



## **Watershed Assessment in the Glade Community Watershed**

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*Complaint Investigation #18045*

**FPB/IRC/232**

July 2020

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# Board Commentary

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Many communities in BC are concerned about the quality of their drinking water. This complaint is about a watershed assessment<sup>1</sup> commissioned by two forest licensees who plan to operate within the Glade community watershed.

While this investigation examined activities regulated under *Forest and Range Practices Act* (FRPA), the Board also observed many factors that could contribute to long-term risk to water quality in this watershed that are not addressed in FRPA. In particular, there are elevated risks of sediment delivery from non-status roads, historic logging, natural processes exacerbated by an old wildfire, and other land uses including hydro access.

The Board previously identified systemic gaps in community watershed planning in a 2014 special investigation report,<sup>2</sup> and BC's Auditor General has identified gaps in integrated planning for watersheds. An integrated approach to risk assessment and planning in community watersheds is needed in light of the increasing risk and intensity of wildfires and other impacts of climate change. In watersheds with multiple land users, new mechanisms are needed that extend beyond the provisions of the *Forest and Range Practices Act* to assess and manage the risks to domestic water. New tools are needed to address legacy issues and unregulated activities in community watersheds.

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<sup>1</sup> A watershed assessment, also referred to as a hydrogeomorphic assessment, is the identification and analysis of hydrologic and geomorphic processes in a watershed unit.

<sup>2</sup> <https://www.bcfpb.ca/wp-content/uploads/2016/04/SIR40-Community-Watersheds-From-Objectives-to-Results-on-the-Ground.pdf>

# Introduction

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## The Complaint

On October 11, 2018, the Forest Practices Board received a complaint from the Glade Watershed Protection Society (the Society), a group that advocates for stewardship of the Glade community watershed.

The Society is concerned that Atco Wood Products and Kalesnikoff Lumber Co. Ltd. (the licensees), operating in the Glade community watershed, are not meeting government's community watershed objectives and not achieving the strategies in their forest stewardship plans (FSP). The Society believes that the watershed assessment completed by the licensees is incomplete, outdated, and does not meet the objectives of a watershed assessment and is therefore inconsistent with the FSP strategies.

### Community Watersheds

A community watershed is a watershed designated under *Forest and Range Practices Act* (FRPA) that requires special forest management to protect water used for drinking.

Community watersheds have specific practice requirements that provide for some enhanced protection of streams and consideration of peak flows for culverts and bridge design. Community watersheds also have an objective set by government that applies when a community watershed is located in a forest development unit.

## Background

Glade Creek is a 2977 hectare community watershed located 15 kilometres northeast of Castlegar, BC, on the east side of the Kootenay River (see Map 1). There was logging in the watershed in the early 1920s,<sup>i</sup> a significant forest fire in 1934,<sup>ii</sup> and there are transmission lines crossing the lower portion of the watershed just above the community's water intake. These past events all contribute to a very high risk to the intake from sediment transport.<sup>iii</sup>

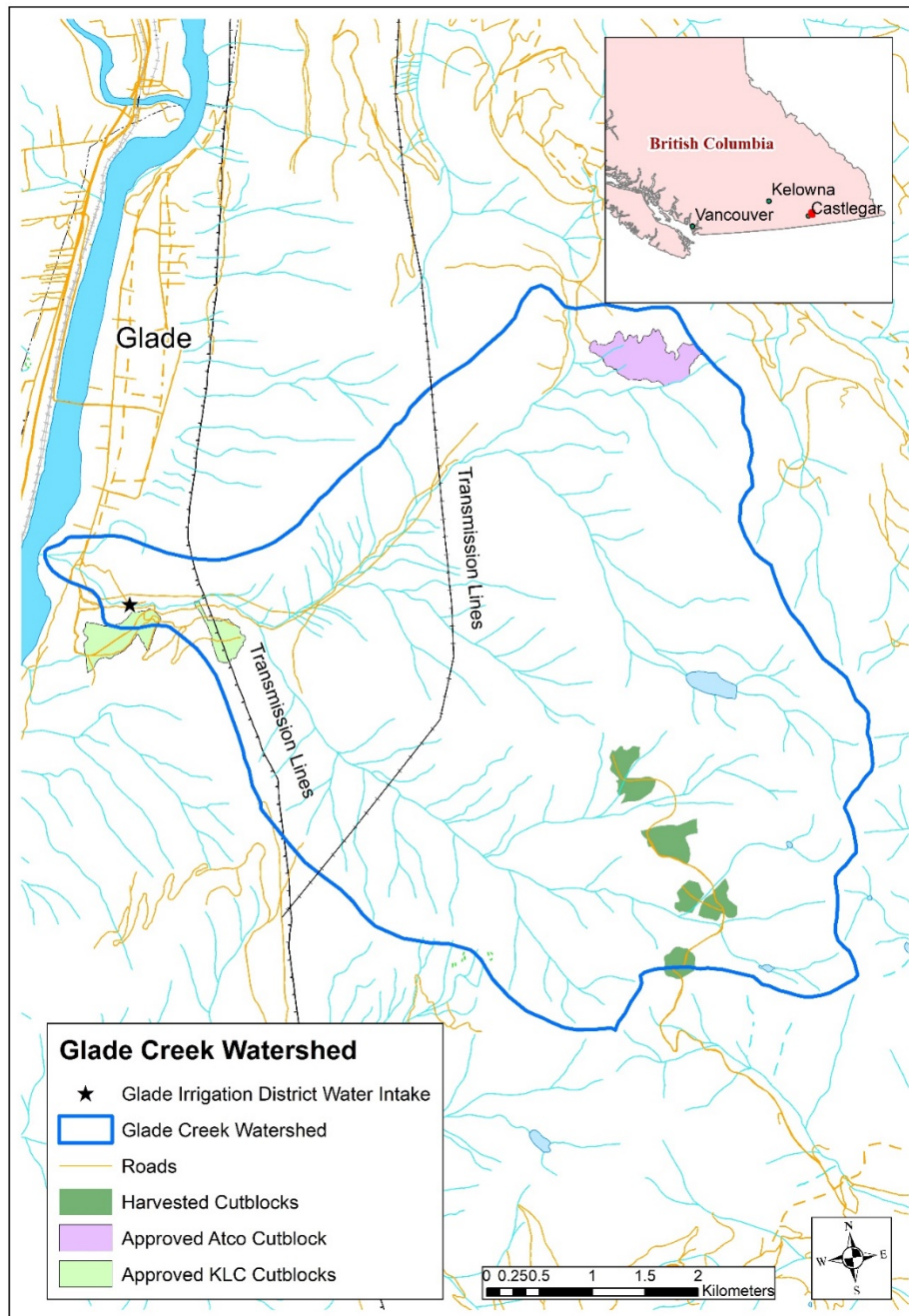
Since 1908, the Glade community has held a water licence on Glade Creek. In 1974, the Glade Irrigation District took over authority for the water system that currently supplies about 100 households with drinking water. The Glade Irrigation District has a single treatment surface water system that does not meet the Interior Health Authority's drinking water standards. Therefore, a continuous boil water notice is in place until appropriate improvements to the treatment system are made.<sup>3</sup>

Kalesnikoff Lumber Co. Ltd. (Kalesnikoff) and Atco Wood Products (Atco) hold forest licences that provide timber harvesting rights within the Glade community watershed. Both licensees have an approved FSP with results or strategies that apply to forestry activities within the watershed. In 2001, Atco harvested a total of 45.3 hectares within the watershed. The licensees' approved development plans include harvesting an additional 47 hectares, and building approximately 3 kilometres of road.<sup>4</sup>

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<sup>3</sup> A boil water notice is required in situations where the public health threat is significant due to high turbidity or higher than acceptable levels of pathogens or substances but where the risk can be resolved by boiling water. High turbidity (sediment in water) can make disinfection less effective.

<sup>4</sup> These figures may change as additional development is approved within the Glade community watershed.



**Map 1.** The Glade Creek Community Watershed

In 2016, as part of forest development planning, the licensees jointly engaged a qualified professional geoscientist to prepare a hydrogeomorphic assessment (the watershed assessment). The district manager of the Selkirk Natural Resource District of the Ministry of Forests, Lands, Natural Resource Operations and Rural Development asked the Ministry’s regional hydrologist to peer review the 2016 assessment. The licensees told the Board that they amended the watershed assessment in 2018 to incorporate the recommendations from the regional hydrologist’s review; to move the climate change risk analysis from the appendix into the main body of the report. The amendment considered the licensees re-evaluation of the risk analysis based on the updated risk assessment framework associated with the new professional standards. The licensees did not share the amended 2018 watershed assessment with the Society.

## Watershed-level vs. Site-level Assessments

The Association of BC Forest Professionals and the Engineers and Geoscientists BC have produced the *Joint Professional Practice Guidelines for Watershed Assessment and Management of Hydrologic and Geomorphic Risk in the Forest Industry*<sup>iv</sup> (the guidelines). The guidelines set out the expected standard of practice for professionals responsible for managing hydrologic and geomorphic risks, and the expected standard of practice for professionals who undertake watershed assessments. The guidelines describe how risk identification occurs at the watershed-level and how risk analysis occurs at both the watershed- and site-levels:

*Most commonly, a watershed assessment provides recommendations to a forest licensee that assists the licensee in avoiding unacceptable consequences from its forest management practices... A watershed assessment identifies and characterizes sources of risk to the identified values from natural hydrologic and geomorphic processes, natural and/or human-induced disturbances, and the collective effects of these processes.*

*Risk analysis for forest planning occurs at both the watershed-level and the site-level. For some kinds of risk sources, the watershed assessment provides strategic-level risk ratings and identifies where site-level risk assessments are required for forest planning. The forest professional uses results from both watershed-level and site-level risk analysis to complete risk evaluation and incorporates those results into the harvest and road site plans. Examples of site-level risk analyses include terrain stability assessments, windthrow assessments, and sediment control plans for stream-adjacent roads.*

## Professional Standards

While the guidelines were not yet published when the watershed assessment was completed, they are now the current standard of practice. The guidelines were published on January 14, 2020; they include similar elements to those used by the Board in the 2014 special investigation of community watersheds. The guidelines represent the standard of expectation for practitioners,<sup>5</sup> keeping in mind that practitioners are also expected to use their judgement and discretion. These professional standards reflect best practice, and therefore the Board uses them to determine if assessments have been undertaken in a reasonable and effective manner.

The *Joint Professional Practice Guidelines for Watershed Assessment and Management of Hydrologic and Geomorphic Risk in the Forest Industry* were initiated, in part, in response to the Forest Practices Board special investigation of *Community Watersheds: From Objectives to Results on the Ground*, April 2014. The Joint Practices Board of the Association of Professional Engineers and Geoscientists of BC and the Association of BC Forest Professionals led the development of the guidelines.

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<sup>5</sup> A practitioner must be qualified to undertake a watershed assessment.

## Legal Requirements

Section 8.2(2) of the *Forest Planning and Practices Regulation*, paraphrased below, sets an objective for water in community watersheds:

- The objective set by government is that the cumulative hydrological effects of primary forest activities in a community watershed:
  - a. do not have a material adverse impact on the quantity of water or the timing of the flow of the water to the waterworks, or
  - b. do not have a material adverse impact on human health that cannot be addressed by water treatment.

FSPs must include a result or strategy to address this objective, and section 21 of FRPA requires the holder of an FSP to carry out the strategies or achieve the results specified in the FSP. The FSP results and strategies are therefore the legal requirements that an FSP holder must meet. Both licensees have an approved FSP strategy addressing the community watershed objective that commits the licensees to complete a watershed assessment and implement its recommendations.

## The Investigation

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The Society is concerned the licensees are not achieving government's community watershed objectives, and that the Glade watershed assessment is incomplete, outdated, and therefore does not meet the licensees' approved FSP strategies.

To investigate this complaint, the Board and a consulting hydrologist reviewed the watershed assessment and the licensees' approved community watershed FSP strategies. The Board examined the amended 2018 watershed assessment and reviewed the 2016 assessment. The entire process of conducting the watershed assessment was considered, including peer review and amendments to address feedback and make improvements.

The investigation considered whether the watershed assessment was consistent with the expected professional standards, and whether the licensees complied with legal requirements in FRPA. The Board did not investigate on-the-ground practices, as the planned blocks and roads have not yet been logged or constructed.

### Is the watershed assessment consistent with the professional standards?

The Society is concerned that the watershed assessment is incomplete because it does not include planned cutblocks and roads or consider discharge data for Glade Creek.

#### *Expected professional standard*

The investigation first considered whether the watershed assessment is consistent with the expected professional standard for watershed-level assessments as defined in the guidelines. The guidelines are not a legal requirement, but they set the baseline standard against which to compare the watershed assessment. The required elements of an assessment are summarized in Appendix 1; these elements are included in the Glade watershed assessment.

### ***Inclusion of planned cutblocks and roads***

The Society believes that the watershed assessment is incomplete because proposed forest development has not been assessed for hydrological risks.

The watershed assessment identifies sources of hydrological risk at the watershed-level, sets risk tolerance thresholds in the form of a maximum Equivalent Clearcut Area (ECA),<sup>v</sup> provides a recommended approach to cutblock orientation on the landscape, and recommends areas where licensees should carry out site-level assessments to prevent forest development-related increases in likelihood of damaging events, such as landslides.

The guidelines support this approach—assessing the risks that are inherent in a specific watershed, and then identifying approaches to consider during planning, and actions that can be taken at a site-level to reduce or manage those risks.

*The forest professional may include certain risk analysis for watershed-scale effects, such as stream flow change in the scope of a watershed-level assessment, and have site-level assessments done to make risk decisions on specific roads and harvest areas.*

*The specialist considers recovery from past disturbances when interpreting both current watershed condition and longer-term trends, and the potential effects of additional forest management activities...The specialist considers (these factors) together with the disturbance history and recovery in the watershed, when commenting on risk tolerance thresholds and recommending management strategies...*

In this watershed, the licensees appropriately used a watershed-level assessment to identify potential sources of risk at the watershed scale, and site-level assessments to analyze the risk of specific roads and cutblocks.

### ***Data availability***

The Society is concerned that the watershed assessment is incomplete because of the lack of discharge data for Glade Creek, and the associated inability to quantitatively assess the likelihood of a damaging event occurring.

The watershed assessment evaluated common watershed processes using both quantitative and qualitative approaches, based on whether local data was available. It is common for factors that affect hydrologic processes to be considered qualitatively, based on observed watershed conditions and available climate data, as the current state of available data in BC often does not allow for quantitative estimates of hydrologic processes such as stream flow changes.<sup>vi</sup>

#### **Quantitative vs. Qualitative**

Quantitative data has numeric values that describe a quantity.

Qualitative data has categorical values that describe a 'quality' or 'characteristic'.

The guidelines acknowledge these circumstances exist.

*Some watersheds may include smaller watersheds, or be near to other watersheds, that have available streamflow and environmental data sets that can be analyzed and incorporated into the watershed assessment. However, many watersheds have limited or no hydrologic data available or even regional studies for comparison. Some data can be acquired from complementary studies...*



## *Finding*

The watershed assessment is consistent with the professional standards. It identifies sources of hydrological risk at the watershed-level, sets risk tolerance thresholds in the form of maximum ECA, provides a recommended approach to cutblock orientation on the landscape, and recommends areas where licensees should carry out site-level assessments to prevent forest development-related increases in likelihood of damaging events.

## **Is the watershed assessment consistent with the FSP strategies?**

The Society is concerned that the watershed assessment is not consistent with the licensees' FSP strategies because it did not consider proposed cutblocks and roads or consider a recent landslide, and is therefore out of date.

The investigation examined the licensees' compliance with the legal requirement to carry out the strategies in their FSPs, and the Society's specific concerns related to risk assessment of proposed development and a recent landslide.

The investigation compared the watershed assessment against the approved FSP strategies and found that the watershed assessment is consistent with the approved FSPs for both licensees.

### *Proposed cutblocks and roads*

Atco included its proposed block in the watershed assessment. Although not a recommendation in the watershed assessment, Atco completed a terrain stability and soil erosion hazard assessment of the block and road, which yielded no changes to the block or road design.

Kalesnikoff proposed blocks directly above the water intake, and they were not directly incorporated into the watershed assessment. Kalesnikoff carried out site-level assessments of these blocks, as recommended in the watershed assessment. It told the Board about the site-level steps it took to reduce the hazard to the intake. These steps include:

- hiring a qualified professional to carry out a detailed terrain stability assessment and prepare a drainage plan for the new and existing roads within the permit area,
- adjusting block boundaries and road layout based on input from the qualified professional,
- establishing machine-free zones near the terrace edge, and
- incorporating the recommendations from the drainage plan into the road site plan.

Kalesnikoff informed the Society that site-level assessments were complete and that the proposed development is well-within the recommended maximum ECA thresholds.

This site-level approach used to assess the specific risk of blocks and roads is consistent with the guidelines, as discussed previously in this report.

### *Recent landslide*

The Society was concerned that the lack of consideration of a recent landslide in the watershed means that the watershed assessment is outdated.

Atco's FSP strategy does not specifically address the lifespan of a watershed assessment. According to Kalesnikoff's FSP strategy, the watershed assessment is valid for up to 10 years, or until "appreciable change" has occurred beyond the limits of recommendations or thresholds established in the

assessment. The FSP defines *appreciable change* as a change to the disturbance level and/or forest development that could increase the qualitative risk to elements previously identified as at risk.

This recent landslide does not constitute appreciable change beyond the limits in the watershed assessment. The watershed assessment establishes ECA limits. The current level of proposed development will increase the ECA from 15.1 percent to a proposed 15.6 percent at the watershed-scale, still well-within the recommended maximum ECA of 25 percent. Watershed assessments are strategic-level overview assessments of watershed risk and are not typically triggered by single events in a watershed, unless the event causes significant downstream impacts or impacts at a watershed scale.<sup>vii</sup> This situation is an example of where a site-level assessment of the landslide would be appropriate to inform the risk analysis for any proposed development in the vicinity.

Kalesnikoff told the Board it had a qualified professional look at the recent landslide. The qualified professional verbally informed Kalesnikoff that the slide would likely have been avoided by some maintenance on an old non-status road. The site-level steps taken by Kalesnikoff and summarized above were, in part, to be cautious in protecting the landslide area from potential water diversion resulting from their proposed development.

### ***Finding***

The watershed assessment and actions of the licensees to date are consistent with both licensees' FSP strategies for community watersheds. The watershed assessment is not outdated. The licensees followed the recommendations of the watershed assessment.

## **Observations on Communication**

Both the licensees and the Society have made multiple attempts at communicating their plans and concerns. Collectively, they have struggled to agree on a suitable forum for meaningful engagement, and they don't share a common goal. The licensees want input on how their plans could potentially impact the water users. The Society remains concerned about conventional logging in their watershed for fear of impacts on water quality.

As one example, the Society was unaware of the 2018 amended version of the watershed assessment that the Board used in this investigation. The licensees told the Board they did not share the amended watershed assessment with the Society because the recommendations did not change, and therefore they felt the changes were not significant.

Despite their differences, the Board believes that both parties need to find a way for more constructive engagement. They should develop a forum for engagement and communication that focuses on review of proposed forest developments. Concerns about broad land use decisions are legitimate public matters; however the licensees cannot respond to those and engagement with the licensees should be focused on matters they are responsible for. A process should adopt best practices for information sharing and transparency. This includes licensees sharing all assessments in the watershed, even if they believe they are not significant.

## Conclusions

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The Society is concerned that the Glade watershed assessment is incomplete, outdated, and therefore does not meet the licensees' approved FSP strategies.

The Board found the watershed assessment is consistent with the professional standards, based on a comparison to the Association of BC Forest Professionals and the Engineers and Geoscientists BC's *Joint Professional Practice Guidelines for Watershed Assessment and Management of Hydrologic and Geomorphic Risk in the Forest Industry*. The steps taken by the licensees in assessing and analyzing risk in the Glade community watershed are consistent with both the Kalesnikoff and Atco FSP strategies for community watersheds. The watershed assessment is not outdated as the watershed has not experienced appreciable change.

# Appendix 1: Required Elements of a Watershed Assessment Considered in this Investigation

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The objectives for a watershed assessment include some or all of the following:

- characterizing a watershed unit to determine baseline conditions for future comparison,
- determining the present physical condition of a watershed unit, the extent of past natural and anthropogenic disturbance, and current recovery trends,
- tracking trends over time with respect to collective hydrologic and geomorphic effects from forest and non-forest development, fire or extreme floods, and/or other land uses,
- identifying sources of risk to values of interest in the watershed,
- assessing the change in risks to values from proposed forest management activities,
- providing input to guide forest management planning, and
- determining watershed condition and trend in order to identify and prioritize restoration opportunities, and select management strategies that promote recovery of geomorphic and hydrologic processes.

The components commonly addressed by a watershed assessment include:

- investigation of watershed characteristics, channel characteristics, geomorphic and hydrologic processes, sensitivity to disturbance, and disturbance history,
- undertaking analyses appropriate for the scope and purpose of the study, which may include analyses of hydrometric and climate data, determination of hydrologic recovery of regenerating forest stands, landslide frequency, rates of sediment production, and elaboration of risk sources and consequences pertaining to the values of interest, and
- evaluation and synthesizing the above information to allow the specialist to draw conclusions and develop guidance or recommendations to meet the purpose of the study.

A watershed assessment report should be written with sufficient detail to:

- allow the forest professional and other specialists reading the report to understand the methods, information used, and supporting rationale for conclusions and recommendations,
- enable the forest professional to understand the sources of risk and risk levels, and be able to either undertake an evaluation in relation to risk tolerance or seek the appropriate site-specific assessments for risk analyses, and
- allow the forest professional to implement the recommendations and evaluate options provided.

## ENDNOTES

<sup>i</sup> Carver M, Utzig G, Putt D. 2001. Final Report - Interior Watershed Assessment Procedure & Reconnaissance Stability Assessment of Structure Locations, Glade Creek. Carver Consulting. <https://a100.gov.bc.ca/pub/acat/public/viewReport.do?reportId=8767>

<sup>ii</sup> Green K. 2018. Glade Creek Hydrogeomorphic Assessment. Apex Geoscience Consultants Ltd.

<sup>iii</sup> Ibid. Page 32.

<sup>iv</sup> ABCPF / EGBC. 2018. Professional Practice Guidelines: Watershed Assessment and Management of Hydrologic and Geomorphic Risk in the Forest Sector. Draft Guidelines, November 9, 2018.

<sup>v</sup> Wilford, D.J., M.E. Sakals, W.W. Grainger, T.H. Millard, and T.R. Giles. 2009. Managing forested watersheds for hydrogeomorphic risks on fans. B.C. Min. For. Range, For. Sci. Prog., Victoria, B.C. Land Manag. Handb. 61. [www.for.gov.bc.ca/hfd/pubs/Docs/Lmh/Lmh61.htm](http://www.for.gov.bc.ca/hfd/pubs/Docs/Lmh/Lmh61.htm)

<sup>vi</sup> Robert Scherer, PhD., P.Eng. 2019. Letter regarding Glade Creek Hydrogeomorphic Assessment – Professional Opinion.

<sup>vii</sup> Robert Scherer, PhD., P.Eng. 2019. Letter regarding Glade Creek Hydrogeomorphic Assessment – Professional Opinion.



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