

Retention Mapping Options & Alternatives

Submitted to the:

Ministry of Environment

C/o

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Executive Summary

Commissioned by the Ministry of Environment, Forsite was contracted to coordinate the identification of retention options and alternatives in light of accelerated harvesting and silviculture activities occurring as a result of the mountain pine beetle (MPB) epidemic. This was achieved by analyzing three management units based on the methodology developed and approved for each of the management units at the outset of this project. The methodology for each unit was developed in coordination with the other units with consistency and transferability being one of the guiding objectives.

This project was funded through Forest For Tomorrow funding to support the responsibilities of both the Ministry of Environment and Ministry of Forests and Range in managing non-timber resource values in areas impacted by catastrophic wildfire and MPB events.

The following management units were examined as part of this project:

- Merritt TSA
- Quesnel TSA
- Vanderhoof Forest District.

Under contract with the Ministry of Environment, the Merritt TSA was examined by JS Thrower and Associates and both the Quesnel and Vanderhoof management units were examined by Timberline Forest Inventory Consultants.

This document provides an overview of the processes involved in meeting the retention mapping project objectives such as project coordination, developing methodology, consultation process, discussion of results and recommendations for future retention strategy work.

Project coordination involved bringing together the collective knowledge of several resource professionals in 3 different management units to complete the project. Each management unit developed a methodology to identify and rank optional and alternative retention areas in meeting their retention objectives. These methods were then collectively examined in roundtable discussions throughout the course of the project to ensure that there was a reasonable degree of consistency between the units in developing retention strategies. The methodologies were designed to address specific retention principles for each management unit based on the data available for each unit.

For each management unit consultation took place with government agencies, TSA or District steering committees, and to a limited extent licensees in capturing existing retention strategies and processes. The consultation helped confirm where management units were with regard to their retention strategies for non-timber resource values.

The result is a management unit report for each of the identified units and this document, a framework and summary of the principles and methods. In addition, considerable map based resources were also produced for illustrating proposed retention strategies in each of the management units. The data custodian for these resources is the Ministry of Environment. Each of the management unit summary reports are appended to this report.

Acknowledgements

The cooperation and contributions made by several key people have lead to the successful implementation of this project. The following people have contributed to and shaped the outcome of this project in the following areas:

Vanderhoof Project Area:

Chris Ritchie, Section Head, Ecosystems Section, Ministry of Environment, Prince George
Patience Rakochy, Timberline Forest Inventory Consultants, Prince George

Quesnel Project Area:

Charlotte Kurta, Ecosystems Officer, Ministry of Environment, Cariboo Region, Quesnel Forest District Office
Patience Rakochy, Timberline Forest Inventory Consultants, Prince George

Merritt Project Area:

Michael Burwash, Senior Ecosystem Biologist, Ministry of Environment, Kamloops
Doug Lewis, Ecosystem Biologist, Ministry of Environment, Kamloops
Dan Erikson, JS Thrower and associates, Kamloops
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Ministry of Environment Contract Monitor:

Colene Wood, Ecosystems Forester, Ecosystem Planning Section, Victoria

FFT Program Coordination:

Glenn Theim, Forsite Forest Management Specialists

1 Background

In December 2001 the Quesnel Forest District was designated as an Emergency Management Unit (EMU) as per the Forest Practices Code of BC. Mountain Pine Beetle (MPB) overview flights in the Quesnel Forest District in 2002 indicated that the MPB infestation had reached epidemic proportions¹ with 370,000 hectares infested. This translated to approximately 100,000,000 cubic meters; 22 times the annual harvesting capacity of 4.5 million cubic meters for the region.

Prior to 2002 the imperative to harvest beetle infested timber was given precedence over landscape level biodiversity considerations. Detection information collected in 2001 and 2002 indicated that sanitation harvesting was not going to bring the infestation under control. In July of 2002 the allowable annual cut (AAC) was increased by the chief forester for the three most impacted TSAs. The second uplift in 2004 was made by the chief forester assuming a retention target of 20 to 25 percent. Approximately half of this retention was to be incremental to existing standards.

Harvesting all infested timber is not feasible or practical; furthermore, it is likely ecologically unsound². The provinces Integrated Mountain Pine Beetle – Biodiversity Management Strategy recognizes that beetle infested forests support landscape and stand level biodiversity objectives to some extent. Consequently, a management strategy which identifies high value retention options is required to effectively mitigate the impacts of the MPB infestation on biodiversity values.

1.1 Project Description

Commissioned by the Ministry of Environment (MOE), Forsite Consultants Limited (Forsite) was contracted to coordinate the identification of retention options and alternatives in light of accelerated harvesting and silviculture activities occurring as a result of the mountain pine beetle (MPB) epidemic. This was achieved by analyzing three management units based on a methodology developed and approved for the management unit at the outset of the project. The methodology developed for each unit was developed in coordination with the other units with consistency and transferability being one of the guiding principles.

The following management units were examined as part of this project:

Merritt TSA

Quesnel TSA

Vanderhoof Forest District.

The objective of the project was to bring together the collective knowledge and effort that presently exists in each management unit to provide MOE staff with a spatially explicit landscape level retention mapping “base” and a framework to apply the principles and methods developed to other management units in the future. This base will provide ministry staff with a spatial representation of existing legislated retention and the “options and alternatives” identified during the course of the analysis and evaluation of retention in each of the respective management units.

¹ Quesnel Forest District Policy – *Management of MPB and Seral Stage Distribution*, January 2003

² Eng 2004. *Forest Stewardship in the context of large-scale salvage operations*

1.2 Project Administration

In effectively delivering this project to ensure the objectives would be achieved, the project was administrated at three levels. Overall administration was lead by the Ministry of Environment out of Victoria, contract management, administrative support and technical support was overseen by Forsite Consultants, and finally project management occurred under respective contracts with JS Thrower and Associates and Timberline Forest Inventory Consultants.

Through direction of the MOE, the Merritt TSA was examined by JS Thrower and Associates with Dan Erikson as the project manager and through similar arrangements, the Quesnel TSA and Vanderhoof Forest District, was examined by Timberline Forest Inventory Consultants, Patience Rakochoy as project manager. Michael Burwash, Senior Ecosystems Biologist and Doug Lewis, Ecosystems Biologist were the MOE technical contacts regarding the Merritt TSA work. Chris Ritchie, Ecosystems section, MOE was the ministry technical contact in the Vandehoof unit and Charlotte Kurta, Ecosystems officer, MOE, was the ministry technical contact for the Quesnel management unit.

Quality assurance and fulfillment of contract requirements was carried out by Forsite Consultants Ltd.

2 Study Areas

The study areas for this project were selected based on assessed need for higher level coordinated retention planning in light of the MPB infestation. The management units selected were also identified as preferred areas to assess in the first iteration of the retention identification process because of their different stages of planning and degree of infestation. The intent of this selection was to assess these areas and in so doing, identify regional differences and similarities such that common retention “principles” could be identified for future application in other management units.

Vanderhoof and Quesnel management units were characterized as having advanced MPB infestations while Merritt was viewed as a management unit which had not yet identify the extent of the MPB threat. For these reasons, these management units were chosen to best represent the range of retention issues present. Additional details pertaining to each of the management units is located in the relevant summary report appended to this document (Appendix B and C).

2.1 Merritt Study Area

The Merritt TSA covers approximately 1,130,000 hectares of ecologically diverse landscape. For the last several years the focus of harvesting has been on pine beetle salvage operations. In July of 2005 the Chief Forester determined an annual allowable cut (AAC) of 2,814,171m³ which included an uplift of nearly 1 million meters to address the MPB infestation impacts. There currently is no land use plan established for the Merritt TSA.

2.2 Quesnel Study Area

The Quesnel TSA covers approximately 2,075,875 hectares of diverse landscape. Accelerated MPB salvage harvesting is also occurring in the Quesnel TSA. The

Quesnel unit is unique in that it is part of the Cariboo-Chilcotin Land Use Plan and the landscape unit planning identifying spatial OGMA's has been completed.

2.3 Vanderhoof Study Area

Vanderhoof study area for this project was revised down to only address the Vanderhoof Forest district. The Vanderhoof TSA was deemed to be too cumbersome to adequately address at the resolution desired based on the time available and the deliverables desired in each of the three project areas. The Vanderhoof Forest District covers approximately 1,387,537 hectares and is part of an LRMP but it is not a Higher Level Plan.

3 Project Coordination

3.1 Needs Assessment

Ministry of Environment staff has identified a need to plan retention at a landscape unit (or greater) scale to identify those areas which should be considered as high value retention options by forest planners. The desired product of this undertaking is two fold. There is a need for a higher level alternative retention mapping overview to be used by planners and for a set of generally accepted ecological principles for identifying retention options. The Chief Forester in his December 2005 letter to resource professionals³ stressed the need for "...spatially explicit for landscape –level retention, considering the full range of values for conservation – visuals, ungulate winter ranges, wilderness tourism, etc". The Chief forester also stressed that planning be "...developed cooperatively so it is known and honored by all operators harvesting in the management unit."

The mapping overview will provide a data set which is both a visual tool and an inventory of those areas identified. The resulting data set will bring together existing efforts to map retention, such as the "Red-Green" map into a larger collective data set designed for use by ministry staff and forest planners. The resulting product illustrates the spatial distribution at a large scale of existing legislated retention and a set of ranked options or alternatives for increased retention levels.

3.2 Adaptation & Integration with existing processes

When initially conceived the project objective included an extensive stakeholder consultation. The limited time available and the pressures to integrate existing work and similar projects made this consultation impractical. It was also determined that expert opinion should be favored in the identification of ecologically valuable retention which could then be "taken to" other stakeholders for input and review.

In order to provide maximum benefit given limited time and available funding, it was concluded during the methodology development stage that the management unit contractors place more effort on developing a defensible and credible methodology to produce retention option base maps which could then be used in subsequent consultation with the public and industry. This approach was arrived at by consensus with the MOE technical contacts for each of the management units. This process will

³ http://www.for.gov.bc.ca/hfp/mountain_pine_beetle/stewardship/cf_retention_guidance_dec2005.pdf

still provide MOE a well founded set of alternative retention areas ranked according to the respective methodology.

3.3 Standardization

Standardization between units was desired. However, it was recognized early that excessive standardization could adversely affect the process and results in each unit.

To facilitate consistency project meetings were held at regular intervals throughout the project. During these sessions dialogue on process and procedure in each of the management units was discussed. Similarities and differences were discussed and approaches to accommodate them were suggested.

The starkest differences in each of the units, which in turn drove the development of the methodology to be used, were the availability of data and the completeness of that data. While “incomplete” data was not an issue, land use planning processes and retention planning in each unit was at different stages. This required developing an improvised process in order to make use the available data and thus identify retention options and alternatives.

4 Methodology and Process

As indicated above standardization and transferability were key components driving the development of the methodology for this project and the management unit projects subsequently undertaken. In order to meet the objective in the *Mountain Pine Beetle Action Plan 2005-2010*⁴ of conserving long term forest values, such as biodiversity identified in land use plans, a large scale strategy is necessary. The methods which follow are aimed at identifying this strategy and providing a resource document (complete with maps pertaining to the management unit in question) to be used by forest planners.

Retention planning in this context is the identification of forest areas that will not be harvested or salvage logged even if they are attacked by mountain pine beetle. The retention identified is at the landscape level, prior to harvest planning with the intent that planners will use this resource when identifying stand level retention areas during operational plan development. Landscape level planning provides an instrument to maintain the broad pattern of ecosystem function across the landscape.

4.1 Retention Principles

Ecosystems and biodiversity values benefit from the retention of beetle damaged or killed stands. When a beetle infestation strikes the overstory tree species that element of the ecosystem may be damaged or destroyed; however, the ecosystem is not “killed” or destroyed⁵. Consequently, careful consideration and evaluation is required to identify these areas and make their value known.

The most effective way to carry out this sort of retention alternatives identification requires the incorporation of several principals and the development of some sort of evaluation and ranking system. How the ranking system evolves is dependant on the

⁴ http://www.for.gov.bc.ca/hfp/mountain_pine_beetle/actionplan/2005/actionplan.pdf

⁵ *General Criterion for Retention of MPB Damaged Stands*, Chris Ritchie, January 2005

amount, type and completeness of data available. Incorporating the principles into the ranking system is dependant on how the principles can be addressed with the data available. Several principles were identified during the course of this project and they are described in Appendix 1. How the principles were addressed in each management unit is described in the respective management unit reports. The next section briefly addresses the management unit differences in this context such that a retention mapping framework can be identified.

4.2 Management Unit Differences

Each of the management units examined under this administration contract was in a different “place” or position relative to the others in a number of key ways.

For example land use planning and higher level plan designation is complete for the region which the Quesnel unit falls under. The Vanderhoof unit has a draft Land and Resource Management Plan (LRMP) in progress. Meanwhile the Merritt management unit does not have an approved or draft plan in place. The Landscape Unit Planning process is at different stags in each of the regions. However, most significant is the severity of the beetle infestation in each of the units.

The Quesnel and Vanderhoof management units are both identified as Salvage/limited action in the January 23, 2006 re-designation of Emergency Management units⁶. Whereas the Merritt management unit has several landscape units identified as “containment” in the re-designation letter. Management units designated as salvage no longer qualify for planning exemptions and aggressive control and containment (sanitation) tools may no longer be used. As a consequence the planning objectives in the Vanderhoof and Quesnel units differ from those in place in Merritt’s management unit.

The distinctions described above are primarily a consequence of environmental circumstance. Additional differences which directly impact the ability of planners and analysts to evaluate the landscapes are data differences. The scale of planning required to develop tools such as this alternative retention mapping framework requires comprehensive and consistent data sets to best evaluate and ultimately rank the landscape.

In each of the management units examined planners and analysts had to formulate a hierarchical ranking system consistent with the values and objectives identified for the management unit with existing data sets. The collection of new data was beyond the scope and mandate of this project.

4.3 Framework Development

The development of a framework for the identification and mapping of optional and alternative retention areas was one of the objectives of this project. To provide a tool that is useful to both strategic and operational planners as a starting point and a reference source requires that the process incorporate the following overarching principles in developing its framework:

1. Sound ecological principles must be used;

⁶ http://www.for.gov.bc.ca/hfp/mountain_pine_beetle/maps/ebbma/EBBMA_IBM.pdf

2. The process must be designed such that it is repeatable and defensible;
3. The process must be easily understood such that both strategic and operational planners will find it useful;
4. The results should not be considered definitive, rather indicative requiring field verification prior to any sort of implementation;
5. The process must provide a means to evaluate both timber and non-timber values;
6. Consideration of the social and economic implications must also be provided as this is one of the first questions likely to be asked.
7. Integration with existing work and concurrent processes is essential to ensure that unnecessary duplication of effort does not occur.
8. Planning should be spatially explicit at the landscape level;
9. Planning should be carried out cooperatively with other agencies and stakeholders.

5 Discussion & Recommendations

5.1 Project Continuance

Management units in all stages of infestation will benefit from an examination similar to the ones completed in the Vanderhoof, Quesnel and Merritt management units.

The base/projection map product created for each of these units will be a living document. Ultimately it will be operational planners who will use and benefit the most from this data set. It is expected that this will be used to assist forest managers in their efforts to identify the additional retention required to counterbalance the accelerated harvest levels occurring in many beetle infested management units.

It is expected that once these frameworks are established, the utility will be realized. Next steps should include the introduction of these alternative retention frameworks to licensees, First Nations and other land use professionals. The results provided through this consultation exercise will only improve the framework and governing principles. with the objective being to enhance the overall utility of the material. While it is unlikely that a consensus will be reached regarding the application of many of the “principles”, that should not be viewed as the objective of the process. The intent of establishing an alternative retention framework is to identify and understand the limiting factors which are only fully understood through consultation with all non-timber resource users. The best utility of this frame work are the resultant maps and data sets that will be realized as a living resource document to benefit the management of non-timber resource values.

5.2 Planning and Organization

Projects of this magnitude require significant coordinated input in order to be successful. Future units that are being considered for examination and analysis should be considered relative to the magnitude of the 3 units examined in this project.

Additional undertakings following the framework outlined by this project should include a structured review and investigation of existing processes and related literature. One of the shortcomings of this particular project was the limited consultation that took place.

Timelines are also critical to efficient delivery, especially when capitalizing on other planning processes occurring within particular management units. The late launch of large programs in the fiscal year places significant restrictions on contingency plans and the overall ability to address unforeseen issues that impacts overall project delivery.

5.3 Integration with Other Processes

When attempting to establish an alternative retention framework at the TSA level, significant effort is required to ensure there is alignment with projects and processes currently underway. Part of the investigation and review suggested above should, in future projects, address the integration of existing work and ongoing processes.

By pulling in resources and personnel involved in other related work early during the project concept stage, duplication and redundancy can be minimized. Furthermore, additional clarity regarding project scope and objective in the hands of the right resource people early will facilitate the effective integration of existing work and literature into the larger process.

A good example situation is that of Landscape Unit Planning. In management units with approved biodiversity chapters OGMAs will be spatially located. The placement of additional retention adjacent to OGMAs will enhance both efforts. In contrast, in situations where there are no OGMAs identified a optional retention mapping exercise such as this one will feed directly into the planning and identification of OGMAs.

Appendix A. Retention Mapping Principles⁷

The retention mapping principles identified here have been broken down between primary and secondary for clarity purposes. The distinction is entirely arbitrary and could in effect be placed anywhere in the list or removed. Primary retention principles are typically those which are applied at larger scales than those designated as secondary.

Primary Retention Principles:

1. Anchor retention on an ecological legacy: Ecological legacy features are features left by a natural disturbance agent. An example of an important legacy is non pine stands.
2. Uniform distribution across the landscape: Identification of retention mapping alternatives must consider the spatial distribution of the identified area much like that which must be considered with other land use planning objective – OGMA's are a good example.
3. Landscape level connectivity should be considered when evaluating potential retention options.
4. Rare ecosystem and stand types will benefit having retention located within or adjacent to them.
5. Natural disturbance patterns left by previous natural disturbance agents should be used to guide the spatial distribution, size and shape of optional retention areas.
6. Wildlife movement corridors should be ranked as high value alternative retention areas. Forest Ecosystem Networks may provide information relative to this objective.
7. Temporal scale: expected duration of the retention options being considered.
8. Social impacts: Impact on the timber supply and the potential social and economic consequences.

Secondary Retention Principles:

1. Linkages to existing (legislated) retention areas: These existing retention areas provide the "anchor" for much larger retention areas. Additional retention located adjacent to existing "anchor retention" areas provides increased benefit. For example locating retention adjacent to riparian reserves increases resilience against wind, reduces edge effect and provides for greater interior forest condition.

⁷ Chris Ritchie has been instrumental in the development and application of retention principles. Most of the retention principles described here are a synthesis of phone and email communication with Chris over the course of this project. Chris has also authored unpublished "technical notes" on the subject and again much of his work is reproduced here.

2. Site regeneration potential: Craig DeLong's "Red/Green" mapping project sought to identify stands that are likely to have well developed non-pine understories. The objective being to identify these stands as those which are likely to recover much faster after the pine overstory has been destroyed by the infestation.
3. Identification of retention areas should differentiate between stands which are susceptible to infestation and those which are not.

Appendix B. Vanderhoof & Quesnel MU Summary Report

Attached separately

Appendix C. Merritt MU Summary Report

Attached separately