Lakelse River Watershed – Review of Existing Information

Prepared for:

BC Ministry of Forests, Lands, and Natural Resource Operations
Bag 5000
Smithers, BC
V0J 2N0

Prepared by:

M.J. Milne & Associates Ltd.
2603 23rd Street
Vernon, BC
V1T 4J7

August 2014

1.0 Introduction

The following is a review of existing water, fisheries, and land-use related information for the Lakelse River watershed completed for the BC Ministry of Forests, Lands, and Natural Resource Operations (MFLNRO). The watershed is being considered for Fisheries Sensitive Watershed (FSW) designation. The purpose of the review is to determine:

- if significant fish values occur in the watershed, and
- if special management is required to protect fish and fish habitat based on value, current watershed condition, and both current and future land-use pressure.

Where significant fish values occur and special management is deemed necessary land management objectives that could be applied through FSW designation are provided along with possible strategies to achieve those objectives. The intended audience for this report includes: MFLNRO staff, affected forest licensees, and where applicable regional and municipal government.

The Lakelse River watershed is tributary to the Skeena River downstream of Terrace, BC *[refer to project map – Appendix A]*. The watershed is 58,000 ha in size with elevations ranging from 50 m ASL at the mouth to 2000 m along the eastern drainage divide. Approximately 4% of the watershed area is private land with an additional 4% in parks and ecological reserves. The remaining area is crown land with multiple forest tenures and licensees including: Tree Farm License, Forest License, and Community Forest areas.

2.0 Methods

The following sources of information were reviewed for this report:

- Sediment Source Mapping for Williams Creek. Unpublished report prepared by Chartwell Consulting Ltd. for Fisheries and Oceans Canada, Prince Rupert, BC, and BC Timber Sales, Terrace, BC. July 2006.
- Sediment Source Mapping, Detailed Channel Assessment, and Reconnaissance Sediment Budget for Williams Creek for period 1949 – 2001. Unpublished report completed by Weiland Terrain Sciences and Fluvial Systems Research Inc. for Fisheries and Oceans Canada, Prince Rupert, BC, Lakelse Watershed Society, Terrace, BC, and BC Ministry of Forests, Terrace and Smithers, BC. March 2007.
- Second Pass – FSW Candidate Review. Unpublished Workshop Summary prepared by BC Ministry of Environment, Smithers, BC. October 2008.
- Lakelse Lake Watershed "Backgrounder" Draft V.1. Unpublished report prepared by BC Ministry of Environment, Smithers, BC. February 2009.

- Lakelse Watershed – Level 1 Watershed Analysis and Discussion. Unpublished report prepared by the Lakelse Watershed Assessment Team, Smithers, BC. April 2009.
- Google Earth – interpretation of remotely sensed imagery.

Pertinent information from the above sources is summarized in tabular form in Appendix B. Fish habitat value and condition is described in the Table along with current and future land-use concerns. Management objectives that could be applied to address fisheries related concerns are provided along with possible restoration options.

Based on the review of existing information several key basins were defined in the watershed based on the location of major alluvial fans *[Appendix A]*. The major alluvial fans were defined using available terrain mapping, TRIM contours, and air photographs. Key basins include: Williams, Furlong, Hatchery, Scully, Upper Coldwater, and White Creeks. The remaining watershed area is referred to as the Lakelse River residual and includes all areas tributary to Lakelse Lake and the Lakelse River not otherwise defined.

3.0 Review of Existing Information

Fish values are described in background reports as high throughout the Lakelse River system. Several species of anadromous and resident fish are present, including: sockeye, coho, pink, and Chinook salmon, along with steelhead, bull, and cutthroat trout. The Lakelse River watershed is one of the most important sockeye salmon systems on the Skeena River[1] with returns decreasing over time as a result of stream sedimentation (from both natural and road related sources), reductions in riparian function, and channel destabilization in alluvial fan and floodplain areas (high value spawning habitat). An increase in sediment supply on the Lakelse River has also occurred as a result of disturbance on tributary channels. Past forest development on crown land, development on private land, linear corridor developments, and other land-use activity (such as highway construction) have contributed to the problem. The result is an increase in channel sensitivity[2] to streamflow, sedimentation, and riparian function related disturbance that can be generated by forest and other land-use activities on crown and private land in local and upstream areas. Reductions in riparian function have also led to a change in vegetation type in disturbed areas from mature forest to deciduous, attracting beaver and associated infrastructure (dams, ponds, and wetlands). The transition to deciduous types in disturbed riparian areas is significant with respect to effects

[1] Lakelse Lake Watershed "Backgrounder" Draft V.1. Unpublished report prepared by BC Ministry of Environment, Smithers, BC. February 2009.
[2] Sensitivity refers to the likelihood of change with application of external force or stimuli.

on fish passage and the type of fish habitat that result from beaver dam construction and associated flooding and dam ruptures.

Disturbing or channel changing flows on the Lakelse River and tributaries are generated by both snow melt and rain-on-snow events, with the latter occurring most often in the fall. As such, reductions in forest cover that lead to increased snow accumulation and snow melt rates are a concern in the steep and well drained portions of the watershed (basins). Streamflow hazards are moderate to high in these areas naturally and the situation can be exacerbated by reductions in forest cover. In the residual area, terrain is low and rolling and drainage density is less, resulting in lower streamflow hazard conditions, and less concern around reductions in forest cover and runoff. However, disturbance of very fine textured (glaciomarine) soils present in the residual area can lead to significant increases in stream sedimentation levels. To date the amount of past forest development has been limited in the Lakelse River basins but considerable in the residual area *[Appendix A and B]*.

4.0 Discussion

Fish habitat value is described by experts as high throughout the Lakelse River watershed. The watershed has a combination of private and crown land with multiple tenures and demonstrated sensitivities illustrated by channel destabilization in alluvial fan and floodplain areas, and landslides and earth flows related to roads and forest cover removal. As a result of high fish and fish habitat values, multiple land tenures, and demonstrated sensitivity, special management above and beyond that required by current and applicable legislation is deemed necessary over the entire watershed. The objective of special management should be to:

- reserve, protect and where possible restore (and recover function of) critical riparian areas, particularly on alluvial fans and floodplains (referred to as active fluvial units or AFU's),
- manage the rate at which changes in forest cover occur as a result of logging and other forms of development, particularly at the basin level, and
- minimize sediment input to channels from human related upslope sources.

5.0 Recommended Land Management Objectives

Based on the review of available information the following objectives are recommended for special management and restoration of the Lakelse River watershed and associated fish habitat.

5.1 Special Management

- Retain and protect mature trees and other vegetation in alluvial fan and floodplain areas (AFU's) expected to be active during an event of magnitude 1 in 100 years. Major alluvial fans were mapped for basin delineation purposes *[Appendix A]*, it is expected that upwards of 500 additional AFU areas occur within the Lakelse River watershed. AFU's should be expected on most channels >1.0 m in width except where controlled by bedrock.
- Manage upslope areas throughout the watershed for a low likelihood of sediment delivery to fish bearing streams[3] from roads, landslides and other types of erosion events. Existing terrain stability mapping and assessment protocols should be sufficient to achieve this objective where cutblocks and new roads are involved provided that the likelihood of sediment delivery to fish bearing streams is considered in the risk analysis, and attention is given to the extent and location of glacio-marine sediments in the residual area. For existing roads, management by risk is recommended beginning with comprehensive risk analysis based on a recognized, field based procedure[4], and existing information such as sediment source surveys and Forest and Range Evaluation Procedure (FREP) protocols[5]. The program should cover all roads – public, private, Forest Service, licensee permitted, and non-status and include options to mitigate moderate and higher risk situations.
- Determine and adhere to a sustainable rate of cut in operable and productive forest stands in each of the Lakelse River basins (Williams, Hatchery, Furlong, Scully, Upper Coldwater and White Creeks) based on a full rotation. Distribute cut by aspect and elevation at the basin level to prevent concentration in sub-basin level systems and consider managing in 5-year increments by which 5 years worth of cut is taken in one year with four years of recovery before the next pass is taken. In the absence of modelling the sustainable rate should not exceed 1.0% of the operable and productive basin area per year.

5.2 Restoration

- Look for opportunities to restore and protect disturbed and intact AFU's and foreshore areas through fee simple purchase or covenants where on private land, or designation as park or other protected area where within crown land.

[3] Defined as a remote possibility of sediment reaching a stream either episodically or cumulatively in an amount capable of harming fish locally or in downstream areas.
[4] Wise, M. P., G.D. Moore, and D.F. Vandine (editors). 2004. Landslide risk case studies in forest development planning and operations. B.C. Min. For., Res. Br., Victoria, B.C. Land Manage. Handb. No. 56.
[5] http://www.for.gov.bc.ca/hfp/frep/indicators/table.htm

- Review beaver related effects on fish passage and habitat value in low lying areas. Include a survey of existing beaver dams with identification of risk of rupture for various reasons such as inactivity. Eradication of beaver should be considered where long term benefits for fish are clear. Natural drainage patterns should be restored where beavers have left the site as a result of a change in seral stage, or the risk of dam rupture is significant enough to warrant removal. Restoration/dam removal should be combined with light-handed instream work to improve channel definition and fish access through previously backwatered/flooded areas.
- Include non-status roads and trails in the comprehensive road risk analysis and treatment program, where not addressed by forest licensees or other tenure holders.

6.0 Closure

This report dated August 2014 has been prepared exclusively for the BC Ministry of Forests, Lands and Natural Resource Operations. M.J. Milne & Associates Ltd. accepts no responsibility for the use of this document or its findings for any purpose other than the management of forest, water, and fisheries related resources in the Lakelse River watershed.

This concludes the review of existing water, fisheries, and land-use related information for the Lakelse River watershed with recommended land management objectives to protect and restore high value fish habitat. We trust that the information contained herein is complete and consistent with the scope of work assigned to M.J. Milne & Associates Ltd.

Prepared by:

Michael Milne, M.E.S. 08/07/14
Project Hydrologist
ABCFP Limited Licensee #0004