March 2016 / Info Note No. 9

FPInnovations

INFO NOTE

DISPOSAL OF LOGGING DEBRIS (BARK) ALONG SPUR ROADS

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Introduction

Logging operations conducted during the spring may encounter a greater amount of bark sloughing from cut trees than during other times of the year. The sap flow in a tree during the spring can loosen bark, and depending on the tree species, it can result in bark becoming detached more easily during machine handling. In March 2014, B.C. Timber Sales (BCTS) provided a sale on Maurelle Island that produced a large quantity of detached bark. The bark accumulated at both the log storage area and on the transport barge during loading and unloading. The amount of bark on the barge was too much for the offload facility to accept, so it was left on the barge for the return trip to Maurelle Island. The bark was disposed of along two dead-end spur roads (Figure 1).

FPInnovations visited the sites to help identify environmental concerns regarding this disposal practice and to identify long-term monitoring opportunities. Environmental performance is a key measure for forest managers and for certification compliance. Continuous improvement and improved environmental performance are closely associated with the social license granted to forest companies by the public. The disposal of bark along resource roads needs to be further investigated to determine whether it is a sound environmental practice.

Figure 1. Disposal pile at the end of spur 2. Note the break between adjacent piles.

Harvesting Operations

The scaled volume of wood for the 132-ha harvest area was approximately 88 050 m^3, of which 41 150 m^3 was Douglas-fir. Trees were felled using a feller buncher and hoe-chucked (excavator forwarding) to the roadside. Full trees were processed at the roadside and loaded with a self-loading logging truck. Stems were delivered “hot” to both a floating barge and a log storage area near the barge. A front-end loader delivered logs to the barge, and final placement and building of the barge load (2 000 m^3) was done with a log loader. Each handling phase produced more detached bark (Figure 2).

Most of the bark for disposal was stockpiled at the log storage area. The bark from the second-growth Douglas-fir trees is thick, rough, and furrowed, and accounted for most of the bark that accumulated.

Figure 2. View of the barge being loaded by a log loader. Note the logs with much of their bark missing after being handled multiple times. Photo courtesy of BCTS.

Environmental management

Environmental and social considerations that were managed for within the harvest area included wildlife, water, soil, viewscapes, and tourism; disposal of logging debris (bark) along roads had not been considered or tried before by the Strait of Georgia Business Area of BCTS.

The bark was transported and dumped along two spur roads with a 9.2-m^3 (12-yard) end-dump rock truck. An excavator loaded the rock truck; the hauling distance from the log storage area near the barge ramp to the end of spur 1 was 410 m, and to the end of spur 2 was 910 m. An excavator spread the dumped piles flat. Each pile had breaks between them, which restricted the size of the piles and provided a non-continuous lineal feature. There were five disposal piles built along spur 1, with the pile at the end of the spur being placed over a blasted rock pit. Spur 2 had four disposal piles.

Piles were built over existing spur roads that were not rehabilitated or planted. The average width and depth of the piles varied by spur road (see Table 1). The pile at the front of spur 2 was likely the last pile built and was only 30 cm thick. The length of the piles ranged from 13 m to 25 m. The disposal location at the rock pit was not constrained by the width of a road and was built 11 m wide by 11 m long; this area was the only debris pile planted with tree seedlings (Douglas-fir and western red cedar). There was more debris placed along spur 1 than spur 2 in part due to the shorter hauling distance, the construction of wider piles, and the wider dimensions of the rock pit. A total of 835 m^3 (90 loads) was disposed of along the two spur roads. The cost of disposal of the debris along the spur roads was estimated to be $6 000.

Table 1. Disposed volume of debris[a] (m^3)

Pile 1	Pile 2	Pile 3	Pile 4	Pit	Total
Spur 1: Typical depth/width (m) = 1.1/6.0					
165	85	90	85	115[b]	540
Spur 2: Typical depth/width (m) = 1.25/4.5					
20[c]	100	90	85	n/a	295
Total					835

[a] The debris was estimated to be 70% Douglas fir bark.
[b] Located at end of spur 1 at a blasted pit.
[c] Located at front of spur 2 and spread thin.

An S6 stream crossed spur 1. The debris pile was kept away from the stream (approximately 45 m away at a 10% slope), and cross-ditches were constructed through the road to prevent any ditch or surface flows from the pile reaching the stream along the road (Figure 3). No streams crossed spur 2. Careful attention was given to preventing bark from entering the ocean at the dock during barge loading and deck clearing. The bark that remained on the barge deck during the return haul was removed and stockpiled at the log storage area. The management of debris and the protection of the ocean floor during marine operations (e.g., log dumps and helicopter drops) have been discussed by Gillies (2012, 2014).

Figure 3. View of stream location at spur 1 and a cross-drain constructed adjacent to a debris pile. A buffer of approximately 45 m was maintained between the disposal pile and the stream.

Discussion

Waste bark from a BCTS harvest area was disposed of along two spur roads on Maurelle Island. The spur roads were considered permanent access structures that can account for a maximum of 7% of the harvest area. The bark (and associated minor woody debris) may provide a favourable medium for plant or fungi growth either immediately or over time as the bark breaks down and decomposes. Forrester (2002, 1998a, 1998b) described the use of composted woody sortyard debris placed along spur roads to improve site productivity and promote plant growth. In these cases, the composted material was mixed into the road either during the ripping of the road surface or when sidecasted material was retrieved during road reclamation. Compared to a compacted road surface, the bark piles may provide a greater opportunity for plant growth and habitat. Douglas-fir bark has a neutral pH, a minimal percentage of wood attached to it (resulting in a low nitrogen draw), and provides organic matter to the soil as it decomposes. No plant growth was observed within the piles except at the rock pit pile, which was planted with tree seedlings. It was noted that the piles were holding moisture below the surface layer (**Figure** 4). Preserving moisture at depth may help seedling establishment and survival during the summer.

Figure 4. Typical size of bark within a disposal pile (field notebook was included for scale). The darker area near the notebook was below the surface and was retaining moisture to a greater degree than was the surface layer.

Rainwater passing amongst or over the bark has the potential to transport leachates (where dissolvable leachates are present). Leachates can be a concern when found in aquatic environments. The S6 stream and water quality were protected by providing an approximate 45 m buffer between the stream and the disposal piles. As well, cross-drains were constructed to prevent surface and ditch flows from reaching the stream directly along the sloping road surface. There was no concern with potential leachate having direct connectivity to the S6 stream. The ocean and marine environment at the barge loading area was also protected from bark disposal; bark was carefully removed from the barge deck and stockpiled in preparation for disposal along the spur roads (Figure 5).

Surveying the size of the piles will provide a measure of change over time and allow for an assessment of the material as a growing medium. The tree seedlings planted in the rock pit pile provide an opportunity to assess seedling survival. Natural ingress of plant and fungi colonization on the piles compared to the road surface could be used as a measure of environmental performance.

Figure 5. View of stockpiled bark and woody debris (see arrow) near the barge loading and log storage areas. Photo courtesy of BCTS.

Further opportunities to assess additional disposal operations would allow for comparison and possible refinement of the disposal method. Placement of debris on the surface of a road may be compared to more aggressive rehabilitation efforts, such as road surface ripping and the mixing of debris into the ripped and decompacted road profile.

There are management and environmental attributes specific to the disposal of bark over resource road surfaces that could be further examined, a few of which are presented below.

- Should watercourses have a minimum buffer width from disposal material?
- Are there concerns with leachate?
- Will bark decompose over time?
- Can bark be composted in situ?
- Will trees planted in bark survive and/or show favourable growth?
- Are there alternative disposal methods or options?
- Are the debris piles providing habitat and promoting biodiversity?
- What is an appropriate pile size (length, width, and height) or target volume per lineal metre?
- Are breaks in the piles providing a necessary performance measure?
- Can bark sloughing be predicted and planned for?
- Is there a maximum hauling distance at which the cost of disposal becomes prohibitive?
- Are there cost-effective alternatives for the use of bark?

References

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