Forest Practices Board

Dry Creek – Hydrology and Wildlife Concerns About a Large Cutblock

Complaint Investigation #15033

FPB/IRC/203

November 2016

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The Complaint

In February 2015, a local hunter and advocate for wildlife conservation submitted a complaint about Interfor Corporation's (Interfor) cutblock 04Q-09 in Tree Farm Licence 8 (TFL 8). The cutblock is 20 kilometres north of Greenwood, in the Dry Creek watershed (see Figure 1). The complainant is concerned that the 454-hectare cutblock is too large and will negatively impact water and wildlife. He would like government to stop licensees from harvesting such large cutblocks.

There is a limit on cutblock size under the *Forest and Range Practices Act* (FRPA), but forest licensees are allowed to harvest larger cutblocks, subject to certain constraints. The effects of these larger cutblocks can be negative or beneficial, depending on the hydrology or species of wildlife present. Since the complainant raised concerns about the size of the cutblock at a general level, rather than about a specific wildlife species or hydrological effect, the Board investigated Interfor's management of wildlife and water in the Dry Creek area by examining the following two questions:

1. Were Interfor's management of water and assessment of hydrological risk reasonable?
2. Did Interfor adequately manage impacts to wildlife habitat and biodiversity at the stand level and landscape level?

Forest licensees must comply with FRPA, but have discretion in how they address forest values that are not regulated. Each section of this report examines compliance with FRPA, followed by a discussion of how Interfor considered the risk of this large cutblock affecting water and wildlife values.

Background

In 2002, the Kootenay Boundary Higher Level Plan Order (the Order) established the Boundary Landscape Unit, which includes the Dry Creek watershed. The Order assigned the landscape unit a lower biodiversity emphasis option, which the *1995 Biodiversity Guidebook* (the guidebook) says may be appropriate for areas where social and economic demands, such as timber supply, are the primary management objectives. This designation allows for more risk to elements of biodiversity than in landscape units with a biodiversity emphasis option of intermediate or higher.

The Order also established an enhanced resource development zone for timber, which includes the Dry Creek watershed. Government established this resource zone to "support intensive forest management for the purpose of increasing volumes of merchantable timber and to reduce industry costs while maintaining adequate environmental stewardship."[i]

Under the *Forest Planning and Practices Regulation* (FPPR), cutblocks are limited to 40 hectares in the Kootenay Boundary Forest Region, unless a larger cutblock is consistent with natural disturbance characteristics.

In September 2014, Interfor completed harvesting the 454-hectare cutblock that is of concern to the complainant. The cutblock is within a larger dense lodgepole pine stand that was established following an extensive fire about 80 years ago (see Appendix A). The stand grew well for a time after the fire, then stagnated[1] due to high tree densities and dry site conditions.

[1] In stagnated lodgepole pine stands, the annual growth of individual trees is very small so the increase in merchantable volume remains negligible.

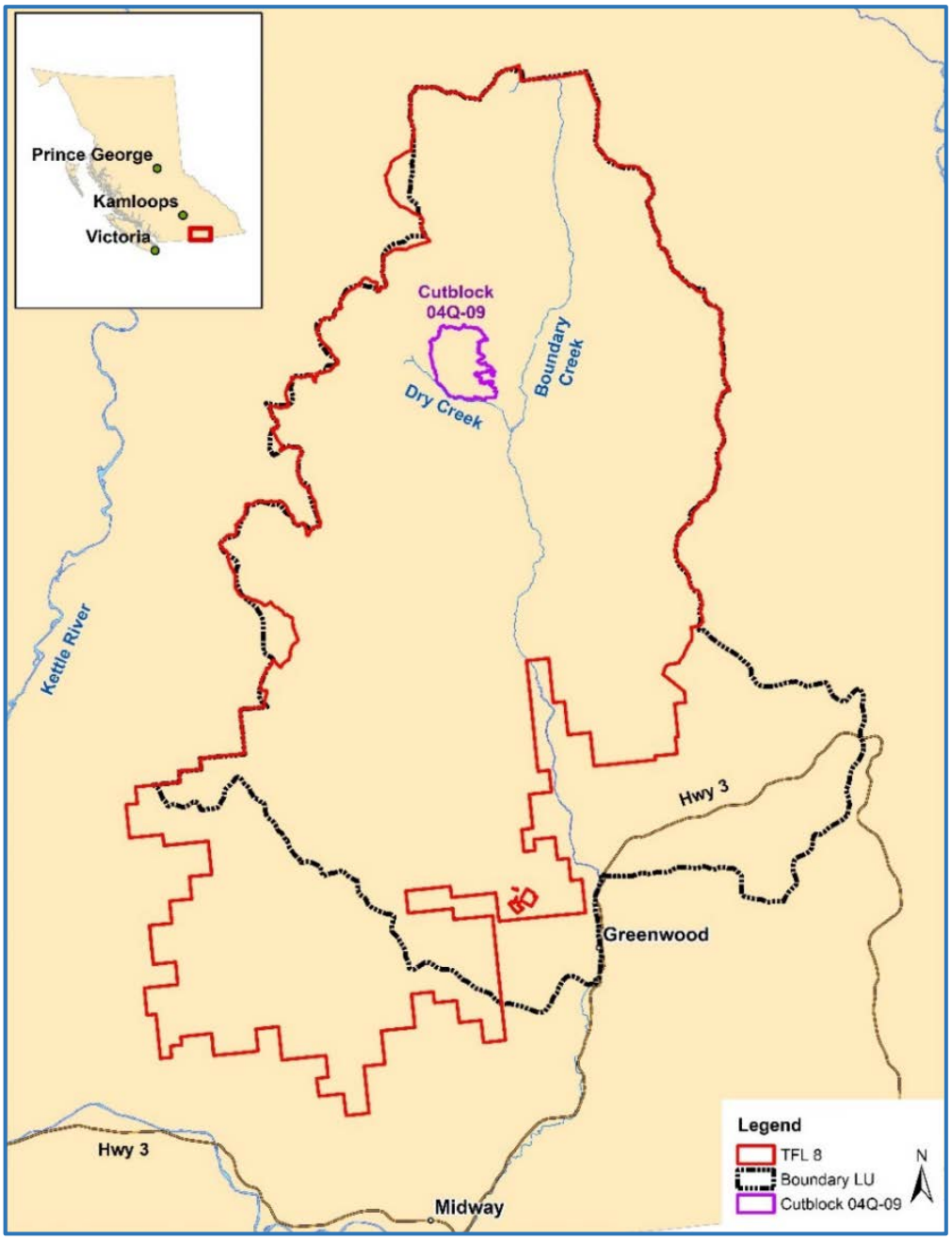


Figure 1. Location of Cutblock 04Q-09

The site plan for the cutblock shows 61 hectares of mapped reserves, including a 50-hectare wildlife tree retention area (WTRA) on the northwest boundary and 3 smaller internal WTRAs (see Figure 2). The rest of the cutblock is a clearcut with a few small unmapped patches of leave trees (see Figures 3 and 4).

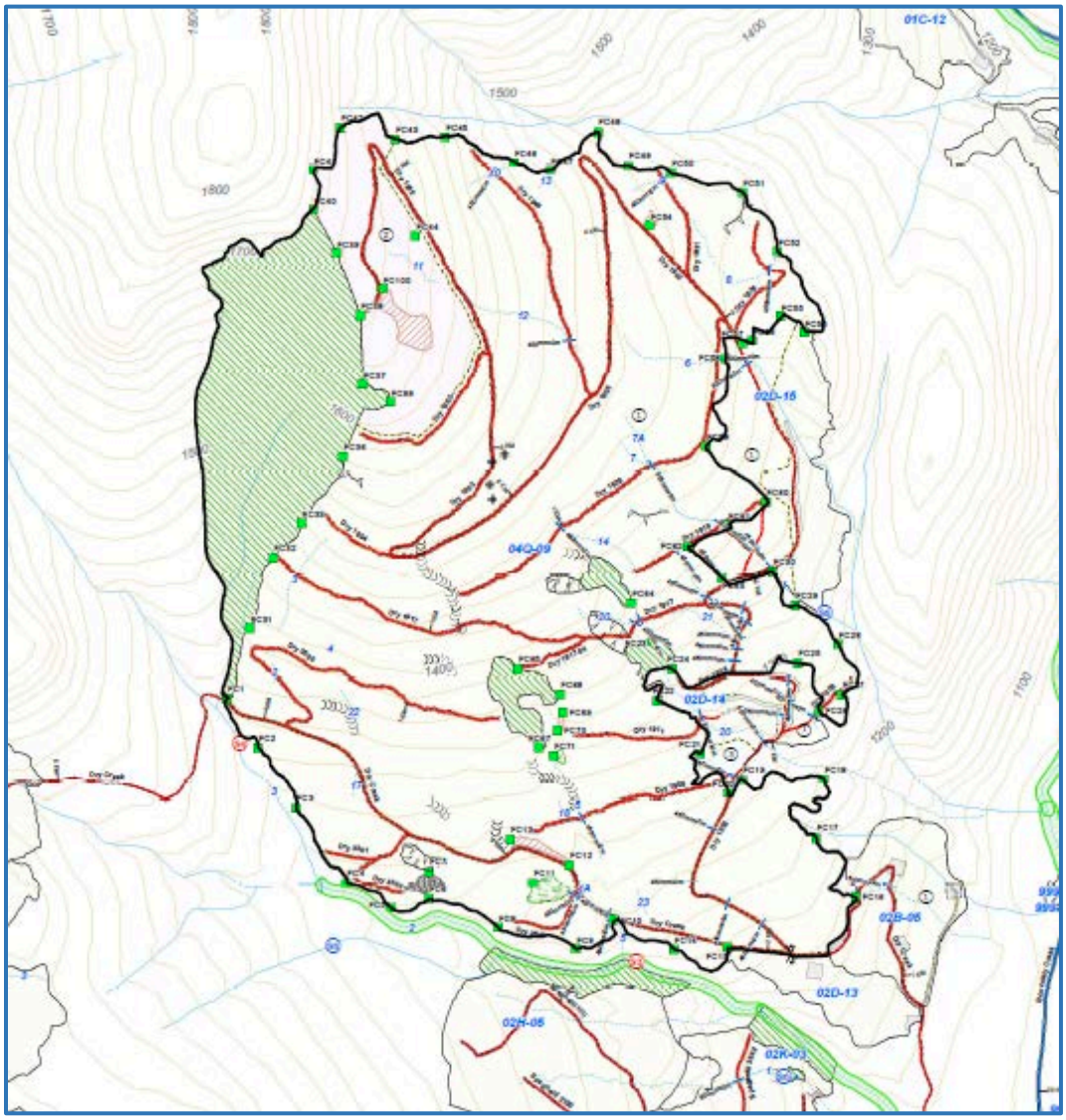


Figure 2. Site plan CP 04Q-09 (green diagonal hash polygons are mapped wildlife tree retention areas).

Figure 3. Overview of cutblock from Boundary Creek Forest Service Road. *Photo taken by Randy Waterous, Interfor.*

The stand contained a mix of marginally economic sawlog and pulp timber. Interfor harvested the stand for two main reasons:

- Interfor partnered with a local pulp mill to harvest the stand experimentally, using new equipment suited to the small log size. The pulp mill used the pulp grade logs, and Interfor used the sawlogs.
- Harvesting and then replanting the cutblock allowed Interfor to establish a new forest stand that will provide better sawlogs in the future.

In addition, the deputy chief forester said, in her rationale for setting the allowable annual cut (AAC) for TFL 8, that avoiding harvesting of these dense pine stands could result in a reduction of the AAC in the future.[ii]

Investigation Findings

Were Interfor's management of water and assessment of hydrological risk reasonable?

Management of Water

Section 39 of the FPPR requires that licensees maintain natural surface drainage patterns both during and after permanent or temporary access road construction. The cutblock contained 20.1 kilometres of road with only one stream crossing. The Board found no evidence of stream flow diversion.

Section 59 of the FPPR requires that licensees protect water diverted for human consumption and section 60 requires that licensees protect licensed waterworks. However, there are no water licences on Dry Creek so these provisions are not applicable.

Finding

Interfor complied with section 39 of the FPPR by maintaining the natural surface drainage patterns, and there are no other applicable requirements for management of water.

Assessment of Hydrological Risks

The complainant was concerned that the size of the cutblock would make the environment on the cutblock even drier. By removing the forest canopy, a large cutblock can significantly increase temperatures and dry surface soils. It can also influence water and hydrology in other ways, such as increasing the net precipitation[2] and altering watershed flow regimes, both of which are discussed below.[ii]

Increased net precipitation

Increased net precipitation can contribute to slope instabilities, depending on soil types, terrain and geology.[iii] Section 37 of the FPPR requires that licensees ensure their practices do not cause landslides that could affect soils, water and other forest resources.

[2] Net precipitation is the precipitation that reaches the ground. It is influenced by interception (by vegetation), evaporation and sublimation.

Before harvesting, Interfor noted that some areas near the planned cutblock were mapped as potentially unstable, and identified this during block layout. The company hired a qualified professional who prepared a terrain stability assessment for these areas.

The terrain stability report identified areas where increased net precipitation following logging could cause terrain stability problems. The professional recommended that Interfor create a 50-hectare WTRA in the northwest portion of the proposed cutblock (see Figure 2), and rehabilitate skid trails or areas of repeated machine traffic that could capture or divert runoff in the southwest corner. Interfor followed those recommendations.

Altered watershed flow regime

Extensive clearcutting can contribute to increased winter snow accumulation and more rapid spring snowmelt, which can significantly alter flow regimes in southern Interior watersheds. In such cases, forest professionals may engage a hydrologist to conduct a watershed assessment to explore the impacts of an altered flow regime on forest values.

FRPA sets requirements to manage the effects of harvesting on streamflow, in terms of water quantity and timing of flow, but they only apply within a designated community watershed or a fisheries sensitive watershed—and Dry Creek is neither.

Even though not required under FRPA, licensees may still consider the hydrological risks of harvesting on other resource values. In this case, Interfor's professionals determined there was no need to have a hydrologist conduct a watershed assessment in Dry Creek, since the area is relatively dry with only one permanent non-fish bearing stream and a few other temporary drainages. During the investigation, Interfor said the professional who conducted the terrain stability report was also qualified to do this kind of watershed assessment, and would have advised them if there were potential hydrological issues.

Finding

Interfor's assessment of hydrological risk was reasonable. The Board agrees with Interfor's professionals that there was no need to do a hydrological assessment on this dry site that had few natural drainages.

Did Interfor adequately manage impacts to wildlife habitat and biodiversity at the stand level and the landscape level?

As previously noted, larger cutblocks are allowed under FRPA if certain conditions are met. The impacts to wildlife and overall biodiversity from larger cutblocks can be positive or negative, depending on the species and how well the planning considers stand- and landscape-level habitat characteristics.

Government manages wildlife habitat under FRPA using a multi-layered approach. Through the *Government Actions Regulation*, it can establish legal requirements for habitat in designated areas, such as wildlife habitat areas (WHAs) and ungulate winter ranges (UWRs), where special management is required for individual species. More generally, to protect habitat needs for other species, it sets stand- and landscape-level biodiversity objectives in FRPA and related practice requirements in the FPPR. Licensees' forest stewardship plans (FSPs) must contain results and strategies that are consistent with government objectives before they can harvest timber. Alternatively, they can commit to follow the practice requirements in the FPPR for those objectives.

This discussion looks at how well Interfor complied with FRPA requirements, and how well it managed stand- and landscape-level biodiversity outside of the specific species requirements. In its rationale for this larger cutblock, Interfor referred to the *Biodiversity Guidebook*, which offers guidance for balancing conservation of wildlife and timber harvesting—some aspects are implemented in the legislation; others remain as guidance. The Board used the guidebook and more recent policy on wildlife tree management in evaluating Interfor's management of wildlife habitat and biodiversity in the Dry Creek area.

Species Requiring Special Management

Section 69 of the FPPR requires that licensees comply with the general wildlife measures that apply to an area being harvested. In its FSP, Interfor committed to complying with this regulation for the grizzly bear WHA 8-373, which overlaps the cutblock, and the moose UWR 8-007, which is adjacent to the cutblock.

The site plan was consistent with the FSP for species requiring special management, and with other objectives arising from the Kootenay Boundary Higher Level Plan Order for caribou and wildlife habitat features.

Finding

Interfor complied with legal requirements for species requiring special management.

Stand-level Biodiversity

Amount of stand level retention

Section 9.1 of the FPPR states government's objective for wildlife and biodiversity at the stand level is retaining wildlife trees. Interfor's FSP committed to the FRPA requirement that seven percent of the area of all cutblocks must be retained in WTRAs or as individual trees over a single cutting permit. The percentages can go lower if the pre-harvest stand contains more than 80 percent pine, but it must remain above zero. The cutblock was over 90 percent pine.

Interfor retained 15 percent of the cutblock area in WTRAs. These include the large WTRA on the northwest boundary of the cutblock, three smaller mapped WTRAs in the southern half of the block (see Figure 2), and unmapped patches of small pine, large larch trees and all aspen, spruce and cedar.

Finding

Interfor complied with FRPA's stand-level biodiversity requirements and its approved FSP results and strategy.

Distribution of stand level retention

The distribution of WTRAs in this block did not follow general direction established by the provincial wildlife tree committee, which calls for relatively well-distributed wildlife tree retention throughout a cutblock, with internal patches no further apart than 500 metres.[iv] Most of the wildlife tree retention was concentrated in the large WTRA on the northwest edge of the cutblock to address a potential terrain stability issue, allowing Interfor to meet the percentage policy guidance for larger blocks.[3] The internal mapped WTRAs were concentrated in the lower half of the large cutblock, and represented just two percent of it (see Figure 2).

[3] For cutblocks over 100 hectares, wildlife tree retention should be increased over default requirements by about 1 percent per 100 hectares.

Physical factors on the cutblock limited what could be retained internally. The quality and quantity of stand-level retention depends on timber type, the diversity of pre-harvest structural elements, and other operational considerations such as risk of windthrow. Interfor reserved larch trees greater than 52.5 centimetres and all windfirm aspen, spruce and cedar trees, reasoning that they exist in small moist pockets (see Figure 4). These reserved trees provide some other unmapped WTRAs, especially in the southern half of the cutblock. Overall, due to the nature of the pre-harvest stand, there was little retention and few WTRAs in the cublock.

Other relevant considerations are that this landscape unit has been assigned a lower biodiversity emphasis; the Dry Creek area is in an enhanced resource development zone for timber; the block is in a natural disturbance type associated with large disturbances; the previous stand was an extensive uniform stagnated pine stand; and Interfor reserved trees that will provide structural characteristics for future WTRAs.

Figure 4. Examples of individual trees reserved from harvest in the south of the cutblock.

Finding

Stand-level retention was not evenly distributed throughout the cutblock. However, site conditions, the lower biodiversity emphasis option for the Boundary Landscape Unit, and the enhanced timber production zone designated for Dry Creek meant Interfor's stand-level retention strategy adequately managed impacts to wildlife habitat and biodiversity on this block.

Landscape-level Biodiversity

Section 9 of the FPPR states:

> The objective set by government for wildlife and biodiversity at the landscape level is, without unduly reducing the supply of timber from British Columbia's forests and to the extent practicable, to design areas on which timber harvesting is to be carried out that resemble, both spatially and temporally, the patterns of natural disturbance that occur within the landscape.

When preparing FSPs, forest companies may specify results or strategies to meet this objective or undertake to comply with the practice requirements for maximum cutblock size in section 64 and adjacency in section 65 of the FPPR.

Section 64 establishes 40 hectares as the maximum cutblock size in the Kootenay Boundary Forest Region. This limit does not apply where harvesting is to recover damaged timber or sanitation treatments, or is "designed to be consistent with the structural characteristics and the temporal and spatial distribution of an opening that would result from a natural disturbance…"

This latter provision allows larger cutblocks where they may be more consistent with natural disturbance patterns and can result in a less fragmented landscape, which is generally better for wildlife and biodiversity values.

Interior Forest Habitat Condition

Interior forest is forest that is far enough from open edges (more than 400 metres) to be less influenced by the edge effects of climate and predation.

Section 65 prohibits harvesting next to a previously harvested area until the new trees in that area have achieved specific stocking and structural targets. It does not apply if the maximum cutblock size exemptions in section 64 apply. The guidebook suggests that adjacent cutblocks can be aggregated to form larger patches of similar-aged stands. This allows planning for larger retention patches on the landscape, which may provide important interior forest habitat conditions and allow for planning areas of connectivity between key habitat elements.

In its FSP, Interfor committed to meet the practice requirements in sections 64 and 65. In the rationale for having the cutblock larger than 40 hectares, Interfor's forest professional compared the cutblock with the area affected by a fire that initiated the pine stand 80 years previous. He explained that this cutblock "fits into this historical mosaic better than much of the previous logging around here that was limited to 40 hectares" (see Appendix A). Interfor located the cutblock next to 6 other cutblocks, creating a total aggregated harvest area of 580 hectares. However, Interfor did not assess all patches in the landscape unit to determine whether large patches are over-represented or whether corresponding larger retention areas were being maintained.

Pre-harvest satellite imagery shows the cutblock area to have been a dense lodgepole pine forest interspersed with small veins of larger, possibly older, forest in riparian areas to the north, east and south. The cutblock generally follows the timber type lines, taking the dense small pine and leaving the riparian areas. The investigation found that Interfor did not harvest the areas most likely to remain following a natural disturbance, and designed the cutblock shape in keeping with the original natural disturbance caused by wildfire about 80 years ago. Therefore, the cutblock design at the stand level was consistent with the structural characteristics that would result from natural disturbance.

The requirement to design timber harvesting to be consistent with the temporal and spatial distribution of openings resulting from natural disturbance cannot be met by looking at one cutblock

in isolation, and requires an analysis of the landscape. In the Board's view, this requires an analysis of all patches on the landscape, harvested and natural, to determine how the distribution compares to the natural patch size for this natural disturbance type (NDT 3), and how those patches are distributed over time. The result would be a plan over time that ensures opportunities to retain key structural elements, such as large retention patches and connectivity between patches, are not lost at the landscape level.

This interpretation follows from the meaning of *landscape level* in section 9 of the FPPR, *temporal and spatial distribution* in section 64, and is further supported by the factors listed in schedule 1 of the FPPR, section 3(1)(b), which references "the size, distribution and salient characteristics of *other areas within the landscape* that have been shaped by, or affected by, natural disturbance."

During the investigation, Interfor acknowledged that it had a responsibility to have a qualified professional prepare a plan that considers biodiversity at both the stand and landscape levels and connectivity. It asserted the site plan and FSP provide that function, since the site plan includes stand- and landscape-level biodiversity elements that are considered with regard to the applicable results and strategies from the FSP. However, site plans deal with the immediate area of each cutblock and Interfor's FSP did not contain results or strategies for landscape-level biodiversity, but instead committed to meeting sections 64 and 65 of the FPPR.

Interfor conducted patch size and seral stage distribution analyses for other landscape units prior to FRPA coming into effect in 2004, but said it currently does not have the GIS resources to do one for the area in question. In this situation, Interfor said its forest professionals felt comfortable, based on past experience, applying professional judgment with a simpler map analysis. That analysis used forest inventory data from polygons surrounding the cutblock to assess the spatial and temporal distribution of openings resulting from natural disturbance. Interfor has since engaged a consultant to perform a patch size distribution analysis on this and other landscape units.

The Board considered the area surrounding the cutblock and found that, including a new 114-hectare cutblock proposed by Interfor, the total aggregate harvested area in young forest will be 1307 hectares (see Appendix B). It appears that the landscape unit is being developed in a manner that could impact landscape-level biodiversity elements. It is unclear whether Interfor's current cutblock and future harvest plans are consistent with a natural disturbance pattern, as this has not been adequately analyzed. More detailed analysis will provide clarification. Such an analysis is necessary in order to ensure that key elements that protect wildlife habitat and biodiversity are maintained on the landscape.

Finding

Interfor designed the cutblock to have structural characteristics consistent with natural disturbance. However, it did not consider whether the design would be consistent with the temporal and spatial distribution of openings in the landscape context because there was no patch size distribution analysis done.

In the Board's opinion, Interfor met some, but not all, of the design requirements of section 64, and is therefore not adequately planning for important biodiversity and habitat elements at the landscape level. Without that planning, the Board cannot conclude whether the result on the ground adequately manages the impacts to wildlife habitat and biodiversity at the landscape level.

Conclusions

Interfor harvested a large 454-hectare cutblock on TFL 8 in response to several timber management objectives and priorities. The complainant was concerned that the size of the cutblock would negatively impact wildlife habitat and water.

Cutblocks larger than 40 hectares can have positive impacts on wildlife and overall biodiversity, as long as the planning addresses stand- and landscape-level habitat characteristics.

The Board found that Interfor complied with FRPA requirements related to the management of water, and demonstrated that its assessment of hydrological risk and management of water was reasonable.

Interfor complied with FRPA requirements and adequately managed the impacts to wildlife at the stand level in this large cutblock.

While Interfor designed the cutblock to have structural characteristics consistent with natural disturbance at the stand level, it did not properly consider temporal and spatial distribution at the landscape level because it did not examine recent or planned harvest activities across the landscape unit in relation to the distribution of patch sizes that would occur naturally. As a result, Interfor did not meet all the requirements of section 64 of the *Forest Planning and Practices Regulation* which, when a cutblock size exceeds 40 hectares in this area, requires the licensee to design timber harvesting to be consistent with the structural characteristics and the temporal and spatial distribution of an opening that would result from a natural disturbance. The Board could not conclude whether the result on the ground adequately manages wildlife habitat and biodiversity at the landscape level.

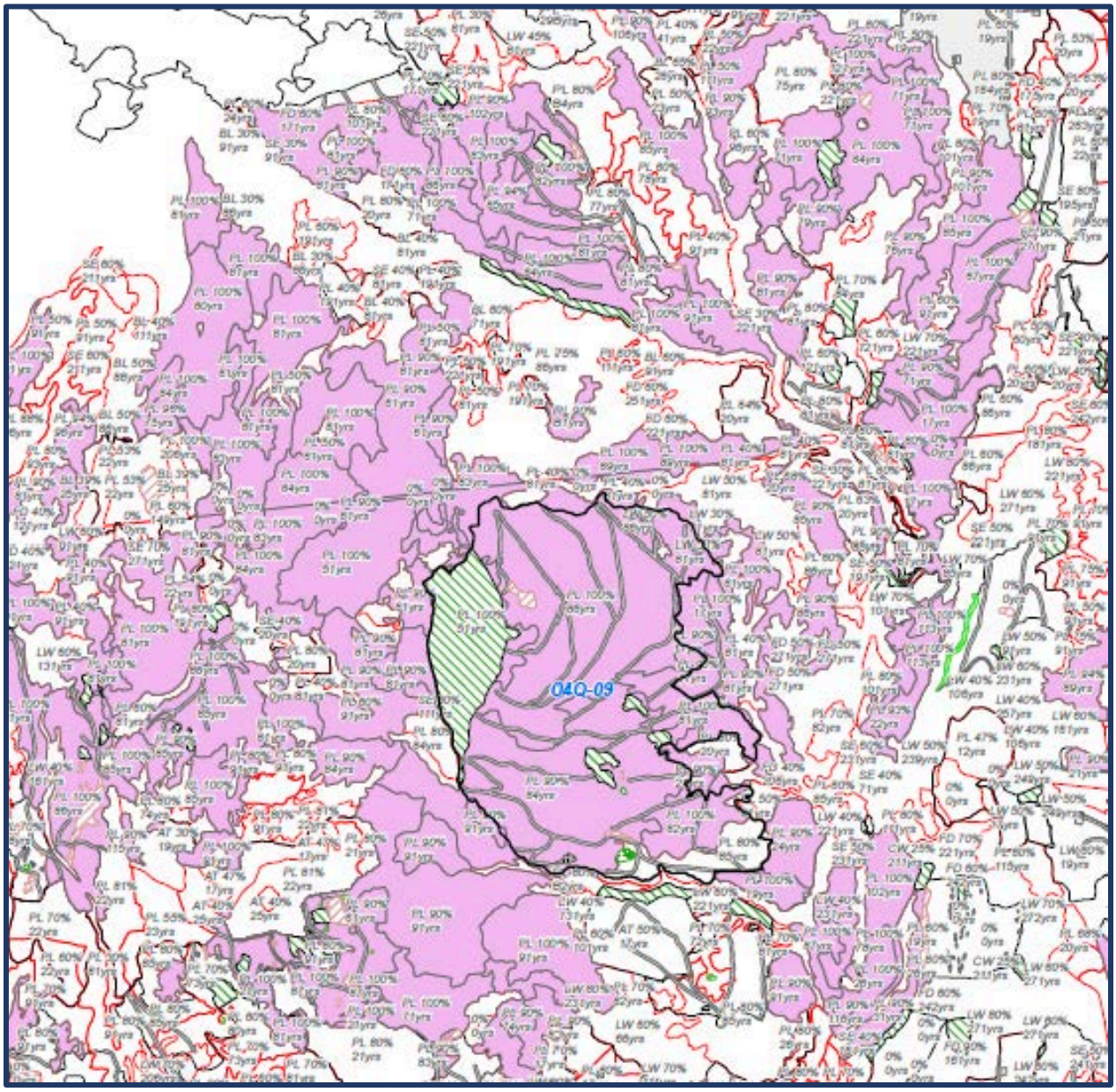
Recommendation

In accordance with section 131(3) of the *Forest and Range Practices Act*, the Board makes the following recommendation.

> To manage for conservation of biodiversity at the landscape level, Interfor should have a qualified person perform an analysis and develop a plan that ensures future timber harvesting in this landscape unit resembles, both spatially and temporally, the patterns of natural disturbance and considers retention areas and connectivity over the landscape.

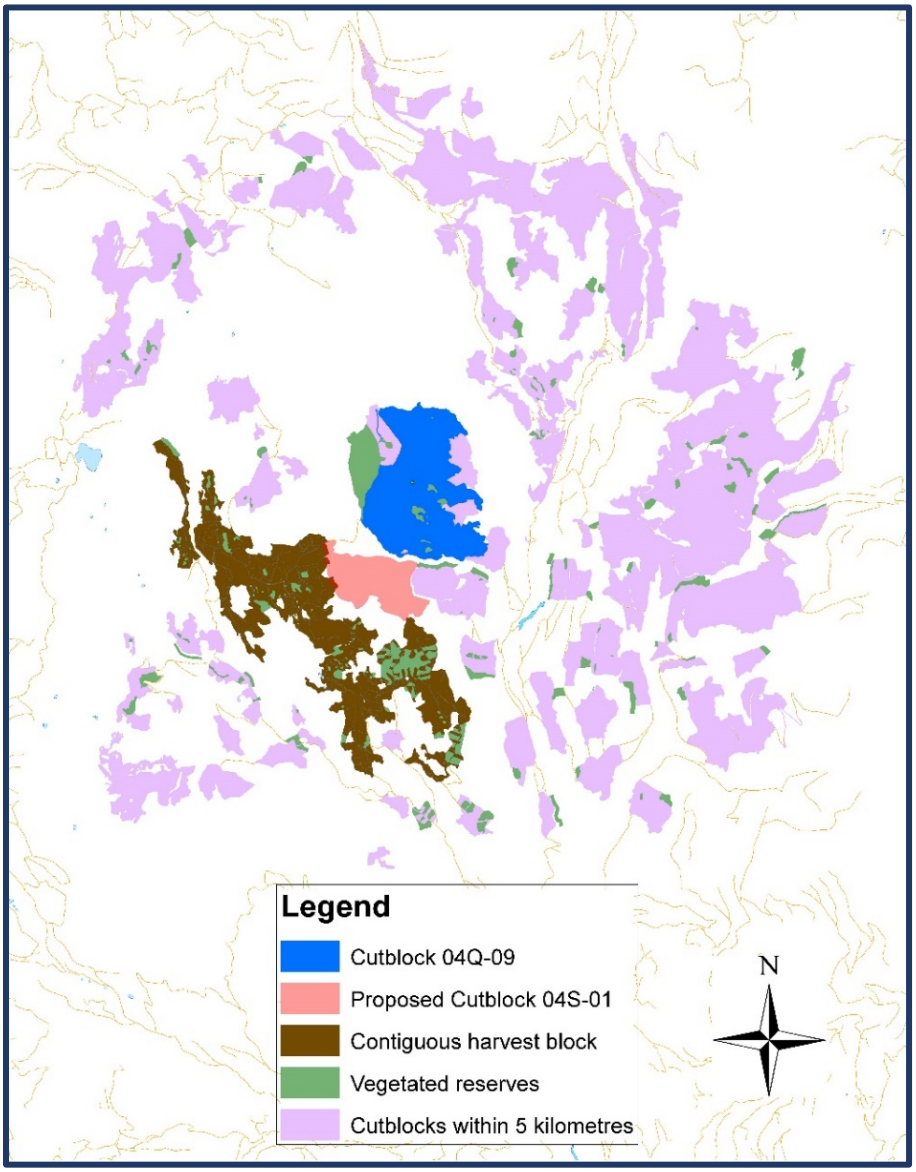
In accordance with section 132 of FRPA, the Board requests that Interfor respond with how it intends to address this recommendation by January 31, 2017.

APPENDIX A: Block Size Rationale Drawing



In his rationale for exceeding the 40 hectare maximum cutblock size, Interfor's forest professional used this map to illustrate the spatial and temporal nature of the natural disturbance history. The map shows the 454-hectare cutblock 04Q-09, with green diagonal hash polygons represent 61 hectares of mapped reserves, including a 50-hectare WTRA on the northwest boundary. The purple shaded areas were most likely regenerated after a fire 80 years ago.

APPENDIX B: Neighbouring Harvest Patches



To illustrate why a plan for retention areas and connectivity is important, the Board did an analysis of the area within five kilometres of cutblock 04Q-09, and found it is next to six other cutblocks. While proposed cutblock 04S-01 combines with other harvest areas to create a harvest patch that is 1307 hectares, Interfor said that by the time it is harvested some adjacent patches would be more than 20 years older, so it would not technically be considered one patch. Even so, it will create a large continuous area of young forest.

Endnotes

[i] Kootenay Boundary Higher Level Plan Order, Page 10.

[ii] British Columbia Ministry of Forests and Range, Tree Farm Licence 8 Rationale for Allowable Annual Cut, (2009), page 10.
The Effects of Forest Disturbance on Hydrologic Processes and Watershed Response, Page 179 (A Compendium of forest hydrology and geomorphology in British Columbia).

[iii] *Land Management Handbook 18 – A Guide for Management of Landslide-Prone Terrain in the Pacific Northwest*. Second edition, 1994.

[iv] https://www.for.gov.bc.ca/ftp/hfp/external/!publish/web/wlt/policies/WT-Guidance-05-2006.pdf, page 8.

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