

Forest Management Opportunities in Non-merchantable Forest Types

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Executive Summary

During the timber supply review (TSR) process, areas within the operable land base were excluded from the timber supply analysis due to having non-merchantable timber stands or being estimated to be incapable of growing timber to merchantable sizes or volumes. These conditions may be the result of factors such as over or under-stocking, very old trees having poor timber quality, non-merchantable tree species, low timber volumes, or indicated low site productivity. Across the province, the total area excluded for these reasons following the first TSR was equivalent to approximately 50% of net timber harvesting land base (THLB).

This report is an overview analysis of opportunities for bringing some of these excluded areas into the timber harvesting land base by means of some form of incremental silviculture activity, including analysis or surveys. It does not include areas that are classified as not satisfactorily restocked (NSR). It covers all timber supply areas (TSA's) but does not include tree farm licences (TFL's), woodlot licences, or private land.

It is assumed that local experts have taken into account the potential biodiversity or other values of non-merchantable forest areas and that area estimates contained herein are therefore net treatable area.

The findings of the review are:

1. Between TSR1 and TSR2 there have been substantial changes in resource information, operability and merchantability in many TSA's - the result being that TSR2 area netdowns for non-merchantable forests generally are, or can be expected to be, less than those of TSR1 – sometimes significantly so.
2. The largest opportunities in terms of active incremental silviculture treatments are:
 - (a) rehabilitation of approximately 68 000 ha of non-commercial brush (NCBr) in the Prince George Forest Region at an estimated total cost of \$136 million and long term yield of 331 000 m³/yr (however, previously rehabilitated NCBr and NSR sites in the Peace River region are not being adequately monitored and there is a risk of losing some sites);
 - (b) rehabilitation of approximately 165 000 ha of repressed lodgepole pine stands in the Cariboo Forest Region at an estimated total cost of \$157.6 million and long term yield of 429 000 m³/yr; and
 - (c) rehabilitation of potentially 9 000 ha's of NCBr in the Nass TSA, Prince Rupert Forest Region, at a cost between \$1,500-\$5,000/ha, starting with small trials.

Overview analysis, and surveys and assessments are needed to better define these treatment opportunities. Research studies and operational rehabilitation trials may be needed to assess costs and benefits. The effect on long term harvest levels may be below that of the estimated long term yields due to the need to accommodate other resource values.

3. Lesser opportunities for active incremental silviculture treatments include:
 - (a) in the Kingcome TSA, a 10 ha experimental trial for establishing drainage is proposed at a cost of \$30 000; and

- (b) in the Queen Charlotte TSA, research into regeneration of low-site stands, similar to that in North Coast FD, may identify area that could be included in the THLB.
4. A wide variety of surveys and analysis projects are needed throughout the province to further refine opportunities in non-merchantable forest types. These are summarized by forest region in the table below. Some of these projects may already be in district resource management plans. Cost per hectare is based on experienced costs of \$5-7/ha in the Nelson Forest Region for expert inventory assessment. It is recommended that any large sampling project be designed or approved by Resources Inventory Branch. In some cases, particularly in the Cariboo Forest Region, the proposed surveys and assessments and overview analysis may be a first step to better define potential treatment opportunities. Following this, research studies and operational trials may be needed to further assess costs and benefits.

Forest Region	Project	Area (ha)	\$/ha	Cost (\$)
Cariboo	Overview analysis, and surveys and assessments are needed to better define treatment opportunities in repressed pine stands.	300000	4	1,200,000
Kamloops	An extensive vegetation resources inventory is required in the deciduous forest of the Kamloops TSA before any further merchantability or forest management potential can be identified.	46000	6	276,000
Nelson	Survey/assess for a variety of opportunities.	84000	6	504,000
Prince George	See above bullet re strategic resource inventories.	0	-	0
Prince Rupert	Survey low-site land in the Morice TSA for improper low-site classification.	50000	6	300,000
Vancouver	Survey/assess for a variety of opportunities.	40600	6	243,600
Total		520,600		2,523,600

5. Although not directly within the scope of this project, the opportunities presented through investing in strategic resource inventory information in the Peace region TSA's (Fort Nelson, Fort St. John and Dawson Creek TSA's) and the Mackenzie TSA so obviously outweigh increased incremental silviculture investment opportunities of these areas that they cannot go without mention. Strategic resource inventory activities would cost considerably less than incremental silviculture activities and have the potential to immediately expand the timber harvesting land base in these management units. Incremental silviculture, on the other hand, is relatively much more expensive and is more likely to improve timber supply in the long term than in the short term.

Forest Management Opportunities in Non-Merchantable Forest Types

Introduction

During the timber supply review (TSR)¹ process, areas within the operable land base were excluded from the timber supply analysis due to having non-merchantable timber stands or being estimated to be incapable of growing timber to merchantable sizes or volumes. These conditions may be the result of factors such as over or under-stocking, very old trees having poor timber quality, non-merchantable tree species, low timber volumes, or indicated low site productivity. Across the province, the total area excluded for these reasons following the first TSR was equivalent to approximately 50% of net timber harvesting land base (THLB).

This report is an overview analysis of opportunities for bringing some of these excluded areas into the timber harvesting land base by means of some form of incremental silviculture activity, including analysis or surveys. It does not include areas that are classified as not satisfactorily restocked (NSR). It covers all timber supply areas (TSA's) but does not include tree farm licences (TFL's), woodlot licences, or private land.

Figure 1 on the following page illustrates the basic assessment process. Three of the identified possible outcomes merit further description.

Surveys or expert inventories may be identified as needed to accurately describe the non-merchantable forest type. The results of the inventories may establish opportunities for a partitioned allowable annual cut (AAC) or possible inventory adjustment. To date, areas studied under expert inventory (Merritt, Okanagan Springs, and Cranbrook) have been shown to contain a significant proportion of harvestable or stocked land.

Studies or actions may be identified that will encourage merchantability, for example, trial timber sale licences, or road development.

Lastly, areas may be identified as requiring **rehabilitation treatment**, beginning either with vegetation control or killing or knocking down the existing non-merchantable trees to enable reforestation. While operational planning is beyond the scope of this project, in estimating the net treatable area allowance has been (roughly) made for the protection of other resource values.

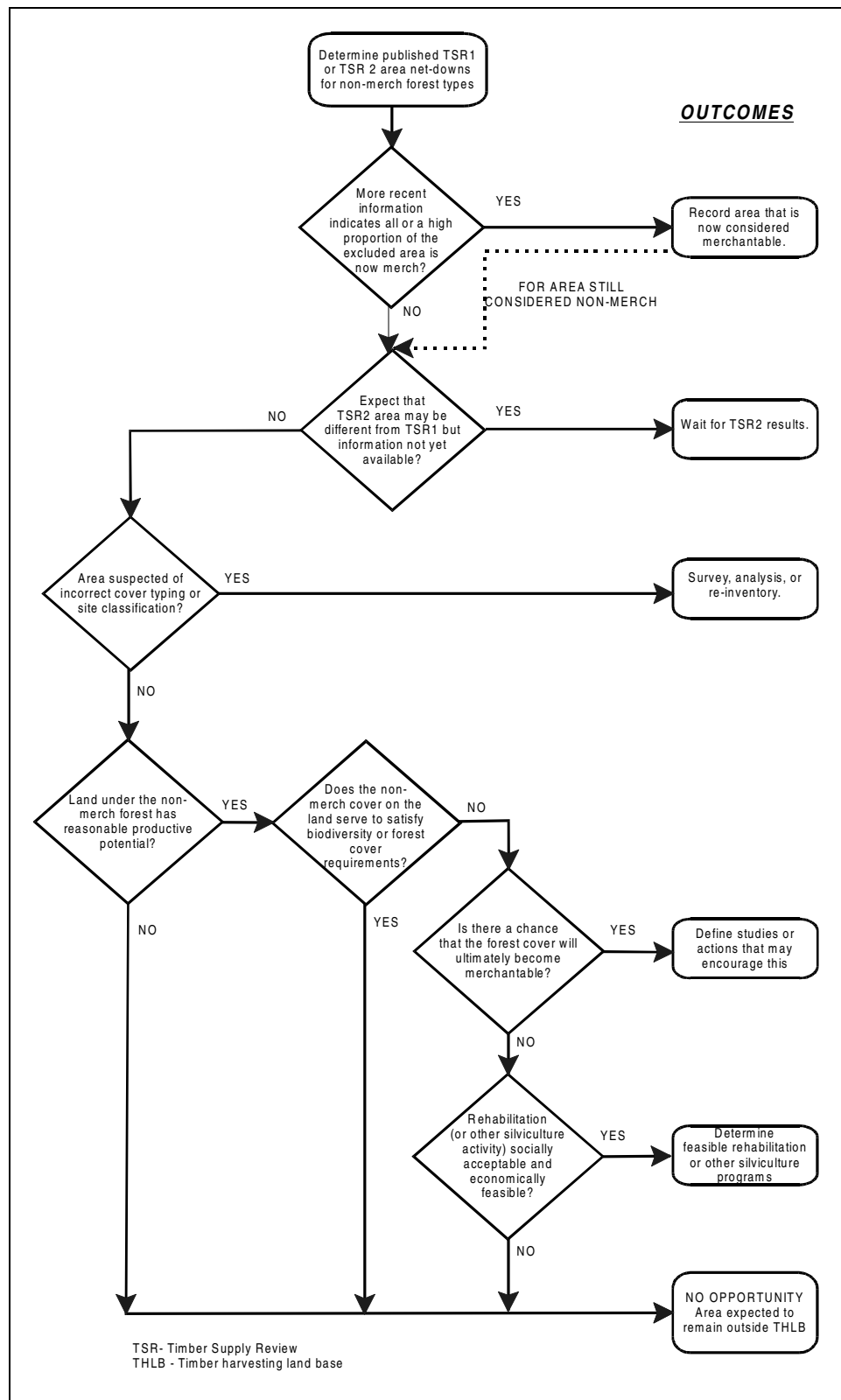
Methodology

The following methodology was used in undertaking this review.

1. An existing spreadsheet of non-merchantable forest type data for TSA's and TFL's (previously prepared by L.P. Atherton & Associates as part of an earlier project) was updated to include new TSR information issued since its completion.

¹ See page 64 for a list of abbreviations used in this report.

2. Available incremental silviculture strategies (all Vancouver and Nelson Forest Region TSAs, TFL 23, Cariboo Timber Investment Strategy Committee) for units having an indicated opportunity were consulted for confirmation of the potential.
3. For units not having a developed strategy, forest regions and forest districts were consulted as appropriate to confirm the potential opportunities for bringing non-merch areas into the land base, as well as to document methods and costs for achieving the inclusion of the area in the land base.
4. A draft report was prepared and presented to the Ministry of Forests for review.
5. This final report was submitted after follow-up to ministry comments.

Figure 1. Assessment Process For Areas Not Having a Strategic Plan

Acknowledgements

L. P. Atherton and Associates, a forestry consulting firm experienced in silviculture planning and analysis, was engaged by the BC Ministry of Forests to undertake this project. The contract was administered by John McClarnon of the Forest Practices Branch, BC Ministry of Forests (MoF) and funded by Forest Renewal BC (FRBC).

The consultant wishes to thank the following persons who generously gave of their time to contribute to the information contained in this review.

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MoF, Headquarters	Jim Gowriluk	Manager, Timber Tenures, Resource Tenures and Engineering Branch
	Suzann Brown	Timber Supply Forester, Timber Supply Branch
	Jon Vivian	Manager, Resources Inventory Operations, Resources Inventory Branch

Lastly, a number of both forest industry and Ministry of Forests staff attended an ‘impromptu’ discussion session of a draft of this report in Prince George on February 23, 2000. Unfortunately, an attendance record was not kept. Rather than attempting to construct an attendance list, risking leaving some people off, the consultant wishes to acknowledge and thank all those who attended.

Important Technical Notes

This review relies heavily upon timber harvesting land base data produced under the timber supply review process. Users of this report are cautioned that the order of netdowns in the derivation of the timber harvesting land base can have a significant effect in determining the area attributed to each category of non-merchantable forest type. A different netdown order may significantly shift area between two or more categories. Thus the actual amount of area in any one netdown category could potentially be considerably higher or lower than the area recorded. For example, the netdown area for deciduous stands may be stated as 5 000 ha. But the actual area in deciduous stands might be 10 000 ha's, with the difference having already been netted out as part of a riparian reserve netdown. Conversely, the netdown area for deciduous could be stated as 10 000 ha's, but the fact that 5 000 ha's of this is also in riparian reserves is not evident. Neither netdown order affects the end result from a TSR perspective.

No attempt has been made in this review to sort out the order of each netdown category of non-merchantable types. However, it is expected local experts contacted in the process of this evaluation are aware of these differences and have factored it into their perception of available opportunities and requirements for further analysis. Similarly, it is assumed that local experts have taken into account the potential biodiversity or other values of non-merchantable forest areas and that area estimates contained herein are therefore net treatable area.

**Forest Management Opportunities
in Non-Merchantable Forest Types**

Evaluation by Forest Region

Cariboo Forest Region

Regional Summary

Merchantability and resource information in the Quesnel and Williams Lake TSA's have both greatly improved between TSR1 and TSR2. As a consequence, TSR2 area netdowns for non-merchantable forest types in these TSA's are expected to be considerably lower than those of TSR1.

Of the TSR netdown categories reviewed, only the rehabilitation of repressed lodgepole pine stands offers an opportunity to further increase the timber harvesting land base through silvicultural actions. There are *possibly* 15 000 and 150 000 treatable hectares in the Quesnel and Williams Lake TSA's respectively. As a first step, surveys and assessments and overview analysis are needed to better define potential treatment opportunities. Following this, research studies and operational rehabilitation trials will be needed to assess costs and benefits.

In the 100 Mile House TSA, after allowing for the PA 16 partitioned AAC, there is no indicated potential for bringing additional non-merchantable forest type area into the timber harvesting land base through silvicultural or remeasurement activities.

100 Mile House TSA

Summary

After allowing for the PA 16 partitioned AAC, , there is no indicated potential for bringing additional non-merchantable forest type area into the timber harvesting land base through silvicultural or remeasurement activities.

Detailed review of opportunities

Data in the area column is from the TSR1 analysis report, rounded to the nearest 100 ha's. If the chief forester modified an area estimate in the AAC determination, the revised area is shown in brackets. Information in the present status column is from TSR 1 reports and discussions with Cariboo Forest Region staff.

Non-Merch Category	Area (ha)	Present Status	Conclusion
Other	137 000	<p><i>TSR 1 reports</i> - Described as too dense, unused deciduous and low site. No breakdown provided.</p> <p>Chief forester set aside a partition of 112 000 m3 in problem forest types to accommodate anticipated harvests under Pulpwood Agreement #16 (PA 16) needed for an oriented strand board (OSB) facility (1B: 22-23, 28).</p> <p><i>Regional staff</i> - It is expected that there is little additional harvesting opportunity in problem forest types after PA 16 is accommodated. There are few if any areas of younger repressed PI that would warrant spacing or rehabilitation.</p>	<p>After allowing for the PA 16 partitioned AAC, there is little area that does not contribute to the THLB. No additional opportunity.</p>

Quesnel TSA

Summary

TSR2 area netdowns for both small diameter lodgepole pine (defined as a “problem forest type” in TSR1) and non-merchantable forest types will likely be different from those in TSR1. In most cases these netdowns will be lower. About 15 000 ha’s of repressed lodgepole pine are potentially treatable. As a first step, surveys and assessments and overview analysis are needed to better define potential treatment opportunities. Following this, research studies and operational rehabilitation trials will be needed to assess costs and benefits.

Detailed review of opportunities

Data in the area column is from the TSR1 analysis report, rounded to the nearest 100 ha’s. If the CF modified these numbers in the AAC determination, the revised number is shown in brackets. Information in the present status column is from TSR 1 reports and discussions with Cariboo Forest Region staff.

Non-Merch Category	Area (ha)	Present Status	Conclusion
Low volume or poor quality conifers		<p><i>TSR 1 reports</i> – A problem forest type zone of 236 238 ha was <u>included</u> in the THLB and in the base case harvest forecast. The zone consists of stands that are outside the traditional sawlog definition and considered to be of marginal merchantability (1A:44). Associated with this zone was a pre-TSR partition of 300 000 m³/yr. The TSR1 AAC determination maintained the partitioned volume of 300 000 m³/ha/yr, targeted at PI stands of stocking class 4 and stands having an average volume of 0.1 - 0.2 m³/tree. (1B: 17)</p> <p><i>Regional staff</i> – J.S. Thrower did a PFT inventory (funded by FRBC) that reduced the total area of small PI from approx. 360 000 ha to 281 000 ha. Most of the 80 000 ha difference was reclassified to spruce. Licences are issued under the PFT partition. The specification for small PI is higher than in Williams Lake, indicating that, over time, more and more of these stands are likely to be harvested.</p>	Stands will likely prove mostly merchantable over time. TSR2 area likely significantly less. Await TSR2.

Non-Merch Category	Area (ha)	Present Status	Conclusion
Deciduous	included in "Other," below	<p><i>TSR1 reports</i> - The base case harvest forecast did not include the deciduous partitioned AAC (1A: 11). Very little harvesting has occurred under this partition since its establishment (1B: 19). The THLB includes 3 000 000 m3 of deciduous in predominantly deciduous stands (area not given, but at 250 m3/ha would equal approximately 12 000 ha) and 2 675 000 m3 of deciduous mixed into predominantly conifer stands. There is a concern regarding the merchantability of older deciduous stands. CF determines it unlikely pre-TSR deciduous AAC of 50 000 m3 could be maintained while still meeting IRM requirements and so lowers to 40 000 (1B: 19-20). CF expects district staff to further assess deciduous before next determination (1B: 19-20).</p> <p><i>Regional staff</i> – Since TSR1 much of the TSA has been re-inventoried so TSR2 figures for deciduous area could be different. The existing AAC partition is not being fully utilized, mostly due to low market demand, not because of an immediate lack of stands of acceptable quality.</p>	Await new TSR2 information. Many stands will likely prove merchantable over time.
Other (Non-merch forest types)	150 700	<p><i>TSR1 reports</i> – Definition of non-merch is based on a table included in the 1990 AAC rationale (i.e., pre-TSR1) which is not re-stated in the analysis report (1A:59). Non-merch types typically consist of unused deciduous (see above for review of deciduous), unused conifer (other than those included in the base case in the problem forest type analysis unit and zone) and low site.</p> <p><i>Regional staff</i> – In addition to deciduous, two other large area reductions would be for residual balsam stands and repressed PI.</p> <p>Resid balsam stands originate from logging in the 70's and 80's when advanced balsam regen was considered acceptable for the next crop. In TSR1 these were thought to be not performing but recent data indicates they are doing better than was thought and that they contain more spruce than previously estimated. TSR2 area deduction will likely be less.</p> <p>There are 2-3 fires W. of the Fraser river with about 15 000 ha of repressed PI. This</p>	<p>Wait for TSR2 results to further define resid balsam opportunities.</p> <p>Survey 15 000 ha of repressed or highly dense PI stands to determine opportunities and treatment prescriptions.</p>

Non-Merch Category	Area (ha)	Present Status	Conclusion
		area is included in the district RMP for surveys to determine opportunities and treatment prescriptions. Many areas will not likely be a true rehabilitation. A gradual thinning over 2-3 entries may be used to increase stand diameters and nurse the stand to merchantability. (Using costs and productivity assumptions noted in Williams Lake TSA of \$750/ha and SI 15, total cost would be \$11.3 million and benefit of 39 000 m3/yr.)	

Williams Lake TSA – Entire TSA

Summary

The TSR2 timber harvesting land base netdown for non-merchantable forest types is expected to be about ¼ of the TSR1 netdown. About 150 000 ha (about ½ of the TSR2 netdown area) consists of potentially treatable repressed lodgepole pine stands. As a first step, surveys and assessments and overview analysis are needed to better define potential treatment opportunities. Following this, research studies and operational rehabilitation trials will be needed to assess costs and benefits.

Detailed review of opportunities

Data in the area column is from the TSR1 analysis report, rounded to the nearest 100 ha's. If the CF modified an area estimate in the AAC determination, the revised area is shown in brackets. Information in the present status column is from TSR 1 reports and discussions with Cariboo Forest Region staff.

In TSR1, the 3 western supply blocks had a different definition of problem forest types because of the long hauling distance to Williams Lake. In TSR1 and TSR2, the main TSA had/will have 2 different definitions of problem forest types - one for the PA 16 area and one for the rest. In TSR2, outside of PA 16, the PFT definition will be the same for both the 3 WSB's and the main TSA.

Non-Merch Category	Area (ha)	Present Status	Conclusion
Low volume or poor quality conifers		Older cedar, hemlock and spruce stands.	
Unused conifer		Ponderosa pine, whitebark pine. (This TSA likely does not have any ponderosa pine, but the exclusion was used in the TSR analysis.)	

Non-Merch Category	Area (ha)	Present Status	Conclusion
Other	503 000 +711 600 1 214 600 (3 WSB's + main TSA)	<p><i>TSR1 reports</i> - described as low volume/poor quality, too dense, unused deciduous, unused conifer and low site. No breakdown provided.</p> <p><i>Regional staff</i> - For the upcoming TSR2, PFT's will be defined as stands below 12.5 cm DBH, below 12 or 14 m ht based on BEC zone, and not having or not capable of producing 65 m³/ha by age 160. These factors in most cases will apply only to lodgepole pine on low sites as all other species are generally on sites above these criteria. These criteria equate to using a site index of 7.0 as the lower site productivity limit. The new definition reflects current utilization.</p> <p>The new definition is expected to reduce the area netdown for non-merch stands in TSR2 to about 300 000 ha's.</p> <p>A large area of repressed pine stands from old fires will still be classified as non-merchantable. Many repressed stands west of the Fraser River exhibit a SI of 6, but the true site productivity is probably 15. Firm estimates are not available. Probably about ½ of the 300 000 ha is treatable. The other half has really low site productivity. The treatable area can be further broken down to about 75 000 ha of total rehab at about \$1,200/ha and about 75 000 ha of a mix of rehabilitation and spacing (space and leave for 100 years) at about \$750/ha, plus 1 or more fertilizations if nutrient augmentation proves beneficial (total cost \$146.3 million; long-term benefit 390 000 m³/yr based on planting 1 yr old PI @ 1 800 sph – TIPSYS ver 2.1e, standard OAF's, SI 15, 2 yr regen delay). First step would be an overview assessment using GIS analysis.</p> <p>Lignum IFPA has not expressed any interest in PI rehab. Treatment would provide substantial employment opportunities for Chilcotin native crews.</p>	<p>TSR2 netdown area greatly reduced from TSR1 due to increased utilization.</p> <p>Overview analysis of up to 300 000 ha's needed to define treatment opportunities and priorities.</p>

Kamloops Forest Region

Regional Summary

Some of the area deducted from the TSR1 timber harvesting land base (THLB) will be included in the TSR2 timber harvesting land base (THLB). Refinement of utilization levels, partitioned AAC, and localized inventories (many funded by FRBC) have already resulted in the increased opportunities.

Some potential may still exist in the 46 000 ha's of deciduous forest in the Kamloops TSA that was deducted under TSR1 (some of this is covered under Pulpwood Agreement 16). An extensive vegetation resources inventory is required before any further merchantability or forest management potential can be identified in the Region's TSAs. Areas may then be identified for possible silviculture expenditures to either enhance or rehabilitate current conditions.

Kamloops TSA

Summary

About 46 000 ha of deciduous area needs an extensive vegetation resources inventory before any further merchantability or forest management potential can be identified.

Detailed review of opportunities

Non-Merch Category	Area (ha)	Present Status	Conclusion
NC Brush	3 366	Regional personnel were not familiar with this area. Likely is adjacent to avalanche chutes in the Clearwater District.	No known opportunity.
Low volume or poor quality conifers	165 743	A new sawlog definition under TSR2 will result in much of the area being reclassified to sawlog. The remainder includes area available to Pulpwood Agreement 16 (PA 16) or cedar/hemlock partitions. Any that might be still remaining may be looked to by the Innovative Forest Practices Agreement (IFPA) holder as a potential source for an AAC increase. The IFPA, covering the Adams Lake drainage, contains about 10% of the TSA timber harvesting land base (THLB).	Will be included in TSR2 land base or covered under PA 16 or cedar/hemlock partition.
Deciduous	46 135	These stands not in the Clearwater District may be subject to PA 16. Some areas are likely to have a spruce understory. The amount of deciduous could change under TSR2 following depletion updates, surveys, etc. Over the years there have been two birch harvesting and milling companies that have not succeeded.	Some opportunity. Needs mapping and re-inventory.
Low site	32 902	Mostly dry-belt Douglas-fir that is short, open-grown and of poor quality. This timber may be available for harvesting under PA 16.	Limited opportunity.

Lillooet TSA

Summary

No opportunities identified.

Detailed review of opportunities

A timber harvesting land base netdown has been undertaken as part of the Lillooet Land and Resource Management Planning (LRMP) process. This offers more current data than that of TSR1. The LRMP timber harvesting land base is approximately 295 000 ha. This is an increase from TSR1 due to the inclusion of Pulpwood Agreement 16 and the availability of terrain class information to replace current ESA designations for soil sensitivity. The area column below shows the TSR1 area for each category followed by the draft LRMP netdown figure in brackets.

Non-Merch Category	Area (ha)	Present Status	Conclusion
NC Brush	0 (532)*	Unknown. Small area. Assume no opportunity.	No opportunity.
Low volume or poor quality Douglas-fir	53 106 (4 870)*	TSR 1 did not have operability classifications available but TSR 2 will. It is expected that most of this area will be deducted in TSR2 under the inoperable classification. LRMP netdown data supports this expectation, having a greatly reduced area in this category (LRMP inoperable is 98 520 ha).	Limited opportunity.
Deciduous	2 924 (not available)*	Relatively small area. Likely in broken patches, in the riparian zone or valued for biodiversity.	Limited opportunity.
Low site	28 514 (38 682)*	Existing criteria for sawlogs are very low in the Lillooet TSA. Classifications are likely correct because the TSA was re-inventoried about 10 years ago. What little opportunity there is may be covered under PA 16. The LRMP area is considerably higher due to the different netdown order from TSR1.	Limited opportunity.

* Draft LRMP netdown figures.

Merritt TSA

Summary

A small-wood inventory, funded by FRBC, was completed in 1995. The results of the inventory are reported in the *Merritt Smallwood Inventory Report* (January, 1995).

Some unquantified opportunity may be presented by the approximately 23 400 ha's netted out of the timber harvesting land base as unused conifers. This may be explored through the Merritt IFPA.

Detailed review of opportunities

Non-Merch Category	Area (ha)	Present Status	Conclusion
NC Brush	3 157	Regional personnel were not familiar with this area. Very small area in comparison with a 600 000 ha TSA.	No known opportunity.
Low volume or poor quality	42 981	New research (<i>Merritt Drybelt Douglas-fir</i> , funded by FRBC) has evaluated approximately 40 000 ha of these types. Some of this area is being rolled back into the THLB. This was done as part of the interim AAC uplift determination effective Jan 1/99 for recovery of fire and beetle damaged timber. This inclusion will be continued in TSR2.	Part of this area now included in the THLB.
Dense lodgepole pine	108 493	In the TSR1 AAC determination, the chief forester created a partition for small diameter pine associated with this area. This partition effectively brings these excluded pine stands back into the timber harvesting land base.	Included in the THLB as an AAC partition.
Deciduous	6 703	These areas are likely aspen fringes on the edges of open range or within riparian zones. It is a small area relative to a large TSA and is likely to be valued for biodiversity.	No opportunity.
Other unused conifers	23 403	This area is occupied by a variety of unused conifer types, such as low-site spruce and balsam stands and short, old yellow pine stands. Regional personnel could not identify any significant opportunity. If there is an opportunity, they expect IFPA holders will be targeting it.	Some unquantified opportunity. May be explored through IFPA.

Okanagan TSA

Summary

The utilization of small timber is very high in this TSA. The region/districts are piloting an “Enhanced Utilization” timber sale for pre-logging trees that are below the utilization standards of 12.5 cm DBH for lodgepole pine and 15 cm for other species.

Detailed review of opportunities

Preliminary TSR2 netdown figures are shown in brackets in the area column as applicable.

Non-Merch Category	Area (ha)	Present Status	Conclusion
NC Brush	5 196 (7 300)	Regional personnel were not familiar with this area. Very small area in comparison with 1.5 million ha's of Crown forest in the TSA.	No known opportunity.
Low volume or poor quality hemlock, lodgepole pine and other conifers	120 013 (62 512)	Approximately 35 000 ha of He and PI were re-introduced into the THLB after localized inventories (funded by FRBC) were completed in 1988. In TSR2 10 400 ha of old He and 37 600 ha of PI are still considered non-merchantable types. Further inventory work in the Penticton District may result in additional PI areas returning to the timber harvesting land base	Limited opportunity, requires additional inventory information.
Deciduous	33 669 (36 314)	Two birch peeling plants have failed to survive in the Kamloops region. Were the order of the THLB netdown process done differently, this area may be part of the riparian netdown. Any opportunity for these stands needs to be verified by an inventory showing their current condition and specific location.	Limited opportunity, requires additional inventory information.
Low site	11 797 (17 576)	Approximately 14 500 ha of Low SI sites are greater than 140 years of age. If these sites are harvested or rehabilitated, the regeneration could have a higher SI based on the OGSi project.	Further inventory required to verify possible opportunity.

Nelson Forest Region

Regional Summary

Limited opportunities are identified for expanding the timber harvesting land base through incremental silviculture or other means. Many netted out stands also contribute to biodiversity and riparian values. Others are expected to become merchantable some time in the future.

Identified opportunities are:

Arrow TSA - Some opportunities may exist for converting 2 000 ha of deciduous to coniferous forest and in afforestation of 500 ha of fume kill areas. These may increase the THLB by 1-2%. Presumably these opportunities will be pursued by the Arrow licensees through the IFPA.

Boundary TSA - Some potential may exist associated with deciduous stands and areas classified as having low-site. District staff are awaiting TSR2 definition of these areas before considering further.

Cranbrook TSA - About 2 000 ha (equal to about 0.5% of the THLB) of dense pine stands could be rehabilitated. About 27 000 ha of older non-merchantable stands that are excluded from the THLB need further evaluation to identify potential opportunities.

Golden TSA - A special inventory is required to better define the opportunities associated with approximately 13 200 ha of low volume and/or low-site stands.

Invermere TSA - A ground-level evaluation of dense pine stands is planned in the EFMPP area. Otherwise, no opportunities were identified.

Kootenay Lake TSA - Surveys of about 5 000 ha of NC Brush, 5 000 ha of aspen stands and 32 500 ha's of low-site stands required to determine proper classification/potential.

Revelstoke TSA - About 1 000 ha of birch stands require surveys. In his recent AAC rationale, the chief forester requires evaluation of ESA area reduction factors (2 300 ha of which is applicable to stands classified as having regeneration difficulty).

Arrow TSA

Summary

Some opportunities may exist for converting 2 000 ha of deciduous to coniferous forest and in afforestation of 500 ha of fume kill areas. These may increase the THLB by 1-2%. Presumably these opportunities will be pursued by the Arrow licensees through the IFPA.

Recent and planned initiatives

Arrow TSA licensees have entered into innovative forest practices agreements (IFPA's) under the *Forest Act*. The joint Forestry Plan submitted by all the licensees includes a variety of projects for researching opportunities associated with non-merchantable forest types. The majority if not all of these projects will be eligible for funding under FRBC's IFPA funding envelope.

Detailed review of opportunities

The area data in the table below is from the document, *Technical Report, Arrow IFPA Base Case Analysis Final Report*, rounded to the nearest 100 ha's. The IFPA report is considered more current than TSR1 information. (Appendix I of this report is from TSR1 sources.) Information in the present status column is from *Arrow Timber Supply Area Interim Silviculture Strategy - version 1.1*.

Non-Merch Category	Area (ha)	Present Status	Conclusion
Low volume or poor quality conifers	3 100	Mostly old cedar/hemlock, balsam and lodgepole pine stands. The potential for these areas to contribute towards old growth management areas needs determination before they could be considered for harvesting or rehabilitation.	Further information required.
Deciduous	8 300	Mostly birch. Deciduous areas are considered valuable towards meeting biodiversity objectives. About 2 000 ha (1% of THLB) could potentially be eligible for conversion to coniferous species. [Re-check this finding after district review of the draft strategy].	Potential to increase THLB by 1%.
Low site	1 800	Relatively small area. Arrow forest licensees will be reviewing a map produced by MoF showing the location of these sites to determine if there is any potential.	Further information required.
Other (Fume Kill)	500	There is a substantial area of fume kill from the smelter in Trail. The Arrow forest licensees have proposed a trial rehabilitation project of 100 ha/yr for 2 years.	Undergoing trial.

Boundary TSA

Summary

Some potential may exist associated with deciduous stands and areas classified as having low-site. District staff are awaiting TSR2 definition of these areas before considering further.

Detailed review of opportunities

Data in the area column is from TSR1, rounded to the nearest 100 ha's. Information in the present status and conclusion columns is from *Boundary Timber Supply Area Interim Silviculture Strategy - version 1.1*.

Non-Merch Category	Area (ha)	Present Status	Conclusion
NC Brush	600	Not reviewed. Relatively small area.	No opportunity.
Low volume or poor quality conifers	14 200 (6 218)	The excluded area is mostly dense lodgepole pine. A district dense pine study (funded by FRBC) has reduced the non-merch area to 6 218 ha, which will be accounted for in TSR2. Some of these stands may prove merchantable through post and rail sales either now or in the future. Otherwise it is likely they could contribute to biodiversity objectives.	Some areas may prove harvestable. No immediate rehabilitation potential.
Deciduous	3 400	The condition of these stands is not known. Some may be harvestable, some may be suitable for conifer release, some may be best allocated to meeting wildlife habitat objectives, while others may be suited to continuous deciduous management. The conclusion stated in the interim strategy is to wait for TSR2 results to redefine the extent of the excluded deciduous area.	Awaiting TSR2 definition of extent of excluded deciduous area before considering further.
Low site	3 600	The conclusion stated in the interim strategy is to wait for TSR2 results to redefine the extent of the excluded low-site area.	Awaiting TSR2 definition of extent of excluded low-site area before considering further.

Cranbrook TSA

Summary

About 2 000 ha (equal to about 0.5% of the THLB) of dense pine stands could be rehabilitated. About 27 000 ha of older non-merchantable stands that are excluded from the THLB need further evaluation to identify potential opportunities.

Detailed review of opportunities

Data in the area column is from the TSR2 analysis report. Information in the present status column is from *Cranbrook Timber Supply Area Interim Silviculture Strategy - version 1.1* which was based on preliminary TSR2 area data.

Non-Merch Category	Area (ha)	Present Status	Conclusion
NC Brush	3 800	No information reported other than “no opportunity.”	No opportunity.
Too dense	21 700	Mostly short, small-diameter lodgepole pine. Some stands may prove merchantable in periods of high pulp prices. Plan to rehab about 10% of the most non-merch stands or 2 000 ha (equivalent to about 0.5% of the THLB).	Opportunity to rehab 2 000 ha's, & increase the THLB by about 0.5%.
Deciduous		Part of the excluded category. Important for wildlife and for contributing to biodiversity. No opportunity.	No opportunity.
Low site	38 500	An FRBC-funded study of low-site stands has identified 3 million m3 of additional volume that has been previously netted out of the timber supply. Many low-site stands have now been re-classified. These remaining stands are seen as the worst of the worst. There is no potential to increase the productivity of these stands.	No further opportunity.
Other - Excluded	28 600	Consists of old, non-merch cedar, hemlock, spruce and balsam stands, deciduous stands (see above), or high elevation stands. Old forests can contribute to biodiversity. No immediate opportunity. A need to further examine these areas for opportunities was identified.	Need to further examine excluded areas for opportunities.

Golden TSA

Summary

A special inventory is required to better define the opportunities associated with approximately 13 200 ha of low volume and/or low-site stands.

Detailed review of opportunities

Data in the area column is from the TSR2 analysis report, rounded to the nearest 100 ha's. If the CF modified these numbers in the AAC determination, the revised number is shown in brackets. Information in the present status column is from *Golden Timber Supply Area Interim Silviculture Strategy - version 1.3* and from the TSR2 AAC rationale statement.

Non-Merch Category	Area (ha)	Present Status	Conclusion
NC Brush	2 100	Likely associated with avalanche tracks and does not offer potential for rehabilitation.	No opportunity.
Low volume or poor quality conifers	1 300	Mostly older hemlock stands. There are many options for the management of these stands, including leaving to satisfy old-seral requirements. Further analysis is required.	Further analysis of opportunities required.
Deciduous	10 600 (6 100)	Mostly aspen. CF found that about 4 500 ha likely has a coniferous understory and should not have been deducted. The silviculture strategy notes that about 1 600 ha is in ESA. Remainder is likely suited to hardwood management. Aspen is important for wildlife.	No opportunity.
Low site	9 700 (11 900)	Mostly spruce or cedar stands. CF found the TSR2 THLB to be over-estimated by having wrongly included about 2 200 ha of low-site mature spruce. See Appendix I for further details. The silviculture strategy notes a need for an expert inventory to refine estimates/classification of low site stands.	Expert inventory required.

Invermere TSA

Summary

A ground-level evaluation of dense pine stands is planned in the EFMPP area. Otherwise, no opportunities were identified.

Detailed review of opportunities

The White and Lussier river drainages, which cover about 20% of the Invermere TSA have been the subject of the Invermere EFMPP. Many studies, funded by FRBC, have been completed to improve information about this area.

Data in the area column is from the TSR1 analysis report, rounded to the nearest 100 ha's. Where available, preliminary TSR2 data is also given in brackets. Information in the present status column is from *Invermere Timber Supply Area Interim Silviculture Strategy - version 1.1*.

Non-Merch Category	Area (ha)	Present Status	Conclusion
NC Brush	800		Not reviewed
Low volume or poor quality conifers	15 400 (4 800)	In the TSR1 AAC determination the CF found there was potential for some of the non-merch types to become merch and factored this into the determination. The TSR2 figure is considerably lower and generally consists of low volume lodgepole pine stands. An EFMPP study found no identifiable opportunities but a ground-level evaluation is planned.	No immediate opportunity. Ground-level evaluation planned.
Deciduous	3 500 (4 000)	Mostly aspen. These areas are valuable for meeting biodiversity objectives.	No opportunity.
Low site	7 900 (2 100)	These stands are very low in productivity and are not capable of growing merchantable trees.	No opportunity.

Kootenay Lake TSA

Summary

Surveys of about 5 000 ha of NC Brush, 5 000 ha of aspen stands and 32 500 ha's of low-site stands required to determine proper classification/potential.

Detailed review of opportunities

Data in the area column is from the TSR1 analysis report, rounded to the nearest 100 ha's. Information in the present status column is from *Kootenay Lake Timber Supply Area Interim Silviculture Strategy - version 1.1*.

Non-Merch Category	Area (ha)	Present Status	Conclusion
NC Brush	5 000	These areas have wildlife habitat potential. Few large contiguous areas that lend themselves to treatment. More info needed.	More info needed.
Low volume or poor quality conifers	5 000	Not reviewed in the strategy. Assume no potential.	No potential.
Deciduous	11 500	Mostly aspen and cottonwood in lower areas. About 5 000 is aspen. Rehabilitation/ conversion to conifer would have impacts on wildlife and green-up. Survey required to determine the overall opportunities.	Survey of aspen stands required.
Low site	32 500	Need to survey these stands to determine how many are actually low site vs how many are mis-classified. Estimated cost: \$140 000.	Survey required.

Revelstoke TSA

Summary

About 1 000 ha of birch stands require surveys. In his recent AAC rationale, the chief forester requires evaluation of ESA area reduction factors (2 300 ha of which is applicable to stands classified as having regeneration difficulty).

Detailed review of opportunities

Data in the area column is from the TSR2 analysis report, rounded to the nearest 100 ha's. If the CF modified these numbers in the AAC determination, the revised number is shown in brackets. Information in the present status column is from *Revelstoke Timber Supply Area Interim Silviculture Strategy - version 1.2* and from the TSR2 AAC rationale statement.

Non-Merch Category	Area (ha)	Present Status	Conclusion
NC Brush	100		Not reviewed.
Low volume or poor quality conifers	4 900	Mostly highly decadent old hemlock with > 50% decay and are spread throughout the TSA. May become merch in periods of high pulp prices. Only potential for rehab would be in those landscape units having an old-growth surplus.	No immediate opportunity.
Too dense			
Deciduous	1 600 (1 000)	Mostly birch. CF found about 600 ha to have a conifer understory and should be included in the THLB. Silviculture strategy document notes a survey of these stands is required to determine their potential.	Survey required.
Low site	1 200	No potential.	No opportunity.
Other – ESA regeneration difficulty	2 300	Area classified as ESA having high regeneration difficulty and 90% excluded from THLB. In the TSR2 AAC rationale, the CF recommends staff examine these areas (reference is to all ESA's, not just regen difficulty) and refine reduction factors.	Reduction factors require refinement.

Prince George Forest Region

Regional Summary

Forest Inventories in the Peace region and Mackenzie TSA's

Although not within the scope of this project, the opportunities presented through investing in strategic resource inventory information in the Peace region TSA's (Fort Nelson, Fort St. John and Dawson Creek TSA's) and the Mackenzie TSA so obviously outweigh rehabilitation of NC Brush areas that they cannot go without mention. Inventory information in these areas is often 30 years old and was done to the standards of the time. Poor inventory information also makes assessing silvicultural opportunities to expand the timber harvesting land base a difficult task.

Strategic resource inventory activities would cost considerably less than incremental silviculture activities and have the potential to immediately expand the timber harvesting land base in these management units. Incremental silviculture, on the other hand, is relatively much more expensive and is more likely to improve timber supply in the long term than in the short term. (Nevertheless, maintaining at least the current level of incremental silviculture is essential to developing knowledge, experience, and growth and yield information. This information will be important for planning future treatments once strategic reasons for large-scale operations are identified.)

Strategic resource inventories offer the potential to expand the timber harvesting land base in two ways. First, such inventories could better define the extent of those tree species that are currently considered merchantable. For example, it is believed that large areas typed as black spruce contain merchantable pockets of white spruce stands within them. Also, in the Fort Nelson TSA, it is believed that there may be more merchantable aspen stands (and that aspen grows at much better rates) than the current inventory indicates. Without reasonably sound information, however, the chief forester is unlikely to consider increasing AAC's.

The second potential for strategic inventory to expand the THLB is in quantifying opportunities in tree species that are not currently utilized. These species are aspen in the Mackenzie TSA, and birch and black spruce in the Peace region TSA's. Mistyping and species succession since the time of the last inventories makes current inventory estimates unreliable. Hence, quantifying the opportunities for sustainable harvesting of these species is also difficult.

Maintenance of Existing NCBr rehabilitation and backlog NSR rehabilitation sites

Several interviewees commented on the fact that existing rehabilitated NCBr and NSR sites in the Peace River region are not being adequately monitored and that there is a risk of losing some sites.

Rehabilitation of NC Brush areas

The above comments regarding the forest inventory notwithstanding, substantial opportunities to rehabilitate NC Br areas exist in all TSA's except Robson Valley. These are estimated in the table below. In most cases further surveys and analyses are required to refine these estimates. Nevertheless, except in the Prince George TSA, there is sufficient proven performance and experience in NCBBr rehabilitation to be confident that there are indeed substantial treatable areas which will exhibit at least a medium site index response. An estimated \$136 million investment could increase long term harvest levels in five TSA's by an estimated combined total of 331 000 m³/yr. This is equivalent to or greater than the total AAC of many TSA's elsewhere in the province.

TSA	Total NCBr (Ha)	Treatable NCBr (Ha)	Cost @ \$2,000/Ha (\$000,000's)	MAI for SI 18 S¹ (m³/ha/yr)	Potential LTHL gain² (m³/yr – 000's)
Dawson Creek	63,200	15,000	30	4.24	64
Fort Nelson	598,200	30,000	60	4.24	127
Fort St. John	158,000	8,000	16	4.24	34
Mackenzie	69,900	10,000	20	4.24	85
Prince George ³	83,100	5,000	10	4.24	21
Robson Valley	2,400	0	-	-	-
Total	974,800	68,000	136		331

¹ Based on TIPSYS ver 2.1e, standard OAF's, initial stocking of 1600 sph planted with 1 yr regen delay, 12.5 cm DBH utilization.

² Has not to date been actively considered as an opportunity.

³ LTHL – long term harvest level

Prince George and Robson Valley TSA's

In the Prince George and Robson Valley TSA's, many conifer forest types deducted in the THLB net down process contribute towards biodiversity requirements, or else are considered too difficult to regenerate. Both TSA's have an unutilized aspen resource but these are expected to become merchantable in time. Inventories in these units are generally considered reliable. Other than the possibility of rehabilitating NCBBr in the Prince George TSA (which requires further confirmation), no opportunities for incremental silviculture to bring areas into the timber harvesting land base were identified.

Dawson Creek TSA

Summary

Possibly 15 000 ha of NCBr could be afforested at a cost of \$2 000/ha. Black spruce is not a currently utilized species and presents an opportunity. Further analysis is required to determine extent of both of these opportunities.

Detailed review of opportunities

Data in the area column is from the TSR1 analysis report, rounded to the nearest 100 ha's. If the CF modified these numbers in the AAC determination, the revised number is shown in brackets. Information in the present status column is primarily from TSR1 documents and discussions with Prince George Forest Region staff.

Non-Merch Category	Excluded Area (ha)	Present Status	Conclusion
NC Brush	63 200	<p><i>TSR1 reports</i> – no info.</p> <p><i>Regional staff</i> - not familiar with this type. Check with Rod Kronlachner, LIM Officer, 784-1256.</p> <p><i>Rod Kronlachner</i> – The district treated several thousand ha's in the late '80s, a good portion of which was in the TFL. About 500 ha's treated in the TSA in last 5 yrs, but some may have been NSR. No current strategy on this. Other than where re-labelled as a result of depletion updates, the inventory is generally poor in the Peace and Moberly PSYU's. Much of the area labelled NCBr is actually NPBr or is in immature aspen. Possibly ¼ of the area is treatable at \$2000/ha. Treatment is cut, pile, burn, some mounding, plant, some herbicide brushing. Most of the late 80's work is showing a SI of at least 16, often 20.</p>	Possibly 15 000 treatable ha's at a cost of about \$2 000/ha.
Too dense	<p>PI stocking class 4: 15 600</p> <p>PI stocking class 3: 100 000 (147 000)</p>	<p><i>TSR1 reports</i> –</p> <p><u>Stocking class 4 PI:</u> 15 600 ha of mature, overstocked PI deducted from the base case (assumed to be PI stocking class 4).</p> <p><u>Stocking class 3 PI:</u> stands 17.5 to 19.4 m tall and yielding ≥ 120 m³/ha. are considered merch (under an AAC partition). On this basis approx. 119 000 ha of PI stocking class 3 was included in THLB and 100 000 ha excluded. Following a field-</p>	Excluded PI stocking class 3 expected to either become merchantable (considerable opportunity area of 147 000 ha) or contribute to caribou habitat. No immediate

Non-Merch Category	Excluded Area (ha)	Present Status	Conclusion
		<p>based assessment of stocking class 3 PI stands, CF found these included/excluded areas to be over/under-estimated by a net 47 000 ha respectively. Thus the area inside the THLB should be 72 000 ha and the area outside 147 000 ha.</p> <p>Partition of 110 000 m3/yr attributable to harvesting in the approx. 72 000 ha of <u>small diameter PI that is within the THLB</u>. 100 000 of the 110 000 m3/yr partition is under licence.</p> <p><i>Regional staff</i> – Much of the 72 000 ha is medium to high value caribou habitat. There is concern that the 110 000 m3/yr partition is optimistic, but need to wait and see what actual harvesting experience is.</p>	silvicultural opportunities.
Deciduous		<p><i>TSR 1 reports</i> - Deciduous partition of 886 500 m3/yr. Some deciduous stands deducted from THLB as low volume (< 120 m3/ha), or low site productivity (aspen SI < 7, cottonwood SI < 14). All birch and alder deducted. Deciduous area deducted not given in TSR1 reports (deducted area included in "other" below).</p> <p><i>Regional staff</i> – Very little deciduous deducted. TSR1 forecast deciduous AAC to drop 35% over next 2 decades. Any expansion of deciduous usage would go towards maintaining existing AAC. No opportunity.</p> <p><i>Rod Kronlachner</i> – The district would not consider a program to rehab aspen. Now looking at accepting deciduous on backlog NSR areas. Possibly 25% of treatable NSR areas could be accepted as aspen.</p>	No opportunity. Stands will either eventually become merchantable or succeed to spruce.
Other	262 900	<p><i>TSR 1 reports</i> – Area of 262 900 ha includes deciduous and "too dense" PI. See "deciduous" and "too dense" above. Following is with respect to non PI conifers only. Includes areas of low productivity, mature stands <17.5 m tall with a vol. <120 m3/ha, immature stands (>40 & < 140 yrs) < specific min. site indexes by species groups, all larch and black spruce leading-species stands.</p> <p><i>Regional staff</i> – Not much larch. Talk to Dick Nakatsu re accuracy of site classifications in all Peace units & N. end of Mackenzie</p>	Black spruce leading species stands are not currently utilized and present an opportunity. Analysis required to determine extent of opportunity.

Non-Merch Category	Excluded Area (ha)	Present Status	Conclusion
		<p>TSA. No one is utilizing black spruce other than when it is a minor component of a stand of other species. Talk to Dick re accuracy of Sb classification/yield in inventory.</p> <p><i>Dick Nakatsu</i> – All three species of spruce are treated the same in the inventory for volume prediction. White spruce (Sw) and Engelmann spruce (Se) have similar characteristics, so for these, this does not matter. Black spruce (Sb) has a smaller form and lower LRF and so its volumes are likely over-estimated. This does not matter when Sb is totally netted out of the THLB, but does matter when considering its future merchantability. Dawson Ck inventory is not as old as the others. It is in the 2nd of a 3-year phase II inventory sampling. The inventory audit found there was 19% more volume on the ground than estimated by the inventory. 60% of this was due to model error and 40% to wrong classification.</p>	

Fort Nelson TSA

Summary

Due to the poor state of the forest inventory (old and completed to old standards) and the limited harvesting history there is much uncertainty with respect to forest productivity and timber merchantability in the TSA. Substantial areas of aspen stands may be larger or more productive than the inventory indicates. Other stands have changed from aspen to spruce since the old existing inventory was done. Some productive forests are excluded because they are incorporated inside very large excluded polygons typed as black spruce.

The opportunity exists to rehabilitate up to 30 000 ha of NCB_r areas at a cost of about \$60 million. However, because of the poor state of the inventory, the extent of these opportunities and their relationship to the existing AAC are difficult to quantify.

Opportunities may exist to extend merchantability to birch and black spruce. A partial and focused re-inventory in accordance with the district strategic inventory plan appears to have greater potential investment returns than incremental silviculture investments. Such an inventory would be the logical first step in setting the context for future incremental silviculture investment decisions.

Detailed review of opportunities

Data in the area column is from the TSR1 analysis report, rounded to the nearest 100 ha's. If the CF modified these numbers in the AAC determination, the revised number is shown in brackets. Information in the present status column is from TSR 1 reports and the TSR2 Information Report and Data Package, field trip notes by J. McClarnon (Word file "FortNelson" created August 20/99) and discussions with Prince George Forest Region and Forest Nelson Forest District staff.

Non-Merch Category	Area (ha)	Present Status	Conclusion
NC Brush	598 200	<p><i>TSR1 reports</i> – no information.</p> <p><i>McClarnon</i> - District proposes a small program of rehabilitating 2 500 ha over 10 years. Talk to Steve Lindsay. 774-5520.</p> <p><i>Regional staff</i> – TSR 2 deduction will still be in the order of 500 000 ha. At most, ¼ of this would be available for silviculture treatment. Steve Lindsay may know how much brush has potential for conversion.</p> <p><i>Steve Lindsay</i> – Did NCB_r rehab in mid-80's under FRDA. These sites are showing excellent growth, with SI's possibly ranging up to 20 (SI measurements have not been taken).</p> <p>About 50% of NCB_r is actually NP. Another 40% is either too wet or has</p>	About 30 000 treatable ha's at about \$2,000/ha – total potential cost \$60 million.

Non-Merch Category	Area (ha)	Present Status	Conclusion
		<p>stocking under it. This leaves 5-10% (30-60 000 ha's) as potentially treatable. More comfortable with the lower number. Treatable areas could be identified fairly quickly by helicopter recce.</p> <p>Rehab cost would be about \$1,800 to \$2,000/ha. However, funding decisions should be made in a strategic context and compared with other opportunities such as improved inventory.</p>	
Low volume or poor quality conifers	1 040 600	<p><i>TSR1 reports</i> – no information.</p> <p><i>TSR2 data package</i> – Site index cut-offs are spruce 10.8, balsam – 10.7, pine – 16.4.</p> <p>Regional staff – Over time some of this area will become economical to harvest. The timber harvesting land base, and the LTHL will increase commensurately. However, until the inventory is redone (due to the uncertainty in the inventory), the Chief Forester is likely to have reservations with respect to increasing the AAC as these stands become economically viable.</p>	
Deciduous	625 400 (571 800)	<p><i>TSR1 reports</i> - Over 550 000 ha is leading aspen stands which should only be included in the THLB after “further study.” (p 25 of TSR1 supplemental report) Over time some of this area will become economical to harvest. The timber harvesting land base, and the LTHL will increase commensurately. However, until the inventory is redone (due to the uncertainty in the inventory), the Chief Forester is likely to have reservations with respect to increasing the AAC as these stands become economically viable</p> <p><i>TSR2 reports</i> – A sensitivity analysis will be done to analyze the harvesting potential of birch stands above SI 17.0. Aspen stands above SI 17.7 are included in the THLB.</p> <p><i>McClarnon's notes:</i></p> <p>On the east side of the district there are extensive areas supporting thrifty aspen stands. The inventory site classes on the forest cover maps result in exclusion of these timber types from the THLB. Based on observation of growth rates it is anticipated that a significant proportion of</p>	<p>Opportunities exist, but are difficult to quantify due to the poor inventory. A re-inventory in accordance with the strategic inventory plan is needed.</p> <p>A special survey would likely be useful to assess the merchantability/ productivity of aspen stands below the TSR2 SI cut-off of 17.7. Await release of TSR2 info.</p>

Non-Merch Category	Area (ha)	Present Status	Conclusion
		<p>this area should be included in the THLB.</p> <p><i>Regional staff</i> – Area of aspen that is included/excluded is sensitive to the site index cut-off used in the analysis. There is a significant amount of area in aspen that is below the aspen SI cut-off but above the spruce and balsam cut-offs. Ground sampling would be needed to check those stands below the cut-off to determine their productivity/merchantability. Have to await release of TSR2 info to identify the area of opportunity. (Licensee's do not rely that heavily on the site productivity noted in the inventory – they pick out a lot of the stands they are going to harvest from the air. Thus, "Ground sampling" may not provide much additional information – check with district staff and licensee.)</p> <p>Birch stands present an opportunity. They are not being used and are not included in the deciduous partition. One company was unsuccessful in its attempts to use it for OSB. Birch successional is now aspen.</p> <p><i>Dick Nakatsu</i> – Aspen grows very well in the TSA. Can reach 27-31 m in 60 years. There is a lot more S than the inventory indicates, coming up under the aspen. Need to work from the air, not air photos, when leaves are off the trees so you can see the spruce. Inventory is so out of date, even the base maps are incorrect. Ft. Nelson has a strategic inventory plan, but funding is another matter. Under the plan, would map 1.5-2.0 million ha over 5 years. The TSA is over 8 million ha. To inventory all of it would cost \$10-15 million.</p>	

Non-Merch Category	Area (ha)	Present Status	Conclusion
Low site	386 800	<p><i>Regional staff</i> – There is no site series info on the inventory file. About 2/3rds of this is Sb which is not currently a utilized species. If Sw productivity rules were applied, a lot of this area would probably be considered productive. Very wet Sb sites are hard to regenerate, so need to be able to differentiate between wet and dry stands. A study of this problem might be useful.</p> <p><i>Dick Nakatsu</i> – A vegetation resources inventory would classify wet or dry. The current standard is ecological subzone. Getting site series would be very expensive. Site series info is available in areas that have TEM mapping. If the info were available, adding it to the inventory would be easy if the inventory has a proper TRIM base.</p>	See above comments re inventory need.
Other – Broad typing of spruce stands		<p><i>McClarnon notes:</i></p> <p>Inventory information for the TSA is very old, being based on 1940's photography, 1950's typing. Some areas have very large single polygons of several hundred hectares typed as Sb/Sx. These areas contain a wide range of stand and site conditions (productive and excluded types) and would be stratified into many different polygons by today's inventory standards. The CF has expressed concern with the implications of including these areas in the THLB. The TSR 2 determination for these stand types will need to be reviewed. If excluded from the THLB, investment could be made into a project based inventory to specifically re-inventory landscape units with a relatively high proportion of these polygons. A somewhat similar issue occurs in some polygons where the spruce labeling incorporates adjacent Sb swamp types.</p>	Await TSR2 results and AAC determination.

Non-Merch Category	Area (ha)	Present Status	Conclusion
Other – NP Burn	???	<i>McClarnon notes:</i> Old fires in the district were often automatically classified as NP. These labels have not been updated since the original disturbance. Potential exists for classification to productive types through a re-inventory. However this is not considered to be of a sufficient scale to have much impact.	Lesser opportunity area may make reclassification surveys a lower priority.

Fort St. John TSA

Summary

While there may be substantial opportunity to expand the timber harvesting land base, poor inventory information makes the opportunity difficult to quantify as well as place in perspective. Every contact person commented on the poor state of the inventory. A district strategic inventory plan exists, but it is minimally funded.

The state of the inventory notwithstanding, an opportunity exists to expand the THLB through rehabilitation of about 8 000 ha of NCB_r areas. Another opportunity is to re-inventory and re-classify islands of productive area within large areas classified as Sb or NP Burn.

Low volume lodgepole pine stands appear to move in and out of the timber harvesting land base depending upon market factors. The extent of potential opportunities in deciduous and low-site stands can be better judged once TSR2 information is available.

Detailed review of opportunities

Data in the area column is from the TSR1 analysis report, rounded to the nearest 100 ha's. If the CF modified these numbers in the AAC determination, the revised number is shown in brackets. Information in the present status and conclusion columns is from TSR 1 reports, field trip notes by J. McClarnon (Word file "FtStJohn" created August 9/99) and discussions with Prince George Forest Region and Fort St. John Forest District staff.

Non-Merch Category	Area (ha)	Present Status	Conclusion
NC Brush	158 000	<p><i>TSR1 reports</i> - CF notes these areas deducted because it is unlikely they can convert to commercial forests. (1B:12)</p> <p><i>McClarnon notes:</i></p> <p>Summary of discussion with Brian Farwell / Silviculture Officer</p> <p>Previously treated a lot of this forest type. Areas were shear piled and planted / sprayed or site prepared/ planted/ sprayed. Site intercept assessment of older treated areas indicates site indices higher than 20. MELP / First Nations have concerns with the treatment. Issues of concern to MELP can likely be resolved . First Nations not likely to accept herbicide spraying.</p> <p>Potential for other treatment area is high. No estimates available. Inventory/surveys required to strategically plan. Also there is potential that a portion of the area may satisfy backlog stocking requirements (in</p>	<p>Most of this area is actually NP. There are potentially 6-8 000 treatable ha. Need inventory/ surveys to plan. [Need details on area, \$/ha, total \$.]</p>

Non-Merch Category	Area (ha)	Present Status	Conclusion
		<p>the range of 300 well spaced per hectare).</p> <p><i>Regional staff</i> – licences are issued and licensees are in the process of constructing mills so AAC can be considered fully committed.</p> <p>Don't know how much of this area might be due to past harvesting. Ask Roger St. Jean, FPC/Harvesting Officer, 787-5645.</p> <p><i>Roger St Jean</i> – None of this area is from past harvesting – past harvesting should be labelled NSR. Did a fair bit of rehab of NCB under FRDA. Losing some FRDA sites back to grass, but don't have a good handle on it. Without the use of herbicides have to use a whipper-snipper 2X/yr for 4-5 years.</p> <p>Probably most of the area currently classified as NCB is actually NP Sb. Possibly 10-15% of NCB could be rehab'd but don't really know. Talk to Steven Hills, Inventory Officer, who's currently working on TSR2.</p> <p><i>Steven Hills</i> – Most of the NCB and NSR is mis-classified – should be NP. In reality there is probably 20-30 000 ha that is truly NCB. Of this there is probably 6-8 000 ha that has treatment potential. The only way to know for sure is to have a re-inventory (this isn't the only problem). The district has about 400 map sheets which span 5 or 6 different inventories which are up to 30 years old.</p>	
Low volume or poor quality conifers	306 100 (417 100)	<p><i>TSR1 reports</i> - Consists of mature conifer/deciduous stands that do not reach a min ht. of 17.5 m and contain a min vol. of 140 m³/ha. For immature stands, merch was defined by the min. SI which would result in these criteria being met at maturity.</p> <p>CF found about 110 000 ha of poor pine stands should not have been included in the THLB.</p> <p><i>McClarnon notes:</i></p> <p>These are older Pli stands - age class 7 in which a high % of the stems are non-merchantable. Checks to date of forest inventory classifications have gone both ways - some stands classified as non-merch were found to be merchantable, some of the stands classified as merch were found to be</p>	<p>Project inventories by landscape unit can isolate merch stands within large areas typed non-merch.</p>

Non-Merch Category	Area (ha)	Present Status	Conclusion
		<p>non merch.</p> <p>Large generalized polygons of Sw/Sb exist on several map sheets particularly along the Alberta border. Potential exists to define productive forest types within these polygons. Harvesting in these areas is now more feasible due to oil & gas road development.</p> <p>Project based inventories have potential to increase the THLB. Recommended approach is by landscape unit.</p> <p><i>Regional staff</i> – Talk to Dick Nakatsu.</p> <p><i>Dick Nakatsu</i> – Fort St. John has a very old inventory with large polygons of NPSb. District strategic inventory plan prepared but not signed off yet. Inventory audit found the inventory to be overestimated (see “low site,” below). Sb has same volume projection as Se, but in reality has lower volume. Early 70’s inventories are projected 25 yrs for growth but trees have slowed down since then. PI seems to stop growing at about age 80. There are not enough G&Y samples in Peace. Huge burns were classified 25-30 years ago as NSR-P or NP burn. After 30 yrs could be some areas that are merchantable. Have looked at these in Mackenzie and Ft. Nelson but never got to Fort St. John. There’s a lot more spruce than the inventory indicates, coming up under the aspen.</p> <p><i>Steven Hills</i> – According to the inventory, the small pine stands exceed the min. ht and volume cut-offs. However, field measurements indicate they are actually below the cut-offs. These stands are not suited to thinning or rehab, but there is an agreement with the licensees that they will take 10% of their AAC’s from these stands which seems to be working. The land itself is fairly productive.</p>	
Deciduous		<p><i>TSR 1 reports</i> - Deciduous partition of 915 000 m3/yr. Some deciduous stands deducted as low volume, non-merch (see above) but deciduous area deducted not given.</p> <p><i>Regional staff</i> – Existing AAC is fully committed. More opportunity here than in Dawson Ck. for using deciduous excluded types. May be a case of waiting for TSR2</p>	Wait for TSR2 information.

Non-Merch Category	Area (ha)	Present Status	Conclusion
		<p>results. Talk to Andy Johnson, Planning Officer, 787-5617, who was involved in TSR1 analysis. [Note- discussed with Hills, Johnson not contacted.]</p> <p><i>Steven Hills</i> – TSR2 will treat deciduous differently from TSR1. There was no deciduous harvest prior to TSR1. Now that there is actual harvesting experience there is better info on which to set merchantability criteria. Best to wait for TSR2 results.</p>	
Low site	275 800	<p><i>Regional staff</i> – TSR2 will use SI as criteria rather than inventory map label. May be a case of waiting for the TSR2 result. Some of these stands will become merch sometime in the future. Opportunity may be there to assist with harvesting or reforestation cost to encourage merchantability. Don't know if this is PI or Sb. If PI, may have more opportunity. Talk to Andy Johnson, Planning Officer, 787-5617, re validity of L site class in Sb vs PI. [Note- discussed with Hills, Johnson not contacted.]</p> <p><i>Steven Hills</i> – Again the age and quality of the inventory is a factor here. Best to wait until TSR2 data package is available in Jan/Feb/2000. Check the inventory audit.</p> <p><i>Fort St. John TSA inventory audit</i> - Inventory over-estimates volumes (212 m3/ha inventory vs. 172 m3/ha audit). This was mostly attributable to the assignment of inventory attributes, potentially height estimates. Site index assignment in young stands was found to be accurate.</p>	Wait for TSR2 information.

Mackenzie TSA

Summary

There are many uncertainties surrounding issues such as merchantability, operability and inventory in the TSA. Until there is more certainty about these matters, the potential to increase the THLB through silviculture cannot readily be defined. The greatest opportunity appears to be to survey aspen stands in the southern 2/3rds of the TSA to determine factors such as merchantability and successional state, and to develop an aspen management strategy. A greater certainty of information about aspen merchantability would improve the chances of attracting companies to harvest this species.

Detailed review of opportunities

Data in the area column is from the TSR1 analysis report, rounded to the nearest 100 ha's. If the CF modified these numbers in the AAC determination, the revised number is shown in brackets. Information in the present status column is from TSR 1 reports, the *1999/2000 Mackenzie TSA Resource Management Plan* and discussions with Prince George Forest Region and Mackenzie Forest District staff.

Non-Merch Category	Area (ha)	Present Status	Conclusion
NC Brush	69 900	<p><i>TSR1 reports</i> – no information.</p> <p><i>Regional staff</i> – no information</p> <p><i>RMP</i> - Probably no more than 10 000 ha has rehabilitation potential (RMP:31). Cost/ha? Ha/yr?</p> <p>10 000 ha @ 3 m³/ha/yr would add 30 000 m³/yr to the long term harvest level.</p>	Max potential to add 30 000 m ³ /yr to LTHL.
Deciduous	228 100	<p><i>TSR1 reports</i> - No area associated with CF deciduous partition of 50 000 m³/yr is given, so area reduction shown is overstated.</p> <p><i>Regional staff</i> - deciduous licence has never been advertised due to lack of demand. Contact Jim Ladds re rehab opportunity (Range/rec officer 997-2215).</p> <p><i>Jim Ladds</i> –Did a deciduous opportunity study for RPF professional report. About 90% of deciduous is aspen. A net area of 43 200 ha of aspen (haul zones 1&2 (S 2/3rds of TSA), NDT3) could support a harvest level of 135 000 m³/yr assuming an avg MAI of just over 3 m³/ha/yr. A special survey of aspen stands is needed to confirm the</p>	<p>About 1/5th of the area likely has merch potential. Substantial succession to spruce has taken place. Aspen is valued for biodiversity.</p> <p>A special survey of aspen stands is needed to develop an aspen strategy.</p>

Non-Merch Category	Area (ha)	Present Status	Conclusion
		status of these stands. Many of them are over 100 years old and have or are converting to spruce through natural succession. The TSA lies in the Rocky Mountain Trench which is wetter than the Peace region. Aspen seems to mature earlier here than in the Peace. Many aspen stands are desirable for biodiversity values, so options include rehabilitating old, poorly stocked, non-merch aspen to thrifty aspen stands as well as to convert to conifers.	
Low site	31 100	<p><i>TSR1 reports</i> – Height and stocking criteria were used to net out low productivity mature coniferous stands (1A:65). Site index cut-offs were used for immature coniferous-leading stands to net out those stands not capable of reaching 140 m³/ha by 140 years of age (1A:66).</p> <p><i>Regional staff</i> – not reviewed.</p>	
Other	427 552	<p><i>TSR1 reports</i> - Based on age, height, stocking class and distance from processing facilities of timber types in the inventory for which there was no demonstrated harvesting performance.</p> <p><i>Regional staff</i> – TSR1 deduction was reasonable, so would expect this number to come down in TSR2. Need to wait for TSR2 netdown information to see what the new number will be.</p> <p><i>Jim Ladds</i> – Timberline did a ht class 2 PI study in 87/88. This resulted in minor changes which one would assume were captured in TSR1 data. Not much has been done in ht class 2 balsam.</p> <p><i>Dick Nakatsu</i> – District has a strategic inventory plan, but it is not signed off. N. end of Mackenzie has very old inventory – large polygons of NP Sb. Have looked at the huge burn areas in Mackenzie [and presumably reclassified – LA].</p>	<p>Wait for TSR2. Area deducted will probably be less than TSR1. Probably best to wait and see if merch potential arises over time rather than considering rehabilitation at this time.</p>

Prince George TSA

Summary

The two major upcoming TSR2 area netdowns will be for non-merchantable aspen stands and balsam stands. Interviewees do not consider the netted out balsam to present any future opportunities as it is both low in volume (or height) and difficult to regenerate. Aspen, on the other hand, is likely to become merchantable in the future. The extent of the aspen resource and its availability (that is, net of riparian, biodiversity and other concerns) is expected to be clarified in TSR2. At this time, the sole identified opportunity for incremental silviculture in expanding the timber harvesting land base is in rehabilitation of perhaps 5 000 ha's classified as non-commercial brush.

Detailed review of opportunities

Data in the area column is from the TSR1 analysis report, rounded to the nearest 100 ha's. If the CF modified these numbers in the AAC determination, the revised number is shown in brackets. Information in the present status and conclusion columns is from TSR 1 reports and discussions with Prince George Forest Region and Prince George Forest District staff.

Non-Merch Category	Area (ha)	Present Status	Conclusion
NC Brush	83 100	<p><i>TSR1 reports</i> – no information.</p> <p><i>Regional staff</i> – Preliminary TSR2 area is 81 000 ha. Much of this area is probably riparian, swampland or avalanche chutes. May be some opportunity east of Prince George. Talk to Gary Westfall (LIM Officer 565-7210).</p> <p><i>Gary Westfall</i> – Can think of 2 large patches. One is S of Bowron River – high elev., old IU logging, mixed in with old balsam. Bob Richards (565-6025) may know more about potential. Other area is in the Parsnip Plateau – old fires totalling 10-15 000 ha, probably medium sites but were set back by fire to brush and have never recovered. Some deciduous mixed in. Nobody's ever thought of doing anything with these areas.</p> <p><i>Bob Richards (PGFD)</i> – Most NCB is in alder swales up to 10 ha in size. After allowing for biodiversity values, there's probably 5 000 treatable ha's. Smaller patches may already be in the THLB. Small patches (<4 ha's?) must be rehabilitated at licensees own cost if within a cut block. Need surveys and</p>	<p>May be some potential on 5 000 ha. Never been actively considered as an opportunity. Need surveys and analysis to confirm extent of opportunity.</p>

Non-Merch Category	Area (ha)	Present Status	Conclusion
		<p>analysis to confirm extent of opportunity.</p> <p>We're not as successful at reforesting these as we thought we might be. N. aspects in the wet belt are particularly difficult. Treatment would consist of piling the alder with an excavator, planting, followed by a herbicide treatment. Probably about \$2 100/ha total cost.</p> <p><i>Dave Sommerville (Vanderhoof FD)</i> – Couldn't guess how many ha's of NCB_r are in the district. What there is is very patchy and a lot is associated with environmentally sensitive areas. Also has biodiversity value. Don't see any treatment potential.</p> <p><i>Earl Wilson (Fort St. James FD)</i> – NC Br normally exists in 2-5 ha patches. These tend to be designated as wildlife patches within cut blocks. ISIS entry is not consistent and many areas are likely NP. Not aware of any area with rehab potential.</p>	
Low volume or poor quality conifers	45 100	<p><i>TSR1 reports</i> - Includes mature and immature cedar-hemlock stands.</p> <p><i>TSR2</i> – see <i>Unused Conifer</i> below.</p>	No opportunity.
Too dense		<p><i>Regional staff</i> – There is no <i>TSR2</i> deduction for too dense PI. Vanderhoof district has sold a 250 000 m³/yr licence to L&M lumber for too-dense PI averaging 0.2 m³/tree. No partition.</p>	No opportunity.
Unused conifer	303 200	<p><i>Regional staff</i> – <i>TSR2</i> deductions will be for physically inoperable (16 500 ha), economically inoperable (290 000 ha – not capable of growing stands to a specified minimum volume – mostly balsam), and non-merchantable (375 000 ha – meets the specified minimum vol's but there is no harvesting performance: low ht, CH, high elev. balsam, deciduous).</p> <p>As for balsam, a 200 000 m³/yr partition and sale that existed before <i>TSR1</i> was not renewed. Now all licensees are required to take balsam as part of the harvest profile. Mostly is higher up in the old PG West and Ft. St. James districts. There is no opportunity in the areas that are netted out. These areas are very difficult to regenerate.</p>	No opportunity.

Non-Merch Category	Area (ha)	Present Status	Conclusion
Deciduous	292 000	<p><i>Regional staff</i> – Gross TSR2 deciduous area is 370 000 ha aspen, 35 000 ha birch and 18 000 cottonwood. A lot of deciduous is netted out under other categories. Anything that isn't already deducted comes out in the non-merch category (see above).</p> <p>PA 18 for 300 000 m3/yr of aspen leading stands was advertised and subsequently offered, but the offer was never taken up and expired 2 years ago. Feeling is that the sustainable level is more likely in the 150 000 m3/yr range. This is a case of waiting for economic merchantability. There were at least 2 expressions of interest in aspen in the last year. No rehab opportunity. Wait for TSR2 numbers.</p> <p><i>Dave Sommerville (Vanderhoof FD)</i> – There may be some opportunity to treat some areas that were harvested and the aspen left. Aspen can be from 20 to 80 years old. Older aspen is now falling apart. Little spruce understory, so some may evolve to brush. Best guess would be about 3 000 ha's treatable area. Treatments would vary based on site and age of aspen. Haven't done a lot of this</p>	<p>Wait for better TSR2 data. In time, the majority of the aspen resource will likely become merchantable. Potential to treat maybe 3 000 ha's of residual aspen in Vanderhoof FD.</p>
Other	1 600	Residual stands.	Not reviewed.

Robson Valley TSA

Summary

No identified opportunities.

Detailed review of opportunities

Data in the area column is from the TSR1 analysis report, rounded to the nearest 100 ha's. If the CF modified these numbers in the AAC determination, the revised number is shown in brackets. Information in the present status and conclusion columns is from TSR 1 reports and discussions with Prince George Forest Region and Robson Valley Forest District staff.

Non-Merch Category	Area (ha)	Present Status	Conclusion
NC Brush	2 400	<i>TSR1 reports</i> – no information. <i>Regional staff</i> – probably mostly adjacent to avalanche chutes.	No opportunity.
Low volume or poor quality conifers	8 600	<i>TSR1 reports</i> – District concerned that ha reduction is low and does not include C/H stands being avoided. CF expects district staff to re-examine non merch definition before next determination. (1B:12-13) CF expects district to monitor proportion of harvest in C/H and may consider a partition in next determination if harvest not high enough. (1B:13) <i>District staff</i> – Haven't assessed these areas for rehab potential, but are most likely necessary to meet biodiversity requirements. FRDA rehab has a bad history – rehab'd areas would be merch now.	No opportunity.
Deciduous	5 700	<i>TSR1 reports</i> - CF creates 6,000 m3/yr deciduous partition which presumably captures any opportunity presented by these stands. <i>Regional staff</i> – the deciduous partition has never been awarded – whole main valley has S facing deciduous which is extremely visual and probably also ungulate winter range. These create a high planning demand. Talk to Norma Stromberg or Albert Nusbaum. <i>District staff</i> – partition assumes regeneration will be to deciduous. High visual sensitivity and no harvesting to date. MoF small	No additional opportunity.

Non-Merch Category	Area (ha)	Present Status	Conclusion
		business has taken it on. Have interested parties but nothing worked out yet. Have a mill in the valley that cuts beautiful birch.	
Low site	32 700	<i>TSR1 reports</i> – no information. <i>District staff</i> – This category will not exist in TSR2 which will have deductions based on minimum vol/ha and operability.	Wait for TSR2 info. Not likely to be any opportunity.

Prince Rupert Forest Region

Regional Summary

Only a few opportunities were identified for expanding the timber harvesting land base through incremental silviculture or other related means. Many netted out stands also contribute to biodiversity and riparian values. Others are expected to become merchantable some time in the future. There is no harvesting taking place in the Cassiar TSA, making incremental silviculture expenditures to increase the AAC further difficult to justify.

Identified opportunities are:

- Morice TSA - a special survey project opportunity for mis-classified low site may arise if TSR2 results indicate there is still a substantial area in this site class.
- Nass TSA - potentially 9 000 ha's of treatable NCB_r at a cost between \$1,500-\$5,000/ha. Begin with small trials.
- North Coast TSA – FRBC-funded research studies are underway to examine merchantability opportunities in excluded low-site coastal western hemlock stands.

Bulkley TSA

Summary

No immediate opportunities. A portion of the netted-out low volume, deciduous and too dense stands are expected to become merchantable over time.

Detailed review of opportunities

Data in the area column is from the TSR1 analysis report, rounded to the nearest 100 ha's. If the CF modified these numbers in the AAC determination, the revised number is shown in brackets. Information in the present status column is primarily from TSR1 documents and discussions with Bulkley/Cassiar Forest District staff.

Excluding NCB, TSR2 gross total area for all the categories below is 119 010 vs 116 623 ha in TSR1. The TSR2 net total area is 95 075 vs TSR1 net total of 88 073. Differing netdown methodologies make the numbers for individual categories hard to compare between TSR's. The TSR2 operating land base went higher into the ESSF zone, resulting in higher netdowns in other categories (TSR1 gross inoperable area was 69 067 ha vs TSR2 area of 374 ha).

Partitioned AAC for marginal stands does not include any of the following.

Non-Merch Category	Area (ha)	Present Status	Conclusion
NC Brush	5 800	<i>TSR1 reports</i> – no info. <i>TSR2 reports</i> – Preliminary TSR2 area is 8 129 ha gross and 6 312 net. <i>District staff</i> – NCB is scattered. No large polygons. Licensees try to type out of blocks if > 2 ha. MoELP likes to keep these areas for biodiversity. A fair amount of this area is in higher elevations ESSF – could well be alpine forest.	No opportunity.
Low volume or poor quality conifers	65 300	<i>TSR1 reports</i> – described as low stocking. <i>TSR2 reports</i> – Preliminary TSR2 area for “marginal” is 8 567 ha gross and for “pulp” is 4 499 gross. Much of the TSR1 area has been shifted to the low site category in TSR2. <i>District staff</i> – Most of this would be balsam 822 types with maybe a minor spruce component. These stands may have future merch potential. Logging and reforestation costs would be high because of the amount of brush within these stands. Licensees will harvest if a small patch is within a larger block.	Wait for future merchantability. No immediate opportunity.

Non-Merch Category	Area (ha)	Present Status	Conclusion
Too dense	37 600	<p><i>TSR1 reports</i> – described as small trees, poor site.</p> <p><i>TSR2 reports</i> – Preliminary TSR2 area is 1 243 ha gross.</p> <p><i>District staff</i> – This is PI stocking class 3 & 4. Licensees will harvest if diameters are large enough and part of a cut block. Typically stands are 150-200 m³ with 12 cm avg DBH and are 100 km from Smithers. Wait for merchantability.</p>	Wait for future merchantability. No immediate opportunity.
Deciduous	30 100	<p><i>TSR1 reports</i> – no info.</p> <p><i>TSR2 reports</i> – Preliminary TSR2 area is 37 715 ha gross.</p> <p><i>District staff</i> – Mostly aspen. About 1/3 has low vol/ha but is on good growing site and has future merch potential. Aspen/cottonwood would be acceptable regen in some patches, depending on the moose winter range requirement. The remaining areas either have no potential or contribute to high value spring grizzly habitat.</p>	Wait for future merchantability. No immediate opportunity.
Low site	23 500	<p><i>TSR1 reports</i> – no info.</p> <p><i>TSR2 reports</i> – Preliminary TSR2 area is 66 986 ha gross.</p> <p><i>District staff</i> – Current classifications show these sites as having SI's of < 6, but could be as high as 10-11. OGSI might lift up the site classes but even so these sites have no potential.</p>	No opportunity.

Cassiar TSA

Summary

No immediate opportunity. There is no harvesting taking place in the TSA, making incremental silviculture expenditures to increase the AAC further difficult to justify.

Detailed review of opportunities

Data in the area column is from the TSR1 analysis report, rounded to the nearest 100 ha's. If the CF modified these numbers in the AAC determination, the revised number is shown in brackets. Information in the present status column is primarily from TSR1 documents and discussions with Prince Rupert Forest Region staff.

Non-Merch Category	Area (ha)	Present Status	Conclusion
NC Brush	89 600	<i>TSR1 reports</i> – no info. <i>Regional staff</i> – There is currently no harvesting taking place in the TSA. Could not justify the expenditures to rehabilitate NCB. This area is not likely to change as TSR2 will use same data set as TSR1.	No opportunities at the present time.
Other	681 300	<i>TSR1 reports</i> – Consists of low site stands and stands that are age class 5-9 and height class 2 or less (1A:46) <i>Regional staff</i> – There is now an operability corridor mapped for the TSA. This will likely change the TSR net-down numbers (e.g., fewer ha's may show as excluded low site if they are excluded as inoperable). Best to wait for TSR2 results.	Wait for TSR 2 info.

Cranberry TSA

Summary

No opportunity. Most of the areas deducted from the timber harvesting land base contribute to riparian and biodiversity values.

Detailed review of opportunities

Data in the area column is from the TSR2 analysis report, rounded to the nearest 100 ha's. If the CF modified these numbers in the AAC determination, the revised number is shown in brackets. Information in the present status column is primarily from TSR2 documents and discussions with Kispiox Forest District staff.

Although the deductions are relatively small in area, in total they equate to 25% of the timber harvesting land base.

Non-Merch Category	Area (ha)	Present Status	Conclusion
NC Brush	1 600	<i>TSR2 reports</i> – no info. <i>District staff</i> – Mostly within the riparian zone. The TSA has a very large floodplain.	No opportunity.
Deciduous		CF finds it reasonable that certain deciduous stands form part of the THLB (2B:13).	
Low site	4 200	<i>TSR2 reports</i> – no info. <i>District staff</i> – This is probably an accurate estimate. Have been working on a revised definition of low site. Want to use a definition of a min vol/ha at a specified mature age. A lot of low sites are in riparian zones or on steep slopes.	No opportunity.
Other	2 300	<i>TSR2 reports</i> – no info. <i>District staff</i> – No breakdown of the 2 300 ha's is available. Most of this area would be deciduous (aspen or birch) which has biodiversity and riparian values and for which there has never been a market. Next highest component is likely sub-alpine forest which would never be harvestable for environmental and economic reasons. Lastly, there is a very small amount of over- or under-stocked PI which is unlikely to become merch over time. These have never been considered to represent an opportunity.	No opportunity.

Kalum TSA

Summary

No opportunity.

Detailed review of opportunities

Data in the area column is from the TSR2 analysis report, rounded to the nearest 100 ha's. If the CF modified these numbers in the AAC determination, the revised number is shown in brackets. Information in the present status column is primarily from TSR2 documents and discussions with Kalum Forest District staff.

Non-Merch Category	Area (ha)	Present Status	Conclusion
NC Brush	500	<i>TSR2 reports</i> – no info. <i>District staff</i> – Probably near avalanche chutes.	No opportunity.
Deciduous	4 000	<i>TSR2 reports</i> – no info. <i>District staff</i> – Probably alder and cottonwood. History of conversion to conifer is poor - very high cost of treatment, huge amounts of wet snow, have to do 2 brushings/yr for 5 years, then get animal damage after that. Alder is in the 20-30 year age range. Need a deciduous management plan but no current market makes it hard to justify alder management. Often it is in riparian zones.	No opportunity.
Unused conifer	7 100	<i>TSR2 reports</i> – Data source: 2A:8. Consists of stands < 22m in ht or < 250 m ³ /ha at age >100, and stands <26% crown closure at age > 60 (2A:84). <i>District staff</i> – These are typically lower site class stands of old hemlock types with minor mixes of cedar and balsam and tend to be on shallow soils. They occur scattered at all elevation bands. Contribute to stand level biodiversity. Not suitable for rehabilitation.	No opportunity
Low site	800	<i>TSR2 reports</i> – This figure is low because most of the low site area was already excluded under the non-merch category. Effectively, the SI cut-off for low site was 9 m. (2B:17) <i>District staff</i> – no info. Assume no potential.	No opportunity.

Kispiox TSA

Summary

No opportunity.

Detailed review of opportunities

Data in the area column is from the TSR1 analysis report, rounded to the nearest 100 ha's. If the CF modified these numbers in the AAC determination, the revised number is shown in brackets. Information in the present status column is primarily from TSR1 documents and discussions with Kispiox Forest District staff.

Non-Merch Category	Area (ha)	Present Status	Conclusion
NC Brush	1 000	<p><i>TSR1 reports</i> – no info.</p> <p><i>District staff</i> – These areas are mostly on the edges of swamps and fall within riparian zones.</p>	No opportunity.
Low site	2 600	<p><i>TSR1 reports</i> – no info.</p> <p><i>District staff</i> – This area will likely be larger under TSR2. TSR1 was based on very low site index cut-offs. The inventory is considered reasonably accurate in this area so misclassification is not an issue.</p>	No opportunity.
Other	42 000	<p><i>TSR1 reports</i> – *Data: (1A:8).</p> <p>Non-merch types include stands of low volume, non-merch species (including deciduous leading), or stands with insufficient height or dense stocking (1B:12).</p> <p>Sensitivity analysis shows if deciduous vol's were included, the harvest level could be increased by 20,000 m³/yr for the 1st 9 decades (1B:13).</p> <p><i>District staff</i> – A significant part of this is deciduous in riparian areas. The history of trying to convert this type to conifer is not good. Another part is sub-alpine forest which would never be harvestable for environmental and economic reasons. Other deductions are for very dense PI or hemlock. The most economic of these areas have already been treated. The remainder is too scattered to treat.</p>	No opportunity.

Lakes TSA

Summary

TSR2 area netdowns will be considerably lower than in TSR1. No treatment opportunities identified in the remainder.

Detailed review of opportunities

Data in the area column is from the TSR1 analysis report, rounded to the nearest 100 ha's. If the CF modified these numbers in the AAC determination, the revised number is shown in brackets. Information in the present status column is primarily from TSR1 documents and discussions with Lakes Forest District staff.

Non-Merch Category	Area (ha)	Present Status	Conclusion
NC Brush	3 700	<i>TSR1 reports</i> – no info. <i>District staff</i> – This area will be slightly lower in TSR2. All areas were surveyed a few years back. Either put in as NSR and scheduled for treatment or considered as NP. The 3 700 ha left is in reality NP, not NC Br. It occupies a variety of site types.	No opportunity.
Too dense	50 800 (30 800)	<i>TSR1 reports</i> – About 50,770 ha are ht class 2 PI (1B:14) CF finds approx. 20,000 ha of PI between 17 and 19.5 m ht are likely merch. and includes in decision (1B:15). <i>District staff</i> – Have redefined the netdown criteria as anything < 140 m ³ /ha or 17.5 m in ht. New preliminary figure is 8 600 ha. The remaining stands do not have treatment opportunities and may become merch some day.	TSR2 netdown will be considerably less than TSR1. No opportunity in remainder.
Deciduous	41 000	<i>TSR1 reports</i> – District staff estimate as much as 70% of deciduous are of too poor a quality for commercial utilization (1B:14). <i>District staff</i> – Most of this is pure aspen on south facing slopes. It is of poor quality, being old, short, and rotten inside. A lot of it is within scenic corridors and ungulate winter range. These areas have heavy forest cover constraints to which the aspen stands contribute to meeting. The aspen is converting slowly to spruce because of fire protection. TSR2 area will be slightly lower. Concerns are being raised about maintaining area as successional aspen.	No opportunity.

Non-Merch Category	Area (ha)	Present Status	Conclusion
Low site	39 700	<p><i>TSR1 reports</i> – Mostly found in high elev. ESSF zone (1B:12).</p> <p><i>District staff</i> – In TSR2, low site is being based on the inability to grow trees to a specified min. ht. and vol. This is then translated into a site index cut-off. Expect that the TSR2 area deduction will be lower than TSR1 (preliminary figure is below 30 000 ha). Areas that are just above the cut-off will likely show greater productivity after harvest. However, won't be much opportunity in those stands that are below the cut-off.</p>	No opportunity.
Other	16 400 (10 500)	<p><i>TSR1 reports</i> – Consists of pure sub-alpine fir stands or sub-alpine fir stands with < 30% spruce or pine content (9,015 ha – 5,832 $\cong$ 3,200 ha – see below), all mature balsam and spruce stands < 19.5 m in height (4,352 ha), and pine leading stands with a stocking class 4 designation (93 ha) or those with significant aspen and cottonwood components (2,921 ha). Descriptions from 1B:14. Areas from 1A:7. Original total of 16,381 ha.</p> <p>5,832 ha of subalpine fir were found to have been incorrectly removed (1B:14) leaving a total of 10,549. (Note: some inconsistency in rationale document #'s of less than 100 ha's.)</p> <p><i>District staff</i> – Pure balsam is not being utilized. Utilization is dependent upon the % mixture of other species. TSR2 will count balsam leading stands as 100% contributing when the PI/S component is 30% or greater. Over time, the % requirement may decrease depending upon industry utilization.</p>	No opportunity.

Morice TSA

Summary

An opportunity for a special survey project for mis-classified low site may arise if TSR2 results indicate there is still a substantial area in this site class. Wait for TSR2 results. No other opportunities identified.

Detailed review of opportunities

Data in the area column is from the TSR1 analysis report, rounded to the nearest 100 ha's. If the CF modified these numbers in the AAC determination, the revised number is shown in brackets. Information in the present status column is primarily from TSR1 documents and discussions with Morice Forest District staff.

Non-Merch Category	Area (ha)	Present Status	Conclusion
NC Brush	5 700	<i>TSR1 reports</i> – no info. <i>District staff</i> – This figure is not likely to change.	Not likely to present an opportunity.
Low site	175 800	<i>TSR1 reports</i> – Criteria given on page 1B:14. Significant discussion of the area reduction in AAC rationale pages 1B:14-15. CF acknowledges some area could be included in THLB, but not much. Little licensee performance in such stands. <i>District staff</i> – TSR2 will use same criteria. Have recently had a re-inventory so low site area may go up or down. The northern portion was not re-inventoried, and licensees are reporting mis-classification and that they are logging in areas classed as poor site.	Await TSR2 information. May be an opportunity for special inventory survey to reclassify.
Other	44 900	<i>TSR1 reports</i> – Area: (1A:7). Criteria on page 1A:58 but no sub-area breakdown. Includes all deciduous leading stands. <i>District staff</i> – Aspen deciduous is about 60% and C/H about 10-20% of the total. Aspen has value for habitat. There has been no push to harvest it. Can be saved in openings as wildlife tree patches. C/H is in the coastal transition zone [very old? decadent? inoperable?]	No opportunity.

Nass TSA

Summary

Potentially 9 000 ha's of treatable NCB_r at a cost between \$1,500-\$5,000/ha. Begin with small trials.

Detailed review of opportunities

Data in the area column is from the TSR1 analysis report, rounded to the nearest 100 ha's. If the CF modified these numbers in the AAC determination, the revised number is shown in brackets. Information in the present status column is primarily from TSR1 documents and discussions with Kalum Forest District staff.

Non-Merch Category	Area (ha)	Present Status	Conclusion
NC Brush	36 900	<p><i>TSR1 reports</i> – no info.</p> <p><i>District staff</i> – There are both big patches on their own and small pockets inside blocks. Licensees try to type these areas out of cutting permits. Soils are mostly wet, organic and cold. Vegetation is typically 20' high sitka alder.</p> <p>Possibly 25% of area could be treatable. Limited experience at this, so would want to start with trials. Cost \$1,500/ha if chemical treatment and \$5,000/ha if manual.</p>	Potentially 9 000 ha's treatable at a cost between \$1,500-\$5,000/ha. Begin with small trials.
Deciduous	4 700	<p><i>TSR1 reports</i> – no info.</p> <p><i>District staff</i> – Mostly aspen, some birch and cottonwood. No market. Some biodiversity, riparian issues. No potential.</p>	No opportunity.
Low site	3 400	<p><i>TSR1 reports</i> – no info.</p> <p><i>District staff</i> – No knowledge of these sites. Assume inventory is correct.</p>	No opportunity.
Other	73 200	<p><i>TSR1 reports</i> – criteria provided in analysis report, but no area breakdown. Not discussed in AAC rationale.</p> <p><i>District staff</i> – Mostly short trees < 22.5 m in height. Best to wait for merchantability which could be some time away.</p>	Wait for merchantability.

North Coast TSA

Summary

No incremental silviculture opportunities identified. FRBC-funded research is investigating opportunities for harvesting in excluded low site coastal western hemlock types.

Detailed review of opportunities

Data in the area column is from the TSR2 analysis report, rounded to the nearest 100 ha's. If the CF modified these numbers in the AAC determination, the revised number is shown in brackets. Information in the present status column is primarily from TSR2 documents and discussions with North Coast Forest District staff.

Non-Merch Category	Area (ha)	Present Status	Conclusion
NC Brush	100	<i>TSR2 reports – no info.</i> <i>District staff -</i>	Not reviewed but presumably no opportunity.
Low site	276 449	<i>TSR 1&2 reports –</i> TSR1 low site was 4 249 ha. Most of the area was already deducted as inoperable. <i>District staff –</i> FRBC is funding research studies into harvesting and reforesting low productivity sites in the hyper-maritime zone. These are low-elevation, swampy, coastal Hw stands. Now in yr 3 of 5 yr project. Essential for FRBC funding to continue. One part of the project is inventorying these types and stratifying them into categories for management potential. Another part is to gather baseline data and then harvest and regenerate some test stands. Results will be extrapolated to the larger land area based on the stratified categories. When forestry markets are up, MoF gets requests for harvesting in these types. Stands must have Cw in them to be merch. No existing partition but chief forester could consider setting one up under TSR2.	Awaiting outcomes of research studies. A portion of this area may be merchantable under high markets. No incremental silviculture opportunities.

Non-Merch Category	Area (ha)	Present Status	Conclusion
Other	9 323	<p><i>TSR2 reports</i> – Gross area is 62 770 ha. Consists of stands with low stocking or crown closure and stands which are predominantly pine, larch, or broad-leaved (except cottonwood) (2A:9,74).</p> <p><i>District staff</i> – The net deduction is for those sites that are physically operable and also exceed the low site deduction criteria. About 40% of these stands are stunted shore pine and 60% are in alder for which there is no market. Have done a lot of alder girdling to release the conifer understory in the past. Some people are suggesting managing for alder. No rehab opportunity.</p>	No silvicultural opportunity. Alder stands could potentially form part of THLB in their own right sometime in the future.

Vancouver Forest Region

Regional Summary

Identified opportunities are:

Arrowsmith TSA - Some of the 4 400 ha of low-site or non-merchantable stands may be improperly classified. An overview survey of these stands is required at an estimated cost of \$22,000.

Kingcome TSA - Silvicultural opportunities for bringing excluded areas back into the timber harvesting land base include (1) a survey of 7 500 ha of alder stands for further conversion/rehabilitation opportunities; and (2) a 10 ha experimental trial for establishing drainage is proposed at a cost of \$30 000.

Queen Charlotte TSA – Research into regeneration of low-site stands, similar to that in North Coast FD, may identify area that could be included in the THLB.

Soo TSA - Survey 700 ha classified as NCB_r to determine treatment opportunities.

Sunshine Coast TSA - A classification review of 28 000 ha of excluded low-site stands at a cost of \$28,000 may determine some of these stands to be merchantable.

The reviews identified for the Arrowsmith and Sunshine Coast TSAs may have to be broadened beyond the identified types to meet statistical requirements.

Arrowsmith TSA

Summary

Some of the 4 400 ha of low-site or non-merchantable stands may be improperly classified. An overview survey of these stands is required at an estimated cost of \$22,000. The review may have to be broadened beyond these types to meet statistical requirements.

Detailed review of opportunities

Data in the area column is from the TSR1 analysis report, rounded to the nearest 100 ha's. Information in the present status column is from TSR 1 reports and discussion with South Island Forest District Staff.

Non-Merch Category	Area (ha)	Present Status	Conclusion
NC Brush	26		No opportunity.
Deciduous	3 800 (3 500) after AAC partition.	<p><i>TSR1 reports</i> - extensive assessments were carried out in 1995 & 1996 regarding harvesting opportunities in red alder stands. 289 ha were determined to be available and merchantable, for which the CF established a partitioned AAC of 6 300 m3/yr.</p> <p><i>District staff</i> – Most alder is now quite old. Aggressive reforestation to conifers on harvested areas does not result in much new alder. West coast is not operable/merch while east coast is poor quality. Much alder is riparian and not available for harvest. Not considering any areas for rehabilitation. Not much additional opportunity.</p>	No additional opportunity.

Non-Merch Category	Area (ha)	Present Status	Conclusion
Other	4 400	<p><i>TSR1 reports</i> - consists of low volume mature stands (not greater than 19.5 m ht (ht class 2) by 121 years of age) and stands having low site classification (1A:56).</p> <p><i>District staff</i> – The site classification could be due to very old stands that are falling apart and therefore could be erroneous. Would need to do an air photo assessment followed by air calls to confirm classification. Estimate an average cost of \$5/ha, total cost of \$22,000.</p> <p><i>Regional staff</i> – Any survey would need to have a broader context that looks at the non-merchantable, low and poor site types, as changes to forest classification may shift the available hectares in these marginal stands from one classification to the other.</p>	Needs further assessment.

Fraser TSA

Summary

Both low-site and deciduous stands have been recently reviewed. It is assumed that in view of this no additional opportunities exist.

Detailed review of opportunities

Data in the area column is from the TSR2 analysis report, rounded to the nearest 100 ha's. If the CF modified these numbers in the TSR2 AAC determination, the revised number is shown in brackets. Information in the present status column is from discussions with Chilliwack Forest District staff. (The *Fraser Timber Supply Area Incremental Silviculture Strategy (Interim) - version 1.0* does not address the potential for increasing the timber harvesting land base.)

Non-Merch Category	Area (ha)	Present Status	Conclusion
NC Brush	900		
Deciduous	5 600	<p><i>TSR2 Reports</i> - Excluded types are cottonwood, aspen and birch. 10 000 ha of predominantly alder and maple types > 150 m³/ha were included in the THLB. 7 500 ha would be converted to conifer. There is considerable discussion in the AAC rationale about the appropriateness of the 10 000 ha inclusion, but none about the 5 600 ha excluded.</p> <p><i>District Staff</i> – This would pretty much all be cottonwood. A detailed study of all deciduous was done in 1993. However, because this was pre-FP Code, much of it doesn't apply. It is hard at the inventory level to isolate these stands.</p>	No opportunity.
Low site	34 300	<p><i>TSR2 Reports</i> - Economic operability related to low site productivity was extensively evaluated in 1997 in association with the TSR process. Some potential for conflict between the inclusion of additional low-productivity stands and the conservation of biodiversity (2B:15). Opportunities for increasing the productivity of these sites or for checking for proper classification are not discussed in TSR.</p> <p><i>District staff</i> – Not reviewed.</p>	Assume no opportunity.

Kingcome TSA

Summary

Opportunities to harvest in alder stands and low-site productivity stands were maintained or created through establishment of partitioned AAC's. Silvicultural opportunities for bringing excluded areas back into the timber harvesting land base include (1) a survey of 7 500 ha of alder stands for further conversion/rehabilitation opportunities; and (2) a 10 ha experimental trial for establishing drainage is proposed at a cost of \$30 000.

Detailed review of opportunities

Data in the area column is from the TSR1 analysis report, rounded to the nearest 100 ha's. Depending upon the CF's treatment of a category in the AAC rationale, a modified area may be presented in brackets. Information in the present status column is derived from *Kingcome Timber Supply Area Incremental Silviculture Strategy (Interim) - version 1.0* and *Kingcome Timber Supply Area Rationale for allowable annual cut (AAC) determination, effective November 1, 1996*.

Non-Merch Category	Area (ha)	Present Status	Conclusion
NC Brush	800		
Low volume or poor quality conifers	1 400	Mostly low quality pine.	
Deciduous	10 000 (7 500)	<p><i>TSR1 Reports</i> - Deciduous partition of 25 000 m3/yr existed pre-TSR1 but all deciduous was deducted from TSR1 THLB. Between 2-3 000 ha's are considered merchantable.</p> <p><i>Silviculture Strategy</i> - There is considerable area in operable but not commercial alder. An assessment of treatable stands is required.</p>	Survey/assessment of alder stands required.
Low site	25 500 (4 500)	<p><i>TSR1 Reports</i> - Opportunity may exist to harvest about 21 000 ha of low site stands. CF creates a TSR1 partition of 130 000 m3/yr for harvesting in these stands.</p> <p><i>Silviculture Strategy</i> - Opportunity may exist to improve about 8 000 ha of low productivity stands in the Nawhitti Plateau through drainage. Would require environmental and public review.</p>	<p>Opportunity for harvesting created thru partitioned AAC.</p> <p>10 ha trial required.</p>

Mid Coast TSA

Summary

No opportunity.

Detailed review of opportunities

Data in the area column is from the Mid Coast TSR2 analysis report, rounded to the nearest 100 ha's. Information in the present status column is derived from

The *Mid Coast Timber Supply Area Incremental Silviculture Strategy (Interim) - version 1.0* was prepared before TSR2 information was available. The TSR2 analysis is substantially different from that of TSR1 and renders the strategy document obsolete. Information in the present status column is inferred from the TSR2 analysis report and discussions with MoF regional and/or district staff.

Non-Merch Category	Area (ha)	Present Status	Conclusion
NC Brush	500		Small area – not reviewed.
Low site	95 300	<p><i>TSR2 reports</i> - Includes stands currently > 150 yrs old and < 425 m3/ha, as well as all younger stands estimated to be incapable of reaching these attributes (2B:12)</p> <p>TSR2 base case includes outer coast areas for which the TSR1 partition of 130 000 m3/yr was established. The 95 300 ha deducted is distinct from this and includes the inner coast and portions of the outer coast.</p> <p><i>District staff</i> – These stands were deducted because there is no harvesting in them. Harvesting in marginal stands is highly dependent on the amount of cedar and the cedar market. Licensees may go in and take pockets of timber from within a larger area with a cover type that was deducted. Can't visualize a rehabilitation program – wait for merchantability.</p>	No opportunity.

Queen Charlotte TSA

Summary

Research into regeneration of low-site stands, similar to that in North Coast FD, may identify area that could be included in the THLB.

Detailed review of opportunities

Data in the area column is from the TSR1 analysis report, rounded to the nearest 100 ha's. The *Queen Charlotte Timber Supply Area Incremental Silviculture Strategy (Interim) - version 1.0* does not address the topic of deductions from the THLB. Information in the present status column is inferred from the TSR1 analysis report and discussions with Queen Charlotte district staff.

Non-Merch Category	Area (ha)	Present Status	Conclusion
Other	142 100	<p><i>TSR1 reports</i> - Includes low sites, and all pine and alder leading species stands. 13,000 ha's of this is associated with a TSR1 75,000 m3/yr partition in low site and all pine and alder-leading stands. No info on the remaining 131 000 ha.</p> <p><i>District staff</i> – Re the partitioned AAC: 13 000 ha is probably a high estimate. Also, performance on the cut has only been 40%.</p> <p>Re PFT's: very little deciduous. Mostly low-site cedar or shore pine. Lots of cedar 921 and 911 types – verges on being muskeg. If hemlock is mixed in, it's usually an indication of a better site. Low site will be defined pretty much the same way in TSR2 as in TSR1.</p> <p>There is considerable regeneration difficulty on these low-site cedar types. There is a difference depending upon whether the site is in the Hecate lowlands or the Skidegate Plateau. Must be able to prove these sites can be regenerated before the chief forester will consider including in the AAC. Need a research project similar to that going on in the North Coast Forest District.</p>	Need research into regeneration of low-site stands, similar to that in North Coast FD.

Soo TSA

Summary

A single identified opportunity is to survey 700 ha classified as NCB_r to determine treatment opportunities.

Detailed review of opportunities

Data in the area column is from the TSR2 analysis report, rounded to the nearest 100 ha's. Information in the present status column is inferred from the TSR2 analysis report, the *Soo Timber Supply Area Incremental Silviculture Strategy (Interim) - version 1.0*.

Non-Merch Category	Area (ha)	Present Status	Conclusion
NC Brush	700	<p><i>TSR 2 reports</i> – no information.</p> <p><i>Silviculture strategy</i> - need to survey “NPBr” sites and assess opportunities for treatment.</p>	Surveys and assessments required.
Deciduous	3 200	<p><i>TSR2 reports</i> - Consists of all deciduous except cottonwood which has a 2 500 m³/yr partition.</p> <p><i>Silviculture strategy</i> – no mention of deciduous, therefore assume no opportunity.</p>	No opportunity.
Low site	22 500	<p><i>TSR2 reports</i> – Consists of stands that do not have sufficient volume to make them harvestable as well as those younger stands that are not likely to achieve the volume cut-offs of 350 m³/ha for Fdc, Cw, Hw/BI or 300 m³/ha for Sx and PI by age 140, or 150 m³/ha for cottonwood (2A:96). In lieu of pest damage info for PI, more restrictive merch limits were set.</p> <p><i>Silviculture strategy</i> - indicates a potential to convert an estimated 1 000 ha of low productivity lodgepole pine to SI 25 Douglas-fir at a cost of \$2,000/ha and at the rate of 100 ha/yr. Max MAI with planting 1yr stock at 1 400 sph, no regen delay, standard OAF's, is about 5.8 m³/ha/yr (TIPSY 2.1e). Total yield gain on 1 000 ha would therefore be about 5 800 m³/yr.</p> <p>The strategy pre-dates the TSR2 data and does not address the potential opportunities for the remaining area deducted as low site. Assume no other opportunities.</p> <p><i>Regional staff</i> – Now that TSR2 has included lodgepole pine stands of site index of 21 or</p>	Limited opportunity.

Non-Merch Category	Area (ha)	Present Status	Conclusion
		higher the treatment of the lower site index stands is not economically viable.	

Strathcona TSA

Summary

No opportunity.

Detailed review of opportunities

Data in the area column is from the TSR2 analysis report, rounded to the nearest 100 ha's. If the CF modified these numbers in the AAC determination, the revised number is shown in brackets. The *Strathcona Timber Supply Area Incremental Silviculture Strategy (Interim) - version 1.0* does not address the topic of deductions from the THLB. Information in the present status column is inferred from TSR2 reports and discussions with MoF district staff.

Non-Merch Category	Area (ha)	Present Status	Conclusion
NC Brush	200	Not reviewed. Assume no opportunity.	No opportunity.
Low volume or poor quality conifers	900	<i>TSR2 reports</i> – Pine types. <i>District staff</i> - Shore pine (bog areas), rock outcrops. Low elevation around Merville, sand dune (in a woodlot). Low sites.	No opportunity.
Too dense			
Deciduous	300	<i>TSR2 reports</i> - Consists of deciduous other than alder. AAC rationale does not address this excluded area. Assume no significant opportunity.	No opportunity.
Low site	13 800 (9 200)	<i>TSR2 reports</i> – Low site defined as sites not capable of growing trees to 19.5 m ht by 120 years of age. Site index cut-offs were Fdc (13.6), Cw (12.4), Hw (11.3), BI (11.5), S (9.7) and alder (14) (2A:92). About 4 600 ha incorrectly deducted and added back into the land base (leaving 9 200 ha excluded). (2B:12-13) <i>District staff</i> - High elevation or down in boggy areas, high elevation could have some Cy that licensees could cherry-pick with helicopters. Classification is OK. Wouldn't spend silv \$ on these sites.	No opportunity.

Sunshine Coast TSA

Summary

A classification review of 28 000 ha of excluded low-site stands at a cost of \$28,000 may determine some of these stands to be merchantable. The review may have to be broadened beyond these types to meet statistical requirements.

Detailed review of opportunities

Data in the area column is from the TSR1 analysis report, rounded to the nearest 100 ha's. The *Sunshine Coast Timber Supply Area Incremental Silviculture Strategy (Interim) - version 1.0* does not address the topic of deductions from the THLB. Information in the present status column is inferred from the TSR1 analysis report and discussions with district staff.

Non-Merch Category	Area (ha)	Present Status	Conclusion
NC Brush	100		No opportunity.
Deciduous	3 600	<p><i>TSR1 Reports</i> - 3,600 ha deciduous associated with deciduous partition (1B:15-16)</p> <p><i>District Staff</i> – not considering any areas for alder rehab. The deciduous partition is in the form of a non-replaceable licence. A merchantability review of netted out deciduous stands may identify some stands as being merchantable. See “Low site” below.</p>	See below.
Low site	17 800 (13 800)	<p><i>TSR1 Reports</i> - 17,809 ha identified in the rationale (1B:19) less 4,000 ha based on special site classification which raises site class above low (1B:19-20) = 13 800.</p> <p><i>District Staff</i> – a veg. resources inventory was recently completed for the TSA so new information will be used in TSR2. Preliminary TSR2 netdown for low site is approximately 27 700 ha. An air photo review together with some ground checking may show some of this area is merchantable. Cost is estimated at \$1/ha – total cost \$28,000.</p> <p><i>Regional staff</i> – Any survey would need to have a broader context that looks at the non-merchantable, low and poor site types, as changes to forest classification may shift the available hectares in these marginal stands from one classification to the other.</p>	Review of low sites required at a cost of \$28,000.

Non-Merch Category	Area (ha)	Present Status	Conclusion
Other	18 500	<p><i>TSR1 Reports</i> - =39,963 ha total non-merch (1A:7) based on having < 300 m3/ha or not capable of reaching this volume by age 150 (1A:47) or being in deciduous species.</p> <p>3,600 ha deciduous associated with deciduous partition (1B:15-16) - 17,809 ha identified in rationale as low site (1B:19) (1A:47) results in a residual of 18 554 being low volume conifer.</p> <p><i>District Staff</i> – a veg. resources inventory was recently completed for the TSA so new information will be used in TSR2. Preliminary TSR2 netdown information indicates there are no non-merchantable stands within the operable land base after low site stands are removed.</p>	No opportunity.

Abbreviations

The following abbreviations may be used.

AAC	allowable annual cut	NCBr	non-commercial brush
CF	chief forester	NDT	natural disturbance type
CT	commercial thinning	NSR	not satisfactorily restocked
DBH	diameter at breast height	OAF	operational adjustment factor
EFMPP	enhanced forest management pilot project	OLB	operable land base
ESA	environmentally sensitive area	PA	pulpwood agreement
ESSF	engelmann spruce - subalpine fir (ecological zone)	PFT	problem forest type
FCC	forest cover constraints	SBFEP	small business forest enterprise program
FG	free growing	SI	site index
FRBC	Forest Renewal BC	SR	satisfactorily restocked
ICH	interior cedar-hemlock (ecological zone)	TFL	tree farm licence
IFPA	innovative forest practices agreement	THLB	timber harvesting land base
IRM	integrated resource management	TIPSY	table interpolation program for stand yields
KBLUP	Kootenay-Boundary Land Use Plan	TSA	timber supply area
LTHL	long term harvest level	TSR	timber supply review
LRMP	land and resource management plan(ning)	VDYP	variable density yield projection
LRSY	long run sustained yield		
MoELP	Ministry of Environment, Lands and Parks		Species abbreviations: B or Ba - balsam fir; Cw - western redcedar; Fd - Douglas-fir; Fdi - interior Douglas-fir; Hw - western hemlock; Pl - lodgepole pine; S - spruce species.
MoF	Ministry of Forests		Site class abbreviations: G - good; M - medium; P - poor; L - low.
MS	montane spruce (ecological zone)		