWHxm1	135	23	72	314%
Mahatta	CWHvm2	6,782	1,221	3,836	314%
Kashutl	CWHvm1	22,879	4,118	13,016	316%
Keogh	MHmm1	1,136	216	693	321%
Lower Nimpkish	CWHvm2	13,636	2,454	8,052	328%
Escalante	CWHvh1	2,612	470	1,563	333%
Loss	CWHvm2	5,443	980	3,392	346%
Burman	CWHvm1	13,430	2,417	8,918	369%
Loss	MHmm1	559	106	395	372%

Landscape Unit	BEC Variant	CFLB Area (ha)	M + O Forest Target (ha)	M + O Total (ha)	% of policy target met by Mature+Old
Naka	CWHvm2	4,284	771	2,883	374%
Kleeptee	CWHxm2	681	116	438	378%
Kleeptee	CWHvm2	3,168	570	2,161	379%
Escalante	CWHvm2	3,479	626	2,409	385%
Adam-Eve	MHmm1	9,555	1,815	7,032	387%
Sarita	CWHvh1	3,681	663	2,575	389%
Sooke	CWHxm2	770	131	519	396%
Neroutsos	CWHvm2	5,123	922	3,721	404%
Henderson	CWHvm2	5,157	928	3,845	414%
Tahsis	CWHvh1	211	38	158	416%
Lower Nimpkish	MHmm1	7,379	1,402	5,829	416%
Salmon	MHmm1	8,147	1,548	6,519	421%
Upper Campbell	CWHvm1	1,537	277	1,169	422%
Henderson	MHmm1	321	61	262	429%
Zeballos	CWHvm2	4,911	884	3,805	430%
Eliza	CWHvm2	3,913	704	3,059	434%
Nigei	CWHvh1	7,036	1,267	5,553	438%
Buttle	CWHxm2	8,358	1,421	6,246	440%
Tahsis	CWHvm2	8,614	1,551	6,945	448%
Tugwell	MHmm1	106	20	91	449%
Buttle	MHmm1	7,134	1,355	6,097	450%
Burman	MHmm1	4,358	828	3,765	455%
Barkley Sound Islands	CWHvh1	2,860	515	2,357	458%
Zeballos	MHmm1	1,903	362	1,669	461%
Naka	MHmm1	2,826	537	2,519	469%
Holberg	MHmm1	152	29	135	470%
Eliza	MHmm1	118	22	106	472%
Henderson	CWHmm1	67	11	54	476%
Burman	CWHvm2	8,471	1,525	7,408	486%
Puntledge	MHmm1	1,482	282	1,371	487%
Tahsis	MHmm1	2,567	488	2,375	487%
Kleeptee	MHmm1	1,163	221	1,088	492%
Mahatta	MHmm1	345	66	327	498%
Kashutl	MHmm1	382	73	363	500%
Kashutl	CWHvm2	8,003	1,440	7,254	504%
Upper Campbell	MHmm1	2,360	448	2,285	510%
Buttle	CWHmm2	10,835	1,842	9,578	520%
Nasparti	CWHvm1	1,029	185	964	520%
Neroutsos	MHmm1	77	15	76	522%
Oyster	MHmm1	304	58	304	526%
Escalante	MHmm1	6	1	6	526%
Puntledge	CWHmm1	1,372	233	1,255	538%

Landscape Unit	BEC Variant	CFLB Area (ha)	M + O Forest Target (ha)	M + O Total (ha)	% of policy target met by Mature+Old
Nasparti	CWHvh1	12,037	2,167	11,753	542%
Upper Campbell	CWHvm2	1,000	180	984	547%
Buttle	CWHmm1	3,223	548	3,021	551%
Brooks	CWHvh1	12,569	2,262	12,501	553%
Nasparti	CWHvm2	945	170	945	555%
Kleptee	CWHvh1	1	0	1	556%
Upper Campbell	CWHmm1	1,206	205	1,156	564%
Puntledge	CWHmm2	1,670	284	1,626	573%
Upper Campbell	CWHmm2	3,318	564	3,245	575%
Burman	CWHxm2	16	3	16	588%
Oyster	CWHmm2	9	2	9	588%

8.4 Area of Old Forest by BEC Variant and Watershed within Clayoquot Sound

Table 12. Area of old forest by BEC variant and watershed within Clayoquot Sound. This table is included to provide information on how old forest (>140 years) retention occurs across BEC variants within Watershed Planning Units. Targets for retention are not applied at this level, they are applied for the whole of the Watershed Planning Unit, those results are shown in Table 4.

BEC Variant	Watershed Plan Unit	CFLB (ha)	Target old (ha)	Old (ha)	% Old
CWHvh1	Bedingfield	2823	1129	1924	68.1%
CWHvh1	Bedwell-Ursus-Bulson	202	81	133	66.0%
CWHvh1	Cypre	6016	2407	3375	56.1%
CWHvh1	Flores Island	7623	3049	7295	95.7%
CWHvh1	Fortune Channel	4511	1804	2045	45.3%
CWHvh1	Hesquiaht	11587	4635	10826	93.4%
CWHvh1	Kennedy Lake	9609	3843	2765	28.8%
CWHvh1	Sydney-Pretty Girl	220	88	167	75.9%
CWHvh1	Tofino-Tranquil	26*	10	2	6.6%
CWHvm1	Bedingfield	5618	2247	3774	67.2%
CWHvm1	Bedwell-Ursus-Bulson	10492	4197	8745	83.3%
CWHvm1	Clayoquot River	4023	1609	3912	97.2%
CWHvm1	Cypre	10401	4160	6143	59.1%
CWHvm1	Flores Island	6331	2532	6171	97.5%
CWHvm1	Fortune Channel	4157	1663	2552	61.4%
CWHvm1	Hesquiaht	9485	3794	7075	74.6%
CWHvm1	Kennedy Lake	8988	3595	4768	53.1%
CWHvm1	Sydney-Pretty Girl	15985	6394	14690	91.9%
CWHvm1	Tofino-Tranquil	5696	2278	3729	65.5%
CWHvm1	Upper Kennedy	9432	3773	6390	67.8%
CWHvm2	Bedingfield	1550	620	1357	87.5%
CWHvm2	Bedwell-Ursus-Bulson	6292	2517	5703	90.6%
CWHvm2	Clayoquot River	2072	829	1969	95.0%
CWHvm2	Cypre	5474	2190	4556	83.2%
CWHvm2	Flores Island	744	298	743	99.9%
CWHvm2	Fortune Channel	1204	482	914	75.9%
CWHvm2	Hesquiaht	1088	435	881	81.0%
CWHvm2	Kennedy Lake	2053	821	1235	60.2%
CWHvm2	Sydney-Pretty Girl	2362	945	2284	96.7%
CWHvm2	Tofino-Tranquil	2864	1146	2458	85.8%
CWHvm2	Upper Kennedy	6200	2480	5170	83.4%
MHmm1	Bedingfield	170	68	165	96.9%
MHmm1	Bedwell-Ursus-Bulson	1882	753	1202	63.9%
MHmm1	Clayoquot River	175	70	136	77.9%
MHmm1	Cypre	960	384	770	80.2%
MHmm1	Fortune Channel	43*	17	43	100.0%
MHmm1	Kennedy Lake	138	55	118	85.1%
MHmm1	Sydney-Pretty Girl	159	63	147	92.9%
MHmm1	Tofino-Tranquil	557	223	391	70.1%
MHmm1	Upper Kennedy	1388	555	775	55.9%
Total		170,626	68,250	127,498	

*Results for very small units (<100ha) can be misleading as they can be greatly influenced by the degree of accuracy in defining the BEC variant or Watershed Planning Unit boundaries. These units are included here for completeness in to show total areas for the Watershed Planning Units.

Appendix 3 – Assessment Data Assumptions, Scripting and Methodology

The CEF Old Growth Protocol conceptual model for reporting current condition of old growth forest is based on completing analysis for:

- Non-spatial assessment for old and old + mature forest in each analysis unit (Landscape Unit, BEC subzone/variant, Natural Disturbance Type) relative to Regional, Provincial legal order targets and Provincial Policy Targets
- The amount of incursions into OGMA based on OGMA legal order objectives.

Non-spatial Old Growth Seral Assessment: Input Datasets

The aspatial analysis is done using the following input datasets:

Name	Source	Date
Vegetation Resource Inventory (VRI)	WHSE_FOREST_VEGETATION.VEG_COMP_LYR_R1_POLY	Feb 2020
Biogeoclimatic Ecosystem Classification	WHSE_FOREST_VEGETATION.BEC_BIOGEOCLIMATIC_POLY	Feb 2020
Generalized Ownership	WHSE_FOREST_VEGETATION.F_OWN (2019 vintage updated with new ownership coding)	Feb 2020
Landscape Unit Boundaries	WHSE_LAND_USE_PLANNING.RMP_LANDSCAPE_UNIT_SVW	Feb 2020
Human Disturbance	Custom dataset created for the Provincial Cumulative Effects Framework	Dec 2019
Legal Land Use Planning	WHSE_LAND_USE_PLANNING.RMP_PLAN_LEGAL_POLY_SVW	Feb 2020
Non-Legal Land Use Planning	WHSE_LAND_USE_PLANNING.RMP_PLAN_NON_LEGAL_POLY_SVW	Feb 2020
Tree Farm Licenses	FAIB data	Aug 2019

The analysis is done one Landscape Unit at a time and by the following components:

1. Determination of Crown Forest Lands Base
2. Determination of Seral Stage
3. Calculation of Percentage Old and Percentage Mature plus Old
4. Comparison of existing percentages to Legal Orders and Biodiversity Guidebook targets

Cumulative Effects Crown Forested Landbase (CE CFLB) Definition:

The CFLB is defined as provincial Crown land with forest cover managed for timber supply or other forest management objectives. This layer includes all Crown forested land, area-based tenures like Tree Farm Licenses, , Community Forests and First Nations Woodland Tenures, all forested portions of provincial parks, protected areas, ecological reserves and Federal Parks. The CE CFLB is purposely different from a TSR CFLB due to the specific analysis objectives and questions associated to current condition reporting, and the challenges associated from Regional variability applied in developing TSR CFLB definitions. This Regional and Provincial inconsistency with the TSR CFLB makes it difficult to accommodate a standardized analysis approach required in CE reporting for old growth.

The seral stage and current condition assessment of old growth and mature + old forest retention was done on the Crown Forested Land Base (CFLB) only and not further classified by the Timber Harvesting Landbase (THLB) or Non-contributing Landbase (NC). CFLB is determined using information from the Vegetation Resource Inventory (VRI) and the Generalized Forest Cover Ownership (FOWN). VRI is used to determine the Forest Management Land Base (FMLB) and FOWN is used to determine Crown land.

Crown Land from FOWN was customized to create 4 types of ownership: 1) Crown _Forest, 2) Protected, 3) Federal, 4) Private

Crown_Forest	Protected	Federal	Private
62C: Crown – Forest Management Unit	60: Crown Conservancy Area, Ecological Reserve, Protected Area, Provincial Park	50: Federal Reserve	40: Private
68U: Forest Recreation Reserve		51: National Park	41: Treaty Lands
69C: Crown – Community Watershed	61: Crown UREP Reserves	52: Indian Reserve	
69U: Misc Reserves, Watershed Reserves, Misc Reserves (Caribou)	63: Crown BMTA (biodiversity, mining, tourism areas)	53: Military Reserve	
70C: Crown – Active Timber Licence in TFL	64: Crown SFMA (special management forest area)	54: Dominion Government Block	
70N: Crown - Active Timber Licence in TSA	65: Crown WMA (wildlife management area)		
72B: Crown – Schedule B Land TFL	66: Crown RA (recreation area)		
74N: Crown – Timber Alienated Watershed	67: Crown HS (heritage site)		
75N: Crown – Christmas Tree Permit			
78: Crown – First Nations Woodland Licence			
79B: Crown – Community Forest, Schedule B			

For this assessment the categories of “Crown_Forest” and “Protected” were treated as being Crown Land. “Federal” and “Private” categories were excluded from the analysis. Provincial and Federal Parks are included in the CFLB whereas IR, Military Reserves are not. Some of the larger parks such as Entiako, Robson Valley, Strathcona, Wells Gray or Yoho National Park cover entire landscape units. These landscape units would not be assigned a BEO which means there is no old growth target for old and mature + old to compare against for in seral assessment results. These Landscape Units would be assigned as No Target in assessment mapping and reporting results.⁷

Non-Spatial Old Growth Analysis Methodology

Union Datasets: The input datasets are clipped by landscape unit and then unioned to create the analysis units.

- 1. Calculate Cumulative Effects Crown Forest Land Base (CE CFLB):** The CE CFLB is determined by ownership type and Forest Management Land Base from the VRI. CFLB is calculated by selecting “crown” land (OWN in (51, 60, 61, 62C, 63, 64, 65, 66, 67, 68U, 69C, 69U, 70C, 70N, 72B, 74N, 75N, 78, 79B) within the Forest Management Land Base (FOR_MGMT_LAND_BASE_IND = ‘Y’).
- 2. Adjust for Human Disturbance:** Where the CEF disturbance layer indicates the land has been disturbed the forest age is revised to 0. This includes buffering of roads and other linear features (e.g. fire guards and recreation trails).
- 3. Calculate Seral stage for Old, Mature, Mid and Early:** Seral Stage is determined by comparing the forest age in the VRI to the thresholds which are defined in the Legal Orders and Biodiversity Guidebook by Natural Disturbance Type and by BEC zone. For example, in NDT1 CWH in a Low BEO Landscape Unit has:
 - Early Seral 0-39
 - Mid Seral 40-80
 - Mature Seral 81-250
 - Old Seral > 250
 - Old Growth Target 13%
 - Old + Mature Target 18%

⁷ It is recommended that for the Landscape Units that are designated entirely as a Park, future old growth current condition reporting should default to High BEO as to include these LU’s in seral assessment reporting.

4. **Results Calculation:** The total CFLB area of each seral stage by BEC subzone is calculated. The percentage of old and old plus mature in CFLB is then calculated. The area of old required to meet the target is calculated based on the summed CFLB area and the percentage target.
5. **Current Condition Calculation Status:** The Old Status and Old plus Mature Status are calculated by comparing the existing percentages to the target percentages in the CFLB. The existing percentage old and old plus mature is then compared to the targets defined in the Legal Order and the Biodiversity Guidebook and assigned a category for current condition. These categories are based on the Percent of target met with Old Forest (and Old +Mature) by LU and BEC subzone/variant:
- 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
 - Over 125% of target met
 - No target

Vancouver Island Specific Data Assumptions:

Vancouver Island Land Use Plan Special Management Zones (VILUP SMZ)

VILUP designated Special Management Zones with mature targets of 25% – 33% with no old growth target. The SMZ's boundaries do not always follow landscape unit boundaries. Based on Regional guidance derived from legal advice and TSR assumptions, a 25% target for mature+old No this is not required just the one by LU/BEC delete the SMZ assessment was used in the CE assessment. Even though the SMZ overlaps Landscape Units and BEC subzones, the mature target is assigned to the entire SMZ polygon. Therefore, it is possible for a piece of land to meet a target based on the LU analysis but not meet the target based on the SMZ analysis.

Clayoquot Sound

The Clayoquot Sound Watershed Plans are a special case. Old growth targets of 40% are set for all Clayoquot Sound Watershed Plans. There are no mature plus old targets. The following table outlines the Clayoquot Sound Watershed Plans used in this CCR:

Names
Beddingfield Watershed Plan
Bedwell-Ursus-Bulson Watershed Plan
Clayoquot River Watershed Plan
Cypre Watershed Plan
Flores Island Watershed Plan
Fortune Channel Watershed Plan
Hesquiaht Watershed Plan
Kennedy Lake Watershed Plan
Sydney-Pretty Girl Watershed Plan
Tofino-Tranquil (Onadsilth-Eekseuklis) Watershed Plan
Upper Kennedy Watershed Plan

Tree Farm Licenses and Private Land

There are portions of Vancouver Island that have no VRI data because they are Tree Farm Licences (TFLs) or private land. To accommodate this data gap, the best available information for TFLs from the Forest Analysis Inventory Branch (FAIB) was used.

Spatial Old Growth Management Area (OGMA) Analysis and Methodology

The OGMA analysis used the following data layers:

Name	Source	Date	Description
Legal OGMA	WHSE_LAND_USE_PLANNING.RMP_OGMA_LEGAL_CURRENT_SVW	Feb 2020	
Non-legal OGMA	WHSE_LAND_USE_PLANNING.RMP_OGMA_NON_LEGAL_CURRENT_SVW	Feb 2020	
Winter Ungulate Range	WHSE_WILDLIFE_MANAGEMENT.WCP_UNGULATE_WINTER_RANGE_SP	Nov 2021	A mapped area of habitat associated with species-specific management requirements.
Human Disturbance		Dec 2019	Custom dataset created for the Provincial Cumulative Effects Framework.

The OGMA incursion assessment uses the seral stage assessment CFLB resultant data set as does the Aspatial target assessment described below. All assessments are based on the **Cumulative Effects Crown Forested Landbase (CE CFLB) as described above.**

Analysis and Methodology

Union Datasets: The input datasets are clipped by landscape unit and then unioned to create the analysis units.

1. Calculate Cumulative Effects Crown Forest Land Base (CE CFLB): The CE CFLB is determined by ownership type and Forest Management Land Base from the VRI. CFLB is calculated by selecting “crown” land (OWN in (51, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 72, 74, 75, 78, 79, 80) within the Forest Management Land Base (FOR_MGMT_LAND_BASE_IND = ‘Y’) and selecting from Ownership using the above coding.
2. Adjust for Human Disturbance: Where the CEF disturbance layer indicates the land has been disturbed the forest age is revised to 0. This includes buffering of roads and other linear features (e.g., fire guards and recreation trails).
3. Calculate Seral stage for Old, Mature, Mid and Early: Seral Stage is determined by comparing the forest age in the VRI to the thresholds which are defined in the Legal Orders and Biodiversity Guidebook by Natural Disturbance Type and by BEC zone. For example, in NDT1 CWH in a Low BEO Landscape Unit has:
 - Early Seral 0-39
 - Mid Seral 40-80
 - Mature Seral 81-250
 - Old Seral > 250
 - Old Growth Target 13%
 - Old + Mature Target 18%
4. Results Calculation: The total CFLB area of each seral stage by BEC subzone is calculated. The percentage of old and old plus mature in CFLB is then calculated. The area of old required to meet the target is calculated based on the summed CFLB area and the percentage target.
5. Add Vancouver Island Reserves: Region data representing reserves such as Old Growth Management Areas (OGMAs), Ungulate Winter Ranges (UWR), Wildlife Habitat Areas (WHA) and Coastal Douglas Fir moist maritime (CDFmm) were added by intersecting.

6. Calculate Summary Tables: the augmented resultant was exported to MS Access where a series of queries were developed and run on the resultant to summarize Landscape Units' Old Growth targets performance.

OGMA Incursions

OGMAs have been legally established in parts of the province, exist in a “non-legal”/DRAFT status in other parts of the province and in some places do not exist at all. The spatial old growth analysis is an assessment of incursions into OGMA's from human disturbance (forestry and non-forestry related) as compared to OGMA Legal Orders. This spatial analysis examined both legal and non-legal/DRAFT OGMAs.

Orders legally establishing OGMAs vary considerably across the province. Some orders have a fixed incursion limits (either hectare amounts or percentage of OGMA area), others have variable incursion limits based on the size of the OGMA and others require that all incursions are replaced with ecologically equivalent areas (therefore no incursion threshold). Non-legal OGMAs generally do not have set incursion limits, although in some parts of the province, incursion limits exist for non-legal OGMAs (i.e., Merrit, Okanagan Regional Guidance for non-legal OGMA's). All these variations in incursion limits were considered in this analysis.

For the Vancouver Island OGMA Incursion Assessment, there was a zero tolerance for incursions as all incursions into an OGMA require a replacement (as required by Legal Orders). If there was an incursion detected in the OGMA assessment, it was reported.

Definition of Incursion

Incursions included all types of development found in the Cumulative Effects Consolidated Development Layer: roads, forest cut blocks, urban, oil & gas including seismic lines, mines, fire guards and other industrial.

For the OGMA incursion analysis, only “current” incursions were considered. This means that cut blocks and seismic lines from the CE development layer that were more than 20 years old or pre-date the legal establishment of the OGMA not used in assessment reporting.

The OGMA incursion assessment did not consider natural disturbance from wildfires or insect outbreaks due to the lack of updated and reliable inventories in the BCGW. Future assessments should attempt to include natural disturbance data if the information is accessible and improved.

Known Issues

- 1) Many OGMAs in the province were established with pre-existing development (roads, pipelines, seismic lines, trails, cutblocks) within the polygon under the assumption they are no longer considered a disturbance. Much of this disturbance data lacks dates of when the disturbance occurred and remove from the OGMA. for the sake of this assessment, these incursions (except for cutblocks and seismic lines) were included in the total incursion reporting. This results in significantly skewed outcomes of the OGMA incursion analysis. Future OGMA incursion assessment should attempt to differentiate incursion disturbances between pre and post OGMA establishment.
- 2) The 2020 version of BEC (version 11) from the BCGW was used in the assessment, which has been updated since OGMAs were originally established. This has resulted in OGMA's being reported in incorrect or new BECs (e.g., alpine.)



Ministry of
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CEF Cumulative
Effects
Framework