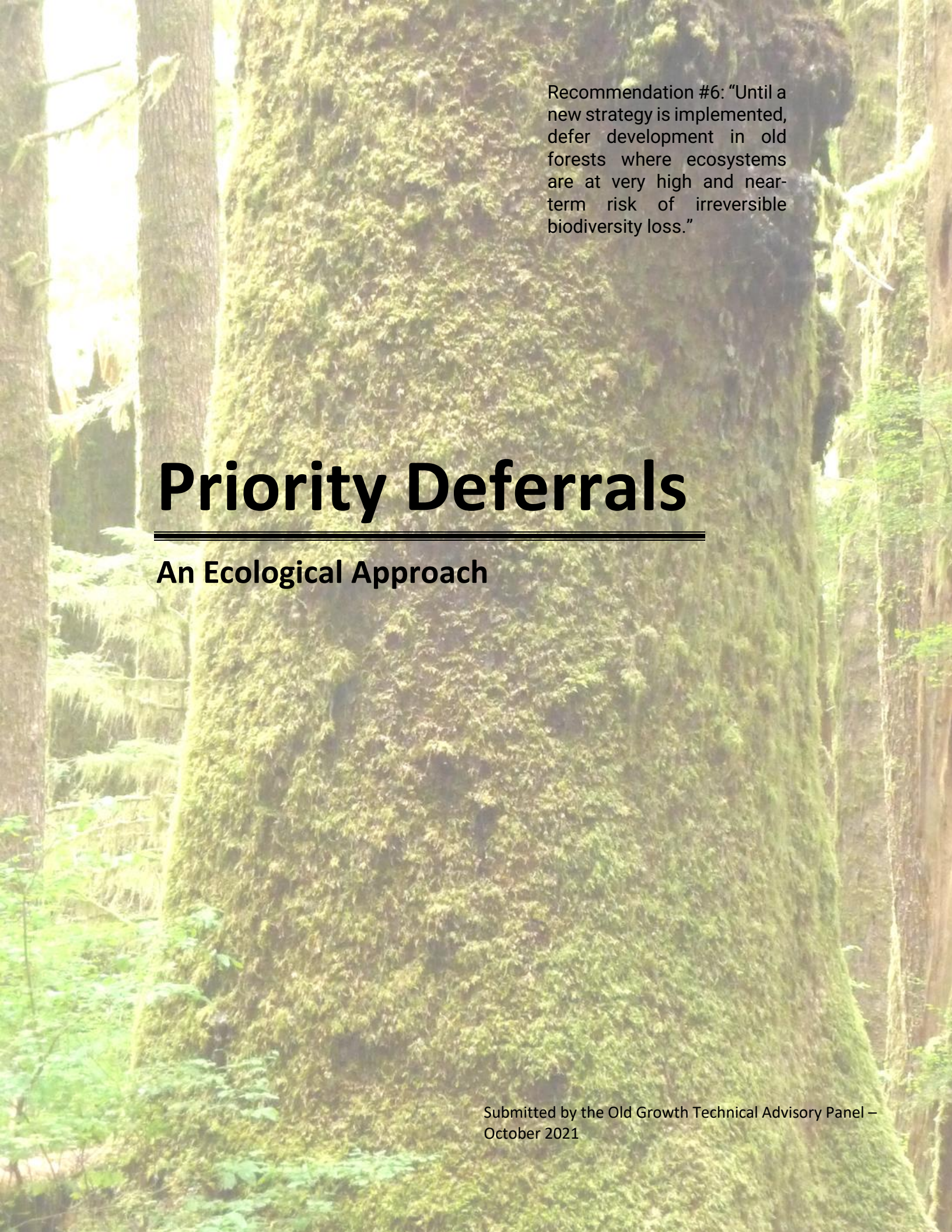

Recommendation #6: “Until a new strategy is implemented, defer development in old forests where ecosystems are at very high and near-term risk of irreversible biodiversity loss.”

Priority Deferrals

An Ecological Approach

Submitted by the Old Growth Technical Advisory Panel – October 2021

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Summary

The Provincial government has committed to implementing all recommendations of the 2020 Old Growth Strategic Review (OGSR). Foundational recommendations include full involvement of Indigenous Nations in decisions and shifting the forest management paradigm from an economic timber focus to a focus on healthy ecosystems (Recommendations #1 and #2). Recommendation #6, one of two "immediate responses", and the subject of this analysis, calls for harvest deferral in at-risk forests[1] to allow time, and to maintain options for implementation of the other OGSR recommendations.

Recommendation #6: "Until a new strategy is implemented, defer development in old forests where ecosystems are at very high and near-term risk of irreversible biodiversity loss."

Deferral pauses harvest pressure temporarily to allow time for developing new approaches to forest management that allow the shift from managing for timber, subject to constraints, to managing for ecosystem health. **Deferral is not equivalent to protection**; deferral maintains at-risk old forests in the short-term. **Meaningful deferrals** occur in forests that would otherwise be harvested.

The Provincial government formed the Old Growth Technical Advisory Panel to develop and map science-based deferral recommendations. As per our terms of reference, we have identified and mapped the most at-risk old forest for immediate deferral based on the OGSR Recommendation #6 criteria, as well as on the ecological principle of identifying sufficient forest in every ecosystem, to provide a minimum ecological baseline for planning across the province.[2] These maps are not intended to constrain the areas to be deferred, but to focus attention on priority ecosystems that reflect the most at-risk forests in the province, and which may also support cultural and wider biodiversity values.

At-risk Old Growth Types

In principle, all old growth forest[3] is irreplaceable in a human timeframe, and possibly in any timeframe given the climate crisis. However, some types of old growth forest (see Appendix 1 for details) currently face higher near-term risk. These types are most important to defer.

All the forest types recommended and mapped for deferral are **rare**, **at-risk**, and **irreplaceable**.

- **Big-treed old growth**: Big-treed old growth is naturally rare. And, since it has been heavily targeted by harvesting, big-treed old growth is now very rare compared to its historic distribution, putting it at extremely high near-term risk. We mapped the biggest-treed remaining old growth (measured by stand height and

[1] We use "at-risk forests" to mean those where "failure to act now could lead to the permanent loss of rare or unique ecosystem components," as per the Old Growth Strategic Review (Rec. #6, p. 55). Where at-risk forests face imminent logging (e.g., have approved or pending cutting permits) we use "threatened at-risk forests".
[2] The identified forest is not sufficient to fully implement the OGSR Panel Recommendations.
[3] See Map 8.

diameter) in each ecosystem[4] up to a given target. We developed two target levels: a) a default target consistent across all ecosystems, and b) a priority area with reduced targets for ecosystems at lower risk. This smaller area (b) of big-treed old growth is included in the Priority Deferral Map (Map 1).

- **Remnant old ecosystems:** If an ecosystem has been heavily harvested and very little old growth remains, these remnant areas are, by definition, rare. We mapped remnant old growth in ecosystems with less than 10% old remaining, in total and within a landscape unit. Remnant old ecosystems are included in the Priority Deferral Map (Map 1).
- **Ancient forest**: Ancient forest is globally rare and particularly irreplaceable because of the time it takes to grow an ancient forest. We mapped ancient forest over 400 years old in ecosystems with rare stand-replacing disturbance, and over 250 years in more frequently disturbed ecosystems. Ancient forest is included in the Priority Deferral Map (Map 1).
- **Intact watersheds:** Contiguous areas of ecosystems unaltered by human activities are rare outside BC's remote regions. We mapped relatively intact watersheds to assist in planning for ecosystem health. Intact watersheds are not shown on the Priority Deferral Map (Map 1), but are addressed in the Recommendations.

Mapping Priority Areas for Deferral

Map 1 identifies the highest priority areas for deferral for high-risk big-treed, remnant and ancient forests. Areas meeting the criteria in each category are identified whether they are already protected or not; mapped forests within existing no-harvest areas do not need to be deferred. We excluded high-elevation woodland and sparsely forested ecosystems as they do not face high near-term risk. Individual map layers are provided in the map portfolio in Appendix 3.

[4] biogeoclimatic subzone/variant (shortened to "BEC variant" throughout the text)

Recommendations

To support urgent conversations between Provincial and First Nations governments, we recommend the following:

- **Defer harvest (i.e., no development or harvesting) in all mapped highest-priority at-risk old forests** (priority big-treed old growth, ancient forest, remnant old ecosystems) while development of a new approach to forest management is underway. Unprotected highest-priority at-risk forests cover approximately 2.6 million ha:
    - Ensure no new logging permits are approved in priority areas and no planning for future harvesting occurs until the new management system identifies what can be logged and how it can be logged.
    - Some of the identified at-risk old forests already have some form of conservation designation. Where harvest is prohibited or generally prohibited ensure such prohibition is maintained.
    - Avoid deferring harvest where forests are not at-risk to ensure meaningful deferrals.
- **Defer harvest in the most intact watersheds for each region and ecosystem.** Deferral of harvest in intact watersheds is critical to maintain or recover landscape-scale resilience (Map 6). Smaller intact areas should be identified in highly impacted areas of the province, as large areas are unavailable.
- **Consider how to address recruitment where insufficient old forest exists.** We recommend extending immediate deferrals to include recruitment areas in ecosystems that are at very high risk to facilitate future planning for ecosystem recovery. Where insufficient old forest was available to meet ecosystem targets, priority recruitment big-tree forest was identified (Map 7).
- **Add areas of high-value old forest known on the ground but not shown on the maps.** The maps will miss areas of high value old forest, known well by people who walk the land. These omissions may be due to inventory error, the scale of analysis, or inclusion of additional criteria for identification. We recommend deferring harvest in any remaining old forest where the following criteria are met:
    - areas of cultural importance relating to old forest identified by First Nations;
    - valley-bottom old forest, especially in ecosystems where these have been heavily harvested;
    - big-treed old forest not mapped in VRI, but where trees are very large for that BEC variant;
    - scattered big and ancient trees: in ecosystems with little old forest remaining, individual old and ancient trees may be present (these 'veteran' trees are critical for maintaining recovery potential but are typically poorly mapped);
    - old and ancient forest where field ages reflect true stand age, but inventory ages do not;
    - areas where current legal targets are not met;[5] and
    - old forest critical to maintaining endangered species that are not otherwise protected.
- **Review and remove areas that are shown on maps but do not contain high-value old forest on the ground.** We expect that the maps will show areas that do not contain at-risk old growth forest, either due to inventory error or because the forest has been recently logged or burned. The Provincial forest inventory system was developed for timber purposes and does not identify old forests well; therefore, we recommend a precautionary approach that defers old forest until it is demonstrated to not meet criteria.
- **We recommend that First Nations and others build on the maps to address mapping errors,** for example, by identifying known high-value old forests that meet criteria on the ground, but are missing from the maps, as potential areas for deferral.

[5] This may include a) insufficient area in Old Growth Management Areas (OGMA), b) OGMAs do not contain old forest, or c) insufficient old exists to meet current targets. Our analyses do not address the second OGSR "immediate response," Recommendation #7: "Bring management of old forests into compliance with existing provincial targets and guidelines for biological diversity." That will likely increase deferred areas where the province is below legislated old forest targets.

Map 1: Priority Deferral Map

Map to be added later.

Appendix 1: Understanding the At-risk Old Growth Categories

We have identified and mapped the most at-risk old forest for immediate deferral based on the OGSR[6] Recommendation #6 criteria as well as ecological principles of identifying representative forest in every ecosystem. All forests recommended and mapped for deferral are **rare**, **at-risk**, and **irreplaceable**.

Big-treed Old Growth

Definition

This category captures the "high productivity" category specified in Recommendation 6 of the OGSR. We have mapped the remaining forest with the biggest trees (tallest and widest trees) in each BEC[7] variant up to a given target. We developed two target levels: a) a default target consistent across all ecosystems, and b) a priority area with reduced targets for ecosystems at lower risk. Because the biggest trees have already been harvested in many ecosystems, the best remaining big-treed old growth may have relatively small trees compared to the past.

Ecological Importance

Big-treed forests have globally significant contributions to biodiversity and carbon. Their size and complexity provide specialized habitat, functions and services at the stand and landscape scale not provided by smaller-statured forest. Some of BC's big-treed old growth forests store more carbon than almost anywhere else in the world. While tree size varies by ecosystem, the forests with the largest remaining trees in each ecosystem matter. Big-treed forests can grow under different ecological circumstances. For example, highly productive valley bottoms generally grow larger trees and develop complex structure more quickly than adjacent steep slopes. Highly productive valley-bottom old growth forms the heart of watersheds. Given sufficient time, some lower productivity sites can also grow large trees and develop complex structure, while others, such as bog or subalpine forests, will never grow complex-structured forests dominated by large trees.

Status

Big-treed old growth is naturally rare at the provincial scale, and has also been heavily targeted by harvesting for the last century. In most BEC variants, big-treed old growth is now very rare compared to its historic distribution, putting it at extremely high near-term risk.[8] The total area remaining differs by BEC variant: low elevation forests usually have almost none remaining (some, such as massive Douglas-fir forests, are already extirpated); some remote and/or higher elevation forests still have forests that resemble the full range of original old forests. In general, big-treed old growth is generally rare or very rare across BC because much of it has already been logged. The small amount left is threatened because it continues to be targeted for timber harvesting.

Historic distribution or amount is based on the historic condition of the forest before large-scale human impacts such as urbanization, industrial forestry, agriculture, oil & gas exploration, mining and transportation.

High-risk forests: Research shows that where 30% or less of the historic amount of an ecosystem remains, risk to biodiversity and ecosystem functions is high. Many big-treed ecosystems have less than 10%, and some have less than 1% of the historic amount of old growth.

[6] Old Growth Strategic Review

[7] Biogeoclimatic ecosystem classification, using BEC version 12 (2021)

[8] Karen Price, Rachel F. Holt, and Dave Daust. Conflicting portrayals of remaining old growth: the British Columbia case. *Canadian Journal of Forest Research*. **51**(5): 742-752. https://doi.org/10.1139/cjfr-2020-0453

Deferral

Meaningful deferrals *must* focus on these very rare forests because they are at very high near-term risk. Big-treed old growth that is also ancient or in remnant ecosystems provides extra benefit. For most ecosystems, remaining old growth covers a wide span of tree sizes; the largest trees provide the most unique value and are most at-risk; they have highest priority for deferral.

Remnant Old Ecosystems

Definition

This category captures the "less than 10% remaining" categories of the OGSR. We mapped remnant ecosystems with less than 10% old forest remaining (in total, and within landscape units to capture geographic variability). If an ecosystem has been heavily harvested and very little old growth remains, these remnant areas are, by definition, rare.

Ecological Importance

If a BEC variant has been heavily harvested, many of the areas remaining often have low economic value (i.e., few merchantable trees), and therefore may also lack the ecological structural attributes of high-quality old forest. These remnants of old forest may include patches of high-value old growth, but they may also consist of edges and inoperable areas with poor condition and/or few old forest values. With little old forest present, even small and fragmented patches of remnant forest may have high value locally and regionally in maintaining old forest values in these highly disturbed ecosystems.

Status

Biodiversity and ecosystem health are at high risk when less than 30% of the expected level of old forest remains in a BEC variant. Mapped remnants all have less than 10% remaining.

Deferral

While forests in this category may generally not be threatened by immediate harvest, they should not be harvested. Remnants that are big-treed old growth or ancient forest have higher priority as meaningful deferrals.

Ancient Forest

Definition

This category captures the "ancient" category of the OGSR. This category includes forests that have developed without a stand-replacing disturbance for many centuries or millennia. We mapped forest identified as over 400 years old in ecosystems with rare stand-replacing disturbance and over 250 years with more frequent disturbance.[9]

Ecological Importance

Ancient forests provide specific values that require long time periods for full development (e.g., unique epiphytic communities). They contribute significant genetic material and biodiversity at a landscape level. They also store extremely high levels of carbon in the soil and in the trees that has built up over centuries to millennia. They are truly irreplaceable because of the time it takes to develop ancient features.

Status

Ancient forests are naturally rare in many parts of BC because it takes a very long time to become ancient. Historic distribution varies by ecosystem, with ecosystems with rare stand-replacing disturbances historically

[9] Province of BC 2010. BC Land Management Handbook #25. Structural stage 7b. NDT 1, 2 and 4 for less frequent disturbance; NDT 3 for more frequent.

expected to have a high proportion (32 - 67% or more), and ecosystems with more frequent disturbance historically expected to have a lower proportion (e.g., 14% or less) of ancient forests. Most productive forest types have a small portion of their original ancient forests remaining.

Deferral

Ancient forests may be big-treed and threatened, or small-treed and not threatened. Deferring threatened ancient forests is critical. These forests are poorly mapped in provincial databases because age is often underestimated, and we expect that additional areas that are not mapped as ancient in provincial datasets will be identified using ground surveys.

Intact Watersheds

Definition

This category captures part of the "resilient forest" category of the OGSR. Intact watersheds are free, or largely free, from anthropogenic modification of forest composition, structure, and function. We mapped relatively intact watersheds (70%, 80%, 90% intact measured in freshwater assessment watersheds[10]) across BC.

Ecological Importance

Intact watersheds maintain biodiversity, support wildlife habitat, act as climate refugia, and provide a suite of ecosystem services that include regulating local climate, regulating hydrology, and maintaining hydroriparian ecosystems and aquatic values. By allowing natural processes to continue at the landscape scale, intact watersheds have high ecological integrity and resilience. In the context of deferrals, maintaining intact watersheds provides opportunities to plan for long-term resilience.

Status

Contiguous areas of ecosystems unaltered by human activities are rare outside BC's remote regions.

Deferral

Intact watersheds are not included in the Priority Deferral Area Map 1. However, they are important and we recommend them for deferral in the near-term; they are mapped as a starting place for discussions with Indigenous groups to maintain options for planning for ecosystem health. Where no large watersheds remain intact, smaller areas of intact forest should be identified and deferred.

Big-treed Recruitment Forest

Definition

Where insufficient big-treed **old** forest remains to fill minimum targets (see above), we identified recruitment forest using the same methods but choosing forest from a younger age-class (age 80 and older).

Ecological Importance

Ecosystems with little to no old growth remaining are at highest risk of any in the province. Ensuring recruitment and recovery of these structurally complex forests is critical in many areas of B.C.

Deferral

Big-treed recruitment forest is not included in the Priority Deferral Area Map 1, because these forests are not old. However, the OG TAP recommends deferral of recruitment forest in all ecosystems with low levels of old remaining. Map 7 provides a starting point for that work.

[10] Watersheds delineated for strategic planning across BC (around 5,000 hectares, though some are larger)

Appendix 2: Making the Maps - Methods

Spatial Data Preparation

The OG Technical Advisory Panel worked in concert with Provincial inventory and ecology staff to determine the most up-to-date and appropriate base input layers for analysis. We developed and used the Forest Assessment Land Base (FALB) as a modified version of the provincial Vegetation Inventory (Vegetation Composite Polygons Rank 1 Layer, aka VRI) forest management land base (FMLB).

Biogeoclimatic Ecosystem Classification (BEC) subzone/variant mapping version 12 (published by the province in September 2021) was used to define seral stages (e.g., minimum age of old), natural disturbance type (NDT), and associated measures such as % expected natural old forest by BEC variant.

Ages in the 2021 VRI were adjusted for[11]:

- Harvest: changed to early seral using the newly released consolidated cutblocks layer (July 2021)
- Fires: changed to early seral for moderate and high severity portions of fires that burned between 2007 and 2020
- Mortality: changed to early seral where percent dead is > 70% in VRI polygons (mostly mountain pine beetle).

Note that some areas of the province lack complete vegetation inventory information and as a result cannot be assigned a seral stage (e.g. Old Forest). This comprises ~3% of the FMLB.

In addition, the following layers were created:

- Underlay 1. Protected area: Protected areas are comprised of: National Park, Ecological Reserve, Provincial Park, Conservancy, Protected Area, Heritage Site, Recreation Area, Regional Park, Ungulate Winter Range No harvest, Wildlife Habitat Area No harvest, Biodiversity Mining and Tourism Area, Sea to Sky Wildland Zone, Special Wildland RMZ in Muskwa Kechika MA, Nlhaxten/Cayoosh Wildland Area, South Chilcotin Mountains Mining and Tourism Areas, NGO Fee Simple Conservation Lands, Great Bear Rainforest (GBR) Special Forest Management Areas, Old Growth Management Area (OGMA) Legal, Old Growth Management Area (OGMA) Non-Legal, Class1 Coast Grizzly Bear Habitat (Coast LUP)
- Underlay 2. Low threat ecosystems: BEC woodland ecosystems, sparsely treed BEC units (i.e., SWB, BG).

Big-treed Old Growth

We selected two target levels of big-treed old growth: 1) default high-risk targets and 2) prioritised targets lowered based on ecosystem risk.

1. For the default target, we identified stands within each BEC variant with the largest trees, based on height and diameter, until the area selected reached the greater of either 10% of the total forest area or 30% of the area of old forest naturally expected.[12]
    - We found that height and diameter were the most reliable indicators in the strategic dataset for what is actually measured on the ground.[13]
    - We prioritised stands identified as old forest.

[11] Note that these updates, combined with the FALB, results in a revised and lower total area of old forest (reduced from 13.7 million hectares to about 11.1 million hectares) in the Province than previously thought.
[12] Based on BECv12, NDT, and updated disturbance information for interior NDT1 and coastal ecosystems.
[13] Additional supporting details are available in a OG TAP methodological supplement.

- If a BEC variant did not contain enough old forest to meet the 10%/30% area goal, then we selected the largest "older mature" stands.[14] Uncertainty around inventory accuracy means that older mature forests may be old growth.
- When insufficient "older mature" forest exists in a BEC variant, the target is not completely filled.[15]

2. To prioritise the selection based on ecosystem risk, we identified high-risk ecosystems (using site productivity classes[16] within BEC groups[17]) where old growth covers less than 30% of the historic distribution.
    - We overlaid scenarios that identified varying levels of big-treed forest (top 3%, 5%, 7%, 10% of the forested area and 30% of expected natural old) with ecosystems and determined the scenario needed to capture 90% of high-risk old forest ecosystems.
    - This sets a lower deferral target for BEC subzones/variants at lower risk (no targets are increased over the default).
    - Where more than 15% of the biggest trees comes from the older mature category (i.e., because there is insufficient old forest to reach the target), we selected areas for harvest deferral to include older mature plus old forest.
    - The selection process to identify forest to meet the target —choosing the biggest old trees first—was identical to the process for the default target but stopped at the lowest threshold where 90% of high-risk ecosystems were accounted for.

Remnant Old Ecosystems

- The remnant old ecosystem map includes all polygons identified as old where old forests comprise <10% of the productive forest area of a BEC variant or of a BEC variant within a Landscape Unit.[18]
    - Old forest is defined as older than 250 years in less frequently disturbed ecosystems and older than 140 years in more frequently disturbed ecosystems.[19]

Ancient Forests

- We defined ancient forests as older than 400 years in ecosystems with less frequent disturbance and older than 250 years in ecosystems with more frequent disturbance. These thresholds use the provincial standard for identifying 'very old' forests.[20]

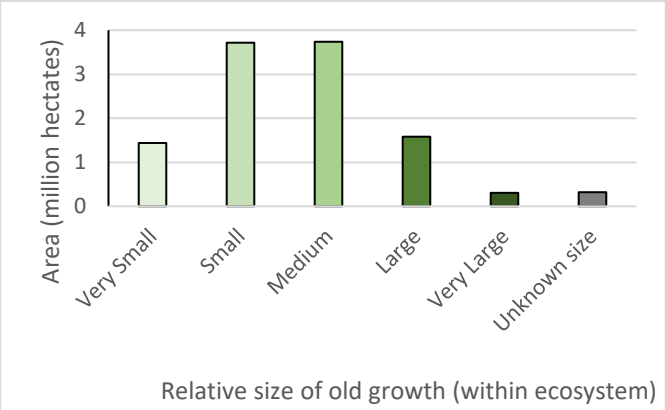
[14] As defined in the Landscape Unit Planning Guide (1999) as >200 where old forests are defined as > 250 and >120 where old forests are defined as >140. These forests may well be "old"; they are included here to address uncertainty in the inventory.
[15] In these cases, the largest 'recruitment' forest is identified (Map 7), but since it not old forest, it is not included on the Priority Deferral Map 1 (see Recommendations).
[16] Productivity class from VRI inventory site index (<10, 10-15, 15-20, 20+). VRI site index correlates better with old growth ground plot data than PSPL site index; hence we selected this measure. Site productivity was NOT used to select big-treed forest. Additional supporting details are available in a OG TAP methodological supplement.
[17] BEC groups include groups of subzones/variants with similar ecological characteristics.
[18] Productive forest is defined in this analysis as the portion of the FALB with a site index > 10.
[19] Less frequently disturbed = NDT 1, 2 and 4; more frequently disturbed = NDT 3. Disturbance refers to refers to stand-initiating disturbances.
[20] Province of BC 2010. BC Land Management Handbook #25. Structural stage 7b. NDT 1, 2 and 4 for less frequent disturbance; NDT 3 for more frequent.

Intact Watersheds

- We mapped watersheds with more than 70%, 80% and 90%[21] of the forested landbase intact (i.e., forest harvesting and roads make up less than 10%, 20% or 30% of a the forested landbase in the watershed).

Old Growth Forest

- We mapped all forest identified as old growth across the province[22].
- We divided old forest into five size classes, based on height and diameter, within each BEC variant
    - We removed the 1st and 99th percentile to reduce the effect of outliers, and divided the remaining size range into five equal classes (e.g., quintiles);
    - We coloured the map to show the forests in each tree size class;
    - The area associated with each size class is unequal because the small and medium size trees are most common in all ecosystems, and the area of large and very large-treed forest is much smaller (see Figure below).
- We excluded forest with missing height and diameter data and forest that burned in the 2021 wildfires[23].



[21] Very few fully intact watersheds exist in the province at the scale of the Freshwater Atlas, and some regions have very few "nearly intact" watersheds; hence we show categories to allow selection of the most intact remaining watersheds.
[22] Includes BTM data in Map 8. BTM data are not used to identify priority areas for deferral. 11.1 million ha of old includes VRI and BTM data sources.
[23] Only Map 8 is updated with 2021 fires.

Appendix 3: Map Portfolio

Map 1: Priority Deferral Map

This map shows an overall picture of our priority recommendations for harvest deferral. It combines the Prioritised Big-treed Old Growth (Map 3), Remnant Old Ecosystems (Map 4) and Ancient Forests (Map 5) maps. Areas meeting the criteria in each category are identified whether they are already protected or not. All of the area noted on this map, outside protected areas, are at high near-term risk and should have harvest deferred. See descriptions under each specific map layer for more detail.

Map 2: Big-treed Old Growth (default targets)

This map shows the remaining old forest with the largest trees in each ecosystem, as described by tree height and diameter. For each ecosystem, the map shows the greater of the biggest remaining old forest up to 10% of the forested area, or up to 30% of the naturally expected amount of old, reflecting ecological variability in the natural historic distribution of old forest. Research shows that when 30% or less of the historic distribution of an ecosystem remains, risk to biodiversity and ecosystem function is high—so this map shows the area of old forest needed to ensure that risk does not cross the high-risk threshold. Many big-treed ecosystems have less than 10%, and some have less than 1%, of the historic distribution of old growth. In these cases, the map also shows the biggest older mature forest to reach the target amount, if possible.

Map 2 is not included as a layer in Map 1.

Map 3. Prioritised Big-treed Old Growth

This map is a subset of Map 2, showing the highest priority big-treed old growth. To create this map, we varied the targets for each ecosystem based on finer-scaled ecological risk. Whereas Map 2 shows the biggest 10% or 30% of expected amount of old for all ecosystems, this map shows the biggest 3 or 5% forests in ecosystems at lower risk, and 7%, 10% or 30% of expected for ecosystems at higher risk.

Map 3 is included as a layer in Map 1.

Map 4. Ancient Forest

This map shows the forests described in provincial forest inventory data as ancient, defined as older than 400 years (for ecosystems with rare stand-replacing disturbance) and older than 250 years (for ecosystems with higher stand-replacing disturbance rates).

Map 4 is included as a layer in Map 1.

Map 5. Remnant Old Ecosystems

This map shows old forest remaining in ecosystems where less than 10% of the total forested area is mapped as old today, defined as older than 250 years in ecosystems with rare stand-replacing disturbance and older than 140 years more frequently disturbed ecosystems. The map highlights BEC variants where less than 10% of the forest is old, and where geographic areas within these ecosystems (described by landscape units) have less than 10% old forest. Remnant old patches are frequently small and fragmented.

Map 5 is included as a layer in Map 1.

Map 6: Intact Watersheds

This map shows relative watershed intactness based on the amount of logging and roads in each watershed. Colours on the map differentiate amongst watersheds that are more than 70%, 80% and 90% unmodified. We are creating a map showing the top 10% most intact watersheds within each resource region for release later.

Map 6 is not included in Map 1 but is provided to assist planning. See Recommendations.

Map 7. Big-treed Recruitment Forest

Ecosystems with little or no remaining old forest face the highest risk in the province. Reducing risk in these highest risk ecosystems requires recruiting appropriate younger forest to grow old. Although the Provincial government has not committed to deferring recruitment forest, where insufficient old and older mature forest remain to meet minimum targets, Map 7 shows younger forests (over 80 years) where the provincial inventory identifies the largest trees that could "recruit" into large-structured old forest in the shortest timeframes. The mapping does not identify stands with veteran trees that are older than the main forest canopy. Forests with veterans may be important for recruitment.

Map 7 is not included in Map 1. See Recommendations.

Map 8. Old-growth Forest

This map provides context for the deferral maps, showing all forest identified in provincial forest inventory as old growth (older than 250 years in ecosystems with rare or infrequent stand-replacing disturbance and older than 140 years in ecosystems with higher stand-replacing disturbance rates). It highlights relative tree size, as described by tree height and diameter, by dividing old growth within each ecosystem into five equal size classes. The area of forest in each size class varies because there are more small and medium-sized trees than large trees. See inset graph showing area by class. The map provides additional context by discriminating between younger stands initiated by logging and those initiated by natural disturbance.

What values do the maps not include?

Our maps focus on criteria designed to capture at-risk old growth as described in the 2020 Old Growth Strategic Review and do not explicitly identify other high-value old forest. For example, the maps do not identify old forest critical to wildlife species (e.g., mountain caribou, spotted owl, marbled murrelet), old forest that forms the backbone to healthy salmon streams, old and primary forests critical to carbon storage and climate adaptation, or old forests critical to supporting cultural practices.

We have not attempted to map these important forests at this time but expect these values to be included in resilience planning that is also mandated in the recommendations as part of the OGSR paradigm shift. The areas mapped as priority deferral candidates likely include forest that captures some of these values and may form the core of a more comprehensive strategy.

How reliable are the maps?

Although these maps are developed at the provincial scale and limited by data accuracy, we recommend that they are adequate to guide meaningful deferrals immediately. We recognise that inventory gaps and errors mean that some forest will be mis-identified.

To help us determine how best to map at-risk old growth, we assessed the reliability of datasets by comparing inventory data to ground plots. That analysis showed good support for using measurements of tree height and diameter to map the remaining largest old forest in the province. [See Methods Supplement report].

We also found that inventoried forest age is less reliable, particularly for ancient forests. We have therefore modified the mapping of recommendations of the 2020 Old Growth Strategic Review slightly to improve reliability in identifying ancient forests and have used the Province's definition for "very old" forests. We expect more ancient forests to be identified on the ground using tree core analysis.

Maps –

to be added as PDFs to final version and made available online and as shapefiles.

Appendix 4: How much forest is included in the priority deferral areas?

The Panel recommends deferral (i.e., no development or harvesting) in all identified priority at-risk forests that are not already protected while the development of a new approach to forest management is underway. In addition, we recommend that Intact Watersheds, and Recruitment forests are deferred while planning is underway.

The table below shows the area of each type of at-risk old growth, the unprotected area, and the overlap with pending and active cutblocks.[24] Of 11.1 million hectares of old growth, 3.5 million hectares are protected (Tier 1 and Tier 2 protection) and 5 million hectares are at-risk and unprotected. The Priority Deferral Map 1 identifies unprotected **priority** at-risk forests covering about 2.6 million hectares of the 5 million hectares of at-risk old forest (see Table). This represents about 10% of the historic amount of old growth in BC, estimated at 25 million hectares.

Type of old growth	Total area (Million ha)	Unprotected area* (Million ha)	Overlap with active and pending cut-blocks (ha)
All forest	56.5	44.0	400,319
All old growth	**11.1**	**7.6**	87,059
At-risk old growth			
Big-treed old growth	6.2	4.1	
Ancient forest	0.6	0.4	
Remnant old ecosystems	0.8	0.5	
Intact watersheds	Not analysed	Not analysed	
Total at-risk old growth	7.6	**5.0**	68,798**
Priority at-risk old growth			
Big-treed old growth	2.6	1.7	
Ancient forest	0.6	0.4	
Remnant old ecosystems	0.8	0.5	
Intact watersheds	Not analysed	Not analysed	
Total priority at-risk old growth	4.0	**2.6**	**48,095**
Total recruitment	0.4	0.3	4,859

*We excluded woodland and sparsely forested ecosystems during prioritization.
**Threatened at-risk old growth

There are several potential mechanisms for deferral, including examples described in the Old Growth Strategic Review (p. 56):

a. "Instruct BCTS to cease development and defer selling timber in the areas;
b. Request authorized tenure holders to voluntarily defer development;
c. Decline to authorize new permits or licences in deferral areas; and
d. If necessary, establish regulatory provisions and incentives to enable deferrals."

[24] Active and pending cutblocks represent immediate threat to at-risk old growth and are available in a provincial database that can be analysed, though they continually change as areas are harvested and new areas added. These data were provided by the province current to June 2021. Some cutblocks being planned by licensees will pose future threats to deferral candidate areas. However, cutblocks that have not been submitted for approval are not tracked or managed within the Provincial tenure system. We are therefore unable to assess the potential impacts of planned cutblocks.