A summary of results and implications for management of small streams in the Prince George TSA using the DM Policy for S4 streams (5-m machine free zone; retention of all non-merchantable stems and 10 merchantable stems per 100 m stream length) (Based on findings to Feb. 2006)

Stream or riparian characteristic	Associated Natural ecological functions	Variables measured in small stream project	Interactions with other stream processes	Expected time frame for changes to occur from riparian harvest[1]	Were there significant changest o individual sream characteristic?	Level of Concern for negative impacts to occur when using "DM Policy" (relative to individual characteristic).	Type of stream most sensitive to this change	Implications for small streams in MPB zone
Streamflow regimes	- controls rate of dowstream transport of sediment, LWD, organic matter - controls rates of channel migration and bank erosion - determines amount and quality of fish habitat (e.g. pool depth) - affects fish passage and movement	- continuous stream stage data - stage discharge curves	- sediment transport - channel morphology - invertebrate drift	Short term	Insufficient long-term data from co-op study; increased spring peakflows observed at Baptiste	**Not applicable**	Related to amount of watershed harvested, no so much riparian treatment	Increased flows caused by reduced ET (dead and salvaged trees) suggests more riparian retention to control bank stability and erosion
Fine sediment transport	- affects natural stream substrate condition (e.g. spawning gravels, invertebrate substrates) - maintains natural concentrations of suspended sediment in water	- continuous turbidity data	- sediment sources - invertebrate and periphyton abundance - suspended sediment effects on fish	Short-medium term	Yes (from roads and trails, not riparian treatment)	**LOW**	Related to quality of stream crossings	Because of very high road density, good erosion and sediment control at stream crossings is very important
Stream sediment supply	- maintains stream substrate condition (e.g. spawning gravels, invertebrate substrates, pool depths)	- identify stream sediment sources - streambank tree windthrow	- channel morphology - bank stability - nutrients	Short-medium term	No significant change, sediment supply maintained within natural range	**LOW**	lacustine parent material	Because of very high road density, good erosion and sediment control at stream crossings is very important
Channel morphology	- natural variability enhances diversity and influences biological productivity	- stream width and depth	- streamflow regimes - sediment transport and supply - large woody debris - bank stability	Long term	No significant change yet, however may be affected in the long term by reduced LWD supply	**MODERATE**	All except bedrock controlled channels	Riparian retention extra important as flows will increase.
Large woody debris	- stream structural diversity, channel morphology - retention of organic matter and sediments - fish cover and habitat - refuge for organisms - substrate for growth	- large woody debris in stream (quantity and age classes) - riparian recruitment distance - riparian composition	- sediment transport - streamflows - fish and stream productivity	Long term	No significant change yet, however modelling predicts a significant decrease in the future	**HIGH**	DM policy provides insufficient long term supply of LWD for all riparian types studied, with the worst impact being in ecosystems dominated by spruce and subalpine fir.	Retention of both dead and green riparian trees important (more than DM policy suggests)
Shade	- controls solar heating - minimizes UV radiation exposure of biota - controls photosynthetically active radiation for periphyton growth	- canopy density - angular densiometer - solar pathfinder (direct solar exposure)	- temperature - periphyton - invertebrates - cover for fish	Short term	Yes, a significant decrease	**HIGH**	"Temperature sensitive" streams; loss of cover for fish	Potentially reduced shade (fewer pine); more retention required.
Water Temperature Regimes	- cool water source (headwater streams) - affects all stream productivity processes - changes fish growth and health; egg survival - stream invertebrate community composition and productivity - invertebrate drift production	- water temperatures	- all stream biota and productivity processes	Short term	Yes, a significant increase, although relatively small	**MODERATE**	Designated temperature sensitive streams and those supporting temperature sensitive species such as Bull trout	More retention may be required in areas where shade is reduced from needle loss. Road crossings should be minimized to decrease stream exposure.
Litterfall	- dominant source of organic matter for headwate stream productivity	- litterfall traps - canopy density	- Invertebrates - Nutrients - Micro-organisms	Short term	Yes, a significant decrease	**HIGH**	All streams	Loss of pine litter inputs may affect productivity of MPB streams
Inorganic nutrients	- inorganic nitrogen and phosphorous availability affects stream productivity and organic matter processing	- nitrogen water chemistry - phosphorous water chemistry - conductivity - discharge	- periphyton - organic matter processing - invertebrate production	Short to mid-term	No changes detected, riparian may have minimal role and may be more a watershed level process	**LOW**	All streams	Changes in watershed vegetation and soil disturbance from salvage activities may affect soil and stream nutrients
Dissolved organic matter	- natural sunscreen to protect against UV exposure of biota - nutrient for microbial communities	- dissolved organic carbon - UV absorbtion	- shade and direct solar radiation exposure - temperature - litterfall - inorganic nutrients	Short to mid term	No changes detected, riparian may have minimal role and may be more a watershed level process	**LOW**	All streams	Changes in watershed vegetation and soil disturbance from salvage activities may affect soil and stream DOM inputs
Periphyton	-organic matter for invertebrate production	- periphyton accrual rates and maximum biomass	- invertebrates - light - temperature - suspended sediment - inorganic nutrients	Short to mid term	Yes/No, remained low in some streams (nutrient limited), increased in others (light limited)	**LOW**	All streams	Changes in stream nutrients and shade will determine response of periphyton communities
Invertebrate drift production	- primary food source for resident fish - production for downstream export to fish habita	- 24 hr drift nets	- benthic invertebrates - water temperature - discharge - fish growth and health	Short to mid term	Yes/No, complex changes in some streams	**MODERATE**	All streams	Productivity affected by changes in stream shade, nutrients, litterfall and periphyton.
Benthic Invertebrates	- source of invertebrate drift - instream processing of organic matter	- Serber sampling	- shade and UV radiation - nutrients - litterfall - periphyton	Short to mid-term	Yes/No, complex changes in some streams	**MODERATE**	All streams	Productivity affected by changes in stream shade, nutrients, litterfall and periphyton.
Fish	- headwater streams are important spawning and rearing habitats	- fish traps, length-weight	- stream productivity - invertebrate drift - stream habitat and cover - water temperatures	Short to mid-term	Ephemeral use of the streams complicates assessment	**MODERATE**	All fish bearing streams	Productivity affected by changes in stream shade, nutrients, litterfall and periphyton.

[1] Short term = 0 to 5 yrs
Medium term = 5 to 20 yrs
Long term = 20 to 80 yrs