



**Forest
Practices
Board**

Management of Douglas-fir Bark Beetles Southeast of Kamloops, BC

FPB/IRC/204

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Introduction

The Complaint

An experienced forest worker is concerned that Tolko Industries Ltd.'s (Tolko) management of the Douglas-fir bark beetle outbreak on Tree Farm Licence 49 in the Upper Salmon River drainage, about 22 kilometres southwest of Westwold BC, is inadequate and is possibly intensifying the outbreak. The complainant is concerned that Tolko did not remove trap trees, some other harvesting practices may exacerbate the infestation and these practices allow Tolko to harvest in otherwise unavailable ungulate winter range. The complainant would like to see Tolko use aggressive trap tree and beetle monitoring programs in the Upper Salmon River area and in other high value wildlife areas where it operates.

To investigate these concerns, the Board examined the following three questions:

1. Was Tolko's management of the Douglas-fir bark beetle outbreak in the Upper Salmon River adequate?
2. Considering the Douglas-fir bark beetle outbreak, are Tolko's harvesting practices reasonable?
3. Did Tolko comply with the *Forest and Range Practices Act* (FRPA) requirements for ungulate winter range and trap trees?

Applicable Legislation

Section 26 of FRPA allows the minister to order a licensee to carry out measures to "control or dispose of the insects."

Section 33 of the *Forest Planning and Practices Regulation* (FPPR) gives an exemption for the requirement for a site plan if harvesting less than 50 cubic metres of timber at a site.

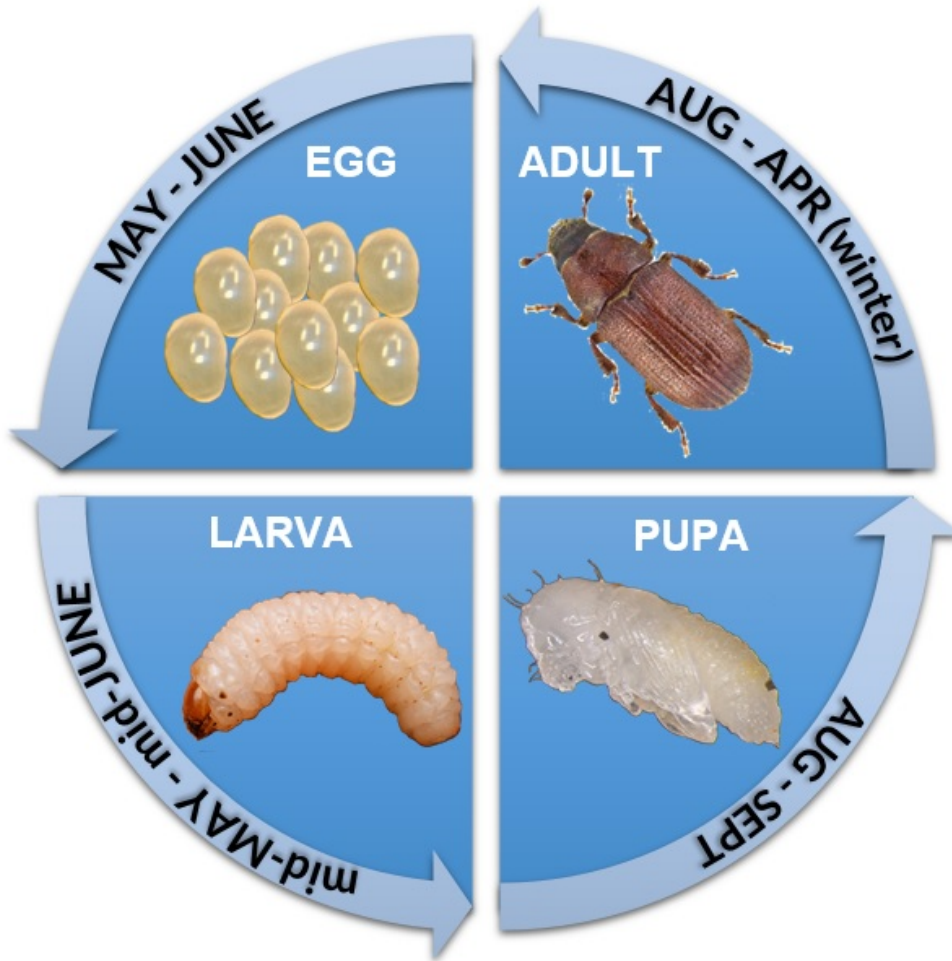
Section 41 of the FPPR requires that a licensee "who uses trap trees or pheromones to concentrate insect populations must ensure that the insect brood is destroyed before the insects emerge."

Section 66 of the FPPR requires wildlife tree retention areas that relate to a cutblock be a "minimum of 3.5% of the cutblock."

Section 69 of the FPPR requires licensees to "comply with each general wildlife measure that applies to the area."

In 2006, government approved a *Government Actions Regulation Order* U-8-006 (the Order) for moose winter range in the Okanagan Shuswap Forest District. In June 2015, government granted Tolko a temporary conditional exemption from the Order.

FIGURE 1. Douglas-fir Bark Beetle (*Dendroctonus Pseudotsugae*) Life Cycle

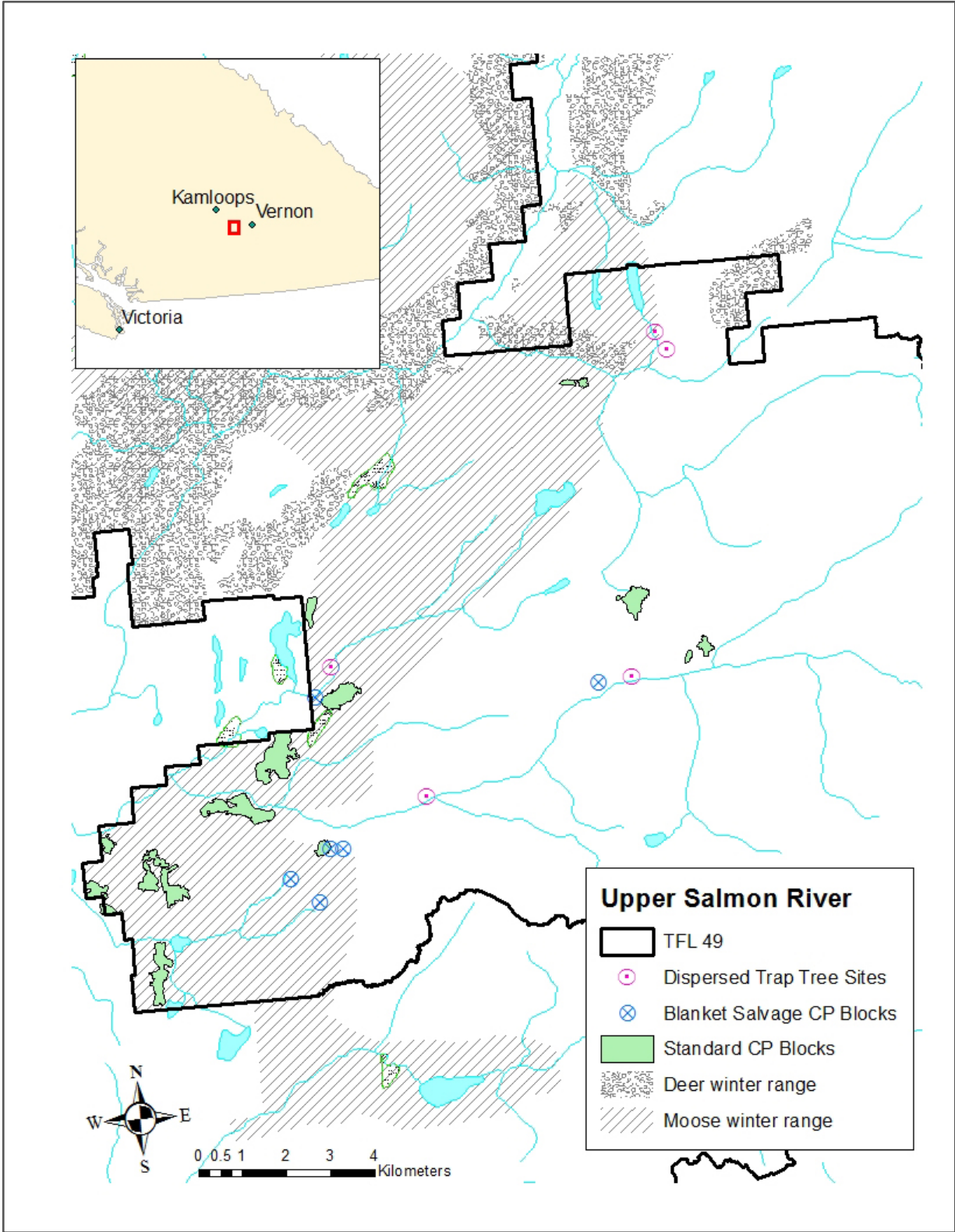


Flight Period



Best Management Practices: Activity Douglas-fir Beetle Time Table		
	Preferred	Possible
Trap Tree Placement	January – March	November – April
Trap Tree Removal	September – December	September – April
CP Issued	September – October	September – Feb

Figure 2. Upper Salmon River



Background

In 2010, a Ministry of Forests, Lands and Natural Resource Operations (FLNRO) aerial overview showed a few spots of Douglas-fir bark beetle in the area of the complaint. The beetle populations continued to build and, in December 2014, the Okanagan Shuswap Natural Resource District (the district) informed Tolko about the outbreak.

Tolko and the district decided that a sanitation harvesting strategy was the best way to protect wildlife, timber, and First Nations cultural values in this area. Accordingly, in February 2015, Tolko developed a plan to fall trap trees in approved cutblocks or cutblocks under development (standard cutting permit cutblocks). It also planned to fall trap trees along roads in the areas where there were no planned cutblocks but high levels of beetle activity (dispersed trap trees.)

In April 2015, Tolko requested, and the district quickly granted, an amendment to Tolko's blanket salvage cutting permit¹ to authorize falling the trap trees. Tolko felled the trap trees before the Douglas-fir bark beetles emerged in the spring of 2015 (see Figure 1 for Douglas-fir bark beetle life cycle). The trap trees were very successful at capturing the Douglas-fir bark beetles.

Tolko established cutting authority for all the standard cutting permit cutblocks by early December (see Figure 1 for best management practices). Establishing cutting authority for the dispersed trap tree sites took longer. Tolko did not consider it had final clearance to complete harvest of the dispersed trap tree sites until January 21, 2016.

Tolko planned to use a high capacity logging contractor to harvest all the standard cutting permit cutblocks and the dispersed trap trees under the salvage permit. It started harvesting in mid-September 2015 and finished harvesting the standard cutting permit cutblocks, except cutblock AB6048, in the third week of December. Tolko decided to hold off logging that cutblock because its forest stewardship plan referral commitments were incomplete. Tolko transferred the high capacity logging contractor to another operating area, to keep them working, while Tolko completed referrals and established cutting authority for the dispersed trap trees.

Douglas-fir Trap Trees

Large healthy Douglas-fir trees felled into shade near infestations that attract and absorb emerging Douglas-fir bark beetle. Trap trees that contain these bark beetles must be treated to kill the larvae brood before the adult beetles emerge. Hauling and processing at a sawmill is usually the easiest and most cost effective method to destroy the brood, but burning the logs on site, or possibly debarking, will also work.

Sanitation Harvesting

Harvesting and milling currently infested stands of trees before adult beetles emerge, to reduce the population and inhibit population expansion. For Douglas-fir bark beetle, guidelines require minimizing infested material with harvesting practices such as leaving stumps no higher than 30 centimetre and burning debris piles before the beetles emerge.

¹ In a blanket salvage cutting permit, small cutblocks are amended into an existing cutting permit by adding maps. This allows licensees to quickly react and deal with insect infestations. The Okanagan Shuswap Natural Resources District told the Board that it does not hold licensees to strict mapping or reserve tree standards in a blanket salvage cutting permit, to allow timely management of infestations.

In February 2016, Tolko hired a hand faller with a skidder and a self-loading logging truck (alternate logging crew) to complete the sanitation harvest. The crew removed approximately 1100 cubic metres, or 22 logging truckloads, of Douglas-fir bark beetle infested trees, but due to late winter/early spring break-up conditions, did not complete harvest of all the trap trees before the insects emerged.

In July 2016, Board staff, FLNRO regional and district forest health staff, a FLNRO consultant, Tolko staff, and First Nations representatives conducted a field review of selected trap tree sites and cutblocks. The group found trap trees where the adults had emerged, infested standing trees, infested debris piles, and logs decked along the road that adults had emerged from and where larva were present as well.

Investigation Results

Was Tolko's management of the Douglas-fir bark beetle outbreak in the Upper Salmon River adequate?

Tolko has no legal or contractual obligation to manage forest health. Under section 26 of FRPA, government could require a licensee to control a bark beetle outbreak. Ideally, a licensee considers its management obligations associated with operating a tree farm licence, plus any directives from government (e.g., the provincial timber management goals and objectives, chief forester expectations, and district forest health strategies) when dealing with bark beetle outbreaks. To effectively deal with bark beetles, the licensee must be able to identify the problem, develop strategies, implement measures to control the beetle, and monitor/follow-up. Therefore, the investigation considered those four steps to determine the adequacy of Tolko's management of the Douglas-fir bark beetle in the area.

1. Identification of Outbreak

Ultimately, government is responsible for the forest resources of the province. FLNRO maintains forest health functions at the provincial, regional and district levels, and makes this expertise available to licensees. Provincially, FLNRO monitors forest health with aerial overview flights each year and makes the information available to licensees. The district monitors forest health and verifies the aerial overview flights with ground surveys. When the district informed Tolko about the outbreak, Tolko immediately assessed the information and developed a plan.

2. Development of a Strategy

The appropriate strategy to deal with Douglas-fir bark beetle depends on the stand condition, level of infestation, existence of access, and the management objectives for the area. In this case, access was generally good² and the timber, wildlife and cultural heritage values were high. Although some of the infestation was outside the tree farm licence and on inaccessible ground, it was still small enough to contain with direct control measures. Tolko decided to use an aggressive suppression strategy to reduce the population. Where there was active beetle infestation and it was feasible³ to harvest, Tolko developed cutblocks for standard cutting permits. Tolko also used its blanket salvage cutting permit to authorize falling and harvesting the trap trees along existing roads, thereby maximizing beetle capture, recovering the tree volume and minimizing the cost to destroy⁴ the beetle brood by hauling the trap trees to the mill.

Suppression Strategy

Suppression is the appropriate strategy for infested areas where resources for harvesting and milling capacities equal or exceed the infestation. The strategy demands detailed detection and follow-up every year to ensure complete sanitation of infested stands.

3. Implementation

Tolko quickly located and felled the trap trees at appropriate sites and preferred timesⁱ (see Figure 1) to capture the emerging adult beetles, and to draw them away from important cultural heritage resources and UWRs. However, if the licensee does not destroy the broods, then the trap trees can intensify infestation levels, so any delays that may affect removing the trap trees should instill a sense of priority and urgency to planning and treatment options.

Timely development of 12 standard cutting permit cutblocks allowed Tolko to complete sanitation harvest of 55 000 cubic metres of timber, 68 percent of which was of infested or highly susceptible Douglas-fir, by mid-December. However, due to an internal miscommunication, Tolko did not destroy the broods in about 10 trap trees (or 5 cubic metres) it felled in cutblock AB6048 before the beetles emerged.

Completing harvest of the dispersed trap trees was more challenging. Many of the dispersed trap tree sites along the roads were so successful at attracting and concentrating the Douglas-fir bark beetle that the beetles attacked nearby standing green trees (spill-over trees).⁵ Douglas-fir bark beetles usually undergo a small secondary flight later in the summer after the peak flight period. The peak flight is the primary tree-killing flight and occurs between April and June. FLNRO recommends assessing attack and spill-over levels when the peak flight is completed (July) in order to plan effective disposal/removal of attacked trees.

Tolko decided to wait for the secondary flight to conclude and started evaluating the dispersed trap tree sites for spill-over in September. Although still possible to remove and destroy the trap trees, the

² In general, the area is accessible but there are small isolated areas that are inaccessible.

³ To be feasible to log, timber needs to be economic to harvest and not constrained by other factors such as visual quality, terrain stability, cultural heritage resources, etc.

⁴ Licensees can also destroy bark beetles by burning or barking the trees while the brood is still present.

⁵ When deploying trap trees or pheromone bait trees managers should always anticipate spill-over and be prepared to treat them or follow-up with additional trap trees.

period to do so was shorter and, in the Board's opinion, the priority and urgency to deal with the trap trees should have been higher.

Section 33 (1)(a)(iii) of the FPPR exempts licensees from preparing a site plan when harvesting less than 50 cubic metres. Tolko knew there would be spill-over but did not know where. By November, it found that the exemption did not apply at six sites. Tolko developed site plans for these small blanket salvage cutting permit cutblocks. Development of the site plans triggered requirements in the forest stewardship plan to refer the site plans to First Nations, so Tolko sent out an expedited referral in December and received responses in early January.

Tolko then had another delay. In January, Tolko initiated a second amendment to its blanket salvage cutting permit to ensure it had harvest authority for the six blanket salvage cutting permit cutblocks. The district quickly issued the amendment. However, the district told the Board that the April 2015 amendment to the blanket salvage cutting permit that gave Tolko authority to harvest the trap tree sites would normally include the anticipated spill-over trees. The district explained that for it to be sure that Tolko had clearance under the April 2015 amendment, the district would need to know the circumstances, but Tolko never asked if it needed another amendment for the spill-over trees. Had Tolko talked to the district earlier, it may have avoided the delays that resulted from getting the second amendment.

The alternate harvesting crew started working on February 15, 2016. Tolko explained that by then there were load restrictions on the preferred route, and unseasonal warm weather made hauling unsafe on two other routes. The alternate harvest crew removed approximately 1100 cubic metres, or 22 logging truckloads, but could not complete the harvest of about 200 cubic metres of infested trap trees. If trap trees cannot be removed or the brood destroyed by burning before the adults emerge, then additional trap trees should be deployed to capture the emerging beetles. Tolko did not destroy the larvae or place trap trees to capture all the adult beetles when the beetles emerged from the remaining trap trees in spring 2016.

4. Monitoring and Follow-up

In April 2016, Tolko felled trap trees at 11 sites under approved cutting permits, and said it would remove them before the beetles emerge in 2017. It did not deploy dispersed trap trees.

In the summer of 2016, Tolko did aerial overview reconnaissance and follow-up ground surveys to identify new Douglas-fir bark beetle infestations. Tolko is using this information to plan new cutting permits to fall trap trees or pheromone bait⁶ before the insects emerge in spring 2017.

Finding

It was reasonable for Tolko to rely on the FLNRO forest health program to provide aerial overview information. Tolko's suppression strategy to manage the Douglas-fir bark beetle outbreak was appropriate. Tolko's deployment of the trap trees was timely and effective in attracting beetles, but if the insects are not destroyed or contained before the adults emerge, the outbreak will most likely intensify. As delays mounted, Tolko should have raised the urgency and priority of dealing with the

⁶ Pheromone baits attract Douglas-fir bark beetles but are less effective than trap trees. The requirement to remove infested trees remains whether falling trap trees or using pheromone baits.

trap trees. When harvesting became impossible, Tolko should have destroyed the broods before the beetles emerged or at least contained them by falling more trap trees.⁷ Therefore, in the Board's opinion, Tolko's management of the Douglas-fir bark beetle in the upper Salmon River was not adequate in 2015/2016. Tolko is continuing to monitor and follow up its treatment of Douglas-fir bark beetle in the area of the complaint.

Considering the Douglas-fir bark beetle outbreak, are Tolko's harvesting practices reasonable?

The complainant was also concerned about what he considered poor harvest practices for Douglas-fir bark beetle. He said harvesting large cutblocks, leaving large debris piles, leaving Douglas-fir trees (standing and blown down) in wildlife tree retention areas, and leaving recent green and red attack trees on cutblock boundaries would degrade the habitat value of the ungulate winter range.

Wildlife tree retention areas are required under section 66 of the FPPR, are important components of biodiversity and are generally important for wildlife. Licensees must have cutting permit authority to harvest red and green attack trees, even if they are adjacent to a cutblock in an active cutting permit. Since licensees must ensure that they only harvest authorized timber and that they leave wildlife tree retention areas, it was reasonable for Tolko to leave infested Douglas-fir trees on the boundaries and in wildlife tree retention areas.

Normally, maximum cutblock size in this area is 40 hectares. Section 64 of the FPPR allows large cutblocks for sanitation harvest, as long as the cutblock resembles an opening that would result from a natural disturbance. In this area, the Biodiversity Guidebook suggests cutblocks can be as large as 250 hectares.ⁱⁱ Tolko designed sanitation harvesting for 2 cutblocks, 48 and 46 hectares, to clean up extensive infestations in these areas. The cutblocks' structural characteristics resembled those that would occur from a natural disturbance, so the large cutblock size was reasonable and complied with FRPA.

Large debris piles effectively attract beetles dispersing from other areas or emerging from residual material in the cutblock. In July 2016, the Board examined piles that had larvae present. Tolko said it heightened priority for burning debris piles in sanitation harvesting cutblocks and had burned all waste piles by December 2016. Since Tolko burned the piles before the adult beetles emerged, it was reasonable for Tolko to leave large piles.

Finding

Considering the Douglas-fir bark beetle outbreak, Tolko's harvesting practices were reasonable and required under the circumstances.

⁷ Although Tolko left logs on the roadside that attracted emerging adult beetles, they were not located strategically to attract emerging beetles, but rather for hauling logistics.

Did Tolko comply with FRPA requirements for ungulate winter range and trap trees?

Ungulate Winter Range

The complainant is concerned that Tolko's approach to Douglas-fir bark beetle management is allowing it to access mature timber in ungulate winter range that is otherwise unavailable.

Tolko harvested a lot of area identified as moose winter range (see Figure 2) identified in GAR order U-8-006 (the Order.) The Order contains a general wildlife measure that is relevant to the complainant's concern—the objective for mature forest cover. However, that measure does not apply when salvage harvesting. After salvage harvesting extensive amounts of timber damaged by mountain pine beetle, Tolko found it had a large deficit of stands needed to meet the mature forest cover objectives of the Order in three planning units, one of which is the Salmon River unit.

Tolko saw an opportunity where an amendment to the Order would temporarily provide better moose habitat in recruitment stands and allow it to harvest in less suitable mature forest.

Recruitment stands are not quite old enough to be mature forest, but moose use them because they are closer to key habitat features. Therefore, Tolko hired a professional biologist to develop a plan and map the recruitment stands. Tolko requested an exemption to the Order based on the biologist's plan and government granted it on June 10, 2015. Now Tolko must maintain a surplus of recruitment stands, which it is doing.

Trap Trees

Section 41 of the FPPR requires licensees to destroy trap trees before the insects emerge. Tolko did not destroy about 200 cubic metres of trap trees, before the adult beetles emerged in the spring of 2016.

Finding

Tolko complied with the general wildlife measure for moose for mature timber when it harvested in 2015/2016 in the upper Salmon River area. Tolko did not destroy about 200 cubic metres or about 4 truckloads, of trap trees before the adult beetles emerged, so it did not comply with section 41 of the FPPR.

Conclusions

1. Was Tolko's management of the Douglas-fir bark beetle outbreak in the Upper Salmon River adequate?

Tolko's reliance on government to identify the Douglas-fir bark beetle outbreak, its development of a suppression strategy, and its use of trap trees and sanitation harvesting to try to protect the forest resources in the Upper Salmon River area was reasonable. Except for one site, its sanitation harvesting of the standard cutting permit cutblocks was adequate. However, to ensure it removed or destroyed the larvae before the adult insects emerged in 2016, Tolko should have heightened the priority for harvesting of the trap trees in AB6048, the dispersed trap trees and spill-over trees. Since adult insects emerged from about 200 cubic metres of trap trees that remained, Tolko's management of Douglas-fir

bark beetle in the upper Salmon River was inadequate in 2015/2016. Tolko is monitoring and preparing follow-up sanitation harvest treatments.

2. Considering the Douglas-fir Bark beetle outbreak, are Tolko's harvesting practices reasonable?

Harvesting large cutblocks and leaving large debris piles is acceptable, and possibly desirable, to control Douglas-fir bark beetle. FRPA prohibits unauthorized harvest of timber even for current attack on cutblock boundaries and requires cutblocks to contain wildlife tree retention areas. Tolko's practices are reasonable in the circumstances.

3. Did Tolko comply with the FRPA requirements for ungulate winter range and trap trees?

Tolko complied with the amended general wildlife measures for moose winter range, but Tolko did not remove or destroy about 200 cubic metres of trap trees before the adult beetles emerged in spring 2016, so it did not comply with section 41 of the FPPR.

Recent Developments

This complaint arose because the complainant was concerned about the approach Tolko was taking to manage Douglas-fir bark beetle. The complainant wanted Tolko to employ an aggressive trap tree and beetle monitoring program in the Upper Salmon River area and other high value wildlife areas where it operates.

The *Bark Beetle Management Guidebook* advises that, "The key to reducing losses is a prompt and thorough annual detection program followed by the timely application of the most appropriate treatment or treatment combination."ⁱⁱⁱ

Since this investigation began, Tolko has started using a new approach that employs various methods to manage the Douglas-fir bark beetle. On existing roads it may use dispersed trap trees (felled or baited) if the trees are in a grouping that is logical for operational efficiencies. It will use dispersed trap trees (baited or felled) and decks of trap trees on approved cutting permits, new road right of ways or in proposed cutblocks where it has completed referral fieldwork. Where terrain or other conditions prevent efficient and effective trap tree programs, it will use decks of timber to try to attract beetles to more effective treatment areas.

For beetles that could emerge in 2018 or later, Tolko reported that it is now designing and referring cutblocks that have little or no Douglas-fir bark beetle current attack, so that if beetles infest the stands Tolko will be able to put them under cutting permit quickly. It will do a helicopter overview flight after the beetles have dispersed in 2017, field confirm the new infestations and either adjust block boundaries or layout new cutblocks in the pre-referred areas. That way it can complete cutting permit application and sanitation harvest of large infestations in fall 2017/winter 2018. Where the infestations are small, it will be able to attract and hold Douglas-fir bark beetle in the developed cutblocks and roads, and then complete sanitation harvest in 2018/19.

As well, before spring break-up each year, Tolko will consider if it is appropriate to leave decks of logs in cutblocks or along road right of ways to attract known concentrations of Douglas-fir bark

beetle and then remove the logs after spring break-up. Tolko anticipates this program to continue until infestation levels once again become endemic.

The FLNRO regional forest health specialist advised the Board that managing Douglas-fir bark beetle requires thinking at a landscape level scale over multiple years and being prepared to use a variety of treatments, including small to mid-size harvesting opportunities coupled with surveys, trap tree programs and other treatments. Douglas-fir bark beetle management is complicated on its own, even without including other concerns, such as cultural heritage values and ungulate winter range. The annual change in insect population and its dispersal requires managers to be diligent and be prepared to adjust plans, which is still Tolko's intention.

The complainant is satisfied that, if Tolko fulfills its commitments to manage Douglas-fir bark beetle in the Upper Salmon River, his concerns will be resolved. The complainant and the Board believe this new approach will significantly minimize impacts from the outbreak and hope that Tolko will apply similar strategies in other operating areas.

Both the Board and the complainant consider the complaint resolved. The Board thanks Tolko for its co-operation during the investigation and its commitment to dealing with this Douglas-fir bark beetle outbreak.

ENDNOTES

ⁱ <ftp://ftp.for.gov.bc.ca/RSI/external!/publish/Forest Health/Douglas-fir Beetle Strategy/> (IBD_Mngt_Feb15).

ⁱⁱ <https://www.for.gov.bc.ca/hfd/library/documents/bib19715.pdf>, page 44.

ⁱⁱⁱ http://www2.gov.bc.ca/assets/gov/farming-natural-resources-and-industry/forestry/forest-health/bark-beetles/bark_beetle_management_guidebook.pdf page 14



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