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Forest Management Specialists

Memorandum

TO: GLENN THIEM, RFT – NSIFS COORDINATOR
FROM: REG DAVIS, RPF AND PATRICK BRYANT, RPF
DATE: OCTOBER 21, 2011
SUBJECT: MERRITT TSA UPLIFT ANALYSIS PROJECT

Background

An Innovative Forest Practices Agreement (IFPA) was first awarded to the Nicola-Similkameen Innovative Forest Society (NSIFS) on March 25, 1998. The Merritt IFPA holders are now updating their Forestry Plan and application for AAC uplift in order to extend the expiry date of their agreement to December 31, 2015. The analysis work described in this document was undertaken to support an IFPA uplift application.

Existing AAC Uplift – The current allowable annual cut (AAC) uplift[1] attributed to innovative forest practices is 330,700 m^3/yr. The AAC uplift application submitted by IFPA holders was for 549,000 m^3/yr but was discounted to account for, among other things, perceived risk and uncertainties associated with forest inventory volumes and site index (SI) estimates at low elevations. Specifically, the statutory decision maker found that:

- The VRI adjustment of +6% was considered reasonable but there were questions around the Fraser Protocol adjustment process and why it did not produce reliable results. IFPA-holders were requested to work with appropriate government staff to provide an updated timber supply analysis with an acceptable adjustment using the Fraser protocol.

- The SI adjustment applied to managed stands at low elevations had issues with the sample population and concerns existed around whether the short-term harvest flow increase was the result of improved yields in the mid- and long-term. The short term AAC uplift was consequently reduced by 21,000 cubic meters. IFPA-holders were requested to continue to monitor the productivity of these stands.

Approach

This analysis assessed the timber supply contribution of only two of the IFPA's innovative activities in order to keep the assessment simple and focused on major influencers. The two activities are forest inventory projects completed under the direction of the NSIFS: a site index adjustment[2] (SIA) and Vegetation Resources Inventory (VRI) phase 2 and net volume adjustment factor (NVAF) adjustment (VRIA).

This analysis prepared an IFPA Base Case run to compare against three sensitivities: 1) SIA alone, 2) VRIA alone and 3) Composite run with SIA and VRIA combined. These runs are discussed in the results section below. While the IFPA Base Case is not the same as that used in 2008 or in the latest timber supply review[3] (TSR4) for the Merritt Timber Supply Area (TSA), it does apply the same modeling methods except for the changes discussed below. An outline of these changes was provided to the Ministry of FLNR on August 18, 2011.

Updated TSR 4 Database: After the TSR4 was completed, it was discovered that the TSR 4 data package was missing many harvest depletions. These depletion updates were subsequently added to the TSR4 data, resulting in a "post-TSR4 dataset". Results from several model runs that used the updated post-TSR4 dataset were provided to and considered by the Chief Forester in his AAC Determination for the Merritt TSA. The updated post-TSR 4 dataset was used in this analysis, which had changed considerably from the one used in the 2003 innovative timber supply analysis[4], in support of the AAC uplift application.

MPB Epidemic: TSR 4 assumptions concerning MPB mortality and salvage harvesting were not included in this project in order to keep the analysis clearly focused on impacts from the SIA and VRIA projects. Inclusion of MPB mortality and salvaging works to shift harvest timing /levels over time, but will not change the additional harvest volumes that can be attributed to the innovative projects. Avoiding the complexity of MPB mortality, salvage uplifts shelf life dynamics, and regeneration patterns post MPB allows the analysis to more clearly illustrate the impacts of the innovative activities.

Other changes: Consistent with the latest AAC determination for the TSA, this analysis did not apply a smallwood partition. Since the MPB dynamics were eliminated, the analysis also applied a steady assumption for non-recoverable losses (143,628 m^3/yr) throughout the planning horizon. As well, the 300,000 m^3/yr loss to spruce-leading stands was maintained within the spruce bark beetle area (Smith-Willis LU and east side of Similkameen LU).

Innovative Forestry Practice - VRI Phase II/NVAF Adjustments: In 1999 the NSIFS initiated a VRI Phase II ground sampling project[5] to develop forest inventory adjustments to height, age and volume. The adjustments were updated in 2003[6] to incorporate results from the NVAF project and to apply the adjustment process used in the "Fraser Protocol". These VRI statistical adjustments were updated again in 2009[7] using VDYP7 which suggested inventory volumes in the Merritt TSA are underestimated by approximately 11.6% on average.

For this analysis, the IFPA Base Case applied unadjusted natural stand yields prepared using VDYP7. The VRIA sensitivity incorporated the statistical adjustments from the 2009[7] analysis.

Innovative Forestry Practice - Site Index Adjustment and Change Monitoring Inventory: In 2003 the NSIFS completed a SIA[2] project that developed reliable estimates of potential site index (PSI) for post-harvest regenerated (PHR) stands. On average, the adjusted PSI estimates were higher than indicated in the inventory by about 4.1 meters in the low elevation areas (i.e., less than 1,650 meters elevation), and 2.0 meters in the high elevation area.

A Change Monitoring Inventory[8] (CMI) first measurement was completed in the Merritt Timber Supply Area (TSA) between 2005 and 2007, which showed an average of about 57 m^3/ha more volume than indicated by the yield curves. The study also concluded that assumptions used to create the yield tables in the original AAC Uplift application were reasonable, if not conservative.

In this analysis, the IFPA Base Case applied the unadjusted inventory attributes to produce managed stand yields with TIPSY 4.1. The SIA sensitivity run applied the managed stand yield tables produced for TSR4[3]. These yields were generated using TIPSY 4.1 after applying the adjusted PSI estimates developed from the SIA[2] project for the low elevation areas. Yields for high elevation stands were generated from unadjusted PSI estimates. In this analysis, the

average increase in site index within the THLB was 3.36 meters.

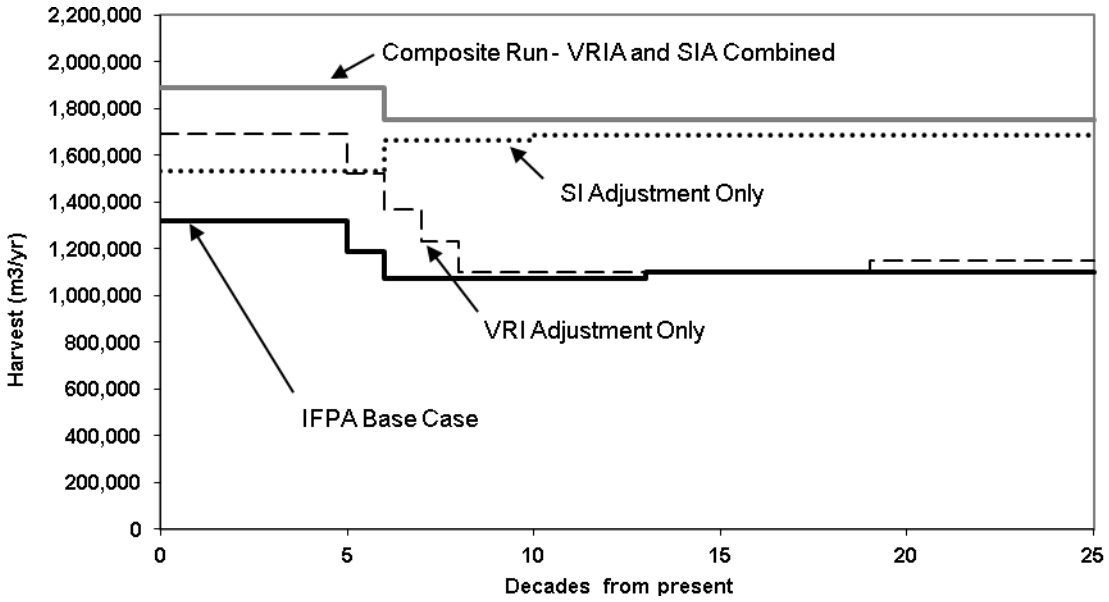
Results

The table below presents changes in potential annual harvest rates relative to the IFPA Base Case with corresponding results from the 2003 innovative timber supply analysis[4]:

Run/Sensitivity	Short-Term Decades 1-2	Mid-Term Decades 3-8	Long-Term Decades 9-25	2003 Uplift Analysis (Scenario)
IFPA Base Case	0	0	0	*0 (C)*
VRIA	370,000	317,585	26,706	*158,918 (D)*
SIA	210,000	359,933	589,706	*413,185 (E)*
Composite Run	570,000	628,933	659,059	*549,121 (K)*

The combined results from both the SIA and VRIA projects (i.e., Composite Run) increases the short-term harvest rate by 570,000 m^3/yr. This suggests an IFPA uplift of 570,000 m^3/yr – slightly larger than the 2003 uplift request (549,211 m^3/yr).

All four harvest flows are shown in the figure below. The absolute harvest rates are of less value than the differences between harvest flows because, as discussed earlier, there has been no attempt to reflect the MPB uplift/salvage or mortality currently occurring in the Merritt TSA. The differences between flows provide a clear indication of the impact of the innovative activities, individually and in composite.



The short term, and to some degree the mid-term, harvest levels are influenced by the standing volume of natural stands. Growth rates for managed stands typically govern the mid-term and long-term harvest levels. The harvest transition from predominantly natural stands to managed stands normally influences the mid-term harvest rate. But the short term harvest rate can also show an upward influence where higher growth rates from managed stands allow this transition

to occur earlier.

IFPA Base Case – This scenario applies the modeling methods used in the latest TSR4[3] for the Merritt TSA except for the changes discussed above. The IFPA Base Case run is used as the baseline from which to compare the outcomes associated with implementing the innovative activities.

VRI Adjustment – In this sensitivity, the higher starting harvest level is supported by higher starting forest inventory volumes. Over time, as natural stands are converted to post-harvested regenerated (PHR) stands, the harvest rate is governed by the managed stand growth rates. Since these PHR stands have the same growth rates as those in the IFPA Base Case, the long term harvest falls towards, and will eventually equal, the IFPA Base Case harvest levels. The VRIA sensitivity run suggests a short-term AAC increase of 370,000 m^3/yr.

SI Adjustment – In this sensitivity, the growth rates in PHR stands are much higher with the adjusted PSIs, so mid- and long-term harvest levels increase significantly. Moreover, earlier access to the high proportion of young and immature stands in the Merritt TSA supports an increased short term harvest rate, and natural stand volumes now have to be metered out over a shorter time frame. The SIA sensitivity suggests a short-term AAC increase of 210,000 m^3/yr.

Composite – This sensitivity combines assumptions from both the VRIA and SIA and suggests a short-term AAC increase of 570,000 m^3/yr.

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[1] Zacharatos, TP. 2005. Merritt Innovative Forestry Practices Agreements. Rationale for Increase in Allowable Annual Cut (AAC) Determination. Effective July 13, 2005. BC Ministry of Forests and Range, Kamloops, BC.

[2] Thrower, JS. 2003. Site Index Adjustment for the Merritt IFPA Area. Final Report. Prepared for the Nicola-Similkameen Innovative Forestry Society. Project: MTI-312. March 17, 2003. J.S. Thrower & Associates Ltd., Vancouver, Kamloops, BC.

[3] Davis, R. 2010. Merritt TSA Timber Supply Review #4. Timber Supply Analysis Report. Prepared for: Nicola-Similkameen Innovative Forestry Society. Final Version: April 28, 2010. Forsite Consultants Ltd., Cranbrook BC.

[4] Timberline Natural Resource Group Ltd. 2003. Innovative Timber Supply Analysis. Prepared for: Nicola-Similkameen Innovative Forestry Society, Merritt, BC. Final Draft. April 30, 2003. Timberline Natural Resource Group Ltd., Victoria, BC.

[5] Thrower, JS. 2001. Nicola-Similkameen Innovative Forestry Society. Vegetation Resources Inventory Statistical Adjustment for the Merritt TSA. Final Report. Prepared for Lloyd Wilson, R.P.F. Kamloops Forest Region, Ministry of Forests and Range, Kamloops, BC Project: MTI-181-216. March 31, 2001. JS Thrower & Associates Ltd., Vancouver, BC.

[6] Thrower, JS. 2003. Nicola-Similkameen Innovative Forestry Society. Vegetation Resources Inventory Statistical Adjustment for the Merritt TSA. Final Report (2003 Update). Project: MTI-416. March 31, 2003. JS Thrower & Associates Ltd., Vancouver, BC.

[7] Churlish, G. and Jahraus, K. 2009. Merritt TSA - Documentation of Analysis for Vegetation Resources Inventory Statistical Adjustment. Draft report. Prepared for: Nicola-Similkameen Innovative Forestry Society, Merritt, BC. November 2009. Jahraus & Associates Consulting Inc., Maple Ridge, BC, and Churlish Consulting Ltd., Victoria, BC.

[8] Ewen, S. 2008. Merritt Timber Supply Area Change Monitoring Inventory: First Measurement. Prepared for: Nicola-Similkameen Innovative Forestry Society, Merritt, BC. Project Number: BC0108620. March 2008. Timberline Natural Resource Group Ltd., Kamloops, BC.