

CHIEF FORESTER EXPECTATIONS

For Prioritization in Response to Spruce Beetle Outbreaks



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Office of the Chief Forester Division

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Approved by:



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ABOUT THIS DOCUMENT

The following document from the Ministry of Forests, Lands, Natural Resource Operations and Rural Development (the Ministry) provides the Chief Forester's expectations to forest professionals who plan and implement harvesting in response to spruce beetle outbreaks in British Columbia. This document does not replace or preclude legal requirements or other sources of guidance that are issued by the Ministry.

INTRODUCTION

The province is experiencing higher than normal populations of spruce beetle (*Dendroctonus rufipennis*) with the potential for significant impacts to timber and non-timber resources, and for lasting social, cultural and economic impacts to communities. The current spruce beetle outbreak, in combination with existing land base impacts resulting from forest management actions in response to mountain pine beetle (*Dendroctonus ponderosae*), has created elevated risk to the stewardship and sustainability of environmental and economic values. Forest management in relation to the outbreak must reflect these increased risks. Forest management must also consider the combined impacts of spruce beetle, mountain pine beetle and other disturbance agents when planning and prioritizing areas for spruce beetle mitigation activities.

In this document I outline my expectations as Chief Forester, regarding priorities for planning and operations in forests that are impacted by spruce beetle, or by spruce beetle in combination with other disturbance agents such as mountain pine beetle, western balsam bark beetle, Douglas-fir bark beetle, windthrow and/or wildfire. As Chief Forester, in expressing these expectations I have considered the environmental, socio-cultural and economic effects to short, mid and long-term sustainability of our forest resources. In stating my expectations regarding relative harvest priority, I have carefully weighed the loss of short-term salvage opportunities with the need to maintain future harvest opportunities and non-timber values provided by our forests.

I expect that forest professionals will work cooperatively with Indigenous peoples to seek to understand and incorporate Indigenous interests in management responses to spruce beetle and will consider potential impacts to Aboriginal rights and title, and Indigenous interests during spruce beetle mitigation activities.

I expect that licensees will work together with Ministry staff to develop a collaborative management response to mitigate the impacts of spruce beetle to timber and non-timber resources. I encourage licensees to work together to ensure that operating areas that are significantly impacted by spruce beetle are prioritized within a management unit. This may require business to business agreements and/or operating area re-allocation.

I expect that the Ministry will continue to monitor licensee management activities in response to the spruce beetle outbreak. If, in my professional judgement, there is a risk to the long-term sustainability of timber and/or non-timber resources in a management unit (timber supply area or tree farm licence), I

will exercise my statutory authority under Section 8 of the *Forest Act*. This may involve changes to the allowable annual cut (AAC) and/or AAC partitions, in order to ensure the stewardship and sustainability of the Province's forest resources.

The following document includes a matrix to guide prioritization of planning and operations for timber harvesting in spruce beetle outbreak areas in the Province of British Columbia.

DEFINITIONS

For the purpose of this document, the following terms are defined as:

Ground Surveys – may include timely spruce beetle probing, reconnaissance surveys, hybrid probing/walkthroughs, star probes and/or timber cruise. Timber cruise or beetle re-sweep provides information regarding tree mortality and infestation levels when completed before the next beetle flight. However, a timber cruise does not provide information regarding the current infestation within the landbase, or spruce beetle life stages, at the time of harvest. In circumstances where the spruce beetle outbreak is dynamic, I expect forest professionals to conduct and provide spruce beetle focused ground surveys and report the information collected to Ministry.

Percent – percent in relation to species composition and/or proportion of dead should be measured based on proportion of live and dead merchantable stems or gross basal area and can be derived:

- from Vegetation Resources Inventory (VRI);
- from a beetle reconnaissance walkthrough and/or beetle probe; or
- from a timely timber cruise or re-sweep.

I note that the assessment of species composition or percent mortality using the VRI should consider basal area in the live layer (Layer 1) and the dead layer (Layer D). The VRI dead layer contains modelled dead pine timber and/or may include photo interpreted dead volume where VRI re-estimates have occurred (estimated based on the date of the re-estimate photos). At the time of this guidance mortality for species other than pine is not consistently available through the VRI. Mortality for species other than pine can be estimated using the VRI and cumulative aerial overview survey (AOS) information. Desktop assessments using the VRI should be used as guidance and should be verified by ground surveys.

Pest Reduction Harvest – harvesting tactics to remove or reduce spruce beetle populations in effort to slow the infestation's expansion by removing timber that contains live beetles at the time of harvest and processing this infested timber before the next beetle flight.

Relative Harvest Priority – for the purposes of this document when referencing prioritization of harvest planning and operations with a management unit impacted by spruce beetle, I indicate a priority order, and the highest priority stands should be actioned first (i.e. **High** priority should be actioned before **Low** priority and **Very Low** priority should be actioned before **Not a Priority**).

Salvage Harvest – harvest of dead timber to minimize timber value loss.

Stand - a community of trees sufficiently uniform in species composition, age, arrangement, and condition to be distinguishable as a group from the forest or other growth on the adjoining area, and thus forming a silviculture or management entity (BC Forestry Glossary).

Susceptible Spruce – spruce-leading stands (not including black spruce) with live spruce that are greater than 80 years of age. Younger spruce stands may be susceptible when spruce beetle population levels are high.

SPRUCE AND SPRUCE BEETLE ECOLOGY

In [Omineca Region Guidance - Stand and Landscape-Level Retention for Harvesting in Response to Spruce Beetle Outbreaks](#) the Ministry provides information regarding spruce and spruce beetle ecology which indicate that forest management activities in response to spruce beetle must diverge significantly from management actions in response to mountain pine beetle.

Most spruce-dominant ecosystems are characterized by gap replacement rather than stand replacement disturbance. As a result these ecosystems are typically uneven-aged stands. In these ecosystems clear cut silviculture systems are often less ecologically suitable than patch cut, retention or selection systems. Therefore, where practicable, I expect forest professionals will use silviculture system alternatives rather than clear cut or clear cut with reserves systems. Refer to [Silvicultural Systems Handbook for British Columbia](#) for more information regarding silviculture systems.

STEPS FOR SPRUCE BEETLE MITIGATION

STEP 1. DETERMINE THE BEETLE MANAGEMENT UNIT STRATEGY

The Ministry develops and publishes Regional and District forest health strategies, available [here](#). The strategies describe the main forest health issues in the TSA or District, the recommended activities to address these issues, and the priorities for management and research. These forest health strategies assign and classify Beetle Management Units (BMU) to provide strategic level guidance for beetle monitoring and mitigation.

The Ministry reviews and updates BMU classification annually or may update classification in an expedited manner in response to a forest health emergency. I note that BMU classification is strategic in scale and is used to guide management responses in a management unit (TSA or TFL). Tactical and operational scale decisions in response to spruce beetle outbreaks should be guided by higher resolution information.

I expect that harvesting in all BMUs will be focussed on salvage of dead mountain pine beetle impacted pine volume, on salvage harvest of spruce beetle impacted stands, or on spruce beetle population pest reduction in spruce beetle infested stands. Mortality and infestation of timber caused by Western balsam bark beetle (*Dryocoetes confusus*) and Douglas-fir beetle (*Dendroctonus pseudotsugae*) should also be considered as well as damage by other biotic and abiotic agents.

The classification of BMUs provides guidance regarding spruce beetle specific forest health mitigation priorities within a management unit, however spruce beetle mitigation measures should be considered at the strategic, tactical and operational scales.

Harvest planning and operations in spruce beetle impacted BMUs will vary in priority level in the relative harvest priority matrix depending on the identified spruce beetle forest health strategy (BMU category). Most BMUs fall into a salvage category (Salvage), or category that requires some type of pest reduction strategy (Suppression/Sanitation, Holding, Holding Plus, Monitoring Plus) where removal of live beetle is prioritized over the removal of dead timber. See [Regional Forest Health Strategies](#) for the names and definitions of BMU strategies which apply to each management unit.

BMUs with advanced infestation or outbreaks, where a salvage harvest strategy is highest priority, will have different relative harvest priority ranking than BMUs where an infestation or outbreak is less advanced, and therefore a pest reduction strategy is recommended.

STEP 2. GATHER STAND INFORMATION

The Aerial Overview Survey (AOS) annual and cumulative mortality data sets should be used to identify landscape-level spruce beetle infestations and to guide mitigation. In order to track the status and spread of the spruce beetle population, I expect that ground surveys will be completed for stands targeted for salvage or pest reduction harvest in response to spruce beetle. Ground surveys should provide information regarding tree mortality and beetle life stage. The Ministry has provided guidance regarding ground surveys in [Spruce Beetle Ground Survey Guidelines – Omineca and Northeast Region](#). This guidance was developed for the Omineca and Northeast regions and is applicable to any spruce ecosystems with spruce beetle across the province.

Ground surveys are needed to provide data on potential for expansion of the infestation (i.e. information regarding life stages, population density and distribution). I expect that licensees will provide the Ministry with ground survey information. I expect that ground survey information will be included in a professional rationale when implementing spruce beetle mitigation activities that are not consistent with expectations stated by the Office of the Chief Forester in the most recent AAC determination or amendment.

STEP 3. USE MATRIX TO PRIORITIZE STANDS FOR HARVESTING

It is my expectation that the following stand harvest priority matrix (Table 1) will guide licensee forest management. I expect that harvest within spruce beetle outbreak areas will be focused to the extent practicable in dead, dying, and damaged stands. Where practicable, timber containing live beetles should be selectively removed from any stand before the next beetle flight using focussed harvesting techniques.

I expect that stands with little or no damage from biotic (e.g. spruce beetle, mountain pine beetle, western balsam bark beetle) or abiotic (e.g. wildfire, windthrow) factors will be retained for mid-term

timber supply. Timber harvest must be focussed on dead, dying and damaged timber to ensure mid and long-term sustainability of timber resources.

3.1 HARVEST PRIORITY – SALVAGE AND PEST REDUCTION HARVEST

The priority in spruce beetle outbreaks is the removal of dead and dying timber. I expect that the most severely impacted stands will be the highest priority for planning and harvesting, and that stands will be harvested in order of descending priority.

The strategies for spruce beetle mitigation should include **salvage harvest** and/or **pest reduction harvest strategies**.

- The objectives for a **salvage harvest strategy** in spruce beetle killed stands must be to: reduce economic impacts of spruce beetle; to maintain a sustainable future timber supply; to maintain healthy forest ecosystems; and to conserve non-timber values. Beetle population reduction is a secondary objective.
- The objectives for a **pest reduction harvest strategy** in spruce beetle infested stands are to: control or reduce the spruce beetle population; to reduce the risk of the infestation spreading to adjacent susceptible spruce stands; to protect mid-term timber supply; and/or to conserve non-timber values.

I expect that a highest priority **salvage harvest** stand should have greater than 50% dead (by live and dead merchantable stems or by gross basal area) of all merchantable species combined. I expect that stands with less than 50% dead, without a significant component of susceptible spruce infested with live beetle at the time of harvest, will be lower priority for harvest. Where live secondary stand structure shows good potential for natural stand re-establishment these stands may be opportunities to retain to contribute to future timber supply.

In order to be considered for **pest reduction harvest**, I expect that a significant component of susceptible spruce has a high probability of being infested with live spruce beetle at the time of harvest. Information regarding intensity of the infestation and life stages present in the stand at the time of harvest should be confirmed via ground surveys (such as beetle re-sweeps) to confirm the harvest activities will remove live beetles.

Pest reduction harvest should consider the application of focussed harvest techniques to retain live, uninfested timber, while removing dead, dying and damaged timber. I expect that information regarding the infestation intensity and beetle life stages will be reported to government in a manner that supports the Ministry's monitoring of the spruce beetle outbreak and management responses.

Tree mortality associated with other insects and/or damage agents should be considered as well as spruce beetle mortality and infestation.

The relative harvest priority matrix presented in Table 1 summarizes my expectations for prioritization of planning and operations for timber harvesting in spruce beetle outbreak areas.

The priorities I have outlined are relative and should be considered throughout a timber management unit (TFL or TSA). I expect that licensees within a management unit will work together to maintain the stewardship and sustainability of the province's timber and non-timber resources.

3.1.1 Relative Harvest Priority

I expect that planning and harvesting will action the outbreak by harvesting the highest priority stands within a management unit first before proceeding to moderate, low and very low relative priority.

In BMUs where a spruce beetle outbreak is in early stages (BMUs classed as Suppression/Sanitation, Holding, Holding Plus, Monitoring Plus), an impacted stand may classify as **Low** or **Very Low** relative priority using the Relative Harvest Priority matrix. In this situation **Low** relative priority should be prioritized ahead of **Very Low** and **Very Low** relative priority should be prioritized ahead of stands with little to no insect-induced mortality and no live beetle present at the time of harvest (**Not a Priority**).

The relative harvest priority matrix presents harvest priority for BMUs with salvage focus (as indicated in red and by an 'S') and BMUs with pest reduction focus (as indicated in green and with a 'P').

Table 1: Matrix for **RELATIVE HARVEST PRIORITY** in spruce beetle impacted stands in unconstrained THLB.

For spruce beetle-impacted stands that occur in constrained THLB forest professionals should refer to [Omineca Region – Guidelines for Spruce Beetle Treatment in Special Management Areas](#).

CRITERIA	RELATIVE HARVEST PRIORITY					Additional Considerations
	Not a Priority	Very Low	Low	Moderate	High	
Stands with > 50% (greater than) dead merchantable stems or basal area with live* spruce beetle present at the time of harvest. Stands with > 50% dead and no live spruce beetle present at the time of harvest are lower relative priority.					S	Removal of timber with live beetle in these stands is high priority. Stands with >30% live beetle should be highest priority. Undamaged timber should be retained wherever practicable.
					P	
Stands with 30% to 50% dead merchantable stems or basal area with > 10% of timber with live* spruce beetle present at the time of harvest.				S		An assessment of live secondary stand structure should be conducted to determine the natural stand re-establishment potential of live stems.
				P		
Stands with 30% to 50% dead merchantable stems or basal area with < 10% of timber with live* spruce beetle present at the time of harvest.			S			Focussed harvest to remove live beetles is recommended. Stands with >30% live beetle should be highest priority.
			P			
Stands with 10% to 30% dead merchantable stems or basal area with > 10% of timber with live* spruce beetle present at the time of harvest.			S			Removal of timber with live beetle in these stands is high priority. Stands with >30% live beetle should be highest priority. Undamaged timber should be retained wherever practicable.
					P	
Stands with 10% to 30% dead merchantable stems or basal area with < 10% of timber with live* spruce beetle present at the time of harvest.		S				Focussed harvest to remove live beetles is recommended.
				P		
Stands with < 10% dead merchantable stems or basal area with > 10% of timber with live* spruce beetle present at the time of harvest.			S			Removal of timber with live beetle in these stands is high priority. Consider applying partial harvest systems and retaining live uninfested timber.
				P		
Stands with < 10% dead merchantable stems or basal area with < 10% of timber with live* spruce beetle present at the time of harvest.		S				Focussed harvest and/or mitigation measures (e.g. trap trees) to remove live beetles is recommended.
			P			
Stands with little to no insect-induced mortality and no live* beetle present at the time of harvest.	S					Harvest of undamaged stands should not be prioritized for harvest in areas with spruce beetle outbreaks.
	P					

*a tree containing “live spruce beetle” is defined as an attacked tree (tree code 1, 2, 3 or 4 in the [Spruce Beetle Ground Survey Guidelines](#)) or using a timber cruise, damage codes 5 or 6.

STEP 4. IMPLEMENT MANAGEMENT RESPONSE

It is my expectation that forest professionals will implement management responses that are appropriate to mitigate risks to environmental, socio-cultural and economic values of our forest resources in priority stands within spruce beetle outbreak areas.

I expect that management responses to mitigate spruce beetle impacts will consider the following objectives:

- Avoid harvesting live un-infested timber;
- Protect secondary stand structure (live, un-infested mature, immature and advanced regeneration trees) wherever practicable;
- Use tactical and surgical silviculture systems which includes small cut block sizes and/or implement patch cut, selection or retention silviculture systems when operating in spruce beetle impacted ecosystems. Refer to *Silvicultural Systems Handbook for British Columbia*;
- Apply beetle control tactics outlined in **Regional and District /TSA Forest Health Strategies**;
- Apply guidance provided in *Omineca Region - Spruce Beetle BMPs* and *Omineca Region Guidance – Stand and Landscape Level Retention for Harvesting in Response to Spruce Beetle Outbreaks*; and
- Avoid or minimize potential impacts to Indigenous rights, title and interests and culturally significant features and resources.

I expect that the Ministry will monitor and report regularly regarding this harvest prioritization guidance. If, in my professional judgement, and supported by the monitoring reports, there is a risk to the long-term sustainability of timber and non-timber resources in these management units, I will exercise my statutory authority under Section 8 of the *Forest Act*.

ADDITIONAL GUIDANCE

I expect that guidance which has been provided by government will be considered in forest management planning and operations in response to the spruce beetle outbreak. Regional guidance developed for spruce beetle outbreaks in other parts of the Province should be reviewed and considered by forest professionals in relation to the local regulatory requirements and timber resource sustainability issues. Guidance includes:

Regional and District /TSA Forest Health Strategies

<https://www2.gov.bc.ca/gov/content/industry/forestry/managing-our-forest-resources/forest-health/forest-health-strategies/regional-forest-health-strategies>

Spruce Beetle Management in B.C.

https://www2.gov.bc.ca/assets/gov/farming-natural-resources-and-industry/forestry/forest-health/bark-beetles/spruce_beetle_guidebook.pdf

Silvicultural Systems Handbook for British Columbia

<https://www.for.gov.bc.ca/hfp/publications/00085/silvsystemshdbk-web.pdf>

Spruce Beetle Ground Survey Guidelines – Omineca and Northeast Region

<https://www.for.gov.bc.ca/ftp/dpg/external/!publish/Spruce%20Beetle/Guidelines/SBGndSurvGuidelinesAug2017.pdf>

Omineca Region Guidance – Stand and Landscape Level Retention for Harvesting in Response to Spruce Beetle Outbreaks

https://www2.gov.bc.ca/assets/gov/farming-natural-resources-and-industry/forestry/forest-health/bark-beetles/retentionguidance_spruce_beetle_20sept2017.pdf

Omineca Region – Guidelines for Spruce Beetle Treatment in Special Management Areas

<https://www.for.gov.bc.ca/ftp/DPG/external/!publish/Spruce%20Beetle/Guidelines/Spruce%20Beetle%20Management%20Direction/Omineca%20Region%20Guidelines%20for%20Spruce%20Beetle%20Treatment%20in%20SMAs%20May%202017.pdf>

Omineca Region – Guidelines for Spruce Beetle Haul and Mill Strategies

https://www2.gov.bc.ca/assets/gov/farming-natural-resources-and-industry/forestry/forest-health/forest-health-docs/spruce-beetle-docs/spruce_beetle_omineca_haul_and_mill_guidelines.pdf

Omineca Region - Spruce Beetle BMPs

<https://www.for.gov.bc.ca/ftp/DMK/external/!publish/SpruceBeetle/Documents/Omineca%20Region%20Spruce%20Beetle%20Document%20Series/v3%20SB%20Document%20Series%20Omineca%20Region%20June%202017.pdf>

Omineca Region - Guidelines for Watershed Planning

<https://www.for.gov.bc.ca/ftp/dpg/external/!publish/Spruce%20Beetle/Guidelines/Spruce%20Beetle%20Management%20Direction/Omineca%20Region%20Guidelines%20for%20Watershed%20Planning%20May%202017.pdf>

Post-Natural Disturbance Forest Retention Guidance – 2017 Wildfires

https://www2.gov.bc.ca/assets/gov/farming-natural-resources-and-industry/forestry/2017_fire_report_revised.pdf