

Interim Assessment Protocol for Old Growth Forest in British Columbia

*Standards for British Columbia's Cumulative Effects Framework
Values Foundation*

Prepared by

Provincial Old Growth Forest Technical Working Group – Ministry of Forests, Lands, Natural Resource Operations and Rural Development – for the Value Foundation Steering Committee

Approved by

Interim Approval by NRS ADMs January 2017

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Note: The protocol outlined in this document is subject to change based on regional updates, as well as periodic updates to reflect continuous improvement of the protocol.

Document Control

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Executive Summary

This report outlines the protocol for two types of assessments of old growth forest objectives in British Columbia (B.C.):

- Old and old and mature retention
- Incursions into Old Growth Management Areas (OGMAs).

This protocol has been developed to be consistent throughout the province while providing flexibility to address the variability in management direction for old growth forests in each region. The protocol was developed by a team of regional B.C. Government staff knowledgeable in policy, assessment, decision support and data management /Geographic Information Systems (GIS), relative to the management of old growth forest.

The protocol outlines the conceptual model for the assessment of old growth forest objectives and describes the key elements of each assessment—including analysis questions, indicators and components, data requirements, and reporting outputs for each assessment.

The components of these assessments will be implemented in two phases:

Phase 1:

1. Assessment of objectives for old growth forest and old and mature retention (e.g. what is the amount of old and old and mature forest, compared to the legally established targets in each analysis unit).
2. Assessment of incursions into OGMAs as specified in legal orders and regional policy.

Phase 2:

1. Assessment of old forest in interior condition within each analysis unit and OGMA as compared to targets and/or policy for old interior forest;
2. Assessment of natural disturbance in each OGMA since establishment;
3. Assessment of the amount of old and old and mature forests within OGMAs;
4. Amount of old and old and mature in protected and constrained areas; and,
5. Assessment of the amount of old and old and mature within OGMAs as compared to the *Biodiversity Guidebook* targets and/or the Provincial Old Growth Forest Order.

Details of Phase 1 assessments are described in this protocol and are to be applied throughout B.C., once piloting in specific areas is completed. Phase 2 assessments are recommended to be completed in future iterations.

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1.0 Background

1.1 Introduction

Old growth forests have ecological, economic, social and cultural value to the people of British Columbia (B.C.). Their importance is reflected in provincial legislation, regulations and policies. Old growth forests are important to First Nations, both spiritually and for ongoing traditional resource use. However, old growth forests are impacted by multiple resource development activities and natural disturbance events, making them subject to cumulative effects.

Legal objectives for old growth forest retention are in place for forested Crown land throughout B.C., either spatially defined in old growth management areas (OGMAs), or through non-spatial landscape level targets that are applied within Forest Stewardship Plans (FSPs).

Management direction for old growth forests, both spatial and non-spatial, is set out in legal Orders, typically within timber supply areas (TSA). The specifications in these legal Orders vary across regions, with differences in the age based definitions of old growth forest, the age, amount to retain (e.g. targets) and analysis units. As a result, tracking the achievement of old growth forest objectives across the province is complicated.

Old growth forest is a core value identified under the B.C. Cumulative Effects Framework (CEF) which consists of policy, procedures and decision-support tools to mitigate potential cumulative effects on values.

This old growth forest assessment is closely linked to the forest biodiversity assessment, as old growth forest is an important component of forest biodiversity. The old growth forest assessment focuses on old growth forest management delivered through legally established objectives. The forest biodiversity assessment takes a more holistic and landscape perspective using multiple indicators of biodiversity condition (e.g., seral stage distribution, interior forest condition amount, etc.).

1.2 Purpose of this Document

The protocol describes two consistent procedures to assess old growth forest in B.C. One procedure produces an assessment of the current condition of old and old and mature forest within analysis units (e.g. landscape units, natural disturbance units). The other assesses the amount of incursions into OGMAs, relative to the allowed established limits of incursion.

These procedures are performance-based assessments of management risk (the risk that the Province is not meeting its stated objectives for old growth forest retention). The assessments are separate from, but will complement work by the Forest Biodiversity Technical Working Group to assess ecological risks associated with current and future projected seral stage distribution, including old and mature forest.

For these procedures, the term “current condition” is defined as the current amount of forest, in hectares, in an old and old and mature age class, and is based on the available Provincial GIS data.

1.3 Development of the Old Growth Forest Assessment Procedures

The procedures described here were developed by a team of regional B.C. government staff knowledgeable in policy, assessment, decision support and data management /GIS relative to the management of old growth forest. The Old Growth Forest Values Foundation Team (Old Growth Forest Team) discussed assessment procedures at a workshop on February 4 and 5, 2015 and refined the definitions and parameters of each assessment procedure during conference calls and reviews.

The discussion about assessment procedures was informed by two documents:

1. *Knowledge Summary of Old Growth Forest Management in B.C.*
2. *Assessment of Old Growth Forest Objectives in B.C.: Comparison of Methods*

These draft assessment procedures will be piloted in 26 landscape units throughout B.C. The results will be used to refine the procedures. A peer review will also be conducted prior to finalizing the assessment procedures and implementing them province-wide (see Section 6- Project Implementation).

2.0 Management of Old Growth Forest in B.C.

2.1 Regulatory Context

Objectives for old growth forest management are established under two forms of legislation in B.C.: the *Forest Practices Code of B.C. Act* and the *Land Act*. Default targets for management of old growth forest are specified in the Provincial Non-Spatial Old Growth Forest Order (PNOGO) (2004), which sets out a percent amount of old forest to be maintained across the province. PNOGO establishes landscape units and sets out targets for the percentage of old forest to be retained within each landscape unit by Biogeoclimatic Ecosystem Classification (BEC) variant, consistent with direction in the Biodiversity Guidebook¹ and Landscape Unit Planning Guide². Targets vary by natural disturbance type (NDT 1 to 4) and biodiversity emphasis (Low, Intermediate or High). Separate targets for old growth forest retention for the Okanagan and Merritt TSAs are set out in Appendix 2 of PNOGO.

To minimize economic impacts to forest tenure holders, the PNOGO contains provisions that allow the use of younger forests to meet old growth forest objectives where equal or better conservation benefits would result. Additionally, provisions exist to recruit from younger stands when there is insufficient old growth forest in a variant.

¹ Biodiversity Guidebook <http://www.for.gov.bc.ca/hfd/library/documents/bib19715.pdf>

² Landscape Unit Planning Guide <http://www.for.gov.bc.ca/tasb/slrp/policies-guides/LUGuide.pdf>

Subsequent land use orders have superseded the PNOGO in many parts of the province. The direction for managing old growth forest forests has evolved as new strategic land use plans are completed and legal objectives established. Earlier orders were established under the *Forest Practices Code Act* and subsequent orders are established under section 93.4 of the *Land Act*. Some orders contain non-spatial objectives for old growth forest retention. Other orders establish OGMAs as spatially defined areas that meet old growth forest retention targets across the landscape.

2.2 Approaches to Management of Old Growth Forest

Overall, there are generally three approaches to old growth forest management in B.C.:

1. Non-spatial objectives for old growth forest retention – Targets are set by BEC unit (zone, subzone, variant or site series/ site series surrogate) and are typically analyzed by Landscape Unit, unless otherwise specified in the order. Some orders reference their definition of old growth forest from the Biodiversity Guidebook but some have modified definitions. . In northeastern B.C. (Omineca and Northeast regions), old growth forest is managed by natural disturbance unit (NDU) to better emulate natural disturbance patterns in boreal forests³.

2. Legal OGMAs –The boundaries of OGMAs are spatially defined in an Order under the *Forest Practice Code Act* or the *Land Act*. Forest tenure holders must apply results and strategies to meet objectives for OGMAs in their FSPs and must abide by direction in the Order with respect to incursion limits and requirements for replacement. A number of OGMAs in northern B.C. have also been established under the *Oil and Gas Activities Act* (OGAA).

3. Non-legal OGMAs – In some regions, the Province has spatially defined OGMAs but they are either (a) in draft form awaiting legal establishment; or (b) will not be made legally binding. Where OGMAs are not intended for legal establishment, tenure holders can choose whether to use these OGMAs or choose another approach to meeting objectives for old growth forest retention. Once tenure holders include non-legal OGMAs in approved FSPs, they become legal.

³ S.C. DeLong. Land units and benchmarks for developing natural disturbance-based forest management guidance for northeastern British Columbia. Province of B.C.
<http://www.for.gov.bc.ca/hfd/pubs/Docs/Tr/Tr059.pdf>

3.0 Conceptual Model of Old Growth Forest Assessment

Figure 1 outlines the conceptual model for old growth forest assessment. There are two components to old growth forest management: spatial and non-spatial (green boxes). To measure how these components are being managed, two types of indicator assessments will be completed (red boxes); 1) assessment of current condition of old and old and mature forests relative to objectives/ targets; and 2) assessment of incursions into OGMA based objectives/target. The assessment of current condition based on legal objectives for old growth forest retention will include:

1. Seral Assessment

- Amount of old and mature forest in each reporting unit (landscape unit, natural disturbance unit or other) relative to established targets for old forest or old + mature forest,
- Amount of old and mature forest in each OGMA relative to targets for old forest or old + mature forest, For the purposes of this analysis, the targets for old forest established in the Biodiversity Guidebook are used as a reasonable surrogate where old forest retention objectives for OGMA are not available in the Orders.

2. Assessment of incursions into OGMA:

- Area of incursion into OGMA from human activities (forestry and non-forestry-related) relative to limits of incursion set out in legal Orders or in policy.

The old growth forest value is assessed against specific objectives (as outlined in the [Cumulative Effects Framework Interim Policy](#)), where the desired conditions for the components can be described quantitatively (e.g. legal objectives).

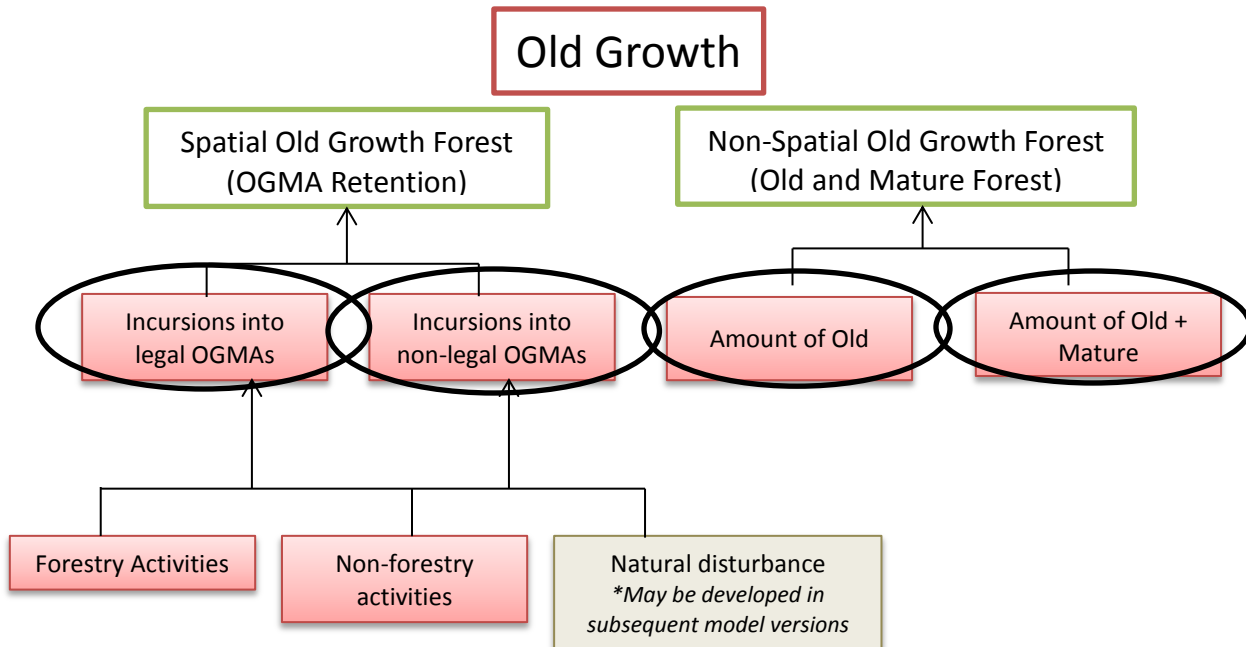


Figure 1: Conceptual Model for the old forest value. This model provides a high-level summary of the system and the assessments. The black circles identify the indicators that are used in the assessment.

4.0 Assessment of Objectives for Old Growth Forest Retention

The purpose of this assessment is to compare the amount of old growth forest currently on the landbase to targets in the legal Orders, reporting by the units specified in each Order.

The inputs to the assessment of objectives for old growth forest retention are:

- Overlap a forest age-class layer themed by seral stage definitions for “old” or “old and mature” (old + mature);
- determine how much old or old + mature is present in each reporting unit and OGMA; and
- Compare these outputs to the targets for old or old + mature in each reporting unit.

This assessment is complex at a provincial scale. Each legal Order has a distinct combination of seral stage definitions, reporting units, and targets for old growth forest retention. A draft spreadsheet is available that summarizes the current set of objectives for old growth forest retention in each FLNRO region.

4.1 Analysis Questions

The following analysis questions aim to determine the current condition of old forests relative to objectives for old growth forest retention. Question 1 will be addressed during Phase 1 of the project and Question 2 will be addressed during Phase 2 (see Section 6-Project Implementation).

Phase 1 Question:

Q1. Does the current amount of old forest, as defined in the Order, meet the minimum targets for old seral retention and old + mature seral retention within each reporting/analysis unit (landscape unit, natural disturbance unit or other)?

Note: Where regionally-specific targets are not specified in a legal Order, the default will be the targets in the Biodiversity Guidebook.

Phase 2 Question:

Q2. Does the current amount of old interior forest⁴ as defined in the Order, meet the minimum targets for old interior forest within each reporting/analysis unit and OGMA?

⁴ The Province of British Columbia Biodiversity Guidebook (1995) defines Interior forest as the edge environment between older forest and newly harvested areas that affects conditions within the forest (e.g. light, temperature, wind). These microclimatic edge effects penetrate into the forest to varying distances, usually 100-200m into the forest.

4.2 Analysis Indicators

Based on the analysis questions above, the following are indicators for the assessment of old growth forest retention. Analysis/reporting units will vary, depending on the specifics in each legal Order.

Phase 1 Indicators:

- Amount of old forest, as defined in the Order, in each analysis/reporting unit.
- Amount of old + mature forest, as defined in the Order, in each analysis/reporting unit.

Phase 2 Indicators:

- Amount of old and old and mature in constrained areas;
- Amount of old forest, as defined in the Order, in OGMA's;
- Amount of old forest within non-legal OGMA's;
- Amount of old forest in interior forest condition with each analysis unit and OGMA;
- Amount of natural disturbance in each OGMA since establishment; and,
- Size and distribution of OGMA's according to legal order.

4.3. Inputs to Phase 1 Assessment of Objectives for Old Growth Forest Retention

Core inputs to the assessment are:

1. A 'look-up' table that sets out the definitions of old, mature and old + mature and the targets for old, mature and old + mature by analysis unit for each legal Order;
2. A consolidated spatial layer of reporting units by legal Order;
3. The existing OGMA layer from the B.C.GW;
4. Private and federal lands, including Indian Reserves, are excluded from the assessment. The exception is national parks, which were included and deemed compatible with objectives for old growth forest retention.

This assessment of old growth forest retention uses the Crown Forested Landbase (CFLB) as the base forest layer. The definition of CFLB, for the purposes of this assessment process is, in the latest Vegetation Resource Inventory layer, the combined fields of (i) forest management landbase (select YES); and (ii) f_own = everything except private and federal lands other than national parks (select where ownership =50, 51, 60, 61, 62, 63, 67, 68,69. If the area includes TFL, Woodlots, Community Forests, First Nations Woodland Licences area based tenures add in 70, 72, 74, 75, 77, 78, and 79).

Other data needs are described in section 4.6 Data Requirements.

The assessment will not identify and separate out areas of recruitment within OGMAs.

4.4 Outputs of Phase 1 Assessment of Objectives for Old Growth Forest Retention

The outputs of the assessment of objectives for old growth forest retention are as follows:

Q1. Does the current amount of old forest and old + mature forest meet the minimum targets for old seral retention and old + mature seral retention within each reporting unit (landscape unit, natural disturbance unit or other)?

For each reporting unit in the legal Order:

- Total area (including land and freshwater and islands); and
- Total area of CFLB.

For each analysis unit in each reporting unit:

- Amount and % of old/old +mature forest reported by (a) total area; and (b) CFLB;
- Amount of old/old+mature required to meet the target;
- % of old/old+ mature target above or below the legal target (using the CFLB as denominator).

Note: In the few units that have targets to the site series level, if site series data is not readily available, reporting will be to the BEC variant level (see Section 4.6- Key Data Issues).

Results by Reporting Unit: Current Condition Reports:

Gradient blue scale showing % of OG target (with range from %+ (above old growth forest target) to %- (below old growth forest target))

Cumulative Effects Assessment and Management Reporting (CEAM)

In CEAM reports when management review triggers have been approved, colours will be used to spatially report findings to facilitate use in review and decision-making⁵. The colour codes are as follows:

Orange – Intensive Management Review Class: Objective not met, existing old below target old growth forest amount i.e. <100% of target

Yellow – Enhanced Management Review Class: Objective met but nearing objective, existing old $\geq 100\%$ and <X% (to be confirmed*) of target old growth forest amount

Green - Standard Management Review Class: Objective Met plus X% (to be confirmed*), existing old $\geq X\%$ above target old growth forest amount

The reporting is to the level of BEC subzone variant to identify any variants that are particularly vulnerable to additional harvesting.

**NOTE: The management review triggers to define management review classes for the old and old + mature retention assessment will be confirmed in the future, and the protocol updated accordingly.*

Q2. Does the current amount of old forest, as defined in the Order, meet the minimum targets for old seral retention and old + mature seral retention within each OGMA?⁶

⁵ CEAM Reporting may be completed at the regional level. Refer to the October 2016 Cumulative Effects Framework Interim Policy additional information on CEAM Reporting.

For each OGMA:

- Amount and % of old/old+mature forest reported by a) total area; b) CFLB;
- Amount of old/old+mature required to meet the legal target (where relevant); BGB targets are used as a surrogate where no legal targets exist;
- % of old/old+mature target above or below the legal target (using the CFLB as denominator).

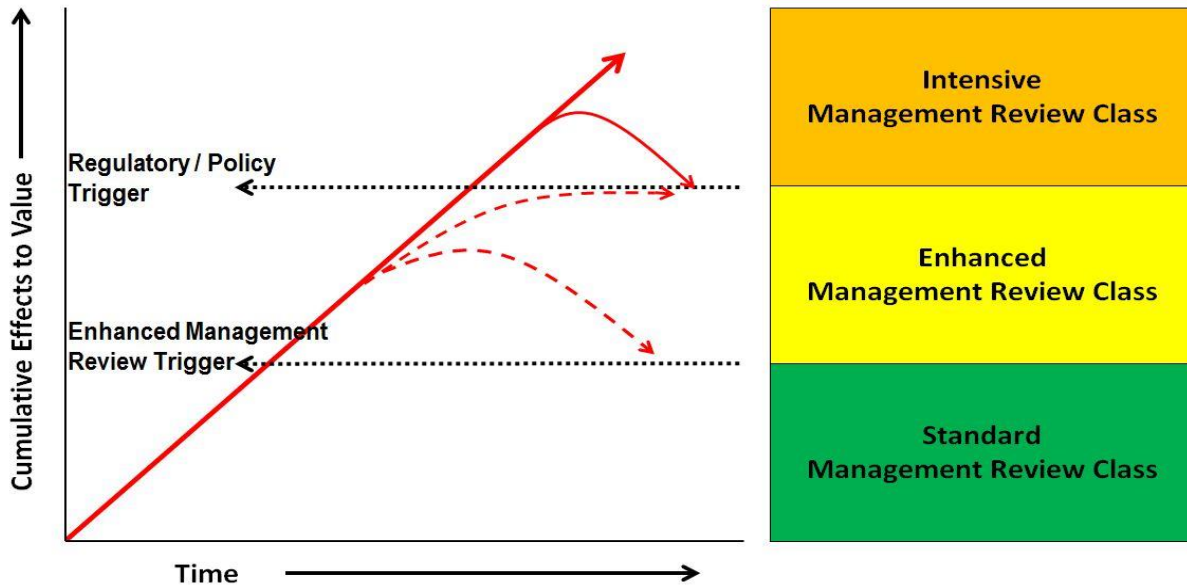


Figure 2: Cumulative Effects Assessment and Management Reporting categories for old growth forest retention in each reporting unit.

⁶ The current condition of old and old and mature forest in each OGMA may be completed during Phase 2 of the assessment.

4.5 Type of Assessment Model

All regions have undergone their own assessments of the amount of old growth forest relative to legal targets. The methods have varied somewhat, being vector- or raster-based and using Excel spreadsheets or Python scripts. A number of these assessments are compared in a companion document to this report titled “Comparison of Old Growth Forest Assessment Procedures”.

The approach, agreed to by the Old Growth Forest Team, is to create a set of inputs, as described in section 4.3, that can be applied and run in any model. This will allow the model to run using the raster-based provincial Landscape Level Biodiversity Tool (LLDB Tool) or a vector-based model. It will also allow definitions and targets to be updated in the future as Orders are amended.

Not all of the legal Orders are able to be assessed using the procedures described here. The assessments for the Great Bear Rainforest (Central and North Coast Order, South Central Coast Order and Haida Gwaii Land Use Agreement) and Clayoquot Sound are based on site series or site series surrogates and complex and evolving rules about old forest retention. Complex assessment models for those areas have already been developed and are run annually by the West Coast region. To avoid duplicating the considerable effort to re-create those models, the Old Growth Forest Team determined to use the West Coast regional analysis outputs. The targets for the Vancouver Island Land Use Plan, which is also in the West Coast region, will be included in the provincial assessment.

4.6 Data Requirements

To the extent possible, the assessment of seral stages will be based on age classes in the current Vegetation Resource Inventory (VRI) layer, updated using cutblock and road information and areas of within-stand retention as reported in the B.C. Ministry of Forests Lands and Natural Resource Operations (FLNRO) Reporting Silviculture Updates and Land status Tracking System (RESULTS). Where VRI is not available, the back-up is to use the Forest Land Classification from the Baseline Thematic Mapping layer or the forest cover inventory that preceded VRI (fc_1). As with any analysis, the reliability of the assessment outputs is dependent on the quality of the inventory layers used as inputs.

The following are required as core datasets for the assessment of objectives for old growth forest retention:

1. A consolidated spatial layer of all the reporting units by legal order by TSA. Reporting units vary by legal Order. Most are landscape units but the Omineca and Northeast regions use NDUs / TSA and some other regions report old growth forest retention by special management zones. Each reporting unit will need to be coded for the purpose of our OG spreadsheets.
2. An up-to-date OGMA layer that incorporates additions and deletions to the current year (see below);
3. The most current BEC layer by NDT (see below).
4. A "look-up table" that lists:

- Definitions of all seral stages (as defined in the legal orders) by reporting unit. We call these "legal seral" definitions, to distinguish them from the "ecological seral" definitions set out in the BDGB; and
- Targets for old forest retention and old + mature forest retention.

The fields in the look-up table are defined in Appendix A, Table A1.

4.7 Key Data Issues

The following are issues that were encountered and are identified below:

1. How to deal with differing versions of Biogeoclimatic Ecosystem Classification?

Issue: Many of the legal orders for old-growth retention were established over ten years ago and many have targets that name specific BEC subzones/variants. Both the BEC classifications and boundaries have changed over time and these changes could potentially affect the amount of old-growth required in a landscape unit or other reporting unit.

Proposed resolution:

- For reporting units: Use the original reporting unit boundaries at the time each legal order was established. For example, the NDU boundaries in the north were developed based on BEC lines at the time. Even though those BEC lines may have changed, the current assessment will use the original NDU layer to avoid the need to revisit spatial mapping and implications for licensees and their forest stewardship planning.
- For analysis units: Use the latest version of BEC (v9 in February 2015)
- Identify the legal Orders that specify outcomes by an old BEC version and, develop a cross-reference from the version of BEC at the time the Order was established to new BEC, as follows:
 - Where the BEC lines have changed but not the classifications, use the boundaries in the current BEC version and assume that the changes just better define the ecology of the subzone/variant so the intent of the legal order is still met.
 - Where there have been changes in classification, use expert opinion to determine how to translate the original BEC subzone/variant / NDT combo into its equivalent in version 9. Since this project is only looking to ensure the legal order is met, it may be adequate to ensure that the BEC unit is within the same NDT or NDU and, if it is not, what to do about that.

2. Up-to-date OGMA layer.

Issue: Most of the legal Orders to establish OGMAs describe conditions in which incursions into the OGMAs are permitted and define rules for when a replacement area of OGMA must be identified and under what conditions. Forest districts require tenure holders to report deletions from individual OGMAs and additions in new locations. Ideally these will be updated annually and an updated OGMA layer submitted to the B.C.GW but this does not occur uniformly across the Province.

Proposed resolution:

- To fully and effectively implement this assessment procedure, in the short-term and on an ongoing basis, regions will work to incorporate OGMA additions and deletions and assemble these into an up-to-date OGMA layer.

3. Targets by site series

Issue: Some areas require targets for old growth forest retention to be met for individual site series, as identified through terrestrial ecosystem mapping. Although surrogates can be used to estimate site series (e.g., predictive ecosystem mapping) analyzing and reporting to this scale creates additional complexity and effort.

Proposed resolution:

- In the units with targets for old growth forest retention by site series, if site series data is not readily available, reporting will be to the BEC variant level. Some regions have reported that areas with site series targets tend to be of higher conservation value, therefore retention of old growth forest is already high and analysis to the site series scale is not considered necessary.
- As mentioned above, old growth forest targets in the Central and North Coast and South Central Coast Orders, the Haida Gwaii Land Use Agreement and for Clayoquot Sound are based on site series or site series surrogates. The Old Growth Forest Team will use the West Coast regional analysis outputs rather than trying to recreate these assessments at a provincial level.

4. Tree Farm License data

Issue: Holders of tree farm licenses (TFLs) hold their forest cover data as proprietary information; therefore data is only available to the Province with the agreement of the license holder. Even where this data is available it is not always complete, current or publically accessible.

Proposed resolution:

- If and where the TFL data is publically accessible in the BCGW, it will be included in the assessments.

5.0 Assessment of Incursions into Old Growth Forest Management Areas (OGMAs)

5.1 Analysis Question

To assess the amount of incursion into OGMAs, the following analysis question will be addressed during Phase 1 of the project.

Question: Is the current amount of human-caused incursion within the limits specified in the Order or in policy for the OGMA?

5.2 Analysis Indicators

Based on the above analysis question, the following are indicators for the assessment:

Phase 1 Indicator:

- Area of incursion into each OGMA as a result of forestry and non-forestry-related activity, relative to limits specified in the Orders or in regional policy.

Phase 2 Indicator:

- Proportion of each OGMA experiencing natural disturbance since the legal Order was established.

5.3. Inputs to Phase 1 Assessment of Incursions into OGMAs

Two spatial layers are required for the assessment of OGMAs:

1. An up-to-date OGMA layer that incorporates additions and deletions to the current year (see Section 5.6- Data Requirements); and
2. A “development layer” that spatially defines permitted development activities, both forestry and non-forestry related.

These two layers described will be overlaid to determine the area of each OGMA that is affected by development. Outputs from this analysis will be compared, using a separate look-up table that reports limits of incursion into OGMAs, as set out in each Order or in regional policy.

5.4 Definitions and Assumptions

- For the purposes of this assessment, the term “legal” is defined as management direction and/or boundaries established in a legal Order as an OGMA layer.
- “Non-legal” OGMAs are those that are either awaiting legal establishment or are not intended to be legally established. The assessment will not track and adjust the legal status of non-legal OGMAs that have been made legal by inclusion in a FSP.
- “Incursions” are defined as alterations to OGMAs caused by permitted activities, such as forestry cutblocks and roads, a range of non-forestry-related activities and human use

features such as recreation sites and trails. To the extent possible, only as-built developments will be included in the layer and not activities that are conceptual, investigative or authorized (i.e. project not yet started even though may have permits and/or certificates). It is common for OGMA to have historic incursions included within the OGMA boundaries at the time of legal establishment. All incursions, including pre-existing and known incursions in the OGMA, were included in the assessment results. The assessment did not remove disturbance/incursions prior to OGMA establishment

- Developments or activities included as incursions are those that permanently alter the forested landbase or that convert the forest cover to a young seral stage (< 20 years old).
- The assessment assumes that the development layer reflects the most up-to-date spatial delineation of human activities on the landbase, acknowledging that there may be limitations to the data and that a number of human activities may not have been available or only detectable through detailed on-the-ground assessment. Phase 1 of the OGMA assessment did not include impacts from natural disturbance (e.g. forest fires, insect attacks).
- The boundaries of OGMA change over time and the assessment may not have captured recent changes published in the BCGW. Regional and/or district specific datasets that track OGMA replacement areas, not available in the BCGW, were not included in the assessment.
- Every attempt was made to ensure the interpretation of the of incursion thresholds in OGMA legal orders is accurate. Nuances of OGMA legal order implementation should be expected as it is difficult to model and automate in a Provincial project of this size and scale.

5.5 Outputs of Phase 1 Assessment of Incursions into OGMA

The outputs of the spatial assessment will be as follows:

For each OGMA:

- Total area (including forested and non-forested);
- Total area of Crown Forested Landbase (CFLB);
- Area of incursion reported by (a) total area; and (b) CFLB, and for each of these, reported by (i) forestry-related activity; and (ii) non-forestry-related activity;
- Area of incursion defined in the limits of incursion in legal Orders or in policy; and,
- % and area (in ha) of OGMA incurred compared to specified limit of incursion.

Where there are no limits of incursion because replacement is always required, the assessment assumes that any incursion will exceed the limit.

Reporting of results:

Current Condition Report

A yellow/blue scale will be used to spatially identify whether the OGMA incursion limit is exceeded or not.

Cumulative Effects Assessment and Management Reporting (CEAM)⁷

In a CEAM report, when management review triggers have been approved, colours will be used to spatially report findings to facilitate use in review and decision-making. The colour codes are as follows:

- Orange (Intensive Management Review Class): Area of incursion exceeds the incursion limit
 - Yellow (Enhanced Management Review Class): Area of incursion $\geq X\%$ (to be confirmed*) of the incursion limit
 - Green (Standard Management Review Class): Area of incursion $< X\%$ (to be confirmed*) of the incursion limit
- In tabular format as % (below incursion limit), -% (exceeds incursion limit) and noted in a separate column as NO CONCERN, NEARING LIMIT, EXCESS INCURSION.

**NOTE: The management review triggers to define management review classes for OGMA incursion assessment will be confirmed in the future, and the protocol updated accordingly.*

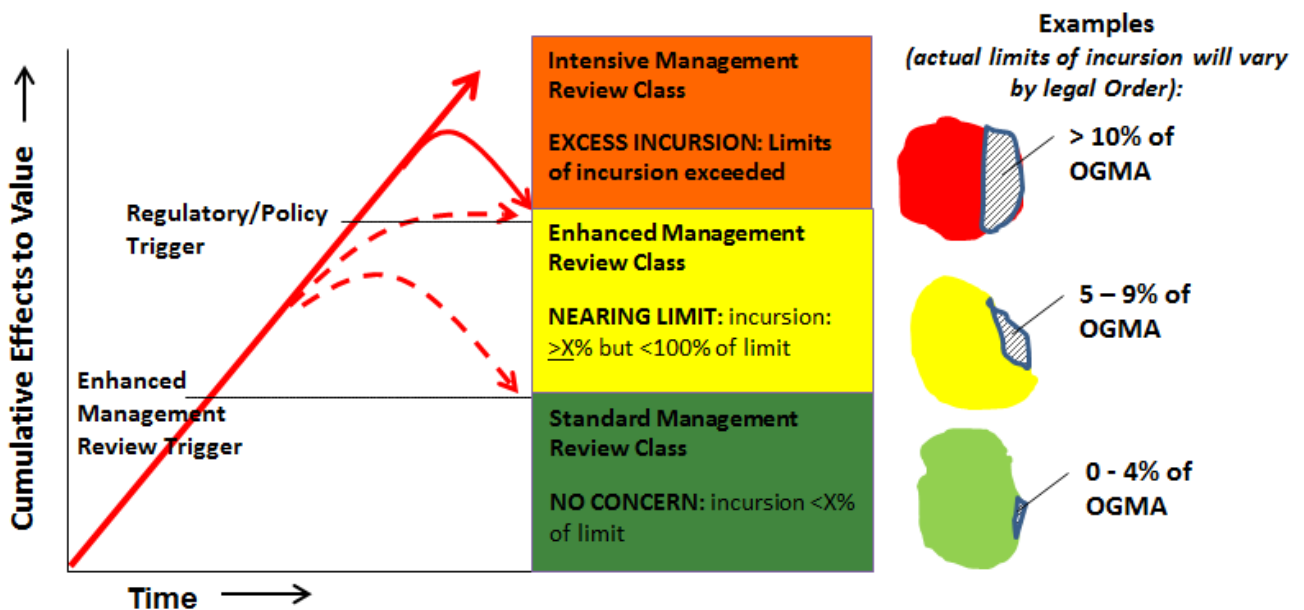


Figure 3: Cumulative Effects Assessment and Management (CEAM) Reporting categories for incursions in OGMA.

⁷ CEAM Reports are to be completed at the Regions.

5.6 Data Requirements

The following data are required as core datasets for the assessment of incursions into OGMA:

1. A consolidated spatial layer of all the reporting units by legal order by TSA, described in Section 4.6.
2. The Natural Resource Permitting Project (NRPP) Consolidated Disturbance layer that spatially defines permitted development activities, both forestry and non-forestry related; and
3. A "look-up table" that lists the rules for incursions into OGMA. Rules for incursions vary with each legal Order or in regional policy. For example, the incursion limit in the Vancouver Island Higher Level Plan Order for the Nawitti LU is 1 ha or < 10% of the area of the OGMA.

The fields in this look-up table are defined in Appendix A, Table A2.

5.7 Key Data Issues

The Natural Resource Permitting Project (NRPP) Consolidated Disturbance needs to be updated on an annual basis to ensure currency of assessment. Additional work is required to ensure that all aspects of disturbance are included (e.g. natural disturbance, mining footprints, EA Certified projects).

6.0 Project Implementation

A proposed approach to implementation of the provincial assessments of old growth forest is outlined in Figure 4. The procedures described in this document will be tested in 26 pilot reporting units throughout B.C. A table of pilot landscape/reporting units and rationale is provided in Table 1.

The Old Growth Forest Team will assess the outputs of the pilot assessments and use this information to revise the procedures. The revised procedures will be submitted to peer-reviewers for further input. The final set of procedures will be applied provincially.

These assessments of old growth forest objectives are intended to be updated annually. The inputs to the assessments will need to be updated as each legal Order is amended or a new Order is established or there is amendment to OGMA boundaries.

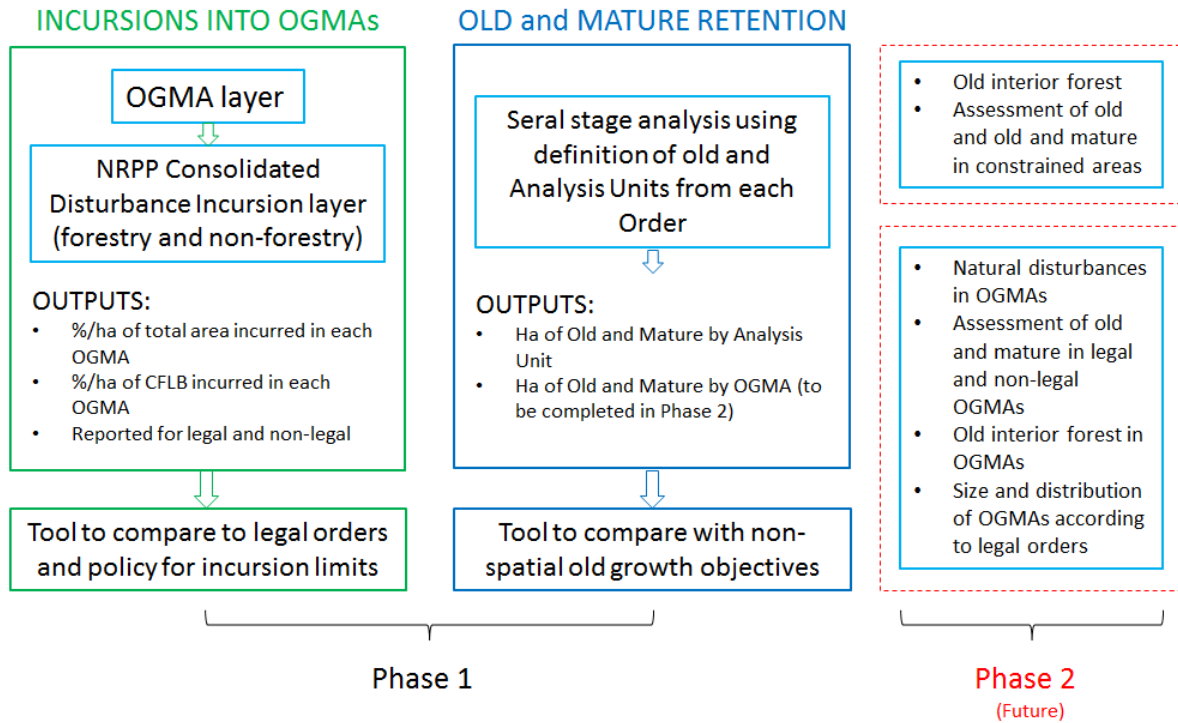


Figure 4: Outline of implementation of old growth forest assessments as described in the protocol

Table 1. Pilot landscape units for testing old growth forest assessment protocol

Region	Planning Area	Landscape Unit	Old Growth Forest Management	Rationale
Cariboo	Williams Lake and Chilcotin Natural Resource District	Bidwell / Lava	Non-spatial and legal OGMA	High amount of mountain pine beetle salvage harvest
	Quesnel	Dragon	Non-spatial and legal OGMA	Considerable non-forestry development
	Quesnel	Umiti	Non-spatial and legal OGMA	Uses TFL data
Kootenay-Boundary	Revelstoke	Akolkolex R (LU R3)	Non-spatial and non-legal OGMA	Revelstoke Higher Level Plan (HLP); Ungulate Winter Range requirements in LU
	Kootenay-Boundary	Trout Lake (LU N530)	Non-spatial and non-legal OGMA	Kootenay-Boundary (K-B) HLP Order; High BEO, caribou critical habitat
	Kootenay-Boundary	Lower Elk R (LU C24)	Non-spatial and non-legal OGMA	K-B HLP Order; mixed development - forest harvesting, mining activity
Northeast	Dawson Creek	Boreal Plans NDU	Non-spatial and legal OGMA	Targets by coniferous, deciduous and mixed

Region	Planning Area	Landscape Unit	Old Growth Forest Management	Rationale
	Fort St John	Boreal Plans NDU	Non-spatial and draft OGMA's	Targets by coniferous and deciduous
	Fort Nelson	Boreal Plans NDU	Non-spatial	Targets by coniferous and deciduous
Omineca	Prince George	A4 (McGregor Plateau NDU)	Non-spatial	Recruitment strategy in place to meet old growth forest targets
	Prince George	A23 (Wet Trench NDU)	Non-spatial and legal and non-legal OGMA's	LU has a combination of old growth forest management: Legal OGMA's (Slim, Dome Humbug LU's), Non-legal OGMA (ICH guidance OGMA's) and non-spatial target from Biodiversity Order;
	Prince George	E5 (Moist Interior Plateau)	Non-spatial	Unit has increased harvesting pressures (current and proposed)
	Mackenzie	Blackwater (Note: will use Gaffney LU for to pilot the OGMA assessment)	Non spatial	Low BEO Has two pipelines (Spectra, Prince Rupert Gas Transmission). Concentrated harvesting activity (past and proposed). Close to Mackenzie township Suggested by district staff
Skeena	Kalum SRMP	Kemano	Non-spatial and OGMA's	Three separate undeveloped watersheds (Wahoo, Brim and Owyacumish) within TFL 41 that are assessed separately but reported for the LU. The watersheds have targets for old only but the LU has targets for old and old+mature.
	Cranberry SRMP	Cranberry	Non-spatial and OGMA's	Separate targets for within and outside of the Upper Kispiox SMZ but report by the LU
	Lakes SRMP	Chelaslie	Non-spatial and OGMA's	Subject to caribou guidelines
South Coast	Sea-to-Sky	Mamquam	Non-spatial and legal OGMA's	Recently established
	Sea-to-Sky	Elaho	Non-spatial and legal OGMA's	In the TFL so may have data challenges
	Sea-to-Sky	East Howe	Non-spatial and legal OGMA's	OGMA's established in 2003 so potential for changes since that time.
Thompson - Okanagan	Merritt	Swakum	Non-spatial and non-legal OGMA's	Consolidated OGMA layer, non-spatial targets as per PNOGO; lots of development, recent MPB salvage
Thompson -	Okanagan-	Salmon Arm	Non-spatial and	Unconsolidated OGMA layer, non-

Region	Planning Area	Landscape Unit	Old Growth Forest Management	Rationale
Okanagan	Shuswap		non-legal OGMAs	spatial targets as ha of THLB and non-THLB (as per PNOGO appendix); lots of development; recent MPB
Thompson - Okanagan	Kamloops	Tum Tum	Non-spatial and legal OGMAs	No legal non-spatial targets – assume as per PNOGO; valley development; recent Mountain Caribou reserves
Thompson - Okanagan	Kamloops	Campbell	Non-spatial and legal and non-legal OGMAs	Includes non-legal OGMAs
West Coast	VILUP	Sayward	Non-spatial and legal OGMAs	Old growth forest just one of several values managed through OGMAs
West Coast	VILUP	White	Non-spatial and legal OGMAs	
West Coast	VILUP	Schoen-Strathcona RMZ	Non-spatial and legal OGMAs	

7.0 Conclusion and Recommendations

The current array of legal Orders represents negotiated outcomes from strategic land use plans and subsequent processes over many years. The conceptual model for old growth forest assessment is simple but its implementation is made complicated by the complexity of distinct seral definitions, reporting units and targets in the Orders.

In the short term, the provincial assessment procedures are made as consistent as possible by creating a common analysis structure, a single table of targets for old growth forest management and a common approach to reporting. This information should be kept current in order to assess the condition of old growth forest, relative to objectives, on a regular basis.

In the longer term, it may be beneficial to amend the Orders to create a common approach to the targets, to the extent possible, and to ensure that the Orders are worded to be flexible to changes in analysis units and inventory over time.

Appendix

Definitions of Look-Up Table Fields

The following two tables provide definitions of the fields in each look-up table for the old growth forest assessments.

Table A1. Fields in the look-up table for assessment of targets for old growth forest retention

Field	Definition
ID	Unique identifier number for each row in the table
Region	FLNRO region
Original_Unit_ID	The original name given to each reporting unit in the source data layer
Project_Unit_ID	The unique name given to each reporting unit for this project, which may be different from the Original_Unit_ID. This is the joining field in GIS.
Source	Provincial Non-Spatial Old Growth Forest Order (POGO) vs other
Legal_Order	Boundary of the legal order (typically by TSA)
NDT_NDU	Natural disturbance type (NDT 1 – NDT 4) or natural disturbance unit
BGC_Label	Biogeoclimatic zone
legal_early_def	Early seral stage definition, as per the Biodiversity Guidebook. Added here for completeness
legal_mid_def	Mid-seral definition, which is greater than early seral and less than mature seral. Added here for completeness.
legal_mature_def	Mature seral definition, which is greater than mid-seral and less than old seral
legal_old_def	Old seral definition, which is greater than mature seral
modifier_query	Used to modify the seral definitions in some legal Orders e.g., where the seral definition varies for deciduous vs coniferous-leading forest.
modifier_name	Name given to the modifier query in the analysis script
BEO	Biodiversity emphasis option (L = Low, I = Intermediate, H = High)

BGC_Measure	The BEC unit that targets are measured against. V = variant, S =site series, M = merged BEC
legal_old_target	Percent target for old seral retention in each reporting unit. Where the target is area-based (ha) it will be converted to a percent. Where there is no target specified, default to PNOGO.
legal_old_mature_target	Percent target for old + mature seral retention in each reporting unit. Where the target is area-based (ha) it will be converted to a percent.
OGMA_ID	Unique identifier for each OGMA polygon
legal_old_OGMA_target	Percent target for old seral retention in each OGMA, where this exists. Where the target is area-based (ha) it will be converted to a percent.
legal_old_mature_OGMA_target	Percent target for old + mature seral retention in each OGMA, where this exists. Where the target is area-based (ha) it will be converted to a percent.

Table A2. Fields in the look-up table for assessment of incursions into OGMAs

Field	Definition
ID	Unique identifier number for each row in the table
Region	FLNRO region
Project_Unit_ID	The unique name given to each reporting unit for this project, which may be different from the Original_Unit_ID. This is the joining field in GIS.
OGMA_ID	Unique identifier for each OGMA polygon
Legal_Order	Boundary of the legal order (typically by TSA)
Incursion_rule	Incursion limits specified in a legal Order or in regional policy