WESTERN FOREST PRODUCTS LTD.
TFL 25 BLOCKS 1, 2 & 3
VEGETATION RESOURCES INVENTORY
STATISTICAL ADJUSTMENT

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EXECUTIVE SUMMARY

Western Forest Products Ltd. initiated a Vegetation Resources Inventory (VRI) program in 1998 on Tree Farm Licence (TFL) 25 Blocks 1, 2 & 3 to Ministry of Forests and Range (MFR) inventory standards. Phase II programs were designed and implemented separately for Block 1 and Blocks 2 & 3. The Block 1 Phase II program was completed over the 1998 and 1999 field seasons and Block 2 & 3 sampling program was completed during the 2003 field season.

In May 2007, Timberline Natural Resource Group Ltd. was asked to complete the inventory adjustments for Block 1 and Block 2 & 3 in preparation for the upcoming Timber Supply Review. Height, age, and total live net merchantable volume (17.5+ cm) were adjusted following standard MFR inventory methods.

The target population in Block 1, where the adjustment was applied, is the Vegetated Treed (VT) (BC Landcover Classification Scheme) portion of the TFL over 30 years of age (in 2001). The target population covers 22,397 ha.

Following adjustment, the Block 1 inventory **volume decreased by approximately 3.4%**. **Height decreased by 7% and age increased by 1%** and **site index decreased by 1.4%**.

The Block 2 & 3 target population, where the adjustment was applied, is the VT portion of the TFL over 30 years of age (in 2001) excluding private lands, parks and other officially protected areas. The target population covers 38,305 ha.

Following adjustment, the Block 2 & 3 inventory **volume increased by approximately 18%**. **Height and age increased by 2.4% and 33.5%, respectively** and **site index decreased by 9.7%**. The recommendations from this report are that Western uses the adjusted estimates of height, age, and volume for the upcoming TSR.

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1.0 INTRODUCTION

1.1 Background

1.1.1 Vegetation Resources Inventory Overview

The Vegetation Resources Inventory (VRI) is the Ministry of Forests and Range's (MFR) forest inventory standard on public lands in BC. Where possible, forest licensees must use the VRI standard in their Data Package submission for Timber Supply Review (TSR).

The VRI is a four-step process (Figure 1):

1. Phase I (unadjusted inventory data) – Estimates of polygon attributes are derived for the target population, usually from photo-interpretation.
2. Phase II (ground sample data) – Measurements are taken from randomly located ground samples in the target population.
3. Net Volume Adjustment Factor (NVAF) sampling – Random trees are selected for stem-analysis, from the Phase II samples, to develop adjustment ratios that correct taper and decay estimation bias.
4. Adjustment Phase – The Phase I estimates are adjusted using the NVAF-corrected Phase II ground samples to provide an adjusted unbiased estimate of forest inventory attributes. The final product is an adjusted VRI database (Section 3.4; Figure 5).

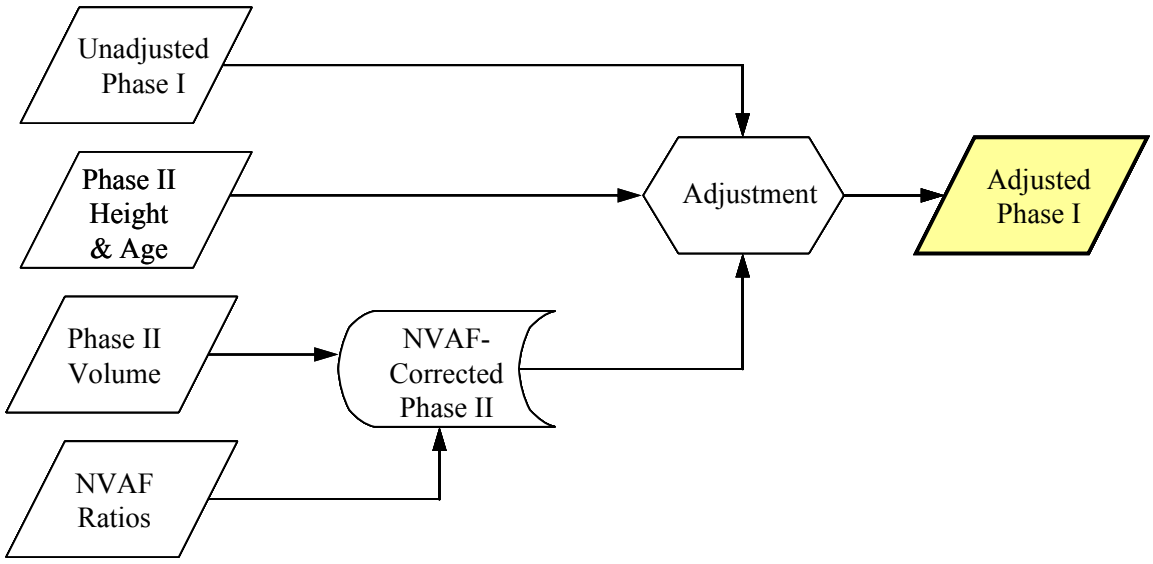

Figure 1: VRI program overview

1.1.2 VRI Program Background

Dave Byng, *RPF* led implementation of Western Forest Products Ltd. (Western) TFL 25 Blocks 1, 2 & 3 VRI Phase II programs. In March 2006, Guillaume Thérien, *PhD* of Timberline Natural Resource Group Ltd. (Timberline) assisted Dave by completing statistical analysis of the data and developing preliminary adjustment factors for TFL 25 Blocks 1, 2 & 3.[1] Patrick Bryant, *RPF* of Western approached Timberline in March 2008 seeking to update the inventory with Net Volume Adjustment Factor (NVAF) data, readjust the inventory according to the most current VRI statistical adjustment standards[2] (i.e. only adjust polygons greater than 30 years), and to document the adjustment results.

1.2 Project Objectives

The objective of this project was to complete a statistical adjustment of the TFL 25 block 1, 2 & 3 Phase I VRI to the most recent MFR standards[2] using Phase II and NVAF data, and report on the results.

1.3 Terms of Reference

Timberline prepared this report for Patrick Bryant of Western. Stephanie Ewen, *BSF*, *FIT* was the lead analyst and prepared the report. Technical support was provided by Guillaume Thérien and the project manager was Hamish Robertson, *RPF*. This report will be provided to the MFR Forest Analysis and Inventory Branch (FAIB) for review and comment prior to its use in Timber Supply Review (TSR).

[1] J.S. Thrower & Associates Ltd. 2005. Contract for Western Forest Products Ltd. (Project no. WPC-006).

[2] This analysis was completed in the spring of 2008 using VDYP (version 6.6d).

2.0 DATA

2.1 Landbase

TFL 25 spans 458,447 ha across five non-contiguous blocks spread in five separate coastal Forest Districts. All five blocks are predominantly within the Coastal Western Hemlock biogeoclimatic zone, with small areas of Blocks 2 and 5 in the Mountain Hemlock zone. The principal tree species are western hemlock (Hw) and western redcedar (Cw), which are found in all blocks. Block 1 is the only block with a substantial component of Coastal Douglas-fir (Fdc) (44 percent of the timber harvesting land base). For this report, only the inventories in Blocks 1, 2 & 3 were adjusted (Figure 2).

Block 1 is bounded by TFL 46 to the northwest and the Arrowsmith Timber Supply Area (TSA) to the east and south. The terrain is generally moderate in slope, but is dissected by steep-sided creeks. The major waterways are the Jordan River and Sombrio, Loss, Noyse, and Muir creeks. Block 1 has the longest harvest history of the five, with operations dating back to 1857, but still contains significant areas of old growth.

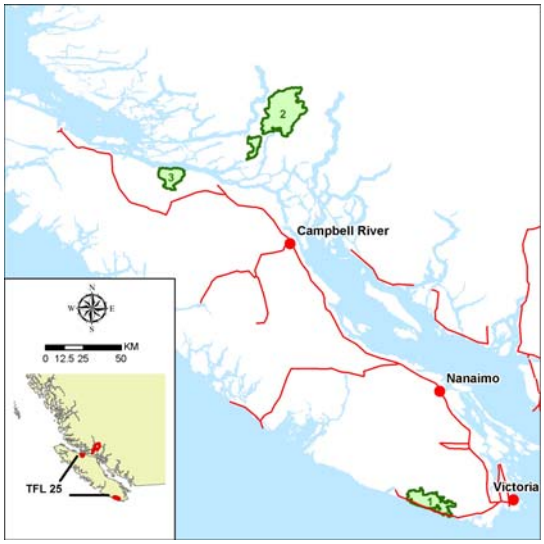

Figure 2: Location of TFL 25, Blocks 1, 2 & 3

Block 2 borders TFL 45 to the north, the Kingcome TSA to the west, TFL 47 and the Strathcona TSA to the south, and TFL 39 to the east. The block is split among four sub-units: Heydon Bay, Apple River, Frazer Bay and Stafford River. The topography is relatively rugged, with steep-sided valley walls and flat valley bottoms; consequently, only 24 percent of the total land base is considered operable. Hw is the major species, but there are substantial areas of Cw and amabilis fir (Ba). Fdc grows only on some drier, well-drained sites. Harvesting in most areas began in the 1960s and 1970s.

Block 3 is located between Campbell River and Port McNeill along Johnstone Strait and is surrounded by TFL 39. The Peel, Naka, Teissum and Cedarstadt watersheds and part of the Tsitika watershed lie within its borders. Most of the landbase is below 1000 m in elevation, and the terrain features moderately sloped valleys. Hw and Cw are the most common tree species. Harvesting began in 1974, and substantial areas of old growth remain.

2.2 Block 1 Statistics

2.2.1 Target Population

Block 1 is 30,354 ha of which 22,397 ha are in the target population (Table 1).[3] The target population is all forested stands in Block 1 over 30 years (in 1999), excluding private lands, parks and other officially protected areas. The Block 1 Phase I inventory provides the basis for sampling. The main tree species in the target population are Fdc (37%) and Hw (33%), reported by area as a leading species.

Table 1: Block 1 netdown summary

Landclass	Area (ha)	%
Total Area	30,354	100
Age Unknown	1,084	4
Under 30 years	6,873	23
Target Population	**22,397**	***74***

2.2.2 Stratification

The Phase I population was stratified based on age (Table 2). "Second Growth" stands were established on or after 1879 (≤ 120 years in 1999), while "Old Growth" stands were established before 1879 (> 120 years in 1999). Adjustment ratios were calculated at the strata level. Strata were also used to distribute samples.

Table 2: Block 1 stratification summary

Stratum	Area (ha)	% Pop.
Second Growth	14,249	64
Old Growth	8,148	36
Total	***22,397***	***100***

2.2.3 Phase I (Photo-Interpretation) inventory statistics

Overall average net merchantable volume (17.5 cm utilization) in the unadjusted Phase I population was 405.4 m^3/ha as projected to 1999 (Table 3). Average site index was approximately 30 m and 14 m in the "Second Growth" and "Old Growth" strata, respectively. Average age was approximately 50 years and 302 years for the "Second Growth" and "Old Growth" strata, respectively.

Table 3: Unadjusted Inventory Statistics for the Block 1 Target Population

Stratum	Area (ha)	Mean Age (yrs)	Mean Height (m)	Mean SI (m)	Mean Vol. 17.5cm+ (m^3/ha)
Second Growth	14,249	50	26.1	30.1	344.3
Old Growth	8,148	302	32.2	13.8	512.2
Total	***22,397***	***141***	***28.3***	***24.2***	***405.4***

Note: Phase I (photo-interpretation) volume is net merchantable volume as predicted from VDYP version 6.6d.

[3] The target population was identified from the 2006 Forest Cover database where records existed in the "treelayer" table with a "descriptor" = "FOR" and an age (at time of sampling) in the inventory ≥ 30 years. The assumption is made that all private lands, parks and other officially protected areas were excluded from the total area of the TFL in the initial GIS data.

2.2.4 Phase II sample size

One hundred thirty (130) plots were intended to be established in Block 1 in 1999, 120 of which were intended to be in the target population.[4] UTM coordinates were only available for 126 plots, indicating only 126 plots were sampled. Likely, the remaining four plots were not sampled due to safety or access issues.[5] Of the 126 plots, 12 were located in non-forested polygons; one was established in a logged stand; and 26 were located inside the target population, but were less than 30 years of age (Phase I) (Table 4). The total actual sample size was 87 plots (Appendix I).

Table 4: Block 1 plot distribution by landclass

Landclass	n	(%)
Non-forested	12	10
Logged	1	1
Under 30 years	26	21
Target Population	***87***	***69***

The plots covered the entire target population and their distribution is shown in Figure 3.

2.2.5 Phase II sampling weights

Sampling weights were determined from the total actual number of plots sampled from within the target population. The sample plan[1] notes that samples were selected at the stratum level, and therefore weights were also calculated at the stratum level (Table 5).

Table 5: Block 1 Phase II plot sampling weights

Stratum	Area (ha)	n	Area/n
Second Growth	14,249	60	237.5
Old Growth	8,148	27	301.8

2.2.6 Sample statistics

The Phase II plot statistics showed that on average, the "Second Growth" stands were 27 m tall, 52 years of age, had a site index of 30 m, and produced approximately 320 m^3/ha of merchantable volume. Conversely, the "Old Growth" stands were 24 m tall, 306 years of age, had a site index of 11 m, and produced approximately 500 m^3/ha of merchantable volume, on average (Table 7). The average unadjusted Phase I height, age and site index in "Second Growth" stands appears comparable to the Phase II measurements. However, volume appears slightly over-predicted (Table 6). In "Old Growth" stands, the unadjusted Phase I height and site index appear over-predicted, while volume appears under-predicted and ages appear reasonable. The Phase I and Phase II data for each sample is provided in Appendix II.

Table 6: Phase I Statistics for Block 1 Samples

Stratum	Height (m)	Age (yrs)	SI (m)	Vol. 17.5cm+ (m^3/ha)
Second Growth	26.9	51	30.2	380.0
Old Growth	28.6	306	12.3	448.9
Total	***27.4***	***137***	***24.2***	***405.0***

[4] Western Forest Products Limited. 1998. Re-Inventory of TFL 25 – Block 1: Phase II Ratio Adjustment Sampling. Unpublished Report. July 7, 1998. The remaining 10 plots were installed in a non-forested stratum.

[5] This has not been confirmed with Western, but was the reasoning found in other, similar projects.

Table 7: Phase II Statistics for the Block 1 Samples

Stratum	Height (m)	Height Sample Size (n)	Age (yrs)	Age Sample Size (n)	SI (m)	SI Sample Size (n)	Vol. 17.5cm+ (m^3/ha)	Vol. Sample Size (n)
Second Growth	26.6	57	52	57	30.3	23	322.6	60
Old Growth	24.1	23	307	23	10.7	57	494.5	27
Total	***25.8***	***80***	***138***	***80***	***23.6***	***80***	***385.2***	***87***

Note: Phase II volume was whole-stem volume less tops, stumps, NVAF-corrected cruiser-called decay, waste, and breakage.

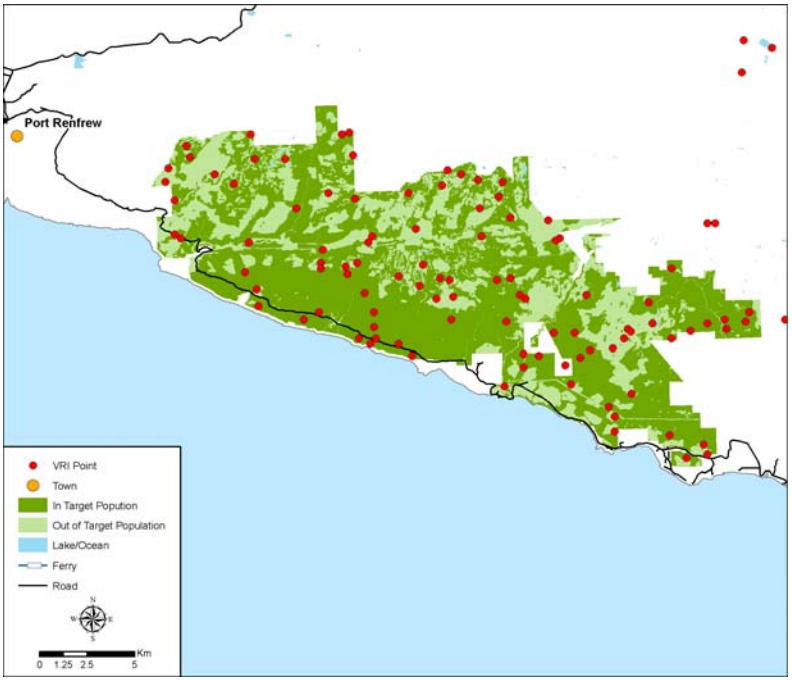

Figure 3: Block 1 Phase II plot locations

2.3 Block 2 & 3 Statistics

2.3.1 Target Population

Blocks 2 & 3 cover 65,185 ha, of which 38,305 ha are in the target population (Table 8).[6] The target population is the Vegetated Treed (VT) (BC Landcover Classification Scheme) portion of the two blocks over 30 years (in 2004), excluding private lands, parks and protected areas. The Phase I provided the basis of units to be sampled. The main tree species in the target population are Hw (40%) and Cw (25%), reported by area as a leading species.

Table 8: Block 2 & 3 netdown summary

Landclass	Area (ha)	%
Total	65,185	100
Productivity Class Unknown	6,599	10
Low Productivity & Old	11,994	18
Under 30 years old	8,287	13
Target Population	***38,305***	***59***

2.3.2 Stratification

The Phase I population was stratified based on age class (Table 9). "Young" stands[7] were established in or after 1863 (≤ 141 years in 2004), while Old stands were established before 1863 (> 141 years in 2004). The "Old" stratum was sub-stratified into species groups based on Phase I leading species.[8]

Adjustment ratios were calculated at the strata level. Sub-strata were used to distribute samples.

Table 9: Block 2 & 3 stratification summary

Stratum	Sub-Stratum	Area (ha)	% Population	% Stratum
Young	*All*	*7,001*	*18.3*	*100*
Old	Hw	18,040	47.1	57.6
Old	Cw	13,264	34.6	42.4
Old	*Total*	*31,304*	*81.7*	*100*
Total	***Total***	***38,305***	***100***	

2.3.3 Phase I inventory statistics

Overall average net merchantable volume (17.5 cm utilization) in the unadjusted Phase I population was 481.2 m^3/ha as projected to 2004 (Table 10). Average site index was approximately 24.4 m and 14 m in

[6] The target population was identified from the 2006 Forest Cover database where records existed in the "treelayer" table, had an age (at time of sampling) in the inventory ≥30 years, a populated spp1, a populated productivity group (prod_group), and was not a low productivity (volume at time of sampling < 200 m^3/ha) "Old Growth" (age at time of sampling >141 years) stand. The assumption is made that all private lands, parks and other officially protected areas were excluded from the total area of the TFL in the initial GIS data.

[7] The sample plans showed that Block 1 stratification was based on Old Growth and Second Growth, while the Block 2 & 3 stratification was based on "Young" and "Old" stands.

[8] The "Cw" species group includes stands that are Cw, Yc (yellow cedar), Dr (red alder), Pl (shore pine), Pw (white pine) or Ac (black cottonwood) leading. The "Hw" species group includes stands that are Hw, Ss (sitka spruce), Ba, Hm (mountain hemlock), or Fdc leading.

the "Young" and "Old" strata, respectively. Average age was approximately 58 years and 276 years for the "Young" and "Old" strata, respectively.

Table 10: Unadjusted Inventory Statistics for the Block 2 & 3 Target Population

Stratum	Area (ha)	Mean Age (yrs)	Mean Height (m)	Mean SI (m)	Mean Vol. 17.5cm+ (m^3/ha)
Young	7,001	58	23.9	24.4	323.0
Old	31,304	276	32.6	13.9	516.6
Total	***38,305***	***236***	***31.0***	***15.8***	***481.2***

Note: Phase I volume is net merchantable volume as predicted from VDYP version 6.6d

2.3.4 Phase II sample size

Ninety-eight (98) plots were established in Blocks 2 & 3 in 2003.[9,10] Of the 98 plots, seven were located in the original sample area, but were less than 30 years in the Phase I (Table 11). The total actual sample size was 91 plots (Appendix I).

The plots covered the entire target population and their distribution is shown in Figure 4.

Table 11: Block 2 & 3 plot distribution by landclass

Landclass	n	%
Under 30 years old	7	7
Target Population	***91***	***93***

2.3.5 Phase II sampling weights

Sampling weights were calculated using the total number of plots sampled from within the target population. According to the sample plan, samples were selected at the sub-stratum level, and therefore weights were also calculated at the sub-stratum level (Table 12).

Table 12: Block 2 & 3 Phase II plot sampling weights

Stratum	Sub-Stratum	Area (ha)	n	Area/n
Young	All	7,001	18	388.9
Old	Cw	13,264	31	427.9
Old	Hw	18,040	42	429.5

2.3.6 Phase II sample statistics

The Phase II plot statistics showed that on average, the "Young" stands were 28 m tall, 88 years of age, had a site index of 25 m, and produced approximately 390 m^3/ha of merchantable volume. Conversely, on average, the "Old" stands were 33 m tall, 356 years of age, had a site index of 15 m, and produced approximately 680 m^3/ha (Table 13). In "Young" stands, the average unadjusted Phase I height, age, site index and volume appear under-predicted when compared to the average Phase II values (Table 14). In "Old" stands, the unadjusted Phase I height and site index are comparable to the actual Phase II values for

[9] Western Forest Products Limited Ltd. 2003. Tree Farm License 25 Blocks 2 & 3: Loughborough Inlet and Naka Creek Timber Emphasis VRI Ground Sampling Plan. Unpublished Report. May 2003.

[10] 100 plots were intended, however, actual UTM coordinates were only available for 98 plots at the time of analysis. It was assumed that if no UTMs were available, the plot was not established. Patrick Bryant indicated that all 100 plots had been established; however, not all UTMs were made available for the analysis.

height and site index. However, Phase I ages and volumes appear under-predicted. The Phase I and Phase II data for each sample is provided in Appendix II.

Table 13: Phase I Statistics for the Block 2 & 3 Samples

Stratum	Sub-Stratum	Height (m)	Age (yrs)	SI (m)	Vol. 17.5cm+ (m^3/ha)
Young	*Total*	*24.4*	*63*	*24.4*	*354.0*
Old	Cw	30.1	271	13.6	496.8
Old	Hw	34.9	264	14.4	590.6
Old	*Total*	*32.9*	*267*	*14.0*	*550.9*
Total		***31.2***	***231***	***16.0***	***514.9***

Table 14: Phase II Statistics for the Block 2 & 3 Samples

Stratum	Sub-Stratum	Height (m)	Height Sample Size (n)	Age (yrs)	Age Sample Size (n)	SI (m)	SI Sample Size (n)	Vol. 17.5cm+ (m^3/ha)	Vol. Sample Size (n)
Young	*Total*	*28.2*	*17*	*88*	*17*	*25.1*	*17*	*385.3*	*18*
Old	Cw	31.2	28	405	30	13.8	28	630.1	31
Old	Hw	34.3	38	320	41	15.6	38	724.4	42
Old	*Total*	*33.0*	*66*	*356*	*71*	*14.8*	*66*	*684.5*	*73*
Total		***32.0***	***83***	***308***	***88***	***16.8***	***83***	***629.8***	***91***

Note: Phase II volume was whole-stem volume less tops, stumps, NVAF-corrected cruiser-called decay, waste, and breakage.

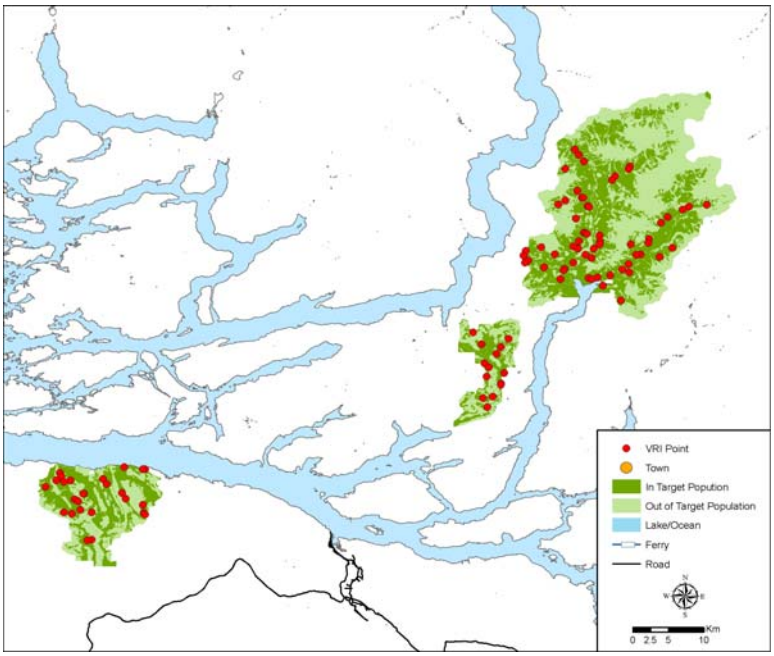

Figure 4: Block 2 & 3 Phase II plot locations

3.0 METHODS

3.1 Phase I Projection

In Block 1, Phase I interpretation was completed to standard in 1999 based on 1993 photos. The Block 1 Phase I data used in this analysis included some legacy data dating back to 1987 and denudation and regeneration updates up to and including 2004.

In Blocks 2 & 3, the last full-scale inventory was completed in 1971. The inventory was partially updated for second growth stands in 2001. The Block 2 & 3 Phase I data used in this analysis also includes denudation and regeneration updates up to and including 2004.

Photo-interpreted age was projected to the year of sampling[11] by adding the required number of years. The photo-interpreted height, stocking class, and corresponding net merchantable volume were projected to the year of sampling using VDYP *version 6.6d*. All other VDYP inputs (species composition, crown closure, forest inventory zone, and public sustained yield unit) were not modified.

3.2 NVAF

NVAF ratios were generated by Will Smith, MFR and provided to Western for the adjustment analysis (Table 15 & Table 16).[12]

Table 15: NVAF ratios for Block 1

Live / Dead	Maturity	Species Group	NVAF Ratios
Live	All	All	0.95040
Dead	All	All	0.66505

Table 16: NVAF ratios for Block 2 & 3

Live / Dead	Maturity	Species Group	NVAF Ratios
Live	Immature	All	0.98846
Live	Mature	C	1.13870
Live	Mature	Rest	0.94689
Dead	All	All	0.77298

3.3 Phase II Compilation and Data Screening

The Phase II data was compiled using the MFR SAS VRI Phase II compiler (June 27, 2002 version). Dead trees (standing and fallen) were recorded in all auxiliary plots. The provided NVAF ratios were then applied to the compiled Phase II volumes. The SAS compiler has built-in error checking and validation routines to identify potential problems in the Phase II field data. No outstanding errors were encountered in the compilation.

[11] Block 1 = 1999; Block 2 & 3 = 2004

[12] Downloaded from Western's FTP site March 17, 2008.

3.4 Statistical Adjustment

The most recent MFR VRI statistical adjustment standards[13] were used to adjust height, age, and live net merchantable volume. The MFR adjustment procedures assume that the unadjusted (Phase I) inventory volume is biased due to two sources of error:

1. An attribute bias associated with the photo-interpreted height and age; and
2. A model bias inherent to the growth and yield model used to estimate volume (*VDYP version 6.6d*).

Three attributes needed for volume prediction are not directly adjusted in this process. A new stocking class is derived by *VDYP* using adjusted age, while there are no acceptable standards for species composition and crown closure adjustment. Leaving these attributes unadjusted is assumed to create a negligible bias.

The attribute adjustment procedure (Step 4 Section 1.1.1; "Adjustment" in Figure 1) is a two-step process called the Fraser Method (Figure 5) and is described as follows:

> Step 1: Phase I height and age bias are corrected using an adjustment ratio of means (ROM) calculated from the Phase I (height or age) and the Phase II plots. An attribute-adjusted volume is then estimated using VDYP with the adjusted height and age.
>
> Step 2: An adjustment ROM estimated from the attribute-adjusted volume and the NVAF-corrected Phase II volume is calculated, and this ratio is used to correct the model bias in the attribute-adjusted volume.

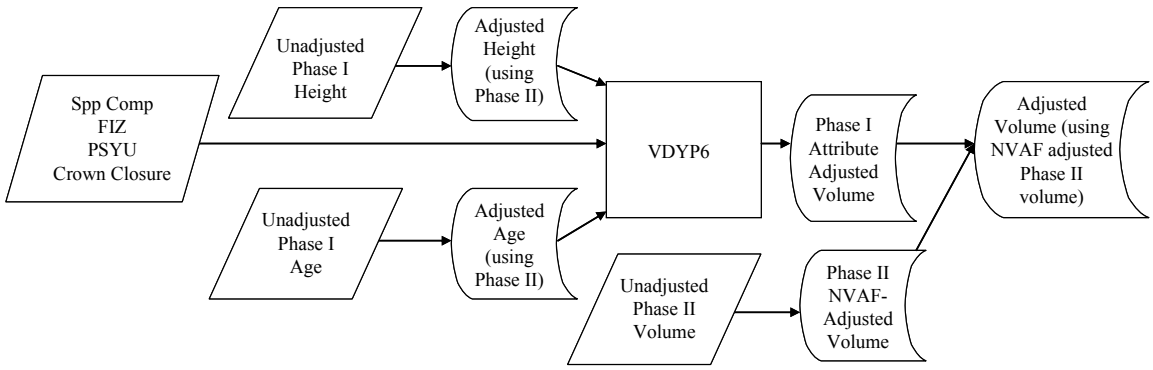

Figure 5: Fraser method

Although some adjustment ratios below are provided to the sub-stratum level, they were applied to the inventory at the stratum (maturity class) level.

[13] VRI Procedures and Standards for Data Analysis Attribute Adjustment and Implementation of Adjustment in a Corporate Database, Version 2.0, March 2004.

4.0 RESULTS

4.1 Block 1 Results

4.1.1 Height

Seven (7) plots were dropped from the analysis because the top-height tree measurements did not match the polygon-leading-species in the inventory, leaving 80 plots available for analysis.[14] Of these 80 plots, 57 and 23 plots were in the "Second Growth" and "Old Growth" strata, respectively. On average, inventory height was over-estimated by 7%; the "Old Growth" stratum and "Second Growth" stratum were overestimated by 16% and 1%, respectively (Table 17, Figure 6). The 95% sampling error was small (4.4%).

Table 17: Height adjustment statistics for the Block 1 target population

Stratum	Unadjusted Pop.		n	Sample		ROM	Adjusted Pop.		
	Area (ha)	Avg. (m)		Phase I (m)	Phase II (m)		Adj. Avg. (m)	95% E (m)	95% E (%)
Second Growth	14,249	26.1	57	26.9	26.6	0.990	25.8	1.6	6.2
Old Growth	8,148	32.2	23	28.6	24.1	0.843	27.1	1.6	5.9
Total	***22,397***	***28.3***	***80***			***0.929***	***26.3***	***1.2***	***4.4***

[14] Lack of suitable heights and ages is the result of the species matching procedure. For the majority of the plots dropped, it is because the leading species in the field cannot be matched to the leading or secondary species in the Phase I data. The remaining plots were dropped because Phase II height or age was called "unsuitable" by field crews.

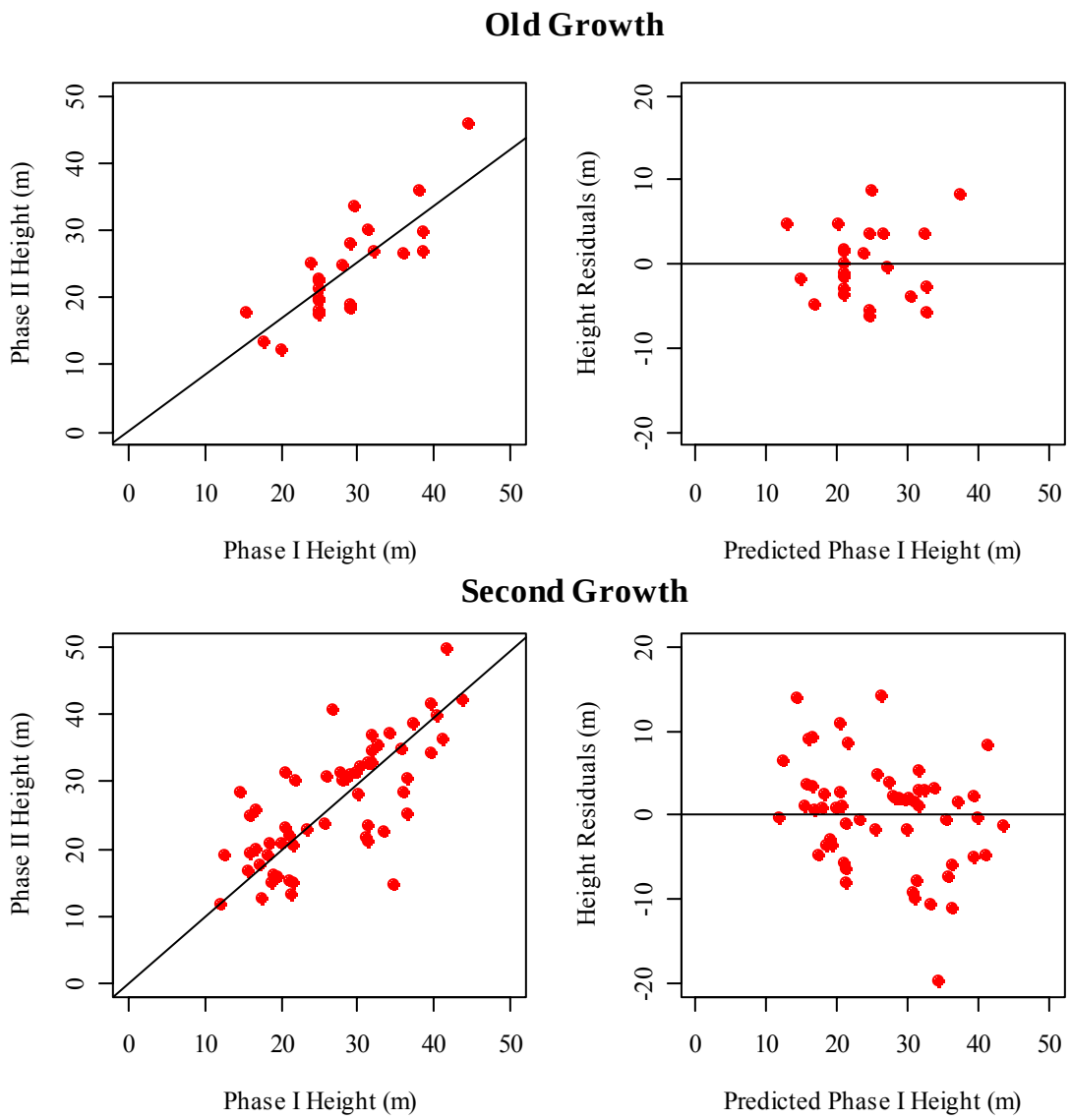

Figure 6: Block 1 height scatterplots

4.1.2 Age

Seven (7) plots were dropped from the analysis because the top-height tree measurements did not match the polygon-leading-species in the inventory, leaving 80 plots for analysis.[1] Of these 80 plots, 57 and 23 plots were in the "Second Growth" and "Old Growth" strata, respectively. On average, inventory age was under-estimated by a minimal amount (0.7%, Table 18). This under-estimation was common to both strata. The 95% sampling error was higher than the sampling error for height (8.9% versus 4.4%). This may be associated with age class mid-pointing in the Phase I age estimation process. Figure 7 shows the same Phase I age estimate for a range of measured Phase II ages in the "Old Growth" strata.

Table 18: Age adjustment statistics for the Block 1 target population

Stratum	Unadjusted Pop.		n	Sample		ROM	Adjusted Pop.		
	Area (ha)	Avg. (yrs)		Phase I (yrs)	Phase II (yrs)		Adj. Avg. (yrs)	95% E (yrs)	95% E (%)
Second Growth	14,249	49.9	57	50.8	52	1.024	51.1	4.9	9.6
Old Growth	8,148	301.5	23	306.2	307	1.003	302.3	35.4	11.7
Total	***22,397***	***141.5***	***80***			***1.007***	***142.5***	***12.7***	***8.9***

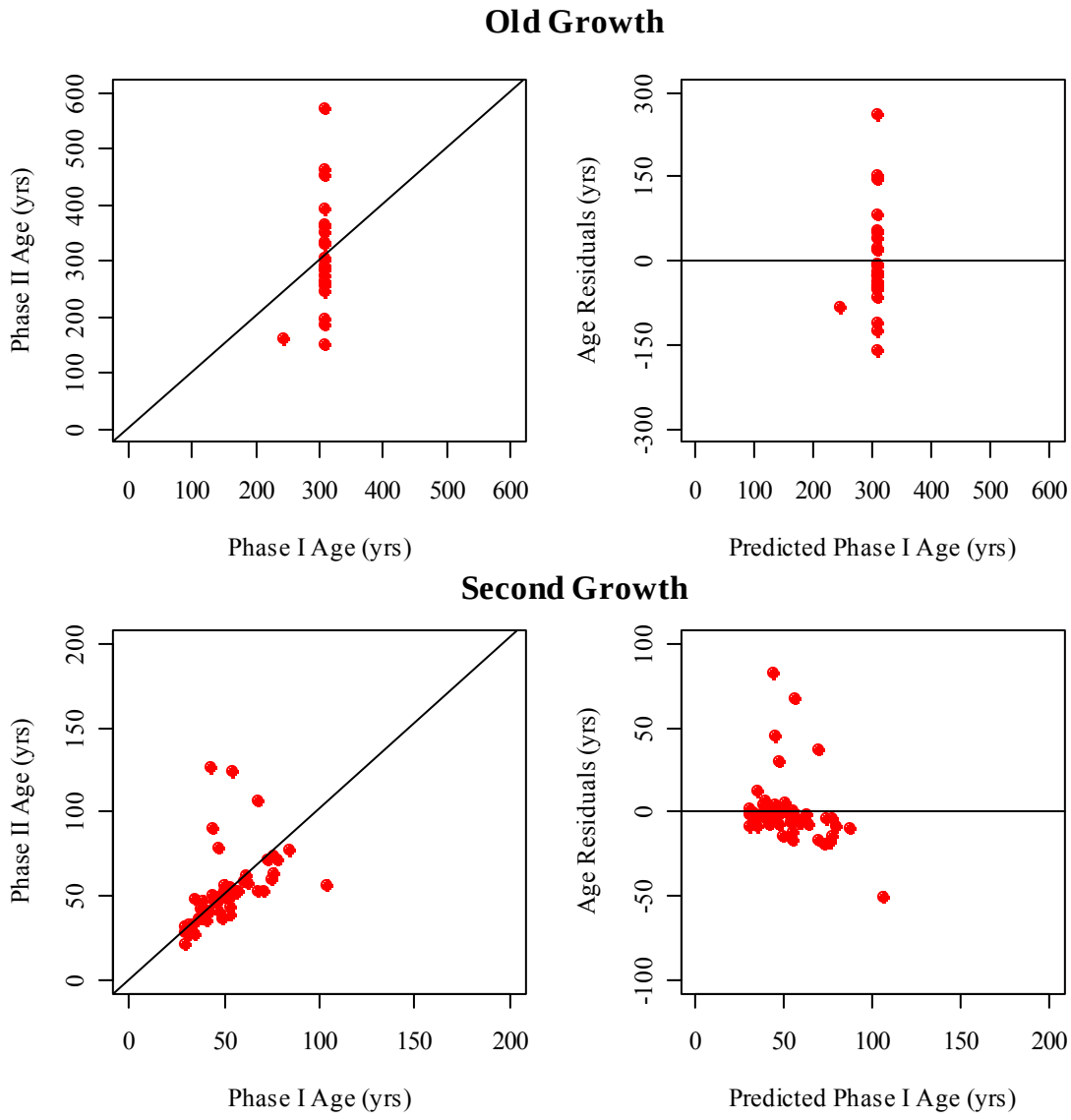

Figure 7: Block 1 age scatterplots

4.1.3 Attribute-Adjusted Volumes for the Block 1 Target Population

VDYP volumes were re-estimated using the adjusted height and age inputs (Figure 5). Attribute-adjusted volumes decreased by 1% and 27% in the "Second Growth" and "Old Growth" strata, respectively, when compared to the Phase I volumes (Table 19). Overall, volumes decreased by 12% relative to the unadjusted inventory volumes. The reduced volume in the "Old Growth" stratum reflects a decrease in height averaging 5.1 m (the main driver of volume for older stands). Decreased overall volume is reflective of an overall decrease in height averaging 2.0 meters.

Table 19: Volume (m^3/ha) change in the Block 1 target population due to attribute adjustments

Stratum	Area (ha)	Unadjusted Inventory	Attribute-Adjusted Inventory	Difference	
				Vol.	(%)
Second Growth	14,249	344.3	340.9	-3.4	-1.0
Old Growth	8,148	512.2	402.7	-109.5	-27.2
Total	***22,397***	***405.4***	***363.4***	***-42.0***	***-11.6***

4.1.4 Site Index

Site index is not directly adjusted in the VRI standard statistical adjustment. Instead, an adjusted site index is derived from the adjusted height and age. The average attribute-adjusted inventory site index is 22.8 m, a decrease of approximately 1.4 m (Table 20). The decrease in site index reflects the decrease in height while age remained relatively constant.

Table 20: Site index change due to attribute adjustments

Stratum	Area (ha)	Site Index (m)	Adjusted SI (m)	Difference	
				(m)	(%)
Second Growth	14,249	30.1	29.3	-0.8	-2.7
Old Growth	8,148	13.8	11.5	-2.3	-20.0
Total	***22,397***	***24.2***	***22.8***	***-1.4***	***-6.0***

4.1.5 Live Net Merchantable Volume

All NVAF-corrected Phase II observations were used to compute the volume ratios. The live net merchantable volume increased by 7.9% after adjustment (Table 21, Figure 8). The target sampling error (10%) was met for the overall target population at the 17.5 cm utilization level.

Table 21: Block 1 adjustment statistics for live merchantable volume (17.5+ cm)

Stratum	Attr. Adjusted Vol.		n	Sample		ROM	Adjusted Population		
	Area (ha)	Avg. (m^3/ha)		Phase I (m^3/ha)	Phase II (m^3/ha)		Avg. (m^3/ha)	95% E (m^3/ha)	(%)
Second Growth	14,249	340.9	60	376.1	322.6	0.858	292.4	39.4	13.5
Old Growth	8,148	402.7	27	351.8	494.5	1.405	565.8	82.5	14.6
Total	***22,397***	***363.4***	***87***			***1.079***	***391.9***	***38.3***	***9.8***

Note: Phase I volume is the attribute-adjusted net merchantable volume as predicted from VDYP version 6.6d using adjusted heights and age. Phase II volumes have been adjusted with the appropriate NVAF ratios to remove bias from cruiser-called decay values.

4.1.6 Unadjusted vs. Adjusted Volume

Following adjustment, the live volume decreased by approximately 13.5 m^3/ha (or 3.4%) when compared to the unadjusted live volumes at 17.5+ cm utilization level (Table 22).

Table 22: Volume change in the Block 1 target population after ratio adjustment

Stratum	Area (ha)	Unadjusted (m^3/ha)	Adjusted (m^3/ha)	Difference	
				(m^3/ha)	(%)
Second Growth	14,249	344.3	292.5	-51.8	-17.7
Old Growth	8,148	512.2	565.8	53.6	9.5
Total	***22,397***	***405.4***	***391.9***	***-13.5***	***-3.4***

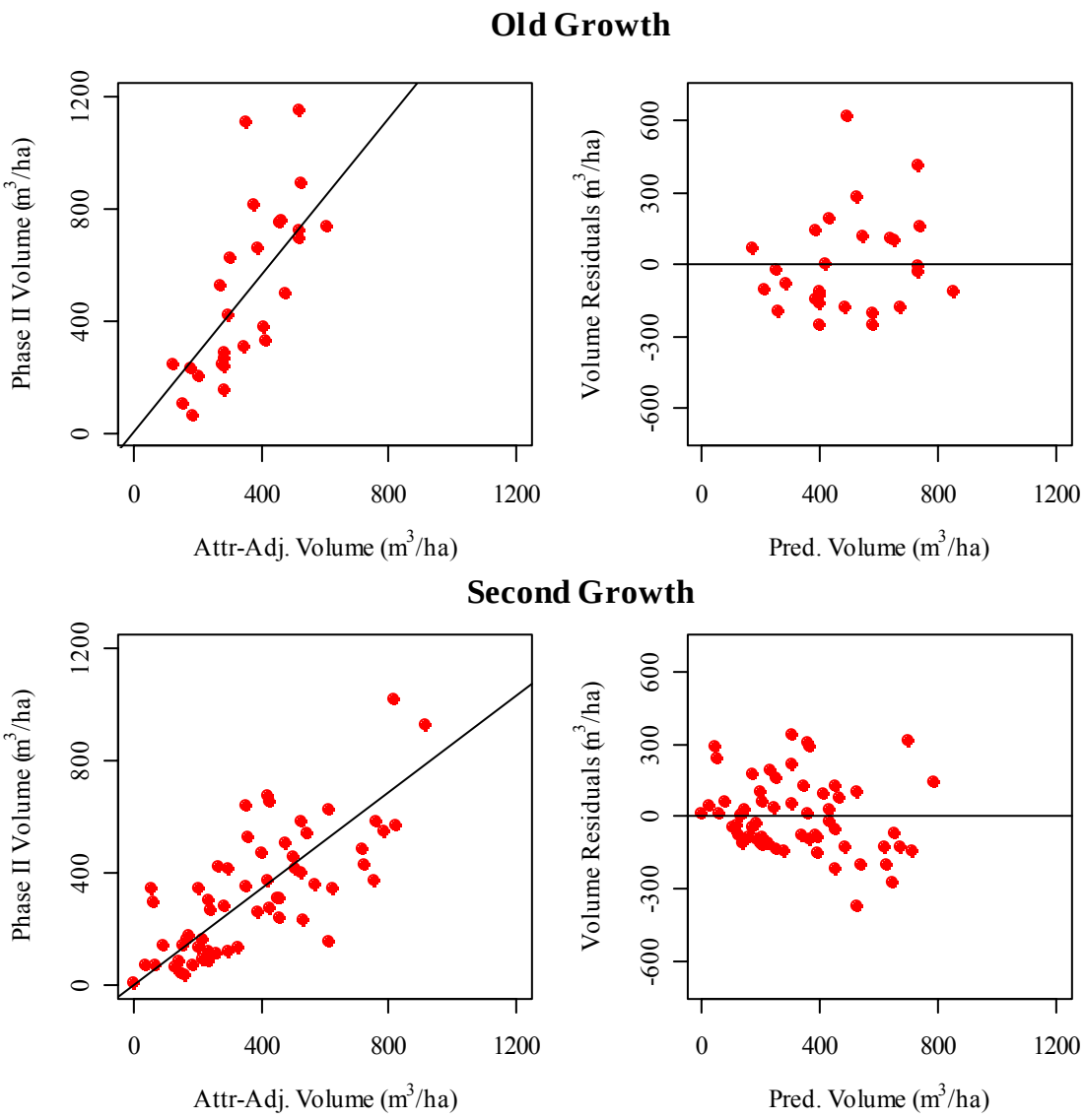

Figure 8: Block 1 live volume 17.5+ scatterplots

4.2 Block 2 & 3 Results

4.2.1 Height

Eight (8) plots were dropped from the analysis because the top-height tree measurements did not match the polygon-leading-species in the inventory, leaving 83 plots available for analysis.[1] Of these 83 plots, 17 and 66 plots were in the "Young" and "Old" strata, respectively. On average, inventory height was slightly biased (under-estimation of 2%, Table 23, Figure 9). Inventory height was more dramatically under-estimated in the "Young" stratum than in the "Old" stratum. The 95% sampling error was small (4.7%).

Table 23: Height adjustment statistics for the Block 2 & 3 target population

Stratum	Sub-Stratum	Unadjusted Pop.		N	Sample		ROM	Adjusted Population		
		Area (ha)	Avg. (m)		Phase I(m)	Phase II (m)		Adj. Avg. (m)	95% E	
									(m)	(%)
Young	*Total*	*7,001*	*23.9*	*17*	*24.4*	*28.2*	*1.155*	*27.6*	*3.8*	*13.7*
Old	Cw	13,264	31.0	28	30.1	31.2	1.035	32.1		
Old	Hw	18,040	33.7	38	34.9	34.3	0.983	33.1		
Old	*Total*	*31,304*	*32.6*	*66*	*32.9*	*33.0*	*1.003*	*32.7*	*1.6*	*5.0*
Total	***Total***	***38,305***	***31.0***	***83***			***1.024***	***31.7***	***1.5***	***4.7***

4.2.2 Age

Three (3) plots were dropped from the analysis because the top-height tree measurements did not match the polygon-leading-species in the inventory, leaving 88 plots for analysis.[1] Of these 88 plots, 17 and 71 plots were in the "Young" and "Old" strata, respectively. On average, inventory age was under-estimated by 34%; 40% in the "Young" stratum and 33% in the "Old" stratum (Table 24, Figure 10). The 95% sampling error was 13.3%. This may be associated with age class mid-pointing in the phase I age estimation process. Figure 10) shows the same Phase I age estimate for a range of measured Phase II ages in the "Old" strata.

Table 24: Age adjustment statistics for the Block 2 & 3 target population

Stratum	Sub-Stratum	Unadjusted Pop.		n	Sample		ROM	Adjusted Population		
		Area (ha)	Avg. (yrs)		Phase I (yrs)	Phase II (yrs)		Adj. Avg. (yrs)	95% E	
									(yrs)	(%)
Young	*Total*	*7,001*	*58.2*	*17*	*62.6*	*87.8*	*1.403*	*81.6*	*24.3*	*29.8*
Old	Cw	13,264	278.3	30	270.9	405.1	1.495	416.1		
Old	Hw	18,040	273.9	41	264.2	319.9	1.210	331.6		
Old	*Total*	*31,304*	*275.8*	*71*	*267.1*	*355.8*	*1.332*	*367.4*	*51.3*	*14.0*
Total	***Total***	***38,305***	***236.0***	***88***			***1.335***	***315.2***	***42.0***	***13.3***

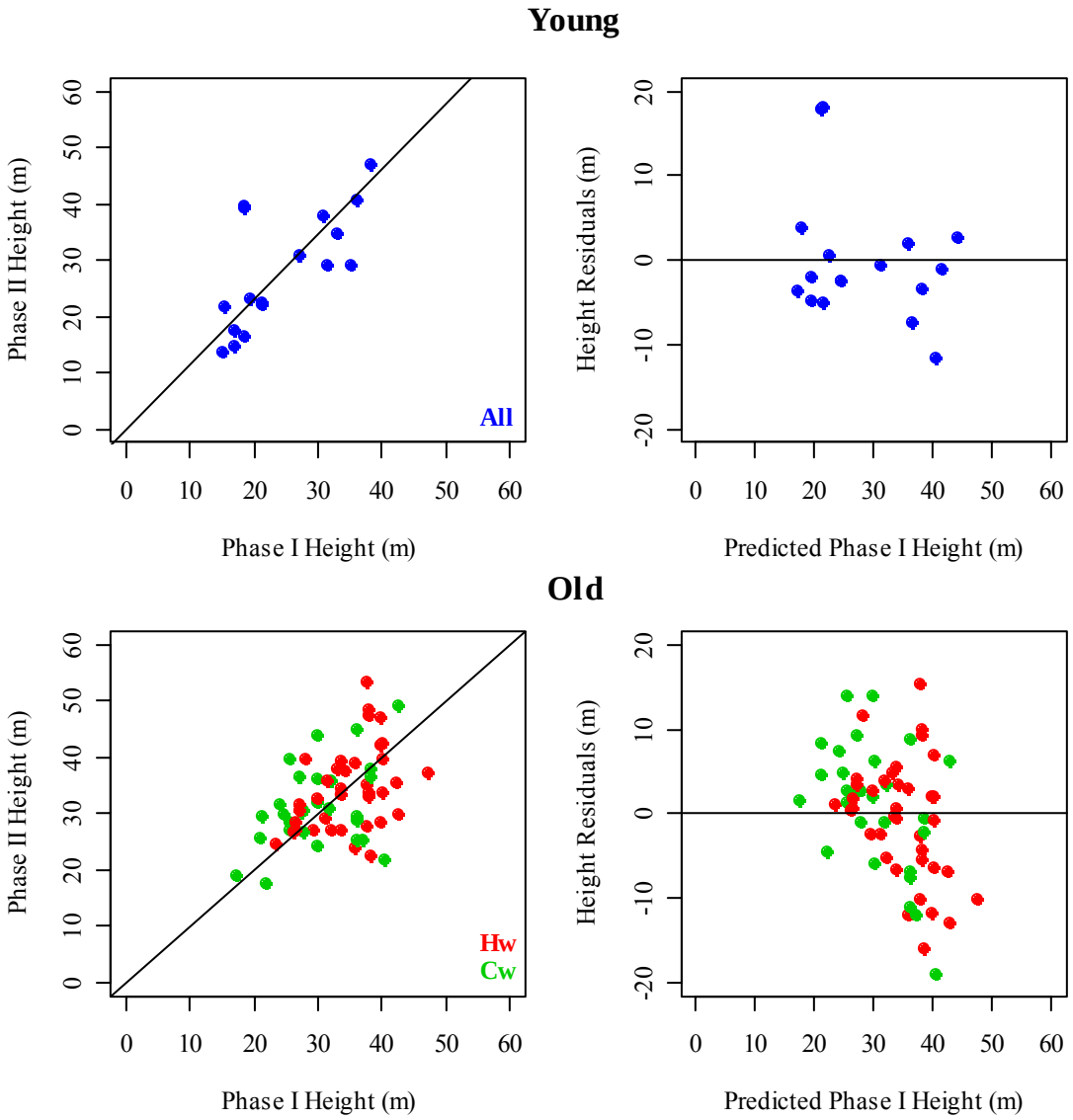

Figure 9: Block 2 & 3 height scatterplots

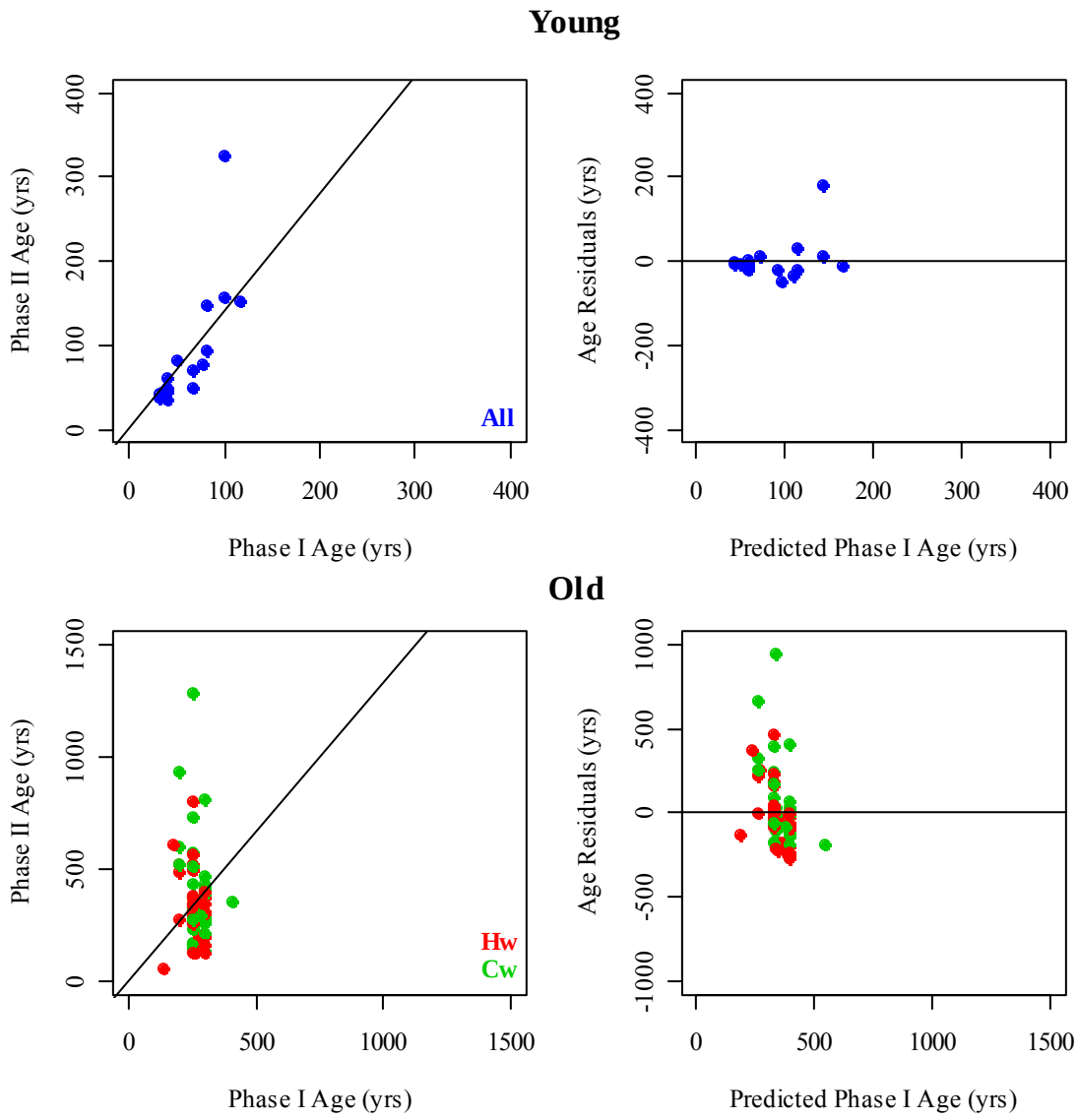

Figure 10: Block 2 & 3 age scatterplots

4.2.3 Attribute adjusted VDYP Volumes for the Block 2 & 3 Target Population

VDYP volumes were re-estimated using the adjusted height and age inputs. Attribute-adjusted volumes increased by 21% and decreased by 7% in the "Young" and "Old" strata, respectively, when compared to the Phase I volumes (Table 25). Overall, volumes decreased by 3% relative to the Phase I volumes. Increased volume in the "Young" strata is reflective of an increased height and age. Decreased volume in the "Old" strata is reflective of constant heights, and increased ages driving site index down. Also, the increased ages likely put several stands into higher age classes to which greater net loss factors were applied.[15]

Table 25: Volume change in the Block 2 & 3 target population due to attribute adjustments

Stratum	Area (ha)	Phase I (m^3/ha)	Attr-Adj (m^3/ha)	Difference	
				(m^3/ha)	(%)
Young	**7,001**	**323.0**	**407.1**	**84.1**	**21**
Old	**31,304**	**516.6**	**482.0**	**-34.6**	**-7**
Total	***38,305***	***481.2***	***468.3***	***-12.9***	***-3***

4.2.4 Site Index

Site index is not directly adjusted in the VRI standard statistical adjustment. Instead, an adjusted site index is derived from the adjusted height and age. The inventory site index decreased by approximately 10% after adjustment (Table 26); reflecting the increased age with a relatively small increase in height.

Table 26: Site index change due to attribute adjustments

Stratum	Area (ha)	Site Index (m)	Adj. Site Index (m)	Difference	
				(m)	(%)
Young	7,001	24.4	22.5	-1.9	-8.4
Old	31,304	13.9	12.6	-1.3	-10.3
Total	***38,305***	***15.8***	***14.4***	***-1.4***	***-9.7***

[15] This suggestion resulted from conversations with Craig Mistal, Timberline, who has several years experience in yield table development.

4.2.5 Live Net Merchantable Volume

All NVAF-adjusted Phase II observations were used to compute the volume ratios. The live net merchantable volume increased by 25.4% compared to the attribute-adjusted volumes (Table 27, Figure 11). The target sampling error (10%) was met for the overall target population at the 17.5 cm utilization level.

Table 27: Volume adjustment statistics for the Block 2 & 3 target population

Stratum	Sub-Stratum	Attr.Adj. Vol.		n	Sample		ROM	Adjusted Population		
		Area (ha)	Avg. (m^3/ha)		Phase I (m^3/ha)	Phase II (m^3/ha)		Avg. (m^3/ha)	95% E (m^3/ha)	95% E (%)
Young	Total	7,001	407.1	18	442.3	385.3	0.871	354.7	82.7	23.3
Old	Cw	13,264	437.0	31	455.2	630.1	1.384	605.0		
Old	Hw	18,040	515.1	42	560.8	724.4	1.292	665.3		
Old	Total	31,304	482.0	73	516.0	684.5	1.326	639.3	57.0	8.9
Total	***Total***	***38,305***	***468.3***	***91***			***1.254***	***587.3***	***48.6***	***8.3***

Note: Calculations of live merchantable volume (17.5+). Phase I volume is the attribute-adjusted net merchantable volume as predicted from VDYP version 6.6d using adjusted heights and ages. Phase II volumes have been adjusted with the appropriate NVAF ratios to remove bias from cruiser-called decay values.

4.2.6 Unadjusted vs. Adjusted Volume

After adjustment, the live inventory volume increased by 18% when compared to the unadjusted Phase I volumes (Table 28) at 17.5 cm utilization level for the Block 2 & 3 target population.

Table 28: Block 2 & 3 volume change following ratio adjustment

Stratum	Area (ha)	Unadjusted (m^3/ha)	Adjusted (m^3/ha)	Difference	
				(m^3/ha)	(%)
Young	7,001	323.0	354.6	31.6	8.9
Old	31,304	516.6	639.1	123.1	19.2
Total	***38,305***	***481.2***	***587.1***	***105.9***	***18.0***

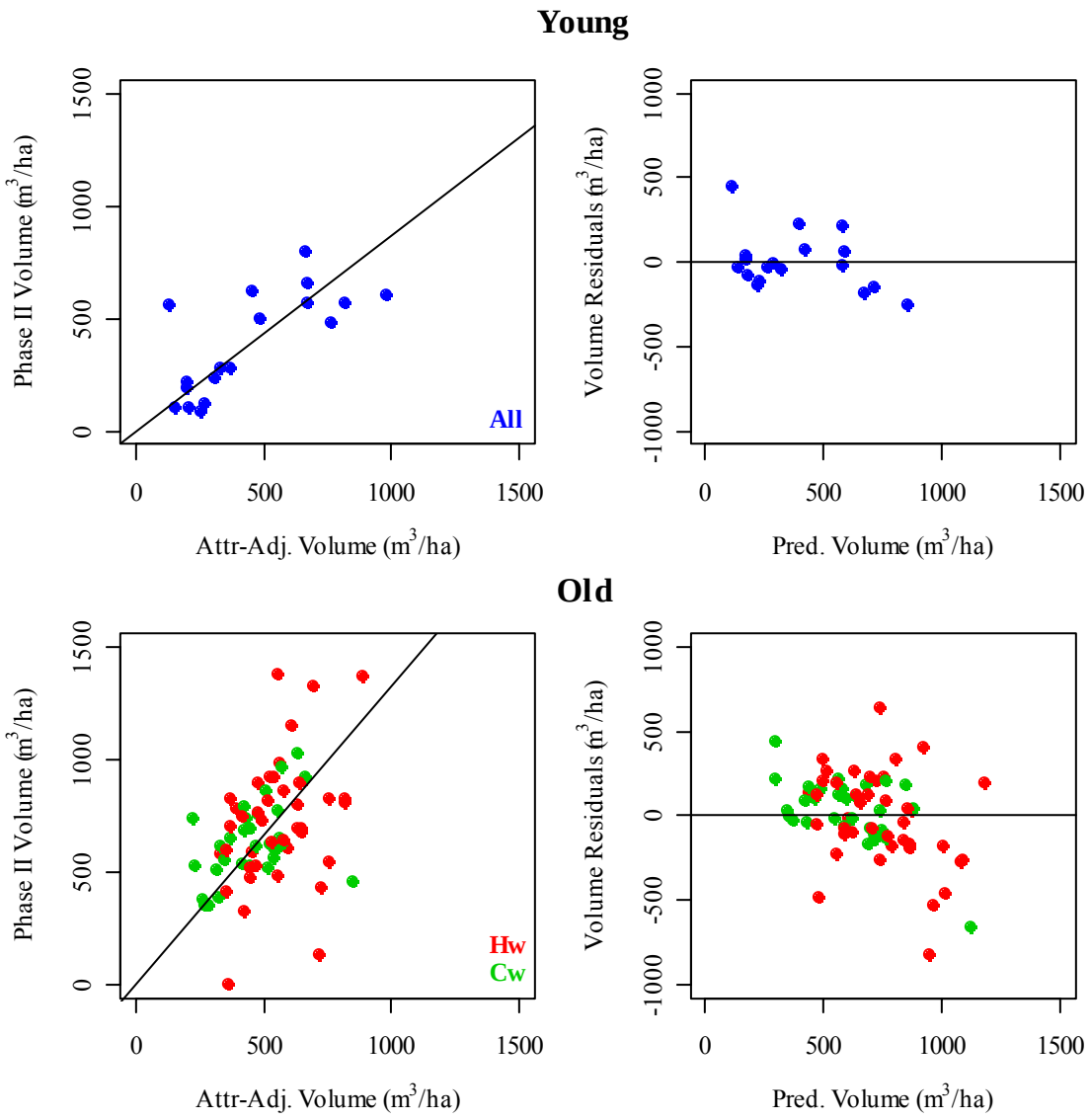

Figure 11: Block 2 & 3 live volume 17.5cm+ scatterplots

5.0 DISCUSSION

5.1 Accuracy and Precision

The inventory adjustments provide unbiased estimates at the scale that the ratios were computed. This means unbiased estimates at the stratum level. There is always a possibility that local bias exists within a stratum. For Blocks 2 & 3, it would be inappropriate to try to estimate sub-stratum bias given the small sample size provided at a smaller scale.

The MFR-recommended precision for adjusted average volume at the target population level is a sampling error of ±10% (95% probability). The overall sampling errors achieved in this project were smaller than the target, 9.8% (Block 1) and 8.3% (Block 2 &3). This means that the inventory adjustment provides the appropriate level of confidence for use in timber supply analysis.

5.2 Risks and Uncertainties

5.2.1 Age Trend

The statistical adjustment removes the bias in each stratum. In other BC land-bases, age-related trends have existed within the VRI data that have led to concerns in the TSR process. To determine whether this is the case for TFL 6, residual errors for each adjusted attribute were plotted against stand age to identify any age-related trends. None of the attributes of interest showed a significant (95% confidence) age-related trend in the residuals. Volume, the most important attribute, did not show any age-related trend in the residuals.

5.2.2 Age Adjustment

The age adjustments completed in the older strata were done using input data where Phase I ages had been mid-pointed (i.e., the majority of the stands had the same age). In Block 1, there was little change in age in the "Old Growth" stratum as the average age of the sampled stands was similar to the mid-point age. In Blocks 2 & 3, however, the ages in the "Old" stratum increased by approximately 90 years. This reflects the fact that the ages sampled had a higher average than the mid-point used for the populations. The adjustment process does not allow for ranges of ages to be computed, only for the existing ages to be updated. Therefore, the resulting adjusted database will still have a single age for many polygons.

6.0 CONCLUSIONS & RECOMMENDATIONS

The statistical adjustment of the Phase I inventories were completed for TFL 25 Blocks 1, 2 & 3 using standard MFR methodology. Unbiased estimates of height, age, and volume were obtained due to the design of the VRI statistical adjustment methods. These estimates represent the best estimates available at present. Therefore, we recommend that

Western use the adjusted estimates of height, age, and volume for the upcoming TSR.

APPENDIX I: PHASE II SAMPLING WEIGHTS & PLOT LOCATIONS

Table 29: Block 1 plot locations

Project	Plot	Stratum	Substratum	Zone	Easting	Northing	Sampling Weight
3431	1	Second Growth		10	432627.92	5360699	237.47775
3431	2	Second Growth		10	414745.87	5367024	237.47775
3431	3	Second Growth		10	447279.13	5370157	237.47775
3431	5	Old Growth		10	407538.6	5375996	301.78809
3431	6	Second Growth		10	448555.82	5367312	237.47775
3431	7	Old Growth		10	419459.14	5374905	301.78809
3431	8	Second Growth		10	415143.24	5369400	237.47775
3431	9	Old Growth		10	441062.19	5364535	301.78809
3431	10	Second Growth		10	428957.95	5363544	237.47775
3431	11	Old Growth		10	418290.6	5370766	301.78809
3431	12	Second Growth		10	433996.11	5367222	237.47775
3431	13	Second Growth		10	422306.45	5364218	237.47775
3431	14	Second Growth		10	440278.31	5362474	237.47775
3431	15	Old Growth		10	422139.43	5369809	301.78809
3431	16	Old Growth		10	422840.29	5369879	301.78809
3431	17	Second Growth		10	411900.59	5368138	237.47775
3431	18	Second Growth		10	439453.1	5361810	237.47775
3431	19	Second Growth		10	416823.65	5366639	237.47775
3431	20	Second Growth		10	412713.3	5368504	237.47775
3431	21	Second Growth		10	431321.17	5370025	237.47775
3431	25	Old Growth		10	416971.92	5370222	301.78809
3431	28	Second Growth		10	409540.54	5368934	237.47775
3431	29	Second Growth		10	442480.16	5362681	237.47775
3431	30	Second Growth		10	434074.91	5366720	237.47775
3431	31	Old Growth		10	406281.45	5376945	301.78809
3431	37	Second Growth		10	430052.29	5368284	237.47775
3431	38	Second Growth		10	414288.59	5370433	237.47775
3431	39	Old Growth		10	411745.02	5374028	301.78809
3431	40	Old Growth		10	414851.39	5374398	301.78809
3431	44	Old Growth		10	422652.71	5374972	301.78809
3431	45	Second Growth		10	426349.38	5365546	237.47775
3431	49	Second Growth		10	438536.8	5363743	237.47775
3431	50	Second Growth		10	425793.91	5364173	237.47775
3431	51	Second Growth		10	423300.79	5368963	237.47775
3431	53	Old Growth		10	419157.55	5370032	301.78809
3431	54	Second Growth		10	426784.36	5368818	237.47775
3431	56	Second Growth		10	424163.94	5365737	237.47775
3431	57	Second Growth		10	431167.96	5366343	237.47775
3431	58	Old Growth		10	423591.12	5368751	301.78809
3431	59	Old Growth		10	414696.87	5377894	301.78809
3431	60	Old Growth		10	419790.76	5375689	301.78809
3431	65	Second Growth		10	440079.27	5362482	237.47775
3431	66	Second Growth		10	415641.64	5366987	237.47775
3431	69	Second Growth		10	426104.52	5366852	237.47775
3431	70	Old Growth		10	421362.8	5375125	301.78809
3431	72	Second Growth		10	435086.75	5367077	237.47775
3431	73	Old Growth		10	425311.71	5371771	301.78809
3431	74	Second Growth		10	422546.28	5367598	237.47775
3431	75	Second Growth		10	450530.18	5369223	237.47775
3431	76	Old Growth		10	408917.72	5370754	301.78809
3431	78	Second Growth		10	443023.48	5363755	237.47775
3431	79	Old Growth		10	408513.52	5375457	301.78809
3431	80	Second Growth		10	426863.54	5365924	237.47775
3431	81	Second Growth		10	440597.82	5365352	237.47775

Project	Plot	Stratum	Substratum	Zone	Easting	Northing	Sampling Weight
3431	82	Second Growth		10	425009.72	5366898	237.47775
3431	83	Second Growth		10	438117.97	5363262	237.47775
3431	84	Second Growth		10	432179.78	5366700	237.47775
3431	85	Old Growth		10	421438.07	5372131	301.78809
3431	88	Second Growth		10	447957.75	5362552	237.47775
3431	90	Second Growth		10	419664.04	5367817	237.47775
3431	91	Second Growth		10	433092.08	5367060	237.47775
3431	93	Old Growth		10	429045	5366801	301.78809
3431	94	Second Growth		10	405607.27	5372686	237.47775
3431	95	Second Growth		10	438395.77	5362752	237.47775
3431	97	Second Growth		10	440037.74	5361487	237.47775
3431	98	Second Growth		10	432806.25	5360193	237.47775
3431	99	Old Growth		10	419813.05	5369008	301.78809
3431	101	Second Growth		10	430857.32	5361271	237.47775
3431	102	Second Growth		10	415330.7	5366701	237.47775
3431	103	Second Growth		10	415599.74	5368384	237.47775
3431	105	Second Growth		10	415566.81	5367588	237.47775
3431	107	Second Growth		10	439021.94	5363424	237.47775
3431	111	Old Growth		10	422972.41	5373064	301.78809
3431	112	Second Growth		10	423371.86	5365869	237.47775
3431	113	Old Growth		10	417650.91	5374581	301.78809
3431	114	Second Growth		10	431703.29	5360040	237.47775
3431	115	Second Growth		10	427734.75	5362897	237.47775
3431	116	Second Growth		10	437180.93	5367089	237.47775
3431	117	Second Growth		10	409182.52	5372339	237.47775
3431	119	Old Growth		10	411254.68	5376640	301.78809
3431	121	Second Growth		10	435306.53	5367566	237.47775
3431	122	Old Growth		10	420479.31	5375461	301.78809
3431	123	Second Growth		10	438594.7	5360351	237.47775
3431	124	Old Growth		10	419651.1	5369912	301.78809
3431	127	Second Growth		10	423342.97	5365172	237.47775
3431	128	Second Growth		10	442177.45	5362594	237.47775
3431	129	Second Growth		10	417495.63	5366013	237.47775

Table 30: Block 2 & 3 plot locations

Project	Plot	Stratum	Substratum	Zone	Easting	Northing	Sampling Weight
3433	1	Young	All	9	689171.7	5595188	388.9169
3433	2	Old	Hw	9	686563.1	5595382	429.5273
3433	4	Young	All	9	689471.3	5595200	388.9169
3433	5	Old	Cw	9	682392.4	5584810	427.8777
3433	6	Old	Cw	9	689378.8	5590095	427.8777
3433	7	Old	Cw	9	681797.4	5584686	427.8777
3433	8	Old	Cw	9	679446.1	5588391	427.8777
3433	9	Old	Cw	9	681025.6	5591356	427.8777
3433	10	Old	Cw	9	675592.7	5592134	427.8777
3433	11	Old	Cw	9	680619.9	5589039	427.8777
3433	12	Old	Cw	9	679760.1	5590504	427.8777
3433	13	Old	Cw	9	677508.4	5594213	427.8777
3433	14	Old	Hw	9	689527.3	5588901	429.5273
3433	15	Old	Hw	9	689735.2	5588709	429.5273
3433	16	Old	Hw	9	677728.5	5593722	429.5273
3433	17	Old	Hw	9	680271.5	5590225	429.5273
3433	18	Old	Hw	9	677053.9	5593094	429.5273
3433	19	Old	Hw	9	678160.5	5592939	429.5273
3433	20	Old	Hw	9	682233.8	5588704	429.5273
3433	21	Old	Hw	9	686945.6	5590896	429.5273
3433	22	Old	Hw	9	680925.8	5591351	429.5273
3433	23	Old	Hw	9	686413.8	5591675	429.5273
3433	24	Old	Hw	9	679051	5593175	429.5273
3433	25	Old	Hw	9	678339.6	5588546	429.5273
3433	26	Old	Hw	9	684164.1	5592884	429.5273
3434	1	Young	All	10	327817	5621705	388.9169
3434	3	Young	All	10	327383.8	5628227	388.9169
3434	4	Young	All	10	312388.5	5604027	388.9169
3434	7	Young	All	10	314984.9	5608824	388.9169
3434	10	Young	All	10	313996.2	5611565	388.9169
3434	11	Young	All	10	314636.2	5612539	388.9169
3434	12	Young	All	10	311955.7	5613049	388.9169
3434	13	Young	All	10	329378.3	5620741	388.9169
3434	14	Young	All	10	330438.5	5622198	388.9169
3434	15	Young	All	10	321194.2	5623677	388.9169
3434	16	Young	All	10	334252.9	5624943	388.9169
3434	17	Young	All	10	319037.5	5624766	388.9169
3434	18	Young	All	10	334856.3	5625019	388.9169
3434	19	Young	All	10	328296.7	5626088	388.9169
3434	21	Young	All	10	323422.1	5621885	388.9169
3434	22	Old	Cw	10	314424.4	5607346	427.8777
3434	23	Old	Cw	10	333100.9	5623690	427.8777
3434	24	Old	Cw	10	337536.7	5624508	427.8777
3434	26	Young	All	10	325412.2	5626506	388.9169
3434	27	Old	Cw	10	326244.1	5627273	427.8777
3434	28	Old	Cw	10	327879	5632088	427.8777
3434	29	Old	Cw	10	326897.4	5633450	427.8777
3434	30	Old	Cw	10	310826.4	5614796	427.8777
3434	31	Old	Cw	10	332169.2	5622928	427.8777
3434	32	Old	Cw	10	325318.2	5624209	427.8777
3434	33	Old	Cw	10	339388	5625733	427.8777
3434	34	Old	Cw	10	326099.2	5626178	427.8777
3434	35	Old	Cw	10	320913.1	5626590	427.8777
3434	36	Old	Cw	10	329173.6	5627953	427.8777
3434	37	Old	Cw	10	333658.6	5637275	427.8777
3434	38	Old	Cw	10	326181.1	5640384	427.8777

Project	Plot	Stratum	Substratum	Zone	Easting	Northing	Sampling Weight
3434	39	Old	Cw	10	323874.8	5623167	427.8777
3434	40	Old	Cw	10	324082.7	5623359	427.8777
3434	41	Old	Cw	10	318525.8	5624487	427.8777
3434	42	Old	Cw	10	329120.4	5626655	427.8777
3434	43	Old	Cw	10	323560	5632586	427.8777
3434	44	Old	Cw	10	327097.2	5633441	427.8777
3434	45	Old	Cw	10	326339	5634473	427.8777
3434	46	Old	Hw	10	327425.6	5621921	429.5273
3434	47	Old	Hw	10	328628.3	5621972	429.5273
3434	48	Old	Hw	10	327948	5624765	429.5273
3434	49	Old	Hw	10	322770.1	5625514	429.5273
3434	50	Old	Hw	10	318366.8	5625494	429.5273
3434	51	Old	Hw	10	318695.1	5626181	429.5273
3434	52	Old	Hw	10	329240.7	5627150	429.5273
3434	53	Old	Hw	10	327188.1	5628335	429.5273
3434	54	Old	Hw	10	324583.5	5633144	429.5273
3434	55	Old	Hw	10	326747.7	5639560	429.5273
3434	56	Old	Hw	10	331295.4	5635771	429.5273
3434	57	Old	Hw	10	331719.5	5636354	429.5273
3434	58	Old	Hw	10	333874.8	5637666	429.5273
3434	59	Old	Hw	10	312467.6	5608426	429.5273
3434	60	Old	Hw	10	315783.8	5613693	429.5273
3434	61	Old	Hw	10	333515.3	5626474	429.5273
3434	62	Old	Hw	10	336145.1	5627167	429.5273
3434	63	Old	Hw	10	326992.4	5628443	429.5273
3434	64	Old	Hw	10	325975.5	5630486	429.5273
3434	65	Old	Hw	10	341012.2	5631169	429.5273
3434	67	Old	Hw	10	324767.7	5637640	429.5273
3434	68	Old	Hw	10	327410.2	5638632	429.5273
3434	69	Old	Hw	10	311842.1	5605350	429.5273
3434	70	Old	Hw	10	331789.3	5618541	429.5273
3434	71	Old	Hw	10	336020.7	5626572	429.5273
3434	72	Old	Hw	10	337937.6	5629394	429.5273
3434	73	Old	Hw	10	338869.4	5630157	429.5273
3434	74	Old	Hw	10	344437.1	5631729	429.5273

APPENDIX II: PHASE I & II DATA FOR SAMPLED POLYGONS

Table 31: Block 1 Phase I polygon attributes

		Phase I										
Project ID	Sample	Spp1	Ht1 (m)	Age1 (yrs)	SI1 (m)	Spp2	Ht2 (m)	Age2 (yrs)	SI2 (m)	Case	Vol. 17.5 (m^3/ha)	Vol.[a] 17.5 (m^3/ha)
3431	1	CW	29.5	70	26	FDC	37.5	75	31.9	6	428.1	421.7
3431	2	FDC	36	47	41.4	SS	34.1	47	38.3	3	542.4	526
3431	3	FDC	21.6	39	29.9	HW	19.5	39	26.7	3	236.7	233.6
3431	5	CW	38.7	309	17	HW	38.2	309	14.9	3	653.3	518.2
3431	6	FDC	14.6	104	11	PL	14.4	104	9.6	7	63.4	61.9
3431	7	HW	36.1	309	14	BA	35.2	309	12.6	3	649.4	523.1
3431	8	HW	21.7	43	27	CW	15.7	50	18.5	1	221.9	219.3
3431	9	FDC	25.1	244	14	PL	23.1	244	11.7	1	256.9	181.4
3431	10	HW	20.6	47	24	FDC	26.4	47	31	3	239.7	243
3431	11	YC	24.9	309	11	HM	28.2	309	10.6	4	369.0	283.3
3431	12	FDC	20.7	34	32.7	HW	16.7	34	26.2	2	176.4	172.7
3431	13	DR	33.5	35	36.1	HW	17.7	35	26.9	4	320.7	326.6
3431	14	HW	38.5	76	31	FDC	39.6	76	33.2	1	733.2	724.7
3431	15	YC	24.9	309	11	HW	27.1	309	10.2	1	358.1	274.4
3431	16	HW	29.1	309	11	CW	28.1	309	12.4	3	444	347.4
3431	17	HW	33.5	42	40	SS	31.5	42	38.7	5	451.3	458
3431	18	FDC	30.5	57	31	HW	30.1	57	29.4	3	485.8	478.5
3431	19	FDC	39.6	54	41	HW	35.8	54	36	3	702.2	717.6
3431	20	CW	21.2	54	23	HW	21.8	54	22.5	2	236.4	232.5
3431	21	HW	21.5	39	29	FDC	20.6	39	28.8	5	266.2	261.3
3431	25	YC	20.2	309	9	HM	23.1	309	8.6	3	266.8	201.4
3431	28	DR	35.2	44	36.1	HW	26.7	44	31.8	3	351.3	357.9
3431	29	FDC	24.7	55	26	PL	23	55	23.6	5	200.6	201.4
3431	30	FDC	23.5	32	38.7	CW	21.6	32	36.3	2	203.4	202.9
3431	31	HW	31.5	309	12	YC	29.1	309	12.8	5	514.1	413.4
3431	37	FDC	19.2	30	34.5	HW	17.2	30	30	5	165.2	163.5
3431	38	FDC	21.6	39	29.9	HW	19.5	39	26.7	6	240.8	237.8
3431	39	HW	44.5	309	18	CW	46.2	309	20.4	3	754.6	605.2
3431	40	HW	31.5	309	12	BA	31.2	309	10.9	1	564.0	456.1
3431	44	YC	24.9	309	11	HW	27.1	309	10.2	3	368.9	283.4
3431	45	HW	17.6	38	25	CW	19.7	38	29.1	4	170.9	166.3
3431	49	FDC	29.2	45	35.2	HW	27.6	45	32.3	3	439.9	424.9
3431	50	FDC	47.2	73	40	HW	43.8	73	36.3	3	921.0	915.6
3431	51	HW	21.2	42	27	CW	11.4	42	16.1	3	241.0	236.4
3431	53	YC	20.2	309	9	HM	21.1	309	7.9	3	249.1	184.7
3431	54	FDC	19.2	35	29.7	HW	15.4	35	23.9	2	187.8	182.5
3431	56	FDC	41.8	76	35	HW	38.6	76	31	1	835.3	826.2
3431	57	HW	18.5	49	21	BA	17.8	49	21.5	1	224.0	218.6
3431	58	CW	38.7	309	17	HW	37.2	309	14.5	1	653.3	518.2
3431	59	HW	36.1	309	14	YC	32.2	309	14.1	2	606.6	479.5
3431	60	HW	29.1	309	11	BA	26.2	309	8.9	3	472.7	375.5
3431	65	DR	29.7	55	29	FDC	35.9	55	36.9	2	428.4	426.3
3431	66	HW	34.8	54	35	FDC	35.5	54	37	1	619.4	614.8
3431	69	HW	30.1	53	31	BA	30.2	53	31.3	1	566.1	566.6
3431	70	YC	24.9	309	11	HW	27.1	309	10.2	3	384.2	298
3431	72	FDC	16	32	27.4	PL	14.4	32	22.7	1	68.1	66
3431	73	CW	29.6	309	13	HW	28.2	309	10.6	2	448.3	350.4
3431	74	FDC	29.9	37	42.1	HW	26.3	37	35.6	1	338.0	354.6
3431	75	FDC	20.1	41	26.8	DR	18.2	41	20.5	3	142.4	141.5
3431	76	CW	31.9	309	14	HW	32.2	309	12.3	5	492.6	388.8
3431	78	PL	14.4	49	16.4	FDC	16.8	68	15.6	1	34.1	33.9
3431	79	YC	15.4	309	7	HW	19.1	309	7.1	3	168.3	121.7

		Phase I										
Project ID	**Sample**	**Spp1**	**Ht1 (m)**	**Age1 (yrs)**	**SI1 (m)**	**Spp2**	**Ht2 (m)**	**Age2 (yrs)**	**SI2 (m)**	**Case**	**Vol. 17.5 (m^3/ha)**	**Vol.[a] 17.5 (m^3/ha)**
3431	80	HW	17.6	38	25	CW	15.2	38	23.1	1	151.6	147.4
3431	81	PL	15.8	43	19.6	FDC	16.8	43	21.8	3	58.4	55.9
3431	82	HW	25	44	30	CW	12.5	44	16.7	3	279.4	295.1
3431	83	FDC	32	58	32	HW	32.1	58	30.9	3	550.0	542.9
3431	84	FDC	26	46	31.1	CW	21	49	24.8	2	305.7	293.9
3431	85	YC	24.9	309	11	HM	28.2	309	10.6	2	368.9	283.4
3431	88	DR	27.8	68	25.6	HW	35.8	68	30.9	1	396.8	392.2
3431	90	FDC	31.4	54	33	HW	29.2	54	29.7	2	503.5	500.1
3431	91	FDC	31.1	45	37.3	HW	27.6	45	32.3	5	460.0	449.7
3431	93	HW	31.5	309	12	YC	28.1	309	12.4	1	514.9	410.3
3431	94	FDC	18.6	30	33.4	HW	16.1	30	28.4	1	159.0	156.1
3431	95	FDC	36.7	50	40.2	HW	31.5	50	33.7	1	628.0	627.6
3431	97	FDC	25.8	62	25	PL	23.1	62	22.1	5	274.9	268.9
3431	98	FDC	40.4	85	32	HW	35.4	80	27.4	1	791.5	784.2
3431	99	YC	24.9	309	11	HW	28.2	309	10.6	1	367.4	281.8
3431	101	DR	25.9	60	24.5	FDC	36.6	71	32.1	1	357.0	353.4
3431	102	HW	31.4	47	35	SS	34.1	47	38.3	2	566.2	530.3
3431	103	HW	28.2	51	30	CW	18.7	51	21.5	3	409.0	402.2
3431	105	HW	32.7	54	33	CW	34.6	54	36.3	1	530.4	527
3431	107	HW	29.4	47	33	FDC	31.9	47	37	1	471.2	455.6
3431	111	YC	24.9	309	11	HW	27.1	309	10.2	1	360.4	275.5
3431	112	HW	39.7	76	32	FDC	41.6	76	34.9	2	824.5	815.9
3431	113	HW	36.1	309	14	YC	34.2	309	15	1	584.9	463.6
3431	114	FDC	40.5	76	34	HW	38.7	74	31.6	5	764.9	754.8
3431	115	HW	28.6	63	26	CW	28	59	27.9	1	424	418.8
3431	116	FDC	12	32	21	PL	10.9	32	18.2	1	0	0
3431	117	HW	21.1	30	35	SS	20	30	35.6	2	290.2	286.2
3431	119	YC	17.8	309	8	HW	20.1	309	7.5	1	207.1	152.2
3431	121	FDC	18.7	32	31.6	HW	18.1	32	29.5	1	129.3	126.9
3431	122	HW	38.3	309	15	FDC	44.1	309	23.1	1	646.1	522.6
3431	123	FDC	32	61	31	HW	28.9	59	27.6	2	512.7	505.9
3431	124	CW	27.2	309	12	YC	24.1	309	10.7	7	395.7	305.3
3431	127	FDC	41.1	78	34	HW	41.3	78	32.8	3	764.3	759.2
3431	128	PL	18.3	53	19.4	FDC	23.8	53	25.7	3	92.0	89.5
3431	129	HW	34.2	55	34	SS	30.9	55	31.3	4	616.4	612

Table 32: Block 2& 3 Phase I polygon attributes

		Phase I										
Project ID	**Sample**	**Spp1**	**Ht1 (m)**	**Age1 (yrs)**	**SI1 (m)**	**Spp2**	**Ht2 (m)**	**Age2 (yrs)**	**SI2 (m)**	**Case**	**Vol. 17.5 (m^3/ha)**	**Vol.[a] 17.5 (m^3/ha)**
3433	1	SS	46.1	118	29.1	HW	38.3	118	23.5	2	839.9	980.5
3433	2	HW	42.6	142	24	CW	38.2	142	22.3	1	410.7	421.5
3433	4	HW	33	82	25	CW	26.4	82	20.9	5	552.6	663.3
3433	5	YC	36.2	252	17	CW	34.1	252	16	5	623.4	562.8
3433	6	CW	40.6	302	18	HW	36.1	302	14.1	2	702.0	636.3
3433	7	YC	27.7	252	13	HW	28.1	252	11.4	1	454.9	414.1
3433	8	YC	27.5	202	14	HM	30.1	202	13.5	1	430.1	435.8
3433	9	YC	27.7	252	13	HM	30.1	252	12.3	5	469.6	426.8
3433	10	YC	29.8	252	14	HW	30.1	252	12.3	2	516.8	480.8
3433	11	YC	17.4	202	9	HM	22.1	202	9.8	1	221.9	228.4
3433	12	YC	17.4	202	9	HM	24.1	202	10.7	4	216.8	224.1
3433	13	CW	22.1	287	10	HW	26.1	287	10	5	290.2	267.3

		Phase I										
Project ID	**Sample**	**Spp1**	**Ht1 (m)**	**Age1 (yrs)**	**SI1 (m)**	**Spp2**	**Ht2 (m)**	**Age2 (yrs)**	**SI2 (m)**	**Case**	**Vol. 17.5 (m^3/ha)**	**Vol.[a] 17.5 (m^3/ha)**
3433	14	HW	43.7	252	19	BA	40.1	252	16.6	2	850.1	818.2
3433	15	HW	34.9	202	16	BA	34.2	202	15.3	2	658.8	657.8
3433	16	HW	40.5	202	19	CW	38.1	202	19.5	2	729.8	727
3433	17	HW	37.9	252	16	CW	34.1	252	16	5	648.7	610.7
3433	18	HW	37.6	152	20	BA	42.3	152	23.5	1	714.4	716.9
3433	19	HW	35.9	252	15	CW	34.1	252	16	1	637.3	596.5
3433	20	BA	33.1	252	13	HW	30.1	252	12.3	1	592.8	578.5
3433	21	HW	33.8	252	14	YC	34.1	252	16	1	576.1	544.1
3433	22	HW	31.3	302	12	YC	28	302	12.4	5	506.9	476.9
3433	23	HW	33.8	252	14	BA	32.1	252	12.5	1	591.3	568.1
3433	24	HW	29.4	252	12	YC	26.1	252	12.3	1	486.2	459.4
3433	25	HM	23.5	180	11	BA	30.2	180	14.1	1	381.0	390.6
3433	26	HW	37.9	252	16	CW	36.1	252	17	1	369.6	335.1
3434	1	HW	36.1	102	24	FDC	38.5	102	28.1	5	673.8	819.8
3434	3	HW	16.9	32	28	DR	29.3	32	33	5	147.0	201.2
3434	4	CW	27.1	79	22	HW	38.9	79	30.5	1	397.1	488.9
3434	7	HW	35.2	69	30	BA	35	68	30.7	1	643.6	768.2
3434	10	HW	31.7	52	33	BA	31.3	52	32.7	1	536.5	672.6
3434	11	HW	18.6	42	24	CW	13	42	18.2	1	195.5	267.5
3434	12	CW	15.1	42	21	BA	14.1	42	20.3	1	104.8	158
3434	13	HW	31	67	27	BA	31	67	27.7	1	554.4	675.7
3434	14	HW	25.3	82	19	CW	18.5	82	14.7	2	374.3	457.1
3434	15	HW	19.5	42	25	BA	17.3	42	23.7	1	248.9	332.2
3434	16	HW	15.5	32	26	BA	17.4	32	29	1	134.4	197.2
3434	17	HW	17.2	37	25.1	BA	19.6	37	28.4	7	192.3	255.4
3434	18	HW	21.4	37	30	BA	21.6	37	30.5	1	285.0	371.1
3434	19	HW	21.2	42	27	CW	21.5	42	28.8	1	238.4	307.2
3434	21	HW	16.9	42	22	CW	7.7	38	12.1	1	155.1	211.7
3434	22	CW	38.4	302	17	HW	38.1	302	15	1	634.3	575.2
3434	23	CW	36.2	252	17	HW	32.2	203	14.5	1	613.9	558.5
3434	24	CW	42.7	302	19	HW	42.1	302	17	5	730.9	664
3434	26	HM	18.7	102	12	YC	18.2	102	12.7	5	98.8	133.3
3434	27	CW	40.6	302	18	HW	40.1	302	16	1	635.9	573.7
3434	28	CW	55.6	302	25	HW	54.1	302	23.4	1	938.8	848.8
3434	29	CW	38.4	302	17	HW	38.1	302	15	5	597.0	540.4
3434	30	CW	31.9	252	15	HW	32.1	252	13.2	1	521.6	469.6
3434	31	CW	21.2	254	10	YC	20.1	254	9.5	5	294.8	265.9
3434	32	CW	29.9	254	14	HW	28.1	254	11.4	1	472.0	427.4
3434	33	CW	36.2	302	16	HW	32.1	253	13.2	2	589.4	537.8
3434	34	CW	29.9	254	14	HW	30.1	254	12.3	1	484.7	446.2
3434	35	CW	36.2	254	17	HW	36.2	254	15.1	5	582.9	528.9
3434	36	CW	30.2	262	14	HW	30.1	262	12.1	2	486.4	448.5
3434	37	CW	36.2	302	16	HW	35.1	302	13.7	1	565.9	511.9
3434	38	CW	36.2	302	16	HW	37.1	302	14.6	5	597.1	545.7
3434	39	CW	25.6	254	12	HW	24.1	254	9.7	1	364.0	324.1
3434	40	CW	25.6	254	12	HW	24.1	254	9.7	1	370.2	330.7
3434	41	YC	21.1	252	10	HM	20.1	252	8.1	1	312.7	284.6
3434	42	CW	25.6	254	12	HW	25.1	254	10.1	1	390.5	367.4
3434	43	YC	37	410	15	HM	32	533	10.4	1	562.2	517.8
3434	44	CW	24.8	302	11	BA	24.1	302	8.2	5	348.0	318.1
3434	45	CW	27.1	302	12	HW	26.1	302	9.9	5	381.7	348.2
3434	46	HW	37.8	294	15	CW	34.1	294	15.2	5	602.9	560.5
3434	47	HW	41.9	254	18	CW	40.2	254	18.9	2	699.0	644.1
3434	48	HW	38.1	302	15	BA	37.1	302	13.6	3	696.2	652.7
3434	49	HW	39.9	294	16	BA	39.2	294	14.8	3	698.3	649.9
3434	50	HW	43.7	252	19	BA	38.2	252	15.5	2	846.8	817

		Phase I										
Project ID	**Sample**	**Spp1**	**Ht1 (m)**	**Age1 (yrs)**	**SI1 (m)**	**Spp2**	**Ht2 (m)**	**Age2 (yrs)**	**SI2 (m)**	**Case**	**Vol. 17.5 (m^3/ha)**	**Vol.[a] 17.5 (m^3/ha)**
3434	51	HW	40	254	17	BA	39.2	254	16	1	737.4	698.7
3434	52	HW	38.1	302	15	CW	40.1	302	17.8	5	624.3	581.3
3434	53	HW	42.3	302	17	CW	42.1	302	18.7	1	684.9	634.6
3434	54	BA	47.4	275	20	HW	48.2	251	21.5	1	920.7	891.8
3434	55	HW	42.3	302	17	BA	38.2	302	14.1	2	810.4	761.9
3434	56	BA	41.8	302	16	HW	42.1	302	17	5	696.7	633.3
3434	57	BA	39.9	302	15	HW	39.1	302	15.5	1	698.2	649.4
3434	58	HW	40.5	262	17	BA	40.2	262	16.3	2	780.6	758.9
3434	59	HW	31.7	252	13	CW	30.1	252	14.2	5	494.3	468.3
3434	60	HW	31.7	252	13	BA	30.2	252	11.6	3	547.2	533.8
3434	61	HW	29.4	252	12	YC	28.1	203	14.3	2	468.6	446.5
3434	62	BA	31	252	12	HW	32.1	252	13.2	2	514.3	493.4
3434	63	HW	35.9	302	14	CW	35.1	302	15.5	1	570.4	528.2
3434	64	BA	33.6	302	12	CW	33.1	302	14.6	1	535.1	482.9
3434	65	HW	33.7	302	13	CW	33.1	302	14.6	1	486.3	445.5
3434	67	HW	29.9	262	12	CW	25.1	262	11.7	5	443.0	419.6
3434	68	HW	38.5	262	16	CW	37.1	262	17.2	5	601.4	558.8
3434	69	HW	27.2	252	11	YC	24.1	252	11.4	5	396.8	374
3434	70	HW	27.2	252	11	CW	28.1	252	13.2	5	396.9	374.1
3434	71	HW	26.2	294	10	CW	26.1	203	13.3	5	377.1	355.1
3434	72	HM	33.7	302	13	YC	34.1	302	15.1	5	555	517.4
3434	73	HW	26.5	302	10	BA	26.1	302	9	5	379.6	354.3
3434	74	HW	26.5	302	10	BA	26.1	302	9	1	391.0	365.7

Table 33: Block 1 Phase II plot attributes

				Phase II				
Project ID	**Sample**	**FOR_PID**	**Area (ha)**	**Leading Species**	**Height (m)**	**Age (yrs)**	**SI (m)**	**Vol. 17.5 (m^3/ha)**
3431	1	991	22.3	HW	25	52.7	26.2	353.0
3431	2	3726	34.0	FDC	23.75	62.0	23.3	423.6
3431	3	2818	20.1	FDC	32.18	51.6	34.1	501.2
3431	5	5221	2.7	FDC	30.36	56.4	30.9	340.7
3431	6	2686	9.7	DR	27.4	64.4	29.4	424.0
3431	7	556	12.4	FDC	34.54	52.4	36.0	538.9
3431	8	3944	40.9	HW	30.28	56.8	29.8	373.0
3431	9	2577	10.7	HW	31.2	77.9	24.5	268.6
3431	10	1386	10.1	FDC	30.93	46.4	35.7	271.8
3431	11	4355	21.3	FDC	32.65	46.7	37.5	308.0
3431	12	1784	81.7	HW	41.95	70.9	35.4	926.8
3431	13	3462	20.8	FDC	25.8	126.6	17.5	341.9
3431	14	1302	3.9	HW	12.5	42.4	16.6	44.5
3431	15	4193	18.8	YC	19.47	327.2	8.6	243.8
3431	16	4172	21.5	FDC	22.7	32.5	36.2	130.1
3431	17	3885	4.2	FDC	20.77	35.9	30.5	162.1
3431	18	1191	38.8	FDC	30.63	45.4	35.9	411.8
3431	19	3599	153.6	FDC	23.13	32.3	37.1	174.0
3431	20	3928	6.0	YC	24.8	461.7	9.9	376.6
3431	21	2251	6.1	CW	21.47	46.3	26.4	305.5
3431	25	4202	20.0	FDC	11.58	26.7	25.4	9.6
3431	28	3081	8.5	FDC	19.38	30.5	33.6	71.9
3431	29	2455	31.8	PLC	14.95	28.9	23.8	61.5
3431	30	1709	42.8	HW	17.55	31.9	29.3	33.0
3431	31	5293	9.6	CW	16	48.0	19.5	69.9

Project ID	Sample	FOR_PID	Area (ha)	Phase II				
				Leading Species	Height (m)	Age (yrs)	SI (m)	Vol. 17.5 (m^3/ha)
3431	37	1939	43.8	CW	13.1	42.3	18.2	114.3
3431	38	4289	15.9	CW	34.85	124	22.6	652.0
3431	39	373	27.9	FDC	NA	NA	NA	345.7
3431	40	378	14.5	DR	31.25	52.0	35.0	260.7
3431	44	589	12.3	PLC	18.9	47.7	21.0	141.5
3431	45	3520	7.0	FDC	19.98	106.4	20.9	71.6
3431	49	1406	21.1	FDC	21.13	160.3	13.9	229.4
3431	50	1450	67.2	FDC	28.4	55.7	30.3	292.1
3431	51	4019	3.6	FDC	20.6	34.83	31.5	86.4
3431	53	4209	5.1	FDC	14.9	46.7	19.5	91.0
3431	54	2002	33.1	HW	40.6	89.4	29.6	527.0
3431	56	3498	78.2	CW	NA	NA	NA	659.6
3431	57	1721	6.8	HW	21.95	28.5	37.7	278.3
3431	58	3967	11.0	DR	22.5	27.3	31.5	135.9
3431	59	843	7.8	HW	36.17	71.2	30.3	578.8
3431	60	686	4.4	FDC	49.68	73.4	42.0	568.8
3431	65	2446	41.5	CW	15.78	36.4	24.9	157.2
3431	66	3710	22.1	HW	37	53.1	37.6	625.1
3431	69	3620	60.9	HW	41.6	63.2	37.6	1016.9
3431	70	409	58.0	FDC	34.23	51.6	36.1	484.9
3431	72	1830	11.3	HW	28.1	51.2	29.9	359.8
3431	73	4693	5.6	CW	18.85	49.6	22.1	117.4
3431	74	3679	27.4	HW	21.13	49.1	23.9	233.3
3431	75	2779	25.5	FDC	31.27	36.0	43.8	641.3
3431	76	3164	42.6	CW	14.7	38.6	22.1	156.1
3431	78	2526	17.5	HW	35.3	53.4	35.9	581.4
3431	79	5120	23.3	FDC	28.22	40.45	37.5	400.4
3431	80	1648	7.3	HW	45.75	243.5	20.5	732.9
3431	81	1591	3.5	HM	26.43	256.6	10.7	753.2
3431	82	3654	12.9	HM	30.1	283.8	11.8	748.4
3431	83	1335	18.2	FDC	32.7	55.2	32.1	454.5
3431	84	1769	33.3	SS	23.43	39.1	31.9	237.5
3431	85	4774	6.2	HW	30.2	43.3	36.6	300.6
3431	88	2459	3.8	HW	30.2	53.0	31.4	471.1
3431	90	3803	21.5	CW	16.6	51.1	19.2	91.1
3431	91	1799	9.7	BA	29.83	291.1	10.7	717.4
3431	93	1785	2.4	HW	15.16	40.5	20.8	81.8
3431	94	4946	15.2	YC	22.63	390.8	9.6	234.2
3431	95	1229	19.0	YC	NA	NA	NA	421.8
3431	97	1146	24.0	YC	18.27	263.5	8.8	305.4
3431	98	977	16.2	YC	19.8	196.6	10.3	522.0
3431	99	4034	12.7	YC	NA	NA	NA	204.0
3431	101	1082	1.9	YC	12.2	183	6.9	60.3
3431	102	3668	23.1	YC	24.97	350.5	10.8	619.7
3431	103	3934	3.8	FDC	20.38	40.2	27.9	121.4
3431	105	3722	39.8	YC	17.3	363.6	7.5	149.0
3431	107	1412	9.2	CW	33.6	331.2	14.5	1108.8
3431	111	169	24.7	YC	22.5	360.4	9.8	285.5
3431	112	3570	11.1	HW	24.9	21.4	50.1	138.7
3431	113	376	9.7	YC	17.67	453.0	7.2	241.5
3431	114	933	38.7	YC	26.75	304.8	11.9	694.3
3431	115	1336	32.4	HW	35.8	261.7	14.7	1148.6
3431	116	1801	7.6	YC	13.23	300.2	6.3	105.1
3431	117	3314	3.1	YC	28.05	271.0	12.9	326.9
3431	119	5276	21.2	HW	NA	NA	NA	889.5
3431	121	1883	37.9	YC	17.92	571.7	7.1	266.6
3431	122	524	44.1	HW	18.9	150.6	9.6	809.7

Project ID	Sample	FOR_PID	Area (ha)	Phase II				
				Leading Species	Height (m)	Age (yrs)	SI (m)	Vol. 17.5 (m^3/ha)
3431	123	965	12.6	YC	26.73	283.1	12.1	496.1
3431	124	4218	1.6	DR	NA	NA	NA	368.9
3431	127	3491	21.0	FDC	36.9	58.3	36.5	411.5
3431	128	2463	37.6	FDC	39.7	76.6	33.4	547.2
3431	129	3569	36.4	FDC	38.62	59.1	37.8	671.1

Table 34: Block 2 & 3 Phase II plot attributes

Project ID	Sample	FOR_PID	Area (ha)	Phase II				
				Leading Species	Height (m)	Age (yrs)	SI (m)	Vol. 17.5 (m^3/ha)
3433	1	41	7.35634	HW	46.95	151.9	26.6	598.8
3433	2	23	3.07237	HW	29.77	51.4	31.7	327.3
3433	4	37	4.27003	SS	34.7	92.3	24.0	792.9
3433	5	1347	14.3673	H	28.67	425.5	10.5	652.4
3433	6	1564	6.52303	HW	45.05	415.0	16.8	1021.4
3433	7	1610	23.5087	YC	30.5	571.2	11.6	530.1
3433	8	1037	19.7189	YC	30.25	593.2	11.6	736.9
3433	9	587	10.5251	BA	26.7	272.6	9.9	684.9
3433	10	437	11.1393	HW	36.27	509.5	12.2	752.9
3433	11	970	20.434	YC	18.85	927.7	6.9	521.8
3433	12	789	7.15288	HW	31.55	518.8	11.0	740.1
3433	13	138	7.14062	YC	17.5	288.9	9.2	349.5
3433	14	1019	8.5506	BA	42.26	291.4	16.8	825.1
3433	15	940	26.4691	BA	37.65	268.0	15.3	903.6
3433	16	152	21.6611	CW	NA	484.8	NA	427.6
3433	17	1556	2.27516	BA	27.8	329.9	9.8	1147.5
3433	18	265	17.1918	HW	NA	NA	NA	126.6
3433	19	303	22.9776	HW	24	564.6	7.5	603.5
3433	20	1018	11.9611	BA	37.93	487.1	11.4	854.7
3433	21	696	12.455	HW	33.4	366.5	12.6	920.6
3433	22	493	18.6997	BA	28.93	395.5	8.6	895.9
3433	23	389	39.4637	HW	34.4	378.6	13.1	981.9
3433	24	273	25.6249	HW	26.93	510.3	8.8	586.3
3433	25	814	53.6534	HM	24.5	602.5	8.1	783.6
3433	26	1520	17.5153	HW	35.2	250.4	14.8	576.1
3434	1	588	24.4127	CW	40.47	154.9	23.1	563.6
3434	3	1211	19.6823	CW	14.75	35.9	23.6	211.8
3434	4	5294	17.6234	CW	30.6	75.2	25.5	497.8
3434	7	5528	108.69	HW	29	48.0	32.6	482.4
3434	10	112	3.32693	HW	29.1	81.6	27.8	568.7
3434	11	122	30.1587	HW	16.28	44.2	19.1	116.8
3434	12	5738	52.7456	CW	13.7	49.2	16.4	105.3
3434	13	509	56.2574	HW	37.83	69.1	31.0	653.5
3434	14	699	8.07719	CW	39.3	145.5	22.8	619.7
3434	15	798	62.2276	HW	23	42.9	28.7	275.2
3434	16	1791	16.9113	HW	21.8	41.2	28.4	187.6
3434	17	884	43.0243	DR	20.15	33.4	25.9	83.1
3434	18	1816	6.74569	HW	22.23	43.5	27.8	281.5
3434	19	1072	7.94717	HW	21.97	34.2	33.7	230.9
3434	21	667	5.43418	HW	17.42	59.5	16.3	106.1
3434	22	5500	3.75115	CW	37.95	426.4	14.9	962.3
3434	23	1701	3.88324	CW	NA	NA	NA	772.7
3434	24	1742	16.9446	BA	49.05	251.4	23.4	921.4
3434	26	1112	5.82848	CW	39.7	323.7	18.6	560.3

Project ID	Sample	FOR_PID	Area (ha)	Phase II				
				Leading Species	Height (m)	Age (yrs)	SI (m)	Vol. 17.5 (m^3/ha)
3434	27	1198	3.40236	CW	21.6	127.1	13.3	625.5
3434	28	2467	6.57118	CW	NA	387.7	NA	458.5
3434	29	2612	15.5979	BA	36.38	267.4	14.6	563.6
3434	30	5828	3.8075	CW	30.9	156.2	17.8	608.8
3434	31	1638	66.8877	HW	29.6	135.4	18.6	377.1
3434	32	881	2.16784	CW	32	323.2	13.8	787.8
3434	33	1875	11.9287	HW	35.6	367.6	13.0	600.5
3434	34	1079	4.76742	CW	43.8	162.7	24.3	526.7
3434	35	1120	8.5065	YC	25.2	1280	10.4	621.7
3434	36	1252	26.1235	HW	24.1	256.1	11.9	693.4
3434	37	4142	6.14492	CW	NA	809.5	NA	861.1
3434	38	3241	11.7617	BA	29.28	211.7	12.6	594.2
3434	39	791	3.21983	CW	26.9	263.1	12.6	384.8
3434	40	807	6.246	CW	28.34	230.9	13.3	609.5
3434	41	883	14.5586	YC	25.6	728.7	10.2	349.6
3434	42	1129	8.58444	CW	39.67	154.1	22.9	647.8
3434	43	2543	11.7894	YC	25.13	347.5	11.3	517.1
3434	44	2642	6.00349	HM	29.75	460.5	10.3	503.9
3434	45	2782	6.46179	YC	36.5	282.9	16.6	555.9
3434	46	647	17.9104	FDC	53.2	138.1	33.9	1374.4
3434	47	656	11.1114	CW	39.45	123.2	25.4	896.7
3434	48	933	2.43192	HM	33.8	403.3	11.9	691.2
3434	49	971	17.2408	HM	28.23	341.2	12.4	671.9
3434	50	987	7.65542	BA	48.3	253.5	17.0	809.9
3434	51	1069	8.08533	HW	46.97	288.5	21.2	1325.3
3434	52	1172	11.0886	BA	47.35	277.2	20.4	642.3
3434	53	1286	26.9681	HW	35.47	198.1	16.7	794.3
3434	54	2572	19.6021	BA	37.27	188.3	19.4	1371.4
3434	55	3197	11.3768	BA	32.8	194.2	15.3	542.7
3434	56	2859	46.4835	CW	NA	407.4	NA	695.7
3434	57	4036	12.3124	BA	42.1	156.1	25.2	687.6
3434	58	4157	7.11995	BA	33.75	135.7	19.9	826.0
3434	59	5523	9.00159	YC	NA	306.6	NA	525.4
3434	60	5790	2.55231	HM	35.7	337.2	13.4	633.3
3434	61	1928	6.18928	YC	39.7	516.2	15.3	475.7
3434	62	1972	24.936	HW	26.9	516.8	10.8	724.3
3434	63	1257	19.6118	HW	38.9	125.4	23.3	924.1
3434	64	1424	13.1784	BA	33.35	307.9	12.1	759.9
3434	65	3526	2.07659	HW	27.1	296.4	13.6	516.1
3434	67	3025	5.82541	BA	32.73	330.7	11.5	748.4
3434	68	3131	3.90058	BA	22.53	121.5	14.4	480.2
3434	69	5397	27.0933	BA	31.43	317.6	10.4	825.5
3434	70	411	24.502	YC	30.6	796.1	13.5	698.2
3434	71	1943	7.426	BA	26.65	192.5	15.4	596.7
3434	72	2205	8.7795	BA	39.27	369.5	13.1	812.1
3434	73	2287	9.49578	YC	27.15	340	11.7	415.2
3434	74	3592	3.73178	HW	28.35	154.3	16.7	0[16]

[16] No volume could be calculated as diameter information was not available.

APPENDIX III: BLOCK 1 SAMPLE PLAN

APPENDIX IV: BLOCK 2 & 3 SAMPLE PLAN