2012
FOREST MANAGEMENT PLAN
GROWTH AND YIELD

CANFOR GRANDE PRAIRIE
FOREST MANAGEMENT AGREEMENT AREA
FMA # 9900037

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April 2012

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GROWTH & YIELD REPORT

Grande Prairie Division
April 2012

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EXECUTIVE SUMMARY

Canfor Corporation holds a Forest Management Agreement for tenure in the vicinity of Grande Prairie (FMA # 9900037). As part of its license obligations, Canfor Grande Prairie (Canfor) is required to complete a Forest Management Plan (FMP). In 2003, Alberta Sustainable Resource Development (ASRD) approved Canfor's current FMP and its program commitments. Canfor is currently operating under a Healthy Pine Strategy Amendment that is effective May 1, 2009. Canfor's next FMP is scheduled for submission by September, 2012. This document describes the processes undertaken to develop natural and managed stand yield tables for the 2012 FMP.

Stratification into yield groups

Canfor developed 17 yield groups for the natural forested landbase, which were based on a modification of the 2003 FMP yield group stratification. The regenerating landbase was stratified into yield strata based on 3 Cutblock Assignment Rules: pre-1991 cutblocks (R1), post-1991 cutblocks (R2) and future cutblocks (R3). The landbase stratification rules were provided in two separate discussion papers to ASRD on November 25, 2011 and they were also included in the Canfor's 2012 FMP Landbase Assignment Report.

Data

Canfor's Rotation 1 Permanent Sample Plot (PSP) data were used for the natural stand yield curve model development, and were stratified into the 17 yield groups based on spatially linked Alberta Vegetation Inventory (AVI) attributes of the approved net landbase area. Conifer volumes were compiled to a 15/12 utilization standard, and deciduous volumes were compiled to a 15/10 utilization standard with a 30 cm stump height.

Canfor's Regenerated Stand Productivity (RSP) study data were used to derive improved site index estimates for lodgepole pine and white spruce in cutblocks harvested prior to March 1, 1991. RSA performance surveys from 2009-2010 were used to derive yield curves for the regenerating landbase harvested post-1991.

Yield curve development

Natural stand yield tables (NSYT) were derived using the Growth and Yield Projection System (GYPSY May 2009) developed by Dr. Shongming Huang (ASRD). GYPSY curves were fitted separately for each Rotation 1 PSP measurement, and were localized to FMA conditions using PSP compiled basal area and top height / site index to "seed" the yield curves. Yield group based NSYTs were computed initially by combining the curves of all measurements in a given PSP followed by combining all the average PSP curves occurring in each yield group.

Managed stand yield tables (MSYT) were developed separately for all existing cutblocks harvested prior to 1991, harvested after 1991 and for all future cutblocks. MSYTs for future cutblocks were further divided into basic and genetic yield curves to reflect increases in yield resulting from the deployment of genetically improved stock.

MSYTs for pre-1991 cutblocks utilized the RSP study improved site index estimates for pine and white spruce and the same method and data used for the development of the NSYTs. MSYTs for post-1991 cutblocks relied on the legislated RSA performance survey information. Basic yield curves for future cutblocks were derived by Canfor silviculturists using crop plans which considered recent silviculture performance, slight changes in silviculture regimes and anticipated future performance. Genetic yield curves for future cutblocks incorporated recently approved gains for pine and white spruce. Genetic curves were applied to all future cutblocks that are located within the approved boundaries of the tree improvement program deployment zones (B1 and G1) subject to seed availability.

Yield validation

Canfor's Temporary Sample Plot (TSP) data collected in the FMA from the 1997 Volume Sampling Program as well as the last measurement of the Rotation 1 PSPs were used to validate the natural stand yield curves.

Canfor's Growth and Yield Monitoring program (GYM) plots and Rotation 2 PSPs were used in validating managed stand yield curves by providing supporting evidence of observed trajectories versus predictions.

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1.0 INTRODUCTION

1.1 BACKGROUND

Canfor Corporation holds a Forest Management Agreement for tenure in the vicinity of Grande Prairie (FMA # 9900037). As part of their license obligations, Canfor Grande Prairie (Canfor) is required to complete a Forest Management Plan (FMP). In 2003, Alberta Sustainable Resource Development (ASRD) approved Canfor's current FMP and its program commitments. Canfor is currently operating under a Healthy Pine Strategy Amendment that is effective May 1, 2009. Canfor's next FMP is scheduled for submission by September, 2012. This document describes the processes undertaken to develop natural and managed stand yield tables for the 2012 FMP.

1.2 REPORT OBJECTIVES

This report documents the models, model inputs, and analytical procedures used to derive the yield tables for the Grande Prairie FMA timber supply analysis. The intent is to provide ASRD staff with the information necessary to review and approve the analysis methods, assumptions, and resulting yield tables.

1.3 TERMS OF REFERENCE

The report was prepared for Dwight Weeks, *RPFT* and Melonie Zaichkowsky, *RPF* of Canfor. The Ecora project team included Gyula Gulyas, *MSc* (project manager), René de Jong, *RPF-BC* (data analyst), and Jay Greenfield, *RPF-BC* (project coordinator). This final report has been submitted to ASRD for review and approval.

2.0 METHODS – NATURAL STAND YIELD TABLES

2.1 OVERVIEW OF PERMANENT SAMPLE PLOT DATA

Canfor's Permanent Sample Plot (PSP) data provide up-to-date volume and growth information for the FMA. PSP locations were selected to represent a particular type of site in terms of over-story species composition, and were relocated if occurring within two or more timber types, roads, seismic lines or main water courses. PSPs in natural fire-origin stands (Rotation 1 PSP) were not protected from harvesting activities. Once harvested, some PSPs were re-established as a Rotation 2 PSP at the same location.[1]

PSPs are comprised of three nested plots sharing the same plot centre; the main plot has an area of 0.1 ha, 0.08 ha, or 0.04 ha depending on stand density, where all trees greater than or equal to 5 cm DBH are tagged and measured.[2] The sapling plot ranges between 0.01 ha, 0.02 ha, and 0.025 ha, depending on the main plot size, where stems from 1.3 m height to 5 cm DBH are tagged and measured. The regeneration plot is 0.005 ha in size, and includes all stems between 0.16 m and 1.29 m in height. A detailed description of Canfor's PSP program and data collection protocols can be found in the Canfor PSP manual.[3]

2.2 DATA PREPARATION

In preparing the data for subsequent analyses, several iterations were required to detect potential outliers, errors and other data anomalies. Reviews included multiple scatter plot comparisons, source plot card reviews, as well as between-measurement data checks. Corrections were made where noted, and plot measurement deletions only occurred in a few instances. SAS programs were written so that compilations could be easily adjusted or modified (e.g., changes in utilization standards). All SAS programs and input data files will be made available to ASRD.

2.2.1 Source Data

The raw PSP data were first assembled into a Microsoft Access™ database and then extracted into SAS data format. All data were cleaned for general and re-measurement errors and new measurements were updated to May 2010. A data dictionary for the tree and plot level variables (including source and compiled datasets) is provided in Appendix A.

[1] Canfor no longer re-establishes previously harvested PSPs, as the Growth and Yield Monitoring plots replace these. However, existing Rotation 2 PSPs are re-measured on their established schedule.
[2] Main plots of 0.1 ha are no longer established, but continue to be maintained.
[3] Permanent Sample Plot Manual. Canadian Forest Products Ltd. Grande Prairie, AB. April 2011.

2.2.2 PSP Netdown

To be eligible for yield curve development, observations were from PSPs occurring in the FMA net landbase area, in natural (non-regenerating, non-thinned) stands that had not been burned since sampling, and had not been harvested either before or after sampling. Of the 823 PSPs established by Canfor in the FMA, 564 PSPs (comprising 1,669 unique measurements) were available for model development. Full detail of the PSP netdown procedure is provided in the results section 4.1.

2.3 TREE & PLOT COMPILATIONS

Canfor's PSP data were compiled using compilation routines previously developed for a GYPSY validation exercise, and therefore all tree and plot level compilations were consistent with meeting GYPSY compilation input requirements. Each eligible PSP measurement was compiled separately for each species, species group, and by conifer and deciduous stand components, to compute a number of plot level attributes: Plot age, Density, Average height, Average DBH, Site height, Top height, Basal Area, Quadratic mean DBH, Gross total volume, and Gross merchantable volume.

2.3.1 Species Groups

Individual tree species detail was used for all compilations that required species-based coefficient lookup tables (*e.g.,* height-DBH equations, taper equations). Species were subsequently summarized into four species groups (Huang et al. 2009), to be consistent with GYPSY forecast requirements (Table 1).

Table 1. Species Group Assignment.

Species Group	Individual Species Combined
PL	Jack pine (PJ), lodgepole pine (PL), tamarack/larch (LT)[4]
SW	Alpine fir (FA), balsam fir (FB), Douglas fir (FD), Engelmann spruce (SE), white spruce (SW)
SB	Black spruce (SB)
AW	Balsam poplar (PB), trembling aspen (AW), white birch (BW)[5]

2.3.2 Plot age

Plot age was determined from various age sources available for each PSP, and included overstory age[6] (either stump age at 0.3 m, or breast height age or both), understory age, stem

[4] LT was included in the GYPSY modeling here to quantify the growing space allocated to these species. However, they are considered non-merchantable species to Canfor, and will be excluded through a subsequent merchantable volume reduction factor to those yield groups with a LT component.

[5] While GYPSY (2009) generally discourages inclusion of BW in the AW species group, it could be considered as "AW" and its yields may be approximated by AW models if managed as the leading species, as opposed to comprising a secondary component. For Canfor's FMA, yield group 4 is classified as a BW leading species yield group, and therefore considered appropriate to include in GYPSY.

analysis-based age (stump age at 0.3 m height) and inventory age (ie., the AVI-based stand total age as derived from the origin of the story of primary management (SoPM) (Table 2).

Table 2. Number of PSP Measurements by Species Group and Age Source.

Total Age Source	PL	SW	SB	AW
Plot Breast height age	212	168	57	183
Plot Total age	32	30	18	14
Stem analysis age	151	164	106	361
AVI Stand age	1565	1598	1779	1402
Total	*1960*	*1960*	*1960*	*1960*

In most cases only one age was available for a particular species in a PSP. In the rare case of multiple age measurements for the same species, all ages were dated to the first measurement of the PSP and an average age was calculated. If there were multiple age sources for the same species or species group, the best age source was selected as: 1) overstory BH age, 2) overstory stump height age, 3) stem analysis age and 4) AVI stand age. Where more than one species occurred in a given species group, preference was given to the dominant species first (e.g., with an overstory stump age available for PL and a BH age available for LT, the PL stump age was selected ahead of the LT BH age).

Species groups with no age measurement for the plot were assigned the inventory[7] age by default. Age assignments were reviewed in the context of other compiled plot attributes such as volume, basal area and density by developing scattergrams by plot. Any discrepancies were reviewed and corrected where possible. All ages were converted to total age by adding GYPSY-based age correction factors for each species group (Huang et al. 2009) (Table 3).

Table 3. Age Corrections Factors to Convert to Total Age.

Species Group	Overstory Stump Age	Overstory BH Age	Stem Analysis Stump Age	Inventory Age
PL	3.0	8.0	3.0	0.0
SW	4.0	12.0	4.0	0.0
SB	5.0	15.0	5.0	0.0
AW	0.5	4.0	0.5	0.0

[6] As per the Canfor PSP manual (2011), one tree from the overstory was sampled to determine stand age. The sampled tree was taken from the sample stand but outside the PSP boundary. The sample was selected from a great enough distance outside the plot to prevent damage to the plot. The selected tree was free of any visible defects. It had to be representative of the C and D crown classes on the plot and was of the predominant species on the plot. Priority was given to the conifer species in mixed wood stands. If stem analysis data were also collected at the time the sample tree was aged, one of the stem analysis samples could be used as the overstory sample tree.

[7] Inventory age is defined from the AVI as (2010 – origin of the SoPM).

2.3.3 Density

Only trees from the main plot (i.e., those greater than or equal to 5 cm DBH) were used in the analysis.

2.3.4 Height & DBH

Canfor PSP measurement protocols allow for the measurement of height on every 5th tree, or 20% of the total number of trees. GYPSY height-diameter models were used to predict missing tree heights (Huang *et al*. 2009). These models were developed using the first-order (FO) method of the nonlinear mixed-effects modeling technique, with local predictions based on plot-level measurements. Predicted heights were used to fill in missing height data only, and not to replace measured height data.

2.3.5 Site height

Site height is defined as the average height of dominant and co-dominant trees.

2.3.6 Top height

Top height is defined as the average height of the 100 largest DBH trees per hectare.[8] Two separate top height criteria were used for the plot-level top height compilation. The 'strict' top height criteria included healthy, non-veteran, dominant and co-dominant trees that were free of broken or forked tops. The less rigorous top height selection criteria ('weak') also included intermediate trees, and allowed for scars, conks, insects, disease and crook or sweep presence.[9]

2.3.7 Gross volumes

Natural subregion based variable exponent taper equation coefficients were provided by Dr. Huang with the exception of white spruce in the Central Mixedwood and Dry Mixedwood, where Canfor requested the use of localized taper parameters based on previous work in the FMA (Simons Reid Collins 1997). Calculations involved the iterative process presented in 'Ecologically Based Individual Tree Volume Estimation For Major Alberta Tree Species' (Huang 1994).

Gross merchantable conifer volumes were compiled at a 30 cm stump height, 15 cm minimum stump diameter outside bark (DOB) and 12 cm top diameter inside bark (DIB), while deciduous volumes were compiled at a 30 cm stump height, 15 cm minimum stump DOB and 10 cm top DIB (Table 4). Tree volumes were converted to gross merchantable stand volume per hectare

[8] A minimum of two eligible trees was necessary to calculate top height regardless of main plot size.
[9] The top height trajectories were reviewed by plot to identify any potential for top heights being derived from two different cohorts of the same species. We also reviewed mixed aspen- white spruce stands for the potential of all spruce trees in the second layer being identified as intermediate or suppressed.

using the appropriate plot size expansion factors. PSP measurements without any merchantable trees present were assigned zero gross merchantable volume per hectare.

Table 4. Compiled PSP Utilization Limits by Species Group.

Species Group	Stump D. O. B. (cm)	Top D. I. B. (cm)	Stump Ht. (cm)	Min. Merch. Length (m)
Conifer	15	12	30	4.88
Deciduous	15	10	30	4.88

2.3.8 Data Error Checks

Global checks between-measurements were made to identify anomalies and/or inconsistencies between measurements for DBH, height, species label, crown class, condition code, and tree status (Table 5). Only changes considered extreme were corrected, with the previous measurement assumed the more reliable. For example, a tree recorded as live between measurements but that shrank in DBH by more than 1 cm/year, had its second measurement DBH assigned equal to its first measurement DBH. Overall, less than 1% of the total number of individual tree measurements (224,376) was identified for correction.

Table 5. Between-measurement Checks.

Issue	Action	# Trees affected
Live Tree shrinks > 1cm/yr	Assign DBH = to previous msmt DBH	51
Dead Tree grows > 1cm/yr	Assign DBH = to previous msmt DBH	13
DBH decrease to 1/10 prev. msmt	Assign DBH = to previous msmt DBH	4
Species change (known - U - known)	Assign species = prev. known species	470
Crown Class change (D - O)	Assign CC to D	45
Ht drops > 1m/yr with no top damage	Assign condition to T	13
Top damage code not carried forward	Assign condition code = prev. msmt	1315
Tree status change L-D-L	Assign Status = L (unless condition = D)	5
Total		*1916*

Missing top heights occurred for some species that were generally represented by lower densities. All instances of missing top height by plot measurement were reviewed with Canfor, resulting in corrections to tree crown class assignments for some trees, thus updating the top height tree definition criteria. For measurements still without top height trees, an alternative assignment of plot level or yield group level site index assignment was used to fill in missing top height information, to address GYPSY input requirements.

Discrepancies were noted with missing sapling and regeneration information for some PSPs. Dr. Huang (ASRD) indicated that for fire-origin stands this would not affect the GYPSY projections, if anything; it would be slightly conservative by discounting some of the smaller trees (email of February 11, 2011).

Tree total height-DBH scattergrams were generated from the source tree height data, to identify potential problem trees and plots. All suspect trees were reviewed, with specific focus on trees with a large DBH and suspect height; the intent being to fix errors that significantly affect the calculation of top height, which is an integral component of the GYPSY model. A number of these suspect trees were corrected based on the plot tally sheets while others were set to missing. Suspect heights were further identified by plotting 'height/DBH' ratios for each species. A total of thirty tree heights with suspect ratios were considered outliers and deleted from the data (Table 6).

Table 6. Suspect Height/DBH Ratios.

Species	DBH	Ht / DBH Ratio Outliers	# Heights Affected
AW	5 - 15	> 3.0	8
	15 - 45	< 0.2	
BW	5 - 15	> 3.0	6
	5 - 25	< 0.2	
FB	5 - 15	> 2.5	2
PB	15 - 45	< 0.2	7
PL	5 - 15	> 2.5	2
	15 - 25	< 0.25	
	25 - 35	< 0.2	
SB	5 - 15	> 2.9	3
	15 - 25	> 1.5	
	5 - 25	< 0.2	
SW	15 - 45	< 0.2	2
Total			*30*

Graphing of selected attributes (volume, basal area, stems/ha, DBH) over age and top height helped further identify potential anomalies in the data. In addition, checks for extremes in computed site index (BH age) for each plot measurement also helped identify potential issues with the assigned total ages and/or computed top heights. Questionable individual plot measurement data were then reviewed with Canfor staff, whose follow-up review of plot cards helped resolve / correct issues wherever possible.

Finally, during the course of the yield curve development process influential points were identified from the data set. Outliers were identified as those exhibiting strongly atypical volumes for their stand type and/or age and may inordinately affect model performance. For example, some GYPSY predictions from individual PSP measurements resulted in very high gross merchantable volumes (i.e., > 600 m^3/ha). The contribution of these specific PSPs was assessed during the yield curve development sensitivity analyses.

2.4 YIELD GROUP DEFINITIONS

As part of its last 2003 FMP, Canfor developed 17 yield groups in the natural forested landbase, which took into account broad cover group and species composition, as well as crown closure class and timber productivity rating (TPR).

The seventeen yield groups previously defined in the 2003 FMP for the natural landbase were generally retained (Table 7), with all modifications described in Canfor's 2012 FMP Landbase Assignment Report.[10] Specific changes included:

1. Used the ASRD 46 extended strata as the building blocks for the assignment as per the Interpretive Bulletin – Yield Projection Guidelines for Alberta in the Forest Management Planning Standards document (ASRD 2006, pages 109-110).
2. Used the conifer density class calls in the understory layer (USDEN_CL) and tertiary layer (TSDEN_CL) for the identification of significant conifer understory.
3. Reclassified non-productive types into yield group 13, which was subsequently removed in its entirety from the net landbase.
4. The approved net landbase area was used to exclude all PSPs occurring outside the net landbase area (through GIS intersection of PSP coordinates).

Table 7. Natural Stand Yield Group Description.

Yield Group	Description
1	AW+(S)-AB
2	AW+(S)-CD
3	AW/SW/PBSW/BWSW
4	BW/BWAW+(S)
5	FB+OTH
6	H+(S)/S
7	PB+(S)
8	PL/PLFB+(H)
9	PLAW/AWPL
10	PLSB+OTH
11	PLSW/SWPL+(H)
12	SBLT (G)
13	SBLT(M,F,U)/LT[11]
14	SBPL/SBSW/SBFB
15	SW/SWFB+(H)-AB
16	SW/SWFB+(H)-CD
17	SWAW/SWAWPL

[10] "2012 Forest Management Plan – Canfor Grande Prairie FMA #9900037 – Landbase Assignment". Report prepared for Canfor Grande Prairie Division, by Ecora Natural Resource Group. February 2012.
[11] Yield Group 13 comprised non-merch. timber types, and was excluded from the net landbase area.

2.5 NATURAL STAND YIELD TABLE DEVELOPMENT

Natural stand yield tables (NSYT) were developed using the GYPSY model (version: May 21, 2009). Direction from ASRD was to use the current approved version of GYPSY without any change or sub-model calibration to the FMA[12].

Given that GYPSY is a relatively new model, ASRD does not yet have written standards with regards to defining plot eligibility, handling of missing data (e.g., species age) and other plot data challenges in NSYT development. Informal rules and generally accepted protocols were therefore applied. In the context of the FMP process in natural stands, the following steps were applied for NSYT development:

1. Stratify the plot data base using AVI stand attributes spatially intersected with the PSP coordinates.
2. Compile the plot data located in the FMA net landbase to include all input attributes required to run the GYPSY model, thus localizing ("seeding") the model.
3. Run separate GYPSY forecasts for each plot measurement.
4. Create a stratum (yield group) average yield curve by first averaging all measurement-based GYPSY projections for each plot and then averaging all plot-based average GYPSY projections occurring within each yield group.
5. Create a broad cover group-based average yield curve by averaging all plot-based average GYPSY projections occurring within each cover type, weighted by the net landbase area proportion of each yield group.

The PSPs used for development of NSYTs included all available Rotation 1 PSPs that had not yet been harvested in the net landbase area. The GYPSY input data for each PSP measurement included age, top height (or site index at BH for missing top height), density and basal area for each species group present in the PSP measurement.

As defined in Table 1, four species groups were defined for GYPSY input: three conifer species groups (PL, SW, SB), and one deciduous species group (AW). The best available total age was assigned to each species group. The "Strict" top height definition for each species group was used for GYPSY input. Density was compiled using the main tree data only (i.e., DBH>= 5 cm). Basal area of each PSP measurement was used to adjust GYPSY projections to the observed basal area.

The GYPSY model required a minimum of 20 stems per hectare density for any species group. For PSP measurements with < 20 stems per hectare, the density was reset to zero, thus removing the minor species from the projections for that plot measurement (Table 8). For PSP

[12] Personal communication with Dr. Huang.

measurements with missing top heights due to low stand density representation or lack of suitable top height trees, the average site index of the species from the other PSP measurements was used, if available. If the species did not have any valid top height measurements for the particular PSP, the yield group average site index (at BH) for that species in the PSP was used. Lastly, if a yield group average site index was not available, a default site index was applied to each species group (Table 8).[13]

Table 8. Number Measurements Requiring Modification Prior to GYPSY Input.

GYPSY Species Group	# Measurements Requiring Site Index in Lieu of Missing Top Height				# Measurements with <20 Stems/ha (ie., reset to 0)
	No Issue (ie., HTOP present)	Plot Level Avg SI Used	Yield Group Level Avg SI Used	Default SI Used	
AW	1295	61	78	0	39
PL	707	19	32	3	112
SB	492	63	198	6	93
SW	774	107	397	29	140
Total	*3268*	*250*	*705*	*38*	*384*

GYPSY forecasts were run separately for each PSP measurement, with an 'average' forecast of the PSP computed as the average of all PSP measurements. Yield group based yield curves were then computed by averaging all PSP-averaged curves occurring in a given yield group. No weighting was applied in either averaging.[14] All PSP measurements with zero stems per hectare, plus all individual species groups having zero stems per hectare, were included in the averaging.

Natural stand yield curves were also computed for each of the broad cover groups. The net landbase area for the natural stands was used to calculate area-weighted yield tables by broad cover group, weighted by the area proportion of each yield group occurring within a given cover group.

2.6 LARCH COMPONENT REDUCTION

Larch (LT) is a component of both the PSPs and AVI within Canfor's FMA, and therefore is included in the GYPSY-based NSYTs within the PL species group. However, LT is not considered a merchantable species by Canfor, and therefore, the proportion of LT must be

[13] The default SI's assigned by species were PL:15, SW:16, SB:12, AW:30. Computed SI's were also constrained at each plot level to not exceed a maximum SI by species: PL:25, SW:25, SB:15, AW:30. If the plot level SI exceeded the maximum SI, then either the yield group average, or default SI was applied.
[14] Plots carry an equal weight due to the inherent uncertainty and unknown sampling frame. The PSPs were originally based on a stratified random sampling but the strata no longer apply and a number of plots were inherited from Procter and Gamble and those plots were on a grid system. Preliminary analysis done in 2005 during the development of a G&Y Monitoring Program indicated good agreement and thus implied representation.

reduced prior to development of final NSYTs. A method to reduce the LT component from the PL species group NSYT was proposed to ASRD.[15] ASRD approved this method for use on January 16, 2012.[16]

In summary, the proportion of LT occurring in each yield group was computed from all PSP data as the ratio of LT merchantable volume to the merchantable volume of all species in the GYPSY-based PL species group. Adjusted PL-species group NSYTs (with the LT component removed) were then computed by multiplying the LT proportion by the PL-species group NSYTs.

2.7 MORTALITY

The GYPSY model currently includes deciduous stand decline and mortality functions, however, it is not considered sufficient to fully address mortality in both deciduous and conifer species in the resulting NSYTs. Without available mortality data from older deciduous and conifer stands, Canfor proposed to ASRD that the same mortality functions previously implemented by Weyerhaeuser for its 2007 FMP, be used for Canfor's 2012 FMP.[17] ASRD approved this method for use on January 16, 2012.[16]

To estimate deciduous mortality in 'deciduous leading' yield groups, the deciduous merchantable volume[18] was capped at 110 years, flat-lined to 130 years and then declined at a linear rate such that the pure deciduous composite curve had 75 m^3/ha deciduous volume remaining at 180 years. For deciduous mortality in 'conifer leading' yield groups, the deciduous volume reduction declined until there was zero deciduous volume remaining in the stand at 180 years.

To estimate conifer mortality, conifer volumes were capped beyond the upper age range of the PSP data to minimize extrapolation errors in the yield tables. The upper age range of PSP data was calculated as the 90th percentile age[19] of the PSP last measurement ages in each yield group. The corresponding termination age beyond which conifer volumes were capped was defined as 30 years after the 90th percentile age. If the NSYT merchantable conifer volume subsequently declined beyond the capped volume, then the original NSYT merchantable volumes were used.

[15] Refer to the memo titled 'Canfor FMA 9900037 – Larch Reduction Factors for 2012 FMP NSYTs, dated January 11, 2012', attached to this document in Appendix H.
[16] ASRD approval received from Thompson Nunifu, ASRD via email on January 16, 2012.
[17] Refer to memo titled 'Canfor FMA 9900037 – Deciduous and Conifer Mortality for 2012 FMP NSYTs", dated January 11, 2012, attached to this document in Appendix I.
[18] All merchantable volumes are gross merchantable volume.
[19] Age is based on the AVI stand age.

2.8 CONIFER UNDERSTORY YIELD TABLE DEVELOPMENT

Natural stand conifer understory yield curves were identified for yield group 6, as stands having a deciduous overstory component together with an understory conifer component. For the purposes of the current FMP, no specific development and modeling were completed for these stands. Instead, the following timber supply modeling substitutions were applied in lieu of natural stand yield curves developed for yield group 6:

1. Substitute the YG 3 (DC) NSYT for any yield group 6 stand that had a conifer stems/ha density class of 3 or 4 (100-500 conifer stems per hectare).[20]
2. Substitute the YG 17 (CD) NSYT for any yield group 6 stand that had a conifer stems/ha density class between 5 and 7 (over 500 conifer stems per hectare).

Canfor considered 500 stems/ha would be a minimum conifer density required to achieve a merchantable conifer stand at rotation. Further GYPSY NSYT modeling efforts helped support this threshold, in that the YG 17 NSYT generated approximately 400 conifer stems/ha at 100 years total age (Appendix F) Therefore, 500 conifer stems/ha was considered an appropriate density threshold to allocate the yield group 6 area between DC vs. CD stands.

An assessment of allocating yield group 6 between DC and CD stands at different density thresholds, showed that about 81% of the yield group 6 area was assigned to DC stands with a 500 stems/ha threshold (Table 9). By increasing the density threshold to 750 and 1000 stems/ha, the assignment to DC stands increased slightly to 87% and 94%, respectively. This suggests that selection of density class thresholds greater than 500 stems/ha would have minimal impact on assigned weighted average NSYTs for yield group 6.

Table 9. Sensitivity of Density Changes for Yield Group 6 Substitution.

Yield Group 6 Substitute	Cover Type	Minimum Conifer Understory Density Class							
		250		500		750		1000	
		ha	%	ha	%	ha	%	ha	%
3	DC	24,604	26%	77,524	81%	83,650	87%	89,617	94%
17	CD	71,079	74%	18,159	19%	12,034	13%	6,067	6%
Total		*95,684*	*100%*	*95,684*	*100%*	*95,684*	*100%*	*95,684*	*100%*

2.9 CONIFER AND DECIDUOUS CULL REDUCTION

Coniferous cull factors were based on a combination of the 2003 FMP cull estimates (5% for all conifer species except FB, and 9% for FB), plus an additional 0.5% cull to account for advanced conifer decay (Table 10). For the deciduous species, a deciduous cull factor of 9.4% was

[20] Conifer density classes are defined in the Inventory Enhancements Detection of Conifer Understory document, Version 1.0 (March 2006).

applied equally to all yield groups at the recommendation of ASRD[21] and subsequent agreement from affected deciduous operators.[22] Gross merchantable volumes were then adjusted to net merchantable volumes based on these cull factors.

To approximate the impact of long-butting, Canfor recompiled all PSP data at last measurement to quantify the volume lost from conifer trees <=19 cm DBH with an increased stump height of 0.6 m (2 ft).[23] The results showed that gross merchantable volume would be reduced by 1.2 % with a 0.6 m stump height for all conifer trees <=19 cm DBH (Table 11). Canfor considered that under operational conditions, about half of the conifer trees <=19 cm DBH would be affected by advanced decay, and therefore, an incremental 0.5% (about half of the impacted volume) was added to all conifer cull estimates to account for advanced decay.

Table 10. Cull Factor by Species.

Cull Factor	Species	% Cull
Deciduous cull	All deciduous	9.4%
Conifer cull	All conifers except FB	5.0%
Conifer cull	FB[24] only	9.0%
Advanced Decay cull	All conifers	0.5%

Table 11. Compiled PSP Conifer Volumes to Estimate Advanced Decay.

Yield Group	Cover Type	Area (ha)	# PSPs	Gross Merch Conifer Volume (m^3/ha)		Merch Vol Diff.	
				0.3 m SH for All Conifers	0.6 m SH for Conifers <=19cm DBH	(m^3/ha)	(%)
1	D	6,704	12	13.2	13.2	0.03	0.2%
2	D	29,973	44	5.5	5.5	0.01	0.1%
3	DC	72,039	87	51.6	51.2	0.41	0.8%
4	D	3,540	6	1.4	1.4	0.00	0.0%
5	C	7,653	18	179.9	177.8	2.14	1.2%
7	D	14,841	14	8.3	8.2	0.07	0.9%
8	C	28,624	57	229.5	225.6	3.89	1.7%
9	C	14,329	32	127.9	126.4	1.51	1.2%
10	C	16,156	22	195.7	192.1	3.63	1.9%
11	C	20,697	30	275.0	273.3	1.66	0.6%
12	C	12,870	14	88.9	85.2	3.70	4.2%
14	C	22,635	31	115.7	111.9	3.74	3.2%
15	C	27,216	29	216.7	216.2	0.54	0.3%
16	C	20,610	26	154.5	152.6	1.87	1.2%
17	CD	44,033	56	109.2	108.4	0.78	0.7%
Total		*341,920*	*478*	*118.1*	*116.7*	*1.44*	*1.2%*

[21] Email dated December 6, 2011, from T. Boult (ASRD) approving a 9.4% deciduous cull.
[22] Email dated January 17, 2012, from A. Bell (Tolko) that 9.4% deciduous cull was acceptable.
[23] Conifers with large ends of <=19 cm diameter with advanced decay may be bucked at 0.6 m (2 ft) intervals to one hundred percent (100%) clear face. For large ends >19 cm, normal bucking rules apply.
[24] FB is modeled under the SW GYPSY species group. This cull % affects yield group #5 only.

2.10 ESTIMATION OF PIECE SIZE

The Alberta Forest Management Planning Standards[25] require an estimate of piece size to be included in the yield table outputs. Net merchantable volume and merchantable stems per hectare estimates as predicted by GYPSY were used to derive conifer and deciduous piece size (trees/m^3). Details of the piece size model results are provided in Appendix F – Piece Size Tables - Natural Stands.

2.11 YIELD CURVE VALIDATION

Natural stand yield curves were assessed by comparing GYPSY forecasts against actual measured plot data. Separate comparisons were made against both the last measurement of the PSP merchantable volume data (used to fit individual natural stand yield curves), as well as against all available TSP data in the FMA (independent data set not used for fitting yield curves). Further analyses of potential volume biases in GYPSY were also developed and presented to ASRD for subsequent review.[26]

2.11.1 Assessment against PSP Data

PSP trajectories were plotted against natural stand yield curves by yield group for each of the four modeled species groups.

PSP merchantable volumes were summarized into 25-year age classes, and for each age class the average plot volume and 95% confidence intervals were compared against natural stand yield curves by yield group as well as by broad cover group, for the conifer, deciduous and total volume species groups.

PSP merchantable volumes of each species at last measurement were also compared against GYPSY merchantable volumes by matching each of the assigned species-specific total age from the PSP with the species-specific total age modeled in GYPSY. The range of tests between measured and predicted volumes included four separate standard statistical measures (Table 12).

[25] Refer to Annex 1 (sec. 4.2.1) of Alberta Forest Management Planning Standards, located at: http://www.srd.alberta.ca/LandsForests/ForestManagement/ForestManagementPlanning/documents/Alberta_Forest_Management_Planning_Standard_Version_4_1_April_2006_Final_2.pdf

[26] Refer to memo titled 'Canfor FMA 9900037 – Bias in Merchantable Volumes for 2012 FMP NSYTs, dated January 11, 2012', attached to this document in Appendix G.

Table 12. Tests Conducted for Individual GYPSY Projections.

Root mean square error of prediction $RMSE = \sqrt{\frac{\sum_{i=1}^{n}(y_i - \hat{y}_i)^2}{n}}$	Bias $Bias = \frac{\sum_{i=1}^{n}(y_i - \hat{y}_i)}{n}$
Goodness-of-fit index $GoFI = 1 - \frac{\sum_{i=1}^{n}(y_i - \hat{y}_i)^2}{\sum_{i=1}^{n}(y_i - \bar{y})^2}$	Percent bias $Bias\% = \frac{Bias}{\bar{y}} \times 100$

2.11.2 Independent Validation against TSP Data

Temporary sample plots (TSP) were established using stratified sampling across the FMA as part of Canfor's 1997 Volume Sampling Program. This provided Canfor an opportunity to assess the GYPSY yield forecasts against an independent data set. Although these TSPs were not sampled within 5 years of the current inventory (as required by the current Forest Management Planning Standard), they nevertheless represent a robust sampling program and an important source of data for yield curve comparison.

The total set of 1,395 TSPs were spatially intersected with the current AVI net landbase area, to identify a subset of TSPs occurring in the FMA that had not yet been harvested. This resulted in a total of 885 TSPs that were available for validation purposes. The methods to compare GYPSY yield forecasts with TSP averages were the same as those used against PSP comparisons.

2.12 SENSITIVITY ANALYSES

2.12.1 Age Sensitivity

For the base set of NSYTs, the total age was taken from plot age data where available, and AVI stand age for PSP measurements where plot age data were missing. For the age sensitivity analysis, all PSP measurements were all re-assigned to AVI stand age, and individual GYPSY forecasts were rerun. The intent of this sensitivity analysis was to quantify the impact of using potentially incorrect plot total age data that may instead have belonged to a different cohort of trees than the PSP species layer that the total age was assigned to.

2.12.2 Volume Cap

For the volume cap sensitivity analysis, all GYPSY forecasts exceeding 600 m^3/ha gross merchantable volume (based on all species combined) were removed from the yield group average NSYTs. The intent of this sensitivity analysis was to eliminate the potential for unreasonably high volume projections.

3.0 METHODS – MANAGED STAND YIELD TABLES

3.1 OVERVIEW

There were some major changes in requirements in Alberta around yield projection and regeneration standards in the past 10 years. Most of the new requirements were published in 2006 in the Alberta Forest Management Planning Standard version 4.1 (the Planning Standard), just three years after the approval of Canfor's last FMP.

Specifically, expectations around yield projections for the regenerating landbase are described under Interpretive Bulletin: Yield Projection Guidelines for Alberta, Section A that states:

"Alberta believes the highest priority is to develop valid and accurate yield projections and regeneration standards for managed stands."

In Section B of the Planning Standard it is also described that:

"Regeneration standards will be derived from the relationships between stand condition observed at the last legislated reforestation survey, and stand condition at the proposed harvest age. The mechanism to develop these relationships will rely heavily on empirical modeling systems acceptable to Alberta."

For the FMP, Canfor intends to develop managed stand yield curves using the current spatial GYPSY model (version: May 21, 2009) that incorporates stocking percent in the projections. For managed stands, this will ensure that the linkage between regeneration targets (derived from yield curves) and assessment of regeneration success (derived from GYPSY model projections) is as tight as possible. As indicated in the Planning Standard, yield curves for managed stands must be linked with regeneration performance standards for all regenerating yield strata.

Canfor developed 4 types of yield curves for the regenerating forested landbase as follows (Figure 1):

Regenerated pre-1991 stands yield curves (R1) were developed for all stands harvested before March 1, 1991.

Regenerated post-1991 stands RSA-based yield curves (R2) were developed for all existing openings harvested after March 1, 1991 and before May 1, 2010; the effective date of the landbase.

Regenerated future stands crop plan based yield curves (R3-B) were developed for all stands harvested after May 1, 2010.

Regenerated future stands genetic yield curves (R3-G) were developed for all stands harvested after May 1, 2010 where genetically improved lodgepole pine and/or white spruce stock will be deployed.

REGENERATING LANDBASE			
EXISTING		FUTURE	
R1	R2	R3	
PRE-1991	POST-1991	BASIC	GENETIC
Harvested prior to March 1, 1991	Harvested between March 1, 1991 and May 1, 2010	Harvested after May 1, 2010, outside genetic seed deployment zones	Harvested after May 1, 2010, in genetic seed deployment zones (B1-Pl and G1-Sw)
Stratification as per natural stand yield groups (1-17)	Stratification based on 7 regenerating strata (RSA-based)	Stratification based on 7 regenerating strata (RSA-based)	Stratification based on 7 regenerating strata (RSA-based)

Figure 1. Overview of the Managed Stand Yield Curves.

3.2 DATA SOURCES

Canfor has a number of data sources that were used to develop and/or validate yield projections for the regenerating landbase.

3.2.1 Rotation 2 Permanent Sample Plots

Canfor's PSP data provide up-to-date volume and growth information for the FMA. PSP locations were selected to represent a particular type of site in terms of over-story species composition, and were relocated if occurring within two or more timber types, roads, seismic lines or main water courses. PSPs in natural fire-origin stands (Rotation 1 PSP) were not

protected from harvesting activities. Once harvested, some PSPs were re-established as a Rotation 2 PSP at the same location.[27]

Table 13. Distribution of Rotation 2 PSPs.

Type	Stratum	Main	Pusk	Peace	Total
Pre-1991 (R1)	NAT-0*		1		1
	NAT-3	7			7
	NAT-5	1			1
	NAT-6	5	3		8
	NAT-8	2			2
	NAT-9	12			12
	NAT-10	2			2
	NAT-11	2			2
	NAT-14	1			1
	NAT-15	4	1		5
	NAT-16	1			1
	NAT-17	8			8
	Sub-Total	*45*	*5*	*0*	*50*
Post-1991 (R2)	CD-PlHw	1			1
	CD-SwHw	6	1	1	8
	C-Pl	16			16
	C-Sw	15	2		17
	Sub-Total	*38*	*3*	*1*	*42*
Grand Total		***83***	***8***	***1***	***92***

* one plot is located in a non-forested area

PSPs are comprised of three nested plots sharing the same plot centre; the main plot has an area of 0.1 ha, 0.08 ha, or 0.04 ha depending on stand density, where all trees greater than or equal to 5 cm DBH are tagged and measured. The sapling plot ranges between 0.01 ha, 0.02 ha, and 0.025 ha, depending on the main plot size, where stems from 1.3 m height to 5 cm DBH are tagged and measured. The regeneration plot is 0.005 ha in size, and includes all stems between 0.16 m and 1.29 m in height. A detailed description of Canfor's PSP program and data collection protocols can be found in the Canfor PSP manual.

There are 92 Rotation 2 PSPs with 272 measurements in the Canfor FMA (Table 13). These plots are more or less evenly distributed between pre- and post-1991 cutblocks. Despite the relatively large number of Rotation 2 PSPs when compared to other FMAs in the Province, there is still not enough long term data to develop reliable managed stand yield curves from this data

[27] Canfor no longer re-establishes previously harvested PSPs, as new Growth and Yield Monitoring plots replace these. However, existing Rotation 2 PSPs are re-measured on their established schedule.

set alone. In addition, the PSPs do not have the stocking information that would be necessary to use spatial GYPSY. However, the Rotation 2 PSPs do provide the means for validating managed stand yield curves by providing supporting evidence of observed trajectories versus predictions.

3.2.2 Growth and Yield Monitoring Plots

Canfor's approved 2003 Forest Management Plan committed to developing a Growth & Yield Monitoring (GYM) program to validate projected regenerated yield assumptions. In response, Canfor has established a 1.67 km grid across the FMA originating from the National Forest Inventory 20 km grid where 2 sizes of plots were established, determined by the grid point location.

Table 14. Distribution of GYM Plots.

Type	Stratum	Main	Pusk	Peace	Total
Pre-1991 (R1)	NAT-1		1		1
	NAT-3	20	10		30
	NAT-5	2			2
	NAT-6	9	4	1	14
	NAT-8	11			11
	NAT-9	7			7
	NAT-10	4			4
	NAT-11	10			10
	NAT-15	2	1		3
	NAT-16	7	1		8
	NAT-17	24	2		26
	Sub-Total	*96*	*19*	*1*	*116*
Post-1991 (R2)	CD-PlHw	6			6
	CD-SwHw	18	6		24
	C-Pl	57			57
	C-Sb	3	1		4
	C-Sw	49	5	1	55
	DC-HwSx	5	2		7
	D-Hw	3	6		9
	Sub-Total	*141*	*20*	*1*	*162*
Grand Total		***237***	***39***	***2***	***278***

*There are 18 plots that fall outside of cutblocks on the 20-km NFI grid.

The 1.67 km plot is a permanent sample plot that will be maintained for 30 years of stand age. Plots that are already in >30-year-old harvested stands will be established and will receive a minimum of one re-measurement 5 years after plot establishment. All genetic, 6.67 km and 20 km plots will be expanded and be included with Canfor's present permanent sample plot program. Any grid point that falls in a new harvested area is identified and a new plot is

established as per GYM program protocols. A detailed description of Canfor's GYM plot program and data collection protocols can be found in the Canfor GYM plot manual.[28]

There are 296 unique GYM plot locations with 381 measurements collected between 2005 and 2010 (Table 14). The first round of re-measurements was completed in 2010 and 85 GYM plots were re-measured. As with the Rotation 2 PSPs, stocking percent is not yet incorporated in the measurement protocols so direct modeling using spatial GYPSY is not possible. However, the GYM plots do provide the means for validating managed stand yield curves by providing supporting evidence of observed trajectories versus predictions.

Canfor's continued commitment to rigorous monitoring of the regenerating landbase via the GYM program will be invaluable in the future for generating reliable yield projections and validating growth assumptions at the FMA level.

3.2.3 RSA Performance Surveys (2009-2010)

Canfor has been conducting Regeneration Standard of Alberta (RSA) performance surveys in their cutblocks since the 2009 field season. The RSA regeneration surveys in 2009 and 2010 encompass over 10,000 ha of openings that were harvested between 1995 and 1999 (Table 15 and Table 16). These areas were stratified based on the aerial stratification program.

Only one block in 2009 (block id = S27042, opening # = 6010611837) and one in 2010 (block id = S07105, opening # = 523065057) were missed and completed based on the non-photo method. None of the RSA surveys include the optional basal area measurements but all surveys incorporate stocking percent by species group as per RSA field protocols.

Table 15. RSA Performance Surveys 2009.

RSA STRATA	POPULATION		SAMPLE	
	Area (ha)	SUs (#)	Area (ha)	SUs (#)
Pl	574.6	58	136.9	15
PlHw/HwPl	15.6	3	15.6	3
Sw/Sb	920.6	96	83.8	10
SwHw/HwSx	218.0	28	89.0	15
Pl-M*	15.4	1	15.4	1
Total	*1,744.2*	*186*	*340.6*	*44*

* Non-photo program

[28] Post Harvest Regenerated Stands Monitoring Manual. Canadian Forest Products Ltd. Grande Prairie, AB. April 2011.

Table 16. RSA Performance Surveys 2010.

RSA STRATA	POPULATION		SAMPLE	
	Area (ha)	SUs (#)	Area (ha)	SUs (#)
Hw	107.7	11	94.6	10
HwSx	184.1	21	115.3	15
Pl	2,395.0	177	142.6	15
PlHw	28.6	7	28.6	7
Sw/Sb	5,372.3	537	88.6	10
SwHw	272.5	37	91.8	15
Sw-H	6.0	1	6.0	1
Total	*8,366.2*	*791*	*567.4*	*73*

3.2.4 Regenerated Stand Productivity Study

In order to obtain accurate estimates of site index for managed stands, Canfor (in cooperation with Alberta Newsprint Company and Weyerhaeuser Company Limited Grande Prairie) undertook a Regenerated Stand Productivity (RSP) data collection program in 2007. As an output from this analysis, site index estimates were produced for each leading species, ecosite and natural subregion. In 2011 Canfor recalculated the site index numbers using the 2009 approved GYPSY site index models. These updates were important, making the estimates more compatible with GYPSY applications. ASRD approved the resulting SI values for use as a valuable source of information for estimating managed stand yields in the Canfor FMA (Thompson Nunifu, email correspondence on November 17, 2011).

Canfor intends to incorporate these results in to development of managed stand yield curves as an input to model development for cutblocks harvested before 1991 (over 80% of the study area was located in pre-1991 cutblocks). A detailed description of the RSP study, data collection protocols and results can be found in the project summary report.[29]

3.3 REGENERATION STRATUM DEFINITIONS

The stratification of managed stands is described in detail in the discussion paper titled "Stratification of the Regenerating Landbase in the Canfor Grande Prairie FMA". This document was submitted to ASRD for review on November 25, 2011 and most of the information was also embedded in Canfor's 2012 FMP Landbase Assignment Report.

As per the Planning Standard, areas harvested prior to March 1, 1991 (R1) were assigned to a yield stratum based on the AVI in place on the effective date of the inventory (May 1, 2010). Polygons in those openings were assigned to one of the 17 natural yield groups (Table 7).

[29] Regenerated Stand Productivity in North Central Alberta. Report #2. Canadian Forest Products Forest Management Area (Revised using GYPSY 2009 top height models). Edmonton, AB. October 2011.

Areas harvested after March 1, 1991 (R2), were assigned to the yield stratum based on the regeneration stratum for the harvest area as defined in the Alberta Regeneration Information System (ARIS) and the most current survey information. Canfor's FMP 2012 regeneration strata are described in Table 17. More details are provided in Canfor's Silviculture Strategy document.

Table 17. Regeneration strata.

Broad Cover Group	Regenerated Yield Trajectory (leading + secondary species)	Transitions Toward Climax	Species Proportions	Code
D	Deciduous	No transition anticipated. Stand structure remains pure deciduous.	>80% deciduous species	D-Hw
DC	Hardwood/Spruce	No transition anticipated. Stand structure remains a deciduous leading mixwood.	>50% deciduous species and >30% spruce leading conferous species	DC-HwSx
CD	White Spruce/Hardwood	No transition anticipated. Stand structure remains a coniferous leading mixwood.	>50% white spruce leading coniferous species and >30% deciduous species	CD-SwHw
CD	Pine/Hardwood	No transition anticipated. Stand structure remains a coniferous leading mixwood.	>50% pine leading coniferous species and >30% deciduous species	CD-PlHw
C	White Spruce pure or leading	No transition anticipated. Stand structure remains pure coniferous.	>80% white spruce leading coniferous species	C-Sw
C	Pine pure or leading	No transition anticipated. Stand structure remains pure coniferous.	>80% pine leading coniferous species	C-Pl
C	Black Spruce pure or leading	No transition anticipated. Stand structure remains pure coniferous.	>80% black spruce leading coniferous species	C-Sb

3.3.1 Regeneration Transitions

Canfor's silviculture matrix described the regeneration transition of the natural stand yield groups (1-17) to the regenerated strata (Table 18) for all future cutblocks. More details are provided in Canfor's 2012 FMP Landbase Assignment Report.

The pine and white spruce leading strata are further divided into basic (B) and genetic (G) for the purpose of yield curve assignment to account for enhanced yield due to tree improvement using genetic stock. Genetic stock is only used in the pine B1 and white spruce G1 breeding regions.

Table 18. Silviculture Matrix.

Natural Yield Group		Regenerated Stratum	
Code	Description	Base	Genetic
1	AW+(S)-AB	D-Hw-B	
2	AW+(S)-CD	D-Hw-B	
3	AW/SW/PBSW/BWSW	DC-HwSx-B	DC-HwSx-G
4	BW/BWAW+(S)	D-Hw-B	
5	FB+OTH	C-Sw-B	C-Sw-G
6	H+(S)/S	CD-SwHw-B	CD-SwHw-G
7	PB+(S)	D-Hw-B	
8	PL/PLFB+(H)	C-Pl-B	C-Pl-G
9	PLAW/AWPL	CD-PlHw-B	C-Pl-G
10	PLSB+OTH	C-Pl-B	C-Pl-G
11	PLSW/SWPL+(H)	C-Pl-B	C-Pl-G/C-Sw-G
12	SBLT(G)	C-Sb-B	
13	*SBLT/LTSB(M/F/U)*	*removed from landbase*	
14	SBPL/SBSW/SBFB	C-Sb-B	C-Pl-G/C-Sw-G
15	SW/SWFB+(H)-AB	C-Sw-B	C-Sw-G
16	SW/SWFB+(H)-CD	C-Sw-B	C-Sw-G
17	SWAW/SWAWPL	CD-SwHw-B	CD-SwHw-G

3.4 MANAGED STAND YIELD TABLE DEVELOPMENT

Canfor developed 4 types of yield curves for the regenerating forested landbase (Figure 1). The methods for each yield curve type are described in the following sub-sections.

3.4.1 Pre-1991 Managed Stands Yield Curves (R1)

Regenerated stands pre-1991 basic yield curves were developed for all stands harvested prior to March 1, 1991 which encompass 34,515 hectares of the regenerating THLB in the Canfor Grande Prairie FMA. Stratification of the polygons was based on the current AVI and each polygon was assigned to one of the 17 natural yield groups (Table 7).

Canfor applied the same methodology that was used to develop the natural stand yield curves as a basis for making yield projections for the pre-1991 openings. However, Canfor implemented an adjustment to the R1 curves based on improved site productivity information for pine and white spruce that was available from the recently completed RSP study.

We compared the natural stand average site index values (based on Rotation 1 PSPs) with the baseline estimates from the RSP study for lodgepole pine and white spruce in the pure conifer and conifer leading mixedwood strata. As an output from the RSP study, site index estimates were produced for each leading species, ecosite and natural subregion.

For the R1 yield curve development, we adjusted the natural stand site index at each Rotation 1 PSP measurement for lodgepole pine and white spruce based on the RSP study. The R1 yield

curves by yield group were then generated based on the same methods used to generate the natural stand yield curves but using the adjusted site index estimates.

The site index adjustment using the RSP study involved the following main steps:

1. *Calculate a proper area-weighted managed stand pine and white spruce site index for the pure conifer (C) and conifer leading mixed (CD) yield groups based on the pre-1991 cutblocks.*

The calculation protocols closely followed those implemented in the Weyerhaeuser Grande Prairie FMA 2011 Detailed Forest Management Plan Yield Tables document (Appendix III – Calculation of site index seeds using results from the Regenerated Stand Productivity Study). This process ensures that the proper sampling frame is applied (i.e., exclusion of alpine, montane and subalpine areas over 1500 m elevation) and also identifies handling minor ecosite/natural subregion combinations.

In the RSP study, site index estimates were produced for each leading species, ecosite and natural subregion. For yield curve development, an estimate of site index is required by leading species and yield group. Because sampling was undertaken by natural subregion and ecosite, and the number of samples was not established proportionally to area, an area-weighted exercise is required to produce the necessary site index estimates.

In addition to mimic the sampling frame of the study; the areas used for area weighting have to be specific to guide species. For example, for the PL-LF site index, only the landbase areas with pine as a guide species would be included in the area weighting (yield groups 8, 9, 10 and 14). The white spruce leading pure C and CD yield groups included yield groups 15, 16 and 17. We calculated an adjusted site index for both species in yield group 11 (PlSw/SwPl). Deciduous and black spruce leading yield groups were not considered for adjustment. This means that we will be using the natural stand yield curves as is for yield groups 1, 2, 3, 4, 5, 7 and 12.

Site index values obtained from the 2011 Regenerated Stand Productivity reanalysis are presented in Table 19.

Any missing species-natural subregion-ecosite "cells" with area representation in the pre-1991 cutblocks and target yield groups will be assigned with a site index following protocols similar to those in the Weyerhaeuser DFMP 2011.

Area-weighted results were calculated by yield group and natural subregion group based on the target yield groups in the pre-1991 cutblock areas. These estimates will be called the managed stand site index seeds (MSI).

Table 19. Adjusted Site Index Values from the RSP Re-analysis 2011.

Guide Species	Natural Subregion Group	Ecosite								
		b	c	d	e	f	g	h	i	j
Pl	LF	17.2	18.3	17.3	18.8	18.5		16.0	16.9	13.9
	UF	15.9	16.0	15.4	17.5	17.6		14.6	13.3	14.6
	BM	17.0	19.7	20.3						
Sw	LF		14.6	13.9	16.8	16.6			14.0	14.6
	UF		13.4		16.2	16.6			12.4	15.2
	BM		12.3	13.9	16.0	15.7		15.9		

* BM: boreal mixedwood - CMW/DMW

2. *Calculate the average site index for Pl and Sw based on the Rotation 1 PSPs in the THLB for the target yield groups (8, 9, 10, 11, 14, 15, 16 and 17) by natural subregion.*

The Rotation 1 PSPs used to develop the natural stand yield curves represented the distribution of natural subregions by yield group very well, and therefore no area-weighting was required. However, since the distribution may differ significantly across the pre-1991 cutblocks, the adjustment process will be area-weighted by natural subregion to mitigate this potential issue. These estimates will be called the natural stand site index seeds (NSI)

3. *Calculate a Pl and Sw site index ratios for each target yield group and natural subregion.*

The site index ratio was calculated based on the formula: MSI/NSI for the Pl and Sw guide species for each natural subregion in the target yield groups.

4. *Adjust the Pl and Sw observed site index values for each Rotation 1 PSP multiplying by the corresponding site index ratio based on yield group, guide species and natural subregion.*

Note that this ratio is not guaranteed to be greater than 1 but we expect that MSI will generally be higher than NSI.

5. *Rerun the natural yield curve development process with the adjusted site index values.*

The resultant R1 yield curves will be used for the cutblocks harvested prior to March 1, 1991.

3.4.2 Post-1991 Managed Stands RSA Based Yield Curves (R2)

Regenerated stands RSA-based yield curves (R2) were developed for all stands harvested after March 1, 1991 and before May 1, 2010. Currently there are 2,590 cutblocks of 51,860 THLB hectares that were linked with ARIS information, detailed planting records and silviculture history. ARIS designations were used to derive the broad cover type following standard

protocols. Planting records were used to define species composition for openings with no survey information.

Canfor proposed the use of the RSA surveys of 2009-2010 to develop yield curves for all existing cutblocks post-1991. We compiled the RSA performance surveys for all relevant stand attributes.

The following notes summarize some of the assumptions that were made as well as the steps that were carried out:

- We only used the aerial survey results for the weighting and construction of the yield curves. The two cutblocks (one in each survey year) based on the non-photo system were ignored due to their small area and unknown selection weight when compared to the aerial stratification system.
- The weighting of the sampled SUs was done as per RSA protocols using the selection probabilities and sampled areas, the 2009 and 2010 surveys were combined by weighting the information by survey year. As per requirements, averaging was based on the GYPSY outputs for each SU using the proper weighting, as opposed to creating average inputs for GYPSY projections.
- The SwHw/HwSx combined strata in 2009 had a very small area of HwSx and therefore it was combined with the SwHw stratum of 2010.
- The PlHw/HwPl combined strata in 2009 had a very small area of HwPl and therefore it was combined with the PlHw stratum of 2010.
- The Sw/Sb strata had almost no pure Sb representation therefore this stratum was assumed to be the pure Sw regeneration stratum (C-Sw). The R2 yield curve for the pure Sb (C-Sb) regeneration stratum was based on Canfor's crop plan based (R3) yield curve.
- The pure Hw stratum of RSA 2010 was not used as a representative of the deciduous stratum due to the very high level of conifer content. The D-Hw regeneration stratum used the natural stand fully stocked aspen yield curve (Yield Group 2 - AW+(S)-CD).
- There were 116 hectares in existing cutblocks with NSR condition resultant from a performance survey with a total stocking <= 50%. These areas were removed from the net productive landbase as per protocols described in the ‘ARIS records validation procedures’ document.
- Openings with total stocking greater than 50% but less than 80% were assigned to a regenerating yield stratum based upon the component D and C stocking as reported in ARIS, and were assigned to a yield assumption scaled proportionately to the total reported stocking for each individual block as per protocols described in the ‘ARIS records validation procedures’ document. This means that on approximately 2005 hectares in 118 cutblocks the RSA based yield curves were individually pro-rated to reflect the observed stocking of the last legislated reforestation survey.

- Some genetic effect is present in these yield projections as a number of the cutblocks (about 26% of the sampled area)[30] include partial or full regeneration by genetic stock.

The use of the RSA information for all existing cutblocks will allow Canfor to develop yield projections from observed performance survey data that is based on consistent data collection protocols, sound statistical sampling design and stratification scheme.

3.4.3 Future Managed Stands Crop Plan Based Yield Curves (R3-B)

Regenerated stands crop plan based yield curves (R3-B) were developed for all future[31] cutblocks harvested after May 1, 2010.

Although the RSA surveys provide good information regarding silviculture performance on a set of existing cutblocks, the extrapolation of this information to future cutblocks may warrant some caution:

- RSA performance surveys available to Canfor only represent 4-5 years' worth of cutblocks based on the 2009 and 2010 survey years;
- The grouping of regeneration strata and thus weighting schemes changed from one survey year to the next;
- There is a relatively small sample size for some of the regeneration strata; and
- Some of the surveyed blocks include partial or full regeneration with genetic stock that would be difficult to exclude for the construction of base yield curves and would also further reduce sample size.

Canfor therefore used the RSA survey data only for existing cutblocks harvested before May 1, 2010 (R2 - RSA based yield curves). Canfor will use the RSA surveys **and** other available supporting information to construct yield curves for future openings (R3-B).

Despite the on-going data collection programs, there is still limited time series data available to identify growth trends for the regenerated strata. There are only 42 Rotation 2 PSPs with multiple re-measurements and only 52 of the 162 GYM plots have one re-measurement. Some of these plots are also located in cutblocks where genetic stock has been used that would have to be excluded from any R3 basic curve development. The available plot measurements lack the key information on stocking percent[32] and many of the plots are located in stands that are still very young.

[30] The 26% proportion is in good agreement with the estimated area planted by genetic stock between 1991 and 2010 (around 14,000 ha as per Christine Quinn, Silviculture Supervisor).
[31] Future cutblocks include all existing openings that were harvested from May 1, 2010 to date.
[32] The GYM plot program will incorporate the measurement of stocking percent to enable Canfor for growth and yield modeling using the spatial version of the GYPSY model.

The Planning Standard states that Alberta's basic assumption is that reforestation performance directly affects projected yields in managed stands. Thus, each yield projection must have associated regeneration standards that serve as targets for silviculture programs. There has to be a direct quantitative link between future stand conditions projected at rotation age and the average observed conditions at the time of the last legislated reforestation survey. Canfor's regeneration strata are also based on standardized criteria to be consistent with Planning Standard definitions.

Based on the above, Canfor proposed the use of crop plans to construct R3 basic yield curves using the available RSA survey information, available plot and tree data and input from silviculture practitioners of the Company. The model of choice was the spatial version of GYPSY (May 2009) to create a direct linkage between target MAIs as derived from the performance surveys and the constructed yield curves. Limited validation of the R3 basic curves will be based on all available Rotation 2 PSP and GYM plot data at this time.

Each R3 basic yield curve defines:

1. the expected average stand conditions for the regeneration strata at performance survey age;
2. the silviculture regime that will lead to those expected stand conditions; and
3. the target stand conditions expected at rotation age, including the conifer and deciduous MAI at the FMA utilization standard.

Canfor will rigorously monitor actual growth to guide adjustments to yield projections and regeneration standards in the future using the G&Y Monitoring Program that was started in 2005.

3.4.4 Future Managed Stands Genetic Yield Curves (R3-G)

Canfor developed tree improvement (genetic) yield curves for lodgepole pine (B1) and white spruce (G1) leading regenerated stand yield strata to reflect increases in yield resulting from the deployment of genetically improved stock.

Regenerated stands genetic yield curves (R3-G) were developed for all future cutblocks that are located within the approved boundaries of the tree improvement program deployment zones (B1 for pine strata and G1 for white spruce strata) subject to seed availability. The genetic yield curves will be assigned as per regeneration transitions defined in the Silviculture Matrix (Table 18).

Canfor has been involved in tree improvement programs since 1977. The Company participates in the B1 lodgepole pine tree improvement program, the G1 white spruce tree improvement program and the L2 black spruce program.

The primary objectives of these programs are to:

- Provide seed with improved genetic growth traits for reforestation;
- Achieve optimum economic gain per unit of time;
- Predict, obtain, and verify genetic gains as quickly as possible; and
- Maintain genetic diversity and long-term adaptive capability through a sufficiently large mainline breeding population, an elite production population, and genetic archives (clone bank).

Canfor follows and is in compliance with the Government of Alberta document "Forest Genetic Resource Management and Conservation Standards" (FGRMS) that governs tree improvement programs in Alberta. All orchards are meeting or exceeding set target levels for seed production.

Canfor's planting strategy is to plant genetically improved stock within applicable breeding regions given adequate seed supply from the orchards. Currently, Canfor has enough improved seed in inventory at the Alberta Tree Improvement Seed Center (ATISC) for roughly 4 million lodgepole pine seedlings and 33 million white spruce seedlings (versus a demand of approximately 1 million/year for each species).

It is not anticipated that there will be a shortfall of improved seed anytime soon, as orchards are producing at or above target levels.

The R3-G genetic yield curves will be based on the R3-B basic curves by applying a percent genetic gain as approved by ASRD for use in managed stand yield table development as follows:

- Lodgepole pine B1 program: 4.0% height gain at 80 years rotation age[33]; and
- White spruce G1 program: 2.6% height gain at 105 years rotation age.[34]

The lodgepole pine genetic curves will be applied to all future harvested stands that are located in the B1 breeding region in the C-Pl regeneration strata. The white spruce genetic curves will be applied to all future harvested stands that are located in the G1 breeding region in the C-Sw, CD-SwHw and DC-HwSx regeneration strata.

The approach for incorporating genetic gain in the yield curves was to calculate an enhanced stand site index by applying the approved height gain to the R3-B stand top height projection at the proposed rotation age and recalculating the "new" implied site index.

[33] Ken J. Greenway (Senior Manager, ASRD FMB) letter to Canfor on January 26, 2011 - Subject: Approved genetic height gain for Region B1 lodgepole pine.
[34] Robert W. Stokes (Senior Manager, ASRD FMB) letter to Canfor on April 6, 2011 - Subject: Approval - white spruce (G1 Program) genetic height gain.

Analysis of the GYPSY modeling scenarios indicated that the percent volume gain based on this approach will not exceed the 2-times percent height gain at rotation age.

3.5 YIELD CURVE ADJUSTMENTS

The gross merchantable volumes predicted by GYPSY 2009 were subject to a number of adjustments/deductions.

3.5.1 GYPSY Volume Function Prediction Bias

Due to lack of data, Canfor cannot quantify the amount of volume prediction bias that may be present in regenerating stands. Early observations suggest that if the volume function prediction bias is present, it is tree form (tree taper) related. Managed stand tree taper, especially in pine stands will be very different from those of natural stands due to wider spacing and early density management. Therefore the adjustment process for the apparent over-prediction in the GYPSY 2009 volume functions in natural stands was not applied.[35]

Over time Canfor will be able to validate this assumption and assess the amount of bias in managed stands, if any, in gross merchantable volume as predicted by the GYPSY model.

3.5.2 Mortality

Deciduous mortality/breakup will be implemented the same way as applied to natural stands. Conifer stand decline will not be modeled in managed stands due to the lack of information.

3.5.3 Cull

Conifer and deciduous cull percentages used for managed stands will be identical to those used in natural stands.

3.6 YIELD CURVE VALIDATION

Managed stand yield curves were assessed by comparing forecasts against actual measured plot data by regeneration strata. Rotation 2 PSP and GYM plot trajectories were plotted against natural stand yield curves by yield stratum.

[35] Since Canfor substitutes the natural stand yield curves for the pure deciduous strata, the volume prediction function bias correction is applied for aspen, birch and poplar which were the main source of concern.

4.0 RESULTS & DISCUSSION - NATURAL STANDS

4.1 PLOT NETDOWN

Of the 823 PSPs established by Canfor, 564 PSPs were identified in the approved net landbase area[36] as active Rotation 1 PSPs that had not yet been harvested, comprising a total of 1,669 PSP measurements (Table 20). Of the 147 PSPs identified as outside the net landbase area (from GIS intersection of PSP coordinate data), the majority were from low productivity stands occurring in yield group 13 (58 PSPs) (Table 21).

Table 20. PSP Netdown Summary.

Description	Removed	Remaining
Total # plots		823
Plots outside Net Landbase	147	676
InActive plots	3	673
Rotation 2 plots	86	587
Clearcut (according to AVI)	23	564
Net # plots in Net Landbase		*564*
Net # plot measurements		*1669*
Net # plots in Net Landbase (excl yg6)		*444*
Net # plot measurements (excl yg6)		*1309*

Table 21. Exclusion Criteria of PSPs outside Net Landbase.

Net Landbase Exclusion Criteria	Removed
AnthVeg	4
AoverNothing	13
DRSDeletion	2
GravelPits	1
LowProd1	58
LowProd2	5
NatNonVeg	2
NonForVeg	12
ParabolicSandDunes	7
RiversLakes	4
SteepSlope	11
Streams	11
Swan	6
THLB_ISLAND	2
Other	9
Total	*147*

[36] The net landbase area corresponds to stands inside the timber harvesting landbase with no harvest history, as defined in the approved resultant database ('SCHEDULE_B' located in the Postgres GeoDatabase 'CANFOR_GP').

4.2 NET LANDBASE COMPARED TO PSP DISTRIBUTION

The net landbase area of the natural (R0) stands totaled 388,736 ha.[37] The distribution of PSP's compared well with the net landbase area in terms of yield group distribution, AVI age class[38] distribution, cover group assignment, and natural subregion (Table 22, and Figure 2 to Figure 4). This suggested that the set of PSPs used for NSYT development were generally representative of the net landbase area.

Table 22. AVI Net Landbase Area vs. PSP Frequency Distribution.

Yield Group	Net Landbase		PSPs		PSP Msmts	
	Ha	%	#	%	#	%
1	6,050	2%	12	2%	35	2%
2	27,406	7%	43	8%	119	7%
3	66,059	17%	84	15%	255	15%
4	3,341	1%	6	1%	18	1%
5	6,843	2%	18	3%	55	3%
6	89,155	23%	120	21%	360	22%
7	13,603	3%	14	2%	39	2%
8	24,838	6%	52	9%	153	9%
9	12,983	3%	32	6%	101	6%
10	13,411	3%	19	3%	56	3%
11	17,491	4%	25	4%	71	4%
12	11,487	3%	11	2%	32	2%
14	19,298	5%	29	5%	85	5%
15	20,200	5%	25	4%	71	4%
16	17,827	5%	25	4%	73	4%
17	38,743	10%	49	9%	146	9%
Total	*388,736*	*100%*	*564*	*100%*	*1,669*	*100%*

[37] The total FMA net landbase area of 475,111 ha is divided into three Rotation periods (R0, R1, and R2) comprising 388,736 ha (R0), 34,515 ha (R1), and 51,860 ha (R2).
[38] 25-year age classes expressed as (2010 – origin of the SoPM).

Figure 2. Net Landbase Area vs. PSP Distribution by Age Class.

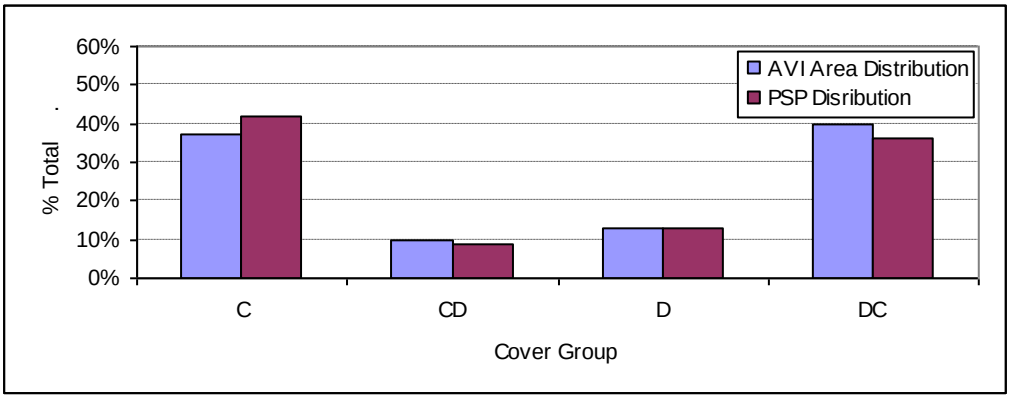


Figure 3. Net Landbase Area vs. PSP Distribution by Cover Group.

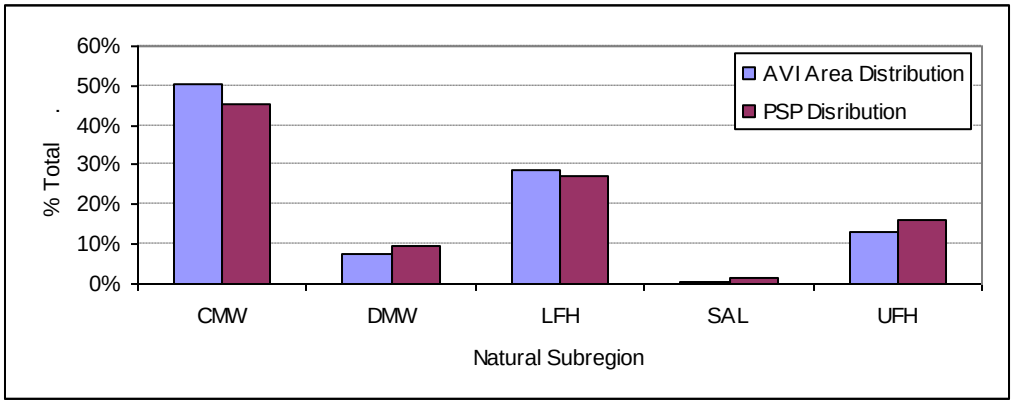


Figure 4. Net Landbase Area vs. PSP Distribution by Natural Subregion.

4.3 NATURAL STAND YIELD TABLE DEVELOPMENT

4.3.1 Yield Group 6 Removal from NSYT Development

NSYTs were not developed for yield group 6 (conifer understory yield group). The PSP sample size available for NSYT development (following the removal of yield group 6 PSPs) was therefore reduced to 444 PSPs comprising 1,309 unique PSP measurements.

4.3.2 Yield Group-based NSYTs

Average NSYTs were computed for each species group and yield group by first averaging all PSP-measurement based NSYTs for each PSP, and then averaging all PSP averaged NSYTs occurring in each yield group. Both sets of averaging at the PSP and yield group level were un-weighted. For yield groups 15 and 16, a single NSYT was computed from the combined set of PSPs in both yield groups.[39]

4.3.3 PSP Trajectories vs. Yield Group-based NSYTs

PSP trajectories of gross merchantable volume were plotted against the unadjusted[40] yield group average NSYTs. Figure 5 to Figure 9 illustrate the PSP trajectories plotted against the yield group averaged NSYTs for all species combined.

[39] The decision to merge yield groups 15 and 16 were approved following discussions with Canfor.
[40] This set of plotted NSYTs are yield group averaged GYPSY projections, and have not yet been adjusted for volume bias removal, LT reduction, or incremental mortality, as discussed in subsequent sections of this document.

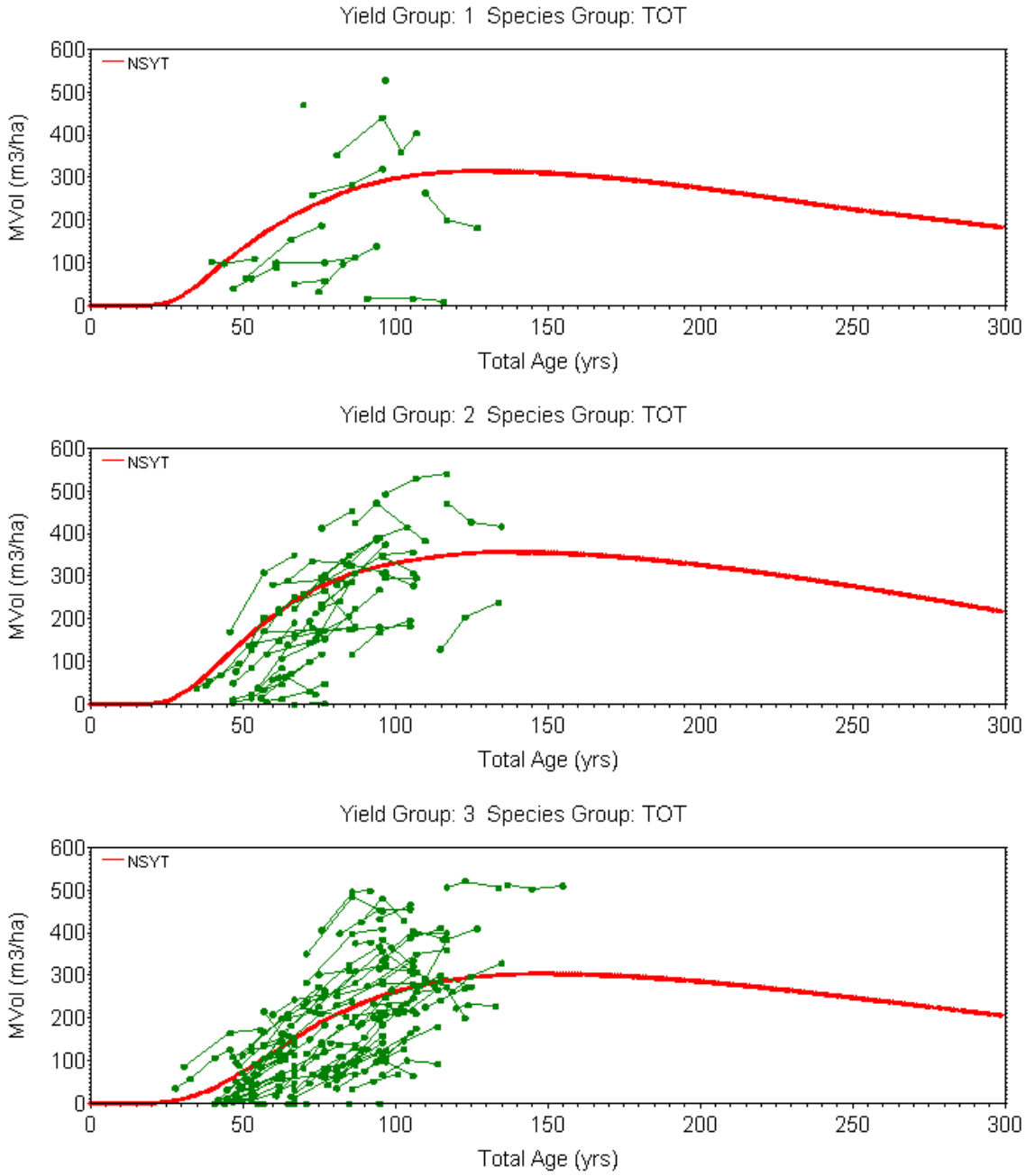


Figure 5. PSP Gross Merch. Volume Trajectory vs. Average NSYT, Yield Groups 1, 2, 3.

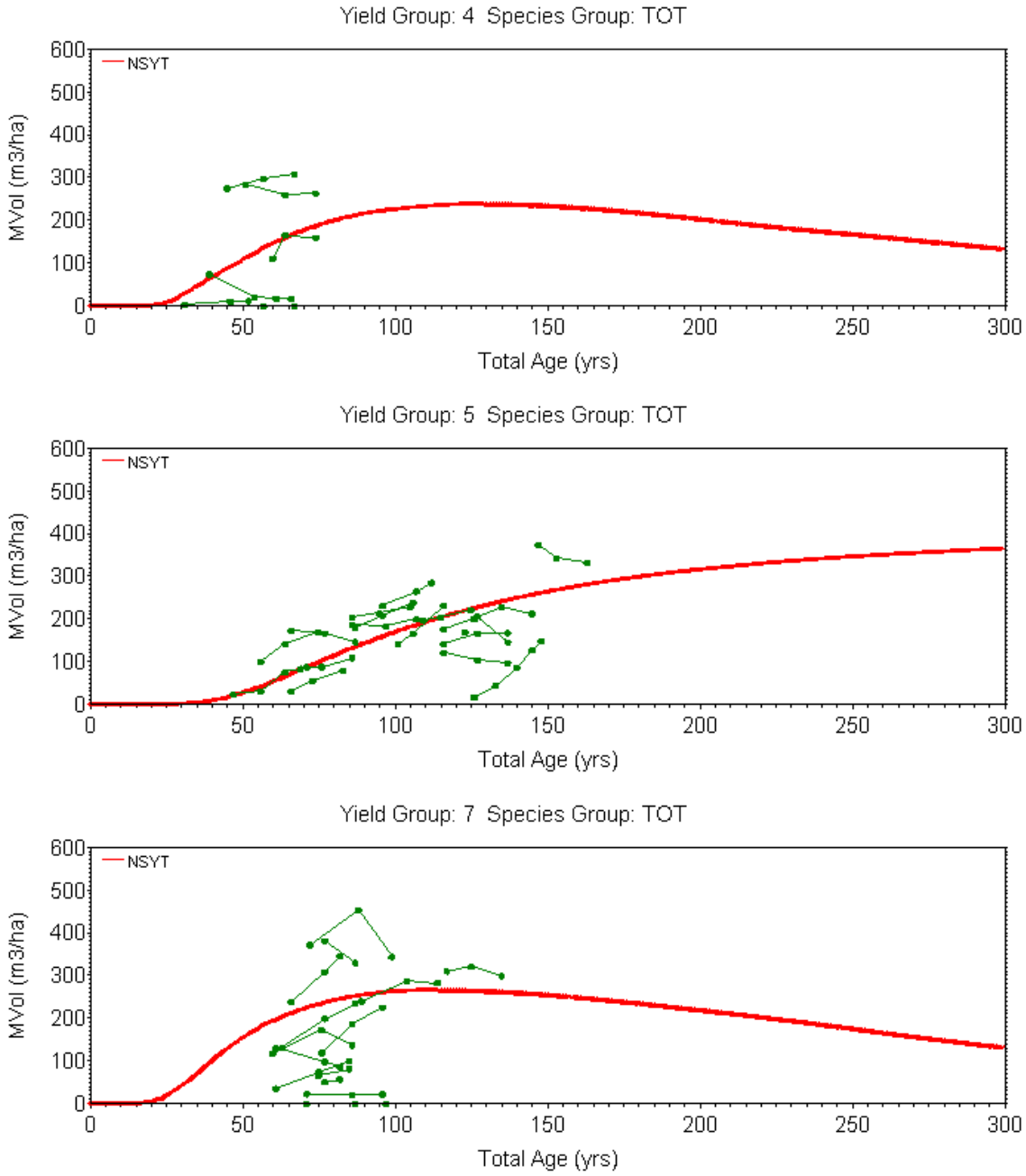


Figure 6. PSP Gross Merch. Volume Trajectory vs. Average NSYT, Yield Groups 4, 5, 7.

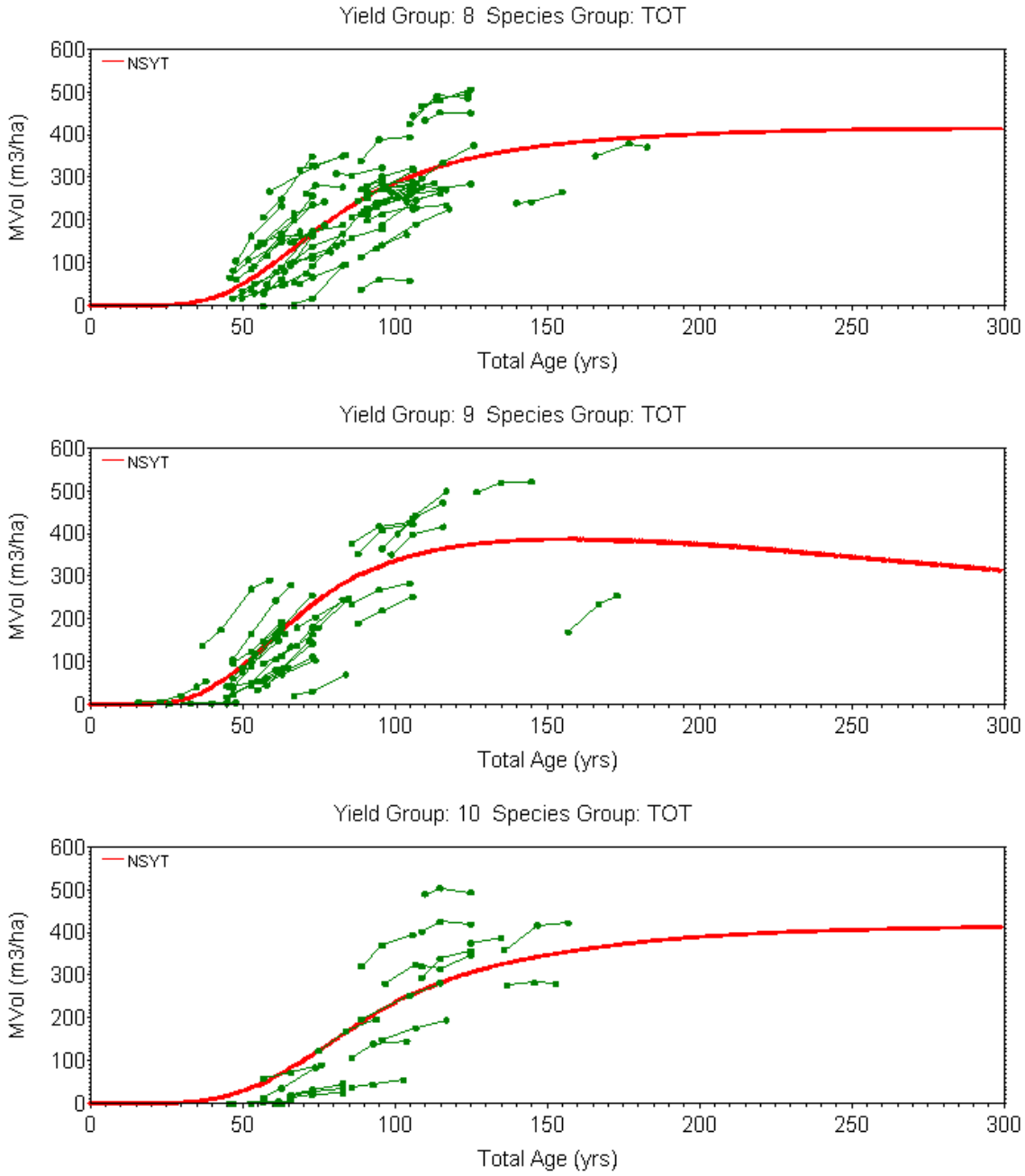


Figure 7. PSP Gross Merch. Volume Trajectory vs. Average NSYT, Yield Groups 8, 9, 10.

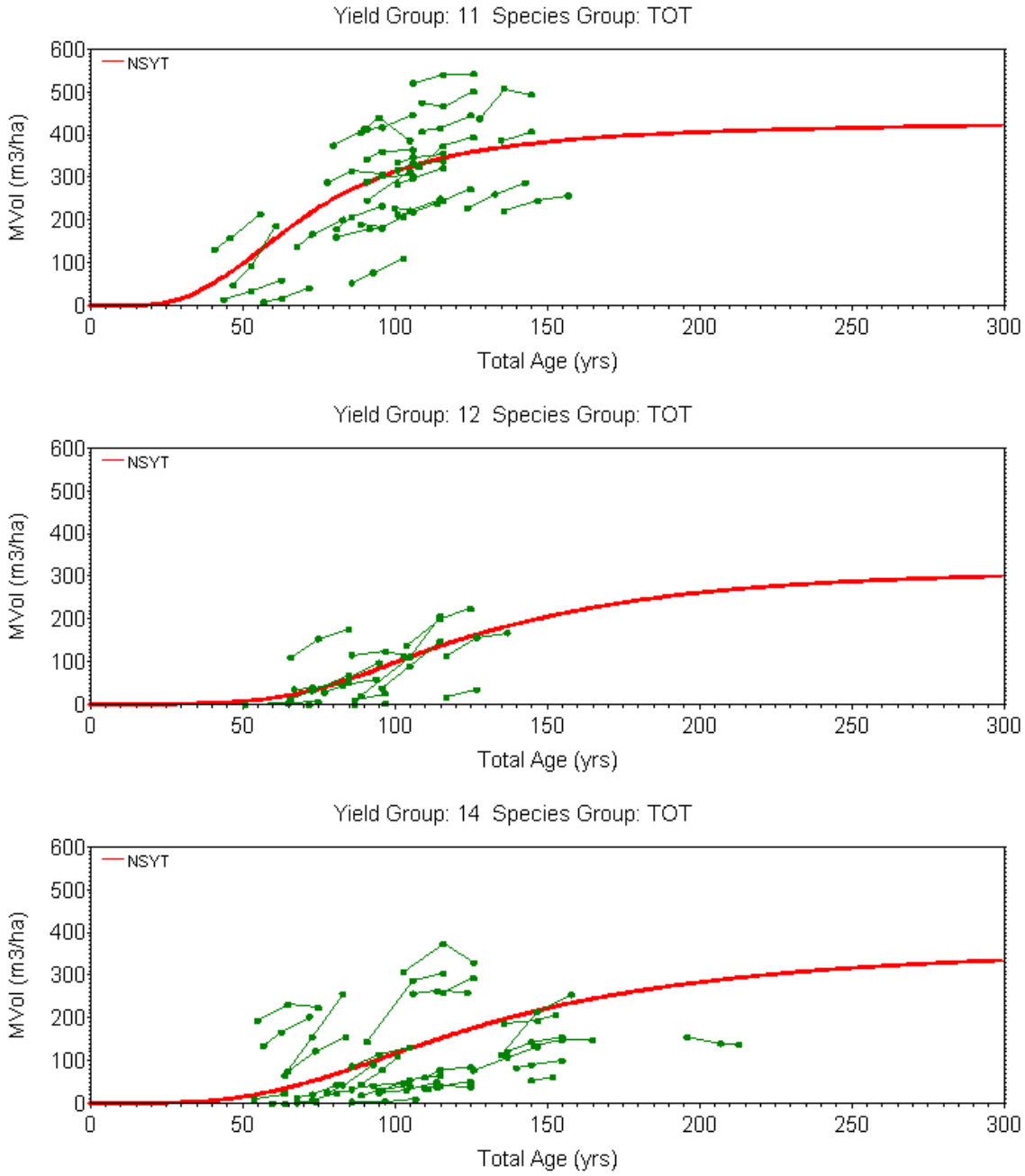


Figure 8. PSP Gross Merch. Vol. Trajectory vs. Average NSYT, Yield Groups 11, 12, 14.

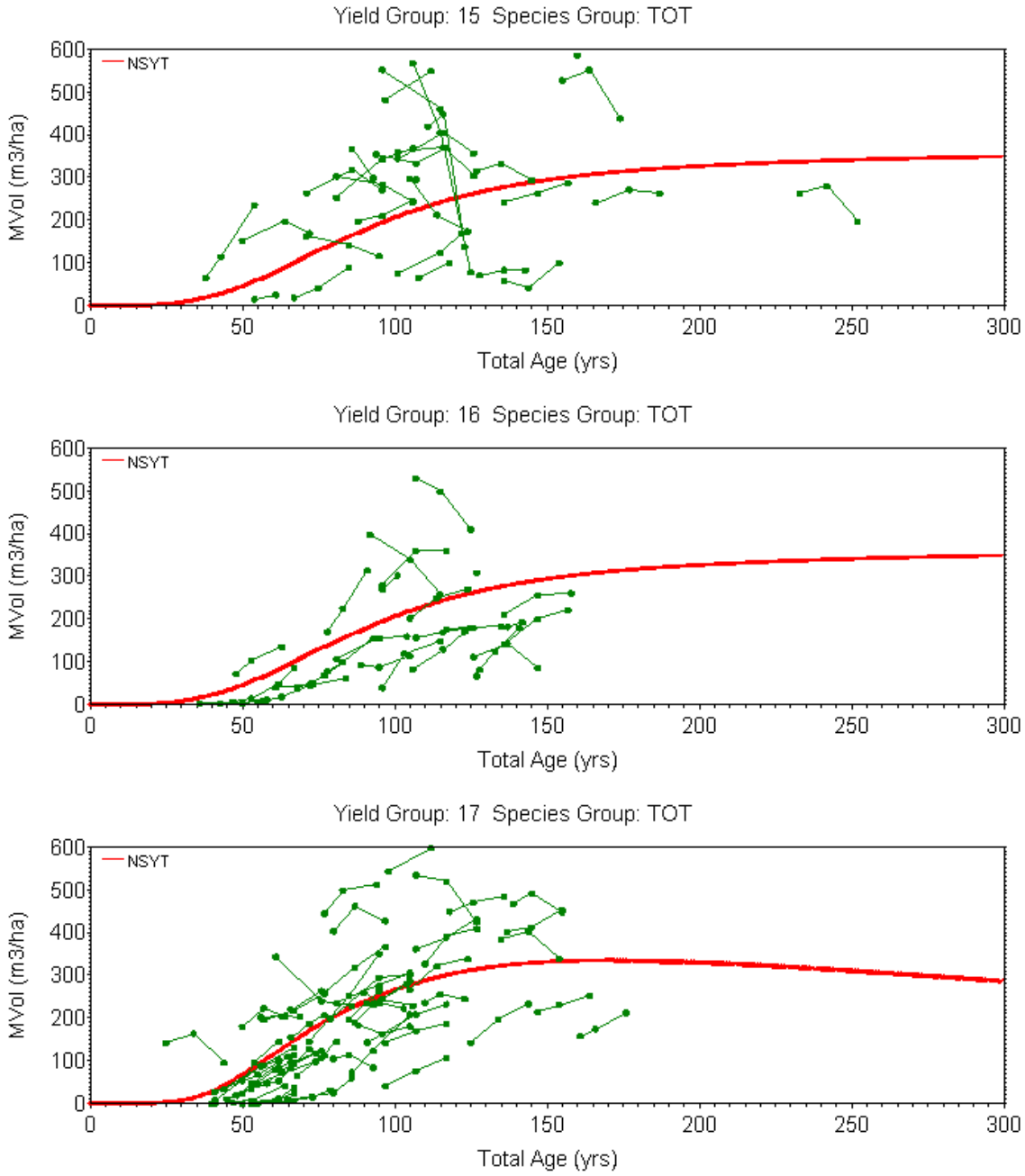


Figure 9. PSP Gross Merch. Vol. Trajectory vs. Average NSYT, Yield Groups 15[41], 16, 17.

[41] The observed drop in some PSP volumes in yield group 15 were due to extreme blowdown events as noted in the original plot cards. These PSPs were not excluded from analysis.

4.3.4 Individual GYPSY Forecasts - Residual Plots

Individual GYPSY forecasts at each PSP measurement were assessed by plotting residuals (PSP observed volume – predicted volume) for each of the four species groups against total predicted volume (Figure 10), gross merchantable predicted volume (Figure 11), species-specific total plot age (Figure 12), and AVI stand age (Figure 13).

As per instructions by ASRD, the GYPSY sub-models and coefficients were not recalibrated to local conditions. From the resulting residual plots however, it appeared that there was some over-estimation of total and gross merchantable volume as predicted by the GYPSY volume functions for the AW species group, and to a lesser degree for the PL species group. There was also clear indication that the birch leading group (yield group 4) had the most severe bias for total volume prediction. The issue with the use of GYPSY for birch is well documented in the GYPSY manual[42].

[42] In the rare case where BW is managed as the leading species, BW could be considered as AW and its yields generated using the AW models, but the results obtained in this manner should be interpreted with caution (GYPSY 2009 User's Manual).

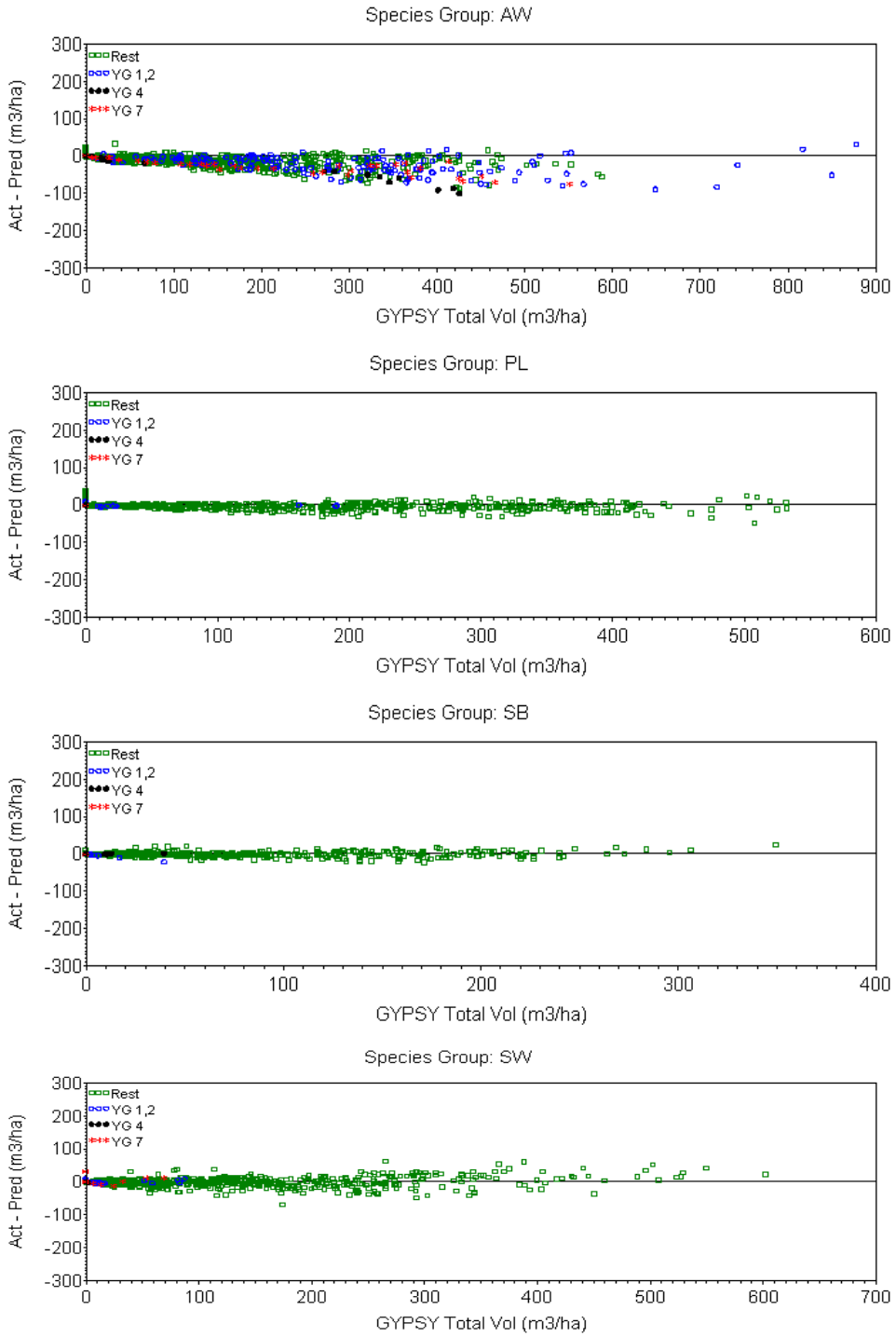


Figure 10. Residuals Plotted Against Total Predicted Volume.

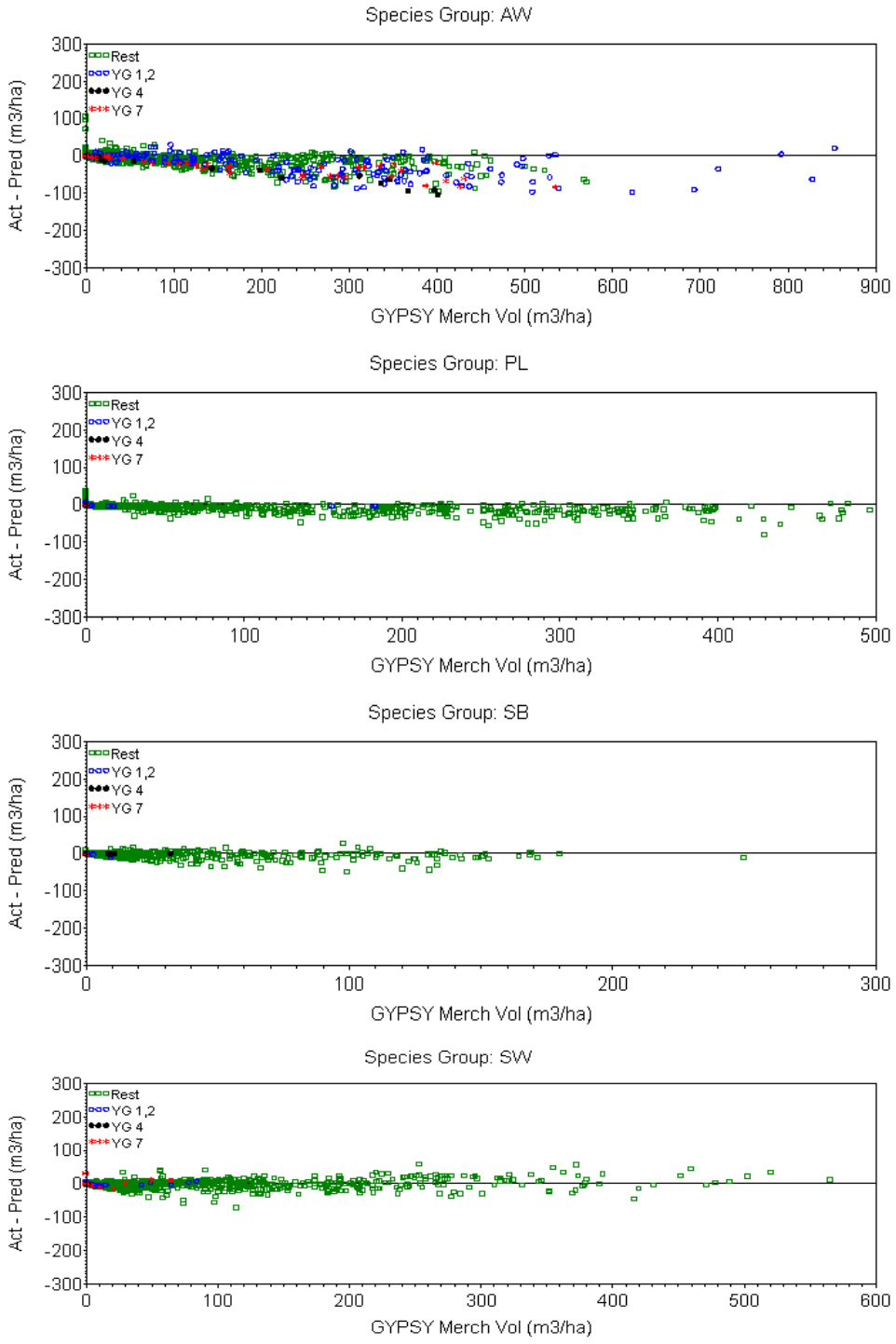


Figure 11. Residuals Plotted Against Predicted Merchantable Volume.

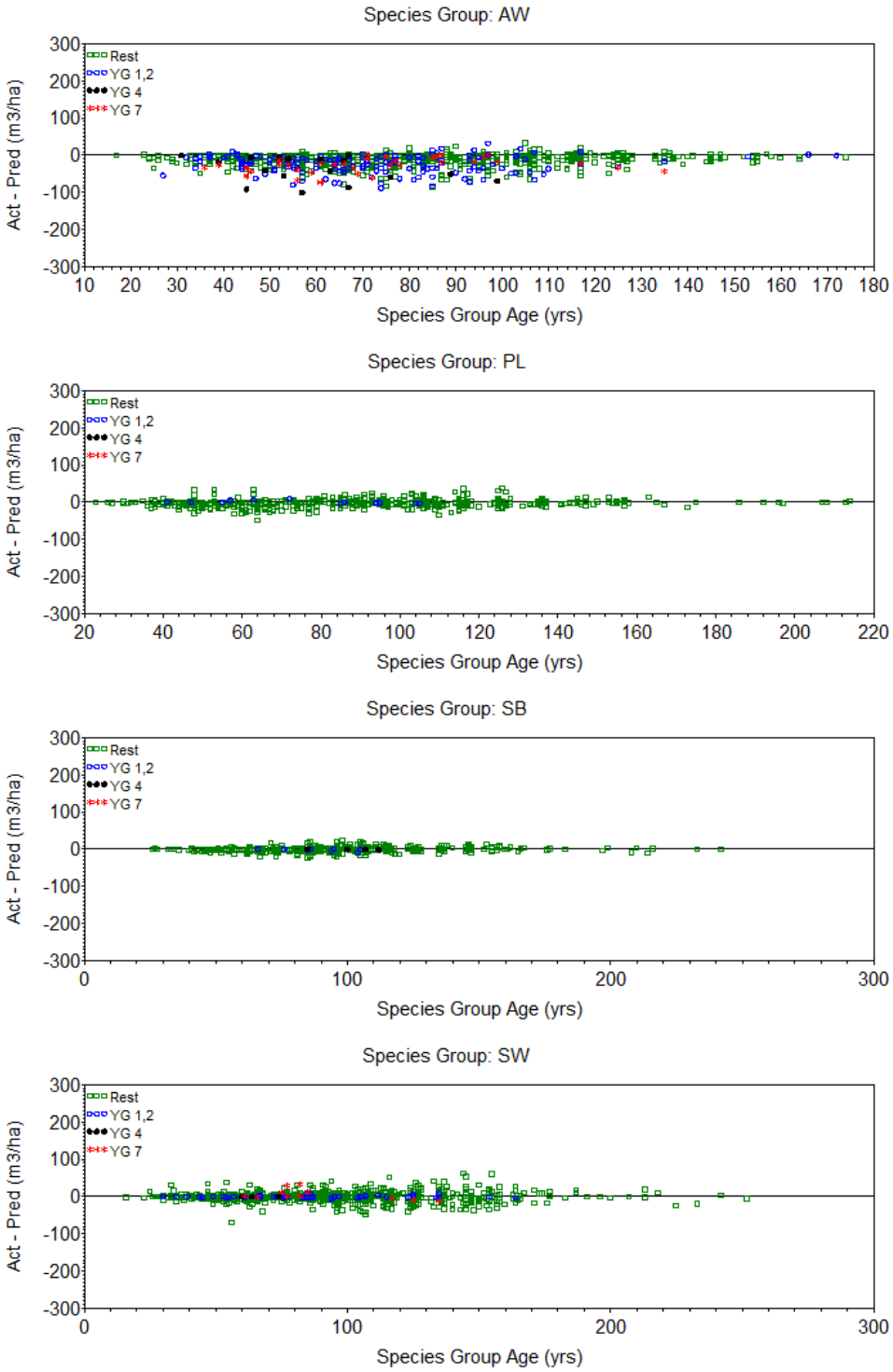


Figure 12. Residuals Plotted against Species Specific Plot Age.

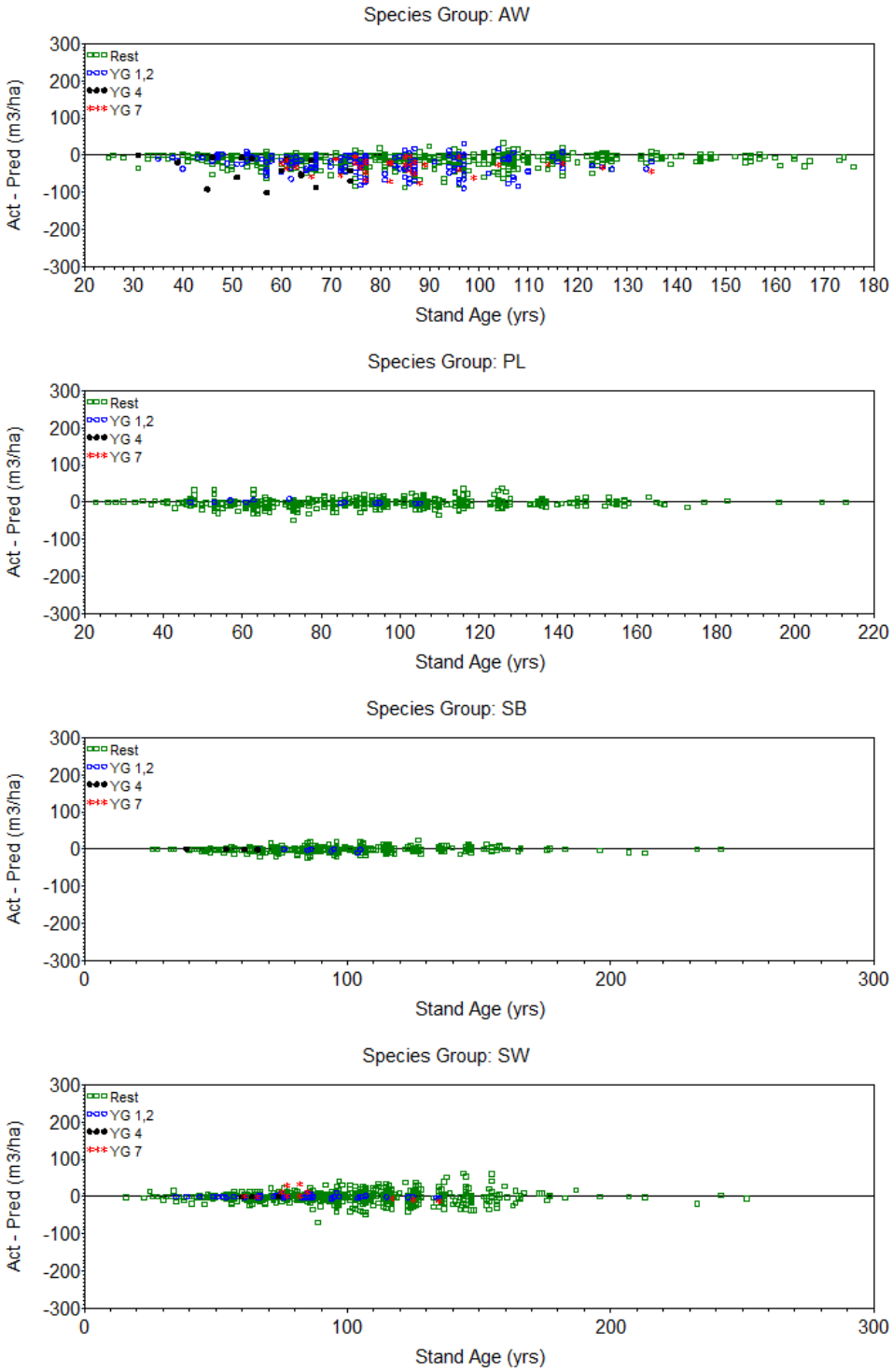


Figure 13. Residuals Plotted against AVI Stand Age.

4.3.5 NSYT Adjustment

Three incremental adjustments were applied to the yield group averaged NSYTs, following review by and approval of ASRD.

1) Volume Bias Adjustment to AW and PL species groups

To address the over-estimation of gross merchantable volume predicted by GYPSY for the AW and PL species groups, an adjustment method to remove the bias was presented to and approved by ASRD.[26, 43] In summary, simple linear regressions were fit between PSP gross merchantable volume (dependent variable) and GYPSY predicted gross merchantable volume (independent variable) for those species whose residuals were tested to be significantly different from zero. The overestimation bias (as determined by the regression slope) for AW was 10% across most yield groups. However, due to noted differences in yield groups 4 and 7, regressions were fit separately and resulted in biases of 15% for yield group 7 and 23% for yield group 4. PL overestimation averaged about 6% across all yield groups. Individual GYPSY projections were adjusted by multiplying predicted volumes by the regression slope for each species and yield group class. Adjusted residuals were then plotted against predicted GYPSY volumes to illustrate the removal of bias following adjustment (Figure 14, Figure 15).

2) Removal of Non-Merch LT Component

ASRD approved the method to reduce the PL species group NSYTs comprising a LT component.[43] The LT reduction factors were applied to PL NSYTs after adjustment for volume bias removal.

3) Mortality Functions

As discussed previously, Canfor proposed that mortality functions implemented by Weyerhaeuser in its 2007 FMP also be used for Canfor's 2012 FMP. ASRD has since approved implementation of Weyerhaeuser's mortality functions for use in Canfor's 2012 FMP.[43] The deciduous mortality function was applied to NSYTs after adjustments for volume bias removal. The conifer mortality function was applied to NSYTs after adjustments for volume bias removal, as well as for the LT component volume reduction. Since yield groups 15 and 16 were based on a single combined NSYT, the conifer mortality termination age was computed as an average of these two yield groups combined. The result was a set of adjusted NSYTs that included all three adjustment factors applied incrementally: volume bias removal, LT reduction, and mortality.

[43] ASRD approval received from Thompson Nunifu, ASRD via email on January 16, 2012.

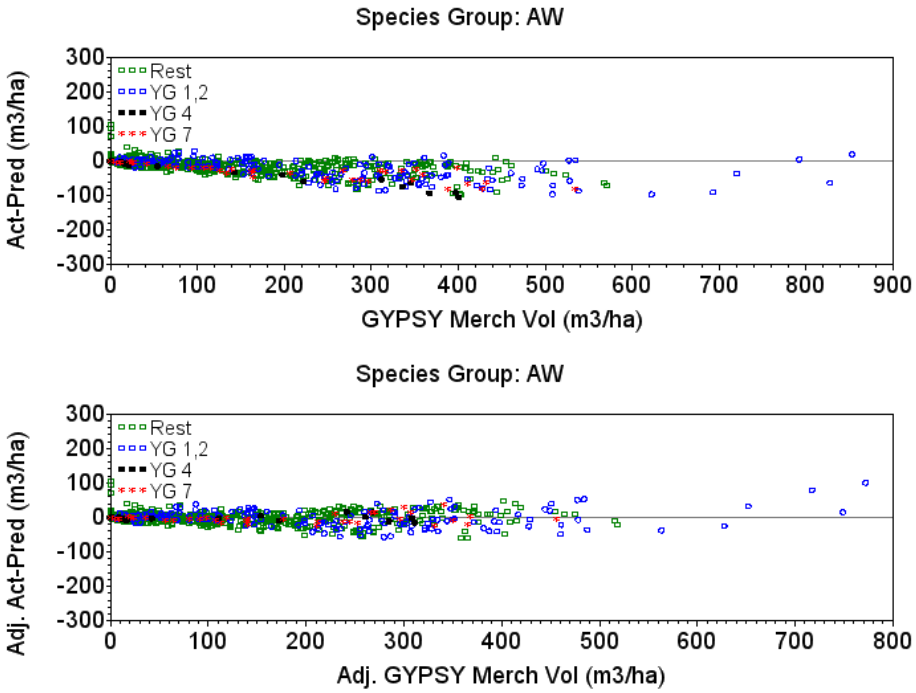


Figure 14. AW Residuals vs. predicted volume (unadjusted above, adjusted below).

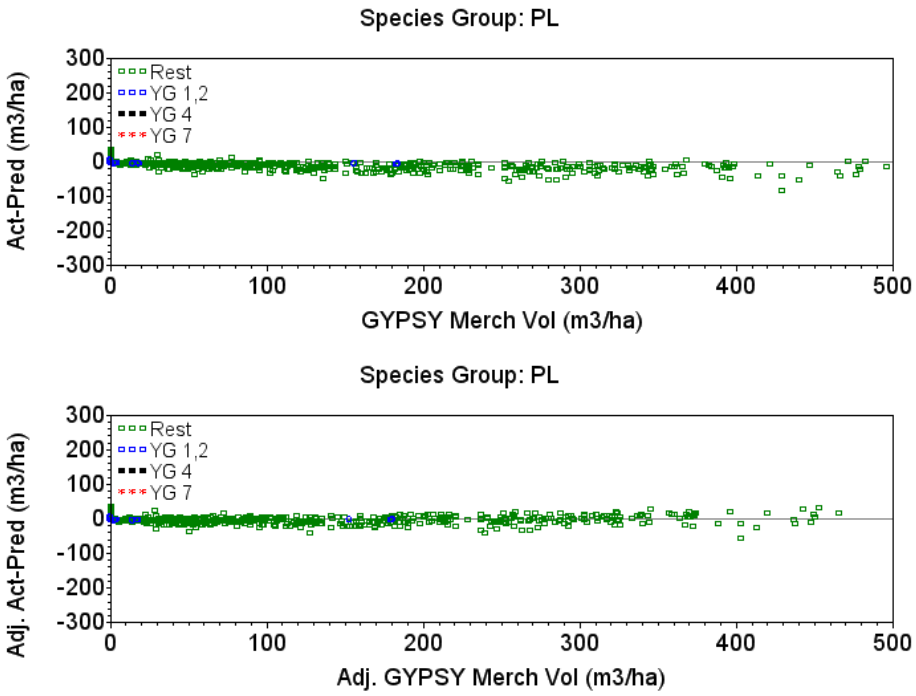


Figure 15. PL Residuals vs. predicted volume (unadjusted above, adjusted below).

4.4 FINAL ADJUSTED NSYTs

4.4.1 Options Compared

Two separate sets of adjusted[44] NSYTs were developed and compared for evaluation. The 'Base' set of NSYTs corresponded to the NSYTs that utilized all available PSP data, plus PSP-based plot ages where available. The 'Combined Sensitivity' set of NSYTs included the replacement of PSP-based plot ages with AVI stand ages for all GYPSY forecasts, plus the removal of all GYPSY projections that exceeded a gross merchantable volume threshold of 600 m^3/ha. The base and combined sensitivity NSYT options were then compared by yield group for the conifer, deciduous, and total species groups (Figure 16 to Figure 20).

[44] Both sets of NSYTs included the combined adjustments for model bias removal, LT reduction, and inclusion of mortality functions.

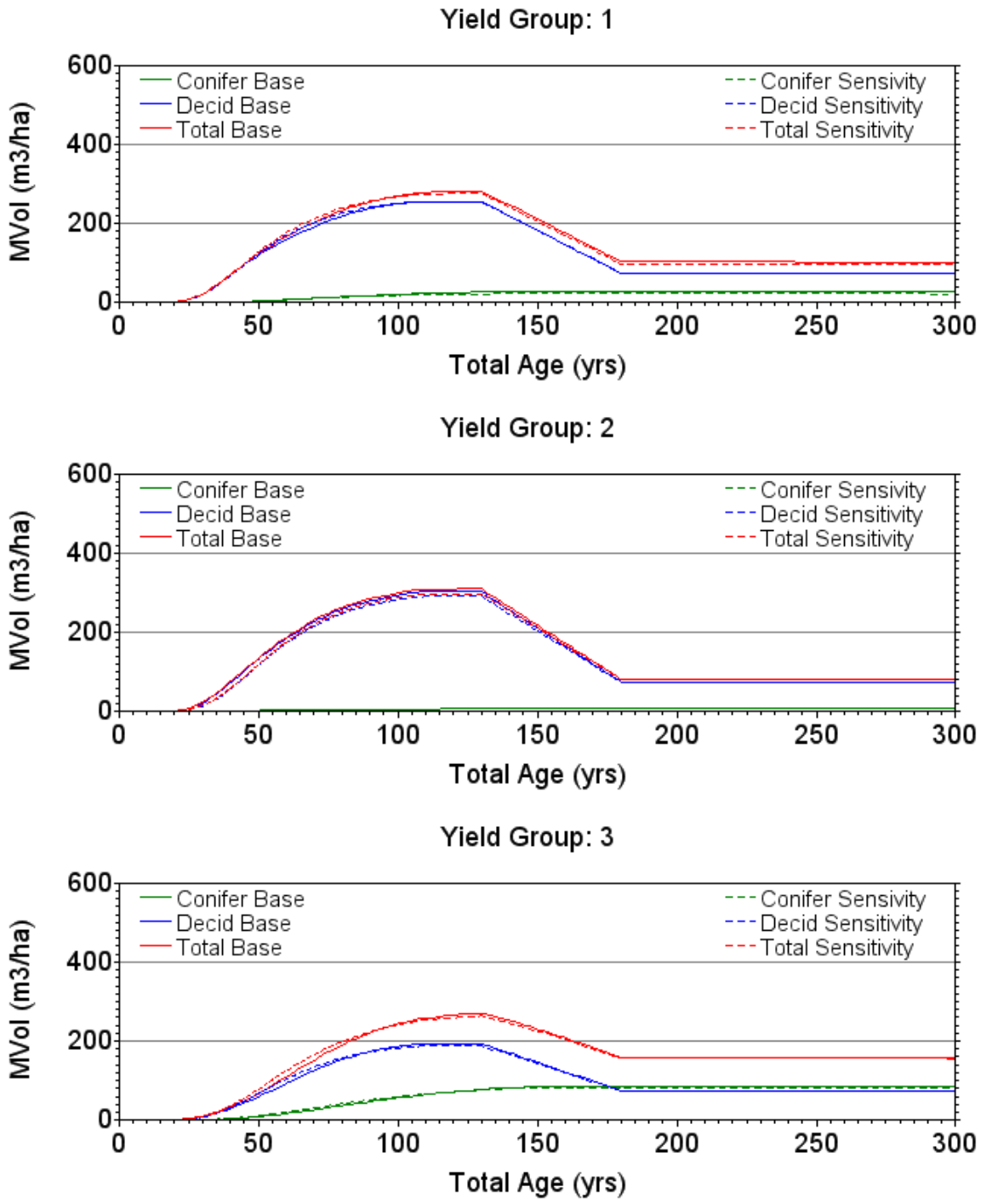


Figure 16. Comparing Base vs Combined Sensitivity NSYTs, for yield groups 1,2,3.

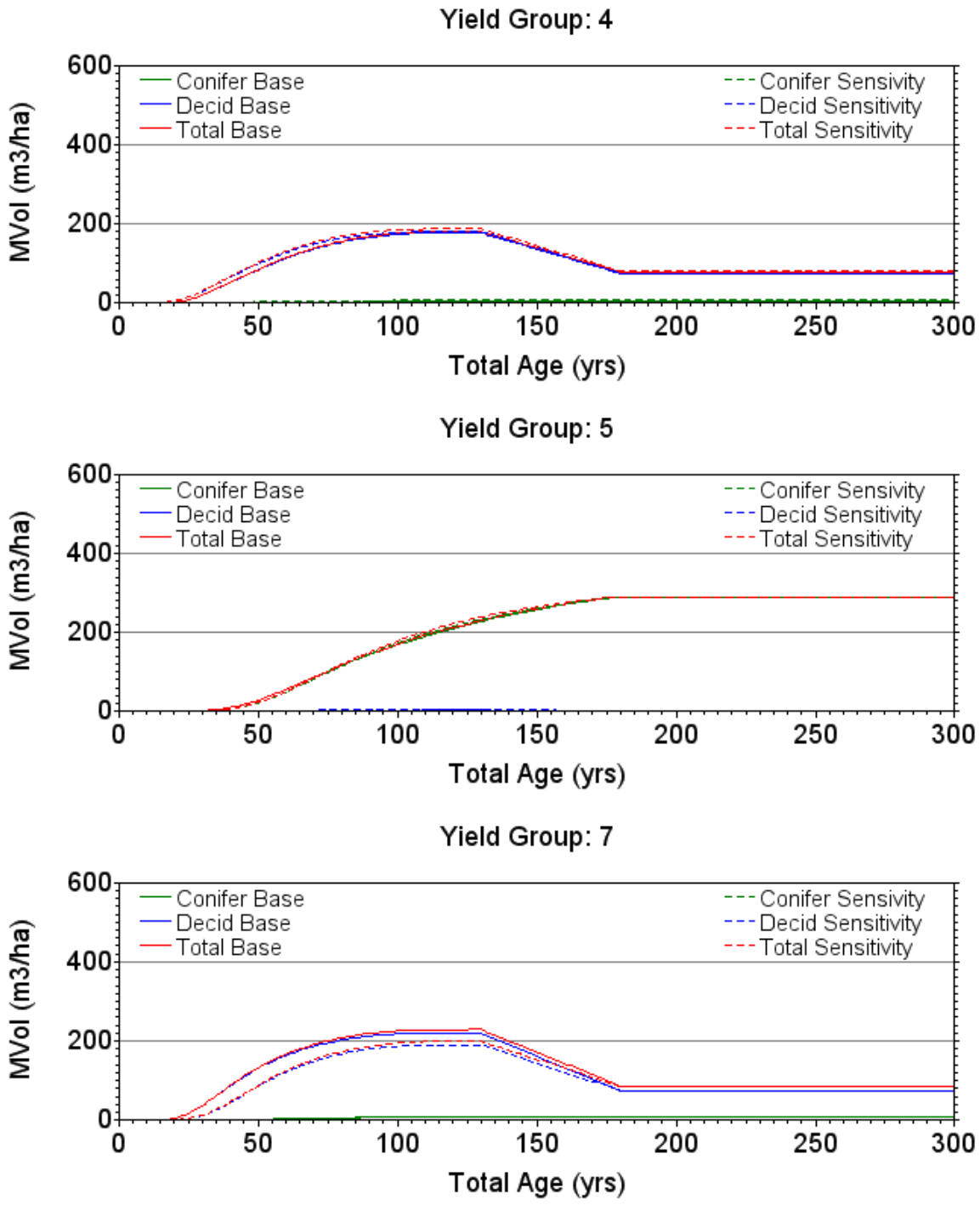


Figure 17. Comparing Base vs Combined Sensitivity NSYTs, for yield groups 4,5,7.

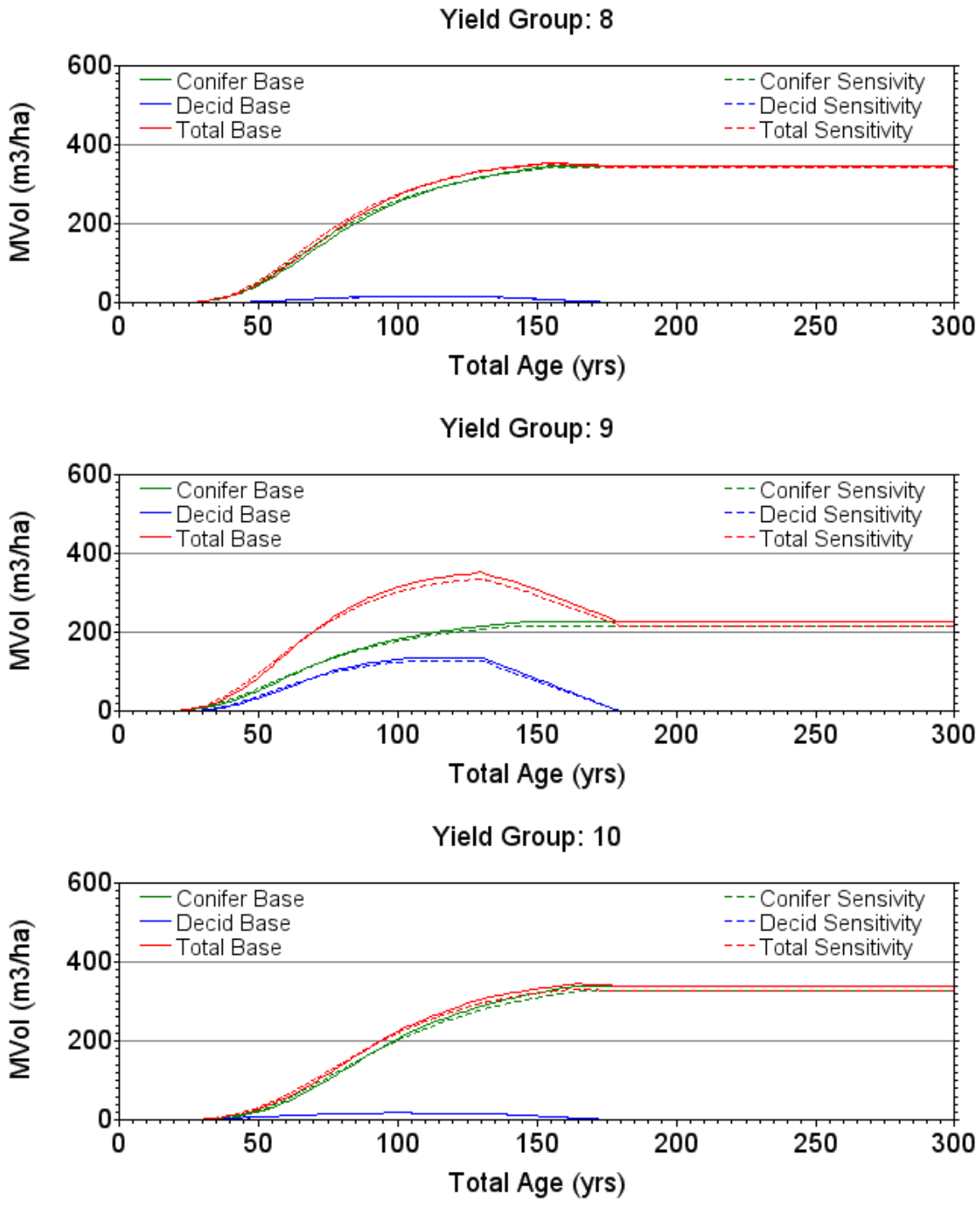


Figure 18. Comparing Base vs Combined Sensitivity NSYTs, for yield groups 8,9,10.

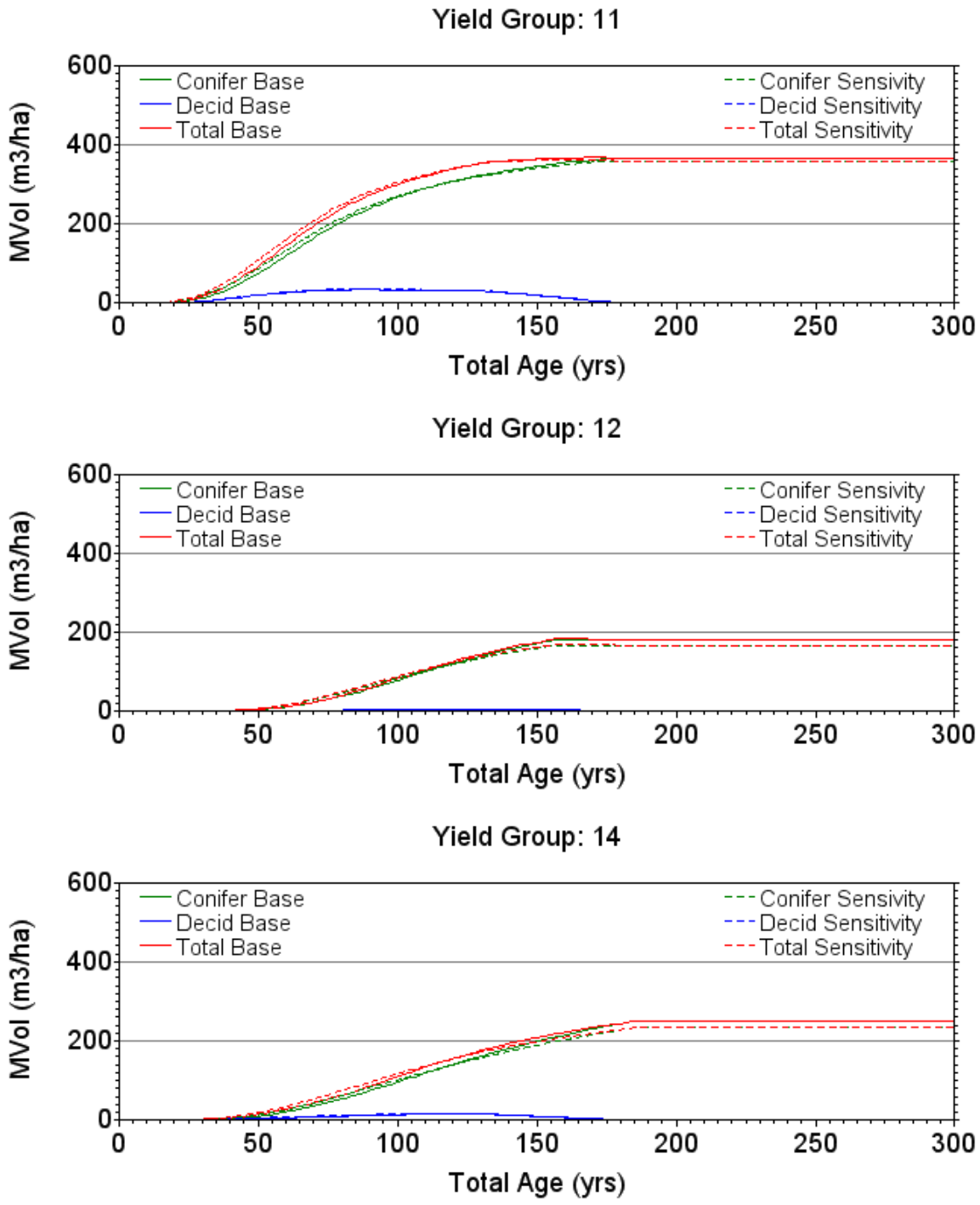


Figure 19. Comparing Base vs Combined Sensitivity NSYTs, for yield groups 11, 12, 14.

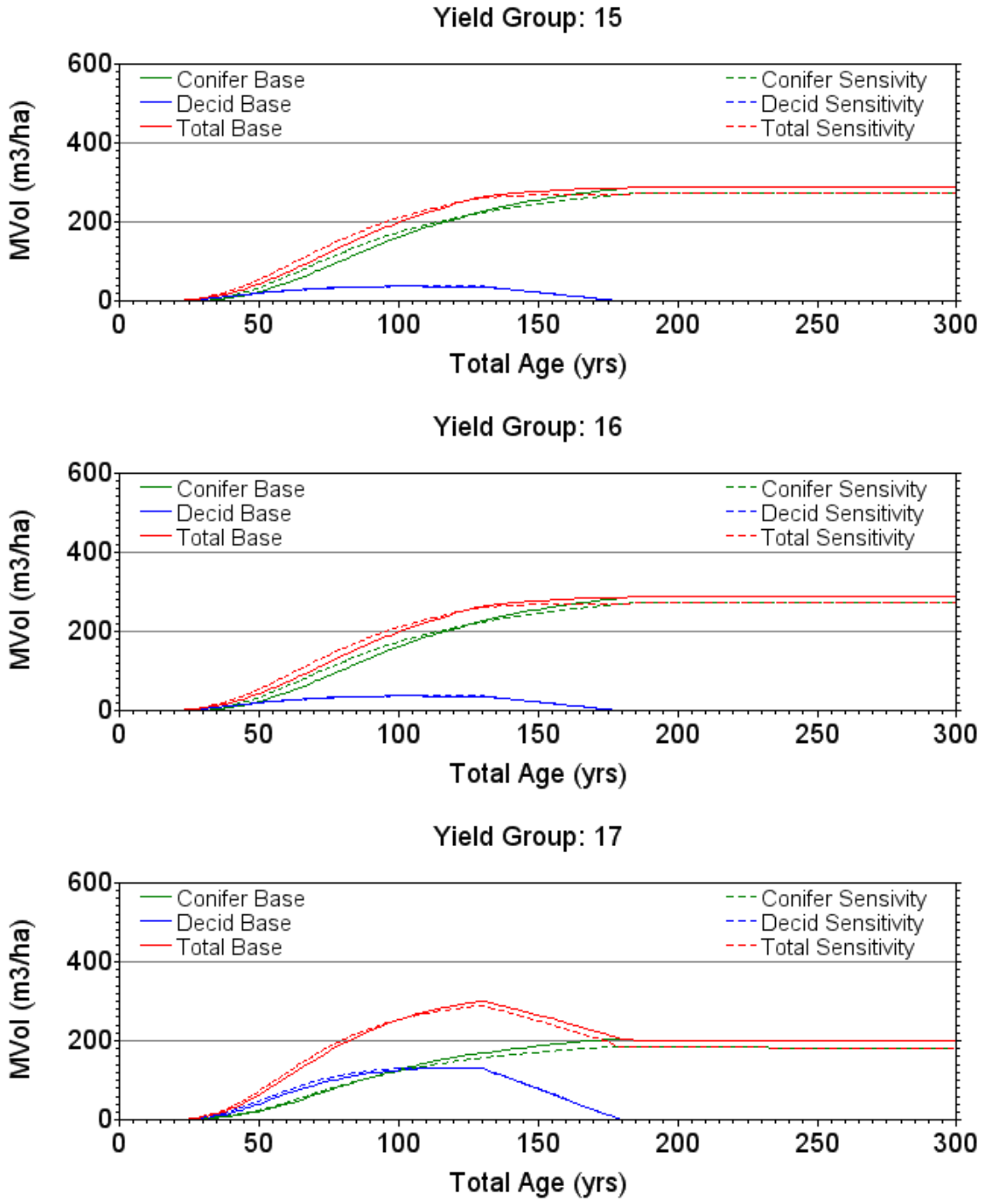


Figure 20. Comparing Base vs Combined Sensitivity NSYTs, for yield groups 15, 16, 17.

4.4.2 Selection of Final NSYTs

The "combined sensitivity" set of adjusted NSYTs was selected for implementation as the final set of NSYTs to use in the current FMP. This set utilized inventory-based ages for all GYPSY projections (as opposed to PSP-based ages where available), plus it excluded PSP-based GYPSY projections that exceeded 600m^3/ha (gross merchantable volume for all species). Excluding high volume projections resulted in a set of 432 PSPs.

Overall, the different set of options generated similar results, since most of the GYPSY projections were already based on inventory age. Of those deciduous groups that showed differences, the reasons were primarily due to the age differences between inventory vs. plot-based age sources.

The decision not to use plot-based age data was because the majority of age data were already based on inventory age, and of those PSPs that had plot-based ages, the majority were from deciduous trees (which may be considered less reliable because of potential difficulties with accurate ring counts on deciduous species). Therefore, inventory-based age could be considered a more accurate age source specifically for the pure deciduous strata.

The decision to cap PSP-based GYPSY projections below 600m^3/ha, was to minimize the inclusion of potentially unrealistic GYPSY projections.

4.4.3 Comparing NSYTs against PSP data and Previous FMP

Gross merchantable NSYTs for each yield group (adjusted for volume bias removal, LT reduction, and mortality) were compared against 25-year PSP age class averages computed from the 444 PSPs at last measurement, and are illustrated for the total species group (Figure 21 to Figure 25). Box plots describe the distribution of the PSPs (at last measurement), with the top and bottom of the box representing the 25th and 75th percentiles, the center horizontal line and dot representing the median and mean, respectively, and the whiskers representing the extreme values.

For information purposes, the 2003 FMP NSYTs were also included for each yield group. To compare similar units of measure with the current NSYTs, the 2003 FMP NSYTs were converted to gross merchantable volumes by dividing the net merchantable volume by (1–2003 cull factor). Comparison between the current NSYT and 2003 FMP needs to also consider the different utilization limits used. The current NSYT included conifer utilization at 15/12 and deciduous utilization at 15/10, whereas the 2003 FMP utilization was 15/10 across all species.

Differences from the FMP 2003 yield curves may also result from the new inventory, slight differences in the stratification scheme and for the deciduous yield groups, from the exclusion of "A" density single-story deciduous stands and the removal of corresponding PSPs.

4.4.4 Comparing NSYTs against TSP data and Previous FMP

Gross merchantable NSYTs for each yield group were also compared against 25-year TSP age class averages computed from the 778 TSPs occurring in the net landbase area, and are illustrated for the total species group (Figure 26 to Figure 30). Box plots describing the distribution of the TSPs as well as the 2003 FMP gross merchantable volumes are also included by yield group.

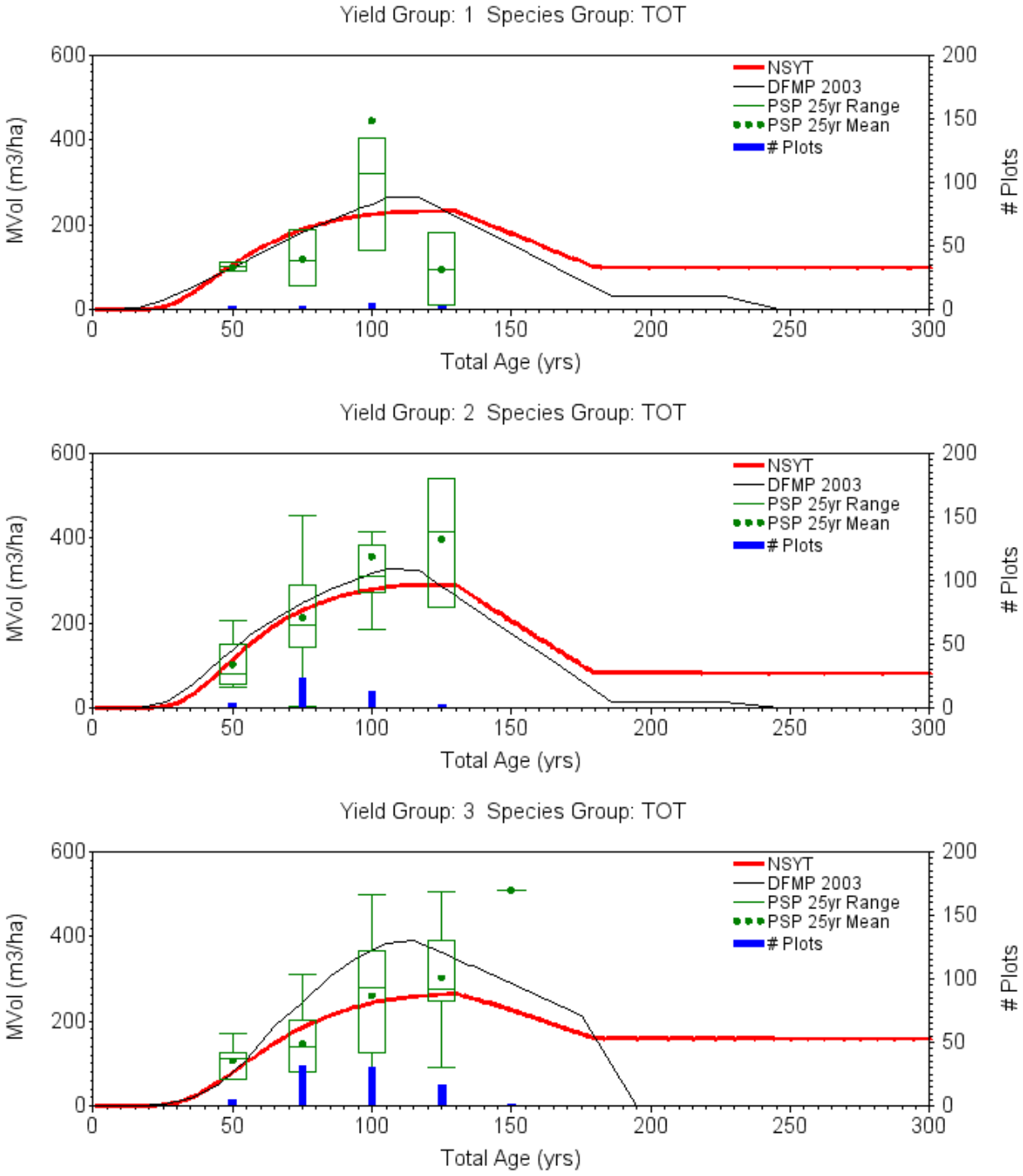


Figure 21. NSYT vs. 25-Year PSP Average and vs. 2003 DFMP for the Total Species Group, for Yield Groups 1, 2, 3.

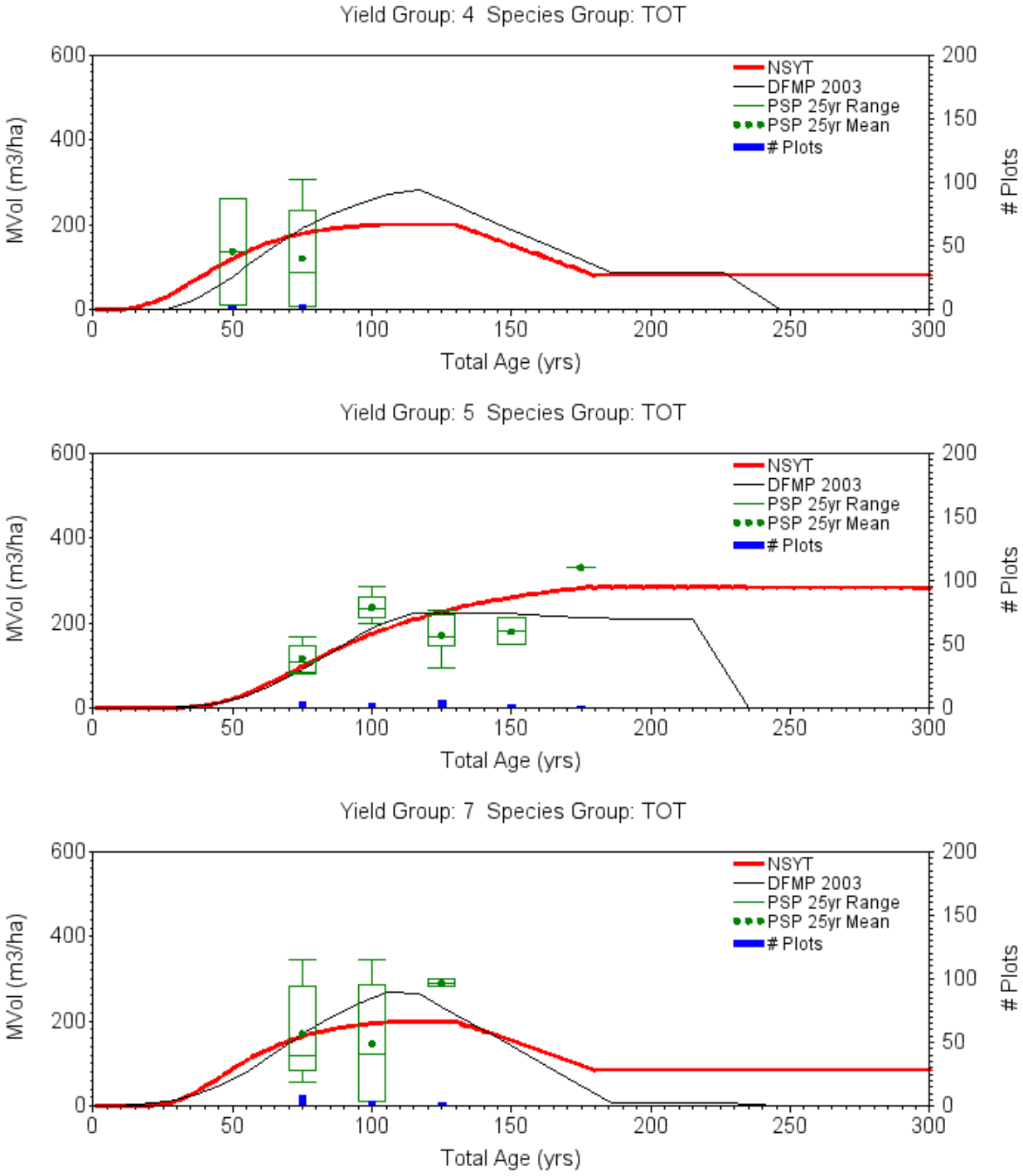


Figure 22. NSYT vs. 25-Year PSP Average and vs. 2003 DFMP for the Total Species Group, for Yield Groups 4, 5, 7.

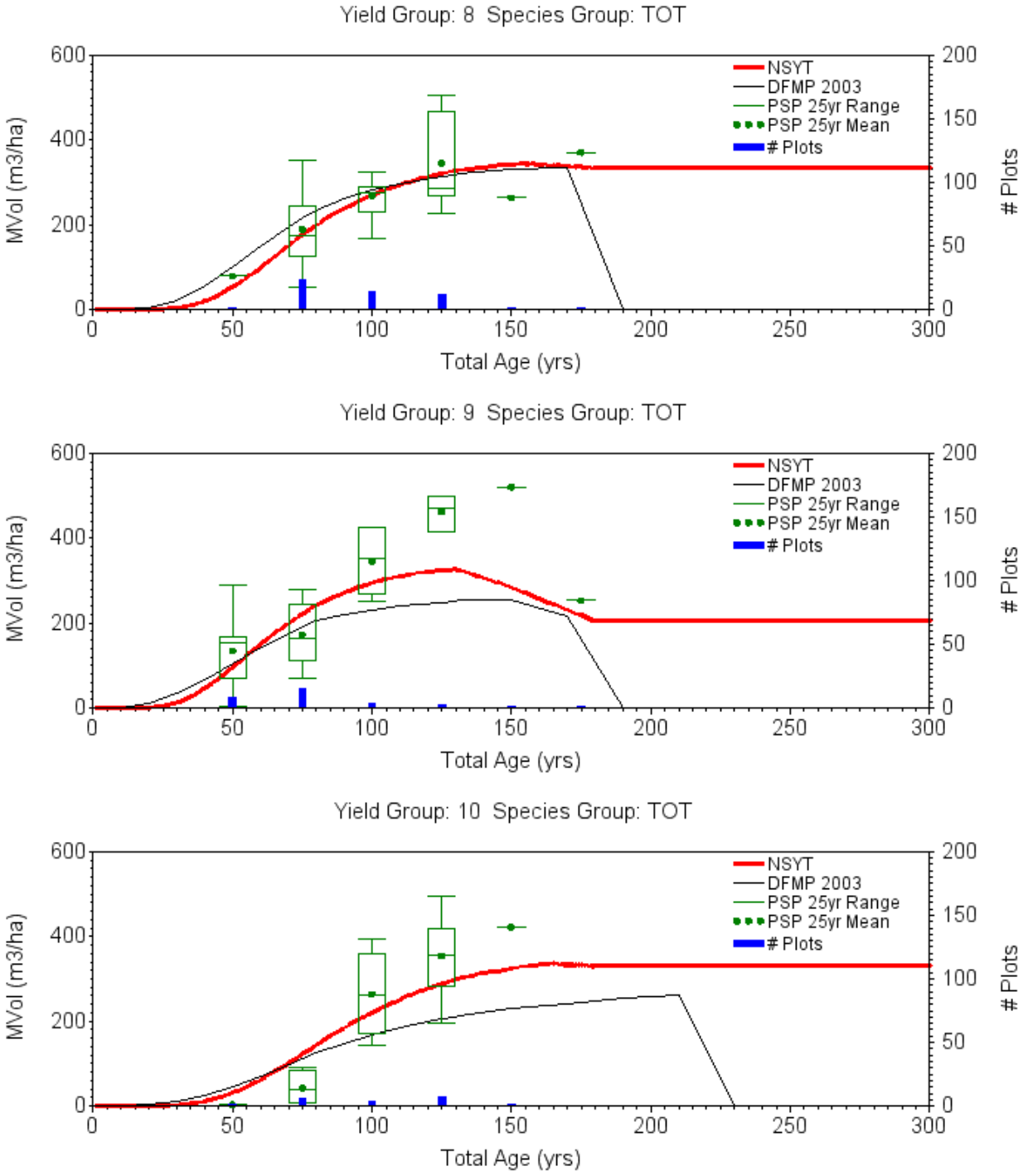


Figure 23. NSYT vs. 25-Year PSP Average and vs. 2003 DFMP for the Total Species Group, for Yield Groups 8, 9, 10.

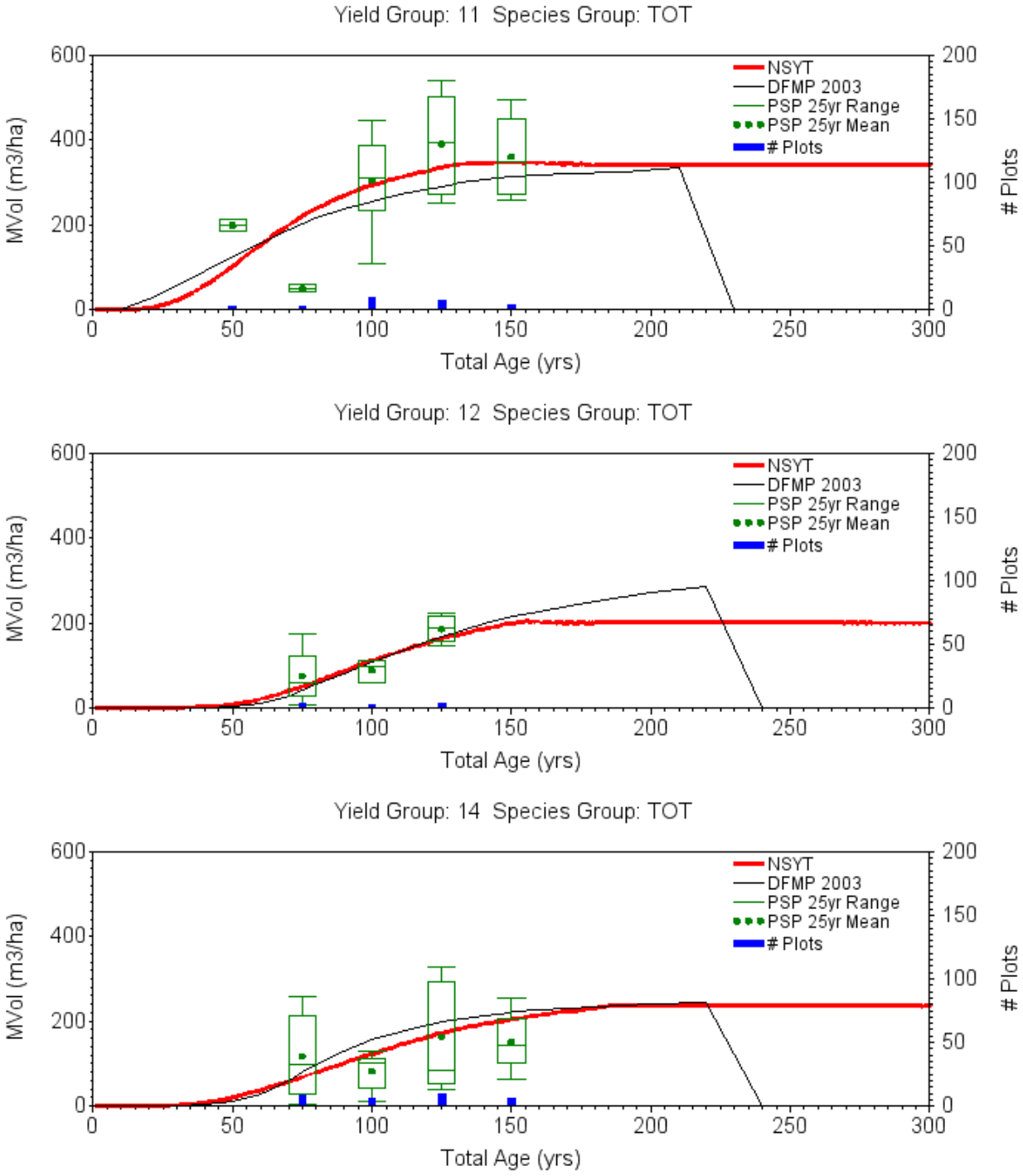


Figure 24. NSYT vs. 25-Year PSP Average and vs. 2003 DFMP for the Total Species Group, for Yield Groups 11, 12, 14.

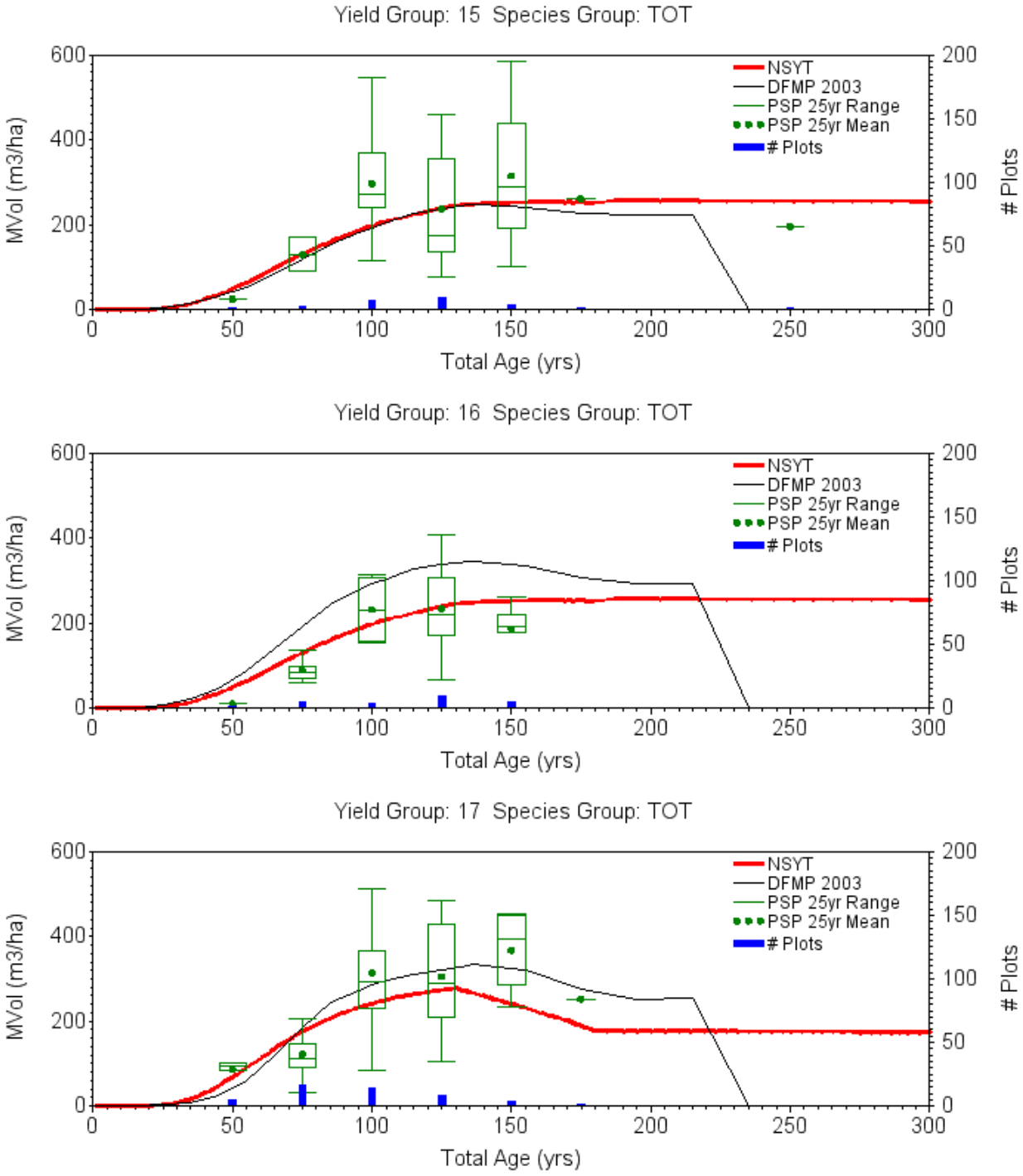


Figure 25. NSYT vs. 25-Year PSP Average and vs. 2003 DFMP for the Total Species Group, for Yield Groups 15, 16, 17.

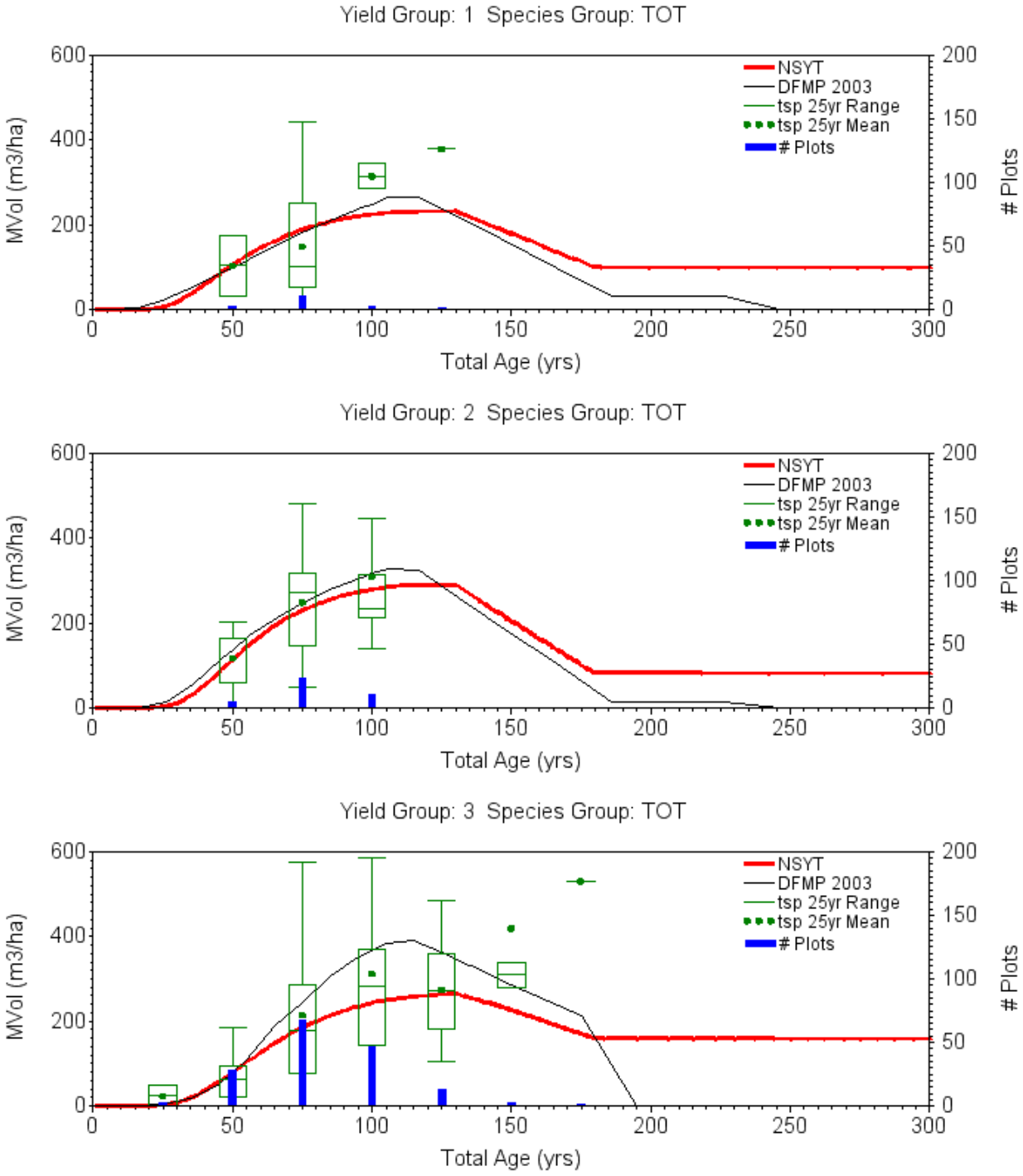


Figure 26. NSYT vs. 25-Year TSP Average and vs. 2003 DFMP for the Total Species Group, for Yield Groups 1, 2, 3.

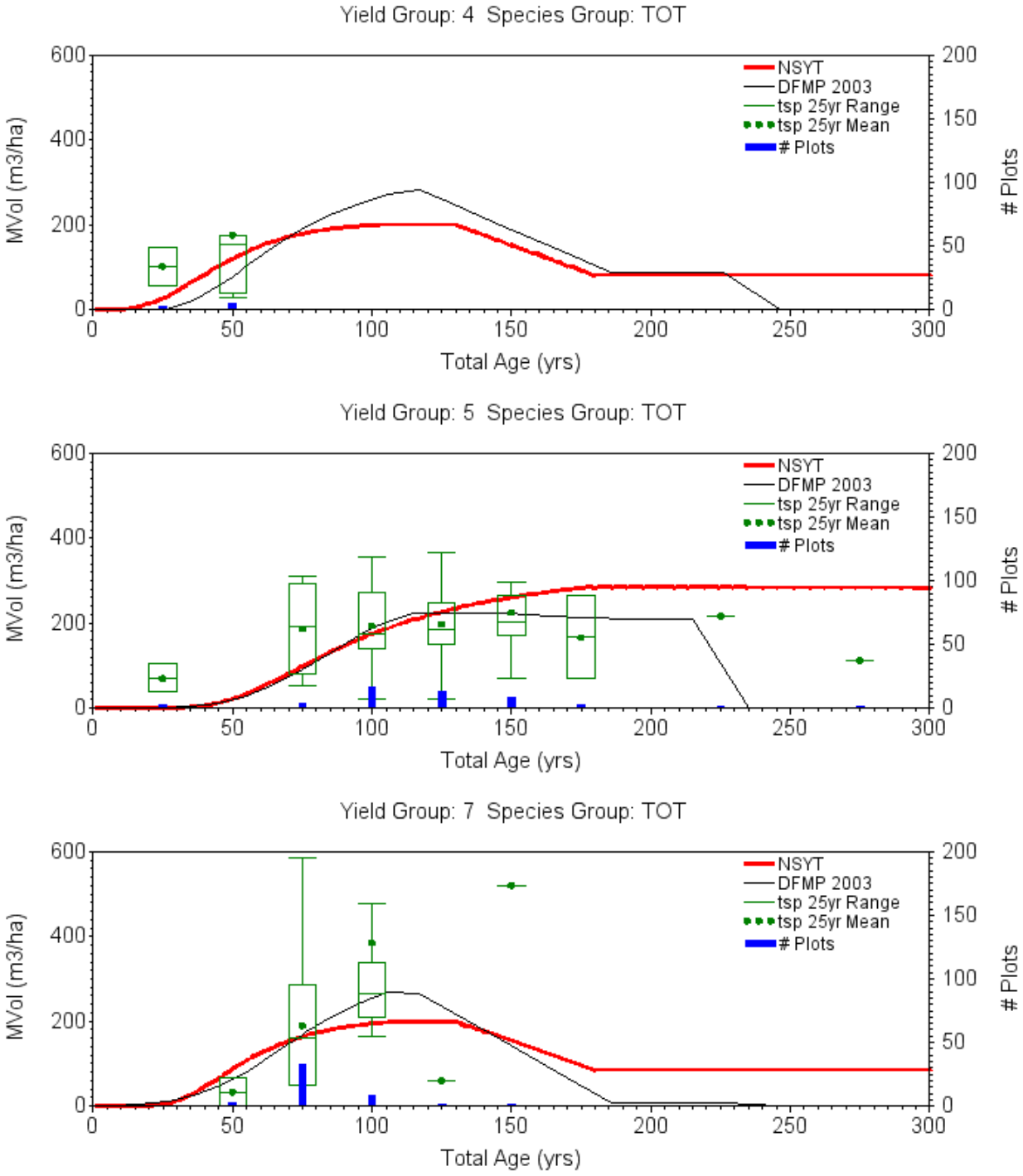


Figure 27. NSYT vs. 25-Year TSP Average and vs. 2003 DFMP for the Total Species Group, for Yield Groups 4, 5, 7.

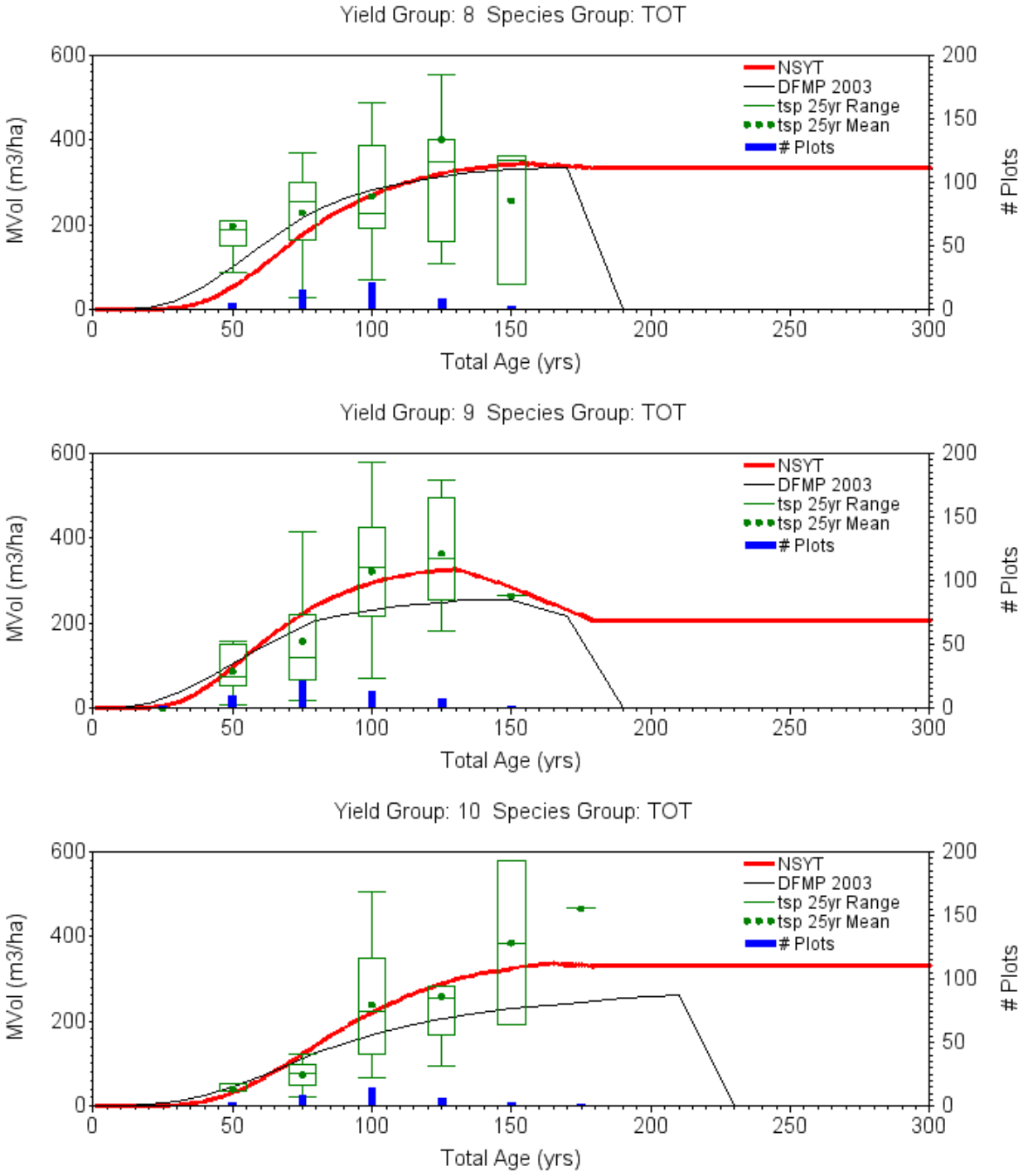


Figure 28. NSYT vs. 25-Year TSP Average and vs. 2003 DFMP for the Total Species Group, for Yield Groups 8, 9, 10.

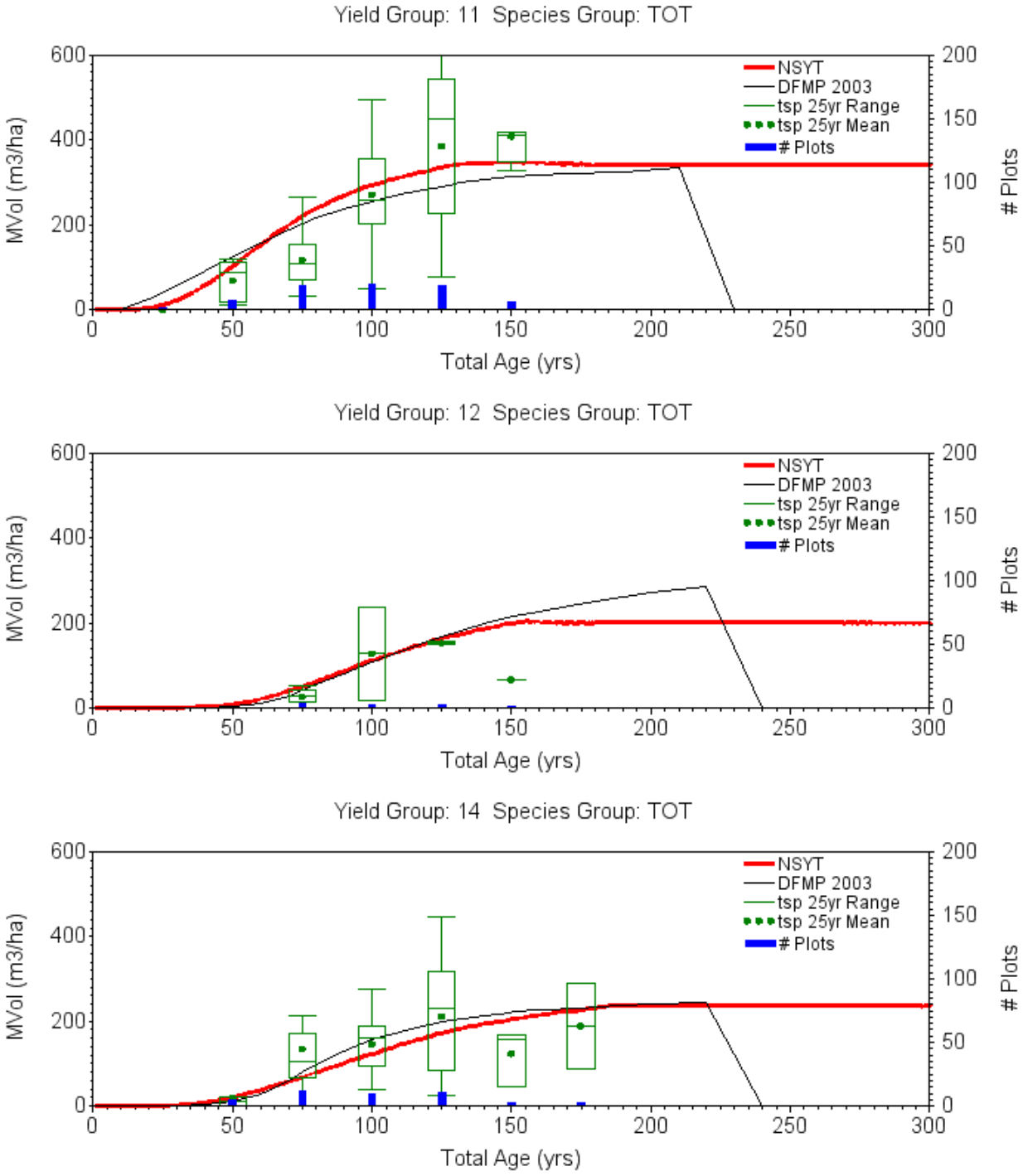


Figure 29. NSYT vs. 25-Year TSP Average and vs. 2003 DFMP for the Total Species Group, for Yield Groups 11, 12, 14.

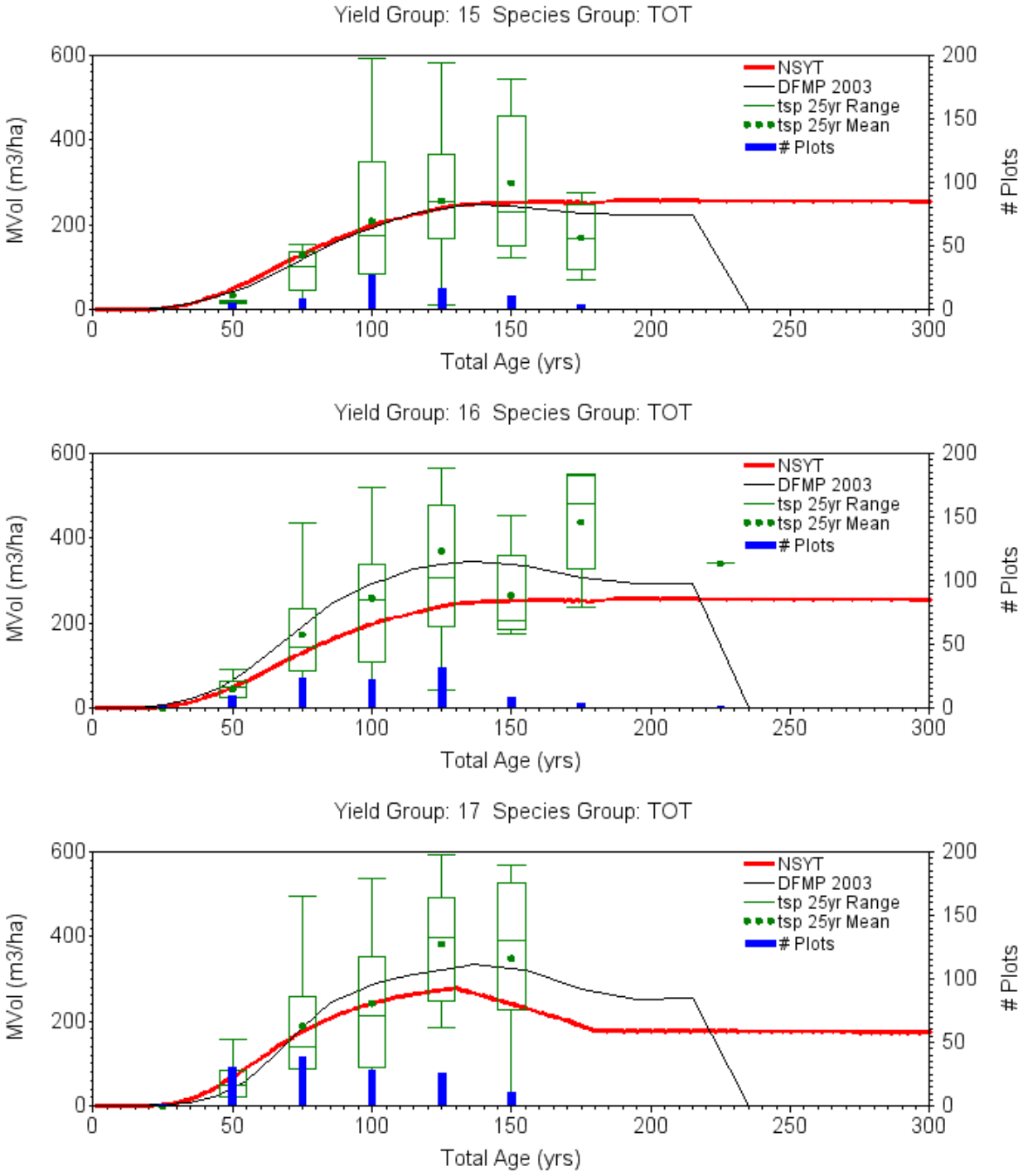


Figure 30. NSYT vs. 25-Year TSP Average and vs. 2003 DFMP for the Total Species Group, for Yield Groups 15, 16, 17.

4.5 AREA WEIGHTED NSYTS

4.5.1 Area-weighted NSYTs by Broad Cover Group

Area-weighted NSYTs were computed by broad cover group for the deciduous, conifer, and total species groups, weighted by the net landbase area of each yield group.[45] Area-weighted NSYTs by broad cover group and species group were plotted (Figure 31 to Figure 32), with PSP and TSP 25-year average volumes superimposed (Figure 33 to Figure 36).

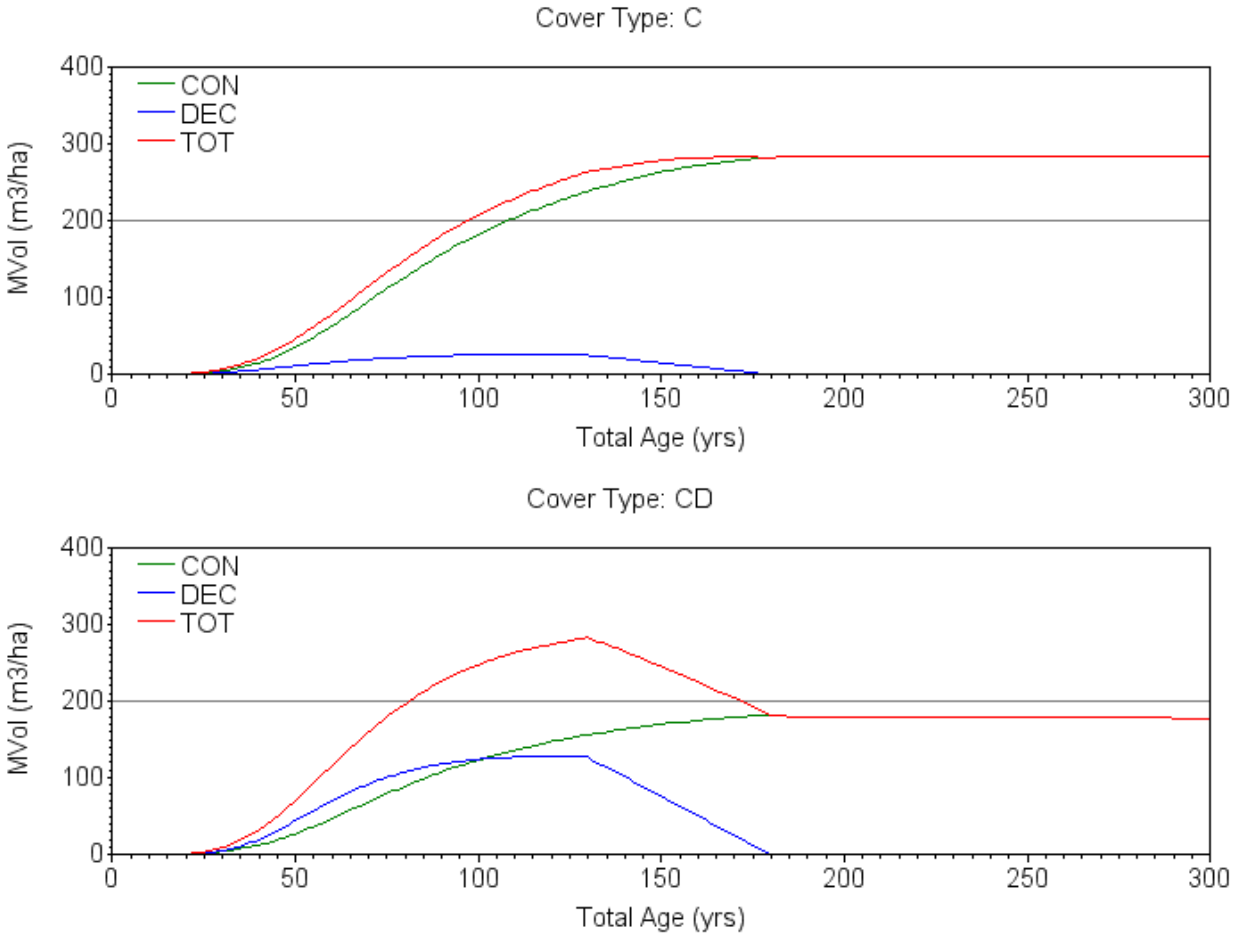


Figure 31. NSYTs for the C and CD Cover Groups.

[45] Note that area-weighted summaries by cover group and overall, include the net landbase area comprising yield group 6, based on the yield group 3 / 17 NSYT substitution methods.

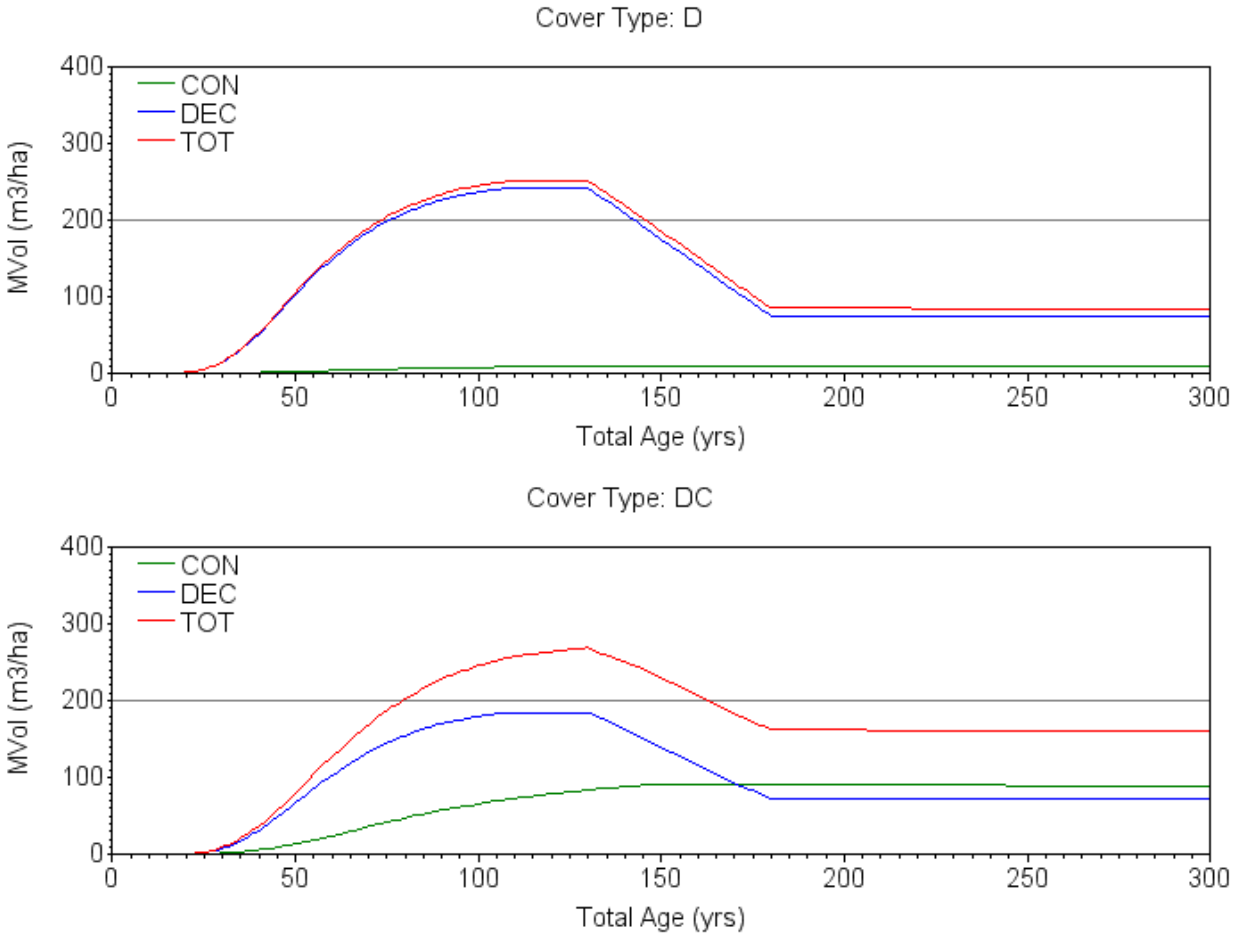


Figure 32. NSYTs for the D and DC Cover Groups.

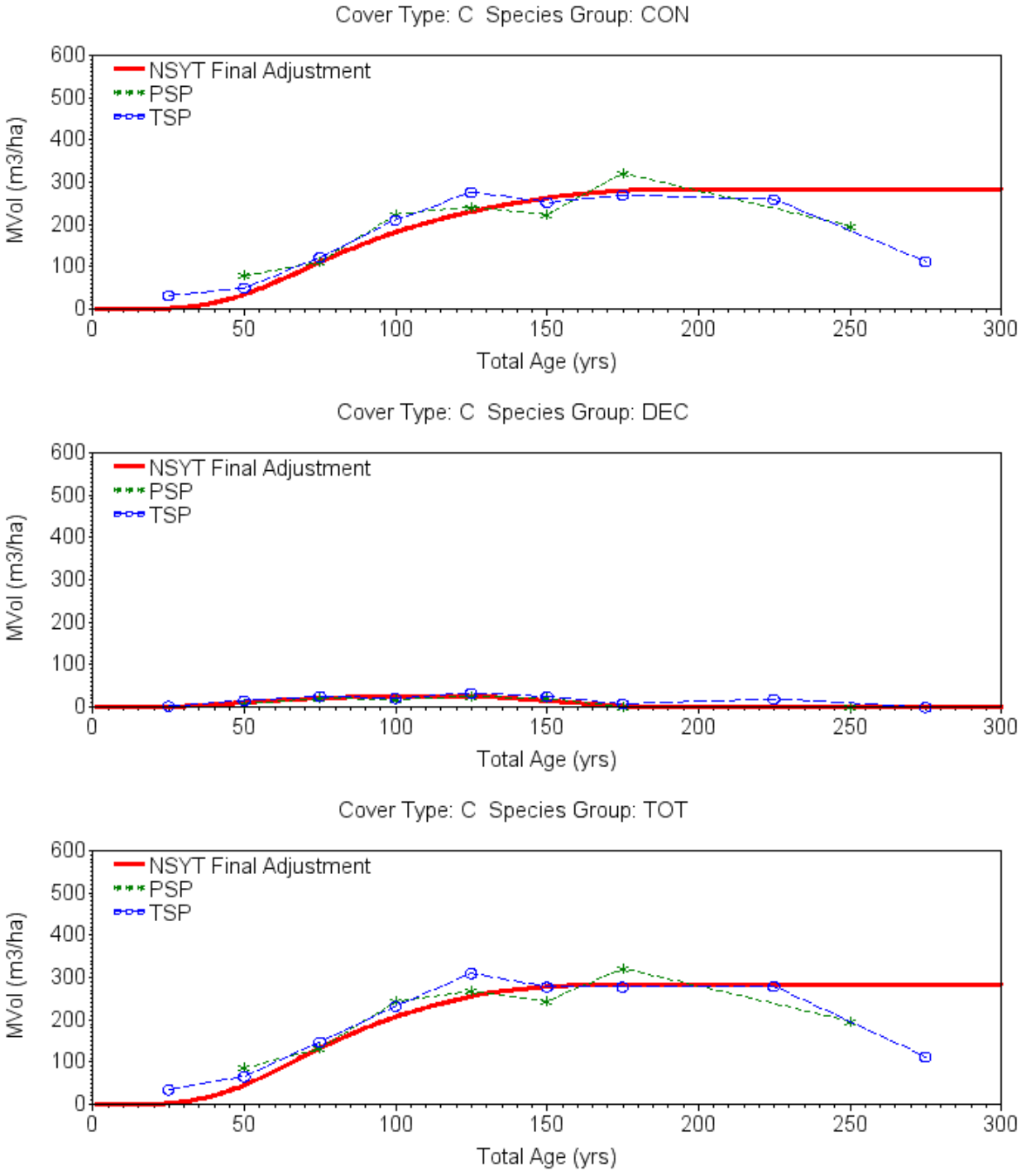


Figure 33. NSYTs by Cover Group (C) and Major Species Group (Con, Dec, Total).

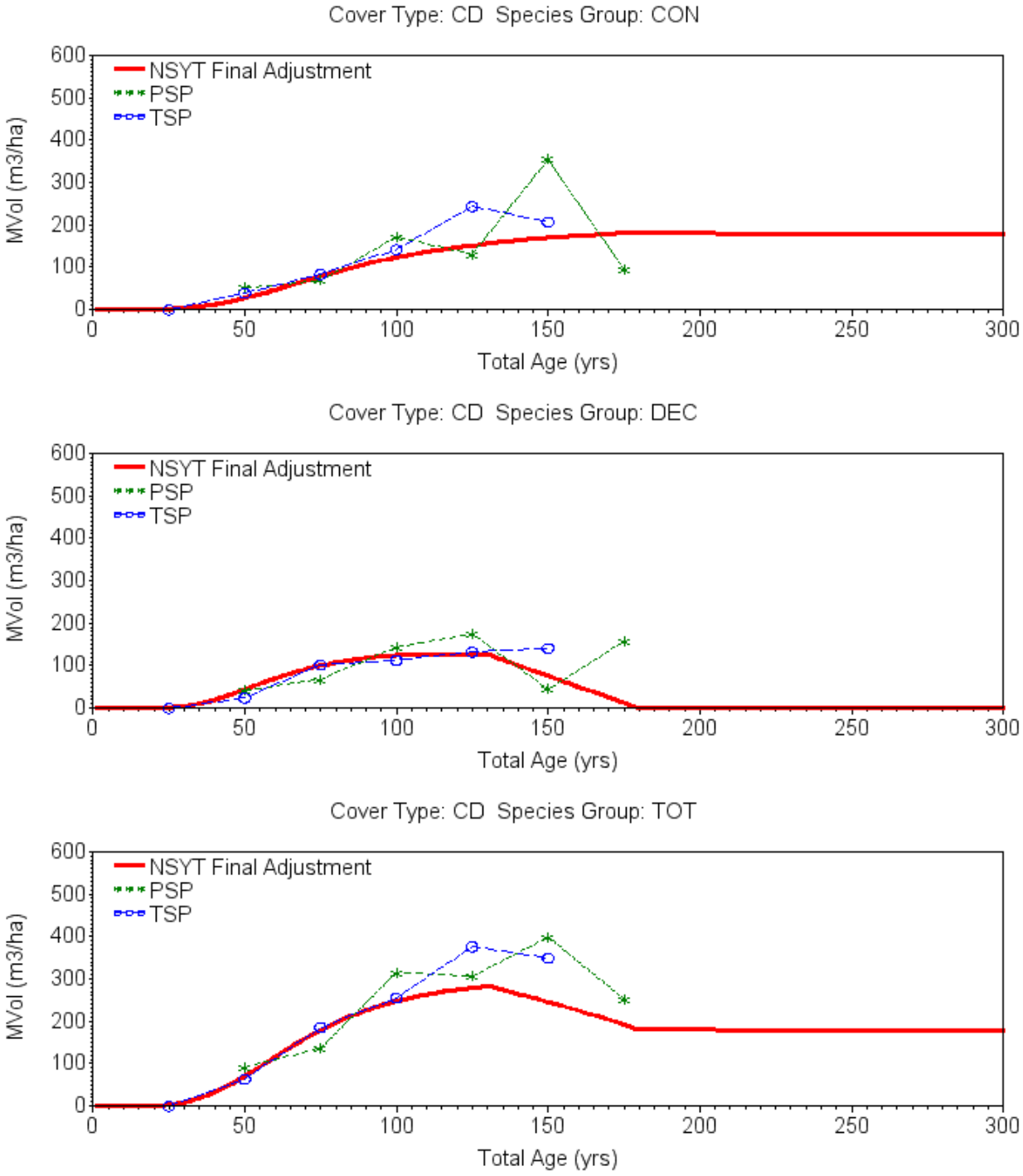


Figure 34. NSYTs by Cover Group (CD) and Major Species Group (Con, Dec, Total).

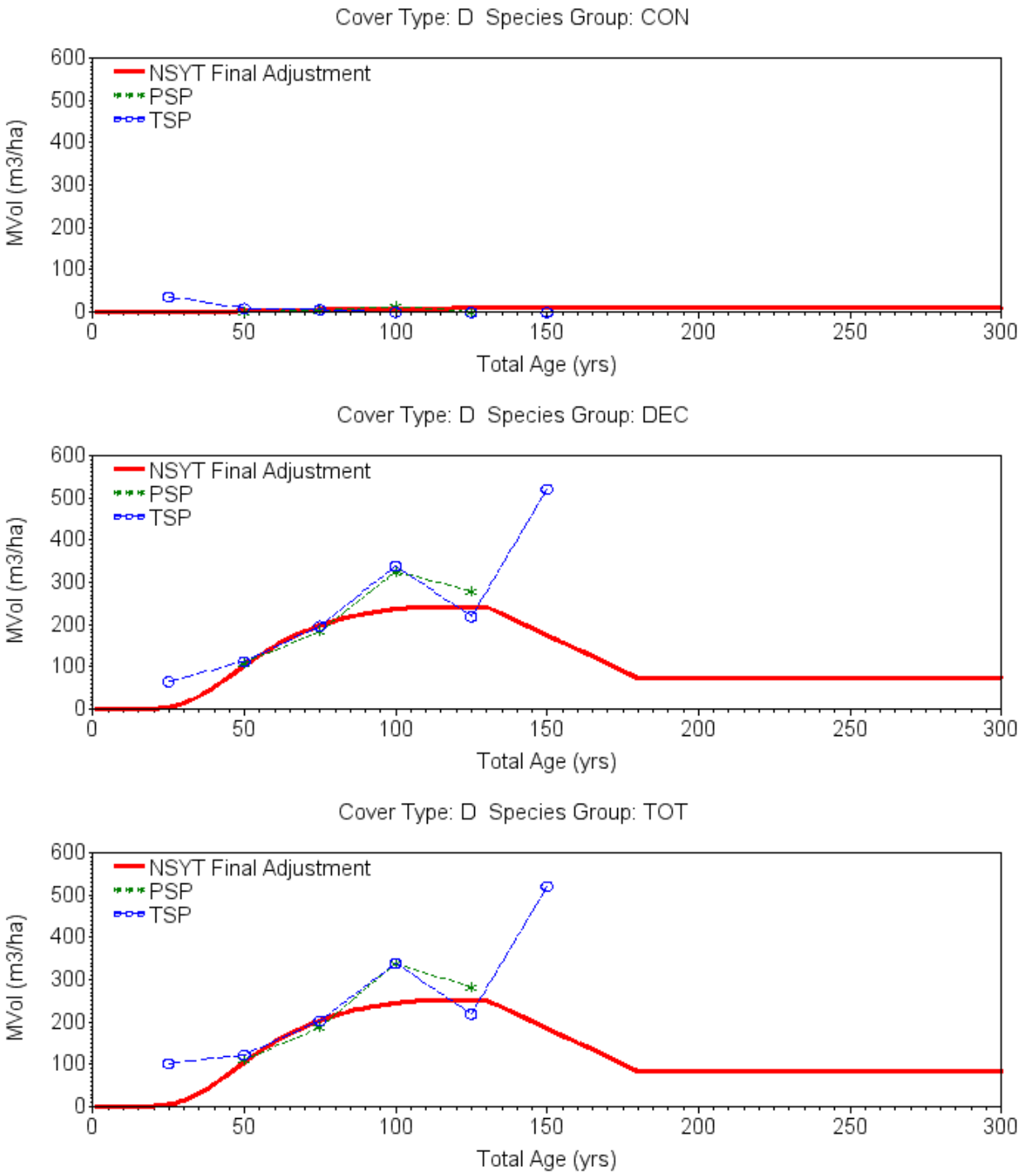


Figure 35. NSYTs by Cover Group (D) and Major Species Group (Con, Dec, Total).

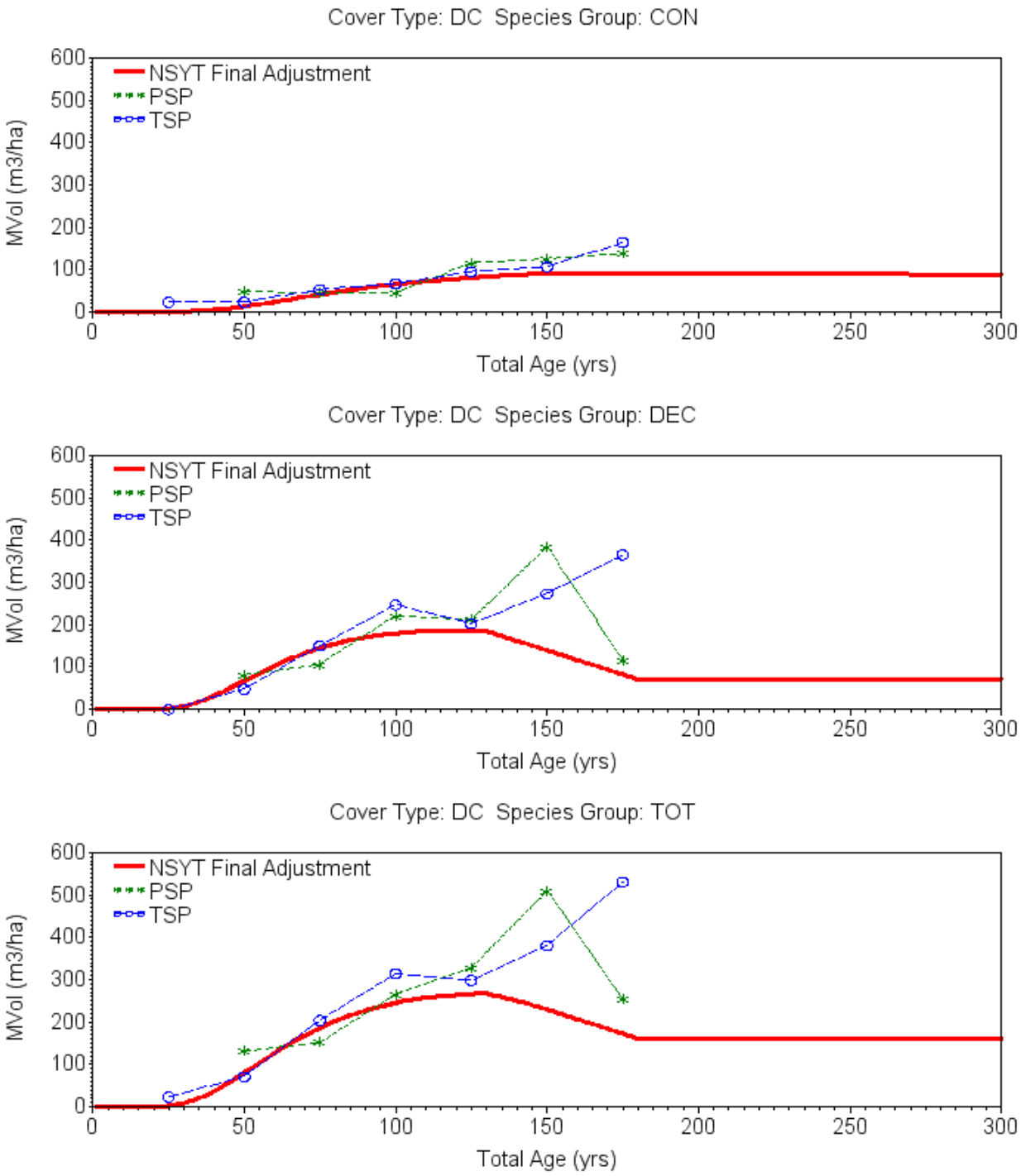


Figure 36. NSYTs by Cover Group (DC) and Major Species Group (Con, Dec, Total).

4.5.2 Overall area-weighted yield tables

Overall area-weighted NSYTs were computed for the deciduous, conifer, and total species groups, weighted by the net landbase area of each yield group (Figure 37).[45]

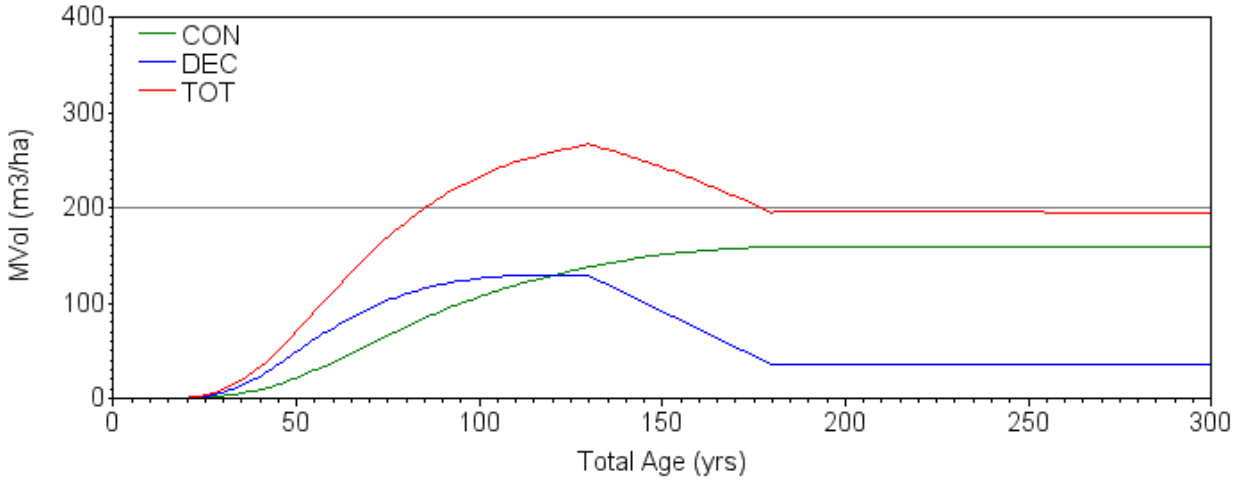


Figure 37. Area-weighted NSYTs (Conifer, Deciduous, and Total Species Groups).

4.6 CULMINATION OF MEAN ANNUAL INCREMENT

Culmination of mean annual increment (of the gross merchantable volume) is reported by yield group and species group, while the culmination age is reported for the leading species group within each yield group (Table 23). MAI curves are also plotted together with final NSYTs by yield group, and culmination ages are identified for the deciduous, conifer, and total species groups (Figure 38 to Figure 42).

Table 23. Culmination of MAI by Yield Group.

Yield Group	Leading Species Group	Culmination of MAI (m^3/ha/yr)		Culm. Age of Leading Species
		Decid	Conifer	Years
1	DEC	2.37	0.15	69
2	DEC	3.00	0.06	74
3	DEC	1.97	0.52	78
4	DEC	2.44	0.06	57
5	CON	0.05	1.77	118
7	DEC	2.13	0.07	72
8	CON	0.19	2.52	99
9	CON	1.31	1.71	83
10	CON	0.14	2.17	120
11	CON	0.49	2.51	90
12	CON	0.03	1.30	141
14	CON	0.06	1.30	156
15	CON	0.33	1.63	115
16	CON	0.33	1.63	115
17	CON	1.22	1.19	102

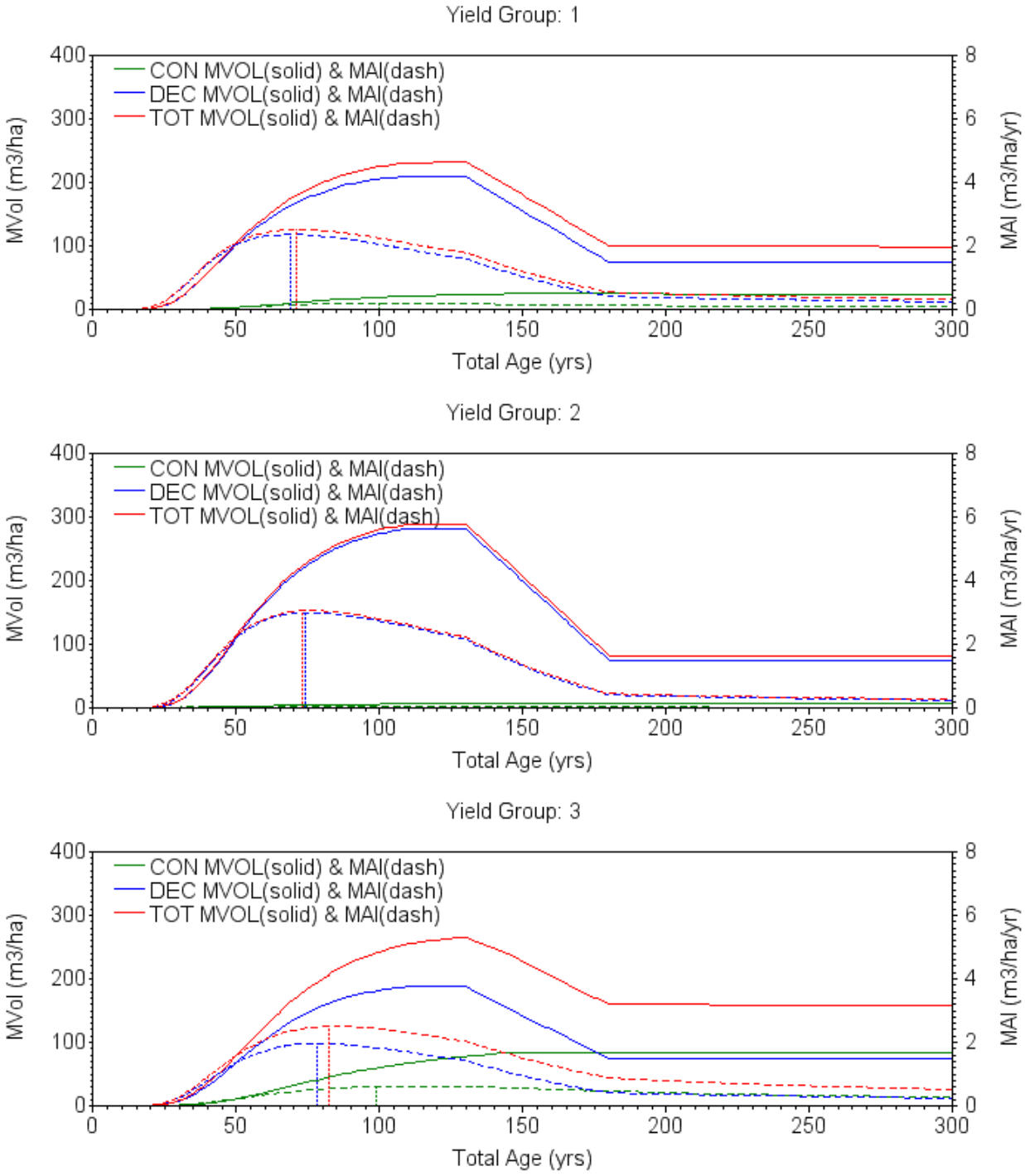


Figure 38. MAI and Culmination Age by Species Group, for Yield Groups 1, 2, 3.

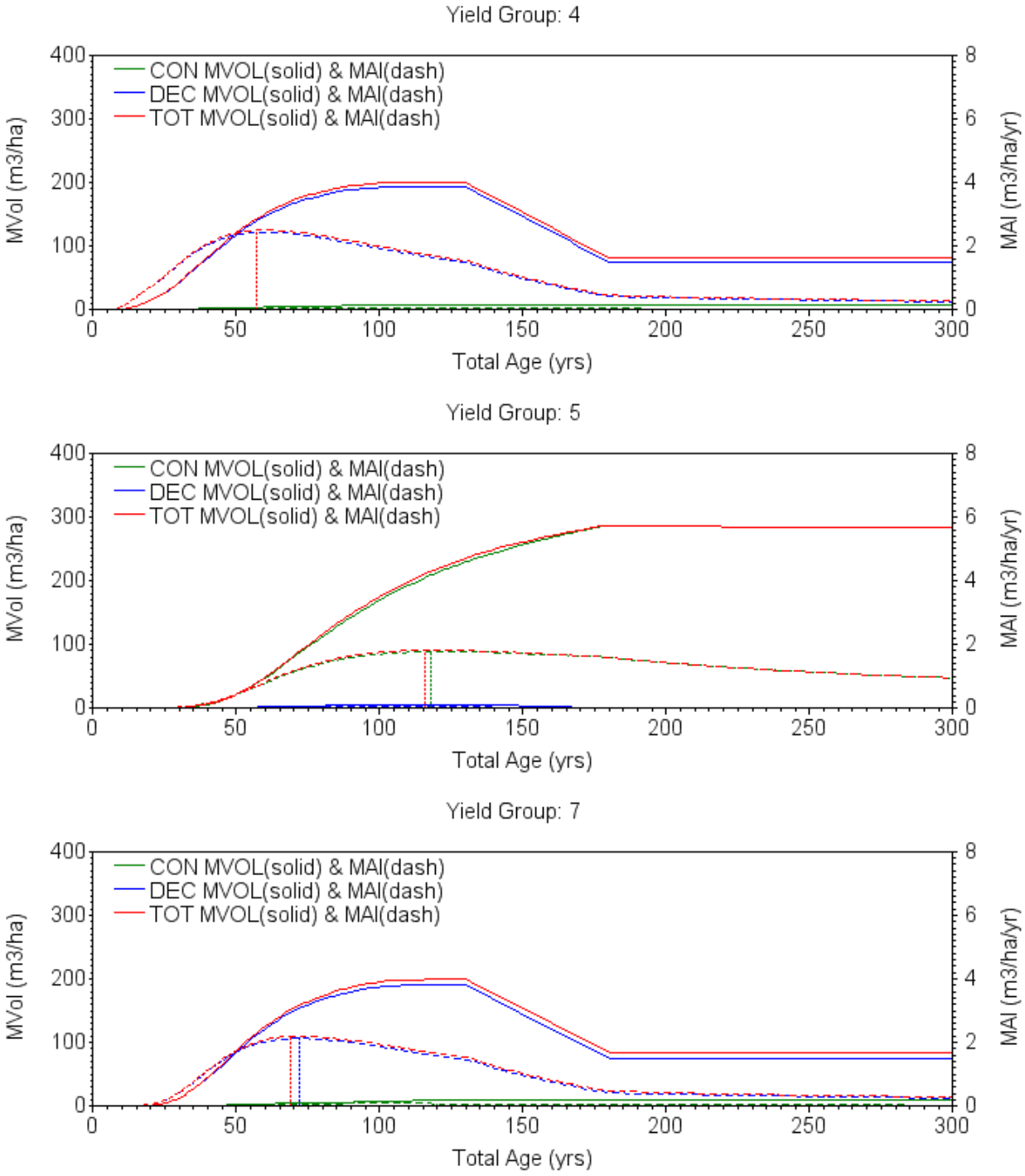


Figure 39. MAI and Culmination Age by Species Group, for Yield Groups 4, 5, 7.

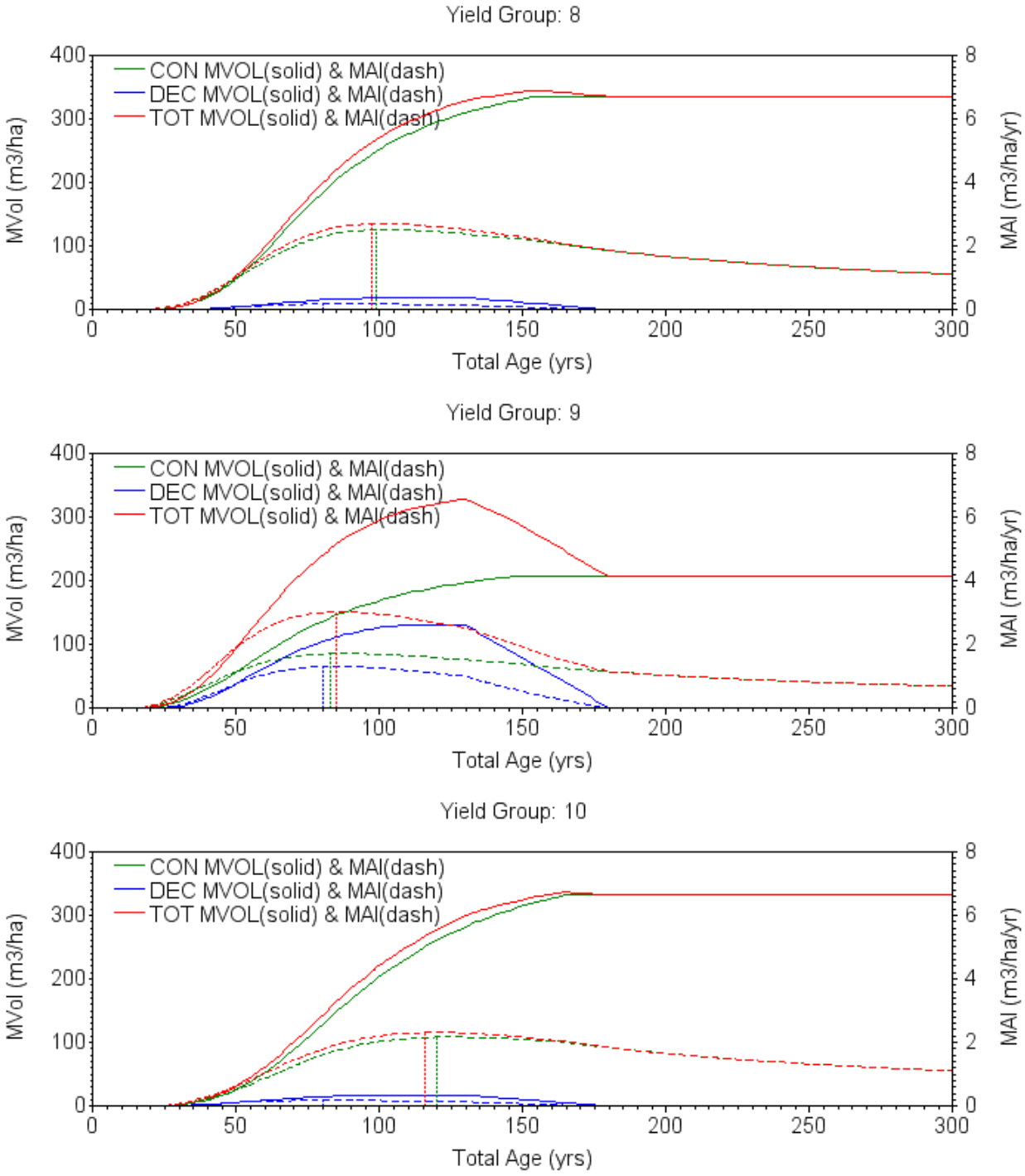


Figure 40. MAI and Culmination Age by Species Group, for Yield Groups 8, 9, 10.

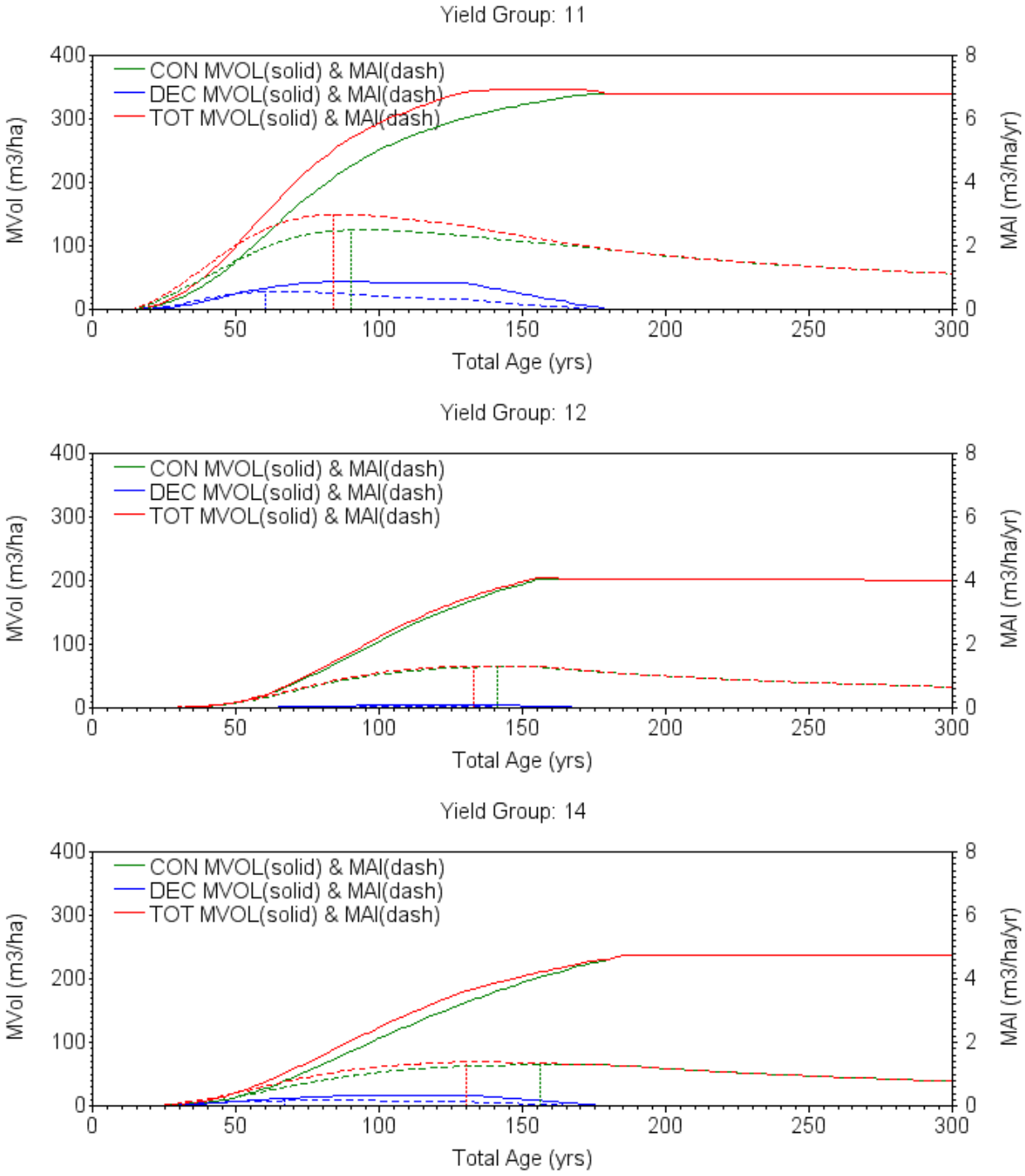


Figure 41. MAI and Culmination Age by Species Group, for Yield Groups 11, 12, 14.

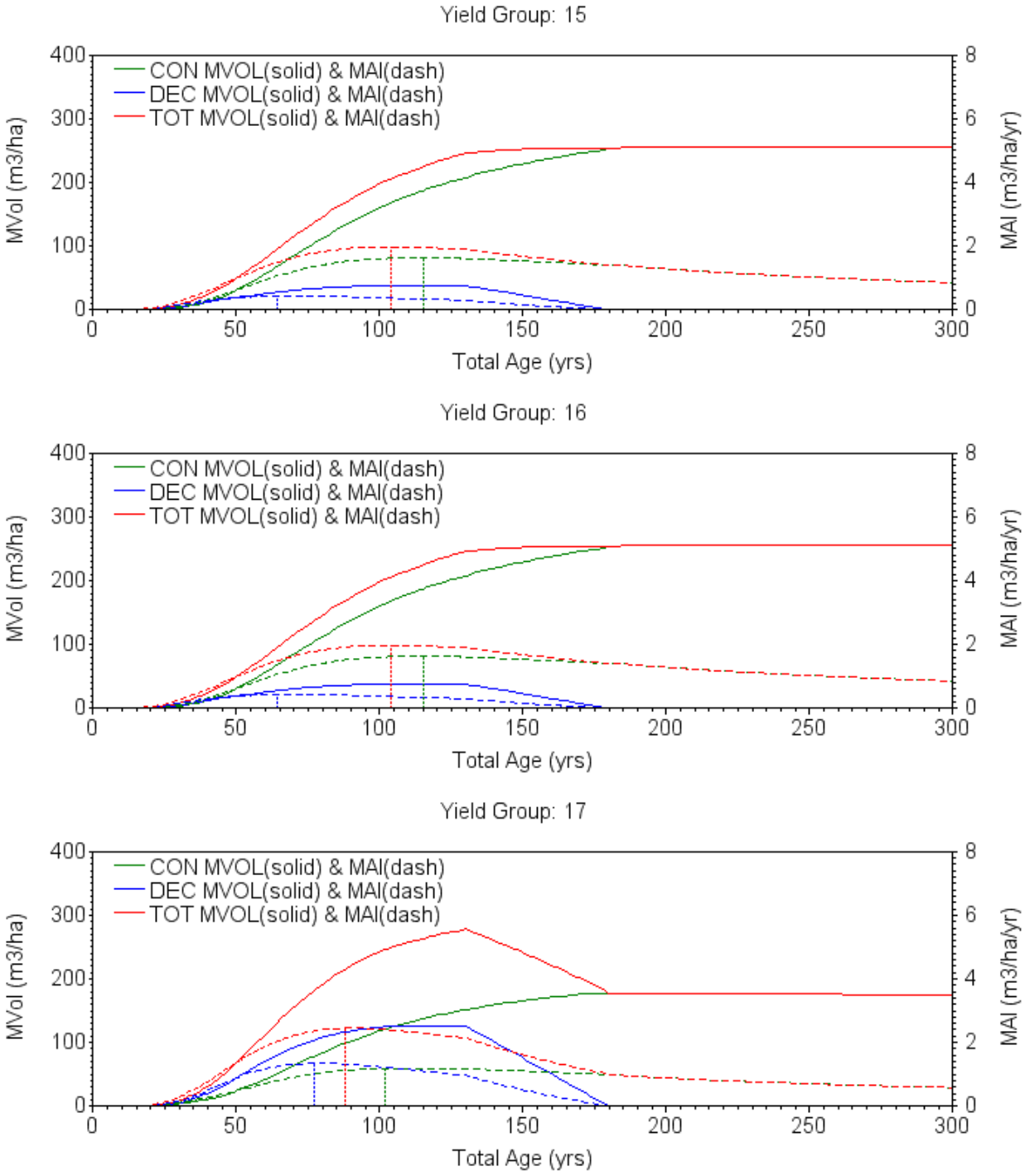


Figure 42. MAI and Culmination Age by Species Group, for Yield Groups 15, 16, 17.

4.7 TESTS OF OVERALL BIAS

The range of statistical tests completed between predicted and PSP volumes (of the 432 PSPs at last measurement) included calculations of root mean square error (of prediction), Goodness-of-fit index, bias, and percent bias. The total bias between the final NSYT's and PSP volumes was determined by using the AVI stand age geo-referenced with each PSP at the last measurement, to look up the predicted volume from the yield group averaged final NSYTs. Tests were calculated from each PSP at last measurement by yield group and species group (Table 24), with weighted average statistics calculated for each cover group (Figure 19) and overall (Table 26), weighted by the net landbase area of each yield group.

These tests show that the bias in predicted volumes is generally quite low at less than 10% across the majority of yield groups, specifically when compared across the main species groups of each particular yield group (Table 24). The higher observed percent bias in those secondary species groups with minor representation is primarily due to the low predicted and observed volumes of those species.

The exception is for yield group 4 (primarily a BW component), where the deciduous component over-predicted volume when compared to the PSP data by over 20%. The reason for this increased bias is likely due to a combination of factors. The sample size of the PSP data yield group 4 is extremely low (n=6), which has a major impact on resulting statistics. In addition, the GYPSY manual cautioned against modeling pure BW groups because of known modeling difficulties. Given the small area in the THLB (<1%) and that the deciduous operators considered the yield projections reasonable for the deciduous strata, the yield group 4 NSYT provides reasonable representation of the growth of BW stands in the FMA. The G&Y monitoring will identify this as a step to accumulate more information in BW stands for future yield curve development.

Table 24. Tests by Yield Group and Major Species Group[46]

Species Group	Yield Group	# PSPs	PSP	NSYT	CI of Difference		RMSE m3/ha	GOFI	Bias	
			m^3/ha	m^3/ha	L 95%	U 95%			m^3/ha	%
CON	1	11	14.4	15.4	-22.0	20.1	30.2	0.0	-0.9	-6.4
CON	2	42	5.3	5.4	-8.7	8.5	27.3	0.0	-0.1	-1.3
CON	3	84	52.5	51.0	-13.2	16.2	67.2	0.1	1.5	2.8
CON	4	6	1.4	4.1	-5.9	0.5	4.0	-0.7	-2.7	-
CON	5	18	177.6	191.2	-47.0	19.7	66.9	0.1	-13.6	-7.7
CON	7	14	5.8	7.0	-12.8	10.4	19.6	0.0	-1.2	-20.6
CON	8	49	225.4	223.0	-19.1	23.8	74.0	0.5	2.4	1.0
CON	9	31	114.6	124.2	-36.7	17.6	73.5	0.1	-9.6	-8.3
CON	10	18	192.7	191.9	-38.1	39.8	76.5	0.7	0.8	0.4
CON	11	23	263.7	257.4	-33.3	46.0	90.0	0.4	6.4	2.4
CON	12	11	99.9	106.3	-37.8	25.0	45.6	0.4	-6.4	-6.4
CON	14	29	110.9	126.6	-45.6	14.1	78.9	0.0	-15.7	-14.2
CON	17	47	103.9	102.0	-19.9	23.8	73.8	0.4	1.9	1.9
CON	15/16	49	176.4	178.8	-28.3	23.7	89.7	0.3	-2.3	-1.3
DEC	1	11	175.1	182.5	-101.6	86.7	135.5	0.0	-7.4	-4.2
DEC	2	42	239.7	238.8	-34.0	35.8	110.7	0.2	0.9	0.4
DEC	3	84	167.2	160.5	-18.5	32.0	115.9	0.1	6.7	4.0
DEC	4	6	125.1	148.5	-162.4	115.6	129.1	0.0	-23.4	-18.7
DEC	5	18	3.6	4.8	-7.3	4.9	12.0	-0.1	-1.2	-32.6
DEC	7	14	175.8	178.4	-77.3	72.2	125.8	0.0	-2.5	-1.4
DEC	8	49	14.3	15.4	-9.4	7.2	28.7	-0.1	-1.1	-7.6
DEC	9	31	100.1	87.8	-25.7	50.3	102.8	0.2	12.3	12.3
DEC	10	18	14.4	15.1	-17.2	15.8	32.4	0.0	-0.7	-4.8
DEC	11	23	36.0	38.6	-32.8	27.7	68.6	0.0	-2.6	-7.2
DEC	12	11	12.6	4.9	-6.8	22.3	22.3	-0.1	7.7	61.2
DEC	14	29	18.8	15.0	-10.3	17.9	36.7	0.0	3.8	20.4
DEC	17	47	110.2	101.2	-20.0	37.8	97.8	0.1	8.9	8.1
DEC	15/16	49	33.7	31.8	-16.3	20.1	62.7	0.0	1.9	5.6
TOT	1	11	189.5	197.8	-105.4	88.7	139.6	0.0	-8.4	-4.4
TOT	2	42	245.0	244.2	-31.7	33.3	103.1	0.3	0.8	0.3
TOT	3	84	219.7	211.5	-16.0	32.4	111.1	0.3	8.2	3.7
TOT	4	6	126.5	152.6	-163.7	111.5	128.4	-0.1	-26.1	-20.6
TOT	5	18	181.2	196.0	-47.3	17.7	65.5	0.0	-14.8	-8.2
TOT	7	14	181.6	185.4	-75.2	67.7	120.1	0.0	-3.7	-2.1
TOT	8	49	239.7	238.5	-20.0	22.5	73.3	0.5	1.2	0.5
TOT	9	31	214.8	212.0	-28.8	34.3	84.7	0.6	2.8	1.3
TOT	10	18	207.1	207.0	-43.1	43.4	84.9	0.7	0.2	0.1
TOT	11	23	299.8	296.0	-40.1	47.6	99.6	0.4	3.7	1.3
TOT	12	11	112.5	111.2	-31.3	33.8	46.8	0.5	1.3	1.2
TOT	14	29	129.7	141.6	-48.5	24.7	95.5	-0.1	-11.9	-9.2
TOT	17	47	214.1	203.2	-19.8	41.5	103.8	0.4	10.8	5.1
TOT	15/16	49	210.1	210.6	-31.3	30.5	106.5	0.2	-0.4	-0.2

[46] Highlighted rows correspond to the leading species of each yield group (ie., for the 'CON' species, yield groups 5 & 8-17 are leading coniferous, and for the 'DEC' species, yield groups 1,2,3,4,7 are leading deciduous).

The assessment of bias across the broad cover groups shows that predicted volumes are within 5% of the PSP data for all species groups combined (Table 25), and within 2% overall (Table 26).

Table 25. Tests by Broad Cover Group and Major Species Group.

Cover Group	Species Group	# Yield Groups	PSP	NSYT	RMSE m^3/ha	GOFI	Bias	
			actual	pred			m^3/ha	%
C	CON	7	182.7	185.6	78.8	0.3	-2.9	-2.9
C	DEC	7	22.8	21.7	44.0	0.0	1.1	5.4
C	TOT	7	205.5	207.3	88.1	0.3	-1.8	-1.5
CD	CON	2	105.4	105.0	73.7	0.4	0.4	0.5
CD	DEC	2	108.8	99.4	98.5	0.1	9.4	8.7
CD	TOT	2	214.2	204.4	101.2	0.4	9.7	4.6
D	CON	4	6.3	6.9	24.0	0.0	-0.7	-20.1
D	DEC	4	207.1	209.7	119.0	0.1	-2.6	-1.9
D	TOT	4	213.4	216.7	113.8	0.2	-3.3	-2.3
DC	CON	2	58.4	58.0	67.8	0.1	0.4	1.8
DC	DEC	2	160.9	153.6	114.6	0.1	7.2	4.8
DC	TOT	2	219.3	211.6	108.6	0.3	7.7	3.5

Table 26. Tests Overall and Major Species Group.

Species Group	# Yield Groups	PSP	NSYT	RMSE m^3/ha	GOFI	Bias	
		actual	pred			m^3/ha	%
CON	15	111.2	112.4	-1.2	66.2	0.2	-1.2
DEC	15	100.3	97.1	3.2	82.0	0.1	3.2
TOT	15	211.5	209.5	2.0	99.4	0.3	2.0

4.8 VOLUME TODAY CALCULATION

4.8.1 AVI compared to PSP Data : Volume in 2010

The gross merchantable volume of the AVI net landbase was computed from the AVI stand age (at 2010) of each polygon associated with the yield group averaged final NSYTs for the conifer, deciduous, and total species groups. The average predicted gross merchantable volumes for each yield group were compared to the 95% confidence intervals of the PSP[47] data at last measurement, to assess if AVI volumes were within or outside the range of PSP measured volumes (Figure 43, Table 27).

Across all yield groups, the "Volume Today" (2010) comparison shows that there is no significant difference (@ alpha=0.05) between AVI vs PSP volumes based on all species combined (Table 27).

4.8.2 AVI Compared to TSP Data : Volume in 1997

A separate comparison was also made between the AVI net landbase and the TSP data. For comparison with TSPs, the AVI stand age was based on the year of TSP measurement (1997), to correspond to the year of TSP sampling. In addition, all stands < 15 m AVI overstory height[48] were excluded from both the AVI net landbase area and from the TSP sample list[49], to approximate stands considered currently inoperable (Table 28).

The AVI comparison with the TSP data (in 1997) tends to reveal a trend of under-estimating predicted volumes. It is unclear what the underlying reasons are, but since the TSP data were established to be generally representative of the FMA, these results may suggest that the set of NSYTs may yield slightly conservative estimates.

[47] A total of 432 PSPs (excluding yield group 6) were used in the volume today calculation.
[48] Based on the AVI attribute "HEIGHT".
[49] A total of 778 TSPs (excluding yield group 6) were used in the volume today calculation.

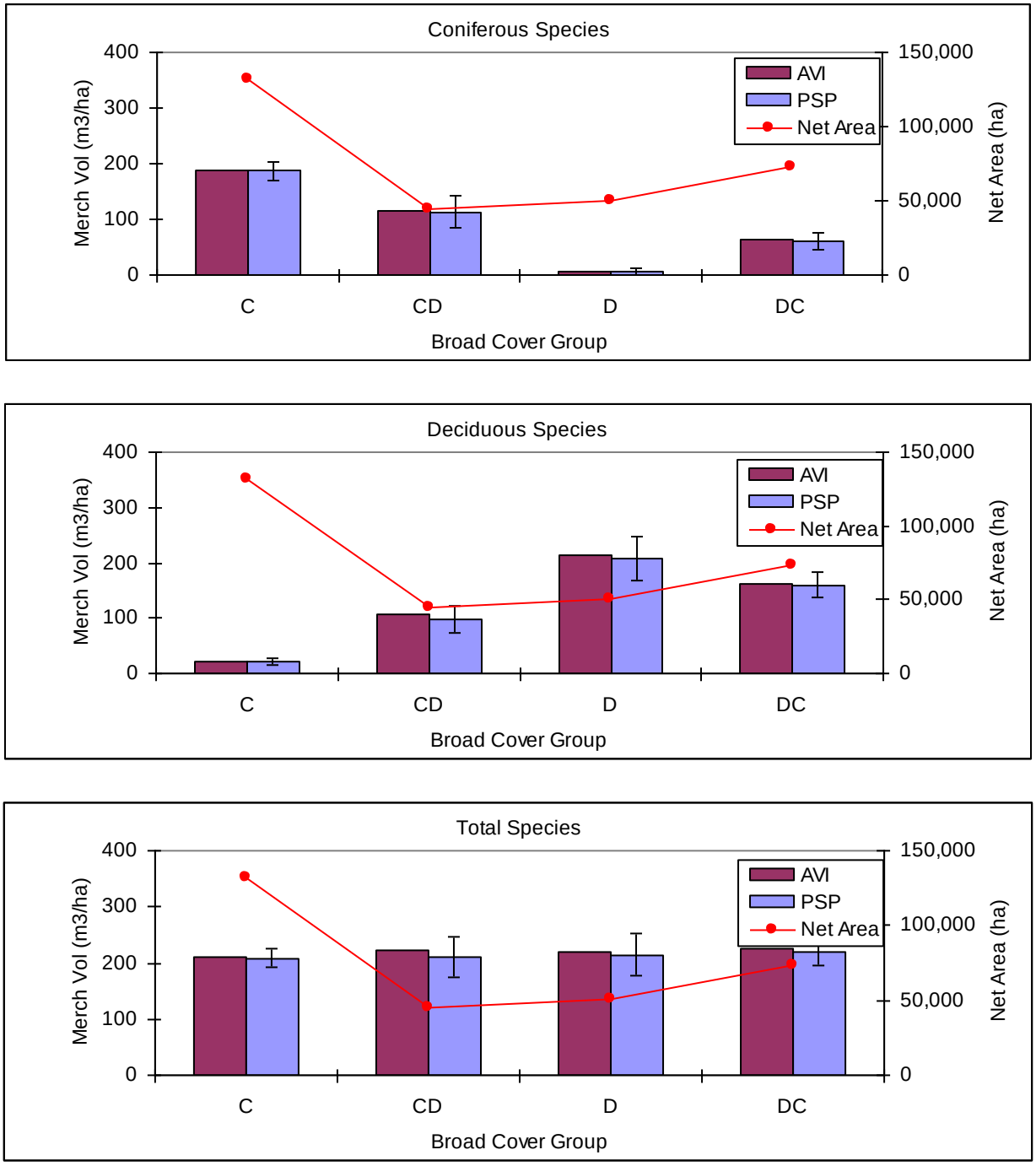


Figure 43. Gross Merchantable Volume Today (AVI vs. PSP at last measurement), by Broad Cover Group. Error bars represent the 95% PSP confidence interval.

Table 27. Comparing AVI Volume Today (2010) vs. PSP

Species Group	Yield Group	AVI Area (ha)	AVI Outside CI	Merch Vol (m^3/ha)		PSP[50]			
				AVI	PSP	n	SE	L95CL	U95CL
CON	1	6,050	N	16.4	14.4	11	9.5	-6.5	35.4
CON	2	27,406	N	5.5	5.3	42	4.3	-3.3	14.0
CON	3	66,059	N	54.9	52.5	84	8.0	36.7	68.4
CON	4	3,341	N	4.6	1.4	6	1.4	-2.0	4.7
CON	5	6,843	N	203.5	177.6	18	17.4	140.9	214.2
CON	7	13,603	N	6.9	5.8	14	5.4	-5.7	17.3
CON	8	24,838	N	244.2	225.5	49	15.5	194.4	256.7
CON	9	12,983	H	152.2	114.6	31	14.4	85.4	143.9
CON	10	13,411	N	193.5	192.7	18	34.2	120.9	264.5
CON	11	17,491	N	266.0	263.7	23	24.6	212.9	314.6
CON	12	11,487	N	116.5	107.5	11	19.0	65.7	149.3
CON	14	19,298	N	121.4	113.1	29	15.5	81.3	144.9
CON	15	20,200	N	171.0	201.1	24	25.2	149.2	253.1
CON	16	17,827	N	169.9	156.0	25	17.6	119.8	192.2
CON	17	38,743	N	110.4	104.2	47	14.1	75.8	132.6
DEC	1	6,050	N	187.1	175.1	11	42.8	80.8	269.3
DEC	2	27,406	N	244.6	239.7	42	19.8	199.8	279.6
DEC	3	66,059	N	166.2	167.2	84	13.4	140.5	193.9
DEC	4	3,341	N	157.3	125.1	6	56.4	-12.8	263.1
DEC	5	6,843	N	4.5	3.6	18	2.7	-2.1	9.4
DEC	7	13,603	N	173.3	175.8	14	35.1	100.5	251.1
DEC	8	24,838	N	16.8	14.3	49	3.9	6.4	22.2
DEC	9	12,983	N	108.7	100.1	31	20.8	57.8	142.5
DEC	10	13,411	N	15.6	14.4	18	7.7	-1.8	30.7
DEC	11	17,491	N	37.1	36.0	23	14.5	6.0	66.1
DEC	12	11,487	N	5.1	12.6	11	6.7	-2.1	27.4
DEC	14	19,298	N	14.9	18.8	29	6.9	4.7	33.0
DEC	15	20,200	N	28.9	36.1	24	16.3	2.4	69.8
DEC	16	17,827	N	33.0	31.4	25	9.5	11.9	50.9
DEC	17	38,743	N	106.5	110.2	47	15.2	79.6	140.7
TOT	1	6,050	N	203.4	189.5	11	44.2	92.3	286.7
TOT	2	27,406	N	250.2	245.0	42	19.0	206.6	283.4
TOT	3	66,059	N	221.1	219.8	84	14.2	191.6	248.0
TOT	4	3,341	N	161.9	126.5	6	55.8	-10.1	263.1
TOT	5	6,843	N	208.0	181.2	18	16.2	147.1	215.3
TOT	7	13,603	N	180.2	181.6	14	33.6	109.6	253.7
TOT	8	24,838	N	260.9	239.9	49	14.4	211.0	268.7
TOT	9	12,983	N	261.0	214.8	31	23.1	167.7	261.8
TOT	10	13,411	N	209.1	207.1	18	37.5	128.4	285.9
TOT	11	17,491	N	303.1	299.8	23	27.9	242.1	357.5
TOT	12	11,487	N	121.7	120.1	11	21.1	73.7	166.5
TOT	14	19,298	N	136.3	131.9	29	18.2	94.8	169.1
TOT	15	20,200	N	199.9	237.3	24	27.0	181.5	293.0
TOT	16	17,827	N	202.9	187.4	25	20.5	145.2	229.5
TOT	17	38,743	N	217.0	214.4	47	19.2	175.8	253.0

[50] The test of AVI volume occurring outside the PSP 95% confidence interval is reported as "N" - no difference between AVI and PSP, "H"- AVI higher than PSP, "L" – AVI lower than PSP. Highlighted rows correspond to the leading species of each yield group (eg., for the 'CON' species, yield groups 5 & 8-17 are leading coniferous, and for the 'DEC' species, yield groups 1,2,3,4,7 are leading deciduous).

Table 28. Comparing AVI Volume @1997 vs. TSP

Species Group	Yield Group	AVI Area (ha)	AVI Outside CI	Merch Vol (m^3/ha)		TSP			
				AVI	TSP	n	SE	L95CL	U95CL
CON	1	5,819	H	13.3	0.0	15	0.0	0.0	0.0
CON	2	26,525	N	4.7	7.4	39	3.7	-0.1	14.9
CON	3	62,758	N	45.7	59.4	140	7.4	44.9	73.9
CON	4	2,559	N	3.6	32.2	6	19.1	-14.4	78.8
CON	5	6,498	N	184.9	206.1	43	14.1	177.7	234.6
CON	7	13,262	N	5.7	3.6	45	2.8	-2.0	9.2
CON	8	23,410	L	210.1	266.1	51	19.7	226.7	305.6
CON	9	12,485	N	131.6	113.0	47	13.7	85.4	140.6
CON	10	11,060	L	166.4	226.7	25	29.2	166.6	286.9
CON	11	16,939	N	243.2	242.5	64	18.9	204.7	280.3
CON	12	6,553	N	112.4	153.4	4	35.0	56.3	250.5
CON	14	13,005	L	108.3	168.9	25	20.5	126.7	211.1
CON	15	17,810	N	165.3	201.1	67	19.1	163.0	239.2
CON	16	16,725	L	152.4	220.8	94	18.1	184.9	256.8
CON	17	35,044	L	97.2	137.5	113	12.4	113.0	162.1
DEC	1	5,819	N	171.8	188.9	15	37.3	109.4	268.4
DEC	2	26,525	N	213.7	242.1	39	22.4	196.9	287.4
DEC	3	62,758	L	152.9	193.1	140	13.2	167.1	219.2
DEC	4	2,559	N	134.5	119.5	6	74.5	-62.7	301.7
DEC	5	6,498	N	4.6	2.7	43	1.6	-0.5	5.9
DEC	7	13,262	N	160.2	218.7	45	30.9	156.5	280.8
DEC	8	23,410	H	15.4	7.3	51	2.8	1.6	12.9
DEC	9	12,485	N	96.0	118.8	47	19.0	80.6	157.1
DEC	10	11,060	N	14.9	22.1	25	11.1	-0.8	44.9
DEC	11	16,939	N	38.8	32.2	64	7.9	16.5	48.0
DEC	12	6,553	H	5.1	0.0	4	0.0	0.0	0.0
DEC	14	13,005	N	14.8	20.9	25	11.7	-3.1	45.0
DEC	15	17,810	N	31.1	23.8	67	5.3	13.2	34.3
DEC	16	16,725	L	33.3	52.8	94	8.6	35.8	69.9
DEC	17	35,044	N	103.2	114.8	113	10.7	93.7	136.0
TOT	1	5,819	N	185.1	188.9	15	37.3	109.4	268.4
TOT	2	26,525	N	218.5	249.5	39	21.3	206.5	292.6
TOT	3	62,758	L	198.5	252.5	140	14.9	223.1	281.9
TOT	4	2,559	N	138.1	151.7	6	70.2	-20.1	323.5
TOT	5	6,498	N	189.6	208.8	43	14.0	180.5	237.1
TOT	7	13,262	N	165.9	222.3	45	30.9	160.0	284.6
TOT	8	23,410	L	225.5	273.4	51	19.5	234.2	312.6
TOT	9	12,485	N	227.6	231.9	47	21.9	187.9	275.8
TOT	10	11,060	L	181.3	248.8	25	31.1	184.7	312.9
TOT	11	16,939	N	282.0	274.8	64	20.2	234.4	315.2
TOT	12	6,553	N	117.5	153.4	4	35.0	56.3	250.5
TOT	14	13,005	L	123.1	189.8	25	23.7	140.9	238.7
TOT	15	17,810	N	196.4	224.8	67	19.3	186.4	263.3
TOT	16	16,725	L	185.7	273.7	94	19.7	234.6	312.7
TOT	17	35,044	L	200.4	252.4	113	16.5	219.7	285.0

5.0 RESULTS & DISCUSSION - MANAGED STANDS

5.1 AREA SUMMARIES FOR THE REGENERATING LANDBASE

As per the Planning Standard, areas harvested prior to March 1, 1991 were assigned to a yield stratum based on the current AVI (R1). Areas harvested after March 1, 1991, were assigned to regeneration stratum based on the information contained in ARIS and in the most recent regeneration survey (R2).

Table 29. R1: Pre-1991 Cutblock Areas.

Natural Strata	Gross (ha)	Net (ha)	Net (%)
*NAT-0**	*106*	*0*	*0%*
NAT-1	48	45	*0%*
NAT-2	135	128	*0%*
NAT-3	8,080	7,691	*22%*
NAT-4	50	49	*0%*
NAT-5	999	949	*3%*
NAT-6	5,707	5,446	*16%*
NAT-7	61	56	*0%*
NAT-8	3,086	2,925	*8%*
NAT-9	4,667	4,379	*13%*
NAT-10	1,258	1,176	*3%*
NAT-11	2,647	2,458	*7%*
NAT-12	10	9	*0%*
NAT-13	12	0	*0%*
NAT-14	101	96	*0%*
NAT-15	1,461	1,386	*4%*
NAT-16	1,646	1,534	*4%*
NAT-17	6,554	6,187	*18%*
Total	36,628	34,515	100%

* non-forest

Table 30. R2: Post-1991 Cutblock Areas.

Regeneration Strata	Gross (ha)	Net (ha)	Net (%)
C-Pl	18,761	18,559	36%
C-Sb	1,423	1,414	3%
C-Sw	17,985	17,774	34%
CD-PlHw	1,247	1,212	2%
CD-SwHw	7,331	7,233	14%
DC-HwSx	1,533	1,526	3%
D-Hw	4,154	4,141	8%
*NSR**	*116*	*-*	*0%*
Total	52,549	51,860	100%
Number of Blocks			2,590

* based on Performance Survey result with <=50% stocking; removed from the productive landbase as per ARIS records validation procedures

The area summary by yield stratum and management unit for pre-1991 cutblocks is presented in Table 29 and for post-1991 cutblocks in Table 30.

5.2 MANAGED STAND YIELD TABLES

Canfor developed 4 types of yield curves for the regenerating forested landbase (Figure 1). The results for each yield curve type are presented in the following sub-sections.

5.2.1 Pre-1991 Managed Stands Yield Curves (R1)

Pre-1991 managed stands (R1) new yield curves were developed for just those yield groups occurring in the C and CD broad cover types with PL and/or SW as guide species. All other yield groups were assigned with natural stand yield curves. Managed stand site index estimates from the Regenerated Stand Productivity (RSP) study were used as per the process described in Section 3.4.1.

The area of interest was 21,321 hectares in all cutblocks harvested prior to March 1, 1991 where the C and CD yield group guide species was PL (yield groups 8, 9, 10, 11 and 14) or SW (yield groups 11, 15, 16 and 17).

The area distribution by natural subregion (NSR) and ecosite is presented in Table 31. Ninety percent of the area of interest is in the LF-d/e and UF-d/e NSR-ecosite combinations. Highlighted cells are where RSP study based site index estimates exist for at least one species (99% of total area).

Table 31. Area Distribution by Natural Subregion and Ecosite.

Ecosite	Area by Natural Subregion (ha)					Total	%
	CM	DM	LF	SA	UF		
a			<1		<1	<1	*0%*
b			26			26	*0%*
c	<1	<1	1		1	2	*0%*
d	1,072	317	51	5	13	1,459	*7%*
e	254	9	13,422		2,517	16,202	*76%*
f	13	4	2,053		1,115	3,185	*15%*
g	<1	<1	1	3	3	6	*0%*
h	<1	<1	17		7	24	*0%*
i	<1	<1	135		1	135	*1%*
j	2	3	26		69	100	*0%*
k-z	7	1	139	<1	34	180	*1%*
Total	1,348	334	15,872	8	3,759	21,321	*100%*
%	*6%*	*2%*	*74%*	*0%*	*18%*	*100%*	

Managed site index values were assigned to each NSR-ecosite combination in the area of interest as presented in Table 32 based on the following steps:

1. Results of the adjusted site index values from the RSP study (highlighted cells). 98% of the total area has PL RSP-based site index, and 99% of the total area has SW RSP-based site index.

2. The minimum RSP study site index within each NSR was assigned as a default to those non-sampled ecosites (non-highlighted cells).

Table 32. Default Site Index Values* by Natural Subregion and Ecosite.

Ecosite	PL SI by NSR					SW SI by NSR				
	CM	DM	LF	SA	UF	CM	DM	LF	SA	UF
a			13.9		13.3			13.9		12.4
b			**17.2**					13.9		
c	**19.7**	**19.7**	**18.3**		**16.0**	**12.3**	**12.3**	**14.6**		**13.4**
d	**20.3**	**20.3**	**17.3**	13.3	**15.4**	**13.9**	**13.9**	**13.9**	12.3	12.4
e	17.0	17.0	**18.8**		**17.5**	**16.0**	**16.0**	**16.8**		**16.2**
f	17.0	17.0	**18.5**		**17.6**	**15.7**	**15.7**	**16.6**		**16.6**
g	17.0	17.0	13.9	13.3	13.3	12.3	12.3	13.9	12.3	12.4
h	17.0	17.0	**16.0**		**14.6**	**15.9**	**15.9**	13.9		12.4
i	17.0	17.0	**16.9**		**13.3**	12.3	12.3	**14.0**		**12.4**
j	17.0	17.0	**13.9**		**14.6**	12.3	12.3	**14.6**		**15.2**
k			13.9		13.3			13.9		12.4
l	17.0		13.9		13.3	12.3		13.9		12.4
m	17.0		13.9			12.3		13.9		
n			13.9					13.9		
w	17.0	17.0	13.9		13.3	12.3	12.3	13.9		12.4
y			13.9		13.3			13.9		12.4
z	17.0	17.0	13.9		13.3	12.3	12.3	13.9		12.4

* Site index values are calculated @ 50 years total age.

Natural stand site index values (NSI) were taken from all available PSP last measurement data in the target yield groups for pine and white spruce.

Managed stand site index values (MSI) were computed for each yield group and NSR combination, weighted by the resultant polygon areas.

Site index adjustment ratios were calculated as a ratio between MSI/NSI for pine in yield groups 8, 9, 10, 11 and 14 and for white spruce in yield groups 11, 15, 16 and 17. The results are shown in Table 33. Weighted average site index increased by 15% for pine and 20% for white spruce across the target yield groups.

Table 33. Site Index Ratios by Natural Subregion and Ecosite.

NSR	Yield Group	Area (ha)	PL				SW			
			# PSP	NSI (m)	MSI (m)	SI Ratio	# PSP	NSI (m)	MSI (m)	SI Ratio
CM	8	1.3	5	15.3	20.3	1.33				
CM	9	110.8	5	14.8	19.9	1.34				
CM	11	3.0	1	16.8	20.0	1.19	1	19.5	14.0	0.72
CM	14	29.8	3	12.9	19.6	1.52				
CM	15	197.8					10	15.0	14.3	0.95
CM	16	105.4					2	11.4	14.5	1.28
CM	17	899.7					26	14.3	14.3	1.00
DM	9	24.1	8	17.9	20.3	1.13				
DM	11	22.9	0	-	20.3	1.00	1	10.6	13.9	1.32
DM	15	92.9					3	15.8	13.9	0.88
DM	16	22.6					1	11.2	13.9	1.24
DM	17	171.3					5	14.3	14.0	0.98
LF	8	1,508.3	12	15.8	18.7	1.18				
LF	9	3,815.6	15	16.1	18.7	1.16				
LF	10	722.9	7	13.0	18.7	1.44				
LF	11	1,884.6	3	17.8	18.7	1.05	4	14.1	16.7	1.18
LF	14	69.8	7	12.4	18.6	1.50				
LF	15	1,110.9					6	16.6	16.6	1.00
LF	16	1,369.4					18	11.7	16.7	1.43
LF	17	5,390.2					15	13.6	16.7	1.23
SA	8	7.6	3	14.1	13.3	0.94				
SA	9	0.5			13.3	1.00				
UF	8	1,513.0	27	14.8	17.5	1.18				
UF	9	711.8	1	18.2	17.3	0.95				
UF	10	534.8	10	13.2	17.3	1.31				
UF	11	719.8	14	16.7	17.5	1.05	15	11.6	16.3	1.41
UF	14	1.5	7	8.3	17.1	2.07				
UF	15	46.7					6	11.4	16.2	1.43
UF	16	148.7					2	8.6	16.2	1.88
UF	17	83.0					3	13.1	16.3	1.24
Total		**21,320.9**		**15.9**	**18.3**	**1.15**		**13.6**	**16.4**	**1.20**

Site index (based on 50 years total age) at each Rotation 1 PSP measurement was then adjusted by multiplying each PSP measurement based site index by the MSI/NSI adjustment ratio. SI was adjusted only for those yield groups where PL or SW was the guide species. The NSYT process was then re-run on the adjusted Rotation 1 PSPs to create new yield curves for the pre-1991 managed stands (R1).

The resulting R1 yield curves for the affected yield groups are presented in Figure 44 to Figure 46. R0 represents the natural stand yield curves for comparison purposes. More details on the adjustment process and results can be found in Appendix L.

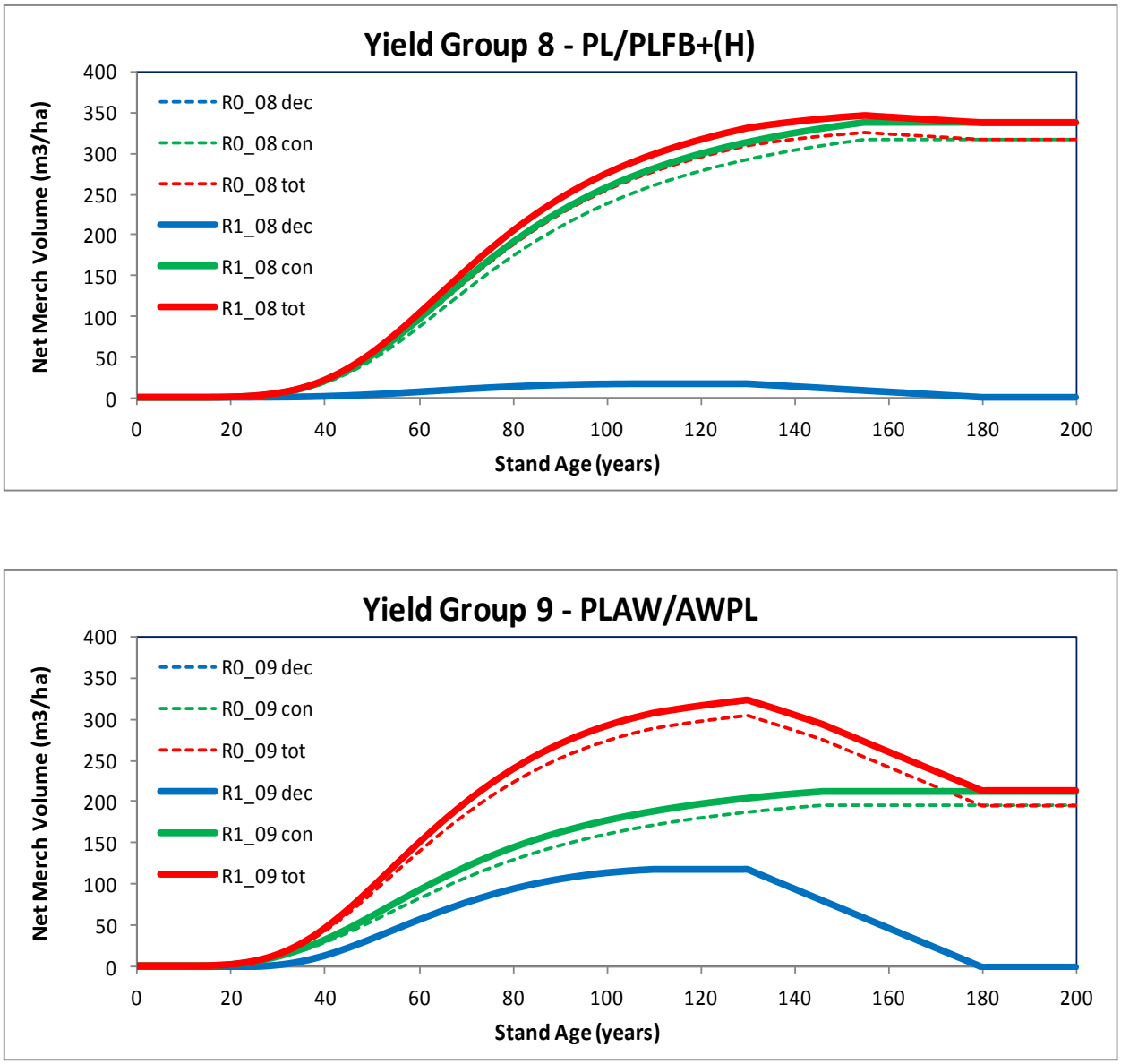


Figure 44. R1 Yield Curves for Yield Groups 8 and 9.

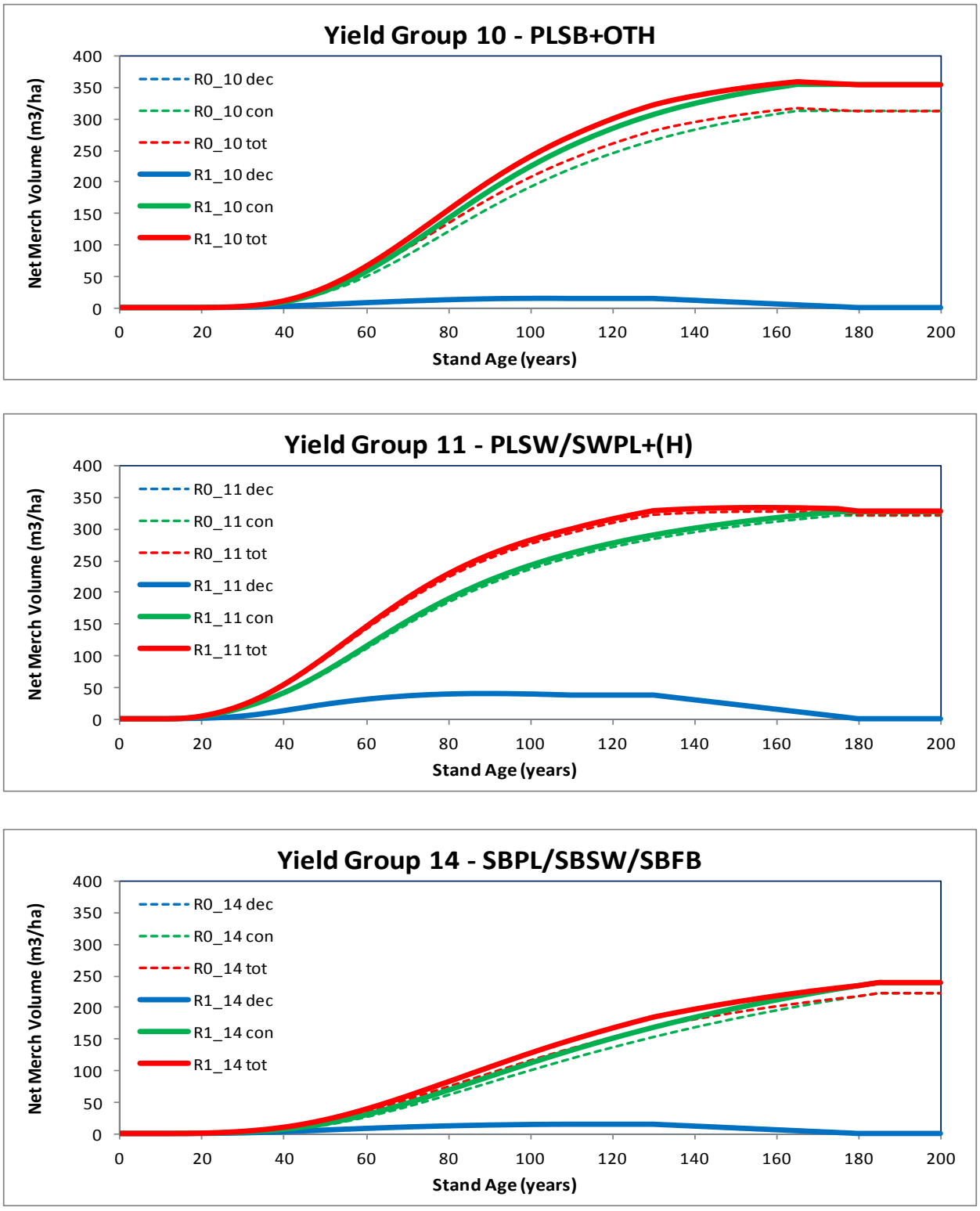
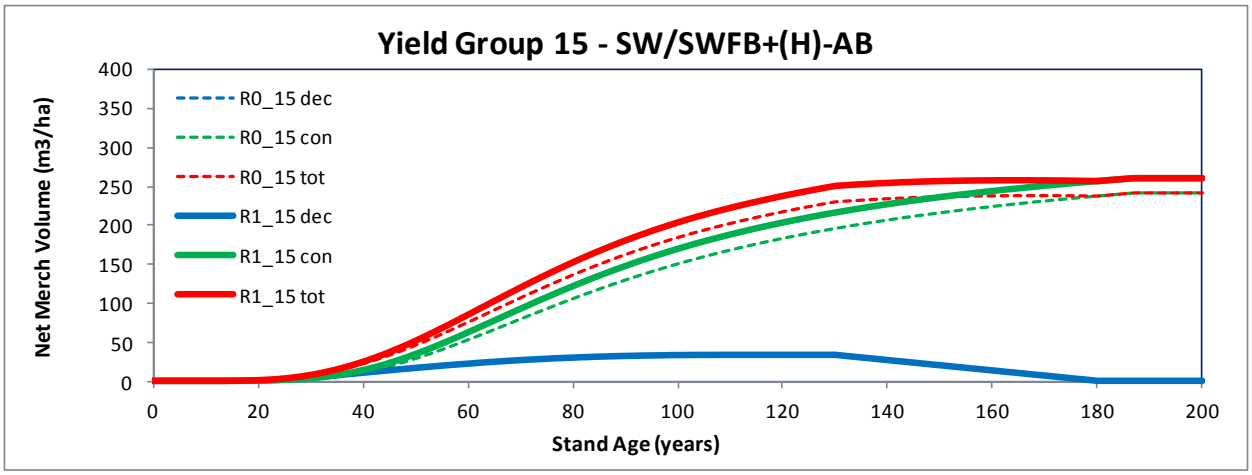
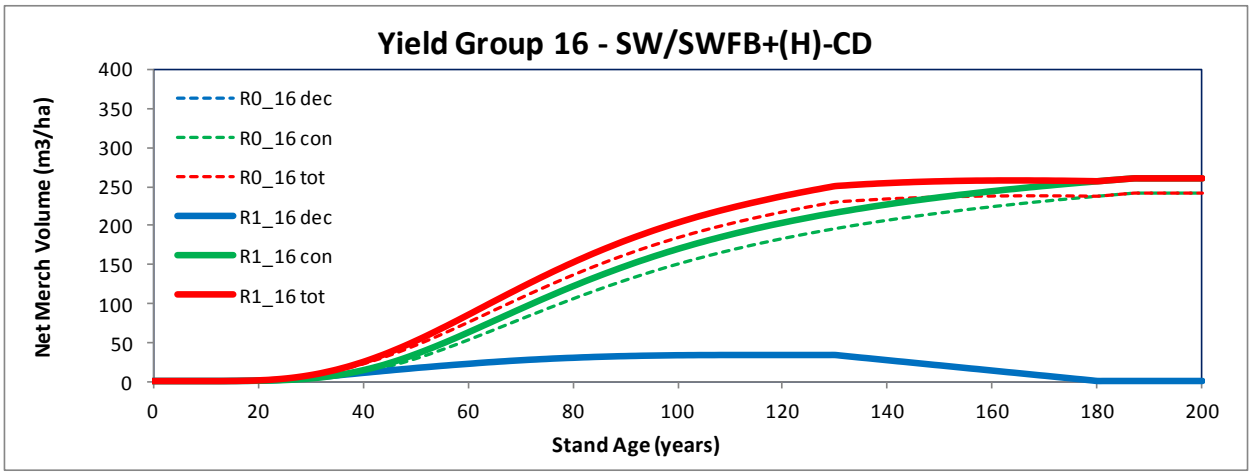


Figure 45. R1 Yield Curves for Yield Groups 10, 11 and 14.





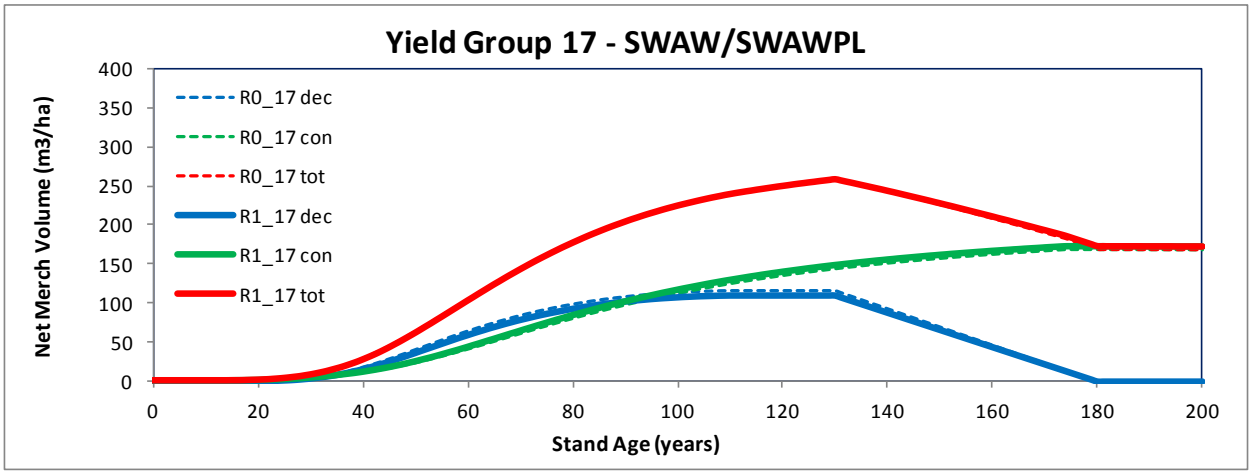


Figure 46. R1 Yield Curves for Yield Groups 15, 16 and 17.

5.2.2 Post-1991 Managed Stands RSA Based Yield Curves (R2)

Regenerated stands RSA-based yield curves (R2) were developed for all stands harvested after March 1, 1991 and before May 1, 2010. ARIS designations were used to derive the broad cover type following standard protocols. Planting records were used to define species composition for openings with no survey information.

Canfor proposed the use of the RSA surveys of 2009-2010 to develop yield curves for all existing cutblocks post-1991. We compiled the RSA performance surveys for all relevant stand attributes for information purposes as shown in Table 34 to Table 38.

Table 34. RSA Performance Survey - Density.

DENSITY (STEMS/HA) @ SURVEY YEAR						
Stratum	Combined					
	Pl	Sw	Sb	Dec	Con	Area (ha)
Pl	3,047	2,221	586	423	5,853	2865.7
Sw/Sb	99	2,006	76	827	2,181	6273.6
SwHw	411	1,681	389	2,976	2,481	493.6
HwSx	172	2,102	356	5,837	2,630	179.0
PlHw	2,642	1,399	142	3,065	4,183	44.2
* weighted as per RSA protocols						9856.1

Table 35. RSA Performance Survey - Stocking.

STOCKING (%) @ SURVEY YEAR						
Stratum	Combined					
	Pl	Sw	Sb	Dec	Con	Area (ha)
Pl	61	55	23	14		2865.7
Sw/Sb	4	86	5	24		6273.6
SwHw	11	73	17	51		493.6
HwSx	5	85	12	77		179.0
PlHw	51	44	7	52		44.2
* weighted as per RSA protocols						9856.1

Table 36. RSA Performance Survey - Top Height.

TOP HEIGHT (M) @ SURVEY YEAR						
Stratum	Combined					
	Pl	Sw	Sb	Dec	Con	Area (ha)
Pl	4.2	2.8	1.5	3.5		2865.7
Sw/Sb	2.8	3.3	1.3	3.6		6273.6
SwHw	3.2	3.2	2.0	3.9		493.6
HwSx	3.7	3.5	1.4	6.1		179.0
PlHw	5.0	3.0	1.6	4.0		44.2
* straight average due to missing values						9856.1

Table 37. RSA Performance Survey - Site Index @ BH.

SITE INDEX AT BH (M) @ SURVEY YEAR						
Stratum	Combined					
	Pl	Sw	Sb	Dec	Con	Area (ha)
Pl	20.0	18.2	13.1	14.6		2865.7
Sw/Sb	17.6	19.5	13.1	15.1		6273.6
SwHw	16.6	17.9	14.3	14.6		493.6
HwSx	20.5	20.3	13.3	18.6		179.0
PlHw	22.2	19.0	13.7	15.4		44.2
* straight average due to missing values						9856.1

Table 38. RSA Performance Survey - Regen Delay.

REGENERATION DELAY (YRS) IMPLIED BY THE SITE TREES						
Stratum	Combined					
	Pl	Sw	Sb	Dec	Con	Area (ha)
Pl	1.7	2.1	3.0	3.7		2865.7
Sw/Sb	2.6	1.6	3.6	3.6		6273.6
SwHw	2.2	1.4	2.6	3.2		493.6
HwSx	2.0	1.3	2.6	1.0		179.0
PlHw	1.2	1.9	2.5	3.2		44.2
* straight average due to missing values						9856.1

Actual R2 yield curves were constructed based on averaging the GYPSY outputs for each SU within the strata using the proper weighting factors (selection probabilities and sampled areas). The population areas were used to combine the average yield curves by strata across RSA survey years.

The resultant R2 yield curves for each regeneration stratum are shown in Figure 47 to Figure 53.

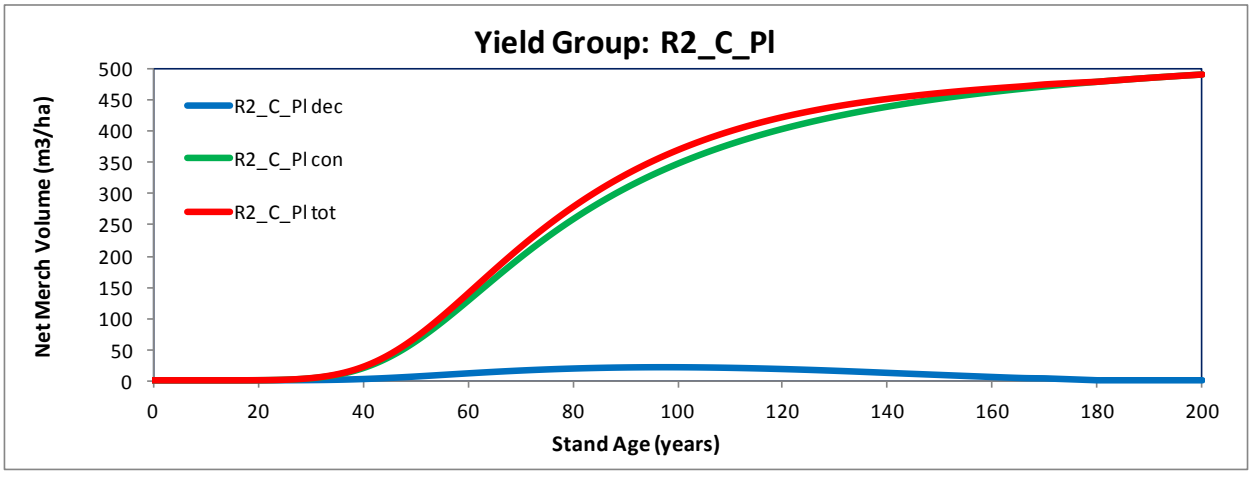


Figure 47. R2_C_Pl Yield Curve.

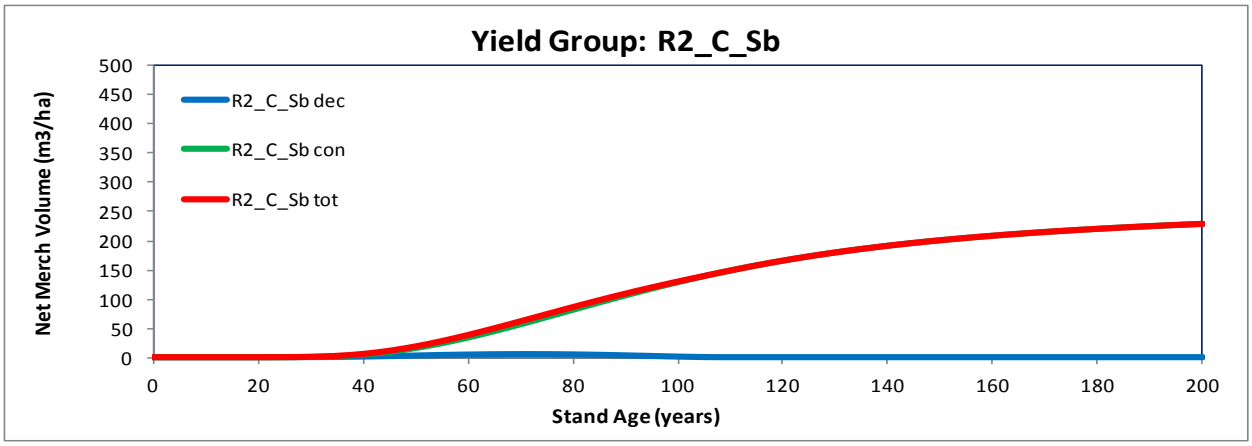


Figure 48. R2_C_Sb Yield Curve.

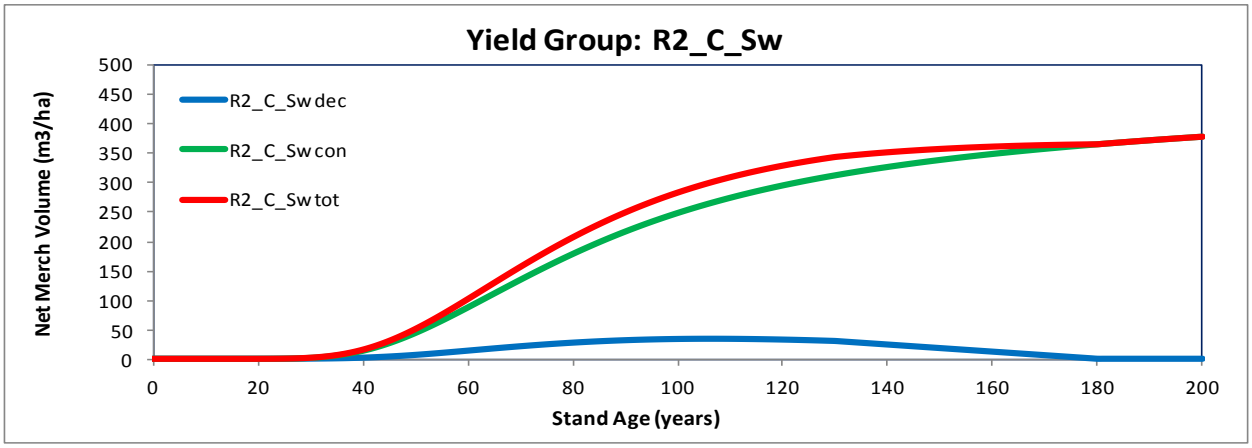


Figure 49. R2_C_Sw Yield Curve.

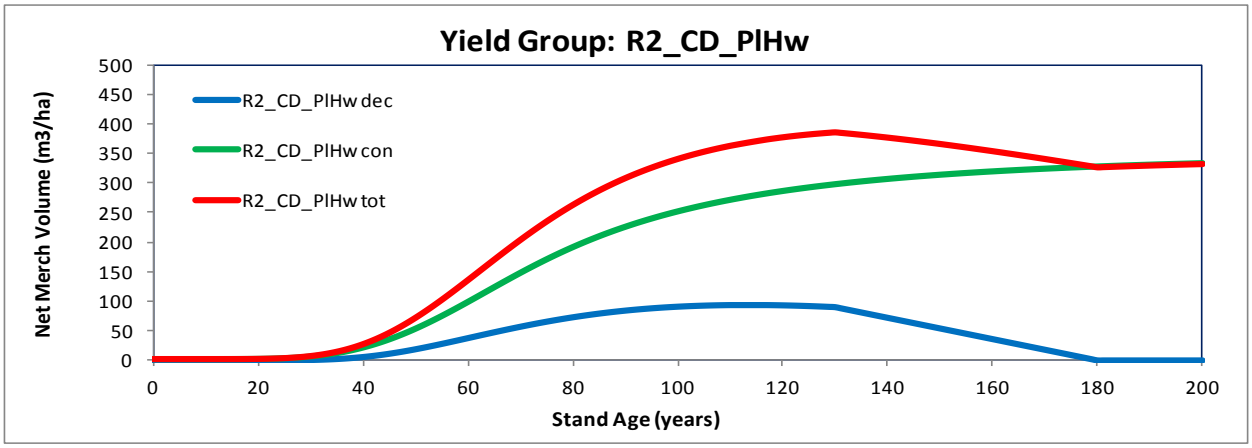


Figure 50. R2_CD_PlHw Yield Curve.

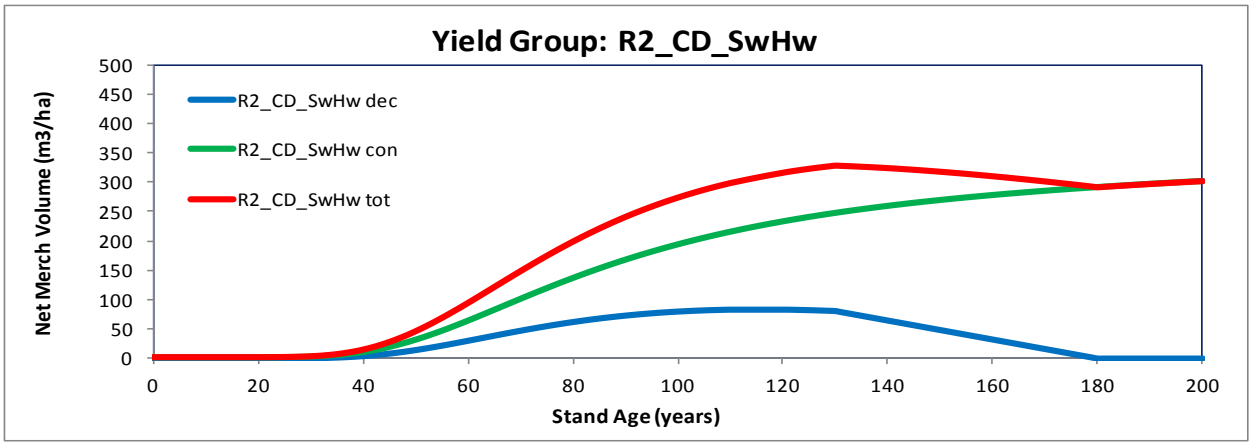


Figure 51. R2_CD_SwHw Yield Curve.

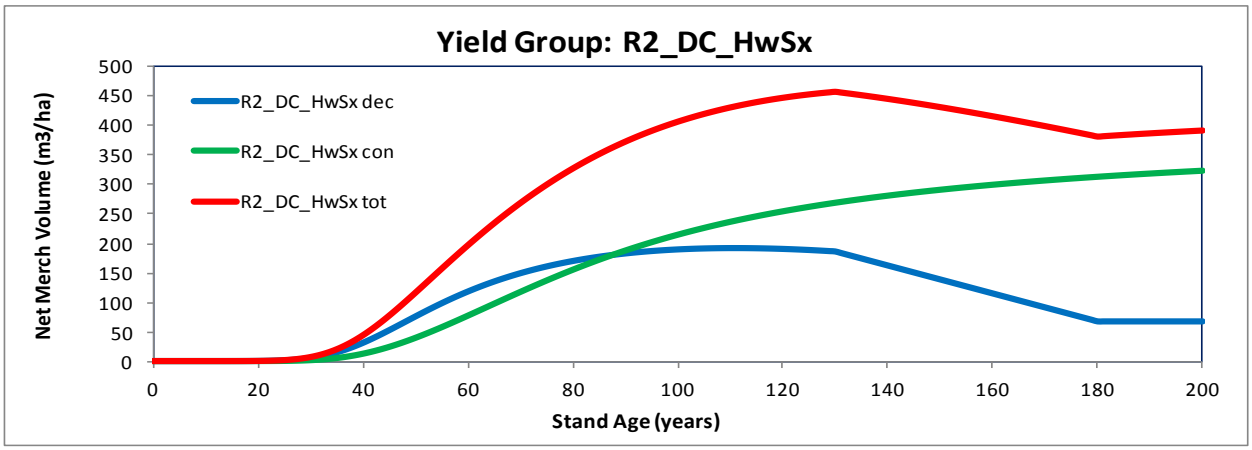


Figure 52. R2_DC_HwSx Yield Curve.

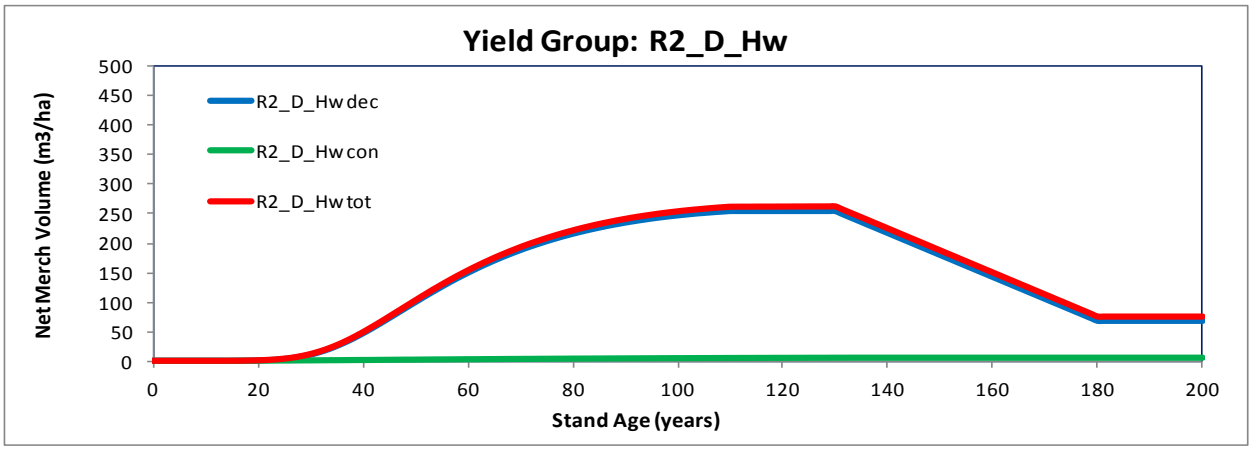


Figure 53. R2_D_Hw Yield Curve.

Openings with total stocking greater than 50% but less than 80% were assigned to a yield assumption scaled proportionately to the total reported stocking for each individual block as per ARIS validation protocols. The list of affected blocks is presented in Appendix M.

5.2.3 Future Managed Stands Crop Plan Based Yield Curves (R3-B)

Regenerated stands crop plan based basic yield curves (R3-B) were developed for all future cutblocks harvested after May 1, 2010. Canfor proposed the use of crop plans to construct R3 basic yield curves using the available RSA survey information, available plot and tree data and significant input from silviculture practitioners of the Company.

Although the RSA performance surveys were considered only as general guidelines and supplemental information, careful analysis was undertaken to ensure that the underlying relationships amongst individual variables is considered. This is important as we need to ensure that the resulting yield projections (including MAIs) closely resemble those that would result from averaging the "output" of the individual sampling units.

For example, the underlying stocking-density relationships are affected by the spatial distribution of seedlings. Planted seedlings in squared uniform spacing may demonstrate higher stocking (as measured by 10 m^2 plots) at the same density when compared to natural ingress/suckering with more clumped distribution. This can be seen in Figure 54 for the HwSx stratum with the planted spruce and the natural regeneration of aspen[51].

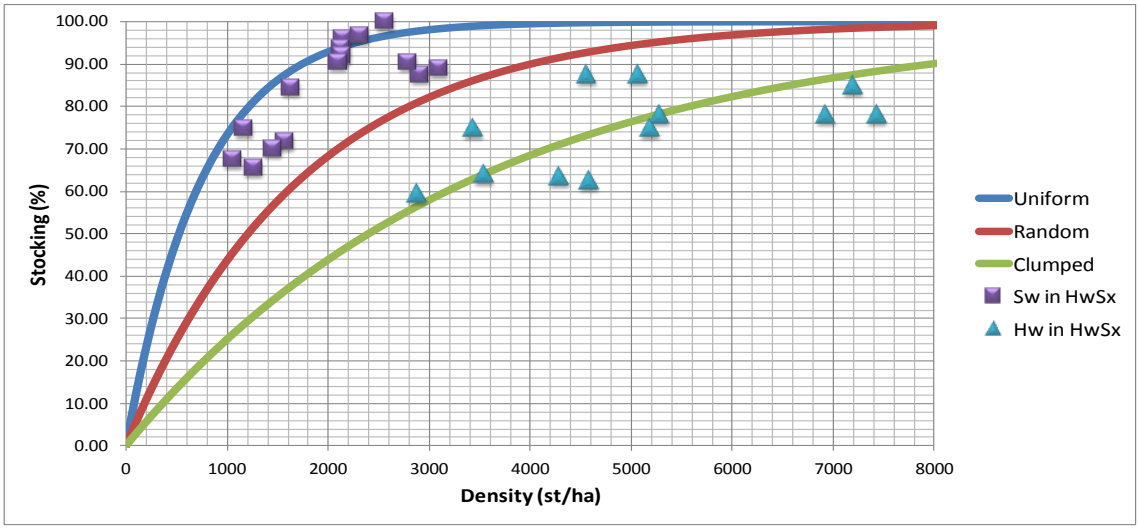


Figure 54. Observed Stocking-Density for White Spruce and Aspen in HwSx.

[51] Stocking-density general relationships are for illustration purposes only based on: Zhili Feng, Kenneth J Stadt, and Victor J Lieffers, 2006. Linking juvenile white spruce density, dispersion, stocking, and mortality to future yield. Canadian Journal of Forest Research, 2006, 36:(12) 3173-3182.

As stocking is a major component of spatial GYPSY, it is very important to understand the above trends and adjust stocking based on expected ingress patterns and do not just rely on expected densities alone. If expected densities at survey age rely on significant amount of ingress, it may require adjustment of the expected stocking percents which, in turn will result in adjusted yield projections in spatial GYPSY.

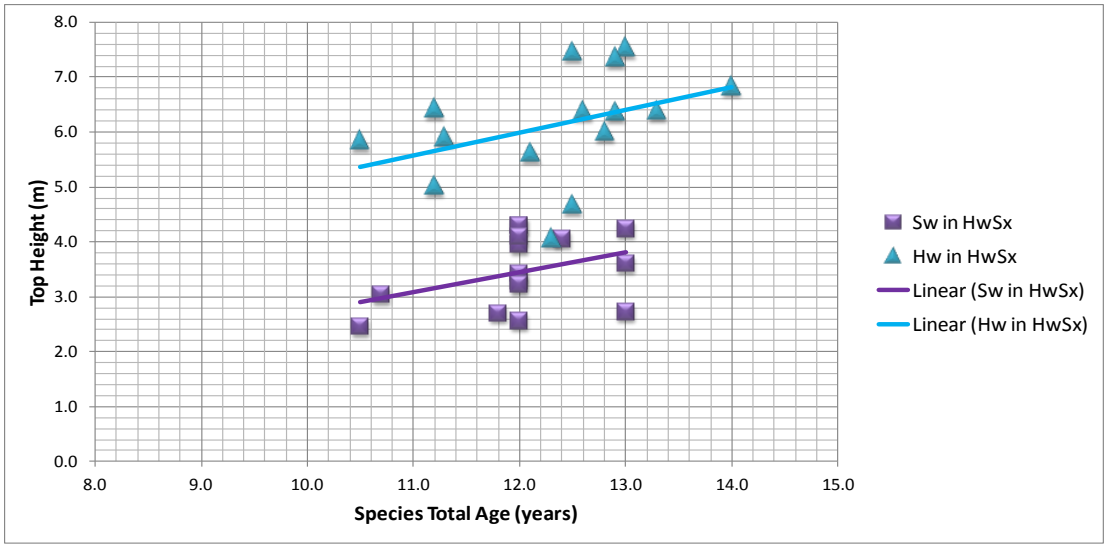


Figure 55. Observed Top Height for White Spruce and Aspen in HwSx.

The general trend for top height for the major species based on species total age is shown in Figure 55. This is also relevant, especially with regards to the proportion of site trees that may be selected from some of the natural ingress. Thus, the selection of species total age at survey age will provide an implied regeneration delay that plays a significant role in the determination of site index, a main driver of any growth and yield model.

Canfor developed R3 basic yield curves based on crop planning for all but the deciduous (D-Hw) regeneration strata[52]. This process involved the development of expected average conditions of the regeneration stratum (GYPSY inputs) at the last legislated survey (regeneration performance), the silviculture strategy that will be undertaken to achieve those stand conditions and the basic assumptions that were made in the development of these targets.

[52] Due to the lack of sufficient data, the pure deciduous (D-Hw) regeneration stratum yield curves will be based on yield curves developed for the pure deciduous natural stands (yield groups 1, 2, 4 and 7). Confirmations on this approach were received from Dave Beck (Ainsworth) on January 27, 2012 and from Allan Bell (Tolko) on February 2, 2012 via email to Melonie Zaichkowsky (Canfor).

The GYPSY inputs and associated silviculture strategy and assumptions for the pure pine basic yield curve (R3_C_Pl_B) are described below. The information for all other R3-B yield curve is presented in Appendix N.

Yield Curve: R3_C_Pl_B (Pure Pl Basic Yield Curve for Future Managed Stands)

Silviculture Strategy

- Site preparation on 15% of the difficult C sites (65% of the pure conifer landbase).
- Plant on average 1000 sph (800 sph Pl and 200 sph Sw).
- Mixed bag planting (more Pl/Sw planned).
- Site specific details: 750 sph and 309 stock (easy sites - 6%) , 950 sph and 309 stock (moderate sites - 29%) and 1150 sph and 411 stock(difficult sites - 65%).
- 2% fill planting (1000 sph) with moderate stock (411 or 412 on difficult sites).
- Chemical stand tend 70% of harvested areas annually.
- 100% establishment and performance surveys done at year 7 and 13, respectively.

Assumptions

- About 60% of area harvested is C-Pl on a yearly basis.
- Assumed 300 sph ingress for spruce.
- Assumed 800 sph ingress for pine (due to less site preparation).
- The RSA performance surveys provide insight into the underlying relationships amongst silviculture attributes and the survey results can be used as guide for future performance.

Additional Notes (changes from RSA compiled results)

- Pine top height was changed from 4.2 m to 3.7 m and total age from 12.3 years to 13 years due to:
    - decreased ingress expected (therefore age increased as more planted trees will become the crop trees);
    - less site preparation being used in general (less ingress);
    - move to higher elevation areas and combined with decrease site preparation (expected reduced growth – decreased top height).

- Pine density was reduced from 3000 sph to 1600 sph:

- less planting being done combined with less ingress expected (due to reasons above) results in lower expected density. Part of Canfor's new silviculture strategy is to provide cost effective treatments while still meeting growth targets. If the MAIs produce the desired AAC at lower densities, this saves Canfor money. Planting is the most expensive part of our Reforestation Program.

- Other species changes from RSA survey results:

  - AW inputs did not change except for rounding down of density.
  - SB density (and associated percent stocking) changed from RSA density of 586 to 100. Black spruce fringes are not harvested now as frequently as they were historically (more emphasis on cost reduction).
  - SW – rounding up of total age (11.9 to 12 years) and reducing top height (2.8 m to 2.5 m).
  - SW – density was reduced from 2200 to 500 for same reasons as pine above (less ingress).

The resultant R3 crop plan based basic yield curves for each regeneration stratum are shown in Figure 56 to Figure 65.

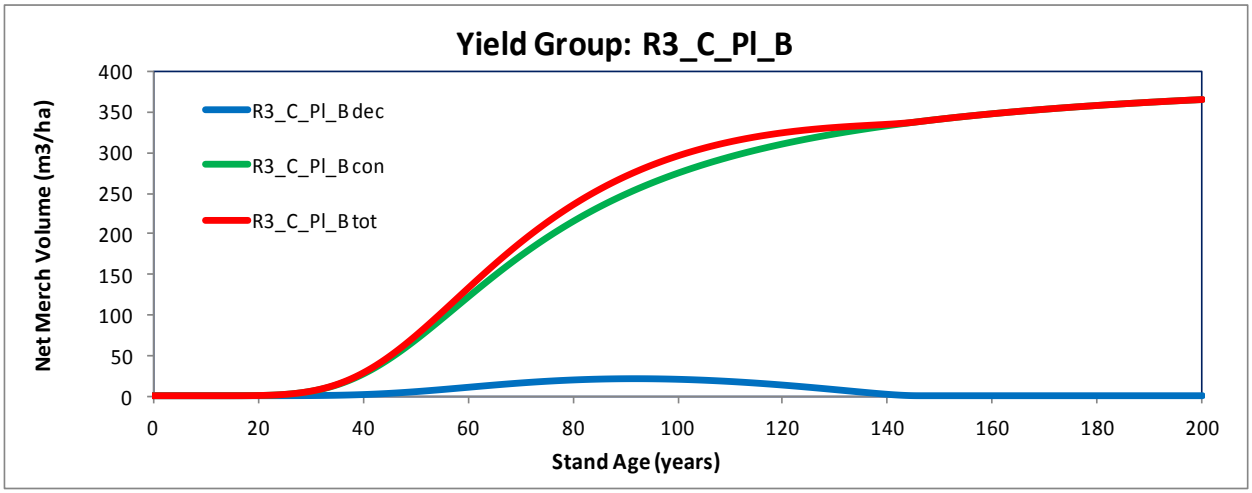


Figure 56. R3_C_Pl_B Basic Yield Curve.

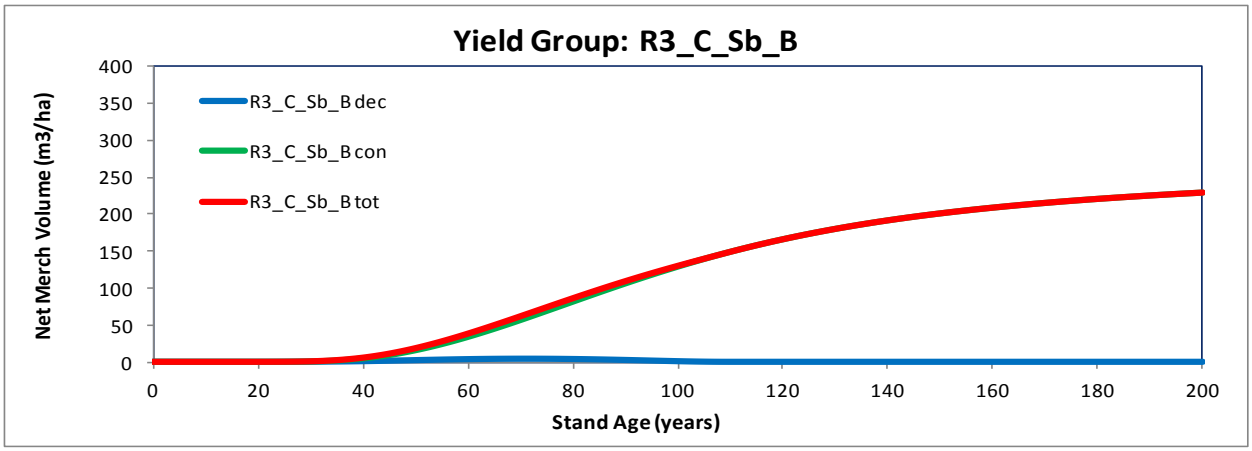


Figure 57. R3_C_Sb_B Basic Yield Curve.

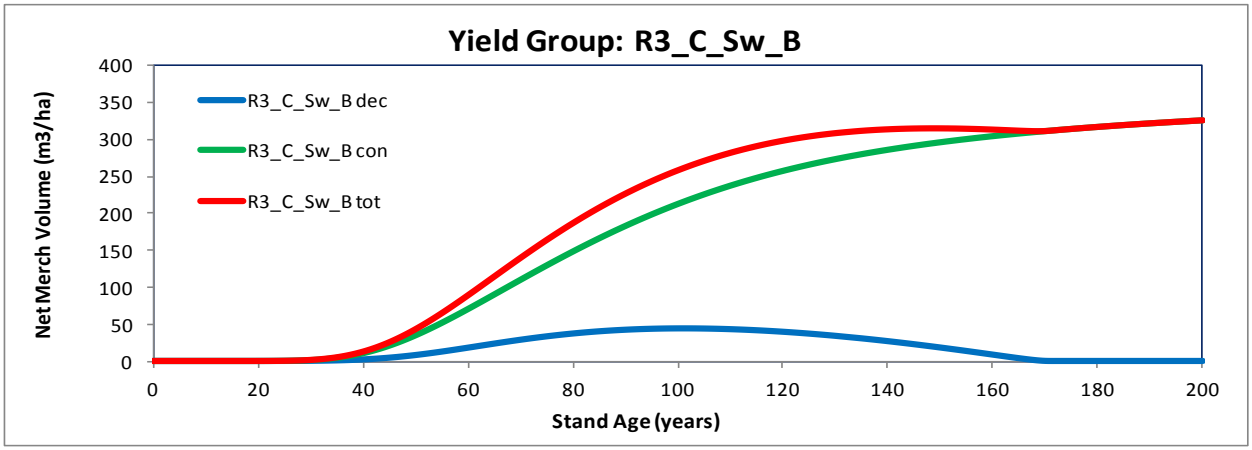


Figure 58. R3_C_Sw_B Basic Yield Curve.

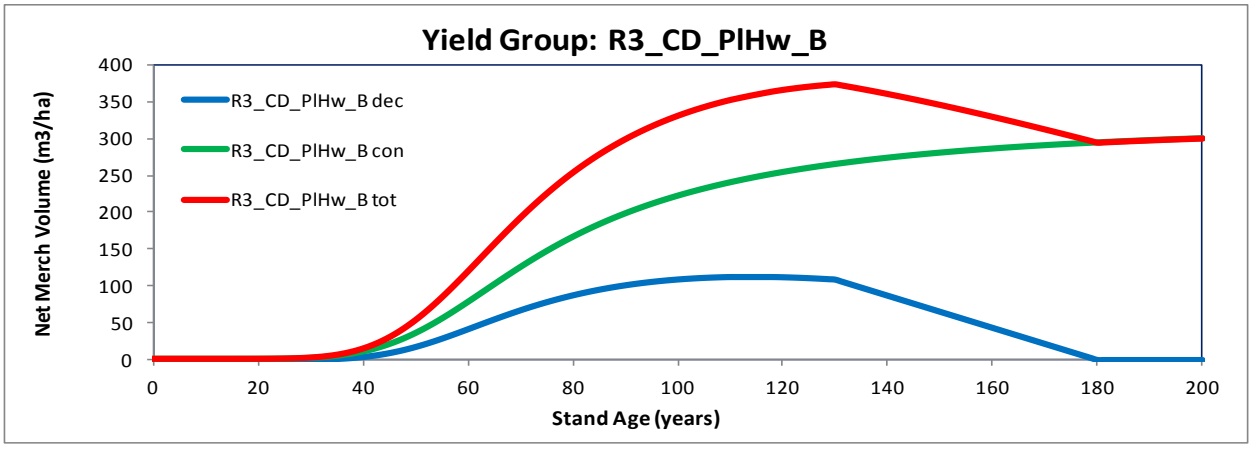


Figure 59. R3_CD_PlHw_B Basic Yield Curve.

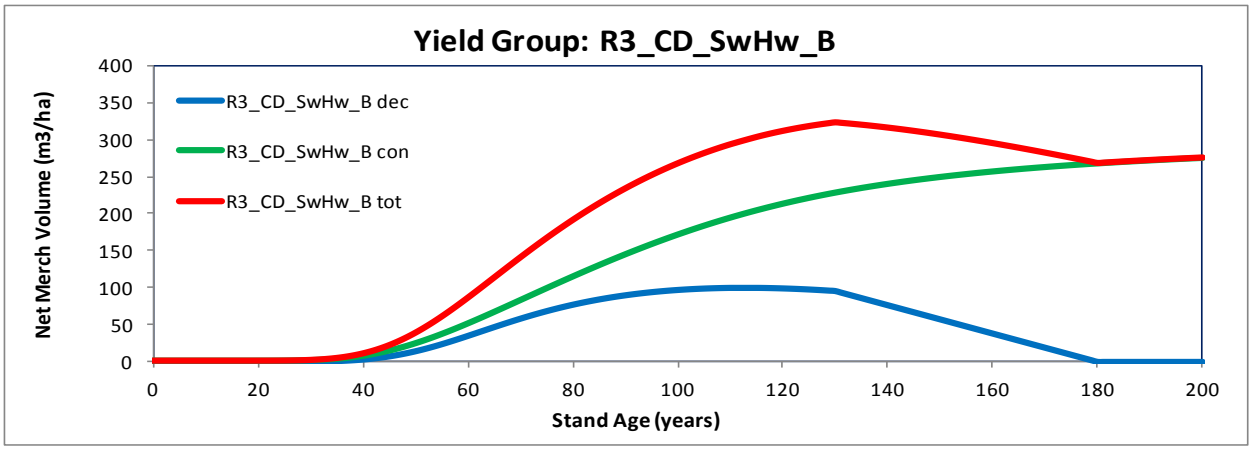


Figure 60. R3_CD_SwHw_B Basic Yield Curve.

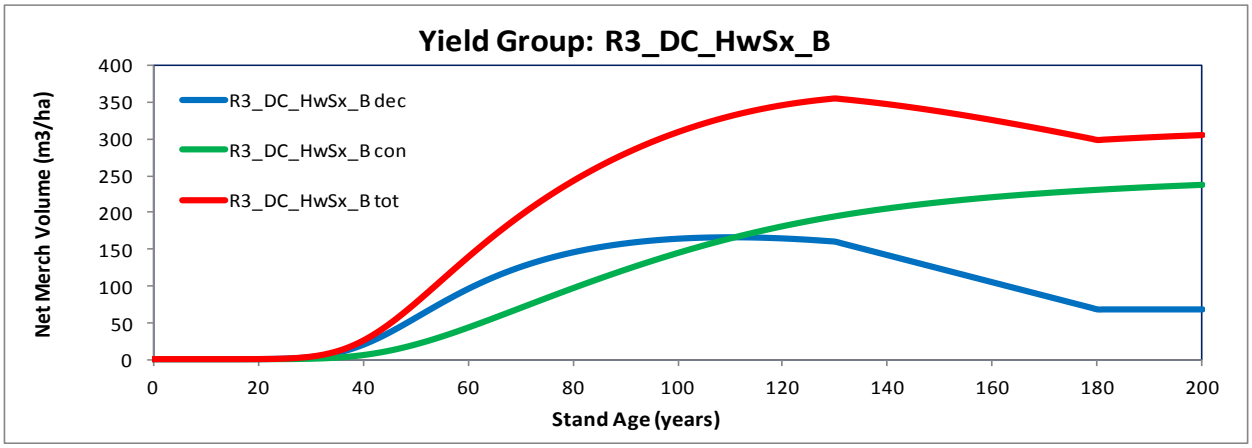


Figure 61. R3_DC_HwSx_B Basic Yield Curve.

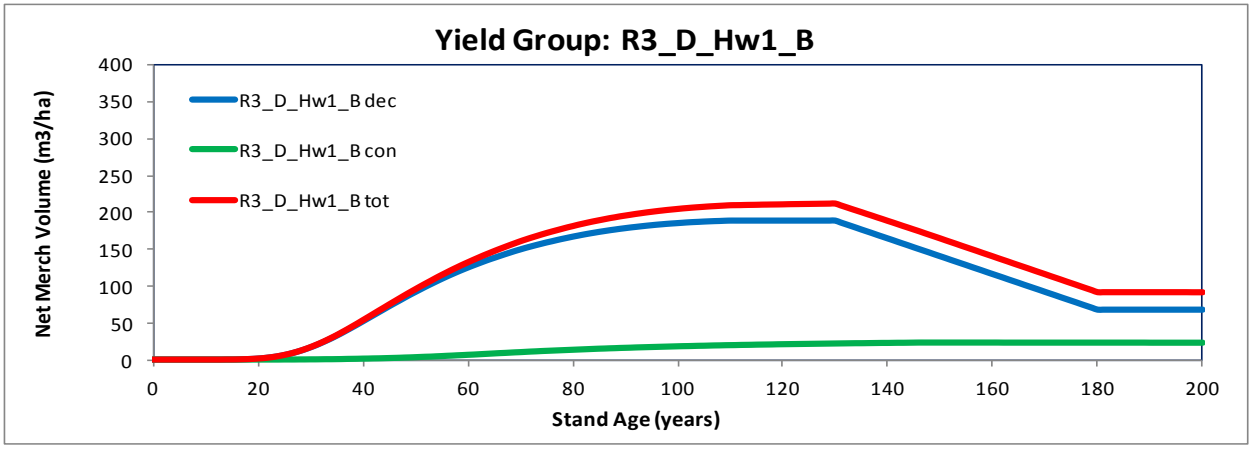


Figure 62. R3_D_Hw1_B Basic Yield Curve.

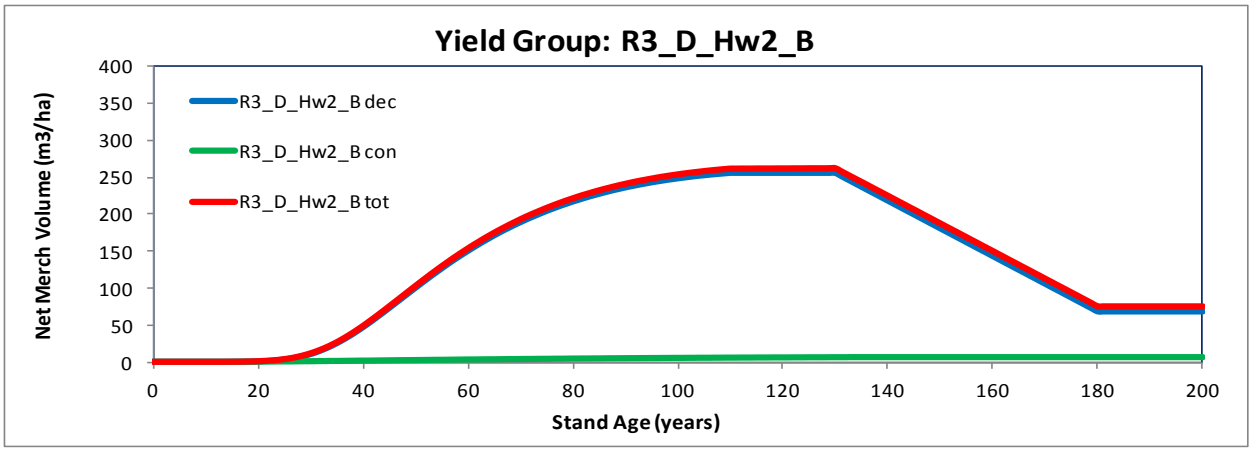


Figure 63. R3_D_Hw2_B Basic Yield Curve.

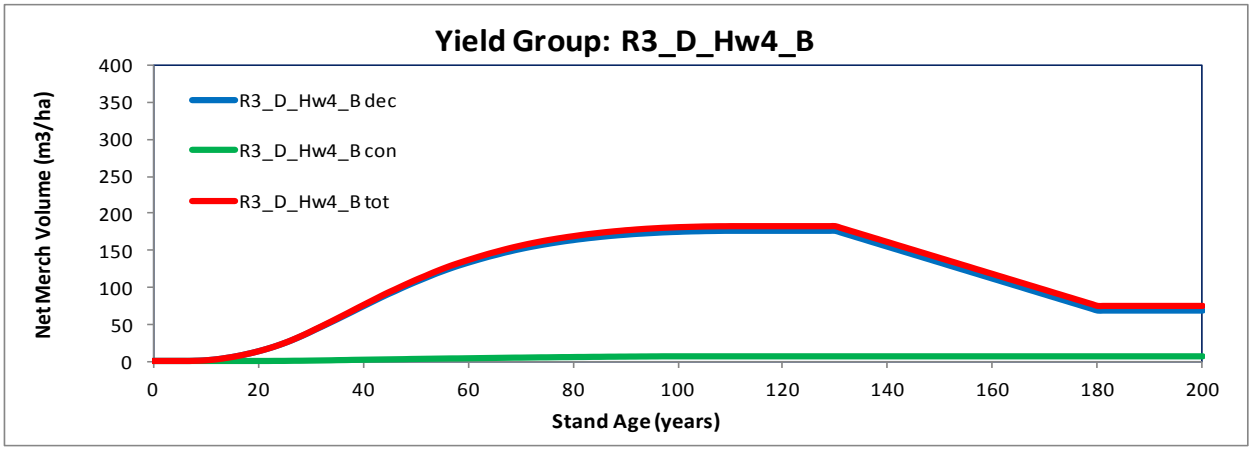


Figure 64. R3_D_Hw4_B Basic Yield Curve.

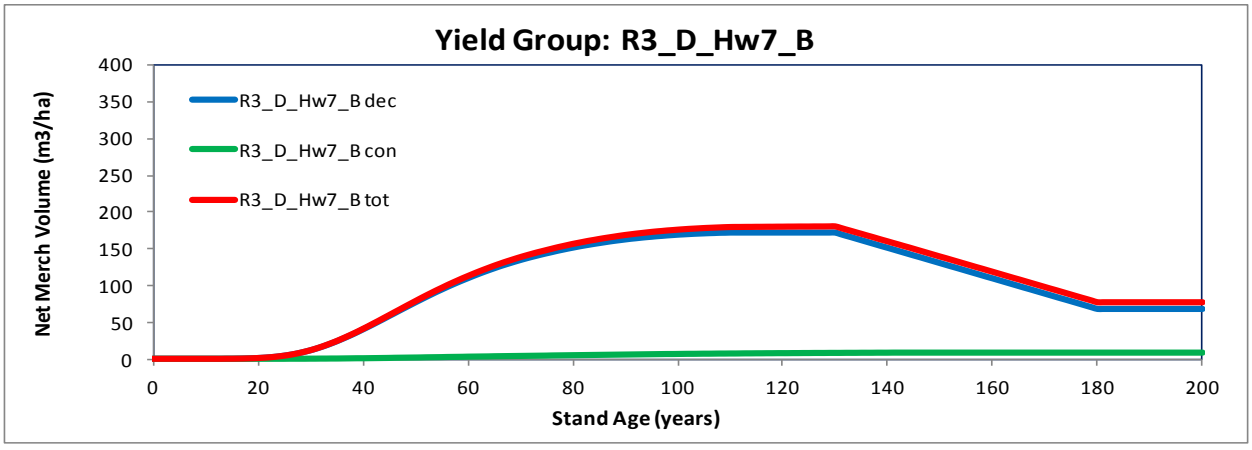


Figure 65. R3_D_Hw7_B Basic Yield Curve.

5.2.4 Future Managed Stands Genetic Yield Curves (R3-G)

The R3-G genetic yield curves were based on the R3-B basic curves by applying a percent genetic gain as approved by ASRD for use in managed stand yield table development as follows:

- Lodgepole pine B1 program: 4.0% height gain at 80 years rotation age; and
- White spruce G1 program: 2.6% height gain at 105 years rotation age.

The lodgepole pine genetic curves will be applied to all future harvested stands that are located in the B1 breeding region in the C-Pl regeneration strata. The white spruce genetic curves will be applied to all future harvested stands that are located in the G1 breeding region in the C-Sw, CD-SwHw and DC-HwSx regeneration strata[53].

The resultant R3 genetic yield curves for each regeneration stratum are shown in Figure 66 to Figure 69 (the R3 basic curves are included for comparison purposes).

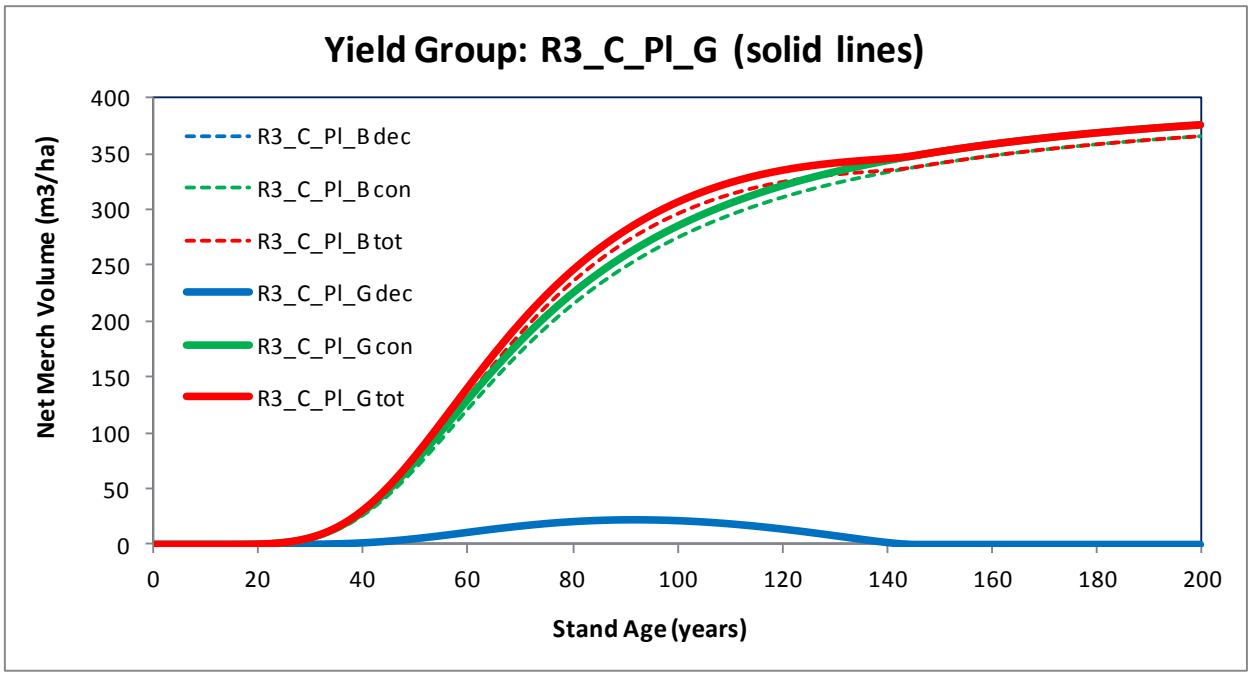


Figure 66. R3_C_Pl_G Genetic Yield Curve (vs Basic).

[53] Note that the minor Sw component in the Pl strata and the minor Pl component in the Sw strata were not increased even in areas where the B1 and G1 breeding regions overlap.

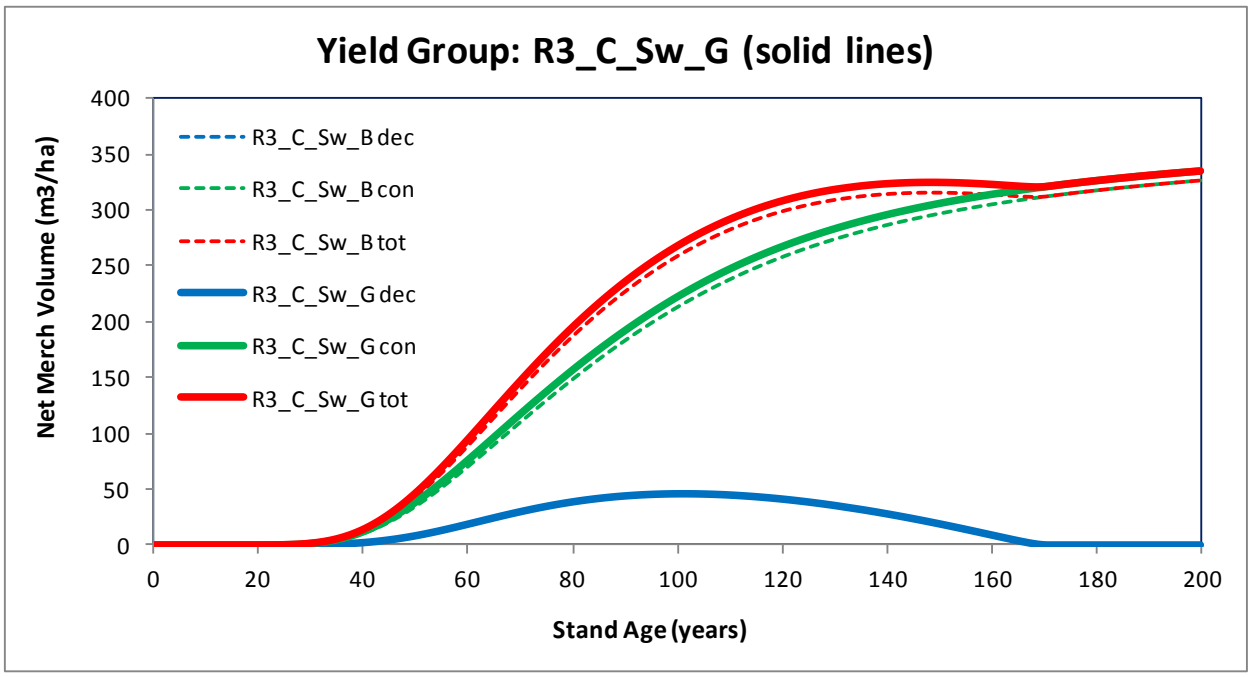


Figure 67. R3_C_Sw_G Genetic Yield Curve (vs Basic).

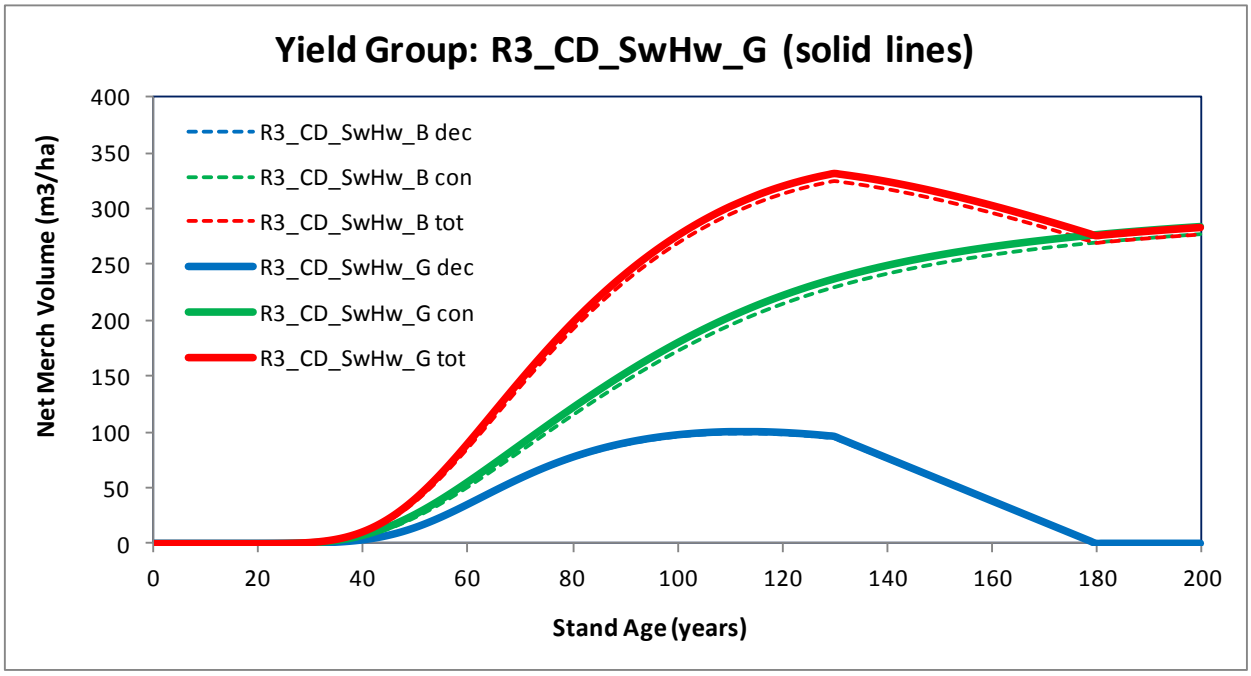


Figure 68. R3_CD_SwHw_G Genetic Yield Curve (vs Basic).

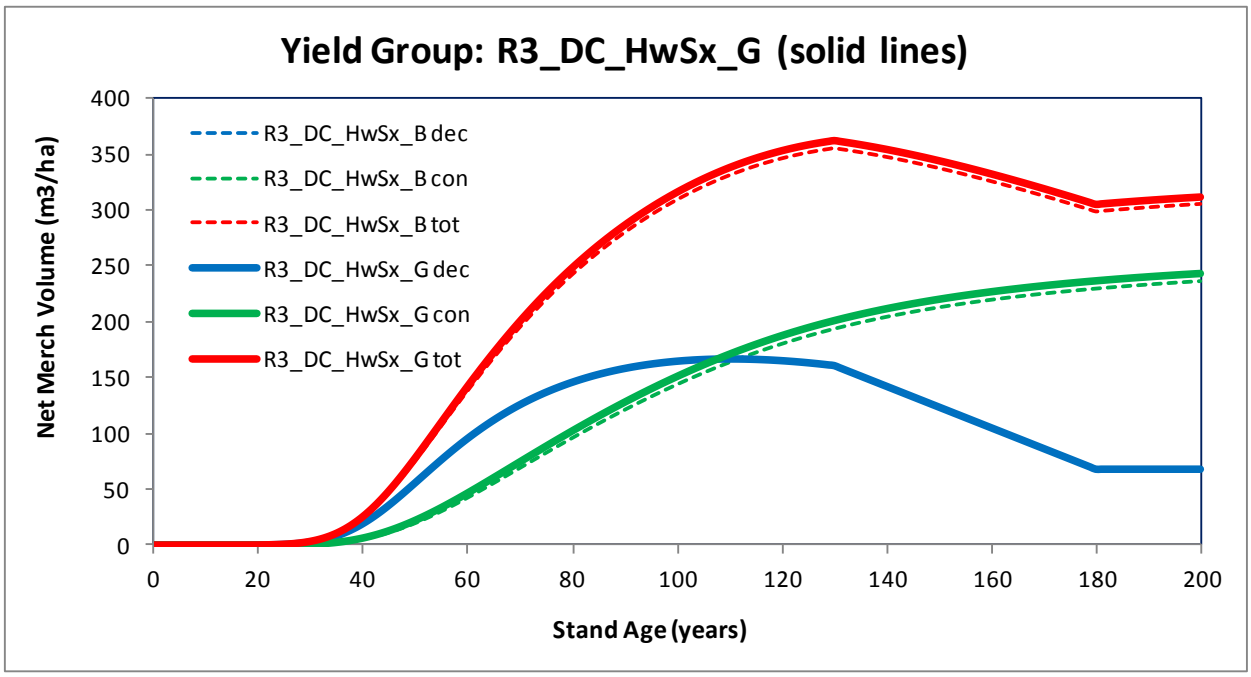


Figure 69. R3_DC_HwSx_G Genetic Yield Curve (vs Basic).

The percent volume gain based on the percent height gain at the rotation age is presented in Table 39.

Table 39. Genetic Gain at Rotation Age.

yield curve id	totage	spp	topht	mv_dec	mv_con	mv_tot
R3_C_Pl_B	80	PL	21.2	22.6	227.5	250.1
R3_C_Pl_G	80	PL	22.0	22.6	238.2	260.8
			104.0%	***100.2%***	***104.7%***	***104.3%***
R3_C_Sw_B	105	SW	26.9	50.1	238.9	289.0
R3_C_Sw_G	105	SW	27.6	50.2	249.5	299.7
			102.6%	***100.2%***	***104.4%***	***103.7%***
R3_CD_SwHw_B	105	SW	26.9	108.6	194.6	303.2
R3_CD_SwHw_G	105	SW	27.6	108.7	202.9	311.6
			102.6%	***100.1%***	***104.3%***	***102.8%***
R3_DC_HwSx_B	105	SW	26.9	183.2	163.6	346.8
R3_DC_HwSx_G	105	SW	27.6	183.4	171.2	354.6
			102.6%	***100.1%***	***104.6%***	***102.2%***

5.3 YIELD CURVE VALIDATION

Managed stand yield curves were assessed by comparing forecasts against actual measured plot data by regeneration strata. Rotation 2 PSP and GYM plot trajectories were plotted against natural stand yield curves by yield stratum. We plotted the pre-1991 (R1) and post-1991 (R2) yield curve predictions against actual gross merchantable volumes for the main strata as presented in Figure 70 to Figure 78. Other strata as well as basal area, total volume and density trajectories were also plotted and are presented in Appendix O.

As it was shown in Table 13 and Table 14, the distribution of GYM plots and Rotation 2 PSPs does not allow for in-depth statistical analysis. The plots are still very young (especially those located in the R2 post-1991 cutblocks) to accumulate meaningful amount of gross merchantable volume. However, a few general observations can be made:

- the gross merchantable volume predictions are showing good agreement when volumes start accumulating for the older pre-1991 yield strata;

- GYPSY is not capable of predicting ingress and thus backward projections of densities are not accurate. Given the potential amount of ingress in some of the strata such as R2 C-Pl, combined with the lower planting densities it will be very important to track the amount of ingress in the Rotation 2 PSPs and especially in the GYM plots. The GYM plots also provide the means of tracking planted versus natural ingress, as well as the planted genetic seedlings. The nested plot design allows for tracking net change (ingress + mortality) but ingress alone cannot be separated unless trees are tagged and preferably stem mapped.

- Judging by basal area and total volume trajectories, as well as looking at gross merchantable volume it appears that if anything, the yield curves might be slightly under predicting volumes. However, given the relatively low plot representation and the young stands, these trends are still unclear.

- The GYM plot program and the re-measured Rotation 2 PSP will provide Canfor with a solid base for evaluating managed stand performance and potentially developing managed stand yield curves from observed trajectories within the next 10 years. If GYPSY remains the model of choice, it will be important to calibrate/assess ingress and incorporate the information into model projections. The spatial version of GYPSY will also require the assessment percent stocking in the GYM plots and Rotation 2 PSPs.

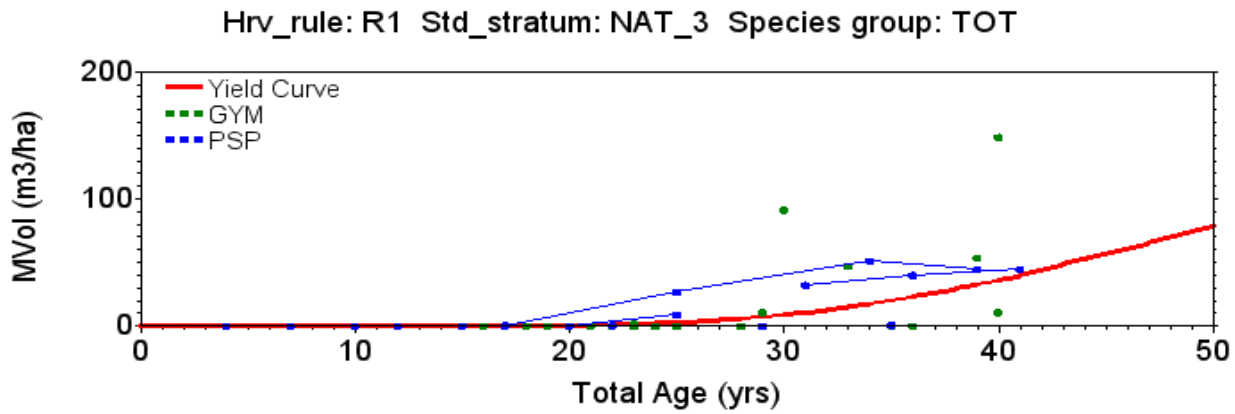


Figure 70. R1_03: AW/SW/PBSW/BWSW - Gross Merchantable Volume.

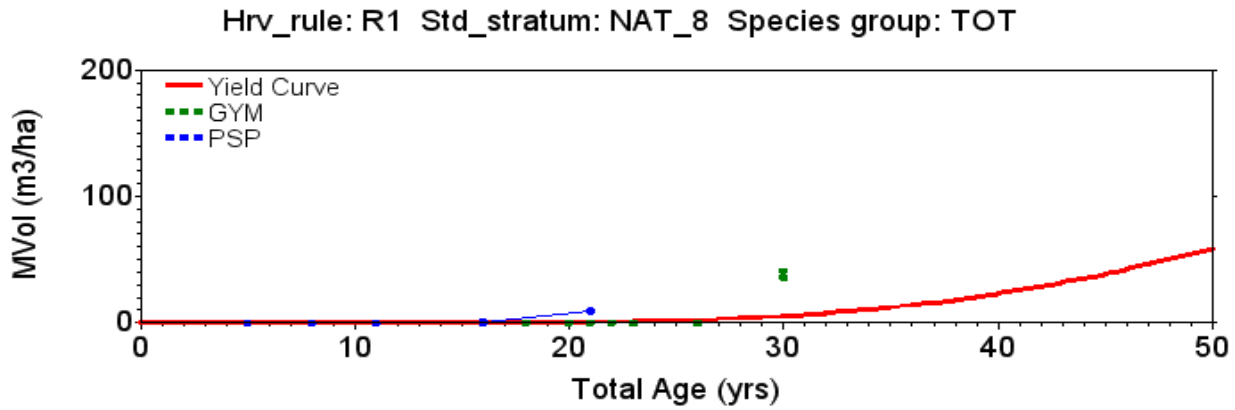


Figure 71. R1_08: PL/PLFB+(H) - Gross Merchantable Volume.

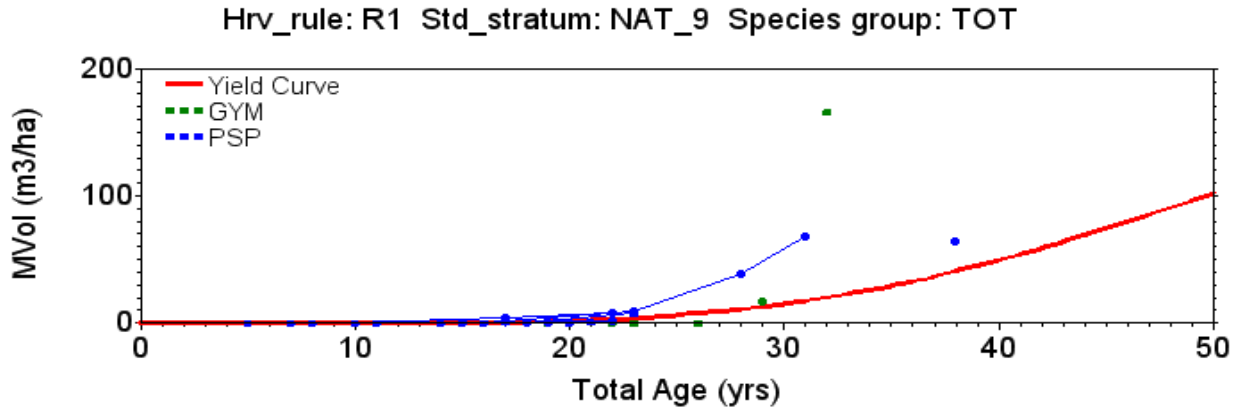


Figure 72. R1_09: PLAW/AWPL - Gross Merchantable Volume.

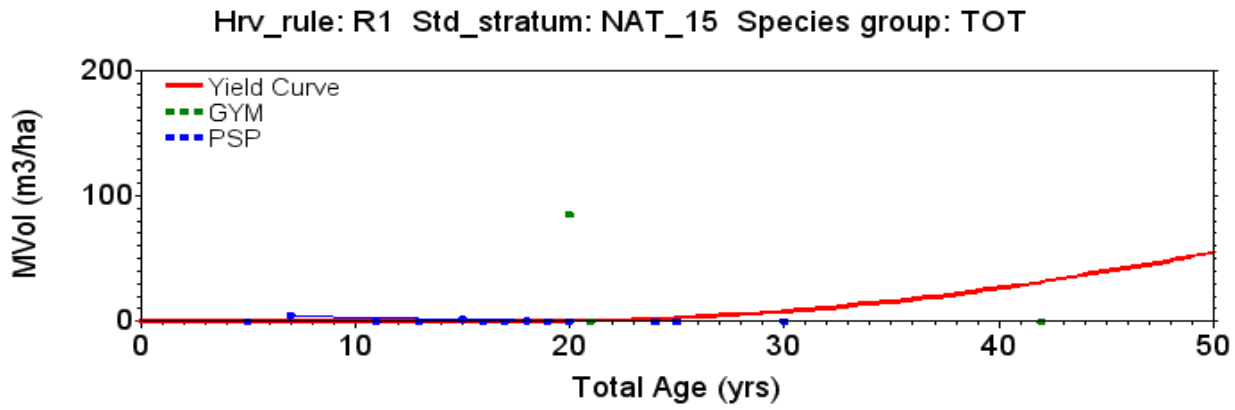


Figure 73. R1_15: SW/SWFB+(H)-AB - Gross Merchantable Volume.

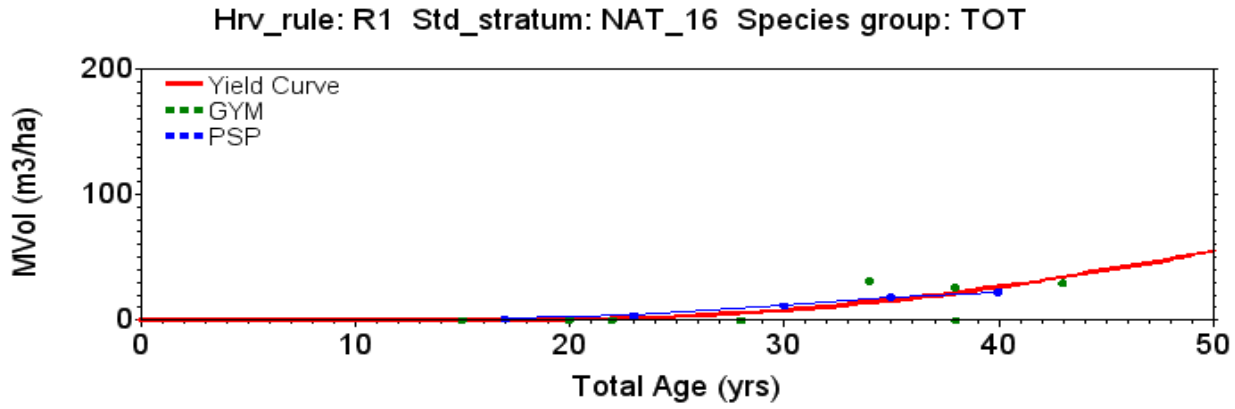


Figure 74. R1_16: SW/SWFB+(H)-CD - Gross Merchantable Volume.

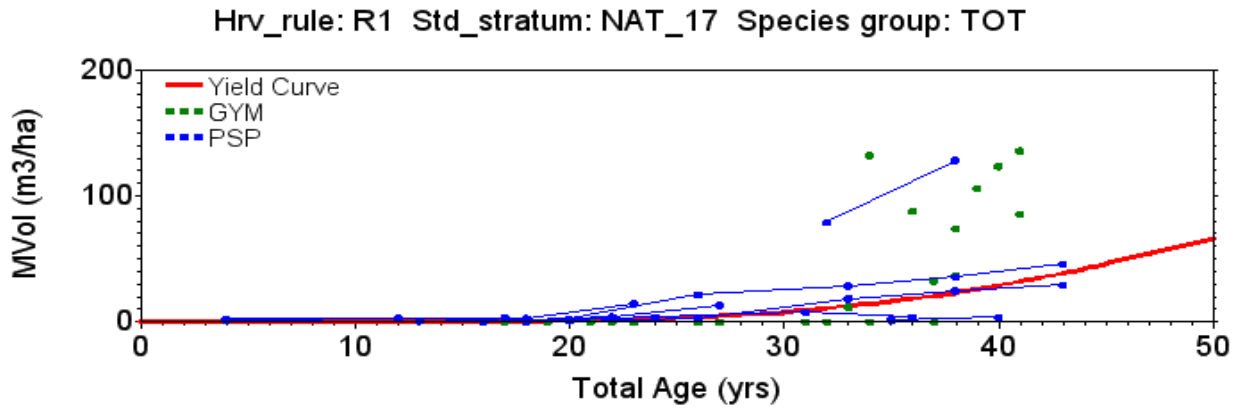


Figure 75. R1_17: SWAW/SWAWPL - Gross Merchantable Volume.

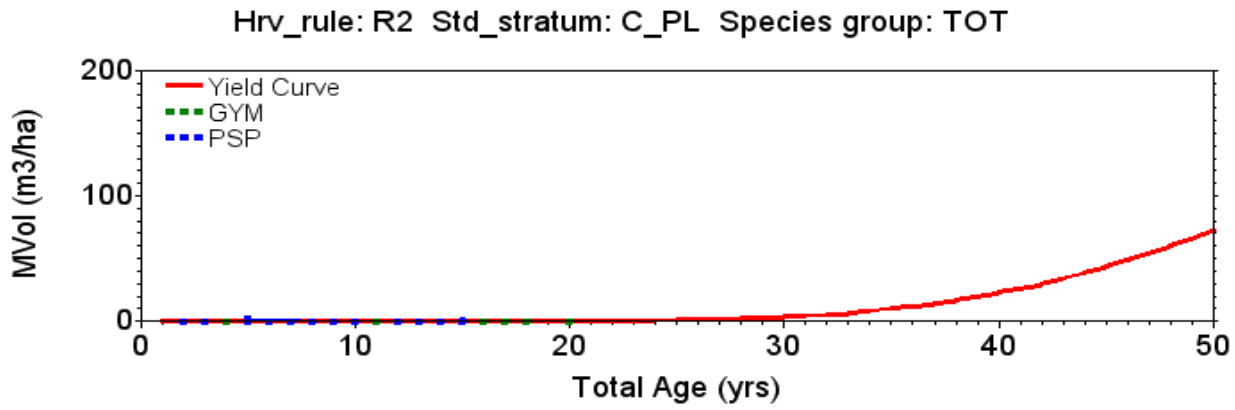


Figure 76. R2_C_PL - Gross Merchantable Volume.

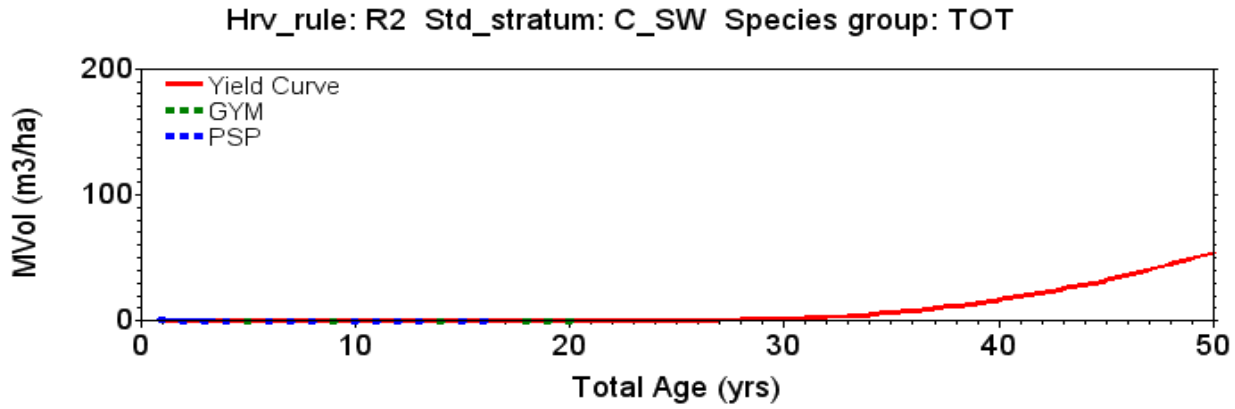


Figure 77. R2_C_SW - Gross Merchantable Volume.

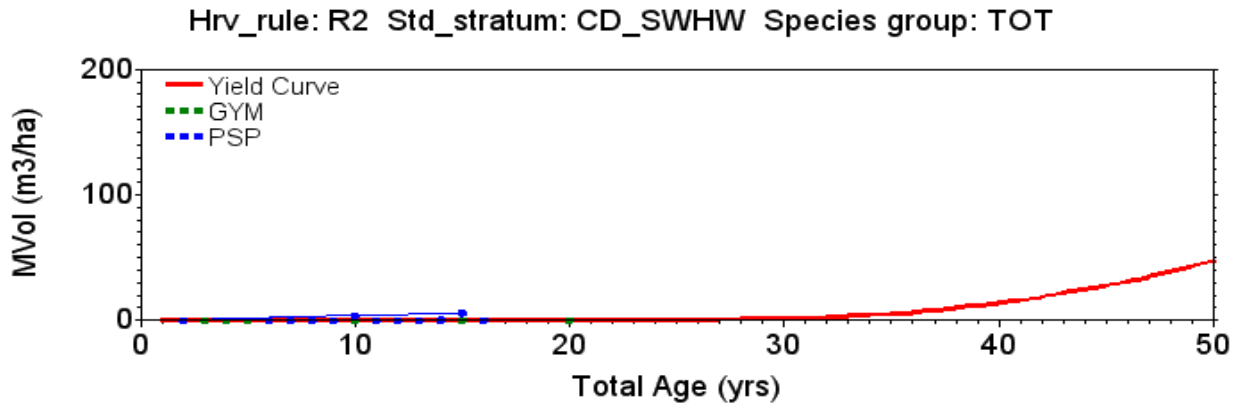


Figure 78. R2_CD_SWHW - Gross Merchantable Volume.

Appendix A: DATA DICTIONARY

1. PSP : AVI Attribute Database

#	Variable	Type	Len	Label
1	PLOT_ID	Char	15	Plot ID
2	YLDGRP	Num	8	Yield Group #
3	NATSUBREG	Char	3	Natural Subregion
4	FMU	Char	5	Forest Management Unit (Main, Pusk, Peace)
5	POLY_NUM	Num	8	AVI Polygon #
6	OPENING_NU	Char	12	AVI Opening #
7	ZONE	Num	8	Plot UTM Zone
8	EASTING	Num	8	Plot UTM Easting Coordinate
9	NORTHING	Num	8	Plot UTM Northing Coordinate
10	MOD1_AVI	Char	2	AVI MOD1
11	ARIS	Char	11	Aris number
12	SC_DATE	Num	8	AVI SC_Date
13	CLG	Char	3	AVI CLG
14	HEIGHT	Num	8	AVI Stand Height
15	CORIGIN	Num	8	AVI C Origin Year
16	ORIGIN_AVI	Num	8	AVI Origin Year
17	UORIGIN_AVI	Num	8	AVI U Origin Year
18	STRATA_SRD	Char	4	AVI Strata_SRD
19	C_CODE	Char	2	AVI C_Code
20	CTPR	Char	1	AVI C TPR
21	LAYER	Num	8	AVI Layer
22	STRUC	Char	1	AVI Struc
23	UDEN_CL	Num	8	AVI UDEN_CL
24	TDEN_CL	Num	8	AVI TDEN_CL
25	DENSITY	Char	1	AVI Density
26	UDENSITY	Char	1	AVI U Density
27	HARDPCT	Num	8	AVI HardPct
28	SOFTPCT	Num	8	AVI SoftPct
29	CSP1	Char	2	AVI Species 1
30	CSP2	Char	2	AVI Species 2
31	CSP3	Char	2	AVI Species 3
32	CSP4	Char	2	AVI Species 4
33	CSP5	Char	2	AVI Species 5
34	CSP1_PER	Num	8	AVI Species 1 Percent
35	CSP2_PER	Num	8	AVI Species 2 Percent
36	CSP3_PER	Num	8	AVI Species 3 Percent
37	CSP4_PER	Num	8	AVI Species 4 Percent
38	CSP5_PER	Num	8	AVI Species 5 Percent
39	AVI_NOTES	Char	255	AVI Notes
40	AVI_ISSUE	Char	50	AVI Record Issues

2. PSP Location Database

#	Variable	Type	Len	Label
1	PLOT_ID	Char	15	Plot ID
2	COMPANY	Char	6	Company
3	DIVISION	Char	2	Division
4	ZONE	Num	8	Plot UTM Zone
5	EASTING	Num	8	Plot UTM Easting Coordinate
6	NORTHING	Num	8	Plot UTM Northing Coordinate
7	ELEV	Num	8	Elevation (m)
8	NATSUBREG	Char	3	Natural Subregion
9	MERIDIAN	Num	8	Meridian
10	RANGE	Num	8	Range
11	TOWNSHIP	Num	8	Township
12	SECTION	Num	8	Section
13	LSD	Char	3	LSD
14	LOC_NOTES	Char	255	Location Data Notes
15	LOC_ISSUE	Char	20	Location Data Issues

3. PSP Plot Measurement Source Database

#	Variable	Type	Len	Label
1	PLOT_ID	Char	15	Plot ID
2	SLOPE	Num	8	Slope
3	ASPECT	Num	8	Aspect
4	DRAINAGE	Char	5	Drainage
5	MEASURE	Num	8	Plot Measurement #
6	MEAS_DATE	Num	8	Plot Measurement Date
7	MEAS_YEAR	Num	8	Plot Measurement Year
8	MEAS_MONTH	Num	8	Plot Measurement Month
9	MEAS_DAY	Num	8	Plot Measurement Date
10	MAIN_AREA	Num	8	Main Plot Area (m2)
11	SUB_AREA	Num	8	Subplot Area (m2)
12	REGEN_AREA	Num	8	Regen Plot Area (m2)
13	MAIN_TAGLIMIT	Num	8	Main Plot Minimum Tagging Limit (cm)
14	SUB_TAGLIMIT	Num	8	Subplot Minimum Tagging Limit (cm)
15	REGEN_TAGLIMIT	Num	8	Regen Plot Minimum Tagging Limit (cm)
16	PLOT_NOTES	Char	255	Plot measurement data notes
17	PLOT_ISSUE	Char	50	Plot measurement data issues

4. PSP Plot Measurement Compiled Database

#	Variable	Type	Len	Label
1	PLOTID	Char	20	Plot ID
2	MEASNUMB	Num	8	Plot Measurement #
3	N13_AW	Num	8	Number of Stems (#/ha) - AW Spc
4	HT13_AW	Num	8	Average Height (m) - AW Spc
5	DBH13_AW	Num	8	Average DBH (cm) - AW Spc
6	HDC13_AW	Num	8	Average Height of Dom, Codom (m) - AW Spc
7	BA13_AW	Num	8	Basal Area (m2/ha) - AW Spc
8	QMD13_AW	Num	8	Quadratic Mean DBH (cm) - AW Spc
9	HTOPS13_AW	Num	8	Top Height Strict Calculation (m) - AW Spc
10	HTOPW13_AW	Num	8	Top Height Weak Calculation (m) - AW Spc
11	TVOL13_AW	Num	8	Total Vol (m3/ha) - AW Spc
12	MVOL13_AW	Num	8	Merch Vol (m3/ha) 30cm stump ht, 15/10 (Dec) & 15/12 (Con) Util - AW Spc
13	N13_BW	Num	8	Number of Stems (#/ha) - BW Spc
14	HT13_BW	Num	8	Average Height (m) - BW Spc
15	DBH13_BW	Num	8	Average DBH (cm) - BW Spc
16	HDC13_BW	Num	8	Average Height of Dom, Codom (m) - BW Spc
17	BA13_BW	Num	8	Basal Area (m2/ha) - BW Spc
18	QMD13_BW	Num	8	Quadratic Mean DBH (cm) - BW Spc
19	HTOPS13_BW	Num	8	Top Height Strict Calculation (m) - BW Spc
20	HTOPW13_BW	Num	8	Top Height Weak Calculation (m) - BW Spc
21	TVOL13_BW	Num	8	Total Vol (m3/ha) - BW Spc
22	MVOL13_BW	Num	8	Merch Vol (m3/ha) 30cm stump ht, 15/10 (Dec) & 15/12 (Con) Util - BW Spc
23	N13_FB	Num	8	Number of Stems (#/ha) - FB Spc
24	HT13_FB	Num	8	Average Height (m) - FB Spc
25	DBH13_FB	Num	8	Average DBH (cm) - FB Spc
26	HDC13_FB	Num	8	Average Height of Dom, Codom (m) - FB Spc
27	BA13_FB	Num	8	Basal Area (m2/ha) - FB Spc
28	QMD13_FB	Num	8	Quadratic Mean DBH (cm) - FB Spc
29	HTOPS13_FB	Num	8	Top Height Strict Calculation (m) - FB Spc
30	HTOPW13_FB	Num	8	Top Height Weak Calculation (m) - FB Spc
31	TVOL13_FB	Num	8	Total Vol (m3/ha) - FB Spc
32	MVOL13_FB	Num	8	Merch Vol (m3/ha) 30cm stump ht, 15/10 (Dec) & 15/12 (Con) Util - FB Spc
33	N13_LT	Num	8	Number of Stems (#/ha) - LT Spc
34	HT13_LT	Num	8	Average Height (m) - LT Spc
35	DBH13_LT	Num	8	Average DBH (cm) - LT Spc
36	HDC13_LT	Num	8	Average Height of Dom, Codom (m) - LT Spc
37	BA13_LT	Num	8	Basal Area (m2/ha) - LT Spc
38	QMD13_LT	Num	8	Quadratic Mean DBH (cm) - LT Spc
39	HTOPS13_LT	Num	8	Top Height Strict Calculation (m) - LT Spc
40	HTOPW13_LT	Num	8	Top Height Weak Calculation (m) - LT Spc
41	TVOL13_LT	Num	8	Total Vol (m3/ha) - LT Spc
42	MVOL13_LT	Num	8	Merch Vol (m3/ha) 30cm stump ht, 15/10 (Dec) & 15/12 (Con) Util - LT Spc
43	N13_PB	Num	8	Number of Stems (#/ha) - PB Spc
44	HT13_PB	Num	8	Average Height (m) - PB Spc
45	DBH13_PB	Num	8	Average DBH (cm) - PB Spc
46	HDC13_PB	Num	8	Average Height of Dom, Codom (m) - PB Spc
47	BA13_PB	Num	8	Basal Area (m2/ha) - PB Spc
48	QMD13_PB	Num	8	Quadratic Mean DBH (cm) - PB Spc
49	HTOPS13_PB	Num	8	Top Height Strict Calculation (m) - PB Spc

50	HTOPW13_PB	Num	8	Top Height Weak Calculation (m) - PB Spc
51	TVOL13_PB	Num	8	Total Vol (m3/ha) - PB Spc
52	MVOL13_PB	Num	8	Merch Vol (m3/ha) 30cm stump ht, 15/10 (Dec) & 15/12 (Con) Util - PB Spc
53	N13_PL	Num	8	Number of Stems (#/ha) - PL Spc
54	HT13_PL	Num	8	Average Height (m) - PL Spc
55	DBH13_PL	Num	8	Average DBH (cm) - PL Spc
56	HDC13_PL	Num	8	Average Height of Dom, Codom (m) - PL Spc
57	BA13_PL	Num	8	Basal Area (m2/ha) - PL Spc
58	QMD13_PL	Num	8	Quadratic Mean DBH (cm) - PL Spc
59	HTOPS13_PL	Num	8	Top Height Strict Calculation (m) - PL Spc
60	HTOPW13_PL	Num	8	Top Height Weak Calculation (m) - PL Spc
61	TVOL13_PL	Num	8	Total Vol (m3/ha) - PL Spc
62	MVOL13_PL	Num	8	Merch Vol (m3/ha) 30cm stump ht, 15/10 (Dec) & 15/12 (Con) Util - PL Spc
63	N13_SB	Num	8	Number of Stems (#/ha) - SB Spc
64	HT13_SB	Num	8	Average Height (m) - SB Spc
65	DBH13_SB	Num	8	Average DBH (cm) - SB Spc
66	HDC13_SB	Num	8	Average Height of Dom, Codom (m) - SB Spc
67	BA13_SB	Num	8	Basal Area (m2/ha) - SB Spc
68	QMD13_SB	Num	8	Quadratic Mean DBH (cm) - SB Spc
69	HTOPS13_SB	Num	8	Top Height Strict Calculation (m) - SB Spc
70	HTOPW13_SB	Num	8	Top Height Weak Calculation (m) - SB Spc
71	TVOL13_SB	Num	8	Total Vol (m3/ha) - SB Spc
72	MVOL13_SB	Num	8	Merch Vol (m3/ha) 30cm stump ht, 15/10 (Dec) & 15/12 (Con) Util - SB Spc
73	N13_SW	Num	8	Number of Stems (#/ha) - SW Spc
74	HT13_SW	Num	8	Average Height (m) - SW Spc
75	DBH13_SW	Num	8	Average DBH (cm) - SW Spc
76	HDC13_SW	Num	8	Average Height of Dom, Codom (m) - SW Spc
77	BA13_SW	Num	8	Basal Area (m2/ha) - SW Spc
78	QMD13_SW	Num	8	Quadratic Mean DBH (cm) - SW Spc
79	HTOPS13_SW	Num	8	Top Height Strict Calculation (m) - SW Spc
80	HTOPW13_SW	Num	8	Top Height Weak Calculation (m) - SW Spc
81	TVOL13_SW	Num	8	Total Vol (m3/ha) - SW Spc
82	MVOL13_SW	Num	8	Merch Vol (m3/ha) 30cm stump ht, 15/10 (Dec) & 15/12 (Con) Util - SW Spc
83	N13_CON	Num	8	Number of Stems (#/ha) - CON Spc
84	HT13_CON	Num	8	Average Height (m) - CON Spc
85	DBH13_CON	Num	8	Average DBH (cm) - CON Spc
86	HDC13_CON	Num	8	Average Height of Dom, Codom (m) - CON Spc
87	BA13_CON	Num	8	Basal Area (m2/ha) - CON Spc
88	QMD13_CON	Num	8	Quadratic Mean DBH (cm) - CON Spc
89	HTOPS13_CON	Num	8	Top Height Strict Calculation (m) - CON Spc
90	HTOPW13_CON	Num	8	Top Height Weak Calculation (m) - CON Spc
91	TVOL13_CON	Num	8	Total Vol (m3/ha) - CON Spc
92	MVOL13_CON	Num	8	Merch Vol (m3/ha) 30cm stump ht, 15/10 (Dec) & 15/12 (Con) Util - CON Spc
93	N13_DEC	Num	8	Number of Stems (#/ha) - DEC Spc
94	HT13_DEC	Num	8	Average Height (m) - DEC Spc
95	DBH13_DEC	Num	8	Average DBH (cm) - DEC Spc
96	HDC13_DEC	Num	8	Average Height of Dom, Codom (m) - DEC Spc
97	BA13_DEC	Num	8	Basal Area (m2/ha) - DEC Spc
98	QMD13_DEC	Num	8	Quadratic Mean DBH (cm) - DEC Spc
99	HTOPS13_DEC	Num	8	Top Height Strict Calculation (m) - DEC Spc
100	HTOPW13_DEC	Num	8	Top Height Weak Calculation (m) - DEC Spc

101	TVOL13_DEC	Num	8	Total Vol (m3/ha) - DEC Spc
102	MVOL13_DEC	Num	8	Merch Vol (m3/ha) 30cm stump ht, 15/10 (Dec) & 15/12 (Con) Util - DEC Spc
103	N13_ALL	Num	8	Number of Stems (#/ha) - All Spc
104	HT13_ALL	Num	8	Average Height (m) - All Spc
105	DBH13_ALL	Num	8	Average DBH (cm) - All Spc
106	HDC13_ALL	Num	8	Average Height of Dom, Codom (m) - All Spc
107	BA13_ALL	Num	8	Basal Area (m2/ha) - All Spc
108	QMD13_ALL	Num	8	Quadratic Mean DBH (cm) - All Spc
109	HTOPS13_ALL	Num	8	Top Height Strict Calculation (m) - All Spc
110	HTOPW13_ALL	Num	8	Top Height Weak Calculation (m) - All Spc
111	TVOL13_ALL	Num	8	Total Vol (m3/ha) - All Spc
112	MVOL13_ALL	Num	8	Merch Vol (m3/ha) 30cm stump ht, 15/10 (Dec) & 15/12 (Con) Util - All Spc

5. PSP Tree Measurement Source Database

#	Variable	Type	Len	Label
1	PLOT_ID	Char	15	Plot ID
2	MEASURE	Num	8	Plot Measurement #
3	MEAS_YEAR	Num	8	Plot Measurement Year
4	MEAS_DATE	Num	8	Plot Measurement Date (Day-Month-Year)
5	TREE_ID	Char	10	Tree ID
6	SPECIES	Char	2	Tree Species Code
7	DBH	Num	8	Tree DBH (cm)
8	HEIGHT	Num	8	Tree Height (m)
9	HTLC	Num	8	Tree Height to Live Crown (m)
10	ISHTMEASURED	Char	1	Measured Height Flag (Y/N)
11	CROWN_CLASS	Char	1	Crown Class Code (D=Dom, C=Codom, I=Inter, S=Suppr, X=N/A
12	CONDITION	Char	1	Tree Condition (D=dead, T=Top damage)
13	ISLIVE	Char	1	Tree live/dead flag (Y=live, N=Dead)
14	PHF	Num	8	Per hectare Plot Expansion Factor (#/ha)
15	TREE_NOTES	Char	30	Tree Measure Data Notes
16	TREE_ISSUE	Char	75	Tree Measure Data Issues

6. PSP Tree Measurement Compiled Database

#	Variable	Type	Len	Label
1	PLOTID	Char	20	Plot Id
2	MEASNUMB	Num	8	Plot Measurement #
3	TREEID	Char	10	Tree ID
4	SPECIES	Char	2	Tree Species Code
5	REPORTSPP1	Char	2	Tree Reporting Species Group 1 (original species code)
6	REPORTSPP2	Char	2	Tree Reporting Species Group 2 (Gypsy 4-species equivalents)
7	DBH	Num	8	Tree DBH (cm)
8	HEIGHT	Num	8	Tree Measured Height (m)
9	HT	Num	8	Tree Height (calculated from Ht/DBh relationship where Height=missing
10	BASALAREA	Num	8	Tree Basal Area (m2/ha)
11	DIBS	Num	8	Stump diameter inside bark (cm)
12	DOBS	Num	8	Stump diameter outside bark (cm)
13	MH	Num	8	Merchantable height (m)
14	MLEN	Num	8	Merchantable length (m)
15	MERCHVOL	Num	8	Tree gross merch Volume (m3/ha) (Util @15/10 (Decid) or 15/12 (Conifer)
16	TOTVOL	Num	8	Tree total volume (stump and tip incl) (m3)
17	TOPHT_WEAK	Char	1	Top height weak definition (includes D,C,I crown class) (m)
18	TOPHT_STRICT	Char	1	Top height strict definition (includes D,C crown class) (m)
19	CONDITION	Char	1	Tree Condition Code
20	ISLIVE	Char	1	Tree live/dead flag (Y=live, N=Dead)
21	PHF	Num	8	Per hectare Plot Expansion Factor (#/ha)
22	TREETYPE	Num	8	Tree type (1-regen, 2-sapling, 3-main plot)
23	POSITION	Num	8	Tree Position Code
24	NREGION	Num	8	Natural Subregion Code
25	ISBROKEN	Char	1	Top Breakage Flag (Y=top break, N=no top break)
26	MAINAREA	Num	8	Main Plot Area (ha)
27	HD1	Num	8	Height-DBH equation parameter 1
28	HD2	Num	8	Height-DBH equation parameter 2
29	HD3	Num	8	Height-DBH equation parameter 3
30	SD1	Num	8	Stump diameter over bark-DBH equation parameter 1
31	SD2	Num	8	Stump diameter over bark-DBH equation parameter 2
32	SD3	Num	8	Stump diameter over bark-DBH equation parameter 3
33	A0	Num	8	Taper equation parameter a0
34	A1	Num	8	Taper equation parameter a1
35	A2	Num	8	Taper equation parameter a2
36	B1	Num	8	Taper equation parameter b1
37	B2	Num	8	Taper equation parameter b2
38	B3	Num	8	Taper equation parameter b3
39	B4	Num	8	Taper equation parameter b4
40	B5	Num	8	Taper equation parameter b5
41	INOUT1	Num	8	Stump diameter inside bark-over bark equation parameter 1
42	INOUT2	Num	8	Stump diameter inside bark-over bark equation parameter 2
43	CONDEC	Char	1	Conifer / Deciduous Species Code (C=conifer, D=Decid)

Appendix B: VOLUME TAPER COEFFICIENTS

Natural Subregion		Species	Volume Taper Coefficients							
Code	Label		a0	a1	a2	b1	b2	b3	b4	b5
0	ALB	AW	0.79041	1.02694	0.99752	0.60058	-0.06568	-0.17381	0.12136	0.06325
0	ALB	BW	0.89436	1.00772	0.99138	-0.48307	0.15559	-2.27312	1.32650	0.16890
0	ALB	FA	1.00202	0.94408	0.99992	1.33633	-0.32035	2.83950	-1.32482	0.07745
0	ALB	FB	1.00202	0.94408	0.99992	1.33633	-0.32035	2.83950	-1.32482	0.07745
0	ALB	FD	0.91315	0.96439	0.99839	1.38632	-0.28650	1.78390	-0.91693	0.05883
0	ALB	LT	0.93352	0.96547	0.99839	2.07946	-0.46203	3.73206	-1.95019	0.19043
0	ALB	PB	0.86118	0.95148	1.00096	0.75258	-0.16731	0.69361	-0.22414	0.00821
0	ALB	PJ	0.94083	0.95558	0.99933	0.11631	-0.02817	-0.38443	0.30406	0.07219
0	ALB	PL	0.89762	0.98852	0.99874	0.67576	-0.13031	0.57063	-0.27546	0.10540
0	ALB	SB	0.94070	0.95721	0.99964	1.39578	-0.34467	2.83592	-1.39646	0.15249
0	ALB	SE	1.07258	0.89777	1.00192	1.30183	-0.30544	2.26572	-1.11967	0.12352
0	ALB	SW	0.86044	0.99541	0.99849	1.04022	-0.25239	1.84282	-0.85223	0.11036
1	CMW	AW	0.84190	0.99706	0.99871	0.53687	-0.06402	-0.23447	0.17996	0.03155
1	CMW	BW	0.89436	1.00772	0.99138	-0.48307	0.15559	-2.27312	1.32650	0.16890
1	CMW	FA	0.91865	0.99023	0.99729	1.56851	-0.38426	3.50347	-1.67719	0.12817
1	CMW	FB	0.91865	0.99023	0.99729	1.56851	-0.38426	3.50347	-1.67719	0.12817
1	CMW	FD	0.91315	0.96439	0.99839	1.38632	-0.28650	1.78390	-0.91693	0.05883
1	CMW	LT	0.93352	0.96547	0.99839	2.07946	-0.46203	3.73206	-1.95019	0.19043
1	CMW	PB	0.80437	0.98287	0.99953	0.99696	-0.22325	1.10673	-0.45982	-0.00339
1	CMW	PJ	0.94083	0.95558	0.99933	0.11631	-0.02817	-0.38443	0.30406	0.07219
1	CMW	PL	1.03357	0.91362	1.00077	0.25663	-0.04909	-0.25212	0.17427	0.12372
1	CMW	SB	0.92904	0.96772	0.99851	1.23660	-0.30820	2.53551	-1.22206	0.14624
1	CMW	SE	1.07258	0.89777	1.00192	1.30183	-0.30544	2.26572	-1.11967	0.12352
1	CMW	SW	1.19222	0.86580	1.00277	1.09826	-0.26183	1.94940	-0.92221	0.11909
2	DMW	AW	0.94452	0.93803	1.00164	0.69536	-0.06785	0.05060	-0.01633	0.11643
2	DMW	BW	0.89436	1.00772	0.99138	-0.48307	0.15559	-2.27312	1.32650	0.16890
2	DMW	FA	0.91865	0.99023	0.99729	1.56851	-0.38426	3.50347	-1.67719	0.12817
2	DMW	FB	0.91865	0.99023	0.99729	1.56851	-0.38426	3.50347	-1.67719	0.12817
2	DMW	FD	0.91315	0.96439	0.99839	1.38632	-0.28650	1.78390	-0.91693	0.05883
2	DMW	LT	0.93352	0.96547	0.99839	2.07946	-0.46203	3.73206	-1.95019	0.19043
2	DMW	PB	0.80437	0.98287	0.99953	0.99696	-0.22325	1.10673	-0.45982	-0.00339
2	DMW	PJ	0.94083	0.95558	0.99933	0.11631	-0.02817	-0.38443	0.30406	0.07219
2	DMW	PL	1.03357	0.91362	1.00077	0.25663	-0.04909	-0.25212	0.17427	0.12372
2	DMW	SB	0.92904	0.96772	0.99851	1.23660	-0.30820	2.53551	-1.22206	0.14624
2	DMW	SE	1.07258	0.89777	1.00192	1.30183	-0.30544	2.26572	-1.11967	0.12352
2	DMW	SW	1.19222	0.86580	1.00277	1.09826	-0.26183	1.94940	-0.92221	0.11909
8	SAL	AW	0.58884	1.16190	0.99210	0.70930	-0.07545	-0.11604	0.04095	0.11364
8	SAL	BW	0.89436	1.00772	0.99138	-0.48307	0.15559	-2.27312	1.32650	0.16890
8	SAL	FA	1.10801	0.89838	1.00182	1.33834	-0.30463	2.69436	-1.27762	0.08744
8	SAL	FB	1.10801	0.89838	1.00182	1.33834	-0.30463	2.69436	-1.27762	0.08744
8	SAL	FD	0.91315	0.96439	0.99839	1.38632	-0.28650	1.78390	-0.91693	0.05883
8	SAL	LT	0.93352	0.96547	0.99839	2.07946	-0.46203	3.73206	-1.95019	0.19043
8	SAL	PB	0.91333	0.92259	1.00257	0.30845	-0.06567	-0.10213	0.22634	0.02315
8	SAL	PJ	0.94083	0.95558	0.99933	0.11631	-0.02817	-0.38443	0.30406	0.07219
8	SAL	PL	0.80065	1.05354	0.99557	0.56835	-0.12511	0.61009	-0.23844	0.04540
8	SAL	SB	0.95762	0.94674	1.00045	1.43046	-0.35670	2.95073	-1.45547	0.15426
8	SAL	SE	1.07258	0.89777	1.00192	1.30183	-0.30544	2.26572	-1.11967	0.12352
8	SAL	SW	0.71339	1.07153	0.99607	1.15368	-0.28381	2.02271	-0.95378	0.10161
10	UFH	AW	0.58884	1.16190	0.99210	0.70930	-0.07545	-0.11604	0.04095	0.11364

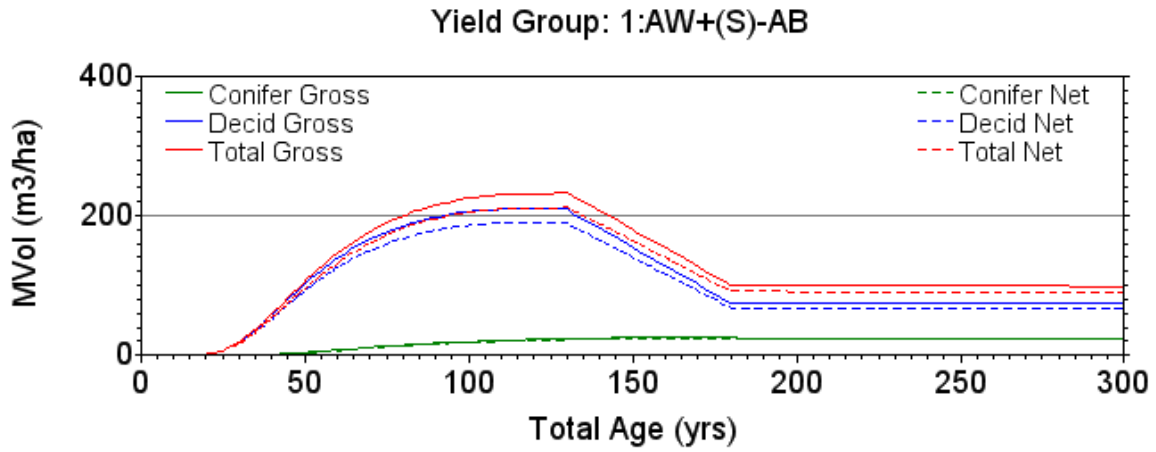
Natural Subregion		Species	Volume Taper Coefficients							
Code	Label		a0	a1	a2	b1	b2	b3	b4	b5
10	UFH	BW	0.89436	1.00772	0.99138	-0.48307	0.15559	-2.27312	1.32650	0.16890
10	UFH	FA	1.10801	0.89838	1.00182	1.33834	-0.30463	2.69436	-1.27762	0.08744
10	UFH	FB	1.10801	0.89838	1.00182	1.33834	-0.30463	2.69436	-1.27762	0.08744
10	UFH	FD	0.91315	0.96439	0.99839	1.38632	-0.28650	1.78390	-0.91693	0.05883
10	UFH	LT	0.93352	0.96547	0.99839	2.07946	-0.46203	3.73206	-1.95019	0.19043
10	UFH	PB	0.91333	0.92259	1.00257	0.30845	-0.06567	-0.10213	0.22634	0.02315
10	UFH	PJ	0.94083	0.95558	0.99933	0.11631	-0.02817	-0.38443	0.30406	0.07219
10	UFH	PL	0.82867	1.02420	0.99749	0.59619	-0.11878	0.46559	-0.19618	0.08309
10	UFH	SB	0.95762	0.94674	1.00045	1.43046	-0.35670	2.95073	-1.45547	0.15426
10	UFH	SE	1.07258	0.89777	1.00192	1.30183	-0.30544	2.26572	-1.11967	0.12352
10	UFH	SW	0.71339	1.07153	0.99607	1.15368	-0.28381	2.02271	-0.95378	0.10161
11	LFH	AW	0.90562	0.96489	1.00005	0.55324	-0.04974	-0.28077	0.17069	0.07579
11	LFH	BW	0.89436	1.00772	0.99138	-0.48307	0.15559	-2.27312	1.32650	0.16890
11	LFH	FA	0.91865	0.99023	0.99729	1.56851	-0.38426	3.50347	-1.67719	0.12817
11	LFH	FB	0.91865	0.99023	0.99729	1.56851	-0.38426	3.50347	-1.67719	0.12817
11	LFH	FD	0.91315	0.96439	0.99839	1.38632	-0.28650	1.78390	-0.91693	0.05883
11	LFH	LT	0.93352	0.96547	0.99839	2.07946	-0.46203	3.73206	-1.95019	0.19043
11	LFH	PB	0.91333	0.92259	1.00257	0.30845	-0.06567	-0.10213	0.22634	0.02315
11	LFH	PJ	0.94083	0.95558	0.99933	0.11631	-0.02817	-0.38443	0.30406	0.07219
11	LFH	PL	0.95716	0.95999	0.99977	0.76675	-0.14076	0.66604	-0.35505	0.13214
11	LFH	SB	0.95762	0.94674	1.00045	1.43046	-0.35670	2.95073	-1.45547	0.15426
11	LFH	SE	1.07258	0.89777	1.00192	1.30183	-0.30544	2.26572	-1.11967	0.12352
11	LFH	SW	0.86269	0.99315	0.99877	1.13502	-0.25238	1.88532	-0.92144	0.15023

Appendix C: HEIGHT / DBH COEFFICIENTS

Natural Subregion		Species	Ht / DBH Coefficients		
Code	Label		hd1	hd2	hd3
0	ALB	AW	25.66140	0.06834	1.13940
0	ALB	BW	27.97270	0.03522	0.86950
0	ALB	FA	24.75320	0.06615	1.56950
0	ALB	FB	24.75320	0.06615	1.56950
0	ALB	FD	21.32990	0.06090	1.59730
0	ALB	LT	26.32660	0.05375	1.40260
0	ALB	PB	25.57000	0.05050	0.98650
0	ALB	PJ	31.42630	0.03888	1.12790
0	ALB	PL	29.00750	0.04859	1.17820
0	ALB	SB	24.57510	0.05432	1.22430
0	ALB	SE	36.31840	0.02604	1.09300
0	ALB	SW	32.12610	0.04633	1.30320
1	CMW	AW	24.84080	0.08081	1.24050
1	CMW	BW	27.97270	0.03522	0.86950
1	CMW	FA	28.63190	0.05226	1.44670
1	CMW	FB	28.63190	0.05226	1.44670
1	CMW	FD	21.32990	0.06090	1.59730
1	CMW	LT	26.32660	0.05375	1.40260
1	CMW	PB	25.38100	0.05010	0.92700
1	CMW	PJ	31.42630	0.03888	1.12790
1	CMW	PL	23.95180	0.07865	1.48130
1	CMW	SB	24.36660	0.05775	1.23130
1	CMW	SE	36.31840	0.02604	1.09300
1	CMW	SW	29.88120	0.05557	1.39110
2	DMW	AW	26.54840	0.05699	0.98460
2	DMW	BW	27.97270	0.03522	0.86950
2	DMW	FA	28.63190	0.05226	1.44670
2	DMW	FB	28.63190	0.05226	1.44670
2	DMW	FD	21.32990	0.06090	1.59730
2	DMW	LT	26.32660	0.05375	1.40260
2	DMW	PB	25.38100	0.05010	0.92700
2	DMW	PJ	31.42630	0.03888	1.12790
2	DMW	PL	23.95180	0.07865	1.48130
2	DMW	SB	24.36660	0.05775	1.23130
2	DMW	SE	36.31840	0.02604	1.09300
2	DMW	SW	29.88120	0.05557	1.39110
8	SAL	AW	28.07500	0.04860	1.21730
8	SAL	BW	27.97270	0.03522	0.86950
8	SAL	FA	24.33830	0.06707	1.59090
8	SAL	FB	24.33830	0.06707	1.59090
8	SAL	FD	21.32990	0.06090	1.59730
8	SAL	LT	26.32660	0.05375	1.40260
8	SAL	PB	25.14130	0.06488	1.31920
8	SAL	PJ	31.42630	0.03888	1.12790
8	SAL	PL	24.41140	0.03555	0.78460
8	SAL	SB	24.93050	0.05281	1.25520
8	SAL	SE	36.31840	0.02604	1.09300
8	SAL	SW	38.31170	0.02635	1.11520
10	UFH	AW	28.07500	0.04860	1.21730
10	UFH	BW	27.97270	0.03522	0.86950

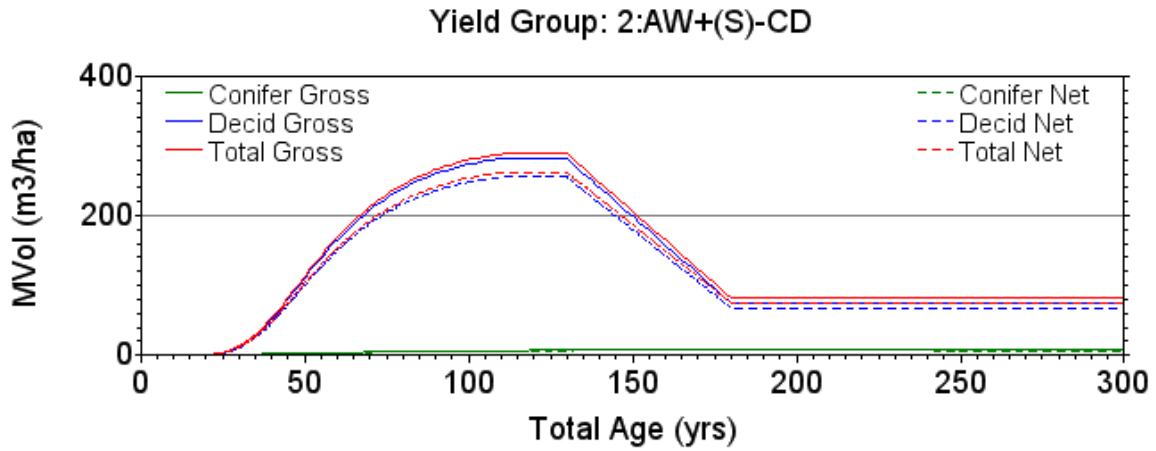
Natural Subregion		Species	Ht / DBH Coefficients		
Code	Label		hd1	hd2	hd3
10	UFH	FA	24.33830	0.06707	1.59090
10	UFH	FB	24.33830	0.06707	1.59090
10	UFH	FD	21.32990	0.06090	1.59730
10	UFH	LT	26.32660	0.05375	1.40260
10	UFH	PB	25.14130	0.06488	1.31920
10	UFH	PJ	31.42630	0.03888	1.12790
10	UFH	PL	24.83980	0.06468	1.29370
10	UFH	SB	24.93050	0.05281	1.25520
10	UFH	SE	36.31840	0.02604	1.09300
10	UFH	SW	38.31170	0.02635	1.11520
11	LFH	AW	25.67310	0.07367	1.26080
11	LFH	BW	27.97270	0.03522	0.86950
11	LFH	FA	28.63190	0.05226	1.44670
11	LFH	FB	28.63190	0.05226	1.44670
11	LFH	FD	21.32990	0.06090	1.59730
11	LFH	LT	26.32660	0.05375	1.40260
11	LFH	PB	25.14130	0.06488	1.31920
11	LFH	PJ	31.42630	0.03888	1.12790
11	LFH	PL	29.62760	0.05461	1.29970
11	LFH	SB	24.93050	0.05281	1.25520
11	LFH	SE	36.31840	0.02604	1.09300
11	LFH	SW	32.42780	0.05055	1.39400

Appendix D: NATURAL STAND YIELD CURVES



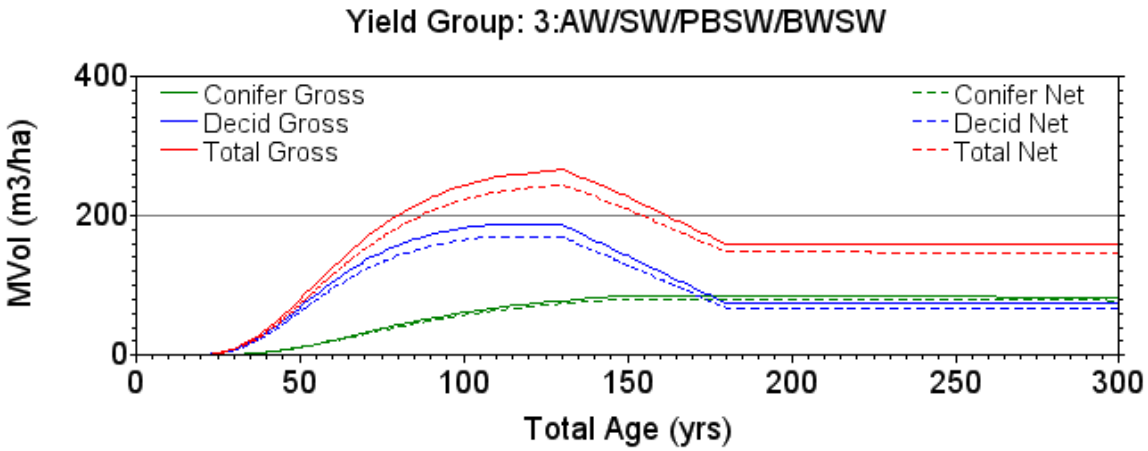
Yield Group 1 THLB Area : 6,050 ha (2%)

Tot Age	Yield Group	Gross Merch Vol (m3/ha)			Gross Merch MAI (m3/ha/yr)			Net Merch Vol (m3/ha)			Net Merch MAI (m3/ha)		
		Dec	Con	Tot	Dec	Con	Tot	Dec	Con	Tot	Dec	Con	Tot
10	1	0.0	0.0	0.0	0.00	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.00
20	1	1.5	0.0	1.5	0.07	0.00	0.07	1.3	0.0	1.4	0.07	0.00	0.07
30	1	18.3	0.3	18.5	0.61	0.01	0.62	16.6	0.3	16.8	0.55	0.01	0.56
40	1	57.5	1.3	58.9	1.44	0.03	1.47	52.1	1.3	53.4	1.30	0.03	1.33
50	1	101.7	3.5	105.2	2.03	0.07	2.10	92.1	3.3	95.4	1.84	0.07	1.91
60	1	138.4	7.0	145.3	2.31	0.12	2.42	125.4	6.6	131.9	2.09	0.11	2.20
70	1	165.7	10.9	176.6	2.37	0.16	2.52	150.1	10.3	160.5	2.14	0.15	2.29
80	1	184.9	14.4	199.3	2.31	0.18	2.49	167.5	13.6	181.1	2.09	0.17	2.26
90	1	197.7	17.3	215.0	2.20	0.19	2.39	179.1	16.3	195.4	1.99	0.18	2.17
100	1	205.3	19.5	224.8	2.05	0.19	2.25	186.0	18.4	204.4	1.86	0.18	2.04
110	1	209.0	21.2	230.2	1.90	0.19	2.09	189.4	20.0	209.4	1.72	0.18	1.90
120	1	209.0	22.5	231.5	1.74	0.19	1.93	189.4	21.3	210.6	1.58	0.18	1.76
130	1	209.0	23.6	232.6	1.61	0.18	1.79	189.4	22.3	211.7	1.46	0.17	1.63
140	1	182.2	24.5	206.7	1.30	0.17	1.48	165.1	23.1	188.2	1.18	0.17	1.34
150	1	155.4	24.9	180.3	1.04	0.17	1.20	140.8	23.6	164.4	0.94	0.16	1.10
160	1	128.6	24.9	153.5	0.80	0.16	0.96	116.5	23.6	140.1	0.73	0.15	0.88
170	1	101.8	24.9	126.7	0.60	0.15	0.75	92.2	23.5	115.8	0.54	0.14	0.68
180	1	75.0	24.9	99.9	0.42	0.14	0.55	68.0	23.5	91.4	0.38	0.13	0.51
190	1	75.0	24.8	99.8	0.39	0.13	0.53	68.0	23.4	91.4	0.36	0.12	0.48
200	1	75.0	24.7	99.7	0.38	0.12	0.50	68.0	23.4	91.3	0.34	0.12	0.46
210	1	75.0	24.7	99.7	0.36	0.12	0.47	68.0	23.3	91.3	0.32	0.11	0.43
220	1	75.0	24.6	99.6	0.34	0.11	0.45	68.0	23.2	91.2	0.31	0.11	0.41
230	1	75.0	24.5	99.5	0.33	0.11	0.43	68.0	23.2	91.1	0.30	0.10	0.40
240	1	75.0	24.4	99.4	0.31	0.10	0.41	68.0	23.1	91.0	0.28	0.10	0.38
250	1	75.0	24.3	99.3	0.30	0.10	0.40	68.0	23.0	90.9	0.27	0.09	0.36



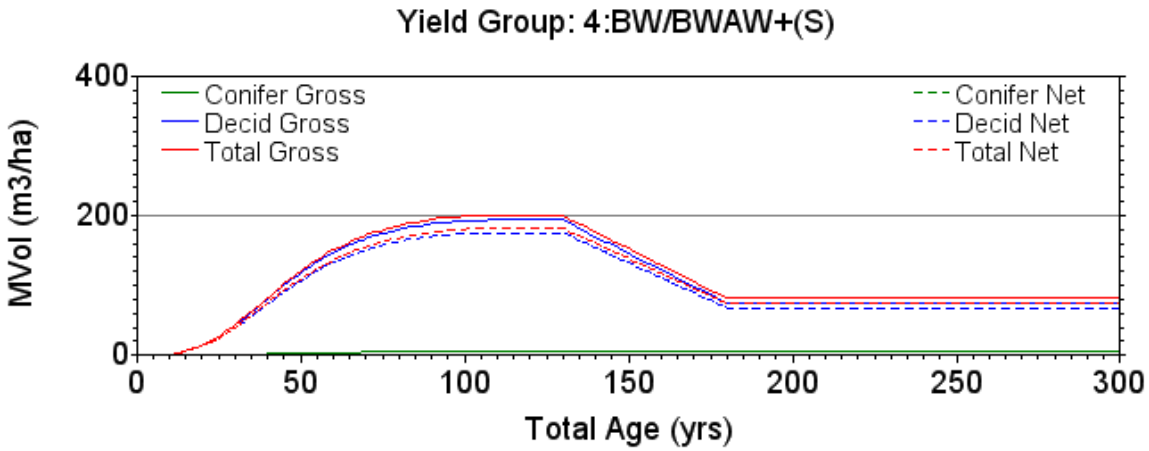
Yield Group 2 THLB Area : 27,406 ha (7%)

Tot Age	Yield Group	Gross Merch Vol (m3/ha)			Gross Merch MAI (m3/ha/yr)			Net Merch Vol (m3/ha)			Net Merch MAI (m3/ha)		
		Dec	Con	Tot	Dec	Con	Tot	Dec	Con	Tot	Dec	Con	Tot
10	2	0.0	0.0	0.0	0.00	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.00
20	2	0.6	0.3	0.8	0.03	0.01	0.04	0.5	0.2	0.8	0.03	0.01	0.04
30	2	11.5	1.0	12.5	0.38	0.03	0.42	10.4	0.9	11.4	0.35	0.03	0.38
40	2	51.5	1.9	53.4	1.29	0.05	1.33	46.7	1.8	48.4	1.17	0.04	1.21
50	2	110.3	2.8	113.1	2.21	0.06	2.26	99.9	2.6	102.5	2.00	0.05	2.05
60	2	165.4	3.7	169.0	2.76	0.06	2.82	149.8	3.5	153.3	2.50	0.06	2.55
70	2	208.1	4.5	212.6	2.97	0.06	3.04	188.5	4.2	192.8	2.69	0.06	2.75
80	2	238.8	5.1	244.0	2.99	0.06	3.05	216.4	4.9	221.2	2.70	0.06	2.77
90	2	259.8	5.7	265.6	2.89	0.06	2.95	235.4	5.4	240.8	2.62	0.06	2.68
100	2	273.4	6.2	279.6	2.73	0.06	2.80	247.7	5.9	253.6	2.48	0.06	2.54
110	2	281.6	6.7	288.2	2.56	0.06	2.62	255.1	6.3	261.4	2.32	0.06	2.38
120	2	281.6	7.0	288.6	2.35	0.06	2.40	255.1	6.6	261.7	2.13	0.06	2.18
130	2	281.6	7.3	288.8	2.17	0.06	2.22	255.1	6.9	262.0	1.96	0.05	2.02
140	2	240.2	7.5	247.7	1.72	0.05	1.77	217.7	7.0	224.7	1.55	0.05	1.61
150	2	198.9	7.5	206.4	1.33	0.05	1.38	180.2	7.0	187.3	1.20	0.05	1.25
160	2	157.6	7.5	165.1	0.99	0.05	1.03	142.8	7.0	149.9	0.89	0.04	0.94
170	2	116.3	7.5	123.8	0.68	0.04	0.73	105.4	7.0	112.4	0.62	0.04	0.66
180	2	75.0	7.5	82.5	0.42	0.04	0.46	68.0	7.0	75.0	0.38	0.04	0.42
190	2	75.0	7.5	82.5	0.39	0.04	0.43	68.0	7.0	75.0	0.36	0.04	0.39
200	2	75.0	7.5	82.5	0.38	0.04	0.41	68.0	7.0	75.0	0.34	0.04	0.37
210	2	75.0	7.5	82.5	0.36	0.04	0.39	68.0	7.0	75.0	0.32	0.03	0.36
220	2	75.0	7.4	82.4	0.34	0.03	0.37	68.0	7.0	75.0	0.31	0.03	0.34
230	2	75.0	7.4	82.4	0.33	0.03	0.36	68.0	7.0	74.9	0.30	0.03	0.33
240	2	75.0	7.4	82.4	0.31	0.03	0.34	68.0	7.0	74.9	0.28	0.03	0.31
250	2	75.0	7.3	82.3	0.30	0.03	0.33	68.0	6.9	74.9	0.27	0.03	0.30



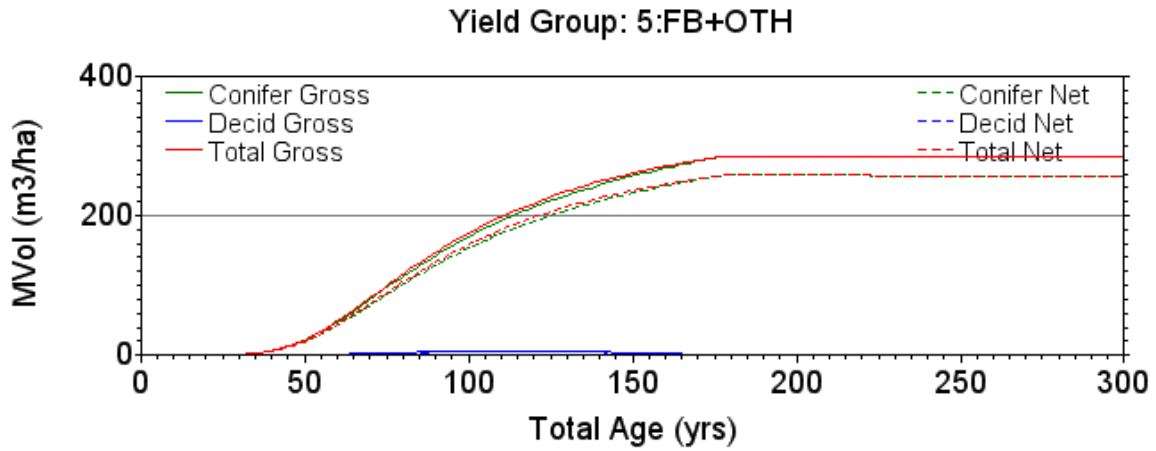
Yield Group 3 THLB Area : 66,059 ha (17%)

Tot Age	Yield Group	Gross Merch Vol (m3/ha)			Gross Merch MAI (m3/ha/yr)			Net Merch Vol (m3/ha)			Net Merch MAI (m3/ha)		
		Dec	Con	Tot	Dec	Con	Tot	Dec	Con	Tot	Dec	Con	Tot
10	3	0.0	0.0	0.0	0.00	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.00
20	3	0.5	0.1	0.6	0.02	0.01	0.03	0.4	0.1	0.5	0.02	0.01	0.03
30	3	7.8	1.2	8.9	0.26	0.04	0.30	7.0	1.1	8.1	0.23	0.04	0.27
40	3	31.9	4.6	36.4	0.80	0.11	0.91	28.9	4.3	33.2	0.72	0.11	0.83
50	3	68.1	11.4	79.4	1.36	0.23	1.59	61.7	10.7	72.4	1.23	0.21	1.45
60	3	104.6	21.1	125.8	1.74	0.35	2.10	94.8	20.0	114.8	1.58	0.33	1.91
70	3	134.9	32.1	167.0	1.93	0.46	2.39	122.2	30.4	152.6	1.75	0.43	2.18
80	3	157.2	42.8	200.1	1.97	0.54	2.50	142.4	40.5	182.9	1.78	0.51	2.29
90	3	172.5	52.5	225.0	1.92	0.58	2.50	156.3	49.6	205.9	1.74	0.55	2.29
100	3	182.2	60.7	242.9	1.82	0.61	2.43	165.1	57.3	222.4	1.65	0.57	2.22
110	3	187.6	67.5	255.1	1.71	0.61	2.32	170.0	63.8	233.8	1.55	0.58	2.13
120	3	187.6	73.2	260.8	1.56	0.61	2.17	170.0	69.2	239.2	1.42	0.58	1.99
130	3	187.6	78.0	265.6	1.44	0.60	2.04	170.0	73.7	243.7	1.31	0.57	1.87
140	3	165.1	82.1	247.2	1.18	0.59	1.77	149.6	77.6	227.2	1.07	0.55	1.62
150	3	142.6	84.7	227.2	0.95	0.56	1.51	129.2	80.0	209.2	0.86	0.53	1.39
160	3	120.0	84.7	204.7	0.75	0.53	1.28	108.8	80.0	188.8	0.68	0.50	1.18
170	3	97.5	84.7	182.2	0.57	0.50	1.07	88.4	80.0	168.4	0.52	0.47	0.99
180	3	75.0	84.7	159.7	0.42	0.47	0.89	68.0	80.0	148.0	0.38	0.44	0.82
190	3	75.0	84.6	159.6	0.39	0.45	0.84	68.0	80.0	147.9	0.36	0.42	0.78
200	3	75.0	84.5	159.5	0.38	0.42	0.80	68.0	79.9	147.8	0.34	0.40	0.74
210	3	75.0	84.4	159.4	0.36	0.40	0.76	68.0	79.8	147.7	0.32	0.38	0.70
220	3	75.0	84.3	159.3	0.34	0.38	0.72	68.0	79.7	147.6	0.31	0.36	0.67
230	3	75.0	84.2	159.2	0.33	0.37	0.69	68.0	79.5	147.5	0.30	0.35	0.64
240	3	75.0	84.0	159.0	0.31	0.35	0.66	68.0	79.4	147.3	0.28	0.33	0.61
250	3	75.0	83.9	158.9	0.30	0.34	0.64	68.0	79.2	147.2	0.27	0.32	0.59



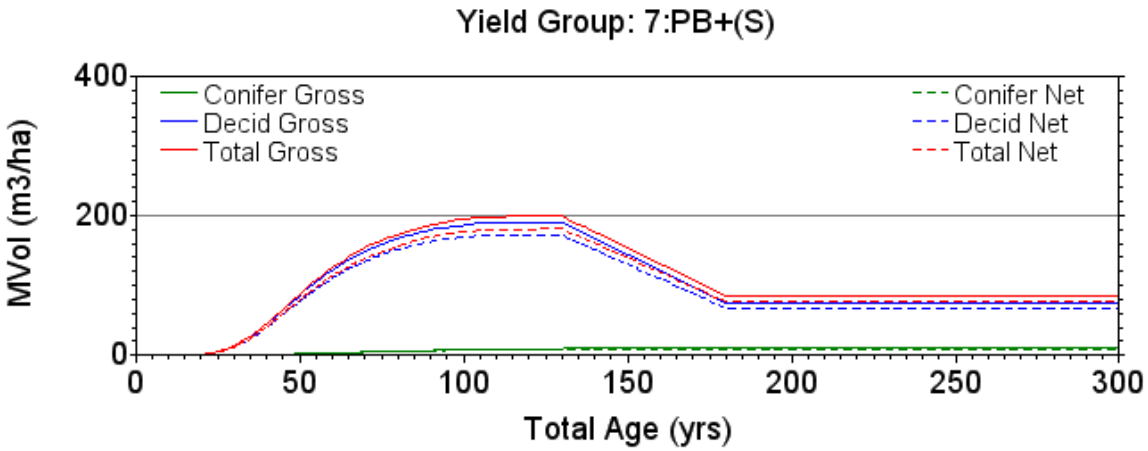
Yield Group 4 THLB Area : 3,341 ha (1%)

Tot Age	Yield Group	Gross Merch Vol (m3/ha)			Gross Merch MAI (m3/ha/yr)			Net Merch Vol (m3/ha)			Net Merch MAI (m3/ha)		
		Dec	Con	Tot	Dec	Con	Tot	Dec	Con	Tot	Dec	Con	Tot
10	4	0.9	0.0	0.9	0.09	0.00	0.09	0.8	0.0	0.8	0.08	0.00	0.08
20	4	14.2	0.0	14.2	0.71	0.00	0.71	12.9	0.0	12.9	0.64	0.00	0.64
30	4	43.0	0.5	43.6	1.43	0.02	1.45	39.0	0.5	39.5	1.30	0.02	1.32
40	4	81.1	1.8	82.9	2.03	0.05	2.07	73.5	1.7	75.2	1.84	0.04	1.88
50	4	117.4	2.9	120.4	2.35	0.06	2.41	106.4	2.8	109.2	2.13	0.06	2.18
60	4	146.2	4.0	150.2	2.44	0.07	2.50	132.5	3.7	136.2	2.21	0.06	2.27
70	4	166.7	4.9	171.6	2.38	0.07	2.45	151.0	4.6	155.6	2.16	0.07	2.22
80	4	180.0	5.7	185.7	2.25	0.07	2.32	163.0	5.4	168.4	2.04	0.07	2.11
90	4	188.0	6.4	194.4	2.09	0.07	2.16	170.3	6.0	176.4	1.89	0.07	1.96
100	4	192.3	6.7	199.0	1.92	0.07	1.99	174.2	6.4	180.6	1.74	0.06	1.81
110	4	193.8	6.7	200.6	1.76	0.06	1.82	175.6	6.4	182.0	1.60	0.06	1.65
120	4	193.8	6.7	200.6	1.62	0.06	1.67	175.6	6.4	182.0	1.46	0.05	1.52
130	4	193.8	6.7	200.6	1.49	0.05	1.54	175.6	6.4	182.0	1.35	0.05	1.40
140	4	170.1	6.7	176.8	1.21	0.05	1.26	154.1	6.4	160.5	1.10	0.05	1.15
150	4	146.3	6.7	153.0	0.98	0.04	1.02	132.6	6.4	138.9	0.88	0.04	0.93
160	4	122.5	6.7	129.3	0.77	0.04	0.81	111.0	6.4	117.4	0.69	0.04	0.73
170	4	98.8	6.7	105.5	0.58	0.04	0.62	89.5	6.4	95.9	0.53	0.04	0.56
180	4	75.0	6.7	81.7	0.42	0.04	0.45	68.0	6.4	74.3	0.38	0.04	0.41
190	4	75.0	6.7	81.7	0.39	0.04	0.43	68.0	6.4	74.3	0.36	0.03	0.39
200	4	75.0	6.7	81.7	0.38	0.03	0.41	68.0	6.4	74.3	0.34	0.03	0.37
210	4	75.0	6.7	81.7	0.36	0.03	0.39	68.0	6.4	74.3	0.32	0.03	0.35
220	4	75.0	6.7	81.7	0.34	0.03	0.37	68.0	6.4	74.3	0.31	0.03	0.34
230	4	75.0	6.7	81.7	0.33	0.03	0.36	68.0	6.4	74.3	0.30	0.03	0.32
240	4	75.0	6.7	81.7	0.31	0.03	0.34	68.0	6.4	74.3	0.28	0.03	0.31
250	4	75.0	6.7	81.7	0.30	0.03	0.33	68.0	6.4	74.3	0.27	0.03	0.30



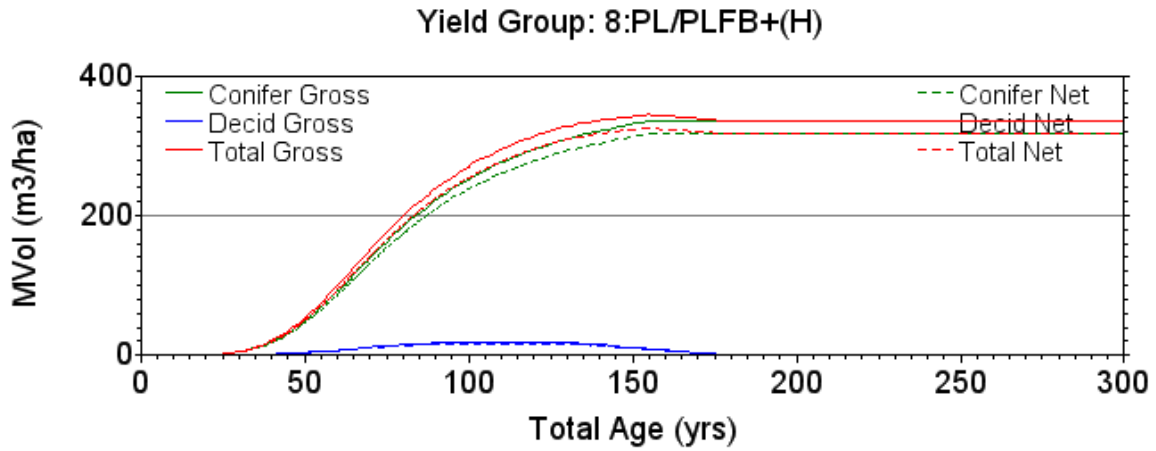
Yield Group 5 THLB Area : 6,843 ha (2%)

Tot Age	Yield Group	Gross Merch Vol (m3/ha)			Gross Merch MAI (m3/ha/yr)			Net Merch Vol (m3/ha)			Net Merch MAI (m3/ha)		
		Dec	Con	Tot	Dec	Con	Tot	Dec	Con	Tot	Dec	Con	Tot
10	5	0.0	0.0	0.0	0.00	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.00
20	5	0.0	0.1	0.1	0.00	0.01	0.01	0.0	0.1	0.1	0.00	0.01	0.01
30	5	0.0	1.1	1.1	0.00	0.04	0.04	0.0	1.0	1.0	0.00	0.03	0.03
40	5	0.1	6.2	6.3	0.00	0.15	0.16	0.1	5.6	5.7	0.00	0.14	0.14
50	5	0.4	21.3	21.7	0.01	0.43	0.43	0.4	19.3	19.7	0.01	0.39	0.39
60	5	1.3	47.3	48.6	0.02	0.79	0.81	1.2	42.8	44.0	0.02	0.71	0.73
70	5	2.5	79.3	81.8	0.04	1.13	1.17	2.3	71.8	74.0	0.03	1.03	1.06
80	5	3.8	111.9	115.7	0.05	1.40	1.45	3.4	101.3	104.8	0.04	1.27	1.31
90	5	4.8	142.3	147.1	0.05	1.58	1.63	4.4	128.8	133.2	0.05	1.43	1.48
100	5	5.6	169.1	174.7	0.06	1.69	1.75	5.0	153.1	158.1	0.05	1.53	1.58
110	5	6.0	192.3	198.3	0.05	1.75	1.80	5.5	174.0	179.5	0.05	1.58	1.63
120	5	6.0	212.1	218.1	0.05	1.77	1.82	5.5	191.9	197.4	0.05	1.60	1.64
130	5	6.0	229.1	235.1	0.05	1.76	1.81	5.5	207.3	212.8	0.04	1.59	1.64
140	5	4.8	243.8	248.6	0.03	1.74	1.78	4.4	220.6	225.0	0.03	1.58	1.61
150	5	3.6	256.6	260.3	0.02	1.71	1.74	3.3	232.3	235.6	0.02	1.55	1.57
160	5	2.4	268.0	270.4	0.02	1.67	1.69	2.2	242.5	244.7	0.01	1.52	1.53
170	5	1.2	278.1	279.3	0.01	1.64	1.64	1.1	251.6	252.7	0.01	1.48	1.49
180	5	0.0	285.4	285.4	0.00	1.59	1.59	0.0	258.2	258.2	0.00	1.43	1.43
190	5	0.0	285.2	285.2	0.00	1.50	1.50	0.0	258.1	258.1	0.00	1.36	1.36
200	5	0.0	285.0	285.0	0.00	1.43	1.43	0.0	257.9	257.9	0.00	1.29	1.29
210	5	0.0	284.8	284.8	0.00	1.36	1.36	0.0	257.8	257.8	0.00	1.23	1.23
220	5	0.0	284.6	284.6	0.00	1.29	1.29	0.0	257.6	257.6	0.00	1.17	1.17
230	5	0.0	284.4	284.4	0.00	1.24	1.24	0.0	257.4	257.4	0.00	1.12	1.12
240	5	0.0	284.3	284.3	0.00	1.18	1.18	0.0	257.2	257.2	0.00	1.07	1.07
250	5	0.0	284.1	284.1	0.00	1.14	1.14	0.0	257.1	257.1	0.00	1.03	1.03



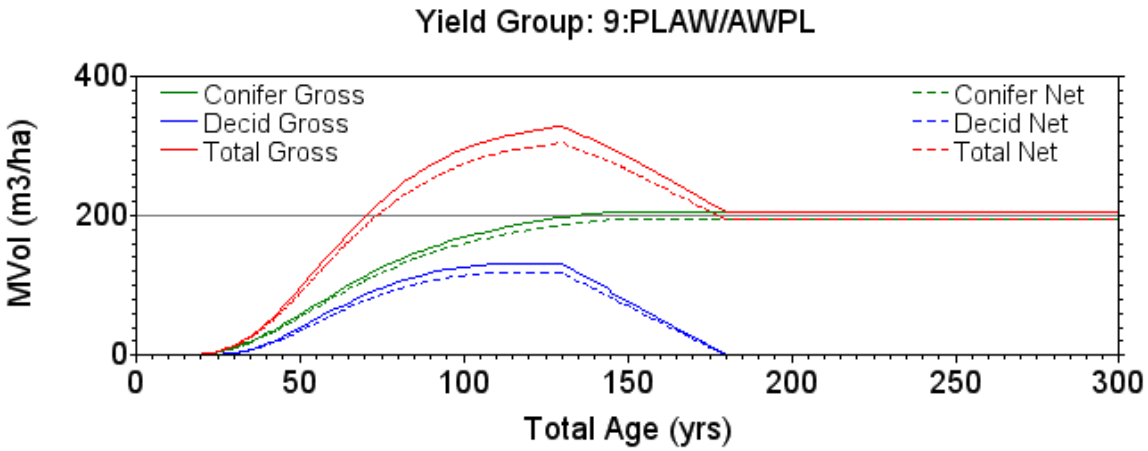
Yield Group 7 THLB Area : 13,603 ha (3%)

Tot Age	Yield Group	Gross Merch Vol (m3/ha)			Gross Merch MAI (m3/ha/yr)			Net Merch Vol (m3/ha)			Net Merch MAI (m3/ha)		
		Dec	Con	Tot	Dec	Con	Tot	Dec	Con	Tot	Dec	Con	Tot
10	7	0.0	0.0	0.0	0.00	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.00
20	7	1.1	0.0	1.1	0.05	0.00	0.05	1.0	0.0	1.0	0.05	0.00	0.05
30	7	12.7	0.2	12.9	0.42	0.01	0.43	11.5	0.2	11.7	0.38	0.01	0.39
40	7	44.1	0.9	45.0	1.10	0.02	1.12	40.0	0.8	40.8	1.00	0.02	1.02
50	7	84.9	2.0	86.9	1.70	0.04	1.74	76.9	1.9	78.8	1.54	0.04	1.58
60	7	121.4	3.3	124.7	2.02	0.06	2.08	109.9	3.2	113.1	1.83	0.05	1.89
70	7	148.6	4.6	153.2	2.12	0.07	2.19	134.7	4.3	139.0	1.92	0.06	1.99
80	7	167.4	5.7	173.1	2.09	0.07	2.16	151.6	5.4	157.1	1.90	0.07	1.96
90	7	179.7	6.8	186.5	2.00	0.08	2.07	162.8	6.4	169.3	1.81	0.07	1.88
100	7	186.8	7.7	194.6	1.87	0.08	1.95	169.3	7.3	176.6	1.69	0.07	1.77
110	7	190.1	8.5	198.5	1.73	0.08	1.80	172.2	8.0	180.2	1.57	0.07	1.64
120	7	190.1	9.0	199.1	1.58	0.07	1.66	172.2	8.5	180.7	1.44	0.07	1.51
130	7	190.1	9.4	199.5	1.46	0.07	1.53	172.2	8.9	181.1	1.32	0.07	1.39
140	7	167.1	9.8	176.8	1.19	0.07	1.26	151.4	9.2	160.6	1.08	0.07	1.15
150	7	144.0	9.9	153.9	0.96	0.07	1.03	130.5	9.3	139.8	0.87	0.06	0.93
160	7	121.0	9.9	130.9	0.76	0.06	0.82	109.7	9.3	119.0	0.69	0.06	0.74
170	7	98.0	9.9	107.9	0.58	0.06	0.63	88.8	9.3	98.1	0.52	0.05	0.58
180	7	75.0	9.9	84.9	0.42	0.05	0.47	68.0	9.3	77.3	0.38	0.05	0.43
190	7	75.0	9.9	84.9	0.39	0.05	0.45	68.0	9.3	77.3	0.36	0.05	0.41
200	7	75.0	9.9	84.9	0.38	0.05	0.42	68.0	9.3	77.3	0.34	0.05	0.39
210	7	75.0	9.9	84.9	0.36	0.05	0.40	68.0	9.3	77.3	0.32	0.04	0.37
220	7	75.0	9.9	84.9	0.34	0.04	0.39	68.0	9.3	77.3	0.31	0.04	0.35
230	7	75.0	9.9	84.9	0.33	0.04	0.37	68.0	9.3	77.3	0.30	0.04	0.34
240	7	75.0	9.9	84.9	0.31	0.04	0.35	68.0	9.3	77.3	0.28	0.04	0.32
250	7	75.0	9.9	84.9	0.30	0.04	0.34	68.0	9.3	77.3	0.27	0.04	0.31



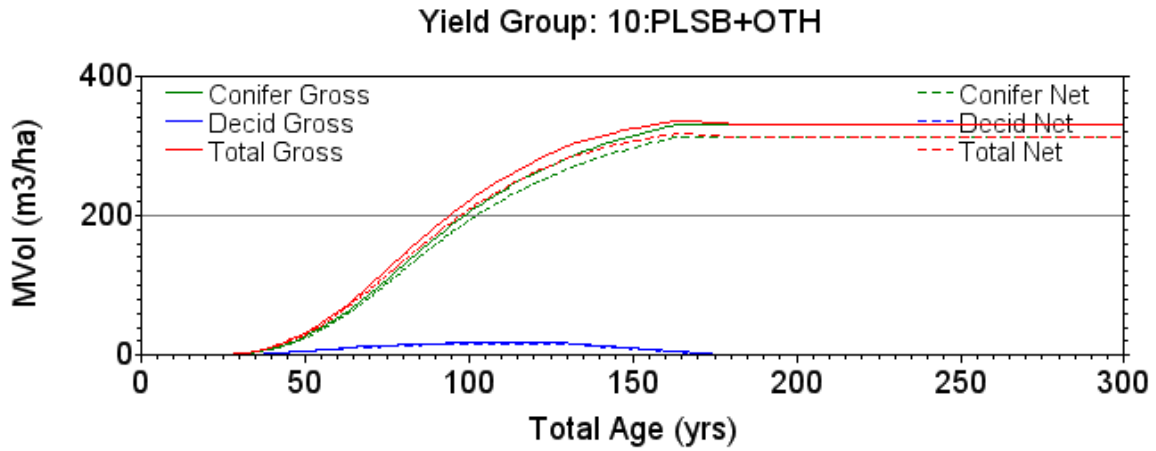
Yield Group 8 THLB Area : 24,838 ha (6%)

Tot Age	Yield Group	Gross Merch Vol (m3/ha)			Gross Merch MAI (m3/ha/yr)			Net Merch Vol (m3/ha)			Net Merch MAI (m3/ha)		
		Dec	Con	Tot	Dec	Con	Tot	Dec	Con	Tot	Dec	Con	Tot
10	8	0.0	0.0	0.0	0.00	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.00
20	8	0.0	0.3	0.3	0.00	0.02	0.02	0.0	0.3	0.3	0.00	0.01	0.01
30	8	0.2	4.4	4.7	0.01	0.15	0.16	0.2	4.2	4.4	0.01	0.14	0.15
40	8	1.4	19.0	20.4	0.03	0.48	0.51	1.2	18.0	19.2	0.03	0.45	0.48
50	8	3.9	48.8	52.7	0.08	0.98	1.05	3.6	46.1	49.6	0.07	0.92	0.99
60	8	7.6	91.6	99.2	0.13	1.53	1.65	6.9	86.6	93.5	0.12	1.44	1.56
70	8	11.5	139.4	150.9	0.16	1.99	2.16	10.5	131.7	142.2	0.15	1.88	2.03
80	8	14.9	183.9	198.8	0.19	2.30	2.49	13.5	173.8	187.3	0.17	2.17	2.34
90	8	17.3	221.5	238.8	0.19	2.46	2.65	15.7	209.3	225.0	0.17	2.33	2.50
100	8	18.5	251.7	270.3	0.19	2.52	2.70	16.8	237.9	254.7	0.17	2.38	2.55
110	8	18.8	275.6	294.4	0.17	2.51	2.68	17.0	260.4	277.4	0.15	2.37	2.52
120	8	18.8	294.4	313.2	0.16	2.45	2.61	17.0	278.2	295.2	0.14	2.32	2.46
130	8	18.8	309.3	328.1	0.14	2.38	2.52	17.0	292.3	309.4	0.13	2.25	2.38
140	8	15.0	321.4	336.4	0.11	2.30	2.40	13.6	303.7	317.3	0.10	2.17	2.27
150	8	11.3	331.1	342.4	0.08	2.21	2.28	10.2	312.9	323.1	0.07	2.09	2.15
160	8	7.5	335.3	342.8	0.05	2.10	2.14	6.8	316.9	323.7	0.04	1.98	2.02
170	8	3.8	335.3	339.1	0.02	1.97	1.99	3.4	316.9	320.3	0.02	1.86	1.88
180	8	0.0	335.3	335.3	0.00	1.86	1.86	0.0	316.9	316.9	0.00	1.76	1.76
190	8	0.0	335.3	335.3	0.00	1.76	1.76	0.0	316.9	316.9	0.00	1.67	1.67
200	8	0.0	335.3	335.3	0.00	1.68	1.68	0.0	316.9	316.9	0.00	1.58	1.58
210	8	0.0	335.3	335.3	0.00	1.60	1.60	0.0	316.9	316.9	0.00	1.51	1.51
220	8	0.0	335.3	335.3	0.00	1.52	1.52	0.0	316.9	316.9	0.00	1.44	1.44
230	8	0.0	335.3	335.3	0.00	1.46	1.46	0.0	316.9	316.9	0.00	1.38	1.38
240	8	0.0	335.3	335.3	0.00	1.40	1.40	0.0	316.9	316.9	0.00	1.32	1.32
250	8	0.0	335.3	335.3	0.00	1.34	1.34	0.0	316.9	316.9	0.00	1.27	1.27



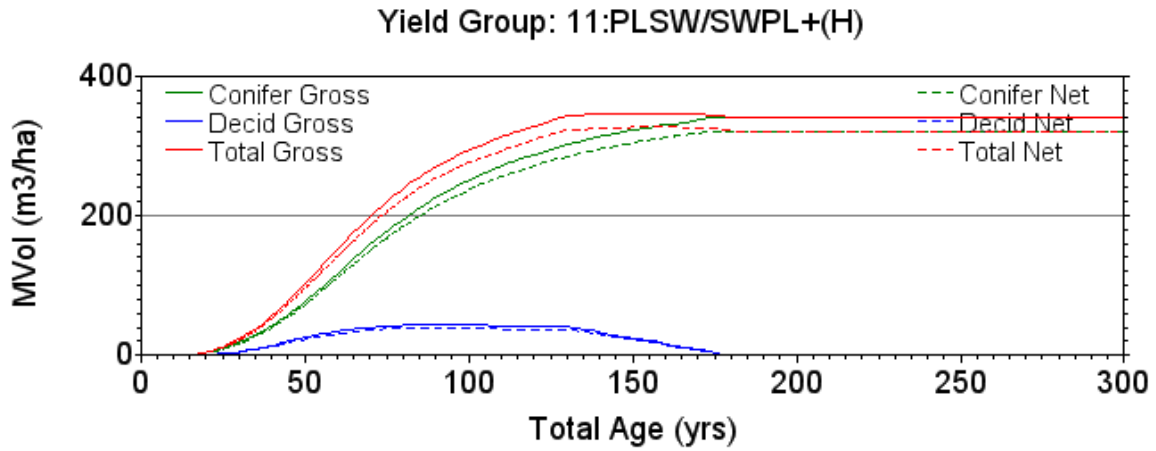
Yield Group 9 THLB Area : 12,983 ha (3%)

Tot Age	Yield Group	Gross Merch Vol (m3/ha)			Gross Merch MAI (m3/ha/yr)			Net Merch Vol (m3/ha)			Net Merch MAI (m3/ha)		
		Dec	Con	Tot	Dec	Con	Tot	Dec	Con	Tot	Dec	Con	Tot
10	9	0.0	0.0	0.0	0.00	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.00
20	9	0.1	1.3	1.4	0.01	0.06	0.07	0.1	1.2	1.3	0.01	0.06	0.06
30	9	2.9	10.6	13.5	0.10	0.35	0.45	2.6	10.0	12.7	0.09	0.33	0.42
40	9	15.7	30.1	45.7	0.39	0.75	1.14	14.2	28.4	42.6	0.35	0.71	1.07
50	9	38.2	57.1	95.2	0.76	1.14	1.90	34.6	53.9	88.5	0.69	1.08	1.77
60	9	63.3	86.2	149.6	1.06	1.44	2.49	57.4	81.5	138.9	0.96	1.36	2.31
70	9	86.2	113.0	199.1	1.23	1.61	2.84	78.1	106.8	184.8	1.12	1.53	2.64
80	9	104.5	135.8	240.3	1.31	1.70	3.00	94.7	128.3	223.0	1.18	1.60	2.79
90	9	117.6	154.3	271.8	1.31	1.71	3.02	106.5	145.8	252.3	1.18	1.62	2.80
100	9	125.9	168.9	294.9	1.26	1.69	2.95	114.1	159.6	273.7	1.14	1.60	2.74
110	9	130.5	180.6	311.1	1.19	1.64	2.83	118.2	170.6	288.9	1.07	1.55	2.63
120	9	130.5	189.8	320.3	1.09	1.58	2.67	118.2	179.3	297.6	0.99	1.49	2.48
130	9	130.5	197.1	327.6	1.00	1.52	2.52	118.2	186.3	304.5	0.91	1.43	2.34
140	9	104.4	203.0	307.4	0.75	1.45	2.20	94.6	191.9	286.4	0.68	1.37	2.05
150	9	78.3	206.0	284.3	0.52	1.37	1.90	70.9	194.7	265.6	0.47	1.30	1.77
160	9	52.2	206.0	258.2	0.33	1.29	1.61	47.3	194.7	242.0	0.30	1.22	1.51
170	9	26.1	206.0	232.1	0.15	1.21	1.37	23.6	194.7	218.3	0.14	1.15	1.28
180	9	0.0	206.0	206.0	0.00	1.14	1.14	0.0	194.7	194.7	0.00	1.08	1.08
190	9	0.0	206.0	206.0	0.00	1.08	1.08	0.0	194.7	194.7	0.00	1.02	1.02
200	9	0.0	206.0	206.0	0.00	1.03	1.03	0.0	194.7	194.7	0.00	0.97	0.97
210	9	0.0	206.0	206.0	0.00	0.98	0.98	0.0	194.7	194.7	0.00	0.93	0.93
220	9	0.0	206.0	206.0	0.00	0.94	0.94	0.0	194.7	194.7	0.00	0.88	0.88
230	9	0.0	206.0	206.0	0.00	0.90	0.90	0.0	194.7	194.7	0.00	0.85	0.85
240	9	0.0	206.0	206.0	0.00	0.86	0.86	0.0	194.7	194.7	0.00	0.81	0.81
250	9	0.0	206.0	206.0	0.00	0.82	0.82	0.0	194.7	194.7	0.00	0.78	0.78



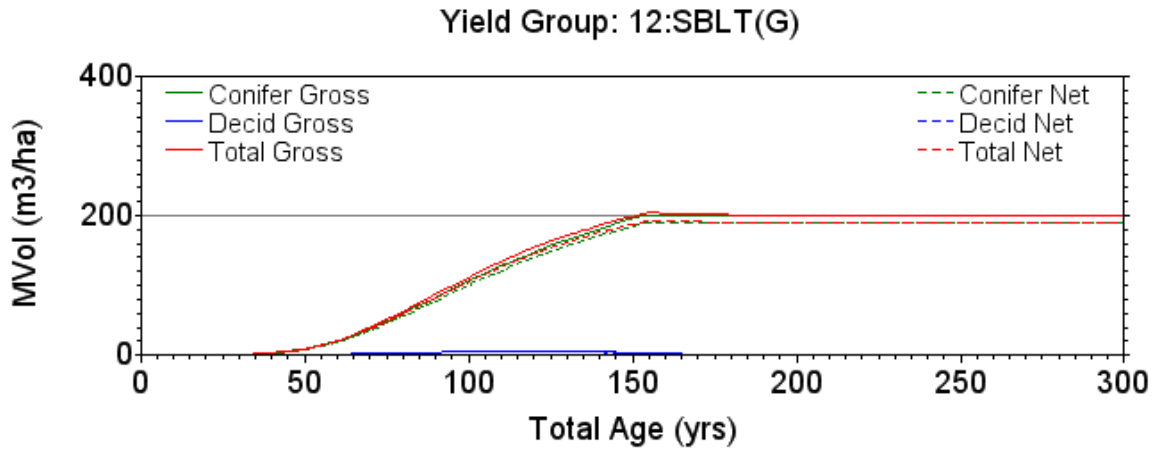
Yield Group 10 THLB Area : 13,411 ha (3%)

Tot Age	Yield Group	Gross Merch Vol (m3/ha)			Gross Merch MAI (m3/ha/yr)			Net Merch Vol (m3/ha)			Net Merch MAI (m3/ha)		
		Dec	Con	Tot	Dec	Con	Tot	Dec	Con	Tot	Dec	Con	Tot
10	10	0.0	0.0	0.0	0.00	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.00
20	10	0.0	0.1	0.1	0.00	0.00	0.01	0.0	0.1	0.1	0.00	0.00	0.00
30	10	0.5	1.9	2.4	0.02	0.06	0.08	0.5	1.8	2.2	0.02	0.06	0.07
40	10	2.5	9.3	11.8	0.06	0.23	0.30	2.3	8.8	11.1	0.06	0.22	0.28
50	10	5.8	25.7	31.5	0.12	0.51	0.63	5.3	24.2	29.5	0.11	0.48	0.59
60	10	9.2	52.6	61.8	0.15	0.88	1.03	8.4	49.7	58.1	0.14	0.83	0.97
70	10	12.3	88.3	100.6	0.18	1.26	1.44	11.1	83.5	94.6	0.16	1.19	1.35
80	10	14.8	128.2	143.0	0.19	1.60	1.79	13.4	121.2	134.6	0.17	1.51	1.68
90	10	16.7	167.7	184.3	0.19	1.86	2.05	15.1	158.5	173.5	0.17	1.76	1.93
100	10	17.5	203.3	220.8	0.17	2.03	2.21	15.8	192.1	207.9	0.16	1.92	2.08
110	10	17.3	234.0	251.3	0.16	2.13	2.28	15.7	221.1	236.8	0.14	2.01	2.15
120	10	17.3	259.9	277.2	0.14	2.17	2.31	15.7	245.6	261.3	0.13	2.05	2.18
130	10	17.3	281.7	299.0	0.13	2.17	2.30	15.7	266.2	281.8	0.12	2.05	2.17
140	10	13.8	299.6	313.4	0.10	2.14	2.24	12.5	283.1	295.6	0.09	2.02	2.11
150	10	10.4	314.1	324.5	0.07	2.09	2.16	9.4	296.9	306.2	0.06	1.98	2.04
160	10	6.9	326.2	333.1	0.04	2.04	2.08	6.3	308.2	314.5	0.04	1.93	1.97
170	10	3.5	331.4	334.9	0.02	1.95	1.97	3.1	313.2	316.3	0.02	1.84	1.86
180	10	0.0	331.4	331.4	0.00	1.84	1.84	0.0	313.2	313.2	0.00	1.74	1.74
190	10	0.0	331.4	331.4	0.00	1.74	1.74	0.0	313.2	313.2	0.00	1.65	1.65
200	10	0.0	331.4	331.4	0.00	1.66	1.66	0.0	313.2	313.2	0.00	1.57	1.57
210	10	0.0	331.4	331.4	0.00	1.58	1.58	0.0	313.2	313.2	0.00	1.49	1.49
220	10	0.0	331.4	331.4	0.00	1.51	1.51	0.0	313.2	313.2	0.00	1.42	1.42
230	10	0.0	331.4	331.4	0.00	1.44	1.44	0.0	313.2	313.2	0.00	1.36	1.36
240	10	0.0	331.4	331.4	0.00	1.38	1.38	0.0	313.2	313.2	0.00	1.30	1.30
250	10	0.0	331.4	331.4	0.00	1.33	1.33	0.0	313.2	313.2	0.00	1.25	1.25



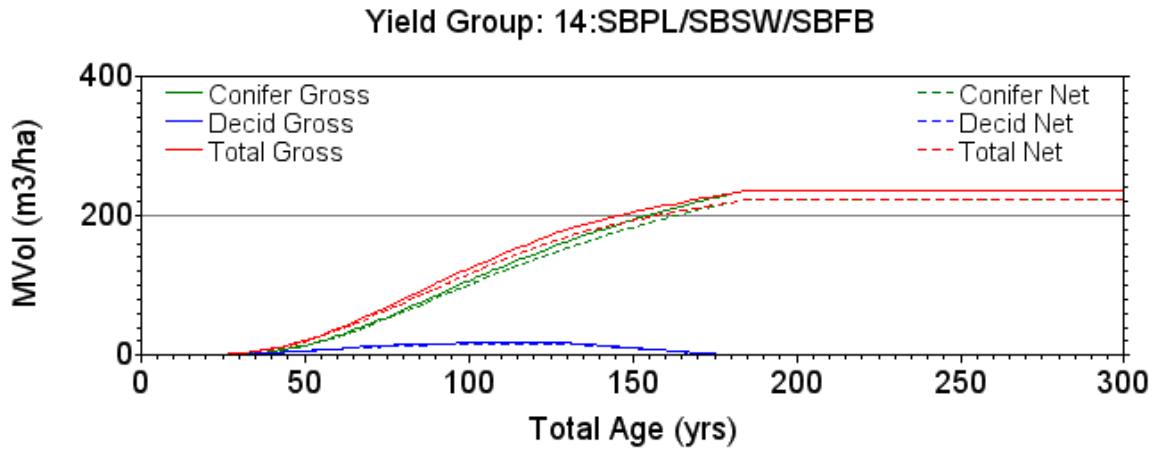
Yield Group 11 THLB Area : 17,491 ha (4%)

Tot Age	Yield Group	Gross Merch Vol (m3/ha)			Gross Merch MAI (m3/ha/yr)			Net Merch Vol (m3/ha)			Net Merch MAI (m3/ha)		
		Dec	Con	Tot	Dec	Con	Tot	Dec	Con	Tot	Dec	Con	Tot
10	11	0.0	0.0	0.0	0.00	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.00
20	11	0.9	3.5	4.3	0.04	0.17	0.22	0.8	3.3	4.1	0.04	0.16	0.20
30	11	4.9	17.9	22.7	0.16	0.60	0.76	4.4	16.9	21.3	0.15	0.56	0.71
40	11	14.2	42.0	56.2	0.36	1.05	1.40	12.9	39.7	52.5	0.32	0.99	1.31
50	11	25.2	76.3	101.5	0.50	1.53	2.03	22.8	72.1	94.9	0.46	1.44	1.90
60	11	34.0	117.3	151.2	0.57	1.95	2.52	30.8	110.8	141.6	0.51	1.85	2.36
70	11	39.9	158.4	198.2	0.57	2.26	2.83	36.1	149.7	185.8	0.52	2.14	2.65
80	11	43.1	194.9	238.0	0.54	2.44	2.98	39.1	184.2	223.3	0.49	2.30	2.79
90	11	44.0	225.5	269.5	0.49	2.51	2.99	39.8	213.1	252.9	0.44	2.37	2.81
100	11	43.2	250.4	293.6	0.43	2.50	2.94	39.1	236.6	275.8	0.39	2.37	2.76
110	11	41.3	270.7	312.1	0.38	2.46	2.84	37.4	255.8	293.3	0.34	2.33	2.67
120	11	41.3	287.3	328.6	0.34	2.39	2.74	37.4	271.5	309.0	0.31	2.26	2.57
130	11	41.3	301.0	342.3	0.32	2.32	2.63	37.4	284.4	321.9	0.29	2.19	2.48
140	11	33.1	312.3	345.4	0.24	2.23	2.47	30.0	295.1	325.1	0.21	2.11	2.32
150	11	24.8	321.9	346.7	0.17	2.15	2.31	22.5	304.2	326.6	0.15	2.03	2.18
160	11	16.5	330.0	346.5	0.10	2.06	2.17	15.0	311.8	326.8	0.09	1.95	2.04
170	11	8.3	337.0	345.3	0.05	1.98	2.03	7.5	318.5	326.0	0.04	1.87	1.92
180	11	0.0	340.2	340.2	0.00	1.89	1.89	0.0	321.4	321.4	0.00	1.79	1.79
190	11	0.0	340.2	340.2	0.00	1.79	1.79	0.0	321.4	321.4	0.00	1.69	1.69
200	11	0.0	340.2	340.2	0.00	1.70	1.70	0.0	321.4	321.4	0.00	1.61	1.61
210	11	0.0	340.2	340.2	0.00	1.62	1.62	0.0	321.4	321.4	0.00	1.53	1.53
220	11	0.0	340.2	340.2	0.00	1.55	1.55	0.0	321.4	321.4	0.00	1.46	1.46
230	11	0.0	340.2	340.2	0.00	1.48	1.48	0.0	321.4	321.4	0.00	1.40	1.40
240	11	0.0	340.2	340.2	0.00	1.42	1.42	0.0	321.4	321.4	0.00	1.34	1.34
250	11	0.0	340.2	340.2	0.00	1.36	1.36	0.0	321.4	321.4	0.00	1.29	1.29



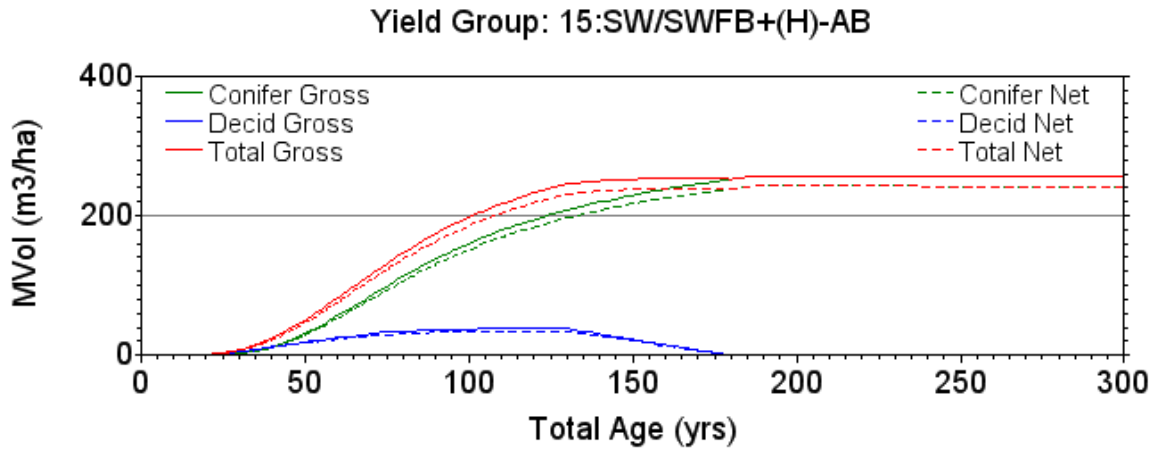
Yield Group 12 THLB Area : 11,487 ha (3%)

Tot Age	Yield Group	Gross Merch Vol (m3/ha)			Gross Merch MAI (m3/ha/yr)			Net Merch Vol (m3/ha)			Net Merch MAI (m3/ha)		
		Dec	Con	Tot	Dec	Con	Tot	Dec	Con	Tot	Dec	Con	Tot
10	12	0.0	0.0	0.0	0.00	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.00
20	12	0.0	0.2	0.2	0.00	0.01	0.01	0.0	0.2	0.2	0.00	0.01	0.01
30	12	0.0	1.1	1.1	0.00	0.04	0.04	0.0	1.0	1.0	0.00	0.03	0.03
40	12	0.1	3.2	3.3	0.00	0.08	0.08	0.1	3.0	3.1	0.00	0.07	0.08
50	12	0.5	8.6	9.1	0.01	0.17	0.18	0.4	8.2	8.6	0.01	0.16	0.17
60	12	1.2	20.1	21.3	0.02	0.33	0.35	1.1	19.0	20.0	0.02	0.32	0.33
70	12	2.2	37.7	39.9	0.03	0.54	0.57	2.0	35.6	37.6	0.03	0.51	0.54
80	12	3.4	59.2	62.6	0.04	0.74	0.78	3.1	56.0	59.0	0.04	0.70	0.74
90	12	4.4	82.5	87.0	0.05	0.92	0.97	4.0	78.0	82.0	0.04	0.87	0.91
100	12	5.4	105.8	111.2	0.05	1.06	1.11	4.9	100.0	104.9	0.05	1.00	1.05
110	12	6.2	127.8	134.0	0.06	1.16	1.22	5.7	120.7	126.4	0.05	1.10	1.15
120	12	6.2	147.7	154.0	0.05	1.23	1.28	5.7	139.6	145.3	0.05	1.16	1.21
130	12	6.2	165.5	171.8	0.05	1.27	1.32	5.7	156.4	162.1	0.04	1.20	1.25
140	12	5.0	181.2	186.2	0.04	1.29	1.33	4.5	171.2	175.8	0.03	1.22	1.26
150	12	3.7	195.0	198.7	0.02	1.30	1.32	3.4	184.3	187.7	0.02	1.23	1.25
160	12	2.5	201.2	203.7	0.02	1.26	1.27	2.3	190.2	192.4	0.01	1.19	1.20
170	12	1.2	201.2	202.5	0.01	1.18	1.19	1.1	190.2	191.3	0.01	1.12	1.13
180	12	0.0	201.2	201.2	0.00	1.12	1.12	0.0	190.2	190.2	0.00	1.06	1.06
190	12	0.0	201.2	201.2	0.00	1.06	1.06	0.0	190.2	190.2	0.00	1.00	1.00
200	12	0.0	201.2	201.2	0.00	1.01	1.01	0.0	190.2	190.2	0.00	0.95	0.95
210	12	0.0	201.2	201.2	0.00	0.96	0.96	0.0	190.2	190.2	0.00	0.91	0.91
220	12	0.0	201.2	201.2	0.00	0.91	0.91	0.0	190.2	190.2	0.00	0.86	0.86
230	12	0.0	201.2	201.2	0.00	0.87	0.87	0.0	190.2	190.2	0.00	0.83	0.83
240	12	0.0	201.2	201.2	0.00	0.84	0.84	0.0	190.2	190.2	0.00	0.79	0.79
250	12	0.0	201.2	201.2	0.00	0.80	0.80	0.0	190.2	190.2	0.00	0.76	0.76



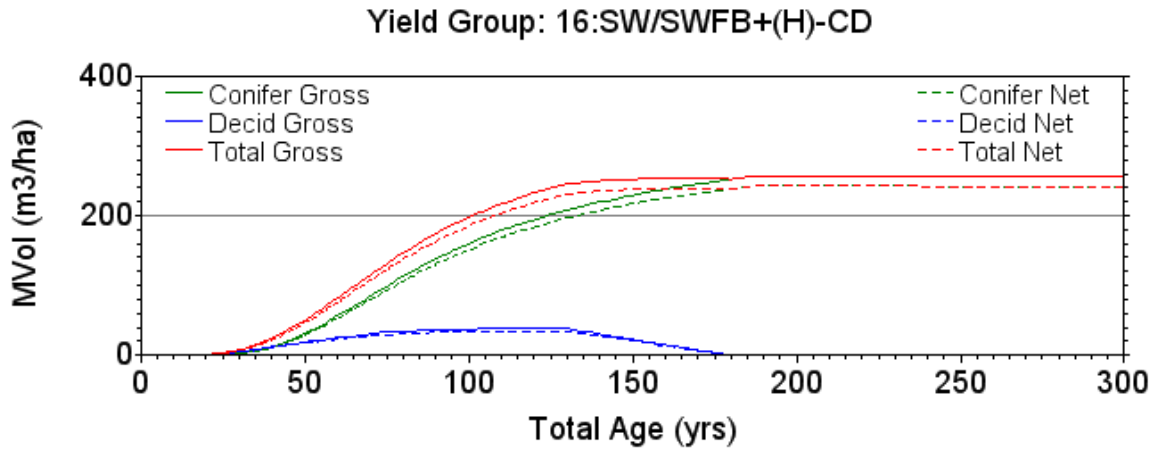
Yield Group 14 THLB Area : 19,298 ha (5%)

Tot Age	Yield Group	Gross Merch Vol (m3/ha)			Gross Merch MAI (m3/ha/yr)			Net Merch Vol (m3/ha)			Net Merch MAI (m3/ha)		
		Dec	Con	Tot	Dec	Con	Tot	Dec	Con	Tot	Dec	Con	Tot
10	14	0.0	0.0	0.0	0.00	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.00
20	14	0.1	0.2	0.3	0.01	0.01	0.02	0.1	0.2	0.3	0.01	0.01	0.01
30	14	1.2	1.6	2.8	0.04	0.05	0.09	1.1	1.5	2.6	0.04	0.05	0.09
40	14	3.7	5.4	9.1	0.09	0.14	0.23	3.3	5.1	8.4	0.08	0.13	0.21
50	14	6.8	14.0	20.8	0.14	0.28	0.42	6.1	13.3	19.4	0.12	0.27	0.39
60	14	9.8	27.7	37.6	0.16	0.46	0.63	8.9	26.2	35.1	0.15	0.44	0.59
70	14	12.6	45.2	57.8	0.18	0.65	0.83	11.4	42.7	54.1	0.16	0.61	0.77
80	14	14.7	64.9	79.6	0.18	0.81	1.00	13.3	61.4	74.7	0.17	0.77	0.93
90	14	16.3	85.6	101.9	0.18	0.95	1.13	14.8	80.9	95.7	0.16	0.90	1.06
100	14	17.4	106.4	123.8	0.17	1.06	1.24	15.7	100.5	116.3	0.16	1.01	1.16
110	14	17.8	126.3	144.1	0.16	1.15	1.31	16.2	119.3	135.5	0.15	1.08	1.23
120	14	17.8	145.0	162.8	0.15	1.21	1.36	16.2	137.0	153.2	0.13	1.14	1.28
130	14	17.8	162.5	180.3	0.14	1.25	1.39	16.2	153.6	169.7	0.12	1.18	1.31
140	14	14.3	178.7	193.0	0.10	1.28	1.38	12.9	168.9	181.8	0.09	1.21	1.30
150	14	10.7	193.7	204.4	0.07	1.29	1.36	9.7	183.1	192.7	0.06	1.22	1.28
160	14	7.1	207.4	214.6	0.04	1.30	1.34	6.5	196.0	202.5	0.04	1.23	1.27
170	14	3.6	220.0	223.5	0.02	1.29	1.31	3.2	207.9	211.1	0.02	1.22	1.24
180	14	0.0	231.3	231.3	0.00	1.28	1.28	0.0	218.6	218.6	0.00	1.21	1.21
190	14	0.0	236.5	236.5	0.00	1.24	1.24	0.0	223.5	223.5	0.00	1.18	1.18
200	14	0.0	236.5	236.5	0.00	1.18	1.18	0.0	223.5	223.5	0.00	1.12	1.12
210	14	0.0	236.5	236.5	0.00	1.13	1.13	0.0	223.5	223.5	0.00	1.06	1.06
220	14	0.0	236.5	236.5	0.00	1.07	1.07	0.0	223.5	223.5	0.00	1.02	1.02
230	14	0.0	236.5	236.5	0.00	1.03	1.03	0.0	223.5	223.5	0.00	0.97	0.97
240	14	0.0	236.5	236.5	0.00	0.99	0.99	0.0	223.5	223.5	0.00	0.93	0.93
250	14	0.0	236.5	236.5	0.00	0.95	0.95	0.0	223.5	223.5	0.00	0.89	0.89



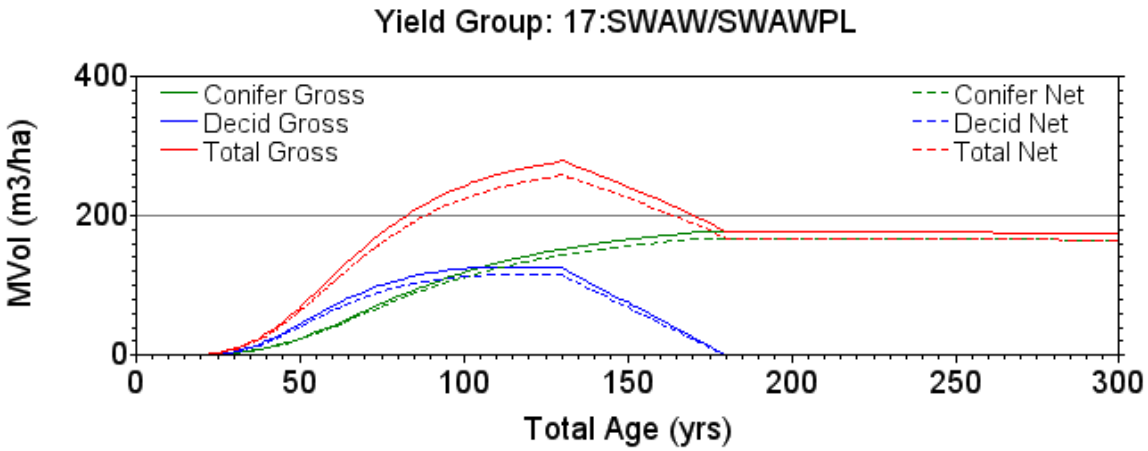
Yield Group 15 THLB Area : 20,200 ha (5%)

Tot Age	Yield Group	Gross Merch Vol (m3/ha)			Gross Merch MAI (m3/ha/yr)			Net Merch Vol (m3/ha)			Net Merch MAI (m3/ha)		
		Dec	Con	Tot	Dec	Con	Tot	Dec	Con	Tot	Dec	Con	Tot
10	15	0.0	0.0	0.0	0.00	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.00
20	15	0.6	0.4	0.9	0.03	0.02	0.05	0.5	0.4	0.9	0.03	0.02	0.04
30	15	4.7	2.9	7.6	0.16	0.10	0.25	4.2	2.8	7.0	0.14	0.09	0.23
40	15	11.8	12.0	23.8	0.30	0.30	0.60	10.7	11.3	22.0	0.27	0.28	0.55
50	15	18.9	30.4	49.3	0.38	0.61	0.99	17.1	28.7	45.9	0.34	0.57	0.92
60	15	25.0	55.9	80.9	0.42	0.93	1.35	22.7	52.8	75.5	0.38	0.88	1.26
70	15	30.2	84.2	114.4	0.43	1.20	1.63	27.3	79.6	106.9	0.39	1.14	1.53
80	15	33.9	112.1	146.0	0.42	1.40	1.82	30.7	105.9	136.6	0.38	1.32	1.71
90	15	36.3	137.5	173.8	0.40	1.53	1.93	32.9	130.0	162.8	0.37	1.44	1.81
100	15	37.5	159.7	197.2	0.38	1.60	1.97	34.0	150.9	184.9	0.34	1.51	1.85
110	15	37.9	178.6	216.4	0.34	1.62	1.97	34.3	168.7	203.0	0.31	1.53	1.85
120	15	37.9	194.5	232.4	0.32	1.62	1.94	34.3	183.8	218.1	0.29	1.53	1.82
130	15	37.9	208.1	245.9	0.29	1.60	1.89	34.3	196.6	230.9	0.26	1.51	1.78
140	15	30.3	219.6	249.9	0.22	1.57	1.78	27.4	207.5	235.0	0.20	1.48	1.68
150	15	22.7	229.5	252.2	0.15	1.53	1.68	20.6	216.9	237.5	0.14	1.45	1.58
160	15	15.1	238.1	253.2	0.09	1.49	1.58	13.7	225.0	238.7	0.09	1.41	1.49
170	15	7.6	245.6	253.2	0.04	1.44	1.49	6.9	232.1	239.0	0.04	1.37	1.41
180	15	0.0	252.3	252.3	0.00	1.40	1.40	0.0	238.5	238.5	0.00	1.32	1.32
190	15	0.0	256.6	256.6	0.00	1.35	1.35	0.0	242.5	242.5	0.00	1.28	1.28
200	15	0.0	256.6	256.6	0.00	1.28	1.28	0.0	242.5	242.5	0.00	1.21	1.21
210	15	0.0	256.5	256.5	0.00	1.22	1.22	0.0	242.4	242.4	0.00	1.15	1.15
220	15	0.0	256.4	256.4	0.00	1.17	1.17	0.0	242.3	242.3	0.00	1.10	1.10
230	15	0.0	256.3	256.3	0.00	1.11	1.11	0.0	242.2	242.2	0.00	1.05	1.05
240	15	0.0	256.2	256.2	0.00	1.07	1.07	0.0	242.1	242.1	0.00	1.01	1.01
250	15	0.0	256.1	256.1	0.00	1.02	1.02	0.0	242.0	242.0	0.00	0.97	0.97



Yield Group 16 THLB Area : 17,827 ha (5%)

Tot Age	Yield Group	Gross Merch Vol (m3/ha)			Gross Merch MAI (m3/ha/yr)			Net Merch Vol (m3/ha)			Net Merch MAI (m3/ha)		
		Dec	Con	Tot	Dec	Con	Tot	Dec	Con	Tot	Dec	Con	Tot
10	16	0.0	0.0	0.0	0.00	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.00
20	16	0.6	0.4	0.9	0.03	0.02	0.05	0.5	0.4	0.9	0.03	0.02	0.04
30	16	4.7	2.9	7.6	0.16	0.10	0.25	4.2	2.8	7.0	0.14	0.09	0.23
40	16	11.8	12.0	23.8	0.30	0.30	0.60	10.7	11.3	22.0	0.27	0.28	0.55
50	16	18.9	30.4	49.3	0.38	0.61	0.99	17.1	28.7	45.9	0.34	0.57	0.92
60	16	25.0	55.9	80.9	0.42	0.93	1.35	22.7	52.8	75.5	0.38	0.88	1.26
70	16	30.2	84.2	114.4	0.43	1.20	1.63	27.3	79.6	106.9	0.39	1.14	1.53
80	16	33.9	112.1	146.0	0.42	1.40	1.82	30.7	105.9	136.6	0.38	1.32	1.71
90	16	36.3	137.5	173.8	0.40	1.53	1.93	32.9	130.0	162.8	0.37	1.44	1.81
100	16	37.5	159.7	197.2	0.38	1.60	1.97	34.0	150.9	184.9	0.34	1.51	1.85
110	16	37.9	178.6	216.4	0.34	1.62	1.97	34.3	168.7	203.0	0.31	1.53	1.85
120	16	37.9	194.5	232.4	0.32	1.62	1.94	34.3	183.8	218.1	0.29	1.53	1.82
130	16	37.9	208.1	245.9	0.29	1.60	1.89	34.3	196.6	230.9	0.26	1.51	1.78
140	16	30.3	219.6	249.9	0.22	1.57	1.78	27.4	207.5	235.0	0.20	1.48	1.68
150	16	22.7	229.5	252.2	0.15	1.53	1.68	20.6	216.9	237.5	0.14	1.45	1.58
160	16	15.1	238.1	253.2	0.09	1.49	1.58	13.7	225.0	238.7	0.09	1.41	1.49
170	16	7.6	245.6	253.2	0.04	1.44	1.49	6.9	232.1	239.0	0.04	1.37	1.41
180	16	0.0	252.3	252.3	0.00	1.40	1.40	0.0	238.5	238.5	0.00	1.32	1.32
190	16	0.0	256.6	256.6	0.00	1.35	1.35	0.0	242.5	242.5	0.00	1.28	1.28
200	16	0.0	256.6	256.6	0.00	1.28	1.28	0.0	242.5	242.5	0.00	1.21	1.21
210	16	0.0	256.5	256.5	0.00	1.22	1.22	0.0	242.4	242.4	0.00	1.15	1.15
220	16	0.0	256.4	256.4	0.00	1.17	1.17	0.0	242.3	242.3	0.00	1.10	1.10
230	16	0.0	256.3	256.3	0.00	1.11	1.11	0.0	242.2	242.2	0.00	1.05	1.05
240	16	0.0	256.2	256.2	0.00	1.07	1.07	0.0	242.1	242.1	0.00	1.01	1.01
250	16	0.0	256.1	256.1	0.00	1.02	1.02	0.0	242.0	242.0	0.00	0.97	0.97

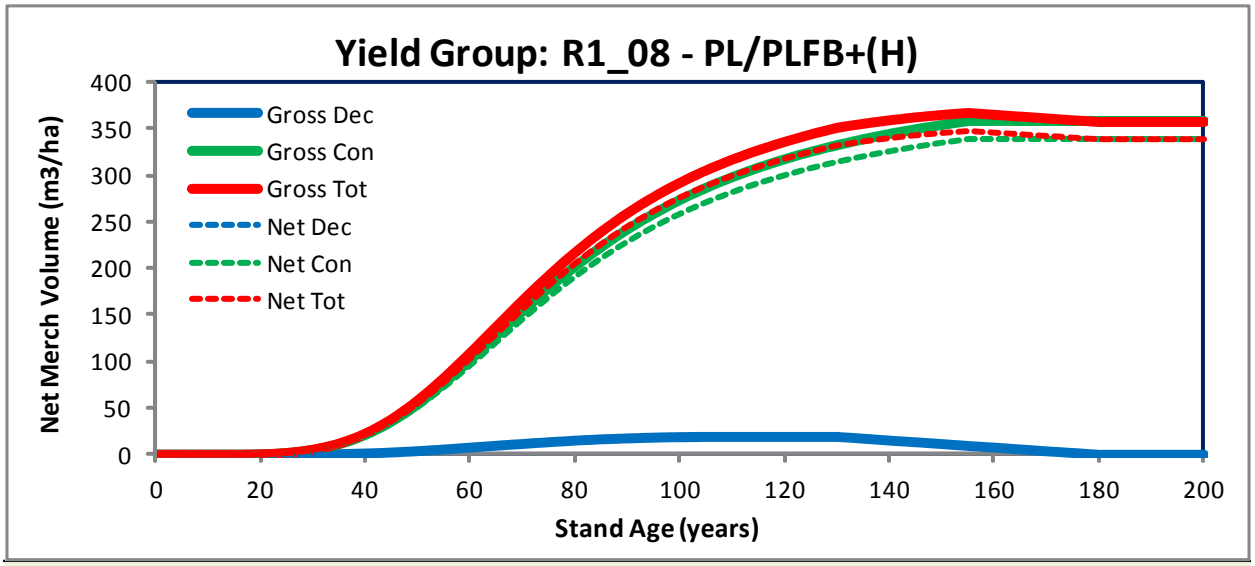


Yield Group 17 THLB Area : 38,743 ha (10%)

Tot Age	Yield Group	Gross Merch Vol (m3/ha)			Gross Merch MAI (m3/ha/yr)			Net Merch Vol (m3/ha)			Net Merch MAI (m3/ha)		
		Dec	Con	Tot	Dec	Con	Tot	Dec	Con	Tot	Dec	Con	Tot
10	17	0.0	0.0	0.0	0.00	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.00
20	17	0.4	0.4	0.9	0.02	0.02	0.04	0.4	0.4	0.8	0.02	0.02	0.04
30	17	5.1	3.5	8.6	0.17	0.12	0.29	4.6	3.3	7.9	0.15	0.11	0.26
40	17	19.9	10.6	30.6	0.50	0.27	0.76	18.1	10.1	28.1	0.45	0.25	0.70
50	17	44.4	23.7	68.1	0.89	0.47	1.36	40.2	22.4	62.7	0.80	0.45	1.25
60	17	70.3	42.3	112.6	1.17	0.71	1.88	63.7	40.0	103.7	1.06	0.67	1.73
70	17	91.9	63.4	155.3	1.31	0.91	2.22	83.3	59.9	143.2	1.19	0.86	2.05
80	17	107.7	84.0	191.7	1.35	1.05	2.40	97.6	79.3	176.9	1.22	0.99	2.21
90	17	118.1	102.3	220.4	1.31	1.14	2.45	107.0	96.7	203.7	1.19	1.07	2.26
100	17	124.1	118.0	242.1	1.24	1.18	2.42	112.4	111.5	223.9	1.12	1.12	2.24
110	17	126.6	131.3	257.9	1.15	1.19	2.34	114.7	124.0	238.8	1.04	1.13	2.17
120	17	126.6	142.3	268.9	1.06	1.19	2.24	114.7	134.4	249.1	0.96	1.12	2.08
130	17	126.6	151.4	278.0	0.97	1.16	2.14	114.7	143.1	257.8	0.88	1.10	1.98
140	17	101.3	159.1	260.4	0.72	1.14	1.86	91.8	150.3	242.1	0.66	1.07	1.73
150	17	76.0	165.5	241.5	0.51	1.10	1.61	68.8	156.4	225.2	0.46	1.04	1.50
160	17	50.6	171.1	221.7	0.32	1.07	1.39	45.9	161.6	207.5	0.29	1.01	1.30
170	17	25.3	175.8	201.2	0.15	1.03	1.18	22.9	166.2	189.1	0.13	0.98	1.11
180	17	0.0	177.5	177.5	0.00	0.99	0.99	0.0	167.8	167.8	0.00	0.93	0.93
190	17	0.0	177.4	177.4	0.00	0.93	0.93	0.0	167.6	167.6	0.00	0.88	0.88
200	17	0.0	177.2	177.2	0.00	0.89	0.89	0.0	167.4	167.4	0.00	0.84	0.84
210	17	0.0	177.0	177.0	0.00	0.84	0.84	0.0	167.2	167.2	0.00	0.80	0.80
220	17	0.0	176.7	176.7	0.00	0.80	0.80	0.0	167.0	167.0	0.00	0.76	0.76
230	17	0.0	176.5	176.5	0.00	0.77	0.77	0.0	166.8	166.8	0.00	0.73	0.73
240	17	0.0	176.2	176.2	0.00	0.73	0.73	0.0	166.5	166.5	0.00	0.69	0.69
250	17	0.0	176.0	176.0	0.00	0.70	0.70	0.0	166.3	166.3	0.00	0.67	0.67

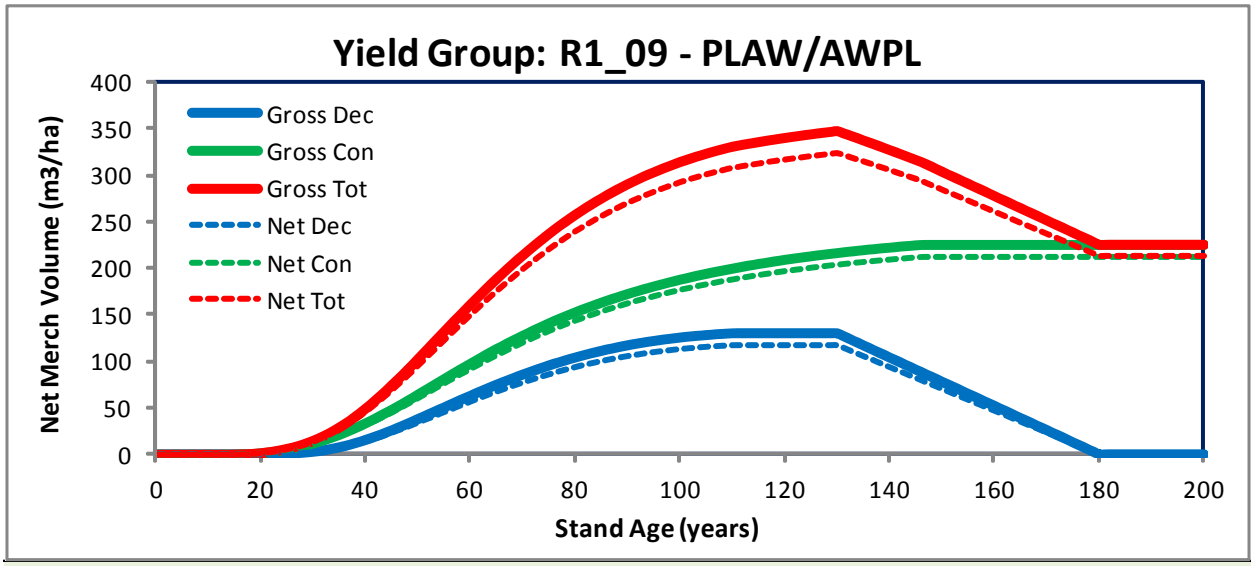
Appendix E: MANAGED STAND YIELD CURVES

R1 - PRE-1991 MANAGED STANDS (ONLY YIELD GROUPS DIFFERENT FROM NATURAL)



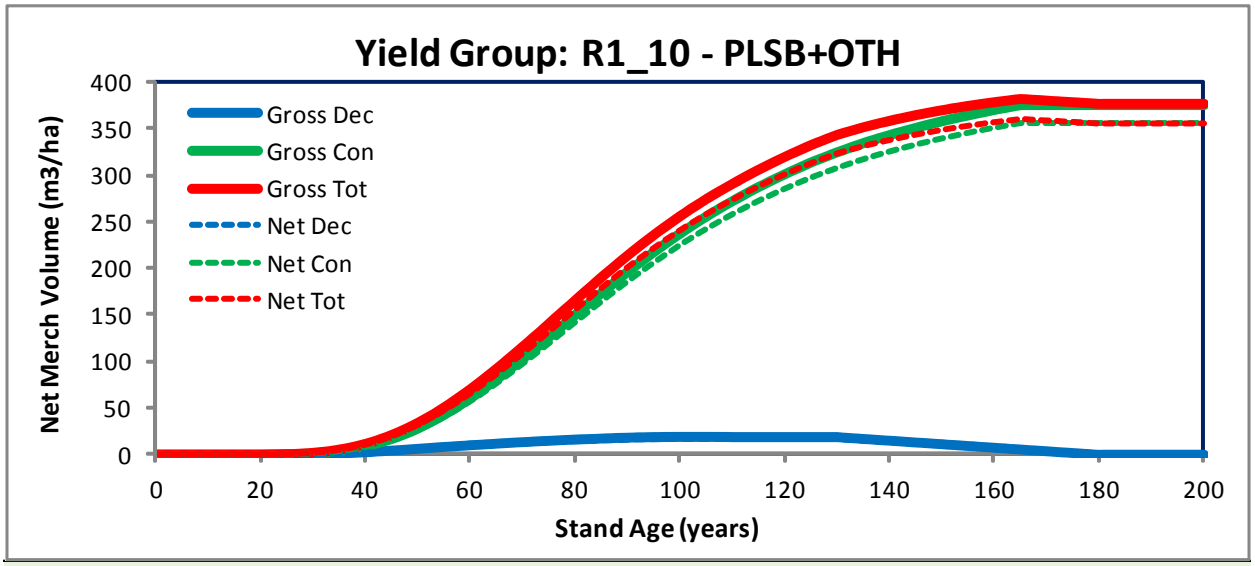
R1 THLB Area: 2,925 ha (8%)

Total Age	Grs Merch Vol (m^3/ha)			Grs Merch MAI (m^3/ha/yr)			Net Merch Vol (m^3/ha)			Net Merch MAI (m^3/ha)		
	Dec	Con	Tot	Dec	Con	Tot	Dec	Con	Tot	Dec	Con	Tot
10	0.0	0.0	0.0	0.00	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.00
20	0.0	0.5	0.5	0.00	0.03	0.03	0.0	0.5	0.5	0.00	0.03	0.03
30	0.2	5.4	5.6	0.01	0.18	0.19	0.2	5.1	5.3	0.01	0.17	0.18
40	1.4	21.6	23.0	0.04	0.54	0.58	1.3	20.4	21.7	0.03	0.51	0.54
50	4.1	54.6	58.7	0.08	1.09	1.17	3.7	51.6	55.3	0.07	1.03	1.11
60	8.0	102.0	109.9	0.13	1.70	1.83	7.2	96.4	103.6	0.12	1.61	1.73
70	12.0	154.2	166.2	0.17	2.20	2.37	10.9	145.7	156.6	0.16	2.08	2.24
80	15.6	202.1	217.6	0.20	2.53	2.72	14.1	191.0	205.1	0.18	2.39	2.56
90	18.0	241.8	259.9	0.20	2.69	2.89	16.4	228.5	244.9	0.18	2.54	2.72
100	19.4	273.3	292.6	0.19	2.73	2.93	17.5	258.2	275.8	0.18	2.58	2.76
110	19.6	297.8	317.5	0.18	2.71	2.89	17.8	281.4	299.2	0.16	2.56	2.72
120	19.6	317.0	336.6	0.16	2.64	2.81	17.8	299.5	317.3	0.15	2.50	2.64
130	19.6	332.0	351.7	0.15	2.55	2.71	17.8	313.8	331.6	0.14	2.41	2.55
140	15.7	344.0	359.7	0.11	2.46	2.57	14.2	325.1	339.3	0.10	2.32	2.42
150	11.8	353.7	365.5	0.08	2.36	2.44	10.7	334.2	344.9	0.07	2.23	2.30
160	7.9	357.8	365.6	0.05	2.24	2.29	7.1	338.1	345.2	0.04	2.11	2.16
170	3.9	357.8	361.7	0.02	2.10	2.13	3.6	338.1	341.7	0.02	1.99	2.01
180	0.0	357.8	357.8	0.00	1.99	1.99	0.0	338.1	338.1	0.00	1.88	1.88
190	0.0	357.8	357.8	0.00	1.88	1.88	0.0	338.1	338.1	0.00	1.78	1.78
200	0.0	357.8	357.8	0.00	1.79	1.79	0.0	338.1	338.1	0.00	1.69	1.69



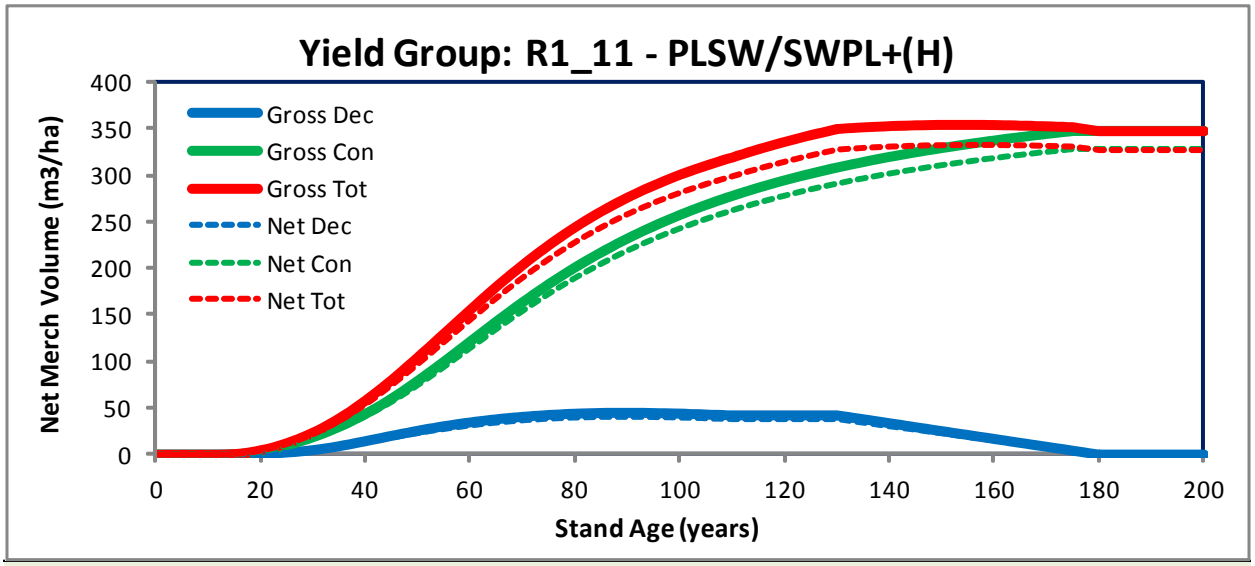
R1 THLB Area: 4,379 ha (13%)

Total Age	Grs Merch Vol (m^3/ha)			Grs Merch MAI (m^3/ha/yr)			Net Merch Vol (m^3/ha)			Net Merch MAI (m^3/ha)		
	Dec	Con	Tot	Dec	Con	Tot	Dec	Con	Tot	Dec	Con	Tot
10	0.0	0.0	0.0	0.00	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.00
20	0.1	1.6	1.7	0.01	0.08	0.09	0.1	1.5	1.6	0.01	0.08	0.08
30	2.9	12.1	15.0	0.10	0.40	0.50	2.6	11.4	14.1	0.09	0.38	0.47
40	15.6	33.8	49.4	0.39	0.85	1.24	14.1	31.9	46.1	0.35	0.80	1.15
50	38.1	64.5	102.5	0.76	1.29	2.05	34.5	60.9	95.4	0.69	1.22	1.91
60	63.2	97.7	160.9	1.05	1.63	2.68	57.3	92.3	149.6	0.96	1.54	2.49
70	86.1	127.7	213.7	1.23	1.82	3.05	78.0	120.7	198.6	1.11	1.72	2.84
80	104.4	152.6	257.0	1.31	1.91	3.21	94.6	144.2	238.8	1.18	1.80	2.99
90	117.5	172.3	289.8	1.31	1.91	3.22	106.5	162.8	269.3	1.18	1.81	2.99
100	125.9	187.6	313.5	1.26	1.88	3.14	114.1	177.3	291.3	1.14	1.77	2.91
110	130.5	199.5	330.0	1.19	1.81	3.00	118.2	188.5	306.8	1.07	1.71	2.79
120	130.5	208.9	339.3	1.09	1.74	2.83	118.2	197.4	315.6	0.99	1.65	2.63
130	130.5	216.2	346.7	1.00	1.66	2.67	118.2	204.3	322.5	0.91	1.57	2.48
140	104.4	222.0	326.4	0.75	1.59	2.33	94.6	209.8	304.4	0.68	1.50	2.17
150	78.3	224.9	303.2	0.52	1.50	2.02	70.9	212.6	283.5	0.47	1.42	1.89
160	52.2	224.9	277.1	0.33	1.41	1.73	47.3	212.6	259.9	0.30	1.33	1.62
170	26.1	224.9	251.0	0.15	1.32	1.48	23.6	212.6	236.2	0.14	1.25	1.39
180	0.0	224.9	224.9	0.00	1.25	1.25	0.0	212.6	212.6	0.00	1.18	1.18
190	0.0	224.9	224.9	0.00	1.18	1.18	0.0	212.6	212.6	0.00	1.12	1.12
200	0.0	224.9	224.9	0.00	1.12	1.12	0.0	212.6	212.6	0.00	1.06	1.06



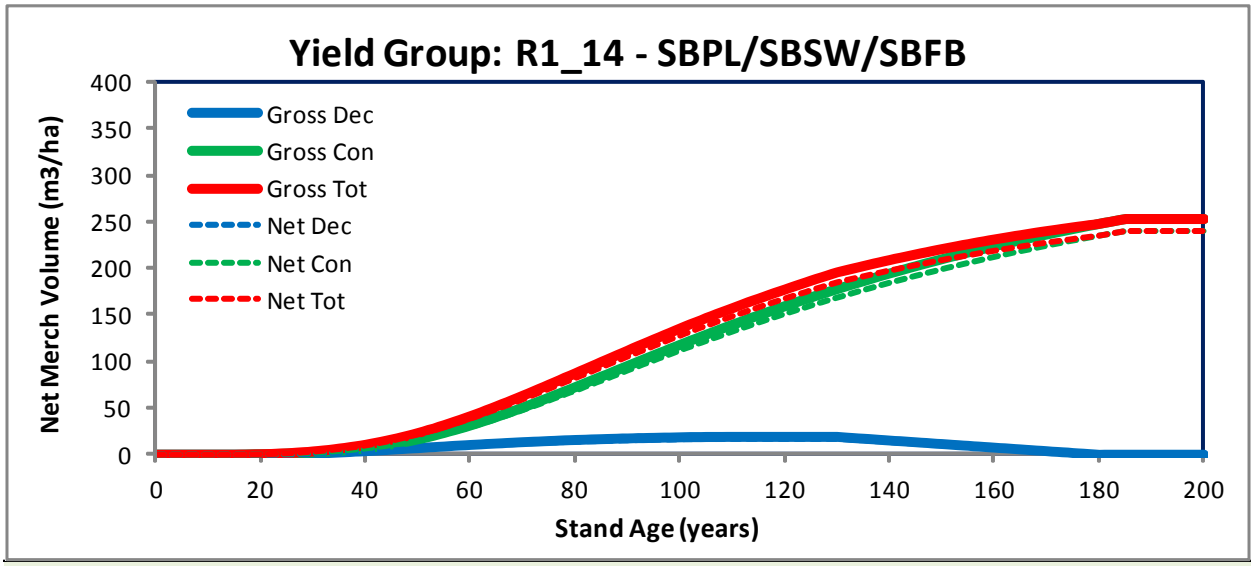
R1 THLB Area: 1,176 ha (3%)

Total Age	Grs Merch Vol (m^3/ha)			Grs Merch MAI (m^3/ha/yr)			Net Merch Vol (m^3/ha)			Net Merch MAI (m^3/ha)		
	Dec	Con	Tot	Dec	Con	Tot	Dec	Con	Tot	Dec	Con	Tot
10	0.0	0.0	0.0	0.00	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.00
20	0.0	0.1	0.1	0.00	0.01	0.01	0.0	0.1	0.1	0.00	0.01	0.01
30	0.5	1.6	2.2	0.02	0.05	0.07	0.5	1.6	2.0	0.02	0.05	0.07
40	2.5	9.3	11.8	0.06	0.23	0.30	2.3	8.7	11.0	0.06	0.22	0.28
50	6.0	28.4	34.3	0.12	0.57	0.69	5.4	26.8	32.2	0.11	0.54	0.64
60	9.5	60.8	70.3	0.16	1.01	1.17	8.6	57.5	66.1	0.14	0.96	1.10
70	12.5	103.3	115.8	0.18	1.48	1.65	11.4	97.6	108.9	0.16	1.39	1.56
80	15.1	150.2	165.3	0.19	1.88	2.07	13.7	142.0	155.6	0.17	1.78	1.95
90	16.9	196.4	213.4	0.19	2.18	2.37	15.3	185.6	201.0	0.17	2.06	2.23
100	17.7	237.6	255.3	0.18	2.38	2.55	16.0	224.6	240.6	0.16	2.25	2.41
110	17.5	272.5	290.0	0.16	2.48	2.64	15.9	257.5	273.3	0.14	2.34	2.48
120	17.5	301.4	318.9	0.15	2.51	2.66	15.9	284.8	300.6	0.13	2.37	2.51
130	17.5	324.9	342.4	0.13	2.50	2.63	15.9	307.0	322.8	0.12	2.36	2.48
140	14.0	343.4	357.4	0.10	2.45	2.55	12.7	324.5	337.2	0.09	2.32	2.41
150	10.5	358.3	368.8	0.07	2.39	2.46	9.5	338.6	348.1	0.06	2.26	2.32
160	7.0	370.4	377.4	0.04	2.32	2.36	6.3	350.0	356.3	0.04	2.19	2.23
170	3.5	375.6	379.1	0.02	2.21	2.23	3.2	354.9	358.1	0.02	2.09	2.11
180	0.0	375.6	375.6	0.00	2.09	2.09	0.0	354.9	354.9	0.00	1.97	1.97
190	0.0	375.6	375.6	0.00	1.98	1.98	0.0	354.9	354.9	0.00	1.87	1.87
200	0.0	375.6	375.6	0.00	1.88	1.88	0.0	354.9	354.9	0.00	1.77	1.77



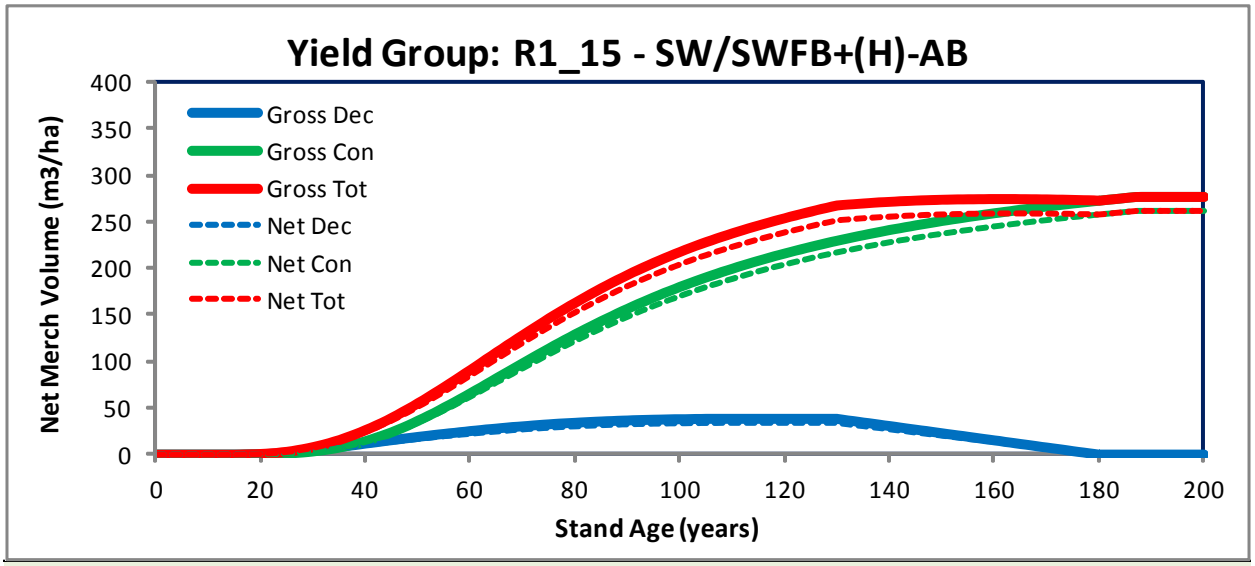
R1 THLB Area: 2,458 ha (7%)

Total Age	Grs Merch Vol (m^3/ha)			Grs Merch MAI (m^3/ha/yr)			Net Merch Vol (m^3/ha)			Net Merch MAI (m^3/ha)		
	Dec	Con	Tot	Dec	Con	Tot	Dec	Con	Tot	Dec	Con	Tot
10	0.0	0.0	0.0	0.00	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.00
20	0.9	3.9	4.8	0.05	0.20	0.24	0.8	3.7	4.5	0.04	0.19	0.23
30	4.9	19.0	23.9	0.16	0.63	0.80	4.4	17.9	22.4	0.15	0.60	0.75
40	14.3	43.9	58.2	0.36	1.10	1.46	12.9	41.5	54.4	0.32	1.04	1.36
50	25.2	79.4	104.6	0.50	1.59	2.09	22.8	75.0	97.9	0.46	1.50	1.96
60	34.0	121.5	155.5	0.57	2.03	2.59	30.8	114.8	145.6	0.51	1.91	2.43
70	39.9	163.5	203.4	0.57	2.34	2.91	36.2	154.5	190.7	0.52	2.21	2.72
80	43.1	200.7	243.9	0.54	2.51	3.05	39.1	189.7	228.8	0.49	2.37	2.86
90	44.0	231.7	275.7	0.49	2.57	3.06	39.8	219.0	258.8	0.44	2.43	2.88
100	43.1	256.9	300.0	0.43	2.57	3.00	39.1	242.7	281.8	0.39	2.43	2.82
110	41.3	277.3	318.6	0.38	2.52	2.90	37.4	262.1	299.5	0.34	2.38	2.72
120	41.3	294.0	335.3	0.34	2.45	2.79	37.4	277.8	315.2	0.31	2.32	2.63
130	41.3	307.7	349.0	0.32	2.37	2.68	37.4	290.7	328.2	0.29	2.24	2.52
140	33.1	319.0	352.1	0.24	2.28	2.52	29.9	301.5	331.4	0.21	2.15	2.37
150	24.8	328.5	353.3	0.17	2.19	2.36	22.5	310.5	332.9	0.15	2.07	2.22
160	16.5	336.6	353.2	0.10	2.10	2.21	15.0	318.1	333.1	0.09	1.99	2.08
170	8.3	343.6	351.9	0.05	2.02	2.07	7.5	324.7	332.2	0.04	1.91	1.95
180	0.0	346.7	346.7	0.00	1.93	1.93	0.0	327.7	327.7	0.00	1.82	1.82
190	0.0	346.7	346.7	0.00	1.82	1.82	0.0	327.7	327.7	0.00	1.72	1.72
200	0.0	346.7	346.7	0.00	1.73	1.73	0.0	327.7	327.7	0.00	1.64	1.64



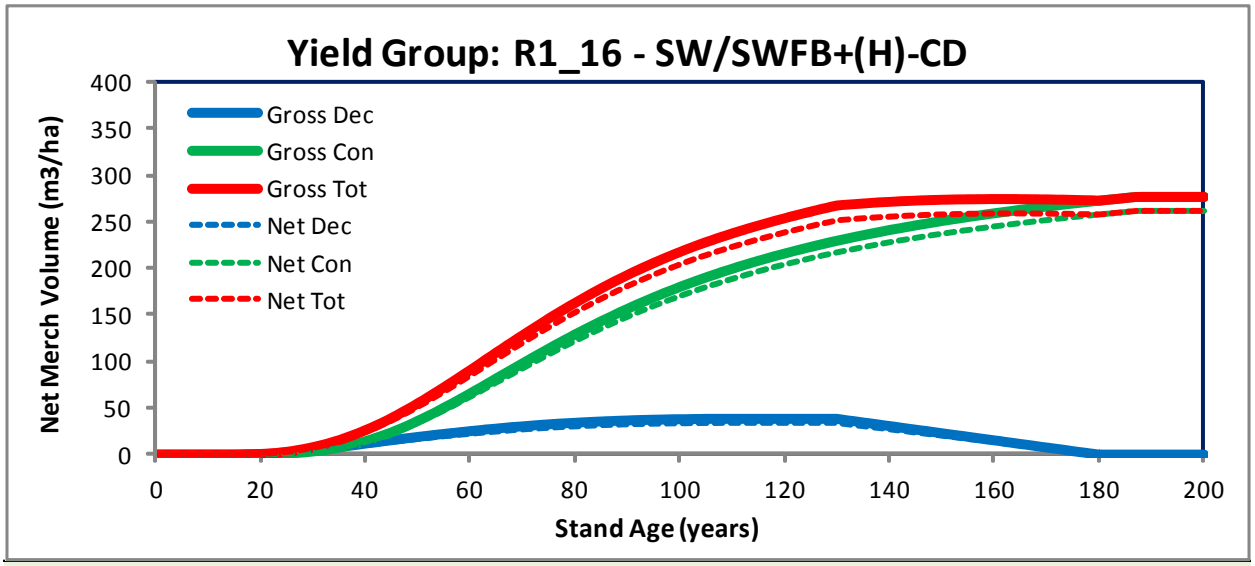
R1 THLB Area: 96 ha (0%)

Total Age	Grs Merch Vol (m^3/ha)			Grs Merch MAI (m^3/ha/yr)			Net Merch Vol (m^3/ha)			Net Merch MAI (m^3/ha)		
	Dec	Con	Tot	Dec	Con	Tot	Dec	Con	Tot	Dec	Con	Tot
10	0.0	0.0	0.0	0.00	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.00
20	0.1	0.5	0.6	0.01	0.03	0.03	0.1	0.5	0.5	0.01	0.03	0.03
30	1.1	2.5	3.7	0.04	0.08	0.12	1.0	2.4	3.4	0.03	0.08	0.11
40	3.6	7.2	10.8	0.09	0.18	0.27	3.3	6.8	10.1	0.08	0.17	0.25
50	6.7	16.7	23.4	0.13	0.33	0.47	6.1	15.8	21.9	0.12	0.32	0.44
60	9.9	31.6	41.5	0.17	0.53	0.69	9.0	29.9	38.8	0.15	0.50	0.65
70	12.7	50.8	63.5	0.18	0.73	0.91	11.5	48.0	59.5	0.16	0.69	0.85
80	14.8	72.7	87.5	0.19	0.91	1.09	13.4	68.7	82.1	0.17	0.86	1.03
90	16.4	95.5	111.9	0.18	1.06	1.24	14.9	90.3	105.2	0.17	1.00	1.17
100	17.5	118.2	135.7	0.18	1.18	1.36	15.9	111.7	127.5	0.16	1.12	1.28
110	18.0	139.7	157.6	0.16	1.27	1.43	16.3	132.0	148.3	0.15	1.20	1.35
120	18.0	159.7	177.6	0.15	1.33	1.48	16.3	150.9	167.2	0.14	1.26	1.39
130	18.0	178.1	196.0	0.14	1.37	1.51	16.3	168.3	184.5	0.13	1.29	1.42
140	14.4	194.8	209.2	0.10	1.39	1.49	13.0	184.1	197.2	0.09	1.32	1.41
150	10.8	210.2	221.0	0.07	1.40	1.47	9.8	198.6	208.4	0.07	1.32	1.39
160	7.2	224.2	231.4	0.05	1.40	1.45	6.5	211.8	218.4	0.04	1.32	1.37
170	3.6	236.8	240.4	0.02	1.39	1.41	3.3	223.8	227.0	0.02	1.32	1.34
180	0.0	248.1	248.1	0.00	1.38	1.38	0.0	234.5	234.5	0.00	1.30	1.30
190	0.0	253.3	253.3	0.00	1.33	1.33	0.0	239.4	239.4	0.00	1.26	1.26
200	0.0	253.3	253.3	0.00	1.27	1.27	0.0	239.4	239.4	0.00	1.20	1.20



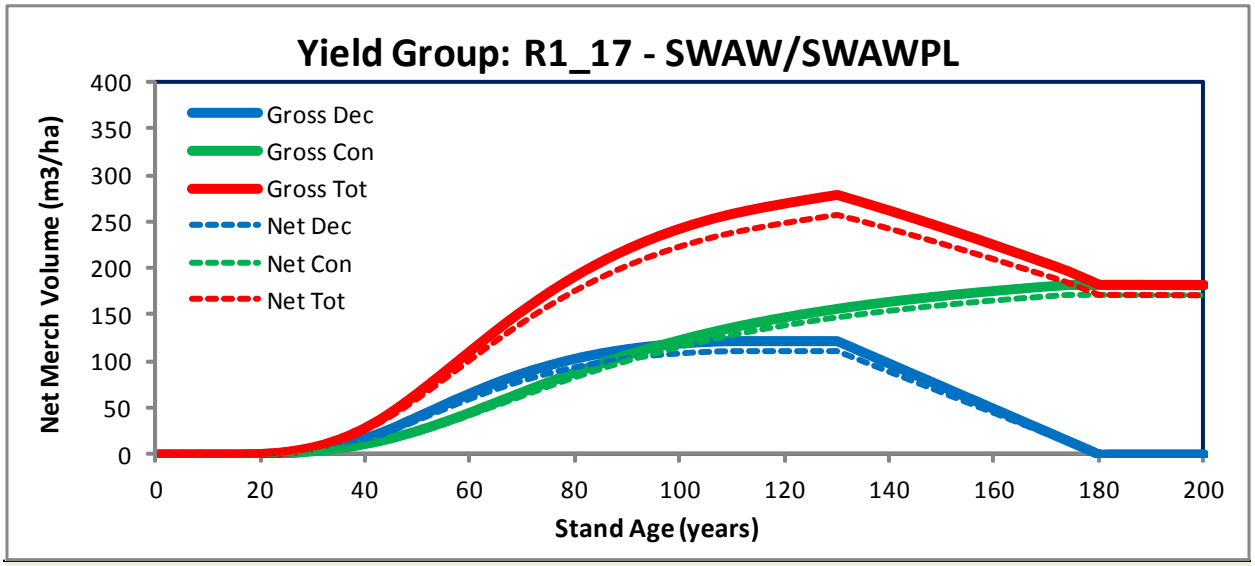
R1 THLB Area: 1,386 ha (4%)

Total Age	Grs Merch Vol (m^3/ha)			Grs Merch MAI (m^3/ha/yr)			Net Merch Vol (m^3/ha)			Net Merch MAI (m^3/ha)		
	Dec	Con	Tot	Dec	Con	Tot	Dec	Con	Tot	Dec	Con	Tot
10	0.0	0.0	0.0	0.00	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.00
20	0.5	0.4	0.9	0.03	0.02	0.05	0.5	0.4	0.9	0.03	0.02	0.05
30	4.6	3.6	8.2	0.15	0.12	0.27	4.2	3.4	7.6	0.14	0.11	0.25
40	11.8	14.7	26.5	0.30	0.37	0.66	10.7	13.9	24.5	0.27	0.35	0.61
50	18.8	36.5	55.3	0.38	0.73	1.11	17.1	34.5	51.5	0.34	0.69	1.03
60	25.0	66.0	91.0	0.42	1.10	1.52	22.6	62.4	85.0	0.38	1.04	1.42
70	30.1	98.2	128.3	0.43	1.40	1.83	27.3	92.8	120.1	0.39	1.33	1.72
80	33.8	129.1	162.9	0.42	1.61	2.04	30.6	122.0	152.6	0.38	1.53	1.91
90	36.2	156.5	192.8	0.40	1.74	2.14	32.8	147.9	180.8	0.36	1.64	2.01
100	37.5	180.0	217.4	0.38	1.80	2.17	34.0	170.1	204.0	0.34	1.70	2.04
110	37.8	199.5	237.3	0.34	1.81	2.16	34.3	188.5	222.8	0.31	1.71	2.03
120	37.8	215.8	253.6	0.32	1.80	2.11	34.3	203.9	238.2	0.29	1.70	1.99
130	37.8	229.4	267.2	0.29	1.76	2.06	34.3	216.8	251.1	0.26	1.67	1.93
140	30.3	240.9	271.1	0.22	1.72	1.94	27.4	227.6	255.0	0.20	1.63	1.82
150	22.7	250.6	273.3	0.15	1.67	1.82	20.6	236.8	257.3	0.14	1.58	1.72
160	15.1	258.9	274.0	0.09	1.62	1.71	13.7	244.6	258.3	0.09	1.53	1.61
170	7.6	266.0	273.6	0.04	1.56	1.61	6.9	251.4	258.3	0.04	1.48	1.52
180	0.0	272.3	272.3	0.00	1.51	1.51	0.0	257.4	257.4	0.00	1.43	1.43
190	0.0	276.3	276.3	0.00	1.45	1.45	0.0	261.1	261.1	0.00	1.37	1.37
200	0.0	276.3	276.3	0.00	1.38	1.38	0.0	261.1	261.1	0.00	1.31	1.31



R1 THLB Area: 1,534 ha (4%)

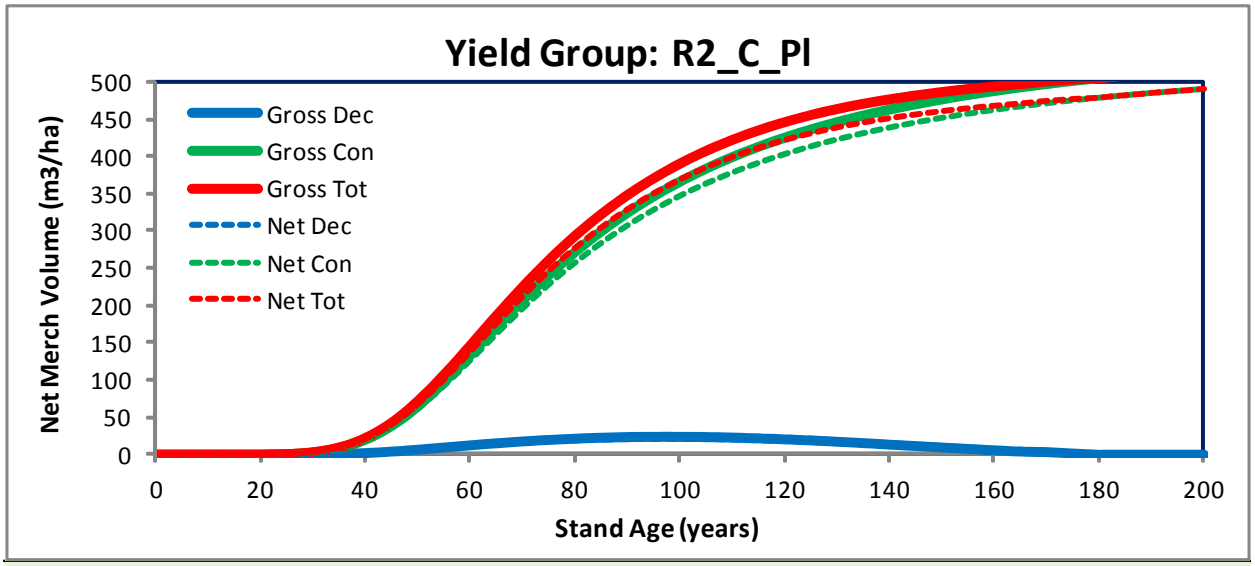
Total Age	Grs Merch Vol (m^3/ha)			Grs Merch MAI (m^3/ha/yr)			Net Merch Vol (m^3/ha)			Net Merch MAI (m^3/ha)		
	Dec	Con	Tot	Dec	Con	Tot	Dec	Con	Tot	Dec	Con	Tot
10	0.0	0.0	0.0	0.00	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.00
20	0.5	0.4	0.9	0.03	0.02	0.05	0.5	0.4	0.9	0.03	0.02	0.05
30	4.6	3.6	8.2	0.15	0.12	0.27	4.2	3.4	7.6	0.14	0.11	0.25
40	11.8	14.7	26.5	0.30	0.37	0.66	10.7	13.9	24.5	0.27	0.35	0.61
50	18.8	36.5	55.3	0.38	0.73	1.11	17.1	34.5	51.5	0.34	0.69	1.03
60	25.0	66.0	91.0	0.42	1.10	1.52	22.6	62.4	85.0	0.38	1.04	1.42
70	30.1	98.2	128.3	0.43	1.40	1.83	27.3	92.8	120.1	0.39	1.33	1.72
80	33.8	129.1	162.9	0.42	1.61	2.04	30.6	122.0	152.6	0.38	1.53	1.91
90	36.2	156.5	192.8	0.40	1.74	2.14	32.8	147.9	180.8	0.36	1.64	2.01
100	37.5	180.0	217.4	0.38	1.80	2.17	34.0	170.1	204.0	0.34	1.70	2.04
110	37.8	199.5	237.3	0.34	1.81	2.16	34.3	188.5	222.8	0.31	1.71	2.03
120	37.8	215.8	253.6	0.32	1.80	2.11	34.3	203.9	238.2	0.29	1.70	1.99
130	37.8	229.4	267.2	0.29	1.76	2.06	34.3	216.8	251.1	0.26	1.67	1.93
140	30.3	240.9	271.1	0.22	1.72	1.94	27.4	227.6	255.0	0.20	1.63	1.82
150	22.7	250.6	273.3	0.15	1.67	1.82	20.6	236.8	257.3	0.14	1.58	1.72
160	15.1	258.9	274.0	0.09	1.62	1.71	13.7	244.6	258.3	0.09	1.53	1.61
170	7.6	266.0	273.6	0.04	1.56	1.61	6.9	251.4	258.3	0.04	1.48	1.52
180	0.0	272.3	272.3	0.00	1.51	1.51	0.0	257.4	257.4	0.00	1.43	1.43
190	0.0	276.3	276.3	0.00	1.45	1.45	0.0	261.1	261.1	0.00	1.37	1.37
200	0.0	276.3	276.3	0.00	1.38	1.38	0.0	261.1	261.1	0.00	1.31	1.31



R1 THLB Area: 6,187 ha (18%)

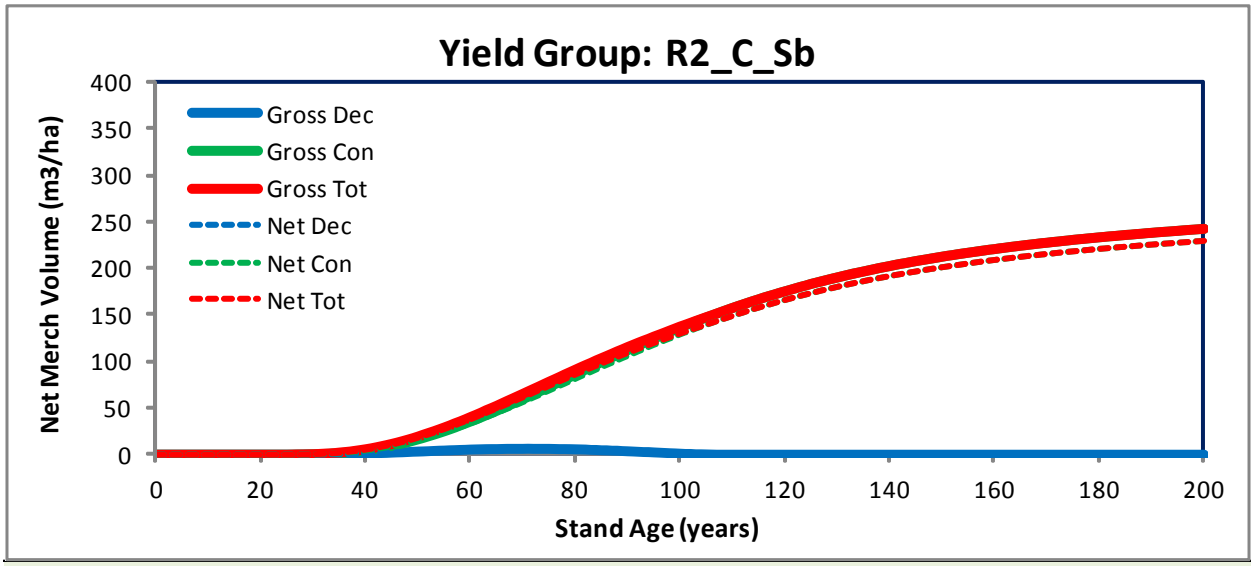
Total Age	Grs Merch Vol (m^3/ha)			Grs Merch MAI (m^3/ha/yr)			Net Merch Vol (m^3/ha)			Net Merch MAI (m^3/ha)		
	Dec	Con	Tot	Dec	Con	Tot	Dec	Con	Tot	Dec	Con	Tot
10	0.0	0.0	0.0	0.00	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.00
20	0.4	0.4	0.9	0.02	0.02	0.05	0.4	0.4	0.8	0.02	0.02	0.04
30	4.3	3.8	8.1	0.14	0.13	0.27	3.9	3.6	7.5	0.13	0.12	0.25
40	17.4	11.7	29.0	0.44	0.29	0.73	15.8	11.0	26.8	0.40	0.28	0.67
50	40.4	25.8	66.2	0.81	0.52	1.32	36.6	24.4	61.0	0.73	0.49	1.22
60	65.6	45.4	111.1	1.09	0.76	1.85	59.4	42.9	102.4	0.99	0.72	1.71
70	87.0	67.3	154.3	1.24	0.96	2.20	78.8	63.6	142.4	1.13	0.91	2.03
80	102.6	88.4	191.0	1.28	1.11	2.39	93.0	83.6	176.5	1.16	1.05	2.21
90	113.0	107.1	220.0	1.26	1.19	2.44	102.3	101.2	203.5	1.14	1.12	2.26
100	118.9	123.0	241.9	1.19	1.23	2.42	107.7	116.2	224.0	1.08	1.16	2.24
110	121.4	136.3	257.7	1.10	1.24	2.34	110.0	128.8	238.8	1.00	1.17	2.17
120	121.4	147.3	268.7	1.01	1.23	2.24	110.0	139.2	249.2	0.92	1.16	2.08
130	121.4	156.4	277.8	0.93	1.20	2.14	110.0	147.8	257.8	0.85	1.14	1.98
140	97.2	163.9	261.1	0.69	1.17	1.87	88.0	154.9	242.9	0.63	1.11	1.74
150	72.9	170.2	243.1	0.49	1.13	1.62	66.0	160.9	226.9	0.44	1.07	1.51
160	48.6	175.6	224.2	0.30	1.10	1.40	44.0	166.0	210.0	0.28	1.04	1.31
170	24.3	180.3	204.6	0.14	1.06	1.20	22.0	170.4	192.4	0.13	1.00	1.13
180	0.0	181.9	181.9	0.00	1.01	1.01	0.0	171.9	171.9	0.00	0.96	0.96
190	0.0	181.7	181.7	0.00	0.96	0.96	0.0	171.7	171.7	0.00	0.90	0.90
200	0.0	181.5	181.5	0.00	0.91	0.91	0.0	171.5	171.5	0.00	0.86	0.86

R2 - POST-1991 MANAGED STANDS (RSA SURVEY BASED)



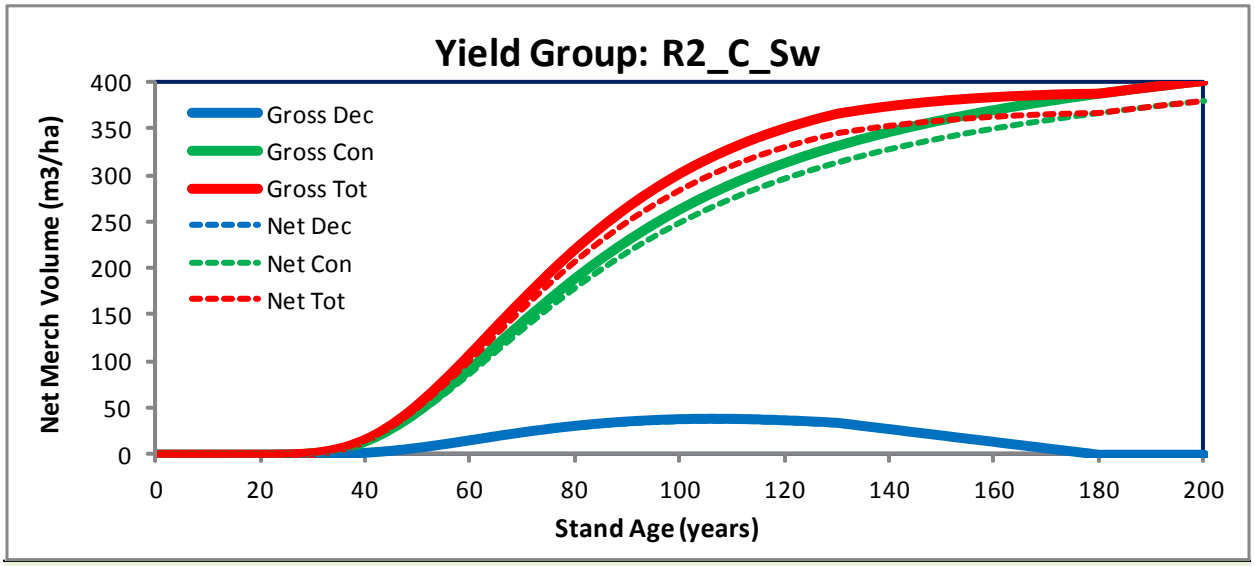
R2 THLB Area: 18,559 ha (36%)

Total Age	Grs Merch Vol (m^3/ha)			Grs Merch MAI (m^3/ha/yr)			Net Merch Vol (m^3/ha)			Net Merch MAI (m^3/ha)		
	Dec	Con	Tot	Dec	Con	Tot	Dec	Con	Tot	Dec	Con	Tot
10	0.0	0.0	0.0	0.00	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.00
20	0.0	0.2	0.2	0.00	0.01	0.01	0.0	0.1	0.2	0.00	0.01	0.01
30	0.3	3.3	3.6	0.01	0.11	0.12	0.3	3.1	3.4	0.01	0.10	0.11
40	2.3	20.5	22.7	0.06	0.51	0.57	2.1	19.3	21.4	0.05	0.48	0.54
50	6.9	65.5	72.4	0.14	1.31	1.45	6.3	61.9	68.2	0.13	1.24	1.36
60	12.8	134.4	147.2	0.21	2.24	2.45	11.6	127.0	138.6	0.19	2.12	2.31
70	18.0	207.9	225.9	0.26	2.97	3.23	16.3	196.5	212.8	0.23	2.81	3.04
80	21.7	272.6	294.4	0.27	3.41	3.68	19.7	257.6	277.3	0.25	3.22	3.47
90	23.8	325.3	349.1	0.26	3.61	3.88	21.5	307.4	328.9	0.24	3.42	3.65
100	24.1	367.1	391.2	0.24	3.67	3.91	21.9	346.9	368.8	0.22	3.47	3.69
110	23.1	400.1	423.1	0.21	3.64	3.85	20.9	378.1	399.0	0.19	3.44	3.63
120	20.8	426.2	447.0	0.17	3.55	3.73	18.8	402.8	421.6	0.16	3.36	3.51
130	17.6	447.0	464.7	0.14	3.44	3.57	16.0	422.5	438.4	0.12	3.25	3.37
140	13.7	463.8	477.6	0.10	3.31	3.41	12.4	438.3	450.8	0.09	3.13	3.22
150	9.9	477.5	487.4	0.07	3.18	3.25	8.9	451.3	460.2	0.06	3.01	3.07
160	6.1	488.8	494.9	0.04	3.06	3.09	5.5	461.9	467.4	0.03	2.89	2.92
170	3.5	498.2	501.7	0.02	2.93	2.95	3.2	470.8	474.0	0.02	2.77	2.79
180	0.0	506.1	506.1	0.00	2.81	2.81	0.0	478.2	478.2	0.00	2.66	2.66
190	0.0	512.7	512.7	0.00	2.70	2.70	0.0	484.5	484.5	0.00	2.55	2.55
200	0.0	518.4	518.4	0.00	2.59	2.59	0.0	489.9	489.9	0.00	2.45	2.45



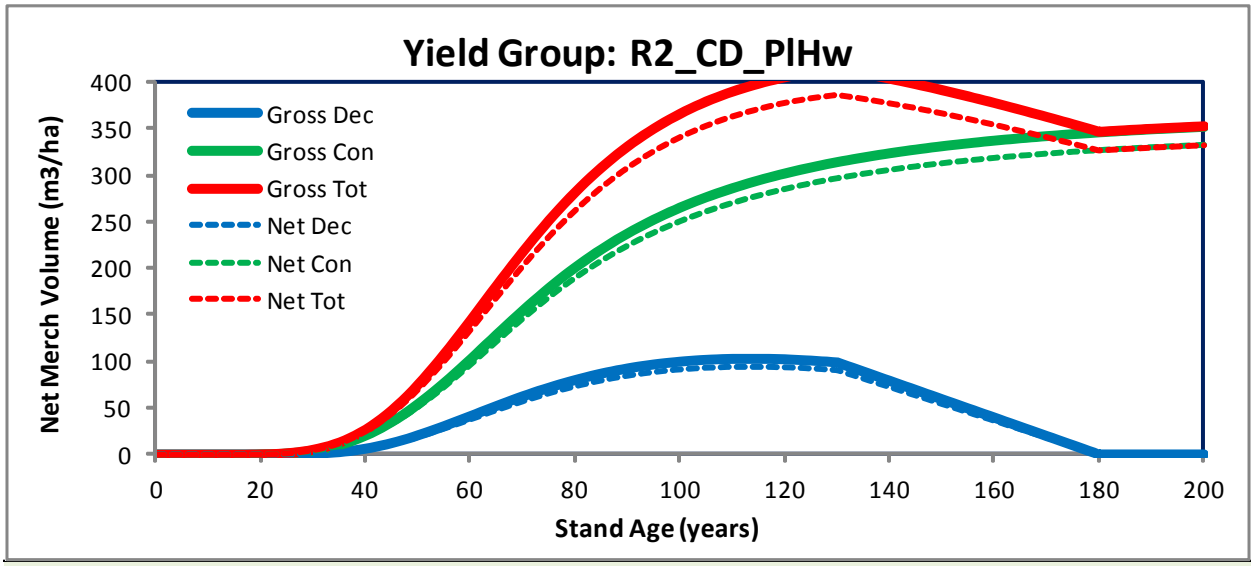
R2 THLB Area: 1,414 ha (3%)

Total Age	Grs Merch Vol (m^3/ha)			Grs Merch MAI (m^3/ha/yr)			Net Merch Vol (m^3/ha)			Net Merch MAI (m^3/ha)		
	Dec	Con	Tot	Dec	Con	Tot	Dec	Con	Tot	Dec	Con	Tot
10	0.0	0.0	0.0	0.00	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.00
20	0.0	0.0	0.0	0.00	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.00
30	0.2	0.5	0.7	0.01	0.02	0.02	0.2	0.5	0.7	0.01	0.02	0.02
40	1.2	4.8	6.0	0.03	0.12	0.15	1.1	4.6	5.6	0.03	0.11	0.14
50	3.0	16.6	19.6	0.06	0.33	0.39	2.8	15.7	18.4	0.06	0.31	0.37
60	4.8	35.7	40.5	0.08	0.59	0.68	4.4	33.7	38.1	0.07	0.56	0.63
70	5.6	59.8	65.4	0.08	0.85	0.93	5.1	56.5	61.6	0.07	0.81	0.88
80	5.1	86.1	91.2	0.06	1.08	1.14	4.6	81.4	86.0	0.06	1.02	1.07
90	3.3	112.2	115.6	0.04	1.25	1.28	3.0	106.1	109.1	0.03	1.18	1.21
100	1.1	136.3	137.4	0.01	1.36	1.37	1.0	128.8	129.8	0.01	1.29	1.30
110	0.0	157.5	157.5	0.00	1.43	1.43	0.0	148.8	148.8	0.00	1.35	1.35
120	0.0	175.4	175.4	0.00	1.46	1.46	0.0	165.8	165.8	0.00	1.38	1.38
130	0.0	190.3	190.3	0.00	1.46	1.46	0.0	179.8	179.8	0.00	1.38	1.38
140	0.0	202.5	202.5	0.00	1.45	1.45	0.0	191.4	191.4	0.00	1.37	1.37
150	0.0	212.5	212.5	0.00	1.42	1.42	0.0	200.8	200.8	0.00	1.34	1.34
160	0.0	220.7	220.7	0.00	1.38	1.38	0.0	208.6	208.6	0.00	1.30	1.30
170	0.0	227.5	227.5	0.00	1.34	1.34	0.0	215.0	215.0	0.00	1.26	1.26
180	0.0	233.3	233.3	0.00	1.30	1.30	0.0	220.4	220.4	0.00	1.22	1.22
190	0.0	238.1	238.1	0.00	1.25	1.25	0.0	225.0	225.0	0.00	1.18	1.18
200	0.0	242.3	242.3	0.00	1.21	1.21	0.0	229.0	229.0	0.00	1.14	1.14



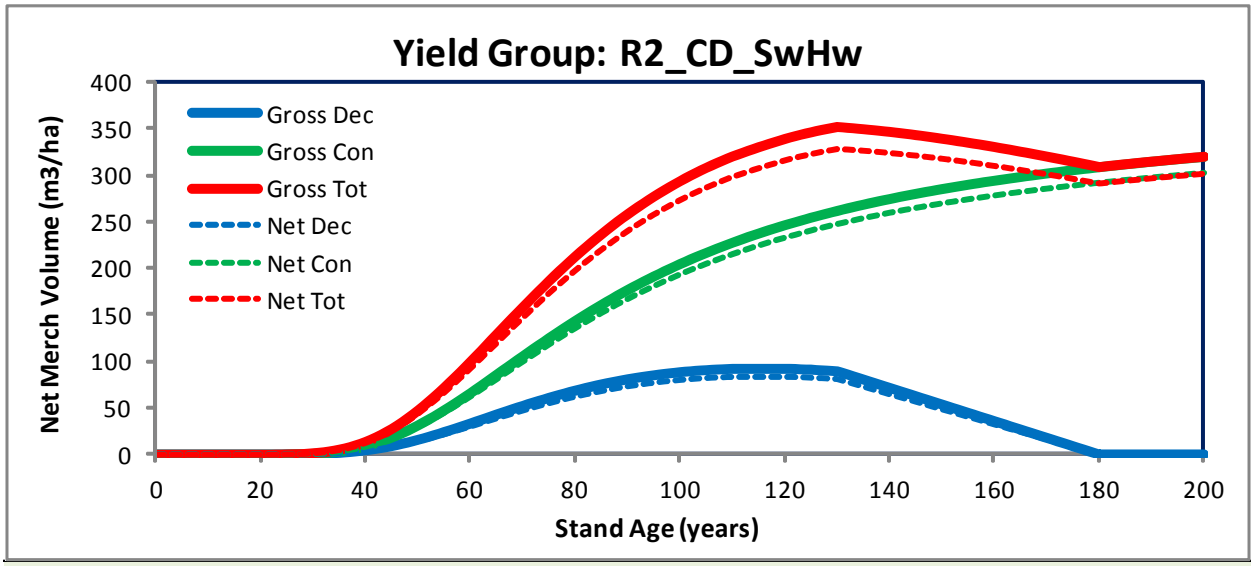
R2 THLB Area: 17,774 ha (34%)

Total Age	Grs Merch Vol (m^3/ha)			Grs Merch MAI (m^3/ha/yr)			Net Merch Vol (m^3/ha)			Net Merch MAI (m^3/ha)		
	Dec	Con	Tot	Dec	Con	Tot	Dec	Con	Tot	Dec	Con	Tot
10	0.0	0.0	0.0	0.00	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.00
20	0.0	0.0	0.0	0.00	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.00
30	0.3	1.7	2.0	0.01	0.06	0.07	0.3	1.6	1.9	0.01	0.05	0.06
40	2.1	14.5	16.6	0.05	0.36	0.42	1.9	13.7	15.6	0.05	0.34	0.39
50	7.5	46.6	54.1	0.15	0.93	1.08	6.8	44.1	50.9	0.14	0.88	1.02
60	15.8	92.8	108.5	0.26	1.55	1.81	14.3	87.7	101.9	0.24	1.46	1.70
70	24.3	142.7	167.0	0.35	2.04	2.39	22.0	134.8	156.9	0.31	1.93	2.24
80	31.3	189.4	220.7	0.39	2.37	2.76	28.4	179.0	207.4	0.35	2.24	2.59
90	36.1	229.9	266.0	0.40	2.55	2.96	32.7	217.3	249.9	0.36	2.41	2.78
100	38.5	263.5	302.0	0.38	2.64	3.02	34.8	249.0	283.9	0.35	2.49	2.84
110	38.7	291.0	329.7	0.35	2.65	3.00	35.1	275.0	310.0	0.32	2.50	2.82
120	37.3	313.3	350.6	0.31	2.61	2.92	33.8	296.1	329.8	0.28	2.47	2.75
130	34.6	331.6	366.1	0.27	2.55	2.82	31.3	313.3	344.6	0.24	2.41	2.65
140	27.6	346.7	374.3	0.20	2.48	2.67	25.1	327.6	352.7	0.18	2.34	2.52
150	20.7	359.4	380.1	0.14	2.40	2.53	18.8	339.6	358.4	0.13	2.26	2.39
160	13.8	370.2	384.0	0.09	2.31	2.40	12.5	349.8	362.4	0.08	2.19	2.26
170	6.9	379.5	386.4	0.04	2.23	2.27	6.3	358.7	364.9	0.04	2.11	2.15
180	0.0	387.7	387.7	0.00	2.15	2.15	0.0	366.4	366.4	0.00	2.04	2.04
190	0.0	394.9	394.9	0.00	2.08	2.08	0.0	373.2	373.2	0.00	1.96	1.96
200	0.0	401.4	401.4	0.00	2.01	2.01	0.0	379.3	379.3	0.00	1.90	1.90



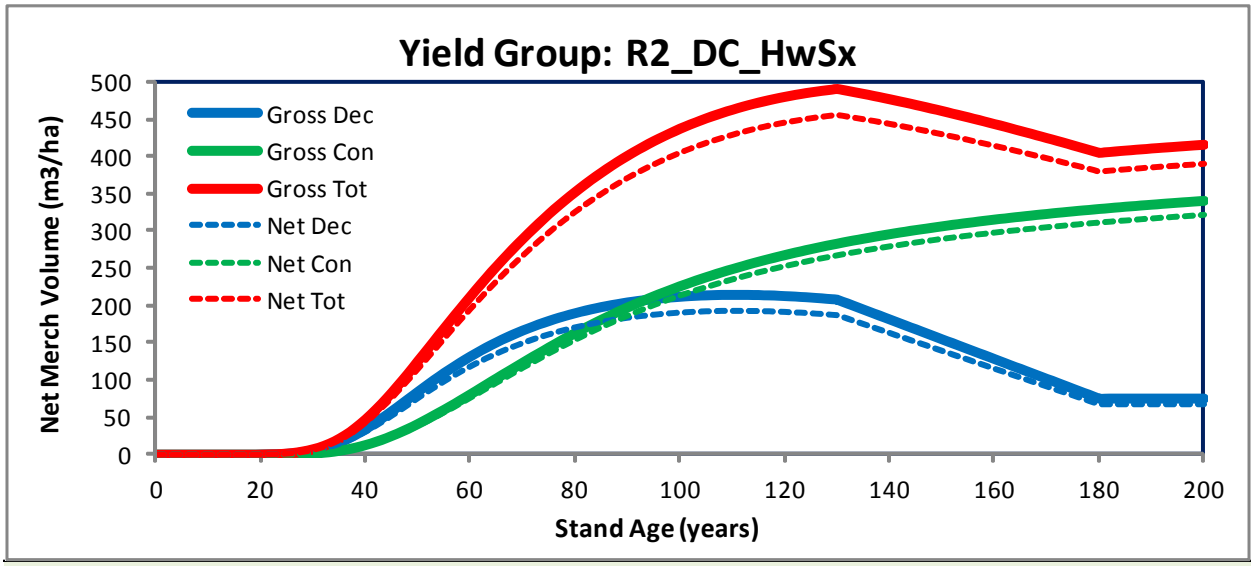
R2 THLB Area: 1,212 ha (2%)

Total Age	Grs Merch Vol (m^3/ha)			Grs Merch MAI (m^3/ha/yr)			Net Merch Vol (m^3/ha)			Net Merch MAI (m^3/ha)		
	Dec	Con	Tot	Dec	Con	Tot	Dec	Con	Tot	Dec	Con	Tot
10	0.0	0.0	0.0	0.00	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.00
20	0.0	0.3	0.3	0.00	0.02	0.02	0.0	0.3	0.3	0.00	0.01	0.02
30	0.8	4.6	5.4	0.03	0.15	0.18	0.8	4.3	5.1	0.03	0.14	0.17
40	6.3	20.7	27.0	0.16	0.52	0.68	5.7	19.6	25.3	0.14	0.49	0.63
50	20.7	54.5	75.2	0.41	1.09	1.50	18.8	51.5	70.2	0.38	1.03	1.40
60	41.5	102.6	144.1	0.69	1.71	2.40	37.6	97.0	134.6	0.63	1.62	2.24
70	62.7	154.9	217.6	0.90	2.21	3.11	56.8	146.4	203.2	0.81	2.09	2.90
80	80.3	201.2	281.5	1.00	2.52	3.52	72.7	190.1	262.9	0.91	2.38	3.29
90	92.7	237.8	330.5	1.03	2.64	3.67	84.0	224.7	308.7	0.93	2.50	3.43
100	100.0	265.4	365.5	1.00	2.65	3.65	90.6	250.8	341.5	0.91	2.51	3.41
110	103.0	286.3	389.3	0.94	2.60	3.54	93.3	270.6	363.9	0.85	2.46	3.31
120	102.5	302.1	404.7	0.85	2.52	3.37	92.9	285.5	378.4	0.77	2.38	3.15
130	99.2	314.3	413.5	0.76	2.42	3.18	89.9	297.1	386.9	0.69	2.29	2.98
140	79.4	323.9	403.2	0.57	2.31	2.88	71.9	306.0	377.9	0.51	2.19	2.70
150	59.5	331.4	390.9	0.40	2.21	2.61	53.9	313.2	367.1	0.36	2.09	2.45
160	39.7	337.4	377.1	0.25	2.11	2.36	35.9	318.8	354.8	0.22	1.99	2.22
170	19.8	342.3	362.1	0.12	2.01	2.13	18.0	323.4	341.4	0.11	1.90	2.01
180	0.0	346.2	346.2	0.00	1.92	1.92	0.0	327.2	327.2	0.00	1.82	1.82
190	0.0	349.5	349.5	0.00	1.84	1.84	0.0	330.3	330.3	0.00	1.74	1.74
200	0.0	352.1	352.1	0.00	1.76	1.76	0.0	332.8	332.8	0.00	1.66	1.66



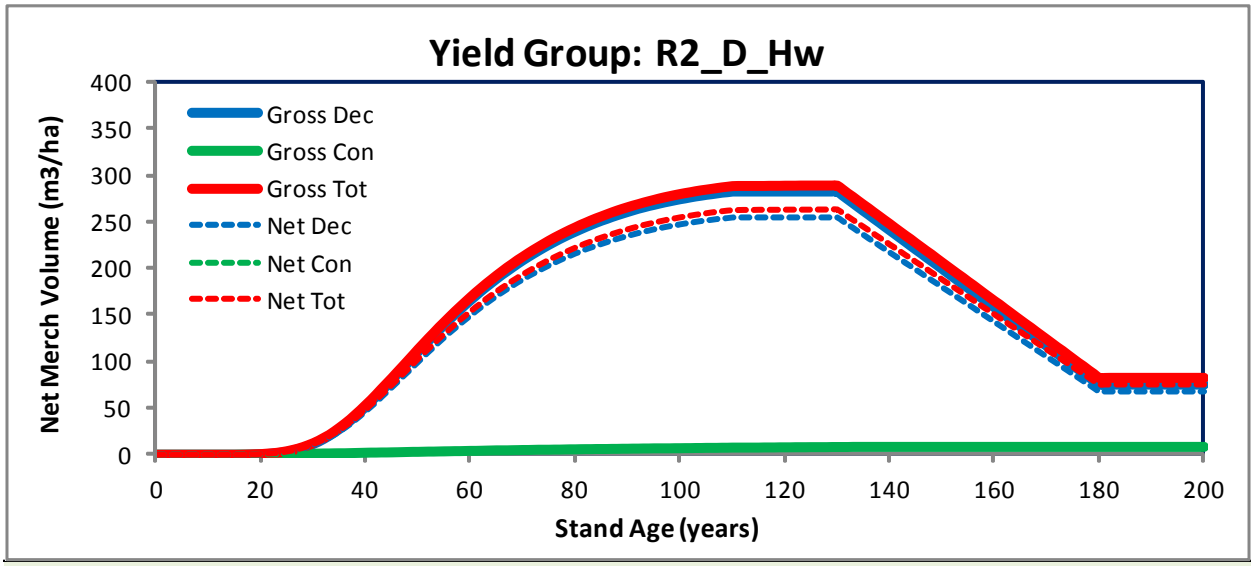
R2 THLB Area: 7,233 ha (14%)

Total Age	Grs Merch Vol (m^3/ha)			Grs Merch MAI (m^3/ha/yr)			Net Merch Vol (m^3/ha)			Net Merch MAI (m^3/ha)		
	Dec	Con	Tot	Dec	Con	Tot	Dec	Con	Tot	Dec	Con	Tot
10	0.0	0.0	0.0	0.00	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.00
20	0.0	0.0	0.0	0.00	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.00
30	0.6	1.1	1.6	0.02	0.04	0.05	0.5	1.0	1.5	0.02	0.03	0.05
40	4.6	9.3	13.8	0.11	0.23	0.35	4.1	8.8	12.9	0.10	0.22	0.32
50	15.9	31.5	47.4	0.32	0.63	0.95	14.4	29.8	44.2	0.29	0.60	0.88
60	33.4	66.1	99.5	0.56	1.10	1.66	30.3	62.4	92.7	0.50	1.04	1.55
70	52.4	105.5	157.9	0.75	1.51	2.26	47.4	99.7	147.1	0.68	1.42	2.10
80	68.8	143.3	212.1	0.86	1.79	2.65	62.3	135.4	197.7	0.78	1.69	2.47
90	80.9	176.4	257.3	0.90	1.96	2.86	73.3	166.7	240.0	0.81	1.85	2.67
100	88.6	204.2	292.7	0.89	2.04	2.93	80.2	192.9	273.2	0.80	1.93	2.73
110	92.2	227.0	319.2	0.84	2.06	2.90	83.5	214.6	298.0	0.76	1.95	2.71
120	92.2	245.8	337.9	0.77	2.05	2.82	83.5	232.2	315.7	0.70	1.94	2.63
130	89.6	261.1	350.7	0.69	2.01	2.70	81.2	246.8	327.9	0.62	1.90	2.52
140	71.7	273.8	345.5	0.51	1.96	2.47	64.9	258.8	323.7	0.46	1.85	2.31
150	53.8	284.5	338.2	0.36	1.90	2.25	48.7	268.8	317.5	0.32	1.79	2.12
160	35.8	293.5	329.3	0.22	1.83	2.06	32.5	277.3	309.8	0.20	1.73	1.94
170	17.9	301.2	319.1	0.11	1.77	1.88	16.2	284.6	300.8	0.10	1.67	1.77
180	0.0	307.9	307.9	0.00	1.71	1.71	0.0	290.9	290.9	0.00	1.62	1.62
190	0.0	313.7	313.7	0.00	1.65	1.65	0.0	296.5	296.5	0.00	1.56	1.56
200	0.0	318.9	318.9	0.00	1.59	1.59	0.0	301.4	301.4	0.00	1.51	1.51



R2 THLB Area: 1,526 ha (3%)

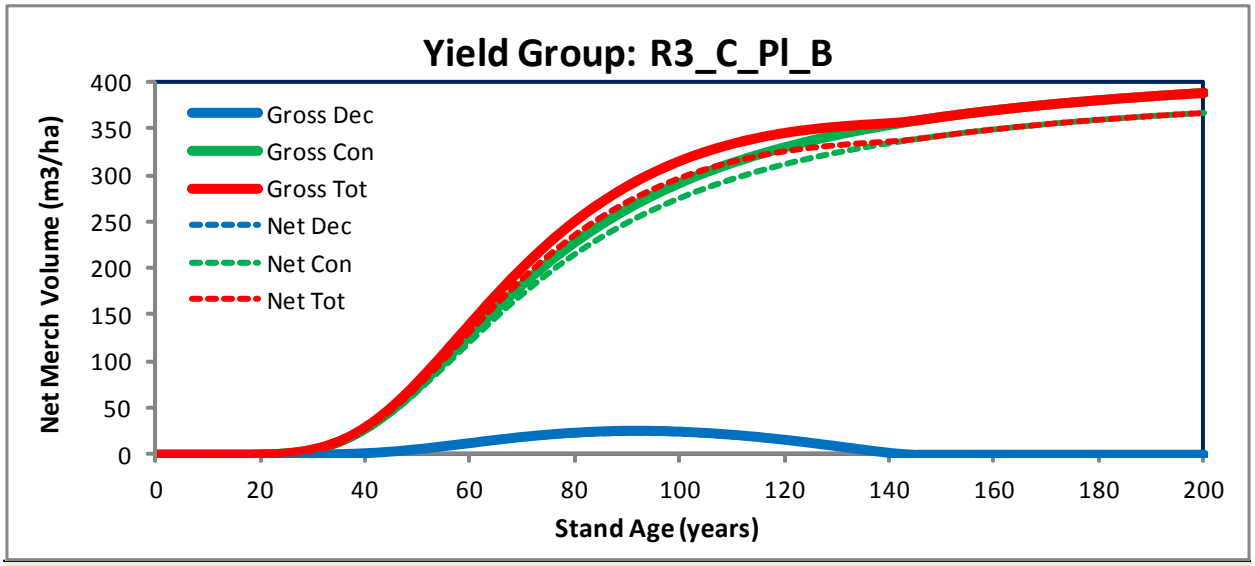
Total Age	Grs Merch Vol (m^3/ha)			Grs Merch MAI (m^3/ha/yr)			Net Merch Vol (m^3/ha)			Net Merch MAI (m^3/ha)		
	Dec	Con	Tot	Dec	Con	Tot	Dec	Con	Tot	Dec	Con	Tot
10	0.0	0.0	0.0	0.00	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.00
20	0.2	0.0	0.2	0.01	0.00	0.01	0.2	0.0	0.2	0.01	0.00	0.01
30	5.8	1.6	7.4	0.19	0.05	0.25	5.3	1.5	6.8	0.18	0.05	0.23
40	34.4	13.1	47.6	0.86	0.33	1.19	31.2	12.4	43.6	0.78	0.31	1.09
50	84.3	41.6	125.8	1.69	0.83	2.52	76.3	39.3	115.6	1.53	0.79	2.31
60	131.4	81.3	212.8	2.19	1.36	3.55	119.1	76.9	196.0	1.98	1.28	3.27
70	166.1	123.9	290.0	2.37	1.77	4.14	150.5	117.1	267.6	2.15	1.67	3.82
80	189.2	163.7	352.9	2.36	2.05	4.41	171.4	154.7	326.1	2.14	1.93	4.08
90	203.5	198.1	401.6	2.26	2.20	4.46	184.4	187.2	371.5	2.05	2.08	4.13
100	211.1	226.5	437.6	2.11	2.27	4.38	191.3	214.0	405.3	1.91	2.14	4.05
110	213.6	249.6	463.3	1.94	2.27	4.21	193.6	235.9	429.5	1.76	2.14	3.90
120	212.1	268.4	480.5	1.77	2.24	4.00	192.1	253.7	445.8	1.60	2.11	3.72
130	207.3	283.8	491.1	1.59	2.18	3.78	187.8	268.2	456.0	1.44	2.06	3.51
140	180.8	296.5	477.3	1.29	2.12	3.41	163.8	280.2	444.0	1.17	2.00	3.17
150	154.4	307.1	461.5	1.03	2.05	3.08	139.9	290.2	430.1	0.93	1.93	2.87
160	127.9	316.1	444.0	0.80	1.98	2.77	115.9	298.7	414.6	0.72	1.87	2.59
170	101.5	323.7	425.2	0.60	1.90	2.50	91.9	305.9	397.9	0.54	1.80	2.34
180	75.0	330.4	405.4	0.42	1.84	2.25	68.0	312.2	380.1	0.38	1.73	2.11
190	75.0	336.2	411.2	0.39	1.77	2.16	68.0	317.7	385.6	0.36	1.67	2.03
200	75.0	341.2	416.2	0.38	1.71	2.08	68.0	322.5	390.4	0.34	1.61	1.95



R2 THLB Area: 4,141 ha (8%)

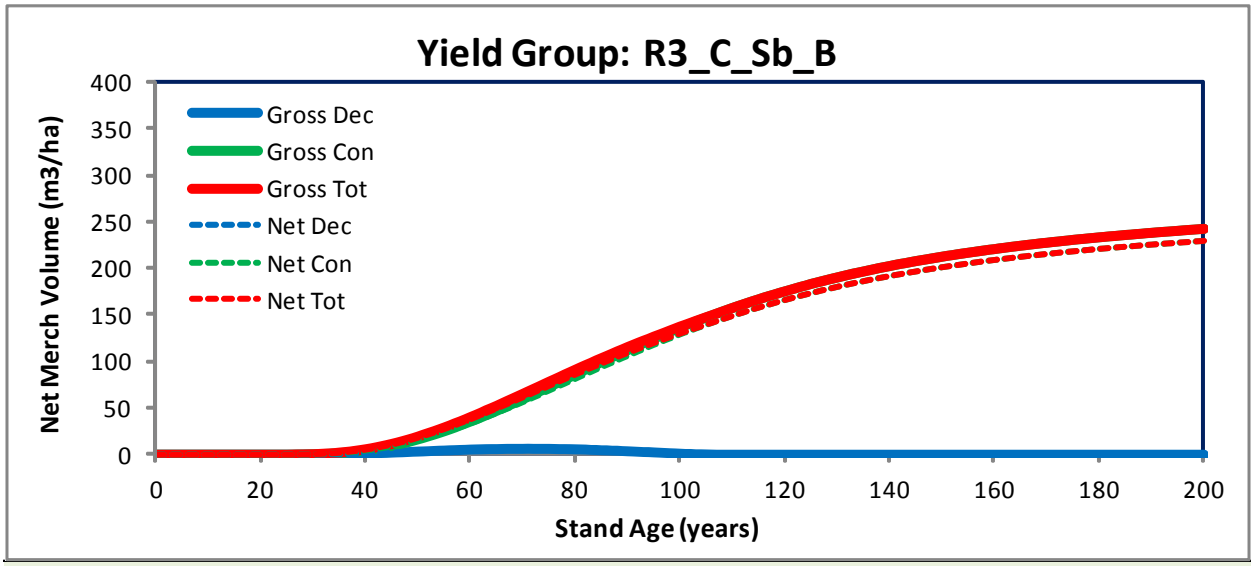
Total Age	Grs Merch Vol (m^3/ha)			Grs Merch MAI (m^3/ha/yr)			Net Merch Vol (m^3/ha)			Net Merch MAI (m^3/ha)		
	Dec	Con	Tot	Dec	Con	Tot	Dec	Con	Tot	Dec	Con	Tot
10	0.0	0.0	0.0	0.00	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.00
20	0.6	0.3	0.8	0.03	0.02	0.04	0.5	0.2	0.8	0.03	0.01	0.04
30	11.5	1.0	12.5	0.38	0.03	0.42	10.4	0.9	11.4	0.35	0.03	0.38
40	51.5	1.9	53.4	1.29	0.05	1.34	46.7	1.8	48.4	1.17	0.05	1.21
50	110.3	2.8	113.1	2.21	0.06	2.26	99.9	2.6	102.5	2.00	0.05	2.05
60	165.4	3.7	169.0	2.76	0.06	2.82	149.8	3.5	153.3	2.50	0.06	2.56
70	208.1	4.5	212.6	2.97	0.06	3.04	188.5	4.2	192.8	2.69	0.06	2.75
80	238.8	5.1	244.0	2.99	0.06	3.05	216.4	4.9	221.2	2.71	0.06	2.77
90	259.8	5.7	265.6	2.89	0.06	2.95	235.4	5.4	240.8	2.62	0.06	2.68
100	273.4	6.2	279.6	2.73	0.06	2.80	247.7	5.9	253.6	2.48	0.06	2.54
110	281.6	6.7	288.2	2.56	0.06	2.62	255.1	6.3	261.4	2.32	0.06	2.38
120	281.6	7.0	288.6	2.35	0.06	2.41	255.1	6.6	261.7	2.13	0.06	2.18
130	281.6	7.3	288.8	2.17	0.06	2.22	255.1	6.9	262.0	1.96	0.05	2.02
140	240.2	7.5	247.7	1.72	0.05	1.77	217.7	7.0	224.7	1.56	0.05	1.61
150	198.9	7.5	206.4	1.33	0.05	1.38	180.2	7.0	187.3	1.20	0.05	1.25
160	157.6	7.5	165.1	0.99	0.05	1.03	142.8	7.0	149.9	0.89	0.04	0.94
170	116.3	7.5	123.8	0.68	0.04	0.73	105.4	7.0	112.4	0.62	0.04	0.66
180	75.0	7.5	82.5	0.42	0.04	0.46	68.0	7.0	75.0	0.38	0.04	0.42
190	75.0	7.5	82.5	0.39	0.04	0.43	68.0	7.0	75.0	0.36	0.04	0.39
200	75.0	7.5	82.5	0.38	0.04	0.41	68.0	7.0	75.0	0.34	0.04	0.38

R3 - FUTURE MANAGED STANDS (CROP PLAN BASED) - BASIC



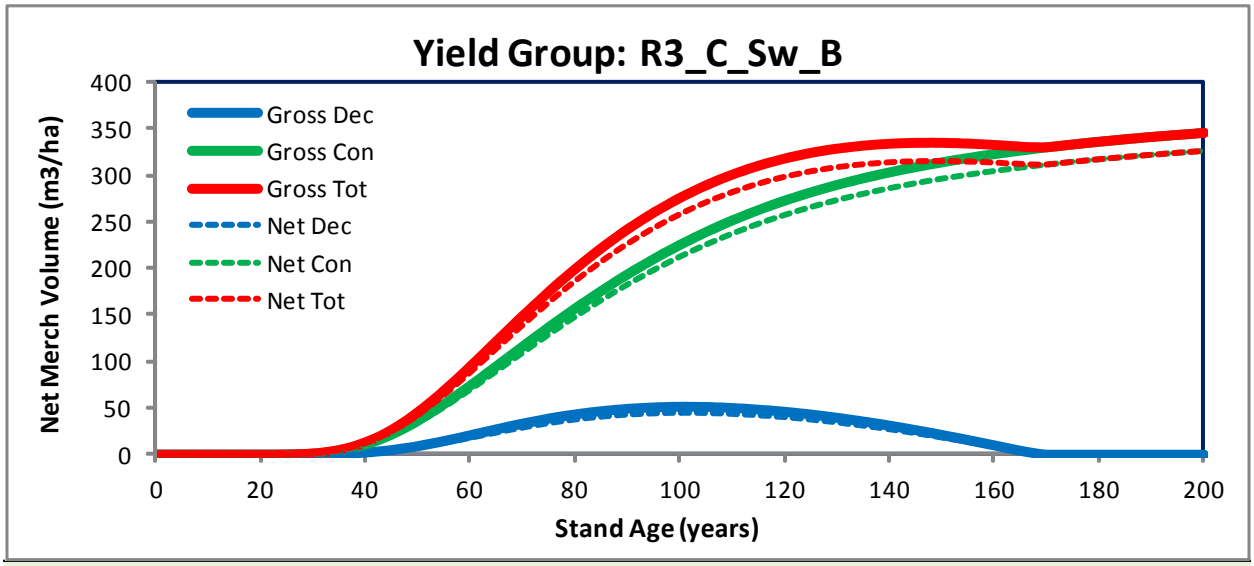
R3 - FUTURE MANAGED THLB AREA

Total Age	Grs Merch Vol (m^3/ha)			Grs Merch MAI (m^3/ha/yr)			Net Merch Vol (m^3/ha)			Net Merch MAI (m^3/ha)		
	Dec	Con	Tot	Dec	Con	Tot	Dec	Con	Tot	Dec	Con	Tot
10	0.0	0.0	0.0	0.00	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.00
20	0.0	0.3	0.3	0.00	0.01	0.01	0.0	0.2	0.2	0.00	0.01	0.01
30	0.2	5.6	5.8	0.01	0.19	0.19	0.2	5.3	5.5	0.01	0.18	0.18
40	1.6	28.0	29.7	0.04	0.70	0.74	1.5	26.5	28.0	0.04	0.66	0.70
50	5.8	72.6	78.3	0.12	1.45	1.57	5.2	68.6	73.8	0.10	1.37	1.48
60	12.0	128.6	140.7	0.20	2.14	2.34	10.9	121.5	132.5	0.18	2.03	2.21
70	18.2	182.5	200.7	0.26	2.61	2.87	16.5	172.4	189.0	0.24	2.46	2.70
80	22.6	227.5	250.1	0.28	2.84	3.13	20.5	215.0	235.5	0.26	2.69	2.94
90	24.4	263.2	287.5	0.27	2.92	3.19	22.1	248.7	270.8	0.25	2.76	3.01
100	23.6	290.8	314.4	0.24	2.91	3.14	21.3	274.8	296.2	0.21	2.75	2.96
110	20.4	312.3	332.7	0.19	2.84	3.02	18.5	295.1	313.6	0.17	2.68	2.85
120	15.3	329.0	344.3	0.13	2.74	2.87	13.8	310.9	324.8	0.12	2.59	2.71
130	8.7	342.3	351.0	0.07	2.63	2.70	7.9	323.5	331.3	0.06	2.49	2.55
140	2.0	352.9	354.8	0.01	2.52	2.53	1.8	333.5	335.3	0.01	2.38	2.39
150	0.0	361.5	361.5	0.00	2.41	2.41	0.0	341.6	341.6	0.00	2.28	2.28
160	0.0	368.6	368.6	0.00	2.30	2.30	0.0	348.3	348.3	0.00	2.18	2.18
170	0.0	374.4	374.4	0.00	2.20	2.20	0.0	353.8	353.8	0.00	2.08	2.08
180	0.0	379.4	379.4	0.00	2.11	2.11	0.0	358.5	358.5	0.00	1.99	1.99
190	0.0	383.6	383.6	0.00	2.02	2.02	0.0	362.5	362.5	0.00	1.91	1.91
200	0.0	387.1	387.1	0.00	1.94	1.94	0.0	365.8	365.8	0.00	1.83	1.83



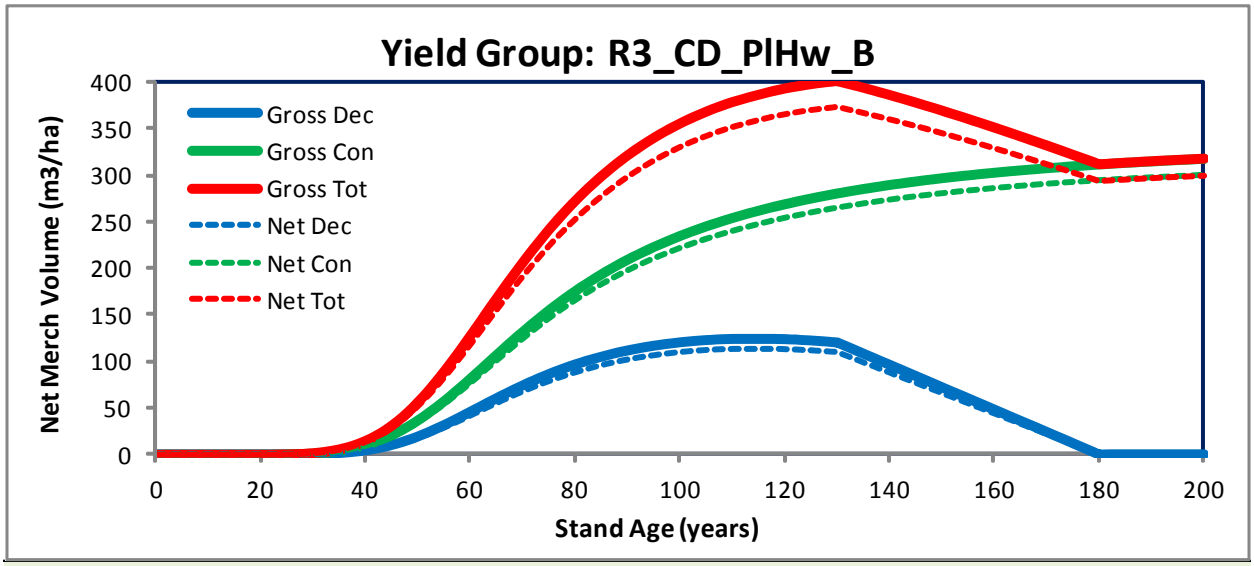
R3 - FUTURE MANAGED THLB AREA

Total Age	Grs Merch Vol (m^3/ha)			Grs Merch MAI (m^3/ha/yr)			Net Merch Vol (m^3/ha)			Net Merch MAI (m^3/ha)		
	Dec	Con	Tot	Dec	Con	Tot	Dec	Con	Tot	Dec	Con	Tot
10	0.0	0.0	0.0	0.00	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.00
20	0.0	0.0	0.0	0.00	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.00
30	0.2	0.5	0.7	0.01	0.02	0.02	0.2	0.5	0.7	0.01	0.02	0.02
40	1.2	4.8	6.0	0.03	0.12	0.15	1.1	4.6	5.6	0.03	0.11	0.14
50	3.0	16.6	19.6	0.06	0.33	0.39	2.8	15.7	18.4	0.06	0.31	0.37
60	4.8	35.7	40.5	0.08	0.59	0.68	4.4	33.7	38.1	0.07	0.56	0.63
70	5.6	59.8	65.4	0.08	0.85	0.93	5.1	56.5	61.6	0.07	0.81	0.88
80	5.1	86.1	91.2	0.06	1.08	1.14	4.6	81.4	86.0	0.06	1.02	1.07
90	3.3	112.2	115.6	0.04	1.25	1.28	3.0	106.1	109.1	0.03	1.18	1.21
100	1.1	136.3	137.4	0.01	1.36	1.37	1.0	128.8	129.8	0.01	1.29	1.30
110	0.0	157.5	157.5	0.00	1.43	1.43	0.0	148.8	148.8	0.00	1.35	1.35
120	0.0	175.4	175.4	0.00	1.46	1.46	0.0	165.8	165.8	0.00	1.38	1.38
130	0.0	190.3	190.3	0.00	1.46	1.46	0.0	179.8	179.8	0.00	1.38	1.38
140	0.0	202.5	202.5	0.00	1.45	1.45	0.0	191.4	191.4	0.00	1.37	1.37
150	0.0	212.5	212.5	0.00	1.42	1.42	0.0	200.8	200.8	0.00	1.34	1.34
160	0.0	220.7	220.7	0.00	1.38	1.38	0.0	208.6	208.6	0.00	1.30	1.30
170	0.0	227.5	227.5	0.00	1.34	1.34	0.0	215.0	215.0	0.00	1.26	1.26
180	0.0	233.3	233.3	0.00	1.30	1.30	0.0	220.4	220.4	0.00	1.22	1.22
190	0.0	238.1	238.1	0.00	1.25	1.25	0.0	225.0	225.0	0.00	1.18	1.18
200	0.0	242.3	242.3	0.00	1.21	1.21	0.0	229.0	229.0	0.00	1.14	1.14



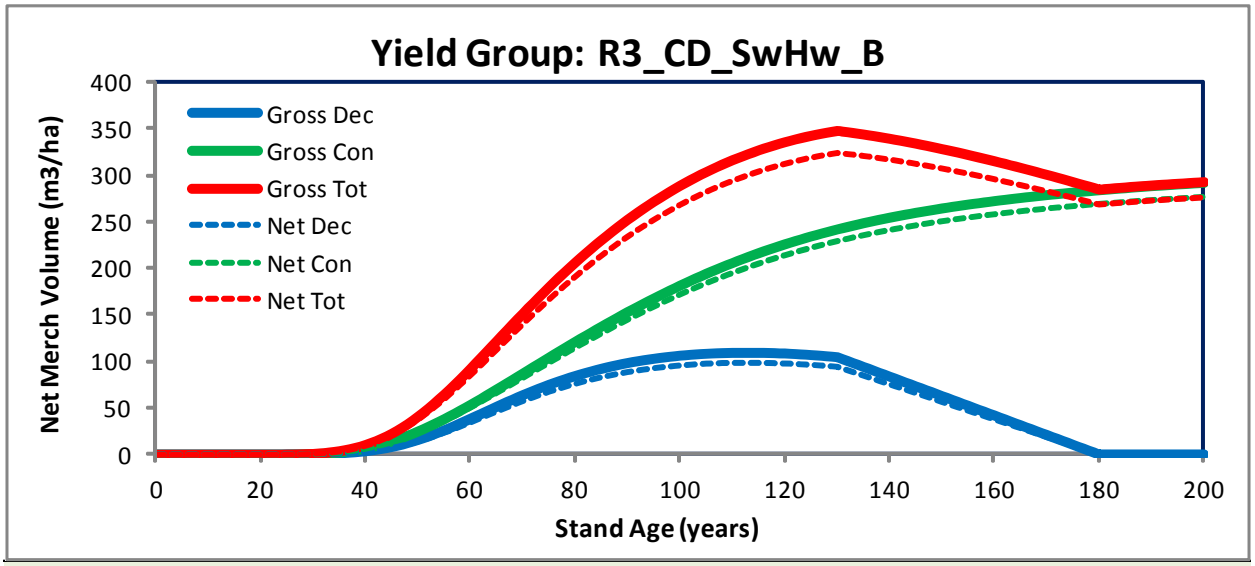
R3 - FUTURE MANAGED THLB AREA

Total Age	Grs Merch Vol (m^3/ha)			Grs Merch MAI (m^3/ha/yr)			Net Merch Vol (m^3/ha)			Net Merch MAI (m^3/ha)		
	Dec	Con	Tot	Dec	Con	Tot	Dec	Con	Tot	Dec	Con	Tot
10	0.0	0.0	0.0	0.00	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.00
20	0.0	0.0	0.0	0.00	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.00
30	0.3	1.3	1.5	0.01	0.04	0.05	0.2	1.2	1.4	0.01	0.04	0.05
40	2.4	11.1	13.4	0.06	0.28	0.34	2.2	10.5	12.6	0.05	0.26	0.32
50	9.1	36.7	45.8	0.18	0.73	0.92	8.3	34.7	43.0	0.17	0.69	0.86
60	20.5	74.4	94.9	0.34	1.24	1.58	18.6	70.3	88.9	0.31	1.17	1.48
70	32.7	116.3	149.0	0.47	1.66	2.13	29.7	109.9	139.5	0.42	1.57	1.99
80	42.4	156.9	199.3	0.53	1.96	2.49	38.4	148.3	186.7	0.48	1.85	2.33
90	48.3	193.6	241.8	0.54	2.15	2.69	43.7	182.9	226.6	0.49	2.03	2.52
100	50.3	225.1	275.5	0.50	2.25	2.75	45.6	212.8	258.4	0.46	2.13	2.58
110	49.1	251.3	300.5	0.45	2.28	2.73	44.5	237.5	282.0	0.40	2.16	2.56
120	45.1	272.5	317.7	0.38	2.27	2.65	40.9	257.5	298.4	0.34	2.15	2.49
130	38.9	289.4	328.3	0.30	2.23	2.53	35.2	273.5	308.7	0.27	2.10	2.37
140	30.6	302.8	333.5	0.22	2.16	2.38	27.7	286.2	313.9	0.20	2.04	2.24
150	20.8	313.6	334.4	0.14	2.09	2.23	18.8	296.4	315.2	0.13	1.98	2.10
160	9.8	322.4	332.2	0.06	2.01	2.08	8.9	304.6	313.5	0.06	1.90	1.96
170	0.1	329.6	329.7	0.00	1.94	1.94	0.1	311.5	311.6	0.00	1.83	1.83
180	0.0	335.7	335.7	0.00	1.86	1.86	0.0	317.2	317.2	0.00	1.76	1.76
190	0.0	340.8	340.8	0.00	1.79	1.79	0.0	322.0	322.0	0.00	1.69	1.69
200	0.0	345.1	345.1	0.00	1.73	1.73	0.0	326.1	326.1	0.00	1.63	1.63



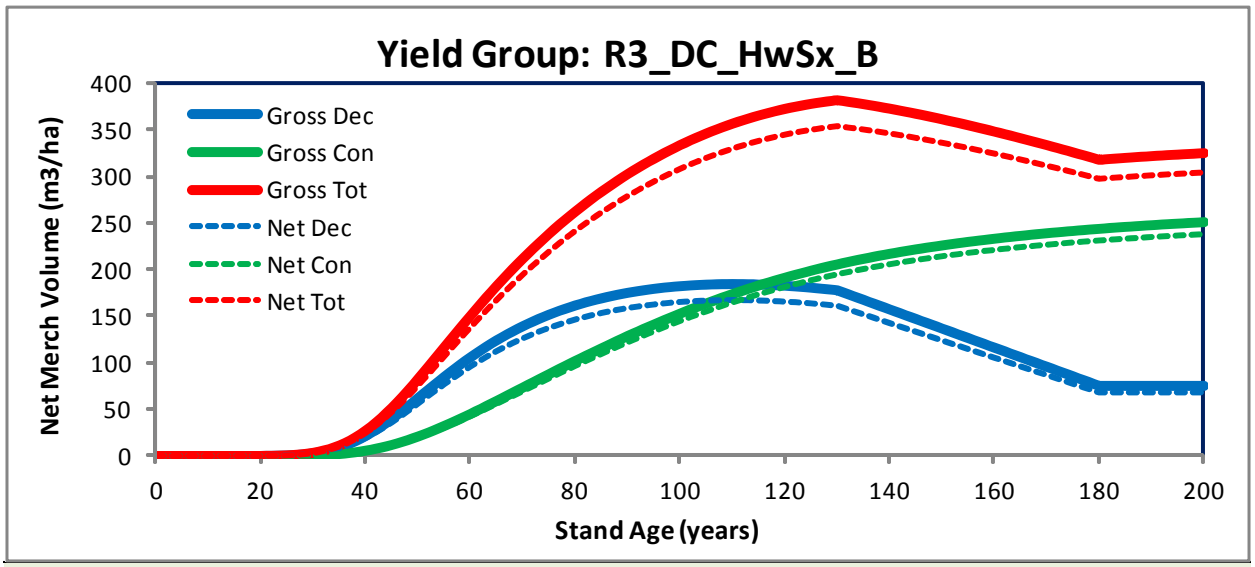
R3 - FUTURE MANAGED THLB AREA

Total Age	Grs Merch Vol (m^3/ha)			Grs Merch MAI (m^3/ha/yr)			Net Merch Vol (m^3/ha)			Net Merch MAI (m^3/ha)		
	Dec	Con	Tot	Dec	Con	Tot	Dec	Con	Tot	Dec	Con	Tot
10	0.0	0.0	0.0	0.00	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.00
20	0.0	0.0	0.0	0.00	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.00
30	0.4	1.4	1.8	0.01	0.05	0.06	0.4	1.3	1.7	0.01	0.04	0.06
40	4.5	10.4	14.9	0.11	0.26	0.37	4.1	9.8	13.9	0.10	0.25	0.35
50	19.4	37.0	56.4	0.39	0.74	1.13	17.6	35.0	52.6	0.35	0.70	1.05
60	45.9	81.8	127.7	0.76	1.36	2.13	41.6	77.3	118.8	0.69	1.29	1.98
70	74.2	132.0	206.2	1.06	1.89	2.95	67.2	124.7	192.0	0.96	1.78	2.74
80	96.6	175.6	272.2	1.21	2.19	3.40	87.5	165.9	253.4	1.09	2.07	3.17
90	111.7	209.3	321.0	1.24	2.33	3.57	101.2	197.8	299.0	1.12	2.20	3.32
100	120.4	234.7	355.1	1.20	2.35	3.55	109.1	221.8	330.9	1.09	2.22	3.31
110	124.0	254.0	378.0	1.13	2.31	3.44	112.4	240.0	352.4	1.02	2.18	3.20
120	123.7	268.8	392.5	1.03	2.24	3.27	112.1	254.0	366.1	0.93	2.12	3.05
130	120.2	280.3	400.5	0.92	2.16	3.08	108.9	264.9	373.8	0.84	2.04	2.88
140	96.2	289.4	385.6	0.69	2.07	2.75	87.1	273.5	360.6	0.62	1.95	2.58
150	72.1	296.7	368.8	0.48	1.98	2.46	65.4	280.4	345.7	0.44	1.87	2.30
160	48.1	302.6	350.7	0.30	1.89	2.19	43.6	285.9	329.5	0.27	1.79	2.06
170	24.0	307.4	331.4	0.14	1.81	1.95	21.8	290.5	312.3	0.13	1.71	1.84
180	0.0	311.4	311.4	0.00	1.73	1.73	0.0	294.3	294.3	0.00	1.63	1.63
190	0.0	314.7	314.7	0.00	1.66	1.66	0.0	297.4	297.4	0.00	1.57	1.57
200	0.0	317.4	317.4	0.00	1.59	1.59	0.0	299.9	299.9	0.00	1.50	1.50



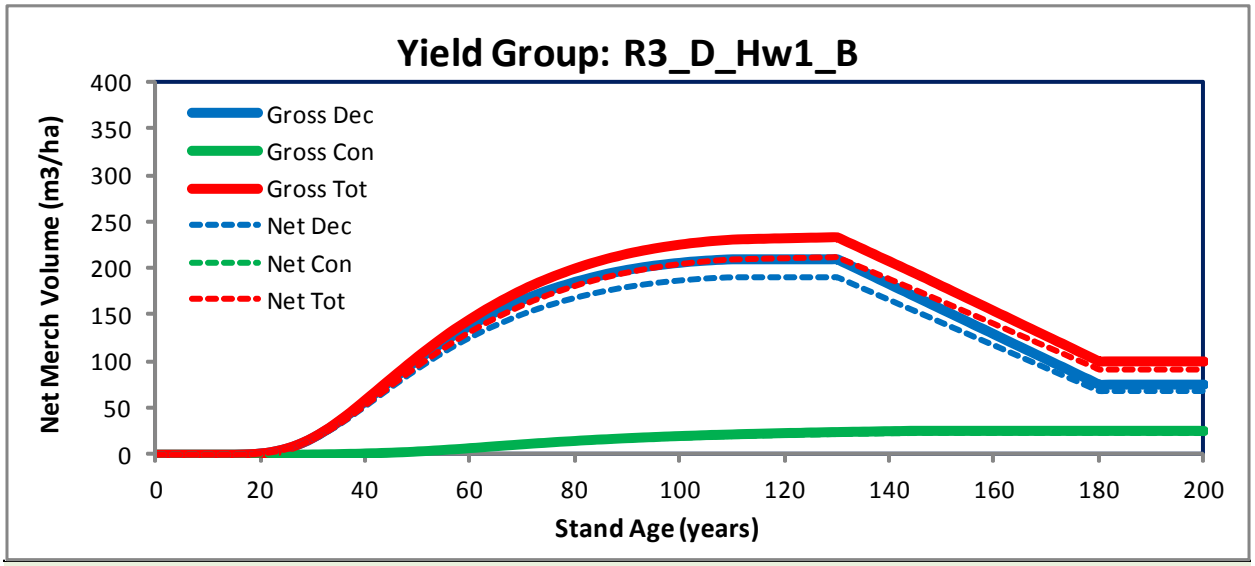
R3 - FUTURE MANAGED THLB AREA

Total Age	Grs Merch Vol (m^3/ha)			Grs Merch MAI (m^3/ha/yr)			Net Merch Vol (m^3/ha)			Net Merch MAI (m^3/ha)		
	Dec	Con	Tot	Dec	Con	Tot	Dec	Con	Tot	Dec	Con	Tot
10	0.0	0.0	0.0	0.00	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.00
20	0.0	0.0	0.0	0.00	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.00
30	0.3	0.7	1.0	0.01	0.02	0.03	0.3	0.7	1.0	0.01	0.02	0.03
40	3.5	7.0	10.5	0.09	0.17	0.26	3.2	6.6	9.8	0.08	0.17	0.25
50	15.7	25.1	40.8	0.31	0.50	0.82	14.2	23.7	37.9	0.28	0.47	0.76
60	38.5	53.7	92.2	0.64	0.89	1.54	34.9	50.7	85.6	0.58	0.85	1.43
70	63.9	87.3	151.2	0.91	1.25	2.16	57.9	82.5	140.4	0.83	1.18	2.01
80	84.6	121.4	206.0	1.06	1.52	2.58	76.7	114.7	191.4	0.96	1.43	2.39
90	98.6	153.3	251.9	1.10	1.70	2.80	89.3	144.9	234.2	0.99	1.61	2.60
100	106.5	181.8	288.4	1.07	1.82	2.88	96.5	171.8	268.3	0.97	1.72	2.68
110	109.6	206.2	315.8	1.00	1.87	2.87	99.3	194.9	294.2	0.90	1.77	2.67
120	108.8	226.3	335.1	0.91	1.89	2.79	98.6	213.8	312.4	0.82	1.78	2.60
130	105.0	242.3	347.2	0.81	1.86	2.67	95.1	228.9	324.0	0.73	1.76	2.49
140	84.0	254.9	338.9	0.60	1.82	2.42	76.1	240.9	316.9	0.54	1.72	2.26
150	63.0	264.8	327.8	0.42	1.77	2.19	57.1	250.3	307.3	0.38	1.67	2.05
160	42.0	272.8	314.8	0.26	1.70	1.97	38.0	257.8	295.8	0.24	1.61	1.85
170	21.0	279.2	300.2	0.12	1.64	1.77	19.0	263.8	282.8	0.11	1.55	1.66
180	0.0	284.4	284.4	0.00	1.58	1.58	0.0	268.8	268.8	0.00	1.49	1.49
190	0.0	288.8	288.8	0.00	1.52	1.52	0.0	272.9	272.9	0.00	1.44	1.44
200	0.0	292.4	292.4	0.00	1.46	1.46	0.0	276.3	276.3	0.00	1.38	1.38



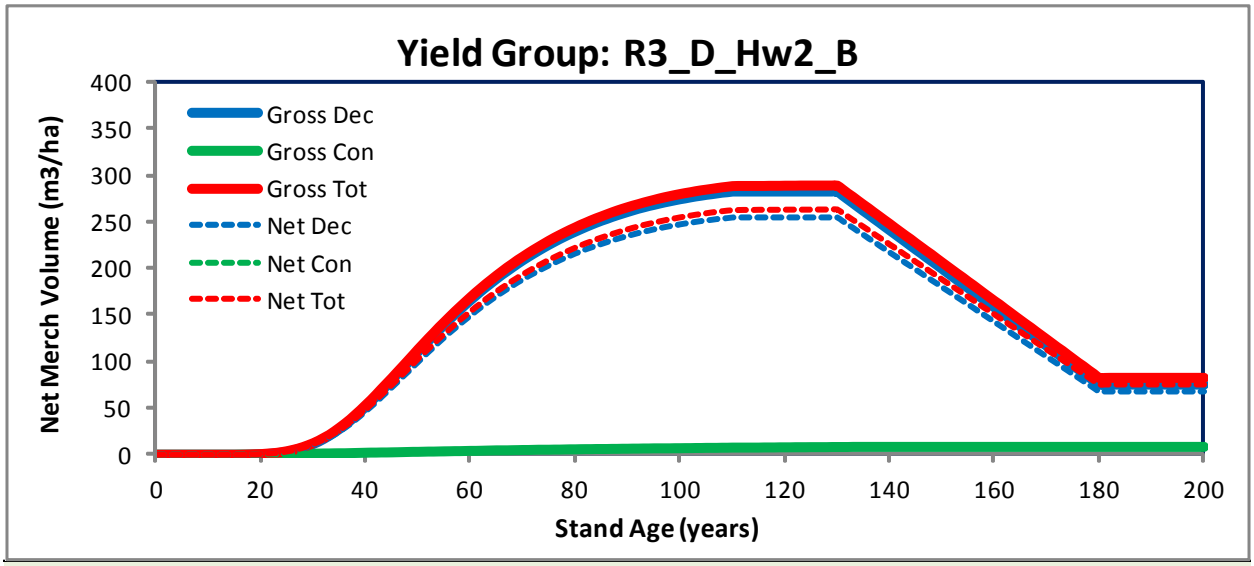
R3 - FUTURE MANAGED THLB AREA

Total Age	Grs Merch Vol (m^3/ha)			Grs Merch MAI (m^3/ha/yr)			Net Merch Vol (m^3/ha)			Net Merch MAI (m^3/ha)		
	Dec	Con	Tot	Dec	Con	Tot	Dec	Con	Tot	Dec	Con	Tot
10	0.0	0.0	0.0	0.00	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.00
20	0.1	0.0	0.1	0.00	0.00	0.01	0.1	0.0	0.1	0.00	0.00	0.00
30	3.0	0.6	3.6	0.10	0.02	0.12	2.8	0.6	3.3	0.09	0.02	0.11
40	21.5	5.8	27.3	0.54	0.14	0.68	19.5	5.5	25.0	0.49	0.14	0.62
50	62.0	21.0	83.0	1.24	0.42	1.66	56.1	19.9	76.0	1.12	0.40	1.52
60	105.6	45.2	150.9	1.76	0.75	2.51	95.7	42.7	138.4	1.59	0.71	2.31
70	138.8	73.5	212.3	1.98	1.05	3.03	125.8	69.5	195.2	1.80	0.99	2.79
80	161.0	101.9	262.9	2.01	1.27	3.29	145.8	96.3	242.2	1.82	1.20	3.03
90	174.5	128.6	303.1	1.94	1.43	3.37	158.1	121.6	279.7	1.76	1.35	3.11
100	181.6	152.7	334.3	1.82	1.53	3.34	164.5	144.3	308.8	1.65	1.44	3.09
110	183.8	173.6	357.4	1.67	1.58	3.25	166.5	164.1	330.6	1.51	1.49	3.01
120	182.1	191.2	373.3	1.52	1.59	3.11	165.0	180.7	345.6	1.37	1.51	2.88
130	177.2	205.4	382.6	1.36	1.58	2.94	160.6	194.1	354.7	1.24	1.49	2.73
140	156.8	216.8	373.6	1.12	1.55	2.67	142.0	204.9	346.9	1.01	1.46	2.48
150	136.3	225.8	362.1	0.91	1.51	2.41	123.5	213.4	336.9	0.82	1.42	2.25
160	115.9	233.0	348.9	0.72	1.46	2.18	105.0	220.2	325.2	0.66	1.38	2.03
170	95.4	238.9	334.3	0.56	1.41	1.97	86.5	225.7	312.2	0.51	1.33	1.84
180	75.0	243.6	318.6	0.42	1.35	1.77	68.0	230.2	298.2	0.38	1.28	1.66
190	75.0	247.5	322.5	0.39	1.30	1.70	68.0	233.9	301.9	0.36	1.23	1.59
200	75.0	250.8	325.8	0.38	1.25	1.63	68.0	237.0	304.9	0.34	1.18	1.52



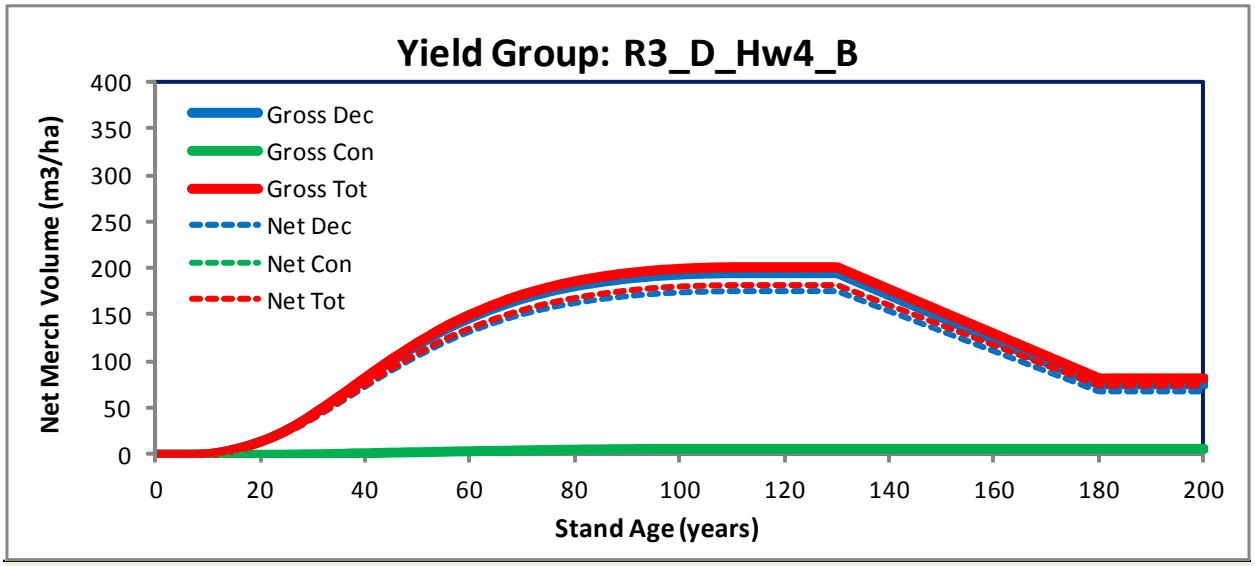
R3 - FUTURE MANAGED THLB AREA

Total Age	Grs Merch Vol (m^3/ha)			Grs Merch MAI (m^3/ha/yr)			Net Merch Vol (m^3/ha)			Net Merch MAI (m^3/ha)		
	Dec	Con	Tot	Dec	Con	Tot	Dec	Con	Tot	Dec	Con	Tot
10	0.0	0.0	0.0	0.00	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.00
20	1.5	0.0	1.5	0.08	0.00	0.08	1.3	0.0	1.4	0.07	0.00	0.07
30	18.3	0.3	18.5	0.61	0.01	0.62	16.6	0.3	16.8	0.55	0.01	0.56
40	57.5	1.3	58.9	1.44	0.03	1.47	52.1	1.3	53.4	1.30	0.03	1.34
50	101.7	3.5	105.2	2.03	0.07	2.10	92.1	3.3	95.4	1.84	0.07	1.91
60	138.4	7.0	145.3	2.31	0.12	2.42	125.4	6.6	131.9	2.09	0.11	2.20
70	165.7	10.9	176.6	2.37	0.16	2.52	150.1	10.3	160.5	2.14	0.15	2.29
80	184.9	14.4	199.3	2.31	0.18	2.49	167.5	13.6	181.1	2.09	0.17	2.26
90	197.7	17.3	215.0	2.20	0.19	2.39	179.1	16.3	195.4	1.99	0.18	2.17
100	205.3	19.5	224.8	2.05	0.20	2.25	186.0	18.4	204.4	1.86	0.18	2.04
110	209.0	21.2	230.2	1.90	0.19	2.09	189.4	20.0	209.4	1.72	0.18	1.90
120	209.0	22.5	231.5	1.74	0.19	1.93	189.4	21.3	210.6	1.58	0.18	1.76
130	209.0	23.6	232.6	1.61	0.18	1.79	189.4	22.3	211.7	1.46	0.17	1.63
140	182.2	24.5	206.7	1.30	0.18	1.48	165.1	23.1	188.2	1.18	0.17	1.34
150	155.4	24.9	180.3	1.04	0.17	1.20	140.8	23.6	164.4	0.94	0.16	1.10
160	128.6	24.9	153.5	0.80	0.16	0.96	116.5	23.6	140.1	0.73	0.15	0.88
170	101.8	24.9	126.7	0.60	0.15	0.75	92.2	23.5	115.8	0.54	0.14	0.68
180	75.0	24.9	99.9	0.42	0.14	0.56	68.0	23.5	91.4	0.38	0.13	0.51
190	75.0	24.8	99.8	0.39	0.13	0.53	68.0	23.4	91.4	0.36	0.12	0.48
200	75.0	24.7	99.7	0.38	0.12	0.50	68.0	23.4	91.3	0.34	0.12	0.46



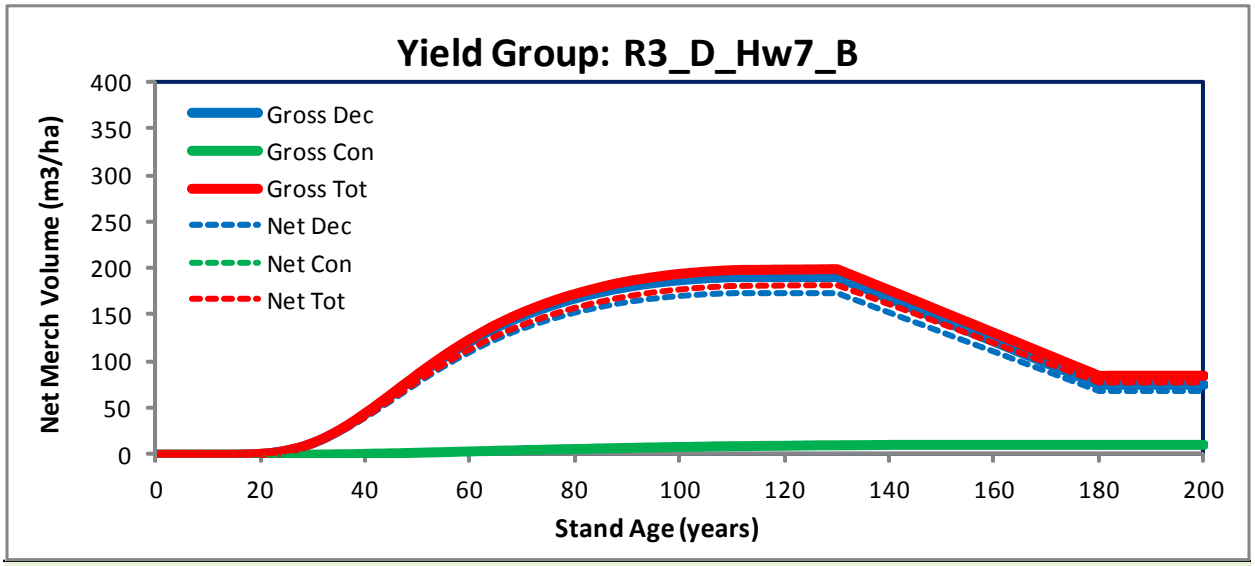
R3 - FUTURE MANAGED THLB AREA

Total Age	Grs Merch Vol (m^3/ha)			Grs Merch MAI (m^3/ha/yr)			Net Merch Vol (m^3/ha)			Net Merch MAI (m^3/ha)		
	Dec	Con	Tot	Dec	Con	Tot	Dec	Con	Tot	Dec	Con	Tot
10	0.0	0.0	0.0	0.00	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.00
20	0.6	0.3	0.8	0.03	0.02	0.04	0.5	0.2	0.8	0.03	0.01	0.04
30	11.5	1.0	12.5	0.38	0.03	0.42	10.4	0.9	11.4	0.35	0.03	0.38
40	51.5	1.9	53.4	1.29	0.05	1.34	46.7	1.8	48.4	1.17	0.05	1.21
50	110.3	2.8	113.1	2.21	0.06	2.26	99.9	2.6	102.5	2.00	0.05	2.05
60	165.4	3.7	169.0	2.76	0.06	2.82	149.8	3.5	153.3	2.50	0.06	2.56
70	208.1	4.5	212.6	2.97	0.06	3.04	188.5	4.2	192.8	2.69	0.06	2.75
80	238.8	5.1	244.0	2.99	0.06	3.05	216.4	4.9	221.2	2.71	0.06	2.77
90	259.8	5.7	265.6	2.89	0.06	2.95	235.4	5.4	240.8	2.62	0.06	2.68
100	273.4	6.2	279.6	2.73	0.06	2.80	247.7	5.9	253.6	2.48	0.06	2.54
110	281.6	6.7	288.2	2.56	0.06	2.62	255.1	6.3	261.4	2.32	0.06	2.38
120	281.6	7.0	288.6	2.35	0.06	2.41	255.1	6.6	261.7	2.13	0.06	2.18
130	281.6	7.3	288.8	2.17	0.06	2.22	255.1	6.9	262.0	1.96	0.05	2.02
140	240.2	7.5	247.7	1.72	0.05	1.77	217.7	7.0	224.7	1.56	0.05	1.61
150	198.9	7.5	206.4	1.33	0.05	1.38	180.2	7.0	187.3	1.20	0.05	1.25
160	157.6	7.5	165.1	0.99	0.05	1.03	142.8	7.0	149.9	0.89	0.04	0.94
170	116.3	7.5	123.8	0.68	0.04	0.73	105.4	7.0	112.4	0.62	0.04	0.66
180	75.0	7.5	82.5	0.42	0.04	0.46	68.0	7.0	75.0	0.38	0.04	0.42
190	75.0	7.5	82.5	0.39	0.04	0.43	68.0	7.0	75.0	0.36	0.04	0.39
200	75.0	7.5	82.5	0.38	0.04	0.41	68.0	7.0	75.0	0.34	0.04	0.38



R3 - FUTURE MANAGED THLB AREA

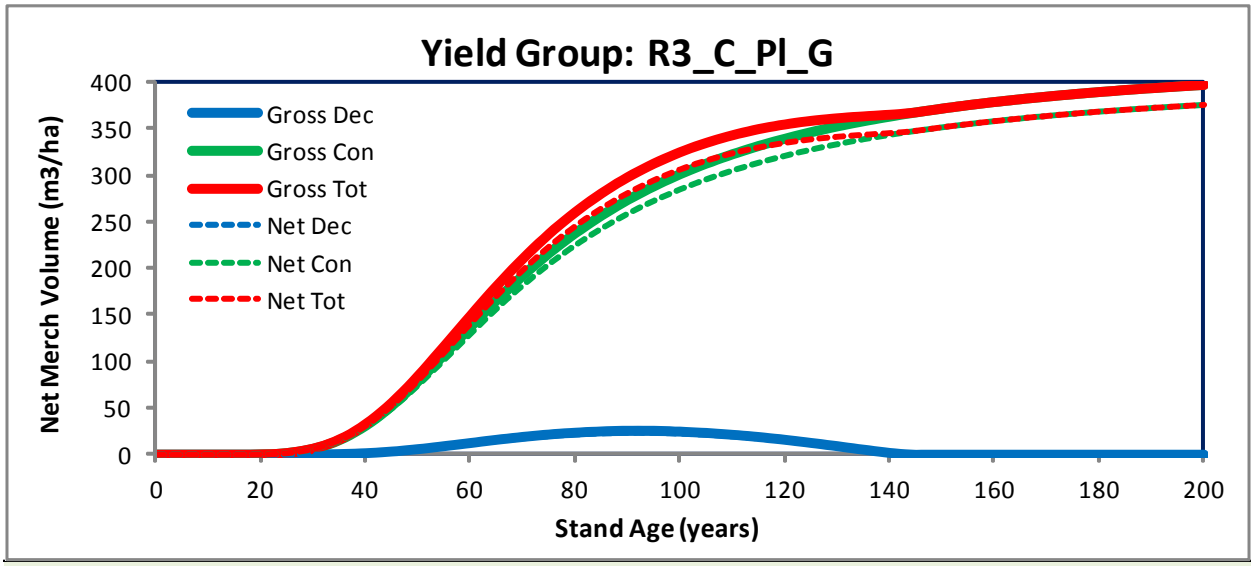
Total Age	Grs Merch Vol (m^3/ha)			Grs Merch MAI (m^3/ha/yr)			Net Merch Vol (m^3/ha)			Net Merch MAI (m^3/ha)		
	Dec	Con	Tot	Dec	Con	Tot	Dec	Con	Tot	Dec	Con	Tot
10	0.9	0.0	0.9	0.09	0.00	0.09	0.8	0.0	0.8	0.08	0.00	0.08
20	14.2	0.0	14.2	0.71	0.00	0.71	12.9	0.0	12.9	0.65	0.00	0.65
30	43.0	0.5	43.6	1.43	0.02	1.45	39.0	0.5	39.5	1.30	0.02	1.32
40	81.1	1.8	82.9	2.03	0.05	2.07	73.5	1.7	75.2	1.84	0.04	1.88
50	117.4	2.9	120.4	2.35	0.06	2.41	106.4	2.8	109.2	2.13	0.06	2.18
60	146.2	4.0	150.2	2.44	0.07	2.50	132.5	3.7	136.2	2.21	0.06	2.27
70	166.7	4.9	171.6	2.38	0.07	2.45	151.0	4.6	155.6	2.16	0.07	2.22
80	180.0	5.7	185.7	2.25	0.07	2.32	163.0	5.4	168.4	2.04	0.07	2.11
90	188.0	6.4	194.4	2.09	0.07	2.16	170.3	6.0	176.4	1.89	0.07	1.96
100	192.3	6.7	199.0	1.92	0.07	1.99	174.2	6.4	180.6	1.74	0.06	1.81
110	193.8	6.7	200.6	1.76	0.06	1.82	175.6	6.4	182.0	1.60	0.06	1.65
120	193.8	6.7	200.6	1.62	0.06	1.67	175.6	6.4	182.0	1.46	0.05	1.52
130	193.8	6.7	200.6	1.49	0.05	1.54	175.6	6.4	182.0	1.35	0.05	1.40
140	170.1	6.7	176.8	1.22	0.05	1.26	154.1	6.4	160.5	1.10	0.05	1.15
150	146.3	6.7	153.0	0.98	0.04	1.02	132.6	6.4	138.9	0.88	0.04	0.93
160	122.5	6.7	129.3	0.77	0.04	0.81	111.0	6.4	117.4	0.69	0.04	0.73
170	98.8	6.7	105.5	0.58	0.04	0.62	89.5	6.4	95.9	0.53	0.04	0.56
180	75.0	6.7	81.7	0.42	0.04	0.45	68.0	6.4	74.3	0.38	0.04	0.41
190	75.0	6.7	81.7	0.39	0.04	0.43	68.0	6.4	74.3	0.36	0.03	0.39
200	75.0	6.7	81.7	0.38	0.03	0.41	68.0	6.4	74.3	0.34	0.03	0.37



R3 - FUTURE MANAGED THLB AREA

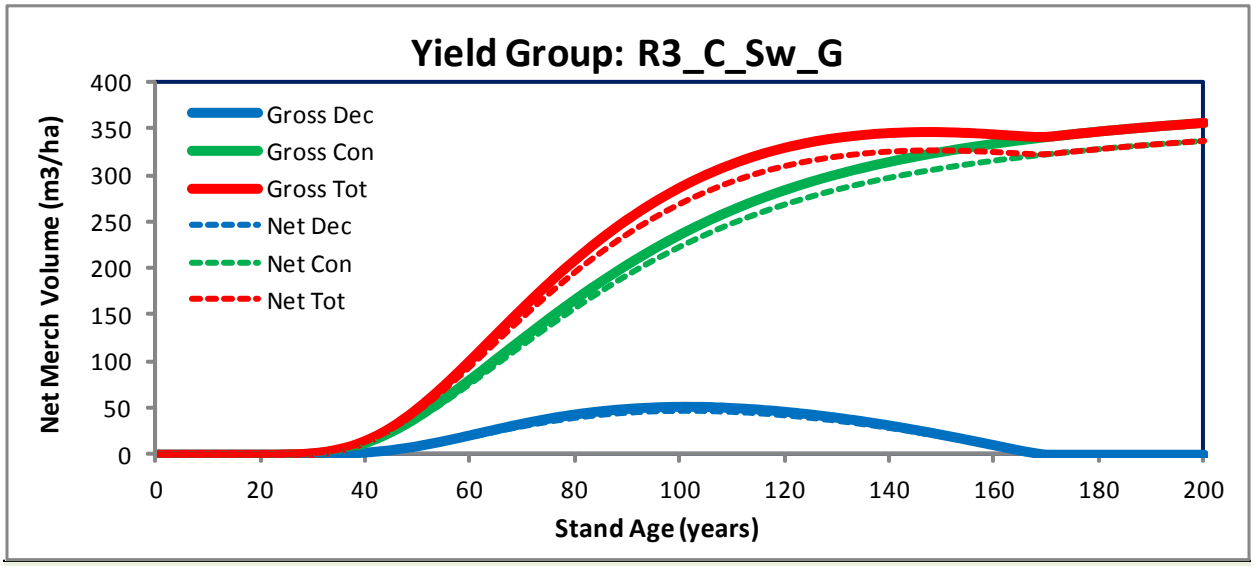
Total Age	Grs Merch Vol (m^3/ha)			Grs Merch MAI (m^3/ha/yr)			Net Merch Vol (m^3/ha)			Net Merch MAI (m^3/ha)		
	Dec	Con	Tot	Dec	Con	Tot	Dec	Con	Tot	Dec	Con	Tot
10	0.0	0.0	0.0	0.00	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.00
20	1.1	0.0	1.1	0.06	0.00	0.06	1.0	0.0	1.0	0.05	0.00	0.05
30	12.7	0.2	12.9	0.42	0.01	0.43	11.5	0.2	11.7	0.38	0.01	0.39
40	44.1	0.9	45.0	1.10	0.02	1.13	40.0	0.8	40.8	1.00	0.02	1.02
50	84.9	2.0	86.9	1.70	0.04	1.74	76.9	1.9	78.8	1.54	0.04	1.58
60	121.4	3.3	124.7	2.02	0.06	2.08	109.9	3.2	113.1	1.83	0.05	1.89
70	148.6	4.6	153.2	2.12	0.07	2.19	134.7	4.3	139.0	1.92	0.06	1.99
80	167.4	5.7	173.1	2.09	0.07	2.16	151.6	5.4	157.1	1.90	0.07	1.96
90	179.7	6.8	186.5	2.00	0.08	2.07	162.8	6.4	169.3	1.81	0.07	1.88
100	186.8	7.7	194.6	1.87	0.08	1.95	169.3	7.3	176.6	1.69	0.07	1.77
110	190.1	8.5	198.5	1.73	0.08	1.80	172.2	8.0	180.2	1.57	0.07	1.64
120	190.1	9.0	199.1	1.58	0.08	1.66	172.2	8.5	180.7	1.44	0.07	1.51
130	190.1	9.4	199.5	1.46	0.07	1.53	172.2	8.9	181.1	1.32	0.07	1.39
140	167.1	9.8	176.8	1.19	0.07	1.26	151.4	9.2	160.6	1.08	0.07	1.15
150	144.0	9.9	153.9	0.96	0.07	1.03	130.5	9.3	139.8	0.87	0.06	0.93
160	121.0	9.9	130.9	0.76	0.06	0.82	109.7	9.3	119.0	0.69	0.06	0.74
170	98.0	9.9	107.9	0.58	0.06	0.63	88.8	9.3	98.1	0.52	0.05	0.58
180	75.0	9.9	84.9	0.42	0.06	0.47	68.0	9.3	77.3	0.38	0.05	0.43
190	75.0	9.9	84.9	0.39	0.05	0.45	68.0	9.3	77.3	0.36	0.05	0.41
200	75.0	9.9	84.9	0.38	0.05	0.42	68.0	9.3	77.3	0.34	0.05	0.39

R3 - FUTURE MANAGED STANDS (CROP PLAN BASED) - GENETIC



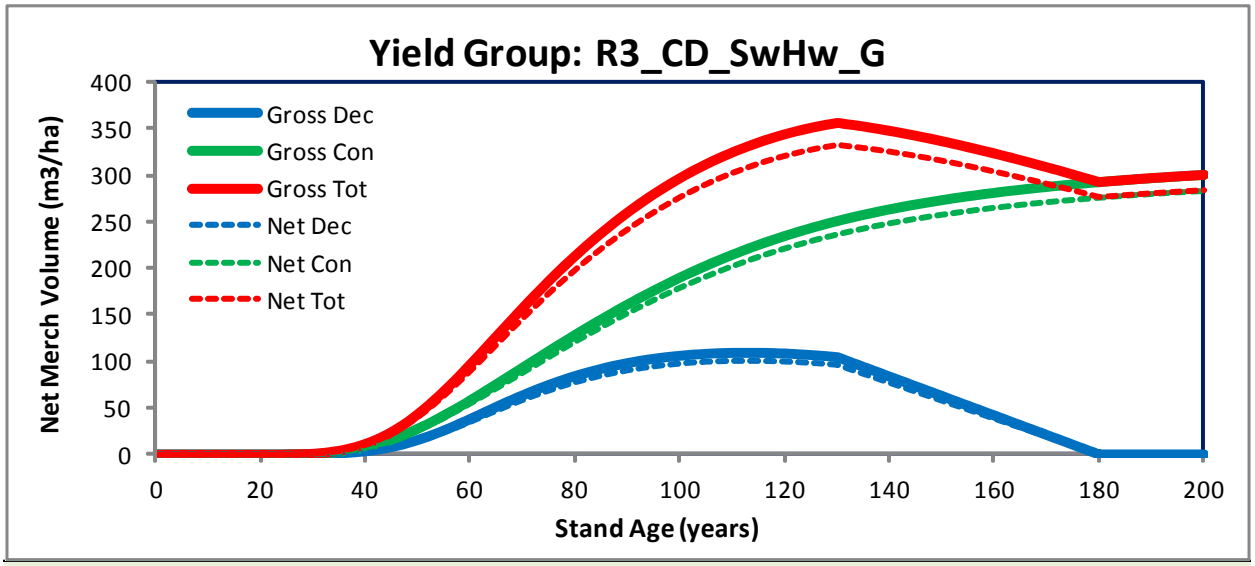
R3 - FUTURE MANAGED THLB AREA

Total Age	Grs Merch Vol (m^3/ha)			Grs Merch MAI (m^3/ha/yr)			Net Merch Vol (m^3/ha)			Net Merch MAI (m^3/ha)		
	Dec	Con	Tot	Dec	Con	Tot	Dec	Con	Tot	Dec	Con	Tot
10	0.0	0.0	0.0	0.00	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.00
20	0.0	0.3	0.3	0.00	0.02	0.02	0.0	0.3	0.3	0.00	0.02	0.02
30	0.2	6.5	6.7	0.01	0.22	0.22	0.2	6.2	6.3	0.01	0.21	0.21
40	1.6	31.3	32.9	0.04	0.78	0.82	1.5	29.6	31.1	0.04	0.74	0.78
50	5.8	79.0	84.8	0.12	1.58	1.70	5.2	74.7	79.9	0.10	1.49	1.60
60	12.1	137.6	149.6	0.20	2.29	2.49	10.9	130.0	140.9	0.18	2.17	2.35
70	18.3	192.7	210.9	0.26	2.75	3.01	16.5	182.1	198.6	0.24	2.60	2.84
80	22.6	238.2	260.8	0.28	2.98	3.26	20.5	225.1	245.6	0.26	2.81	3.07
90	24.4	274.0	298.4	0.27	3.04	3.32	22.1	258.9	281.0	0.25	2.88	3.12
100	23.6	301.7	325.3	0.24	3.02	3.25	21.4	285.1	306.5	0.21	2.85	3.06
110	20.5	323.1	343.6	0.19	2.94	3.12	18.5	305.3	323.9	0.17	2.78	2.94
120	15.3	339.8	355.2	0.13	2.83	2.96	13.9	321.2	335.1	0.12	2.68	2.79
130	8.8	353.1	361.8	0.07	2.72	2.78	8.0	333.6	341.6	0.06	2.57	2.63
140	2.0	363.6	365.7	0.01	2.60	2.61	1.8	343.6	345.5	0.01	2.45	2.47
150	0.0	372.2	372.2	0.00	2.48	2.48	0.0	351.7	351.7	0.00	2.34	2.34
160	0.0	379.3	379.3	0.00	2.37	2.37	0.0	358.4	358.4	0.00	2.24	2.24
170	0.0	385.1	385.1	0.00	2.27	2.27	0.0	363.9	363.9	0.00	2.14	2.14
180	0.0	390.0	390.0	0.00	2.17	2.17	0.0	368.6	368.6	0.00	2.05	2.05
190	0.0	394.2	394.2	0.00	2.07	2.07	0.0	372.5	372.5	0.00	1.96	1.96
200	0.0	397.7	397.7	0.00	1.99	1.99	0.0	375.8	375.8	0.00	1.88	1.88



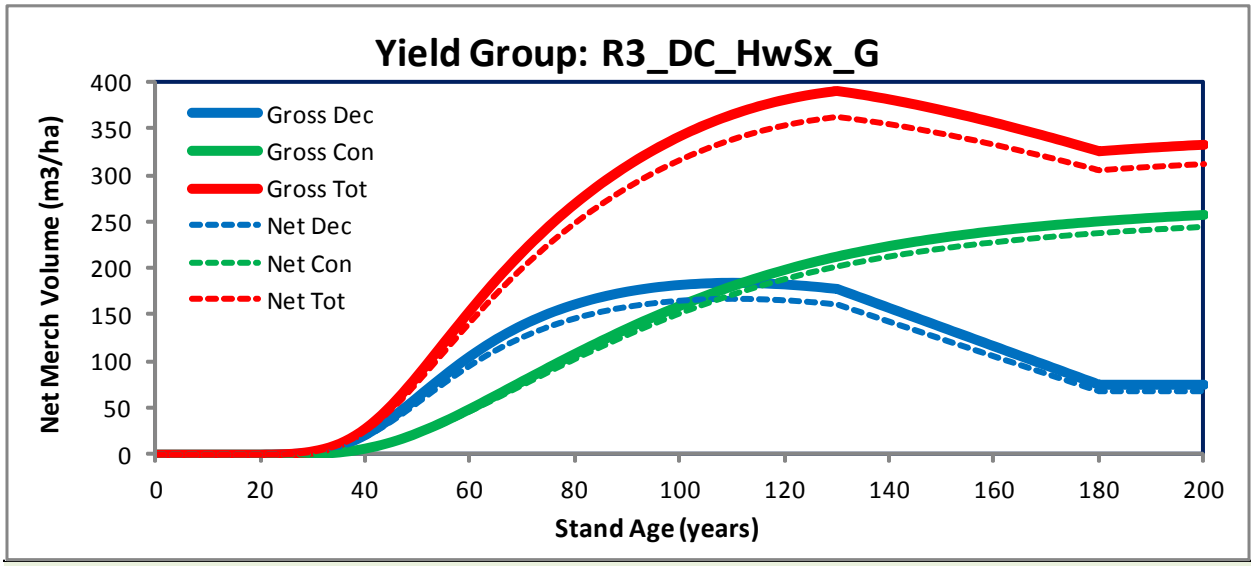
R3 - FUTURE MANAGED THLB AREA

Total Age	Grs Merch Vol (m^3/ha)			Grs Merch MAI (m^3/ha/yr)			Net Merch Vol (m^3/ha)			Net Merch MAI (m^3/ha)		
	Dec	Con	Tot	Dec	Con	Tot	Dec	Con	Tot	Dec	Con	Tot
10	0.0	0.0	0.0	0.00	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.00
20	0.0	0.0	0.0	0.00	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.00
30	0.3	1.5	1.7	0.01	0.05	0.06	0.2	1.4	1.6	0.01	0.05	0.05
40	2.4	12.7	15.1	0.06	0.32	0.38	2.2	12.0	14.1	0.05	0.30	0.35
50	9.2	40.7	49.9	0.18	0.81	1.00	8.3	38.5	46.8	0.17	0.77	0.94
60	20.5	80.8	101.3	0.34	1.35	1.69	18.6	76.3	94.9	0.31	1.27	1.58
70	32.8	124.4	157.2	0.47	1.78	2.25	29.7	117.6	147.3	0.42	1.68	2.10
80	42.5	166.2	208.7	0.53	2.08	2.61	38.5	157.1	195.5	0.48	1.96	2.44
90	48.3	203.6	251.9	0.54	2.26	2.80	43.8	192.4	236.2	0.49	2.14	2.62
100	50.4	235.6	286.0	0.50	2.36	2.86	45.7	222.6	268.3	0.46	2.23	2.68
110	49.2	262.0	311.2	0.45	2.38	2.83	44.6	247.6	292.2	0.41	2.25	2.66
120	45.3	283.3	328.5	0.38	2.36	2.74	41.0	267.7	308.7	0.34	2.23	2.57
130	39.0	300.1	339.1	0.30	2.31	2.61	35.3	283.6	318.9	0.27	2.18	2.45
140	30.8	313.5	344.3	0.22	2.24	2.46	27.9	296.3	324.1	0.20	2.12	2.32
150	20.9	324.2	345.1	0.14	2.16	2.30	19.0	306.4	325.3	0.13	2.04	2.17
160	10.0	332.8	342.8	0.06	2.08	2.14	9.0	314.5	323.6	0.06	1.97	2.02
170	0.2	339.9	340.1	0.00	2.00	2.00	0.2	321.2	321.4	0.00	1.89	1.89
180	0.0	345.9	345.9	0.00	1.92	1.92	0.0	326.8	326.8	0.00	1.82	1.82
190	0.0	350.9	350.9	0.00	1.85	1.85	0.0	331.6	331.6	0.00	1.75	1.75
200	0.0	355.1	355.1	0.00	1.78	1.78	0.0	335.6	335.6	0.00	1.68	1.68



R3 - FUTURE MANAGED THLB AREA

Total Age	Grs Merch Vol (m^3/ha)			Grs Merch MAI (m^3/ha/yr)			Net Merch Vol (m^3/ha)			Net Merch MAI (m^3/ha)		
	Dec	Con	Tot	Dec	Con	Tot	Dec	Con	Tot	Dec	Con	Tot
10	0.0	0.0	0.0	0.00	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.00
20	0.0	0.0	0.0	0.00	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.00
30	0.3	0.9	1.2	0.01	0.03	0.04	0.3	0.8	1.1	0.01	0.03	0.04
40	3.5	8.1	11.7	0.09	0.20	0.29	3.2	7.7	10.9	0.08	0.19	0.27
50	15.7	28.0	43.8	0.31	0.56	0.88	14.2	26.5	40.7	0.28	0.53	0.81
60	38.5	58.6	97.1	0.64	0.98	1.62	34.9	55.3	90.2	0.58	0.92	1.50
70	64.0	93.6	157.6	0.91	1.34	2.25	58.0	88.5	146.5	0.83	1.26	2.09
80	84.7	128.7	213.4	1.06	1.61	2.67	76.8	121.6	198.4	0.96	1.52	2.48
90	98.7	161.2	259.9	1.10	1.79	2.89	89.4	152.3	241.8	0.99	1.69	2.69
100	106.7	190.0	296.7	1.07	1.90	2.97	96.6	179.6	276.2	0.97	1.80	2.76
110	109.7	214.6	324.3	1.00	1.95	2.95	99.4	202.8	302.2	0.90	1.84	2.75
120	109.0	234.7	343.7	0.91	1.96	2.86	98.7	221.8	320.5	0.82	1.85	2.67
130	105.1	250.7	355.8	0.81	1.93	2.74	95.3	236.9	332.2	0.73	1.82	2.56
140	84.1	263.3	347.4	0.60	1.88	2.48	76.2	248.8	325.0	0.54	1.78	2.32
150	63.1	273.1	336.2	0.42	1.82	2.24	57.2	258.1	315.3	0.38	1.72	2.10
160	42.1	281.0	323.0	0.26	1.76	2.02	38.1	265.5	303.6	0.24	1.66	1.90
170	21.0	287.3	308.3	0.12	1.69	1.81	19.1	271.5	290.5	0.11	1.60	1.71
180	0.0	292.4	292.4	0.00	1.62	1.62	0.0	276.3	276.3	0.00	1.54	1.54
190	0.0	296.7	296.7	0.00	1.56	1.56	0.0	280.3	280.3	0.00	1.48	1.48
200	0.0	300.2	300.2	0.00	1.50	1.50	0.0	283.7	283.7	0.00	1.42	1.42



R3 - FUTURE MANAGED THLB AREA

Total Age	Grs Merch Vol (m^3/ha)			Grs Merch MAI (m^3/ha/yr)			Net Merch Vol (m^3/ha)			Net Merch MAI (m^3/ha)		
	Dec	Con	Tot	Dec	Con	Tot	Dec	Con	Tot	Dec	Con	Tot
10	0.0	0.0	0.0	0.00	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.00
20	0.1	0.0	0.1	0.00	0.00	0.01	0.1	0.0	0.1	0.00	0.00	0.00
30	3.0	0.7	3.8	0.10	0.02	0.13	2.8	0.7	3.4	0.09	0.02	0.11
40	21.5	6.8	28.3	0.54	0.17	0.71	19.5	6.4	25.9	0.49	0.16	0.65
50	62.0	23.7	85.7	1.24	0.47	1.71	56.2	22.4	78.5	1.12	0.45	1.57
60	105.7	49.6	155.3	1.76	0.83	2.59	95.8	46.9	142.7	1.60	0.78	2.38
70	139.0	79.2	218.2	1.99	1.13	3.12	125.9	74.9	200.8	1.80	1.07	2.87
80	161.1	108.6	269.7	2.01	1.36	3.37	146.0	102.6	248.6	1.82	1.28	3.11
90	174.7	135.8	310.5	1.94	1.51	3.45	158.2	128.3	286.6	1.76	1.43	3.18
100	181.8	160.2	342.0	1.82	1.60	3.42	164.7	151.4	316.1	1.65	1.51	3.16
110	184.0	181.3	365.3	1.67	1.65	3.32	166.7	171.3	338.0	1.52	1.56	3.07
120	182.3	198.9	381.2	1.52	1.66	3.18	165.2	187.9	353.1	1.38	1.57	2.94
130	177.4	213.1	390.6	1.36	1.64	3.00	160.8	201.4	362.2	1.24	1.55	2.79
140	157.0	224.4	381.4	1.12	1.60	2.72	142.2	212.1	354.3	1.02	1.51	2.53
150	136.5	233.4	369.8	0.91	1.56	2.47	123.6	220.5	344.2	0.82	1.47	2.29
160	116.0	240.5	356.5	0.72	1.50	2.23	105.1	227.3	332.4	0.66	1.42	2.08
170	95.5	246.2	341.7	0.56	1.45	2.01	86.5	232.7	319.2	0.51	1.37	1.88
180	75.0	250.9	325.9	0.42	1.39	1.81	68.0	237.1	305.1	0.38	1.32	1.69
190	75.0	254.7	329.7	0.39	1.34	1.74	68.0	240.7	308.7	0.36	1.27	1.62
200	75.0	257.9	332.9	0.38	1.29	1.66	68.0	243.7	311.6	0.34	1.22	1.56

Appendix F: PIECE SIZE TABLES - NATURAL STANDS

Age	Yield Group	Gross Merch Volume (m^3/ha)			Gross Merch Stems/ha			# Trees / m^3		
		Dec	Con	Tot	Dec	Con	Tot	Dec	Con	Tot
10	1	0.0	0.0	0.0	0.2	0.0	0.2	0.0	0.0	0.0
20	1	1.5	0.0	1.5	23.7	10.1	33.9	0.0	0.0	0.0
30	1	18.3	0.3	18.5	259.0	18.0	277.0	0.0	0.0	0.0
40	1	57.5	1.3	58.9	416.8	24.2	441.0	7.2	18.6	7.5
50	1	101.7	3.5	105.2	472.4	29.2	501.6	4.6	8.3	4.8
60	1	138.4	7.0	145.3	454.9	33.1	488.0	3.3	4.7	3.4
70	1	165.7	10.9	176.6	410.9	36.1	446.9	2.5	3.3	2.5
80	1	184.9	14.4	199.3	361.4	38.3	399.7	2.0	2.7	2.0
90	1	197.7	17.3	215.0	314.7	39.8	354.5	1.6	2.3	1.6
100	1	205.3	19.5	224.8	273.6	40.8	314.3	1.3	2.1	1.4
110	1	209.0	21.2	230.2	238.4	41.3	279.7	1.1	1.9	1.2
120	1	209.0	22.5	231.5	208.0	41.4	249.4	1.0	1.8	1.1
130	1	209.0	23.6	232.6	184.5	41.2	225.7	0.9	1.7	1.0
140	1	182.2	24.5	206.7	144.8	40.6	185.4	0.8	1.7	0.9
150	1	155.4	24.9	180.3	112.6	39.4	152.0	0.7	1.6	0.8
160	1	128.6	24.9	153.5	86.0	37.4	123.4	0.7	1.5	0.8
170	1	101.8	24.9	126.7	62.1	35.4	97.4	0.6	1.4	0.8
180	1	75.0	24.9	99.9	42.9	33.4	76.4	0.6	1.3	0.8
190	1	75.0	24.8	99.8	39.8	31.6	71.4	0.5	1.3	0.7
200	1	75.0	24.7	99.7	38.1	29.9	68.0	0.5	1.2	0.7
10	2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
20	2	0.6	0.3	0.8	5.3	3.9	9.2	0.0	0.0	0.0
30	2	11.5	1.0	12.5	252.6	7.3	259.9	0.0	0.0	0.0
40	2	51.5	1.9	53.4	654.3	9.9	664.2	12.7	5.2	12.4
50	2	110.3	2.8	113.1	850.1	12.0	862.1	7.7	4.3	7.6
60	2	165.4	3.7	169.0	873.4	13.7	887.1	5.3	3.7	5.2
70	2	208.1	4.5	212.6	812.3	15.2	827.4	3.9	3.4	3.9
80	2	238.8	5.1	244.0	723.2	16.2	739.4	3.0	3.2	3.0
90	2	259.8	5.7	265.6	632.4	16.9	649.4	2.4	3.0	2.4
100	2	273.4	6.2	279.6	550.2	17.3	567.5	2.0	2.8	2.0
110	2	281.6	6.7	288.2	479.2	17.4	496.6	1.7	2.6	1.7
120	2	281.6	7.0	288.6	413.0	17.2	430.1	1.5	2.5	1.5
130	2	281.6	7.3	288.8	361.6	16.7	378.3	1.3	2.3	1.3
140	2	240.2	7.5	247.7	274.0	15.7	289.6	1.1	2.1	1.2
150	2	198.9	7.5	206.4	203.3	13.9	217.2	1.0	1.9	1.1
160	2	157.6	7.5	165.1	146.3	12.5	158.8	0.9	1.7	1.0
170	2	116.3	7.5	123.8	97.4	11.4	108.8	0.8	1.5	0.9
180	2	75.0	7.5	82.5	58.1	10.4	68.5	0.8	1.4	0.8
190	2	75.0	7.5	82.5	53.9	9.6	63.6	0.7	1.3	0.8
200	2	75.0	7.5	82.5	50.7	9.0	59.7	0.7	1.2	0.7

Age	Yield Group	Gross Merch Volume (m^3/ha)			Gross Merch Stems/ha			# Trees / m^3		
		Dec	Con	Tot	Dec	Con	Tot	Dec	Con	Tot
10	3	0.0	0.0	0.0	0.0	6.1	6.1	0.0	0.0	0.0
20	3	0.5	0.1	0.6	6.9	34.6	41.5	0.0	0.0	0.0
30	3	7.8	1.2	8.9	172.2	74.4	246.6	0.0	0.0	0.0
40	3	31.9	4.6	36.4	488.2	115.2	603.4	15.3	25.0	16.6
50	3	68.1	11.4	79.4	663.1	150.4	813.5	9.7	13.2	10.2
60	3	104.6	21.1	125.8	700.4	178.1	878.4	6.7	8.4	7.0
70	3	134.9	32.1	167.0	663.3	198.4	861.7	4.9	6.2	5.2
80	3	157.2	42.8	200.1	596.8	212.4	809.2	3.8	5.0	4.0
90	3	172.5	52.5	225.0	524.9	220.9	745.8	3.0	4.2	3.3
100	3	182.2	60.7	242.9	457.9	224.8	682.7	2.5	3.7	2.8
110	3	187.6	67.5	255.1	399.3	225.0	624.3	2.1	3.3	2.4
120	3	187.6	73.2	260.8	345.3	222.1	567.5	1.8	3.0	2.2
130	3	187.6	78.0	265.6	304.2	217.1	521.2	1.6	2.8	2.0
140	3	165.1	82.1	247.2	239.5	210.5	450.0	1.5	2.6	1.8
150	3	142.6	84.7	227.2	187.6	200.5	388.1	1.3	2.4	1.7
160	3	120.0	84.7	204.7	143.8	185.6	329.4	1.2	2.2	1.6
170	3	97.5	84.7	182.2	107.7	172.2	280.0	1.1	2.0	1.5
180	3	75.0	84.7	159.7	77.0	160.2	237.3	1.0	1.9	1.5
190	3	75.0	84.6	159.6	72.1	149.4	221.6	1.0	1.8	1.4
200	3	75.0	84.5	159.5	67.4	139.7	207.0	0.9	1.7	1.3
10	4	0.9	0.0	0.9	3.5	0.3	3.8	0.0	0.0	0.0
20	4	14.2	0.0	14.2	38.8	3.5	42.4	0.0	0.0	0.0
30	4	43.0	0.5	43.6	138.7	6.5	145.2	0.0	0.0	0.0
40	4	81.1	1.8	82.9	265.2	8.8	274.0	3.3	4.9	3.3
50	4	117.4	2.9	120.4	304.0	10.2	314.2	2.6	3.5	2.6
60	4	146.2	4.0	150.2	292.3	10.6	302.9	2.0	2.7	2.0
70	4	166.7	4.9	171.6	260.5	10.4	270.9	1.6	2.1	1.6
80	4	180.0	5.7	185.7	225.3	9.9	235.1	1.3	1.7	1.3
90	4	188.0	6.4	194.4	193.3	9.2	202.6	1.0	1.4	1.0
100	4	192.3	6.7	199.0	166.3	8.3	174.6	0.9	1.2	0.9
110	4	193.8	6.7	200.6	143.9	7.0	150.9	0.7	1.0	0.8
120	4	193.8	6.7	200.6	125.8	6.0	131.8	0.6	0.9	0.7
130	4	193.8	6.7	200.6	111.7	5.3	117.0	0.6	0.8	0.6
140	4	170.1	6.7	176.8	88.1	4.8	92.9	0.5	0.7	0.5
150	4	146.3	6.7	153.0	68.9	4.4	73.3	0.5	0.7	0.5
160	4	122.5	6.7	129.3	52.9	4.0	57.0	0.4	0.6	0.4
170	4	98.8	6.7	105.5	39.5	3.8	43.3	0.4	0.6	0.4
180	4	75.0	6.7	81.7	28.0	3.6	31.6	0.4	0.5	0.4
190	4	75.0	6.7	81.7	25.4	3.4	28.8	0.3	0.5	0.4
200	4	75.0	6.7	81.7	24.0	3.2	27.2	0.3	0.5	0.3

Age	Yield Group	Gross Merch Volume (m^3/ha)			Gross Merch Stems/ha			# Trees / m^3		
		Dec	Con	Tot	Dec	Con	Tot	Dec	Con	Tot
10	5	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.0
20	5	0.0	0.1	0.1	0.0	75.8	75.8	0.0	0.0	0.0
30	5	0.0	1.1	1.1	0.7	178.1	178.8	0.0	0.0	0.0
40	5	0.1	6.2	6.3	19.2	282.4	301.5	192.0	45.5	47.9
50	5	0.4	21.3	21.7	42.0	386.6	428.6	105.0	18.2	19.8
60	5	1.3	47.3	48.6	55.3	485.8	541.1	42.5	10.3	11.1
70	5	2.5	79.3	81.8	60.6	571.2	631.8	24.2	7.2	7.7
80	5	3.8	111.9	115.7	60.4	640.4	700.8	15.9	5.7	6.1
90	5	4.8	142.3	147.1	57.4	692.6	750.0	12.0	4.9	5.1
100	5	5.6	169.1	174.7	53.1	728.8	781.9	9.5	4.3	4.5
110	5	6.0	192.3	198.3	48.4	750.5	798.9	8.1	3.9	4.0
120	5	6.0	212.1	218.1	41.9	759.7	801.6	7.0	3.6	3.7
130	5	6.0	229.1	235.1	37.0	758.8	795.8	6.2	3.3	3.4
140	5	4.8	243.8	248.6	26.6	749.9	776.5	5.5	3.1	3.1
150	5	3.6	256.6	260.3	18.4	735.4	753.8	5.1	2.9	2.9
160	5	2.4	268.0	270.4	10.9	716.8	727.7	4.5	2.7	2.7
170	5	1.2	278.1	279.3	5.3	695.7	701.0	4.4	2.5	2.5
180	5	0.0	285.4	285.4	0.0	668.8	668.8	0.0	2.3	2.3
190	5	0.0	285.2	285.2	0.0	626.9	626.9	0.0	2.2	2.2
200	5	0.0	285.0	285.0	0.0	588.4	588.4	0.0	2.1	2.1
10	7	0.0	0.0	0.0	0.6	0.0	0.6	0.0	0.0	0.0
20	7	1.1	0.0	1.1	11.1	4.0	15.1	0.0	0.0	0.0
30	7	12.7	0.2	12.9	186.9	6.1	193.0	0.0	0.0	0.0
40	7	44.1	0.9	45.0	435.4	7.9	443.3	9.9	8.8	9.9
50	7	84.9	2.0	86.9	522.5	9.3	531.8	6.2	4.7	6.1
60	7	121.4	3.3	124.7	509.4	10.4	519.8	4.2	3.2	4.2
70	7	148.6	4.6	153.2	455.5	11.2	466.7	3.1	2.4	3.0
80	7	167.4	5.7	173.1	393.8	11.7	405.5	2.4	2.1	2.3
90	7	179.7	6.8	186.5	337.2	12.0	349.2	1.9	1.8	1.9
100	7	186.8	7.7	194.6	289.1	12.2	301.3	1.5	1.6	1.5
110	7	190.1	8.5	198.5	249.3	12.3	261.6	1.3	1.4	1.3
120	7	190.1	9.0	199.1	216.0	12.3	228.4	1.1	1.4	1.1
130	7	190.1	9.4	199.5	189.8	12.3	202.1	1.0	1.3	1.0
140	7	167.1	9.8	176.8	149.2	12.2	161.5	0.9	1.2	0.9
150	7	144.0	9.9	153.9	116.7	12.0	128.6	0.8	1.2	0.8
160	7	121.0	9.9	130.9	89.6	11.6	101.2	0.7	1.2	0.8
170	7	98.0	9.9	107.9	66.7	11.3	78.0	0.7	1.1	0.7
180	7	75.0	9.9	84.9	47.7	11.0	58.7	0.6	1.1	0.7
190	7	75.0	9.9	84.9	45.0	10.7	55.7	0.6	1.1	0.7
200	7	75.0	9.9	84.9	41.6	10.4	52.1	0.6	1.1	0.6

Age	Yield Group	Gross Merch Volume (m^3/ha)			Gross Merch Stems/ha			# Trees / m^3		
		Dec	Con	Tot	Dec	Con	Tot	Dec	Con	Tot
10	8	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0
20	8	0.0	0.3	0.3	4.9	31.6	36.5	0.0	0.0	0.0
30	8	0.2	4.4	4.7	32.1	173.6	205.7	0.0	0.0	0.0
40	8	1.4	19.0	20.4	90.4	436.7	527.1	64.6	23.0	25.8
50	8	3.9	48.8	52.7	134.9	695.6	830.5	34.6	14.3	15.8
60	8	7.6	91.6	99.2	152.4	867.6	1020.0	20.1	9.5	10.3
70	8	11.5	139.4	150.9	151.6	947.9	1099.5	13.2	6.8	7.3
80	8	14.9	183.9	198.8	141.5	963.3	1104.8	9.5	5.2	5.6
90	8	17.3	221.5	238.8	127.5	940.2	1067.7	7.4	4.2	4.5
100	8	18.5	251.7	270.3	113.0	896.8	1009.9	6.1	3.6	3.7
110	8	18.8	275.6	294.4	99.2	844.2	943.4	5.3	3.1	3.2
120	8	18.8	294.4	313.2	88.1	788.7	876.8	4.7	2.7	2.8
130	8	18.8	309.3	328.1	81.9	733.7	815.5	4.4	2.4	2.5
140	8	15.0	321.4	336.4	60.0	681.1	741.0	4.0	2.1	2.2
150	8	11.3	331.1	342.4	40.4	631.9	672.3	3.6	1.9	2.0
160	8	7.5	335.3	342.8	25.2	577.8	603.0	3.4	1.7	1.8
170	8	3.8	335.3	339.1	12.1	522.9	535.0	3.2	1.6	1.6
180	8	0.0	335.3	335.3	0.0	476.1	476.1	0.0	1.4	1.4
190	8	0.0	335.3	335.3	0.0	435.7	435.7	0.0	1.3	1.3
200	8	0.0	335.3	335.3	0.0	400.7	400.7	0.0	1.2	1.2
10	9	0.0	0.0	0.0	0.0	8.2	8.2	0.0	0.0	0.0
20	9	0.1	1.3	1.4	3.5	66.6	70.1	0.0	0.0	0.0
30	9	2.9	10.6	13.5	119.9	219.7	339.5	0.0	0.0	0.0
40	9	15.7	30.1	45.7	403.3	371.2	774.4	25.7	12.3	16.9
50	9	38.2	57.1	95.2	579.6	464.9	1044.5	15.2	8.1	11.0
60	9	63.3	86.2	149.6	638.0	504.3	1142.3	10.1	5.9	7.6
70	9	86.2	113.0	199.1	620.5	509.5	1130.0	7.2	4.5	5.7
80	9	104.5	135.8	240.3	569.3	496.2	1065.5	5.4	3.7	4.4
90	9	117.6	154.3	271.8	508.3	473.4	981.6	4.3	3.1	3.6
100	9	125.9	168.9	294.9	448.7	445.9	894.6	3.6	2.6	3.0
110	9	130.5	180.6	311.1	394.9	416.6	811.5	3.0	2.3	2.6
120	9	130.5	189.8	320.3	342.8	386.9	729.7	2.6	2.0	2.3
130	9	130.5	197.1	327.6	303.4	357.8	661.2	2.3	1.8	2.0
140	9	104.4	203.0	307.4	216.9	330.1	547.1	2.1	1.6	1.8
150	9	78.3	206.0	284.3	148.0	300.3	448.3	1.9	1.5	1.6
160	9	52.2	206.0	258.2	91.6	269.1	360.7	1.8	1.3	1.4
170	9	26.1	206.0	232.1	42.3	242.5	284.8	1.6	1.2	1.2
180	9	0.0	206.0	206.0	0.0	219.7	219.7	0.0	1.1	1.1
190	9	0.0	206.0	206.0	0.0	200.1	200.1	0.0	1.0	1.0
200	9	0.0	206.0	206.0	0.0	183.0	183.0	0.0	0.9	0.9

Age	Yield Group	Gross Merch Volume (m^3/ha)			Gross Merch Stems/ha			# Trees / m^3		
		Dec	Con	Tot	Dec	Con	Tot	Dec	Con	Tot
10	10	0.0	0.0	0.0	0.2	0.0	0.2	0.0	0.0	0.0
20	10	0.0	0.1	0.1	2.3	16.8	19.1	0.0	0.0	0.0
30	10	0.5	1.9	2.4	14.2	117.5	131.7	0.0	0.0	0.0
40	10	2.5	9.3	11.8	52.2	348.6	400.8	20.9	37.5	34.0
50	10	5.8	25.7	31.5	102.0	618.8	720.8	17.6	24.1	22.9
60	10	9.2	52.6	61.8	126.6	839.6	966.2	13.8	16.0	15.6
70	10	12.3	88.3	100.6	133.2	988.4	1121.6	10.8	11.2	11.1
80	10	14.8	128.2	143.0	128.4	1073.1	1201.5	8.7	8.4	8.4
90	10	16.7	167.7	184.3	118.2	1108.6	1226.8	7.1	6.6	6.7
100	10	17.5	203.3	220.8	106.3	1108.8	1215.0	6.1	5.5	5.5
110	10	17.3	234.0	251.3	94.1	1084.3	1178.4	5.4	4.6	4.7
120	10	17.3	259.9	277.2	89.2	1043.6	1132.8	5.2	4.0	4.1
130	10	17.3	281.7	299.0	87.3	992.7	1079.9	5.0	3.5	3.6
140	10	13.8	299.6	313.4	70.4	936.3	1006.7	5.1	3.1	3.2
150	10	10.4	314.1	324.5	54.2	877.9	932.1	5.2	2.8	2.9
160	10	6.9	326.2	333.1	35.9	819.8	855.7	5.2	2.5	2.6
170	10	3.5	331.4	334.9	16.2	751.2	767.3	4.6	2.3	2.3
180	10	0.0	331.4	331.4	0.0	679.4	679.4	0.0	2.1	2.1
190	10	0.0	331.4	331.4	0.0	617.3	617.3	0.0	1.9	1.9
200	10	0.0	331.4	331.4	0.0	563.3	563.3	0.0	1.7	1.7
10	11	0.0	0.0	0.0	0.3	0.4	0.7	0.0	0.0	0.0
20	11	0.9	3.5	4.3	6.6	80.5	87.1	0.0	0.0	0.0
30	11	4.9	17.9	22.7	41.2	235.9	277.1	0.0	0.0	0.0
40	11	14.2	42.0	56.2	86.2	413.1	499.3	6.1	9.8	8.9
50	11	25.2	76.3	101.5	109.0	555.5	664.5	4.3	7.3	6.5
60	11	34.0	117.3	151.2	113.4	643.3	756.8	3.3	5.5	5.0
70	11	39.9	158.4	198.2	107.7	686.6	794.4	2.7	4.3	4.0
80	11	43.1	194.9	238.0	98.0	700.5	798.5	2.3	3.6	3.4
90	11	44.0	225.5	269.5	87.4	696.3	783.7	2.0	3.1	2.9
100	11	43.2	250.4	293.6	77.3	681.1	758.4	1.8	2.7	2.6
110	11	41.3	270.7	312.1	66.1	659.1	725.1	1.6	2.4	2.3
120	11	41.3	287.3	328.6	59.9	632.8	692.7	1.5	2.2	2.1
130	11	41.3	301.0	342.3	58.3	604.0	662.3	1.4	2.0	1.9
140	11	33.1	312.3	345.4	46.1	574.1	620.1	1.4	1.8	1.8
150	11	24.8	321.9	346.7	34.0	543.8	577.8	1.4	1.7	1.7
160	11	16.5	330.0	346.5	21.7	514.0	535.8	1.3	1.6	1.5
170	11	8.3	337.0	345.3	10.2	485.3	495.5	1.2	1.4	1.4
180	11	0.0	340.2	340.2	0.0	452.1	452.1	0.0	1.3	1.3
190	11	0.0	340.2	340.2	0.0	416.9	416.9	0.0	1.2	1.2
200	11	0.0	340.2	340.2	0.0	385.8	385.8	0.0	1.1	1.1

Age	Yield Group	Gross Merch Volume (m^3/ha)			Gross Merch Stems/ha			# Trees / m^3		
		Dec	Con	Tot	Dec	Con	Tot	Dec	Con	Tot
10	12	0.0	0.0	0.0	0.1	0.0	0.2	0.0	0.0	0.0
20	12	0.0	0.2	0.2	1.8	14.8	16.6	0.0	0.0	0.0
30	12	0.0	1.1	1.1	8.3	53.4	61.7	0.0	0.0	0.0
40	12	0.1	3.2	3.3	41.1	151.7	192.8	411.0	47.4	58.4
50	12	0.5	8.6	9.1	83.1	286.9	370.0	166.2	33.4	40.7
60	12	1.2	20.1	21.3	120.1	429.2	549.3	100.1	21.4	25.8
70	12	2.2	37.7	39.9	140.0	557.3	697.3	63.6	14.8	17.5
80	12	3.4	59.2	62.6	147.0	662.3	809.3	43.2	11.2	12.9
90	12	4.4	82.5	87.0	142.2	741.2	883.3	32.3	9.0	10.2
100	12	5.4	105.8	111.2	134.2	794.1	928.3	24.9	7.5	8.3
110	12	6.2	127.8	134.0	122.4	823.3	945.7	19.7	6.4	7.1
120	12	6.2	147.7	154.0	100.2	831.9	932.2	16.2	5.6	6.1
130	12	6.2	165.5	171.8	84.9	823.9	908.7	13.7	5.0	5.3
140	12	5.0	181.2	186.2	64.0	803.1	867.1	12.8	4.4	4.7
150	12	3.7	195.0	198.7	47.8	773.4	821.2	12.9	4.0	4.1
160	12	2.5	201.2	203.7	31.3	717.1	748.3	12.5	3.6	3.7
170	12	1.2	201.2	202.5	15.8	646.6	662.5	13.2	3.2	3.3
180	12	0.0	201.2	201.2	0.0	585.6	585.6	0.0	2.9	2.9
190	12	0.0	201.2	201.2	0.0	532.4	532.4	0.0	2.6	2.6
200	12	0.0	201.2	201.2	0.0	485.9	485.9	0.0	2.4	2.4
10	14	0.0	0.0	0.0	0.1	0.0	0.1	0.0	0.0	0.0
20	14	0.1	0.2	0.3	6.0	26.3	32.3	0.0	0.0	0.0
30	14	1.2	1.6	2.8	18.9	86.8	105.7	0.0	0.0	0.0
40	14	3.7	5.4	9.1	53.2	186.4	239.6	14.4	34.5	26.3
50	14	6.8	14.0	20.8	88.4	310.2	398.6	13.0	22.2	19.2
60	14	9.8	27.7	37.6	107.7	445.5	553.2	11.0	16.1	14.7
70	14	12.6	45.2	57.8	113.8	573.6	687.4	9.0	12.7	11.9
80	14	14.7	64.9	79.6	111.1	684.7	795.8	7.6	10.6	10.0
90	14	16.3	85.6	101.9	103.2	775.6	878.8	6.3	9.1	8.6
100	14	17.4	106.4	123.8	91.8	845.4	937.2	5.3	7.9	7.6
110	14	17.8	126.3	144.1	82.6	894.6	977.2	4.6	7.1	6.8
120	14	17.8	145.0	162.8	75.0	924.8	999.8	4.2	6.4	6.1
130	14	17.8	162.5	180.3	70.4	938.1	1008.5	4.0	5.8	5.6
140	14	14.3	178.7	193.0	53.8	936.9	990.7	3.8	5.2	5.1
150	14	10.7	193.7	204.4	38.9	923.9	962.8	3.6	4.8	4.7
160	14	7.1	207.4	214.6	24.8	901.7	926.5	3.5	4.3	4.3
170	14	3.6	220.0	223.5	12.0	872.8	884.8	3.3	4.0	4.0
180	14	0.0	231.3	231.3	0.0	839.1	839.1	0.0	3.6	3.6
190	14	0.0	236.5	236.5	0.0	784.1	784.1	0.0	3.3	3.3
200	14	0.0	236.5	236.5	0.0	716.6	716.6	0.0	3.0	3.0

Age	Yield Group	Gross Merch Volume (m^3/ha)			Gross Merch Stems/ha			# Trees / m^3		
		Dec	Con	Tot	Dec	Con	Tot	Dec	Con	Tot
10	15	0.0	0.0	0.0	0.6	15.7	16.3	0.0	0.0	0.0
20	15	0.6	0.4	0.9	13.8	74.3	88.1	0.0	0.0	0.0
30	15	4.7	2.9	7.6	52.2	159.0	211.3	0.0	0.0	0.0
40	15	11.8	12.0	23.8	103.0	248.4	351.4	8.7	20.7	14.8
50	15	18.9	30.4	49.3	137.0	326.8	463.8	7.2	10.8	9.4
60	15	25.0	55.9	80.9	157.7	390.4	548.0	6.3	7.0	6.8
70	15	30.2	84.2	114.4	162.4	438.8	601.3	5.4	5.2	5.3
80	15	33.9	112.1	146.0	158.0	473.2	631.1	4.7	4.2	4.3
90	15	36.3	137.5	173.8	148.6	494.9	643.5	4.1	3.6	3.7
100	15	37.5	159.7	197.2	136.9	506.0	643.0	3.7	3.2	3.3
110	15	37.9	178.6	216.4	124.5	508.4	633.0	3.3	2.8	2.9
120	15	37.9	194.5	232.4	111.6	504.1	615.7	2.9	2.6	2.6
130	15	37.9	208.1	245.9	102.3	494.6	596.9	2.7	2.4	2.4
140	15	30.3	219.6	249.9	74.8	481.5	556.3	2.5	2.2	2.2
150	15	22.7	229.5	252.2	52.2	465.9	518.2	2.3	2.0	2.1
160	15	15.1	238.1	253.2	31.6	448.9	480.6	2.1	1.9	1.9
170	15	7.6	245.6	253.2	14.3	431.3	445.6	1.9	1.8	1.8
180	15	0.0	252.3	252.3	0.0	413.5	413.5	0.0	1.6	1.6
190	15	0.0	256.6	256.6	0.0	393.2	393.2	0.0	1.5	1.5
200	15	0.0	256.6	256.6	0.0	368.2	368.2	0.0	1.4	1.4
10	16	0.0	0.0	0.0	0.6	15.7	16.3	0.0	0.0	0.0
20	16	0.6	0.4	0.9	13.8	74.3	88.1	0.0	0.0	0.0
30	16	4.7	2.9	7.6	52.2	159.0	211.3	0.0	0.0	0.0
40	16	11.8	12.0	23.8	103.0	248.4	351.4	8.7	20.7	14.8
50	16	18.9	30.4	49.3	137.0	326.8	463.8	7.2	10.8	9.4
60	16	25.0	55.9	80.9	157.7	390.4	548.0	6.3	7.0	6.8
70	16	30.2	84.2	114.4	162.4	438.8	601.3	5.4	5.2	5.3
80	16	33.9	112.1	146.0	158.0	473.2	631.1	4.7	4.2	4.3
90	16	36.3	137.5	173.8	148.6	494.9	643.5	4.1	3.6	3.7
100	16	37.5	159.7	197.2	136.9	506.0	643.0	3.7	3.2	3.3
110	16	37.9	178.6	216.4	124.5	508.4	633.0	3.3	2.8	2.9
120	16	37.9	194.5	232.4	111.6	504.1	615.7	2.9	2.6	2.6
130	16	37.9	208.1	245.9	102.3	494.6	596.9	2.7	2.4	2.4
140	16	30.3	219.6	249.9	74.8	481.5	556.3	2.5	2.2	2.2
150	16	22.7	229.5	252.2	52.2	465.9	518.2	2.3	2.0	2.1
160	16	15.1	238.1	253.2	31.6	448.9	480.6	2.1	1.9	1.9
170	16	7.6	245.6	253.2	14.3	431.3	445.6	1.9	1.8	1.8
180	16	0.0	252.3	252.3	0.0	413.5	413.5	0.0	1.6	1.6
190	16	0.0	256.6	256.6	0.0	393.2	393.2	0.0	1.5	1.5
200	16	0.0	256.6	256.6	0.0	368.2	368.2	0.0	1.4	1.4

Age	Yield Group	Gross Merch Volume (m^3/ha)			Gross Merch Stems/ha			# Trees / m^3		
		Dec	Con	Tot	Dec	Con	Tot	Dec	Con	Tot
10	17	0.0	0.0	0.0	0.1	11.3	11.4	0.0	0.0	0.0
20	17	0.4	0.4	0.9	10.6	75.5	86.1	0.0	0.0	0.0
30	17	5.1	3.5	8.6	124.6	153.3	277.8	0.0	0.0	0.0
40	17	19.9	10.6	30.6	362.4	221.6	584.0	18.2	20.9	19.1
50	17	44.4	23.7	68.1	492.2	277.0	769.2	11.1	11.7	11.3
60	17	70.3	42.3	112.6	519.8	319.4	839.2	7.4	7.6	7.5
70	17	91.9	63.4	155.3	491.4	349.1	840.5	5.3	5.5	5.4
80	17	107.7	84.0	191.7	441.4	367.2	808.6	4.1	4.4	4.2
90	17	118.1	102.3	220.4	388.0	375.3	763.3	3.3	3.7	3.5
100	17	124.1	118.0	242.1	338.6	375.4	714.0	2.7	3.2	2.9
110	17	126.6	131.3	257.9	295.4	369.2	664.6	2.3	2.8	2.6
120	17	126.6	142.3	268.9	258.0	358.5	616.5	2.0	2.5	2.3
130	17	126.6	151.4	278.0	229.5	344.6	574.0	1.8	2.3	2.1
140	17	101.3	159.1	260.4	165.4	328.9	494.3	1.6	2.1	1.9
150	17	76.0	165.5	241.5	114.0	312.5	426.5	1.5	1.9	1.8
160	17	50.6	171.1	221.7	70.4	296.3	366.7	1.4	1.7	1.7
170	17	25.3	175.8	201.2	32.2	280.6	312.8	1.3	1.6	1.6
180	17	0.0	177.5	177.5	0.0	261.8	261.8	0.0	1.5	1.5
190	17	0.0	177.4	177.4	0.0	242.5	242.5	0.0	1.4	1.4
200	17	0.0	177.2	177.2	0.0	225.4	225.4	0.0	1.3	1.3

Appendix G: VOLUME BIAS ADJUSTMENT MEMO

MEMO

Date	January 11, 2012
From	René de Jong, Gyula Gulyas
To	Dwight Weeks, Melonie Zaichkowsky
Re	Canfor FMA 9900037 – Bias in Merch Volumes for 2012 FMP NSYTs

Overview

The Canfor FMA NSYT draft report submitted to ASRD November 28, 2011, suggested that GYPSY predictions consistently overestimated merchantable volumes[1] for AW, and to a lesser degree for PL. This memo discusses a simple adjustment to remove this bias.

Paired T-Tests to Assess Bias

Paired t-tests were run to assess if the residual differences in merchantable volume between GYPSY predictions[2] and individual PSP measurement data, were significantly different from zero at the 95% level of confidence (Table 1). Shaded records highlight species groups with significant bias.[3]

Table 1. T-Test on Paired Differences (shaded cells indicate significant bias).

Yield Group	Species	Average Difference (act-pred)	# of PSP msmts	Standard Error	T statistic	95% CI	
						Lower	Upper
1,2	AW	-23.6806	158	2.347954	1.975092	-28.318	-19.0432
1,2	PL	-0.00668	158	0.090451	1.975092	-0.18533	0.171967
1,2	SB	-0.09411	158	0.062783	1.975092	-0.21812	0.02989
1,2	SW	-0.32141	158	0.167148	1.975092	-0.65155	0.008722
4	AW	-36.3051	18	8.548829	2.100922	-54.2655	-18.3447
4	PL	0	18	0	2.100922	0	0
4	SB	0.08379	18	0.124714	2.100922	-0.17822	0.345805
4	SW	-0.18503	18	0.102513	2.100922	-0.4004	0.030343
7	AW	-31.1227	39	3.855128	2.022691	-38.9205	-23.325
7	PL	0	39	0	2.022691	0	0
7	SB	0	39	0	2.022691	0	0
7	SW	1.525946	39	1.296326	2.022691	-1.09612	4.148014
Rest[4]	AW	-5.54614	1196	0.459597	1.961949	-6.44785	-4.64444
Rest	PL	-4.07261	1196	0.294256	1.961949	-4.64992	-3.49529
Rest	SB	-1.2073	1196	0.160614	1.961949	-1.52242	-0.89219
Rest	SW	-0.74811	1196	0.300654	1.961949	-1.33797	-0.15824

[1] All merchantable volumes reported are gross merchantable volume.
[2] Predicted merch volumes were taken from NSYTs at the 'species-specific' age from the PSP plot data.
[3] Significance is when the 95% confidence interval around the average difference does not include zero.
[4] The 'Rest' group includes yield groups 3, 5, 8, 9 , 10, 11, 12, 14, 15, 16, 17.

Appendix H: LARCH REDUCTION ADJUSTMENT MEMO

MEMO

Date	January 11, 2012
From	René de Jong, Gyula Gulyas
To	Dwight Weeks, Melonie Zaichkowsky
Re	Canfor FMA 9900037 – Larch Reduction Factors for 2012 FMP NSYTs

Overview
Larch (LT) is a component of both the PSPs and AVI within Canfor's FMA, and therefore currently is included in the GYPSY-based NSYT for the PL species group. LT is not considered a merchantable species and therefore, the proportion of LT must be reduced from affected NSYTs.

Defining LT Percent
The PSP percent LT was computed from all PSP data as the ratio of LT merchantable volume[1], to the merchantable volume of all species included in the GYPSY-based PL species group:

PSP: %LT in the PL Group = MVOL_LT / (MVOL_LT + MVOL_PL)

The AVI percent LT was computed from all AVI records as the ratio of LT species percent (crown closure based), to the combined sum of species of LT + PL species:

AVI: %LT in the PL Group = sum of (LT, PL species percent)

Computing LT Reduction Factor
No relationship was apparent in the %LT between PSP and AVI data across all yield groups. Therefore, a simple average %LT was computed for each yield group (Table 1).

All PSP data and AVI records with zero volume (PSP) or zero species percent (AVI) of the combined PL species group (LT+PL) were defined as 0% LT, and included in the average calculations. Only the last measurement of all PSP data were used. The average %LT of the PSP data was used to define the LT reduction factor.

Since yield groups 15 and 16 were based on a single combined NSYT, the LT reduction factor was also computed as an average of these two yield groups combined.

[1] All merchantable volumes reported are gross merchantable volume.

Appendix I: MORTALITY ADJUSTMENT MEMO

MEMO

Date	January 11, 2012
From	René de Jong, Gyula Gulyas
To	Dwight Weeks, Melonie Zaichkowsky
Re	Canfor FMA 9900037 – Deciduous and Conifer Mortality for 2012 FMP NSYTs

Overview

Currently GYPSY does not fully address mortality for both deciduous and conifer species in the resulting NSYTs. Without available mortality data from older deciduous and conifer stands, we propose that the mortality functions implemented by Weyerhaeuser in its 2007 FMP also be implemented for Canfor's 2012 FMP. ASRD has since approved implementation of Weyerhaeuser's deciduous mortality functions for Canfor's 2012 FMP with the condition that agreement be reached with all operators.[1]

Deciduous Mortality Function

For all 'deciduous leading' yield groups, the deciduous merchantable volume[2] was capped at 110 years, flat-lined to 130 years and then declined at a linear rate such that the pure deciduous composite curve had 75 m^3/ha deciduous volume remaining at 180 years. For the 'conifer leading' yield groups, the deciduous volume reduction declined until there was zero deciduous volume remaining in the stand at 180 years. The deciduous mortality function was applied to NSYTs which were previously adjusted for volume bias removal.

Conifer Mortality Function

Conifer volumes in NSYTs were capped beyond the age range of the PSP data to minimize extrapolation errors in the yield tables. The upper age range of PSP data was calculated as the 90th percentile age[3] of the PSP last measurement ages in each yield group (Table 1). The termination age beyond which conifer volumes were capped was defined as 30 years after the 90th percentile age. If the NSYT merchantable conifer volume subsequently declined beyond the capped volume, then the original NSYT merchantable volumes were used. Since yield groups 15 and 16 were based on a single combined NSYT, the conifer mortality termination age was also computed as an average of these two yield groups combined. The conifer mortality function was applied to NSYTs which were previously adjusted for volume bias removal, as well as for the LT component volume reduction.

[1] Email correspondence from Tim Boult, Forest Planning and Performance Monitoring, ASRD., Jan 4, 2012.
[2] All merchantable volumes reported are gross merchantable volume.
[3] Age is defined as the AVI stand age.

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Appendix J: PERMANENT SAMPLE PLOT MANUAL

PERMANENT SAMPLE PLOT MANUAL

CANADIAN FOREST PRODUCTS LTD.

Grande Prairie

April 2011

Appendix K: GYM PLOT MANUAL

Post Harvest Regenerated Stands Monitoring Manual

CANADIAN FOREST PRODUCTS LTD.

Grande Prairie

Updated April 2011

Appendix L: RSP STUDY MEMO

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MEMO

DATE: March 18, 2012

RE: Developing R1 Stand Yield Curves for Pre-1991 Cutblocks – Canfor Grande Prairie Forest Management Agreement Area

1. Background

Yield curves were developed for regenerated stands harvested prior to March 1, 1991. RSP-based yield curves were developed for just those yield groups occurring in the C and CD broad cover types with PL or SW as a guide species. All other yield groups were assigned NSYT-based (R0) yield curves. Therefore, this memo summarizes development of RSP-based R1 yield curves for yield groups 8, 9, 10, 11, 14, 15, 17. Methods follow Sec. 9.0 of the March 6, 2012 Discussion Paper titled "Developing Managed Stand Yield Curves for the Canfor Grande Prairie FMA".

2. Area Summary

The area of interest modeled using RSP-based SI estimates are based on stands

- harvested prior to March 1, 1991;
- Include only C and CD cover groups having either SW or PL as the guide species.
- The total area of interest in pre-1991 cutblocks in yield groups where SW or PL are not guide species is 21, 321 ha. This includes yield groups 8, 9, 10, 11, 14, 15, 16 and 17.

Area Distribution by Natural Subregion and Ecosite:

- 90% of the area of interest is in the LF-d/e and UF-d/e NSR-ecosites. Highlighted cells are where RSP-based SI estimates exist for at least one species (99% of total area).

Ecosite	Area by Natural Subregion (ha)					Total (ha)	%
	CM	DM	LF	SA	UF		
a			<1		<1	<1	0%
b			26			26	0%
c	<1	<1	1		1	2	0%
d	1,072	317	51	5	13	1,459	7%
e	254	9	13,422		2,517	16,202	76%
f	13	4	2,053		1,115	3,185	15%
g	<1	<1	1	3	3	6	0%
h	<1	<1	17		7	24	0%
I	<1	<1	135		1	135	1%
j	2	3	26		69	100	0%
k-z	7	1	139	<1	34	180	1%
Total	1,348	334	15,872	8	3,759	21,321	100%
%	6%	2%	74%	0%	18%	100%	

Appendix M: LIST OF NSR CUTBLOCKS (PS=50-80%)

Unit	Block ID	Area (ha)	Timber Year	ARIS	Design	Stocking Status	Stocking Percent	Stratum
MAIN	G21002	4.7	1991	5240670642	CC	NSR	68.75	CD-SwHw
MAIN	G28001	18.4	1991	5250660264	CC	NSR	71.21	CD-SwHw
MAIN	G28005	21.2	1991	5250660474	SS	NSR	74.24	C-Sw
MAIN	G28013	8.9	1991	5250661599	SS	NSR	64.1	C-Sw
MAIN	G28015	24.2	1991	5250661466	CC	NSR	61.97	CD-SwHw
MAIN	G28030	14.9	1991	5250662893	SS	NSR	64.06	C-Sw
MAIN	G28031	14.3	1991	5250661770	SS	NSR	53.2	C-Sw
MAIN	G28038	14.6	1991	5250662391	CC	NSR	69.12	CD-SwHw
MAIN	G31001	11.7	1993	6020651614	SS	NSR	56.25	C-Pl
MAIN	G31004	18.4	1993	6020650945	SS	NSR	70.77	C-Pl
MAIN	G31007	15.6	1992	6020651031	SS	NSR	70.31	C-Sw
MAIN	G31021	10.1	1992	6020650118	CC	NSR	70.3	CD-SwHw
MAIN	G31022	10.3	1992	6020650291	CC	NSR	66.18	CD-SwHw
MAIN	G31024	11.8	1992	6020650174	SS	NSR	79.7	C-Pl
MAIN	G31025	19.9	1994	6020650992	CC	NSR	72.7	CD-PlHw
MAIN	G31027	45.8	1992	6020651251	SS	NSR	74	C-Pl
MAIN	G31028	4.3	1992	6020651246	CC	NSR	70.5	CD-SwHw
MAIN	G31036	4.2	1992	6020651208	CC	NSR	67.27	CD-SwHw
MAIN	G31037	16.0	1992	6020651299	SS	NSR	64.38	C-Sw
MAIN	G31085	5.9	1993	6020652223	SS	NSR	70.1	C-Sw
MAIN	G32003	12.3	1992	6010650726	CC	NSR	76.9	CD-SwHw
MAIN	G32004	3.4	1992	6010650738	CC	NSR	65.8	CD-SwHw
MAIN	G34002	20.1	1994	6020643638	CC	NSR	76.06	CD-SwHw
MAIN	G34010	4.2	1993	6020643373	SS	NSR	66.7	C-Pl
MAIN	S01910	0.9	1991	5240663103	CC	NSR	62.5	CD-SwHw
MAIN	S07004	40.0	1991	5230650226	SC	NSR	67.52	CD-SwHw
MAIN	S07005	53.5	1991	5230650242	CC	NSR	70.07	CD-SwHw
MAIN	S14004	21.9	1993	5230642177	SS	NSR	53.2	C-Sw
MAIN	S14011	52.4	1991	5230642379	CC	NSR	65	CD-SwHw
MAIN	S14020	12.3	1992	5230642738	SS	NSR	76.6	C-Sw
MAIN	S14033	29.5	1991	5230642423	CC	NSR	52.4	CD-SwHw
MAIN	S14036	22.2	1992	5230642191	SS	NSR	62.5	C-Pl
MAIN	S14044	21.0	1992	5230641068	SS	NSR	54.5	C-Sw
MAIN	S14046	20.8	1992	5230641440	SS	NSR	54.41	C-Sw
MAIN	S14047	23.3	1992	5230641444	CC	NSR	65.2	CD-SwHw
MAIN	S14049	25.8	1992	5230642380	CC	NSR	74.6	CD-SwHw

Unit	Block ID	Area (ha)	Timber Year	ARIS	Design	Stocking Status	Stocking Percent	Stratum
MAIN	S14058	10.3	1992	5230641184	SS	NSR	64.1	C-Sw
MAIN	S14062	17.5	1992	5230641272	SS	NSR	53.1	C-Sw
MAIN	S14063	14.2	1992	5230640128	SS	NSR	69.12	C-Sw
MAIN	S15003	47.5	1991	5220641949	CC	NSR	63.2	CD-SwHw
MAIN	S15005	23.8	1991	5220641962	SS	NSR	67.19	C-Sw
MAIN	S15011	27.8	1992	5220640729	SC	NSR	58.9	CD-SwHw
MAIN	S15019	14.1	1992	5220640670	SS	NSR	60.5	C-Sw
MAIN	S15026	19.9	1991	5220640779	SS	NSR	56.92	C-Sw
MAIN	S15047	22.2	1994	5220641140	CC	NSR	76.19	CD-SwHw
MAIN	S15048	26.2	1994	5220641174	CC	NSR	74	CD-SwHw
MAIN	S15049	23.9	1994	5220641203	SS	NSR	74.2	C-Pl
MAIN	S15051	23.1	1994	5220640113	SS	NSR	60.6	C-Sw
MAIN	S15055	23.1	1994	5220640195	SS	NSR	67.2	C-Sw
MAIN	S15056	18.8	1994	5220640145	CC	NSR	75	CD-SwHw
MAIN	S15058	15.0	1994	5220641241	SS	NSR	67.4	C-Sw
MAIN	S15063	12.6	1994	5220641257	CC	NSR	79.5	CD-SwHw
MAIN	S16000	10.8	1994	5210640700	SS	NSR	73.4	C-Sw
MAIN	S16001	10.8	1994	5210640722	SS	NSR	67.65	C-Sw
MAIN	S16003	17.8	1994	5210640737	CC	NSR	73.6	CD-SwHw
MAIN	S16004	27.9	1994	5210640638	SS	NSR	78.48	C-Sw
MAIN	S16009	17.1	1994	5210640833	CC	NSR	75.8	CD-SwHw
MAIN	S16012	22.8	1994	5210640405	SS	NSR	73.44	C-Sw
MAIN	S23010	40.4	1991	6010622389	SS	NSR	72.2	C-Pl
MAIN	S23031	14.6	1992	6010622033	SS	NSR	68.8	C-Sw
MAIN	S23034	26.6	1992	6010621611	SS	NSR	69.05	C-Sw
MAIN	S23038	36.9	1992	6010621522	SS	NSR	66.3	C-Pl
MAIN	S23054	19.9	1994	6010621562	SS	NSR	61.5	C-Pl
MAIN	S23082	11.3	1992	6010622561	SS	NSR	75.38	C-Sw
MAIN	S27023	30.4	1994	6010611636	SS	NSR	68.2	C-Pl
MAIN	S27054	3.2	1994	6010612883	SS	NSR	78	C-Pl
MAIN	W71002	20.3	1993	5260631882	SS	NSR	73.8	C-Sw
MAIN	W71003	4.6	1993	5260631870	SS	NSR	59.38	C-Pl
MAIN	W71007	15.5	1994	5260631954	SS	NSR	51.6	C-Pl
MAIN	W71008	10.7	1994	5260632214	SS	NSR	62.9	C-Pl
MAIN	W71009	12.5	1994	5260631858	SS	NSR	70.3	C-Sw
MAIN	W71012	8.9	1994	5260631740	CC	NSR	70	CD-SwHw
MAIN	W71017	10.5	1994	5260632114	SS	NSR	75	C-Sw
MAIN	W71018	1.2	1994	5260632161	SS	NSR	73.4	C-Sw
MAIN	W71029	6.0	1994	5260632999	CC	NSR	74	CD-SwHw

Unit	Block ID	Area (ha)	Timber Year	ARIS	Design	Stocking Status	Stocking Percent	Stratum
MAIN	W71034	3.7	1994	5260632964	SS	NSR	73.2	C-Sw
MAIN	W71040	12.7	1994	5260633022	SS	NSR	58.8	C-Sw
MAIN	W71041	7.2	1994	5260631918	CC	NSR	72.3	CD-SwHw
MAIN	W71043	32.7	1994	5260630725	CC	NSR	52.94	CD-SwHw
MAIN	W71044	25.4	1994	5260630522	SS	NSR	77.3	C-Sw
MAIN	W71049	30.4	1994	5260630651	CC	NSR	78.3	CD-PlHw
MAIN	W71053	12.3	1994	5260630681	SS	NSR	77.6	C-Pl
PUSK	5230730462A	27.7	1994	5230730462A	SS	NSR	61.2	C-Pl
PUSK	5250721629	4.2	2002	5250721629	HH	NSR	70.73	D-Hw
PUSK	5250722184	6.0	2000	5250722184	HH	NSR	67.35	D-Hw
PUSK	P31028	7.8	1992	5260731015	CC	NSR	69.2	CD-SwHw
PUSK	P31030	14.6	1992	5260731079	CC	NSR	73.44	CD-SwHw
PUSK	P31033	30.1	1992	5260731176	CC	NSR	67.9	CD-SwHw
PUSK	P31038	0.6	1992	5260731594	SS	NSR	54.55	C-Sw
PUSK	P31040	6.6	1992	5260731032	SS	NSR	56.3	C-Sw
PUSK	P32030	13.4	1992	5250731899	CC	NSR	70.31	CD-SwHw
PUSK	P32033	19.1	1992	5250732158	CC	NSR	66.22	CD-SwHw
PUSK	P32037	12.5	1992	5250732153	CC	NSR	63.64	CD-SwHw
PUSK	P32038	13.3	1992	5250732111	SS	NSR	73.13	C-Sw
PUSK	P32039	2.2	1992	5250731665	CC	NSR	75	CD-SwHw
PUSK	P32040	7.0	1992	5250731633	CC	NSR	70.31	CD-SwHw
PUSK	P32042	15.8	1992	5250730899	SS	NSR	67.2	C-Sw
PUSK	P32043	2.5	1993	5250732071	SS	NSR	55.56	C-Sw
PUSK	P32045	20.8	1992	5250730799	CC	NSR	67.2	CD-SwHw
PUSK	P32047	3.3	1992	5250731821	SS	NSR	69.8	C-Sw
PUSK	P32048	8.2	1992	5250731896	CC	NSR	73.2	CD-SwHw
PUSK	P32049	6.9	1992	5250731878	SS	NSR	76.1	C-Sw
PUSK	P32053	19.7	1992	5250732125	SS	NSR	74.2	C-Sw
PUSK	P32057	9.5	1992	5250731646	SS	NSR	58.4	C-Sw
PUSK	P32058	68.2	1994	5250732745	CC	NSR	78.2	CD-SwHw
PUSK	P32070	7.6	1994	5250732721	CC	NSR	72.3	CD-SwHw
PUSK	P32071	22.0	1992	5250732231	SS	NSR	73.4	C-Sw
PUSK	P32072	11.5	1992	5250732271	CC	NSR	74.24	CD-SwHw
PUSK	P32074	24.9	1992	5250731568	SS	NSR	64.3	C-Sw
PUSK	P32076	20.4	1993	5250731468	CC	NSR	72.31	CD-SwHw
PUSK	P32086	19.0	1992	5250731523	SS	NSR	70.15	C-Sw
PUSK	P32089	1.4	1992	5250731010	SS	NSR	76	C-Sw
PUSK	P32092	30.4	1992	5250731110	SS	NSR	60.24	C-Sw
PUSK	P32103	6.8	1992	5250730944	SS	NSR	77.64	C-Sw

Unit	Block ID	Area (ha)	Timber Year	ARIS	Design	Stocking Status	Stocking Percent	Stratum
PUSK	P32112	18.2	1994	5250730271	SS	NSR	77.6	C-Sw
PEAC	R47005	1.8	1992	6070820296	SS	NSR	68.75	C-Sw
PEAC	R48001	13.6	1991	6060821942	SC	NSR	62.5	CD-SwHw
PEAC	R48004	3.3	1991	6060821980	SS	NSR	59.57	C-Sw

Appendix N: GYPSY INPUT FOR CROP PLANS

R3_C_Pl_B (Pure Pl Basic Yield Curve for Future Managed Stands)

GYPSY Input

Stand Age	14

Utilization	
Conifer	15/12/30
Deciduous	15/10/30

Species	Total Age	Top Height (m)	Density	Stocking%
AW	10	3.5	400	12
SB	11	1.5	100	3
SW	12	2.5	500	25
PL	13	3.7	1600	75

Silviculture Strategy

- Site preparation on 15% of the difficult C sites (65% of the pure conifer landbase).
- Plant on average 1000 sph (800 sph Pl and 200 sph Sw).
- Mixed bag planting (more Pl/Sw planned).
- Site specific details: 750 sph and 309 stock (easy sites - 6%) , 950 sph and 309 stock (moderate sites - 29%) and 1150 sph and 411 stock(difficult sites - 65%).
- 2% fill planting (1000 sph) with moderate stock (411 or 412 on difficult sites).
- Chemical stand tend 80% of harvested areas annually.
- 100% establishment and performance surveys done at year 7 and 13, respectively.

Assumptions

- About 60% of area harvested is C-Pl on a yearly basis.
- Assumed 300 sph ingress for spruce.
- Assumed 800 sph ingress for pine (due to less site preparation).
- Overall planting density reduced from 1500 sph to 1000 sph (split of Pl 80% and Sw 20%). Part of Canfor's silviculture strategy is to provide cost effective treatments while still meeting growth targets, therefore, since RSA surveys have been exceeding MAI expectations – crop plan reduced planting density, kept ingress assumptions the same as a cost savings measure.
- The RSA performance surveys provide insight into the underlying relationships amongst silviculture attributes and the survey results can be used as guide for future performance.

Additional Notes (changes from RSA compiled results)

- Pine top height was changed from 4.2 m to 3.7 m and total age from 12.3 years to 13 years due to:
    - decreased ingress expected (therefore age increased as more planted trees will become the crop trees);
    - less site preparation being used in general (less ingress);
    - move to higher elevation areas and combined with decrease site preparation (expected reduced growth – decreased top height).
- Pine density was reduced from 3000 sph to 1600 sph:
    - less planting being done combined with less ingress expected (due to less site preparation than historic amounts) results in lower expected density. .
- Other species changes from RSA survey results:
    - Aw inputs did not change except for rounding down of density.
    - Sb density (and associated percent stocking) changed from RSA density of 586 to 100. Black spruce fringes are not harvested now as frequently as they were historically (more emphasis on cost reduction).
    - Sw – rounding up of total age (11.9 to 12 years) and reducing top height (2.8 m to 2.5 m).
    - Sw – density was reduced from 2200 to 500 for same reasons as pine above (less ingress).

R3_C_Sb_B (Pure Sb Basic Yield Curve for Future Managed Stands)

GYPSY Input

Stand Age	14

Utilization	
Conifer	15/12/30
Deciduous	15/10/30

Species	Total Age	Top Height (m)	Density	Stocking%
AW	10	3.5	100	5
SB	12	2	1500	80
SW	13	3	200	10
PL				

Silviculture Strategy

- Site preparation on 15% of the difficult C sites (65% of the pure conifer landbase). The majority of site prep is on Sb wet areas.
- Mix bag plant 1200 sph of Sb (1000 sph) and Sw (200 sph).
- 2% fill planting (1000 sph) with moderate stock (411 or 412 on difficult sites).
- Chemical stand tend 80% of harvested areas annually.
- 100% establishment and performance surveys done at year 7 and 13, respectively.

Assumptions

- roughly 3% of area harvested annually could be Sb.
- no RSA historical data on pure Sb, so looked at ingress from other strata:
    - Assumed 500 sph ingress for black spruce (ranges from 100 sph to 600 sph).
    - Assumed 100 sph ingress for Aspen (Sw sites had 800 sph Aw ingress, but Sb sites are wetter, and the expectation is for minimal aspen to ingress onto site).
    - Assumed no white spruce or pine ingress due to wetter site.
- Other species data taken derived from other strata historical data.
- The RSA performance surveys provide insight into the underlying relationships amongst silviculture attributes and the survey results can be used as guide for future performance.

R3_C_Sw_B (Pure Sw Basic Yield Curve for Future Managed Stands)

GYPSY Input

Stand Age	14

Utilization	
Conifer	15/12/30
Deciduous	15/10/30

Species	Total Age	Top Height (m)	Density	Stocking%
AW	10.5	3.6	800	24
SB	10.5	1.3	75	5
SW	13	3.3	1350	70
PL	12	2.8	450	20

Silviculture Strategy

- Site preparation on 15% of the difficult C sites (65% of the pure conifer landbase).
- Plant 1200 sph all sites (mixed bag planting 850 sph Sw and 350 sph Pl) with 411 stock.
- 2% fill planting (1000 sph) with moderate stock (411 or 412 on difficult sites).
- Chemical stand tend 80% of harvested areas annually.
- 100% establishment and performance surveys done at year 7 and 13, respectively.

Assumptions

- About 20% of area harvested is C-Sw on a yearly basis.
- Assumed 500 sph ingress for spruce. (as per historical data)
- Assumed 100 sph ingress for pine (as per historical data on spruce sites).
- Overall Planting density reduced from 1500 sph to 1200 sph (but is now a split of Sw 70% and Pl 30%). Part of Canfor's new silviculture strategy is to provide cost effective treatments while still meeting growth targets, therefore, since RSA surveys have been exceeding MAI expectations – crop plan reduced planting density, kept ingress assumptions the same as a cost savings measure.
- The RSA performance surveys provide insight into the underlying relationships amongst silviculture attributes and the survey results can be used as guide for future performance.

Additional Notes (changes from RSA compiled results)

- Sw age rounded up from 12.4 to 13 years (rounding decision) - top height remained the same. Density decreased from 2000 sph to 1350 sph (850 planting and 500 ingress) due to planting strategy and percent stocking reduced from 86% to 70% due to more pine presence.
- Other species changes from RSA survey results:
    - Pl inputs changed due to planting strategy - total age rounded up to 12 from 11.4 years (more planted stock on site, assume planted stock becomes the site index tree), top height remained the same, density increased from 99 (natural ingress) to 450. (350 planting plus 100 natural ingress). Percent stocking increased from 4 to 20%.
    - Aw inputs did not change substantially - age and density was rounded off and the remaining inputs did not change.
    - Sb inputs did not change substantially - age and density was rounded off and the remaining inputs did not change.

R3_CD_PlHw_B (Mixed PlHw Basic Yield Curve for Future Managed Stands)

GYPSY Input

Stand Age	14

Utilization	
Conifer	15/12/30
Deciduous	15/10/30

Species	Total Age	Top Height (m)	Density	Stocking%
AW	11	4	3000	60
SB	11.5	1.6	140	7
SW	12	2.8	600	40
PL	13	4	1800	70

Silviculture Strategy

- Site preparation on 15% of the difficult CD sites (roughly 70% of CD sites are difficult).
- Plant 1150 sph on difficult sites with 411 stock (70% of area) and 950 sph on moderate sites with 309 stock (30% of the area). Used 1100 sph as average for the crop planning (200 sph Sw and 900 sph Pl).
- 2% fill planting (1000 sph) with moderate stock (411 or 412 on difficult sites).
- Chemical stand tend 60% of harvested openings annually.
- 100% establishment and performance surveys done at year 7 and 13, respectively.

Assumptions

- About 10% of area harvested is CD-PlHw on a yearly basis.
- Assumed 400 sph ingress for spruce.
- Assumed 900 sph ingress for pine (less site preparation, less ingress).
- Assume age data for Pl same as per C-Pl strata - Top height data rounded up to 4 m from 3.7 m (C-Pl strata) – as will be in lower elevations than the pure pine so top height should be slightly better.
- Overall planting density reduced from 1500 sph to 1100 sph. Part of Canfor's new silviculture strategy is to provide cost effective treatments while still meeting growth targets, therefore, since RSA surveys have been exceeding MAI expectations – crop plan reduced planting density, as a cost savings measure.
- The RSA performance surveys provide insight into the underlying relationships amongst silviculture attributes and the survey results can be used as guide for future performance.

Additional Notes (changes from RSA compiled results)

- Other species changes from RSA survey results:
    - Sw – total age rounded down from 12.1 to 12 years; top height reduced from 3.0 m to 2.8 m due to growing under a canopy and less site prep affecting growth. Density reduced from 1399 sph to 600 sph due to planting strategy and percent stocking decreased from 44% to 40%.
    - Aw- essentially did not change. Some rounding to whole numbers occurred.
    - Sb – essentially did not change. Some rounding to whole numbers occurred.

R3_CD_SwHw_B (Mixed SwHw Basic Yield Curve for Future Managed Stands)

GYPSY Input

Stand Age	14

Utilization	
Conifer	15/12/30
Deciduous	15/10/30

Species	Total Age	Top Height (m)	Density	Stocking%
AW	11	3.9	3000	51
SB	11.5	2	400	17
SW	13	3.3	1400	60
PL	12	2.8	400	20

Silviculture Strategy

- Site preparation on 15% of the difficult CD sites (roughly 70% of CD sites are difficult).
- Plant 1200 sph all sites (mixed bag planting 900 sph Sw and 300 sph Pl) with 411 stock.
- 2% fill planting (1000 sph) with moderate stock (411 or 412 on difficult sites).
- Chemical stand tend 60% of harvested openings annually.
- 100% establishment and performance surveys done at year 7 and 13, respectively.

Assumptions

- About 5% of area harvested is CD-SwHw on a yearly basis.
- Assumed 500 sph ingress for spruce (same as pure C-Sw strata).
- Assumed 100 sph ingress for pine (same as pure C-Sw strata).
- Assume age and height data for Sw same as per C-Sw strata (rounded data from RSA results).
- 1400 sph density for Sw is planting plus ingress.
- Overall planting density reduced from 1500 sph to 1200 sph. Part of Canfor's new silviculture strategy is to provide cost effective treatments while still meeting growth targets, therefore, since RSA surveys have been exceeding MAI expectations – crop plan reduced planting density, as a cost savings measure.
- The RSA performance surveys provide insight into the underlying relationships amongst silviculture attributes and the survey results can be used as guide for future performance.

Additional Notes (changes from RSA compiled results)

- Other species changes from RSA survey results:
    - Pl – total age rounded up 11.8 years to 12 years; top height reduced from 3.2 m to 2.8 m due to growing under a canopy and less site prep affecting growth. Density rounded off from 411 to 400 (essentially no change) and percent stocking increased from 11% to 20% due to mixed bag planting strategy.
    - Aw- essentially did not change. Some rounding to whole numbers occurred.
    - Sb – essentially did not change. Some rounding to whole numbers occurred.

R3_DC_HwSx_B (Mixed HwSx Basic Yield Curve for Future Managed Stands)

GYPSY Input

Stand Age	14

Utilization	
Conifer	15/12/30
Deciduous	15/10/30

Species	Total Age	Top Height (m)	Density	Stocking%
AW	13	6.1	4500	70
SB	12	1.4	250	10
SW	13	3.3	1400	50
PL	12	2.8	400	20

Silviculture Strategy

- Site preparation on 15% of the difficult DC sites.
- Plant 1200 sph all sites (mixed bag planting 900 sph Sw and 300 sph Pl) with 411 stock.
- 2% fill planting (1000 sph) with moderate stock (411 or 412 on difficult sites).
- Chemical stand tend 30% of harvested areas annually.
- 100% establishment and performance surveys done at year 7 and 13, respectively.

Assumptions

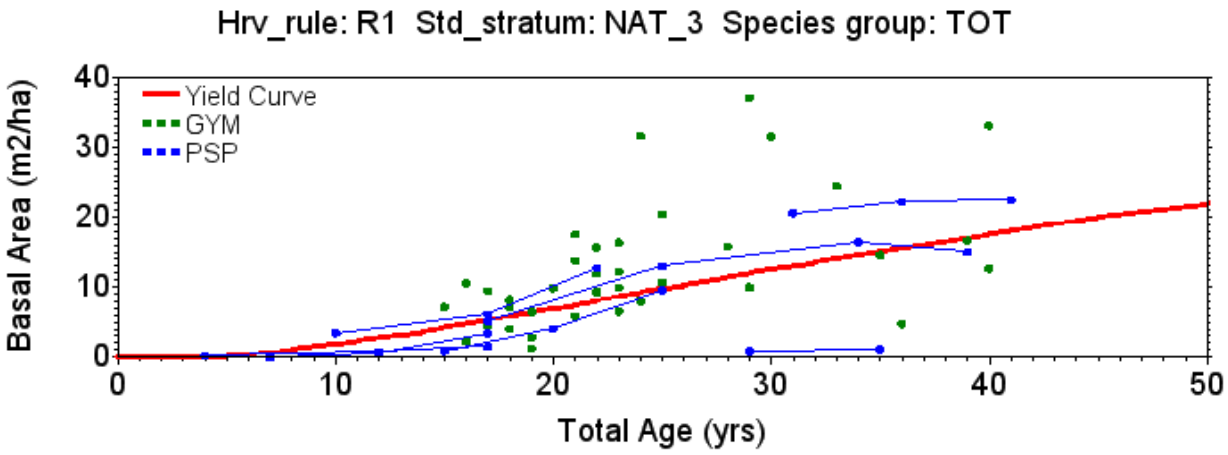
- About 3% of area harvested is DC-HwSx on a yearly basis.
- Assumed 500 sph ingress for spruce (same as pure C-Sw strata).
- Assumed 100 sph ingress for pine (same as pure C-Sw strata).
- Assume age and height data for Sw same as per C-Sw strata (rounded data from RSA results).
- 1400 sph density for Sw is planting plus ingress.
- Overall planting density reduced from 1500 sph to 1200 sph. Part of Canfor's new silviculture strategy is to provide cost effective treatments while still meeting growth targets, therefore, since RSA surveys have been exceeding MAI expectations – crop plan reduced planting density, as a cost savings measure.
- The RSA performance surveys provide insight into the underlying relationships amongst silviculture attributes and the survey results can be used as guide for future performance.

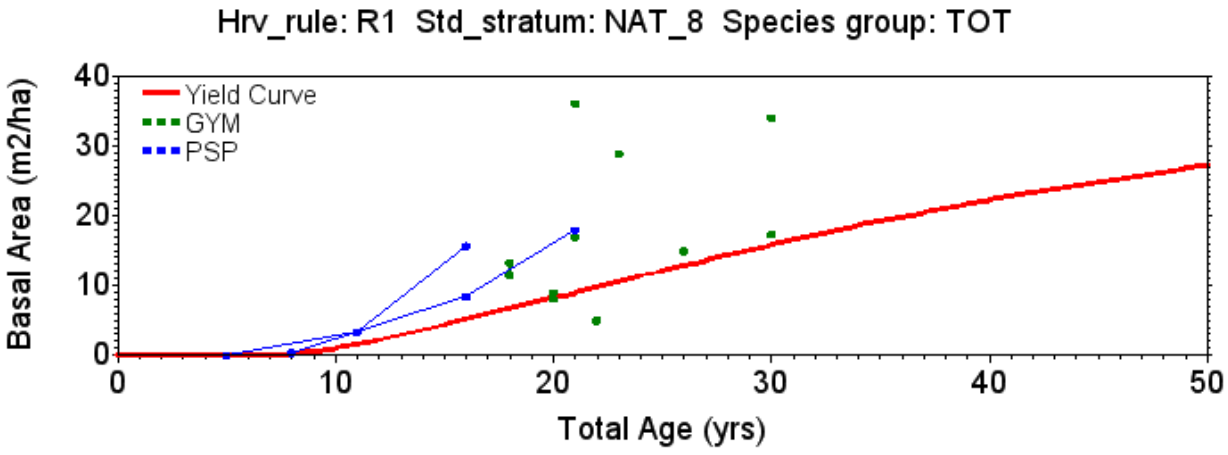
Additional Notes (changes from RSA compiled results)

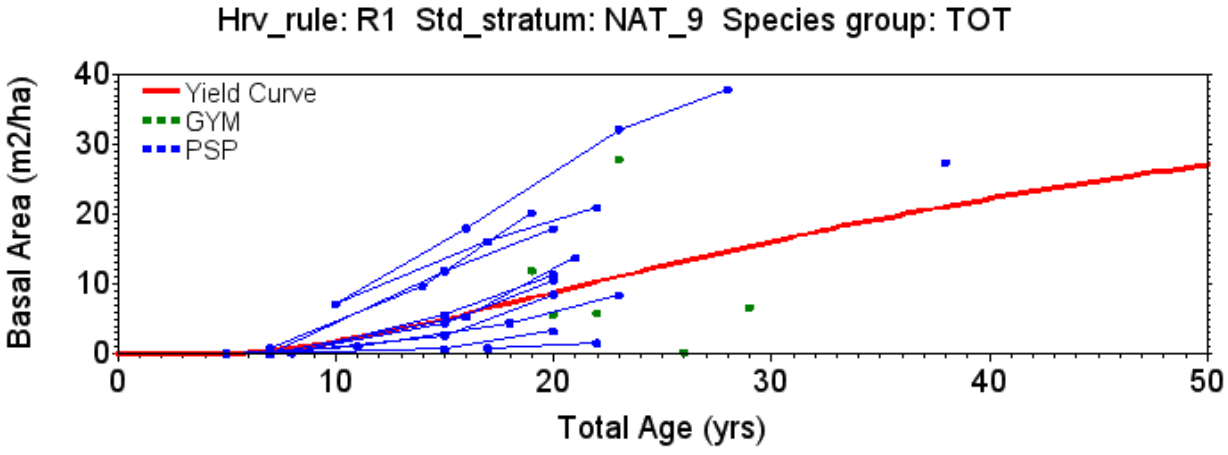
- Other species changes from RSA survey results:
    - Pl – total age remained the same; top height reduced from 3.7 m to 2.8 m due to growing under a canopy and less site prep affecting growth. Density increased from 172 sph to 400 sph and percent stocking increased from 5% to 20% due to mixed bag planting strategy.
    - Aw- left age and top height the same, rounded density of Aw down to 4500 sph from 5837 sph due to a more consistent, early entry spray program.
    - Sb – rounded age up as no Sb will be planted; top height remained the same; Lowered density from 356 to 250 and percent stocking from 12% to 10% due to less Sb ground that we will be operating in.

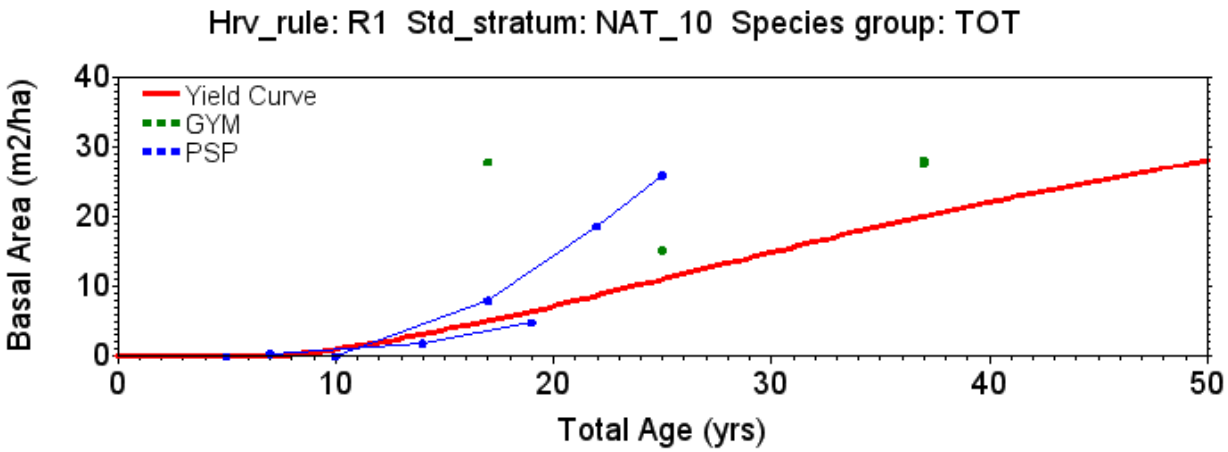
Appendix O: GYM PLOT & ROT 2 PSP TRAJECTORIES

Basal Area (m^2/ha)





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GYM
PSP
Basal Area (m2/ha)
Total Age (yrs)
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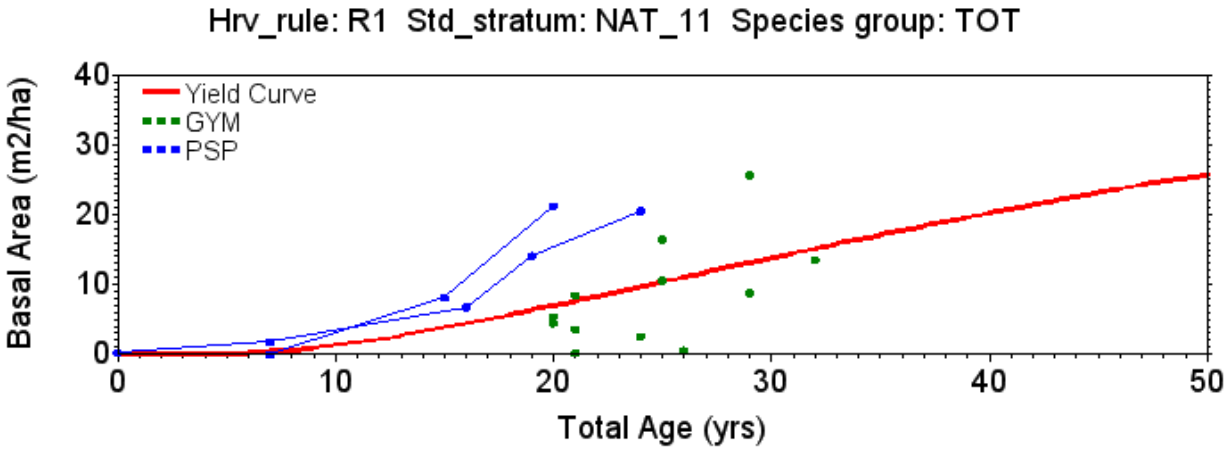
20
30
40
50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Yield Curve
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PSP
Basal Area (m2/ha)
Total Age (yrs)
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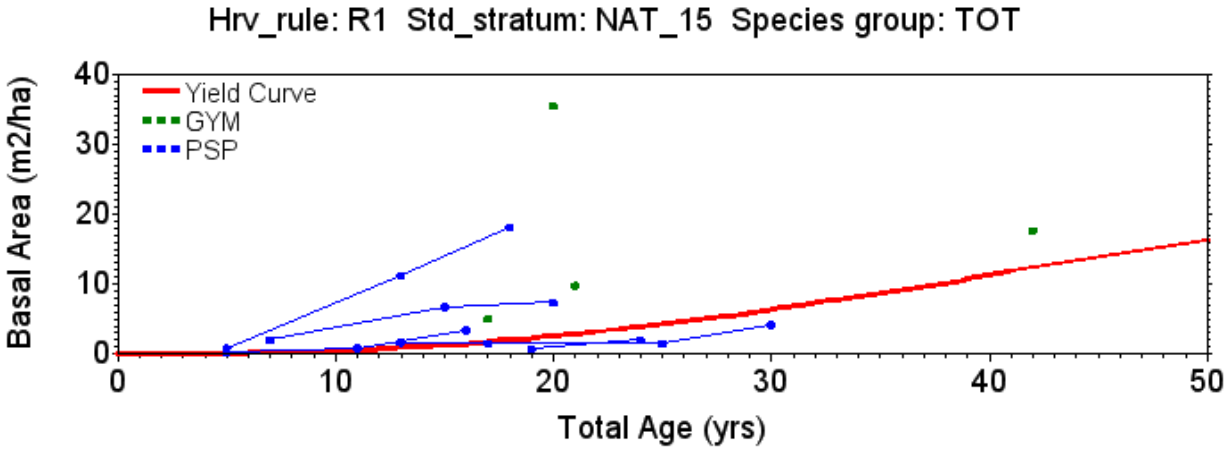
20
30
40
50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Yield Curve
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PSP
Basal Area (m2/ha)
Total Age (yrs)
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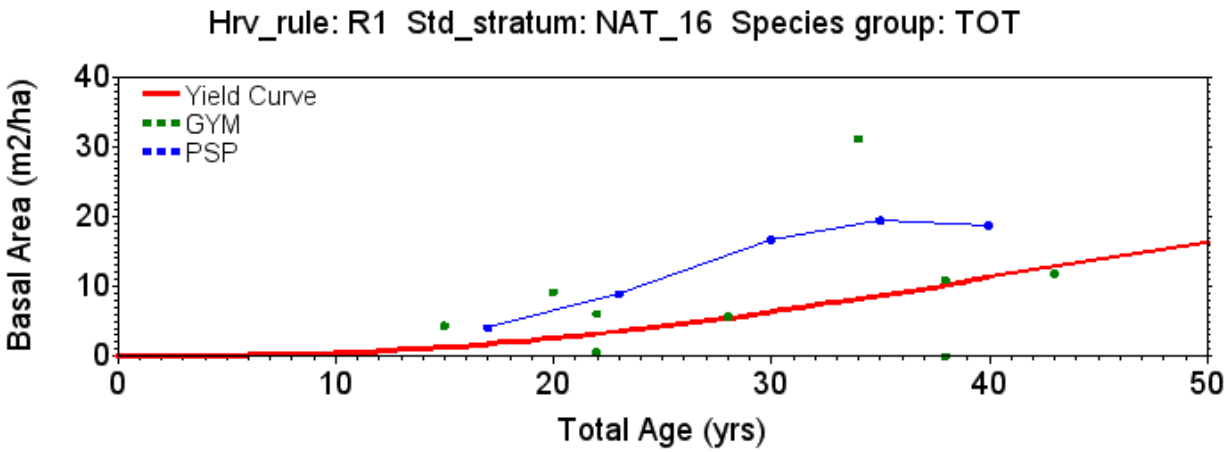
20
30
40
50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Yield Curve
GYM
PSP
Basal Area (m2/ha)
Total Age (yrs)
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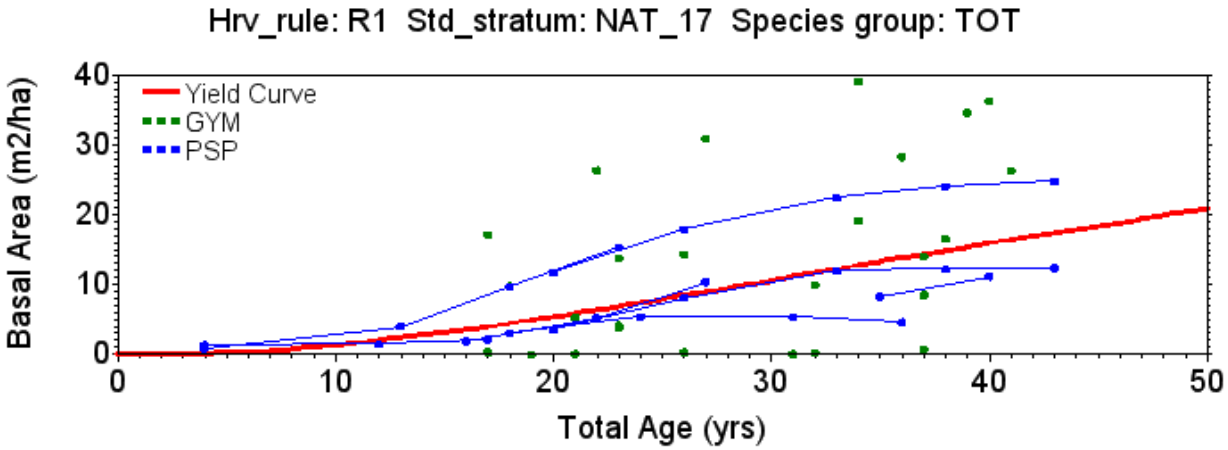
20
30
40
50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Yield Curve
GYM
PSP
Basal Area (m2/ha)
Total Age (yrs)
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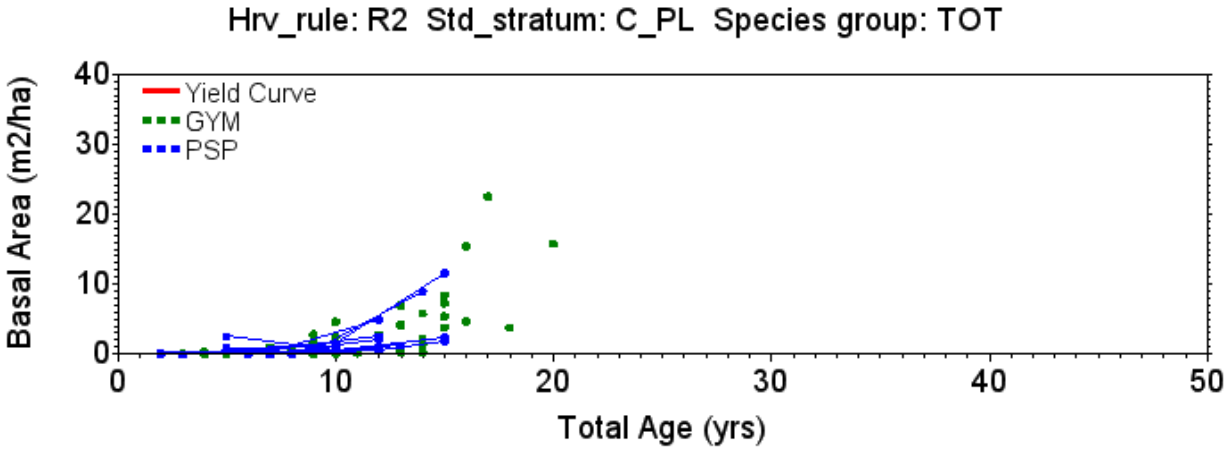
20
30
40
50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Yield Curve
GYM
PSP
Basal Area (m2/ha)
Total Age (yrs)
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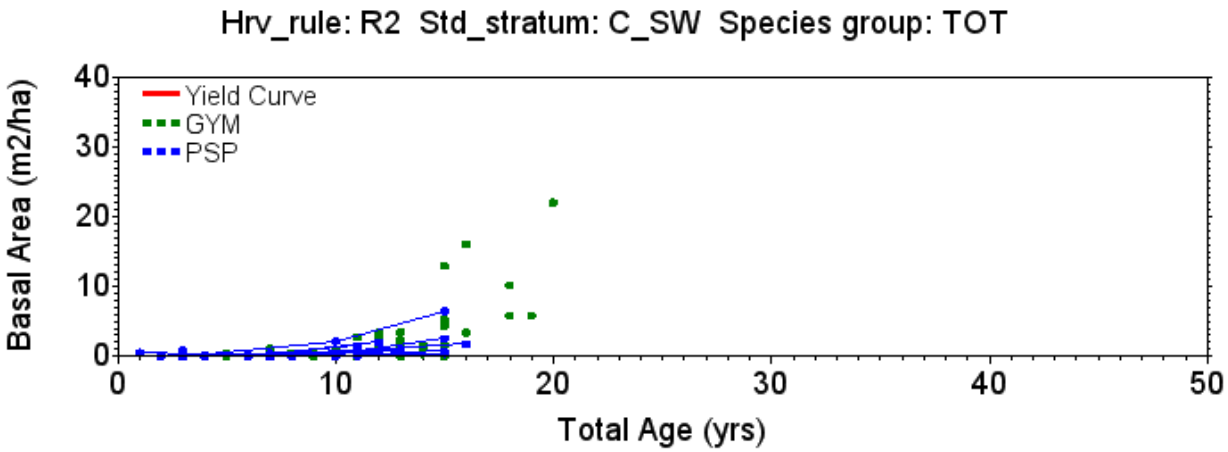
20
30
40
50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Yield Curve
GYM
PSP
Basal Area (m2/ha)
Total Age (yrs)
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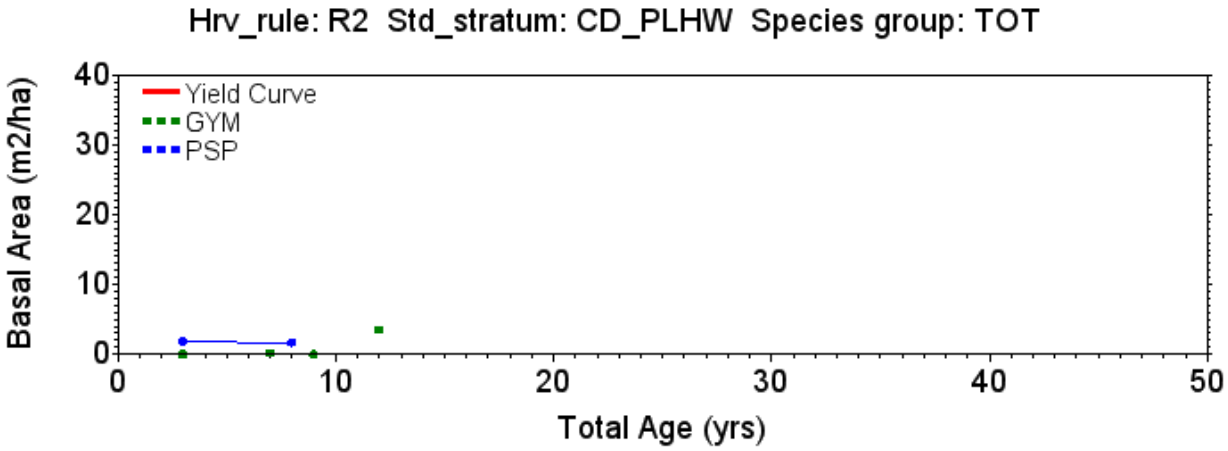
20
30
40
50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Yield Curve
GYM
PSP
Basal Area (m2/ha)
Total Age (yrs)
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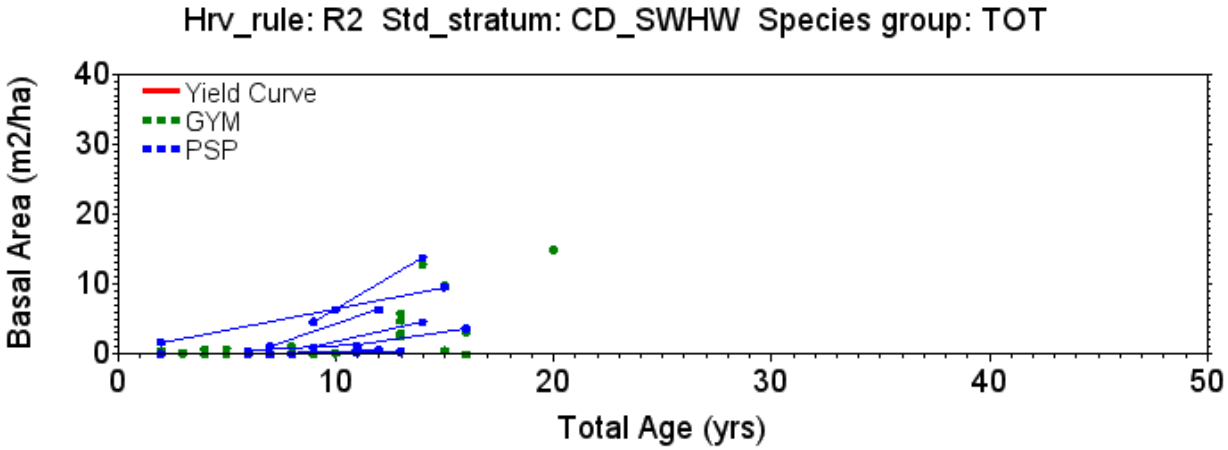
10
20
30
40
50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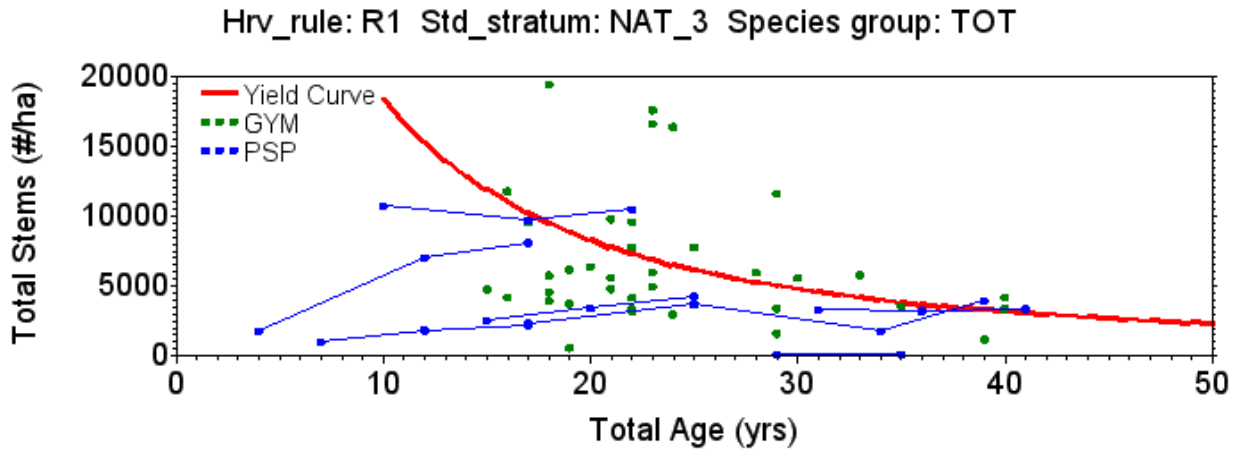
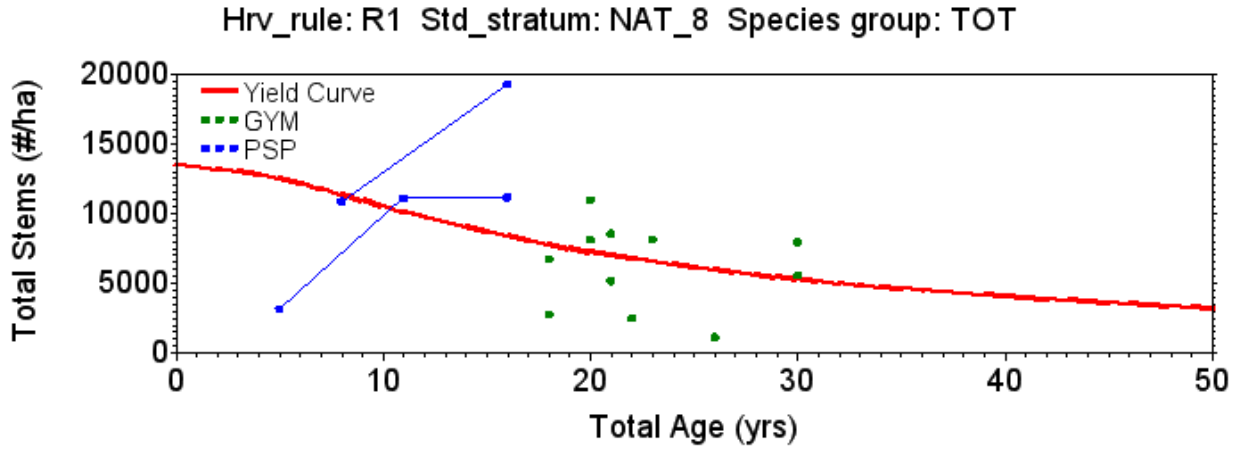
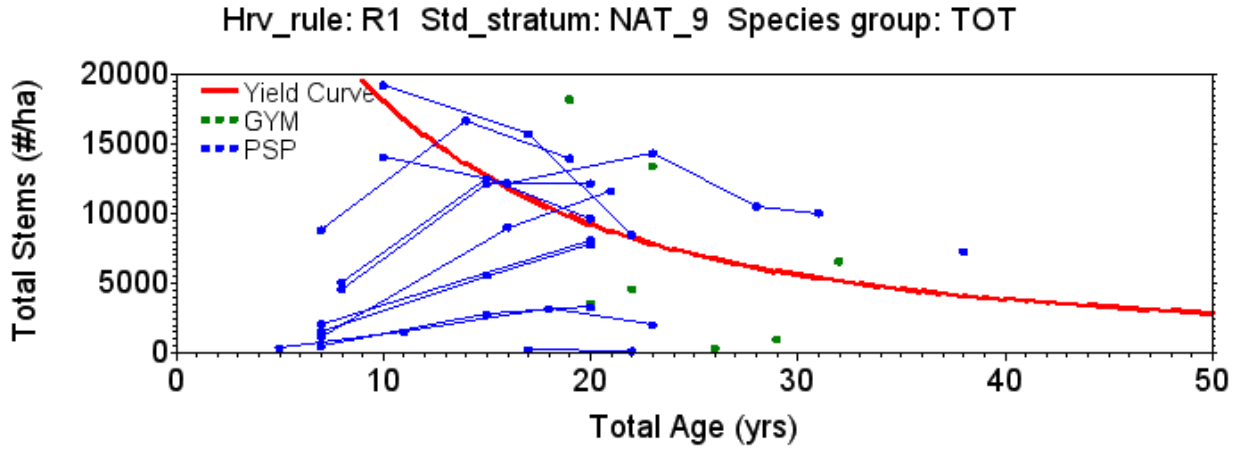
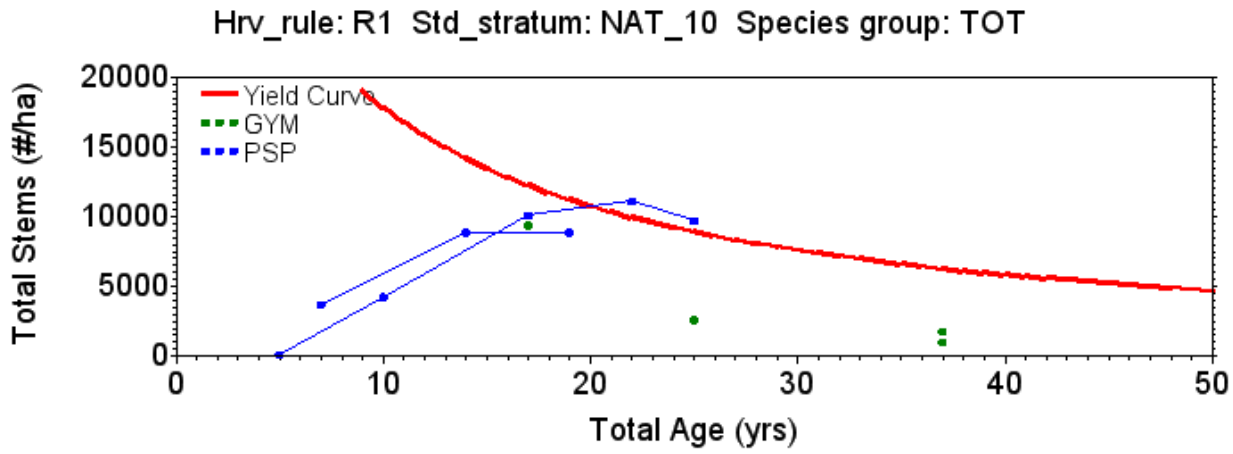
Yield Curve
GYM
PSP
Basal Area (m2/ha)
Total Age (yrs)
0
10
20
30
40
50

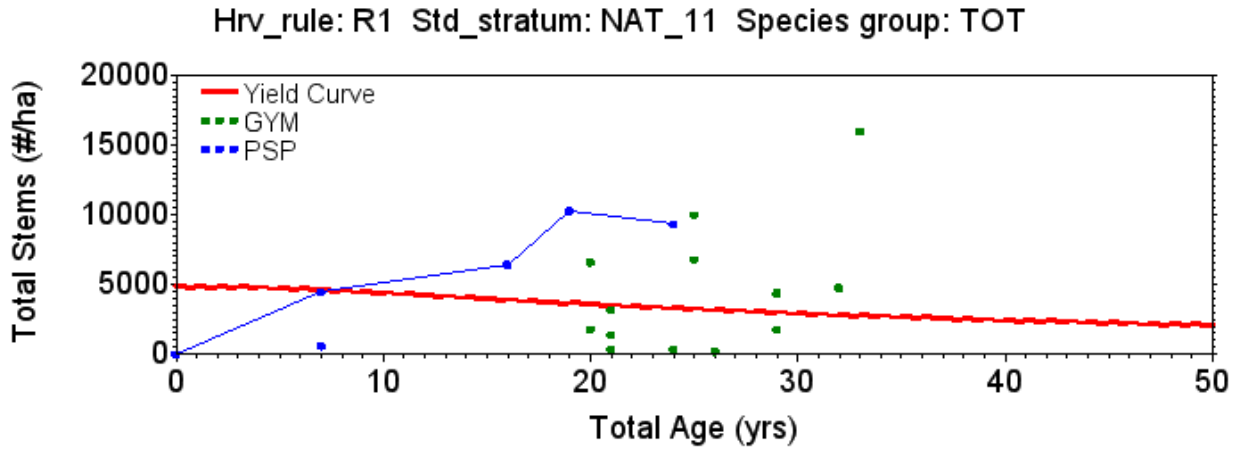
Total Density (stems/ha)

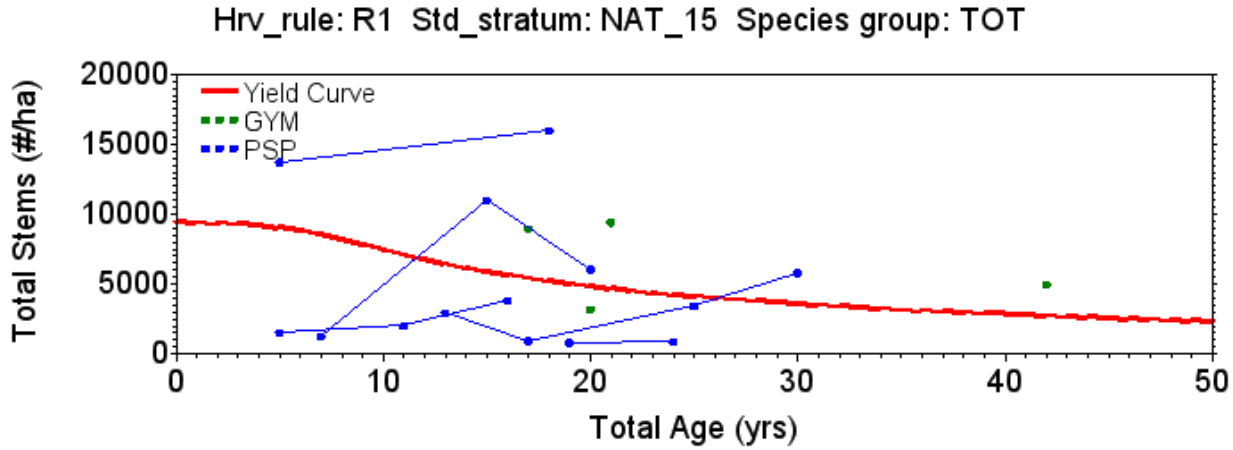


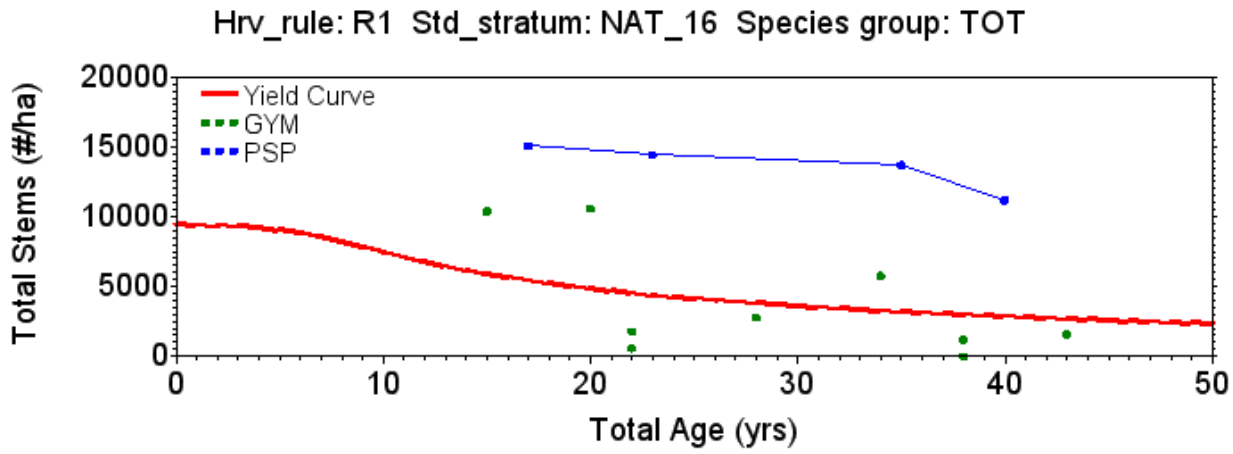


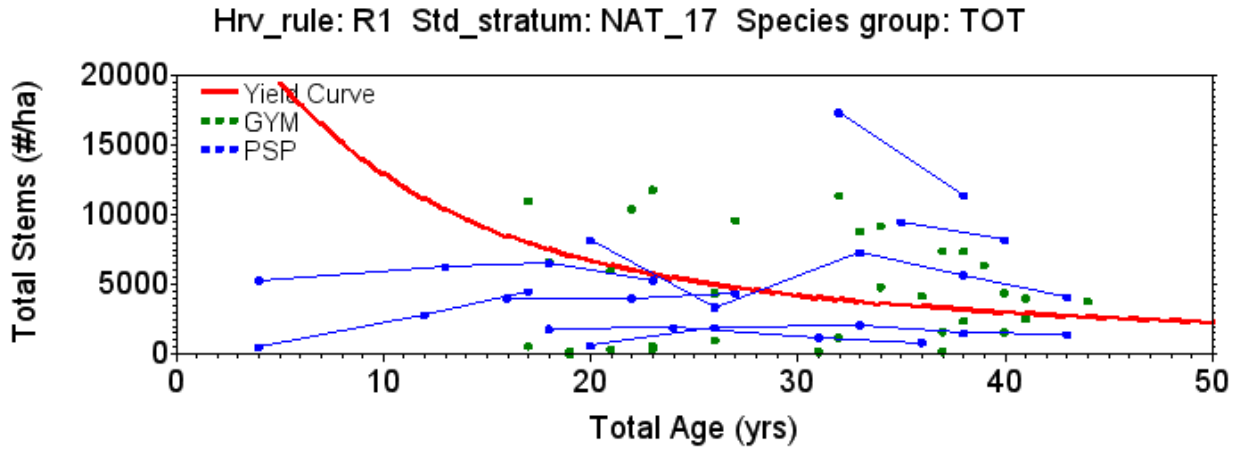


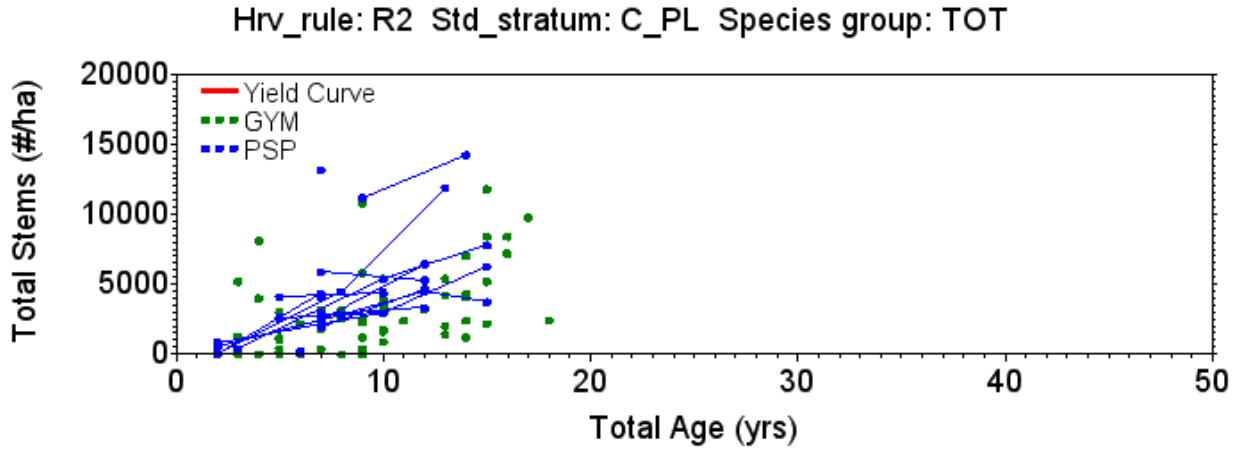

Hrv_rule: R1 Std_stratum: NAT_10 Species group: TOT
Yield Curve
GYM
PSP
Total Stems (#/ha)
Total Age (yrs)
0
5000
10000
15000
20000
0
10
20
30
40
50

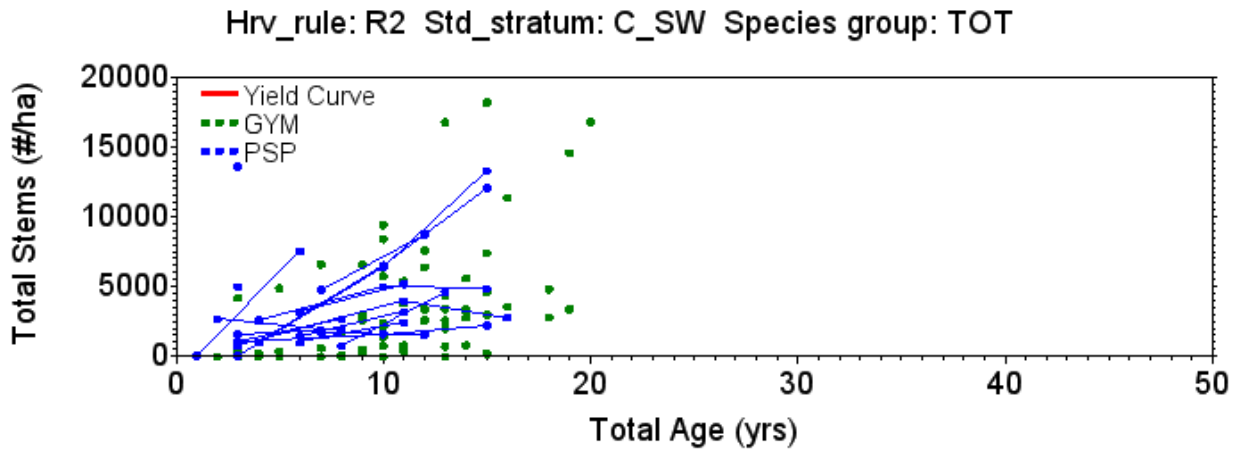

Hrv_rule: R1 Std_stratum: NAT_11 Species group: TOT
Yield Curve
GYM
PSP
Total Stems (#/ha)
Total Age (yrs)
0
5000
10000
15000
20000
0
10
20
30
40
50

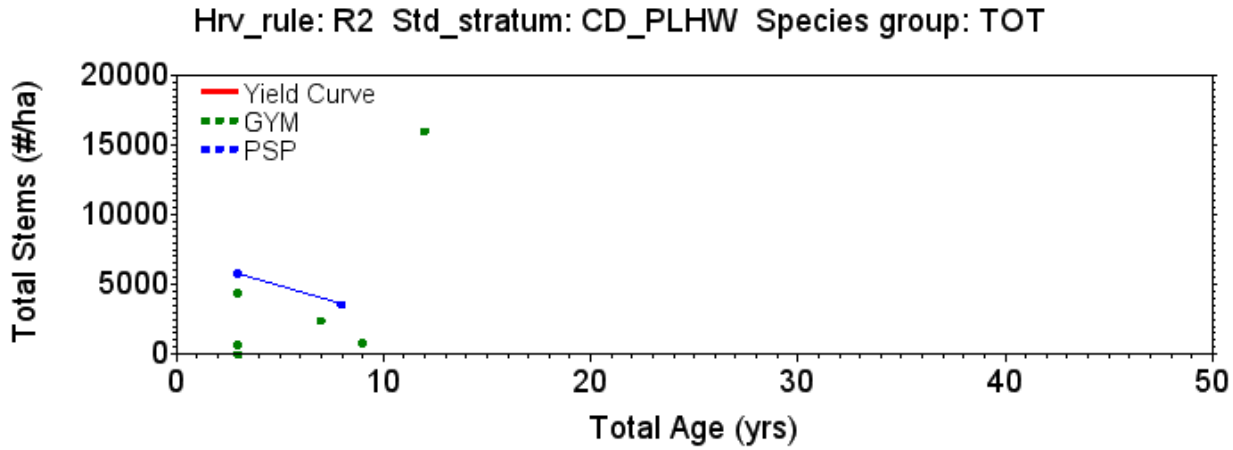

Hrv_rule: R1 Std_stratum: NAT_15 Species group: TOT
Yield Curve
GYM
PSP
Total Stems (#/ha)
Total Age (yrs)
0
5000
10000
15000
20000
0
10
20
30
40
50

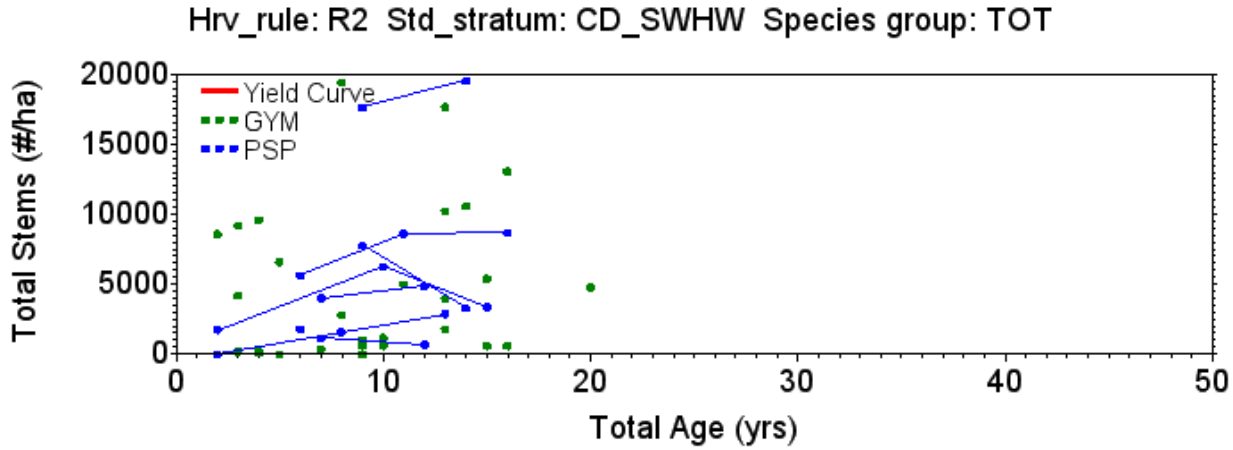

Hrv_rule: R1 Std_stratum: NAT_16 Species group: TOT
Yield Curve
GYM
PSP
Total Stems (#/ha)
Total Age (yrs)
0
5000
10000
15000
20000
0
10
20
30
40
50


Hrv_rule: R1 Std_stratum: NAT_17 Species group: TOT
Yield Curve
GYM
PSP
Total Stems (#/ha)
Total Age (yrs)
0
5000
10000
15000
20000
0
10
20
30
40
50

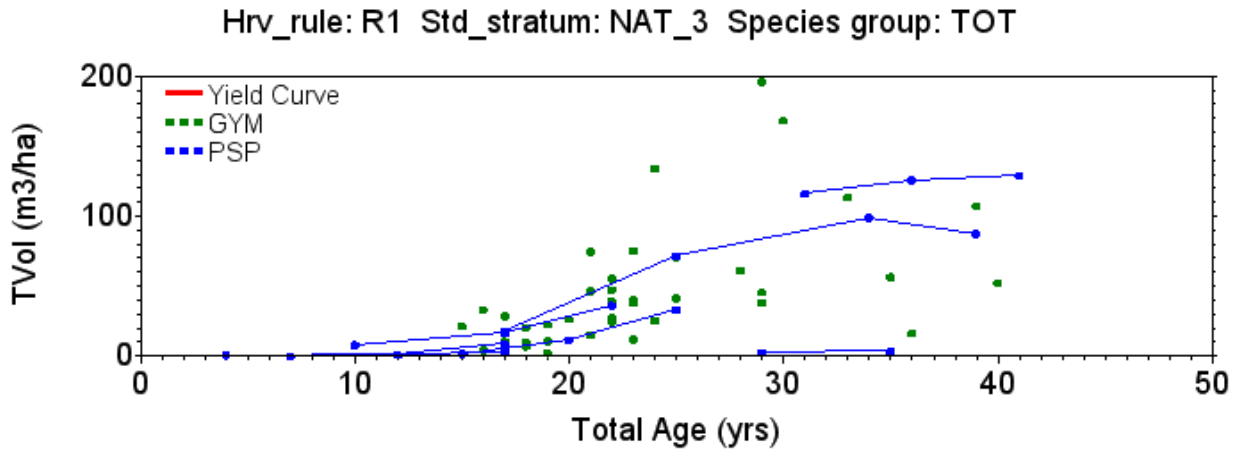

Hrv_rule: R2 Std_stratum: C_PL Species group: TOT
Yield Curve
GYM
PSP
Total Stems (#/ha)
Total Age (yrs)
0
5000
10000
15000
20000
0
10
20
30
40
50

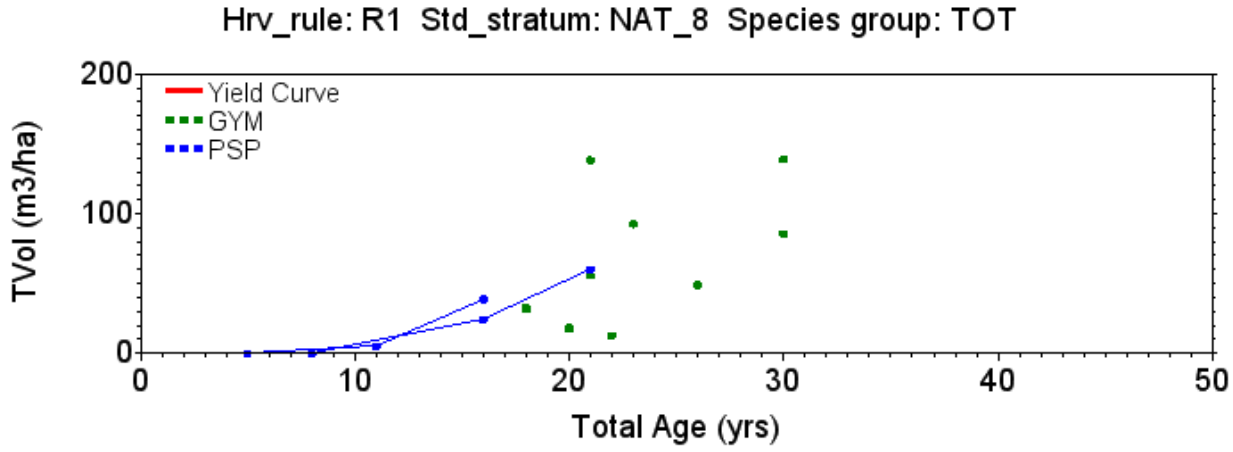

Hrv_rule: R2 Std_stratum: C_SW Species group: TOT
Yield Curve
GYM
PSP
Total Stems (#/ha)
Total Age (yrs)
0
5000
10000
15000
20000
0
10
20
30
40
50

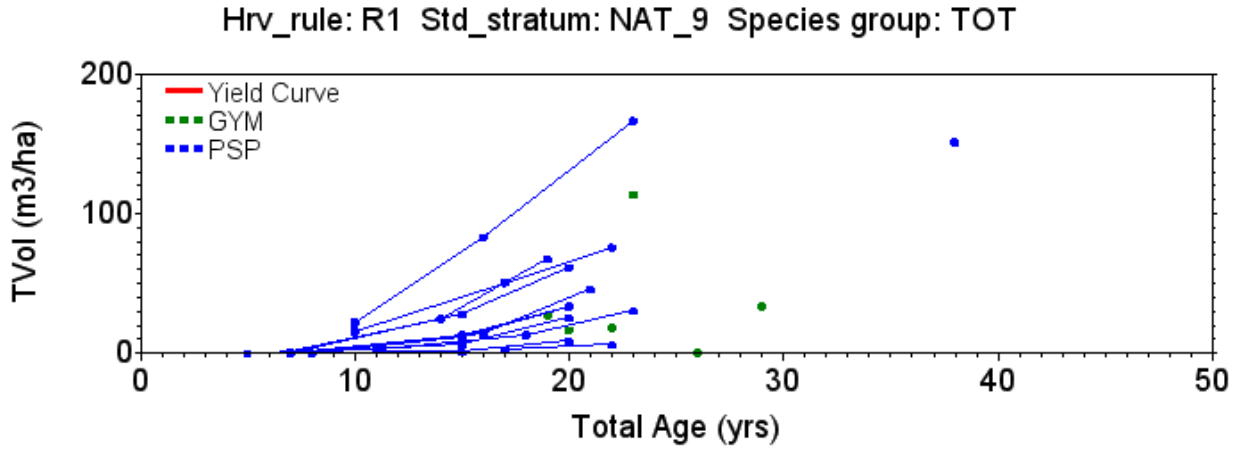

Hrv_rule: R2 Std_stratum: CD_PLHW Species group: TOT
Yield Curve
GYM
PSP
Total Stems (#/ha)
Total Age (yrs)
0
5000
10000
15000
20000
0
10
20
30
40
50

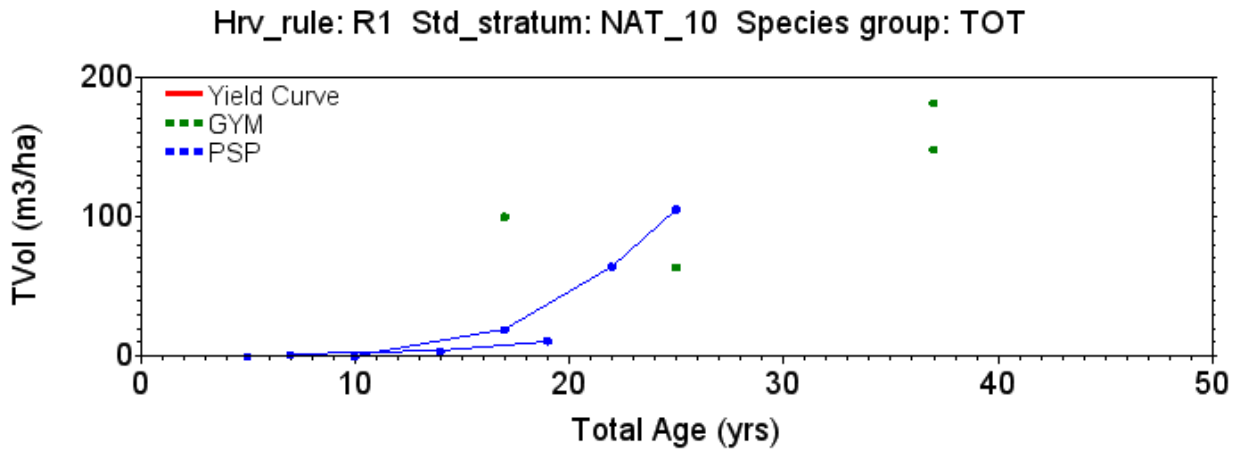

Hrv_rule: R2 Std_stratum: CD_SWHW Species group: TOT
Yield Curve
GYM
PSP
Total Stems (#/ha)
Total Age (yrs)
0
5000
10000
15000
20000
0
10
20
30
40
50

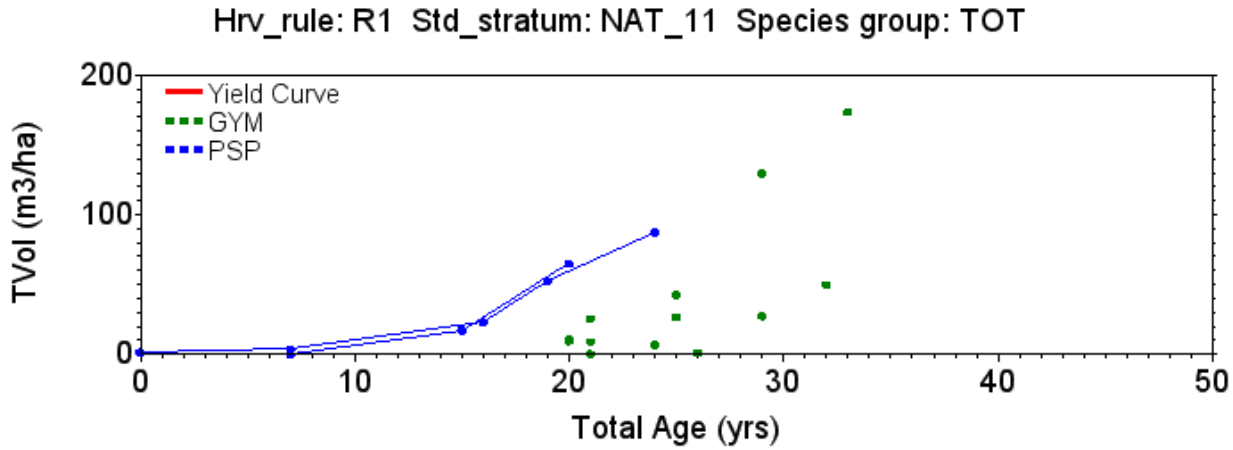
Total Volume (m^3/ha)

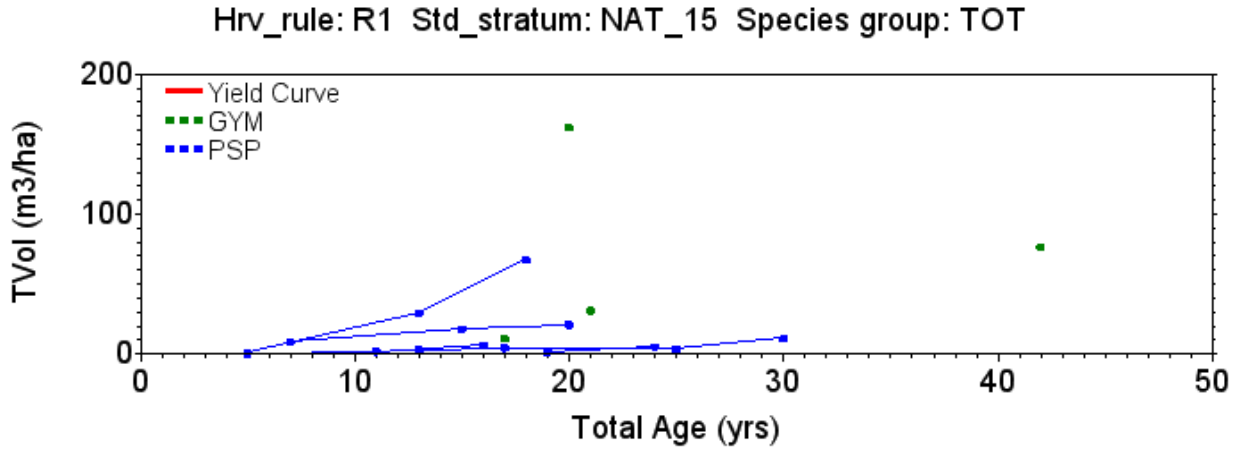


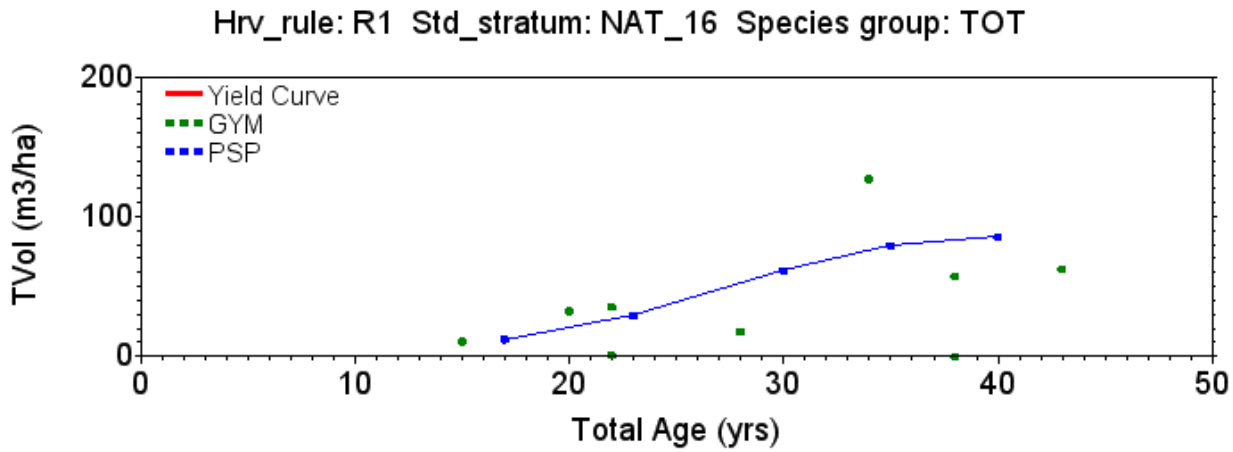


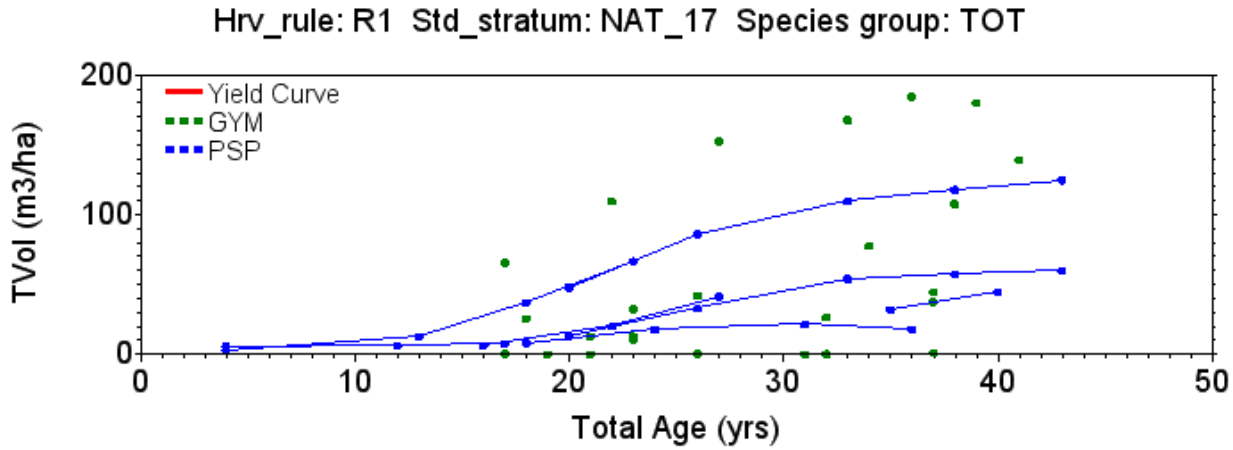


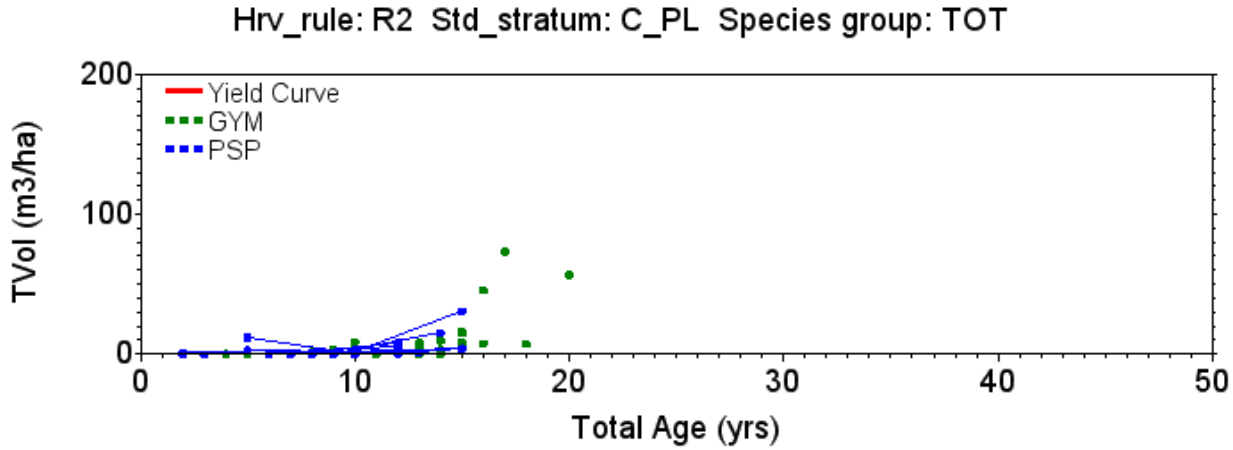

Hrv_rule: R1 Std_stratum: NAT_10 Species group: TOT
Yield Curve
GYM
PSP
TVol (m3/ha)
Total Age (yrs)
0
100
200
0
10
20
30
40
50

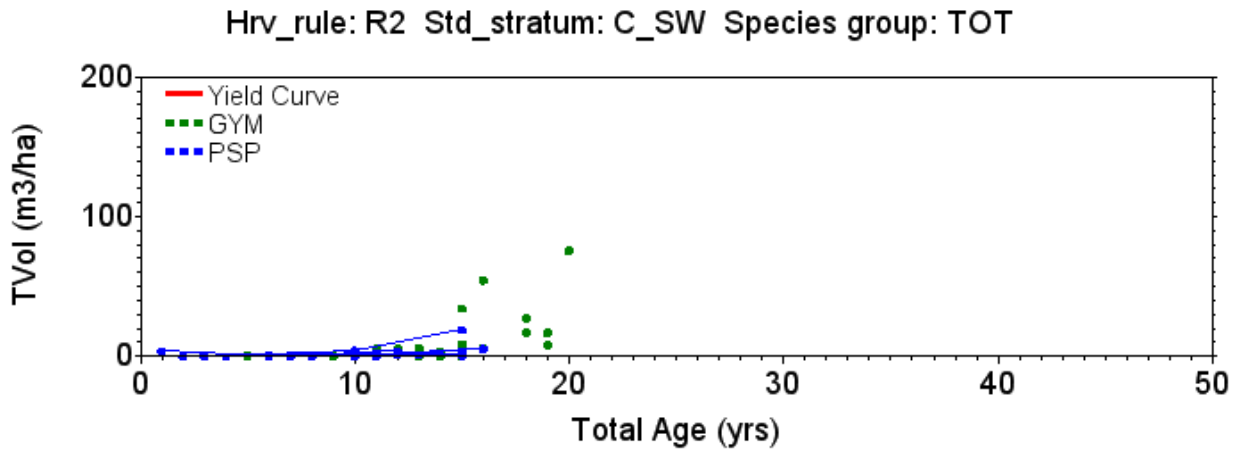

Hrv_rule: R1 Std_stratum: NAT_11 Species group: TOT
Yield Curve
GYM
PSP
TVol (m3/ha)
Total Age (yrs)
0
100
200
0
10
20
30
40
50

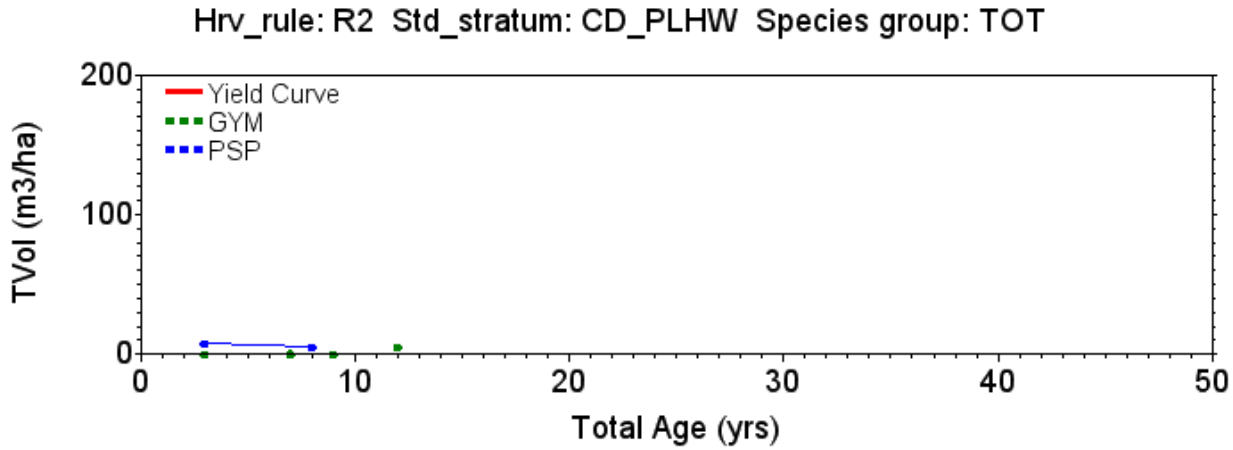

Hrv_rule: R1 Std_stratum: NAT_15 Species group: TOT
Yield Curve
GYM
PSP
TVol (m3/ha)
Total Age (yrs)
0
100
200
0
10
20
30
40
50

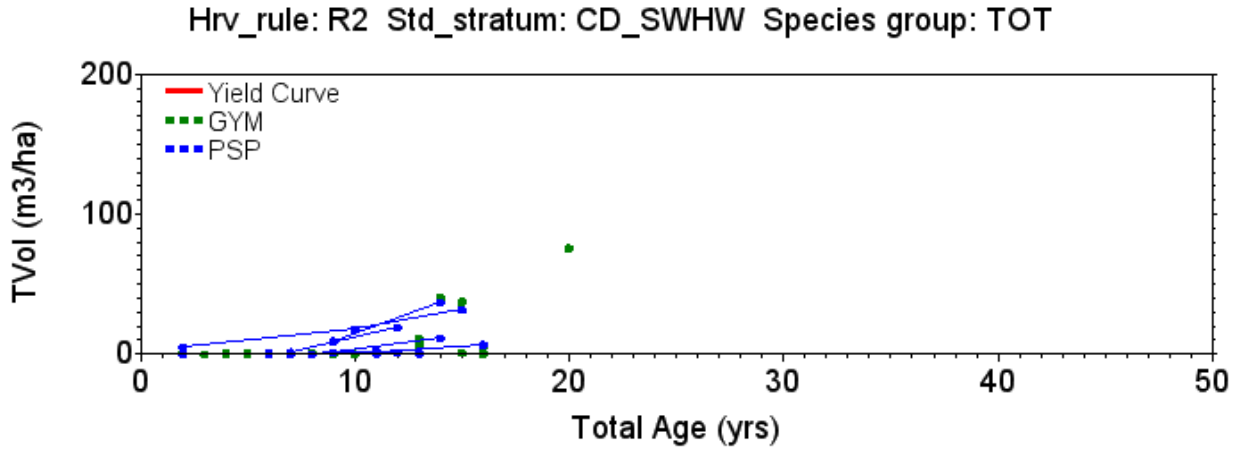

Hrv_rule: R1 Std_stratum: NAT_16 Species group: TOT
Yield Curve
GYM
PSP
TVol (m3/ha)
200
100
0
0
10
20
30
40
50
Total Age (yrs)


Hrv_rule: R1 Std_stratum: NAT_17 Species group: TOT
Yield Curve
GYM
PSP
TVol (m3/ha)
200
100
0
0
10
20
30
40
50
Total Age (yrs)

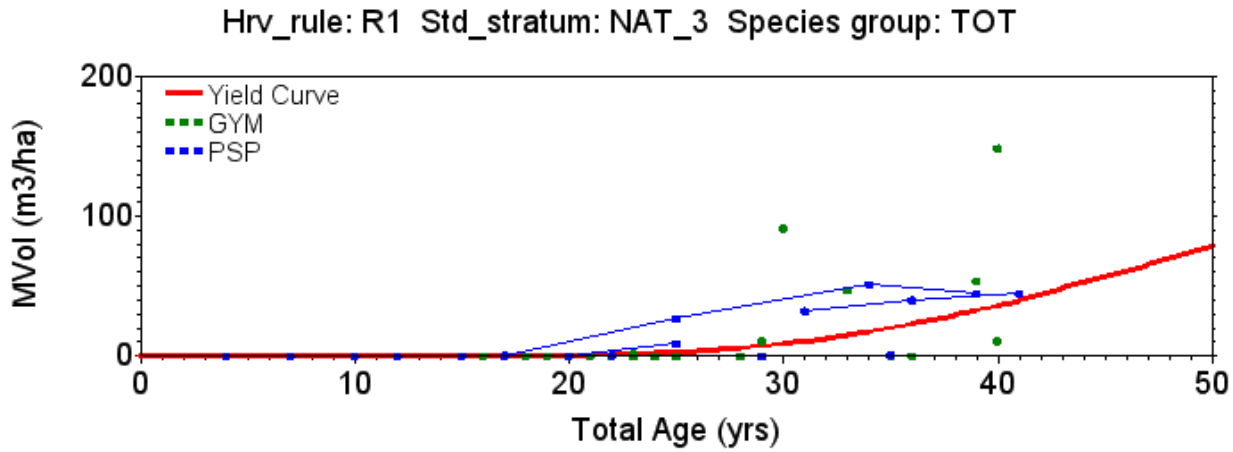

Hrv_rule: R2 Std_stratum: C_PL Species group: TOT
Yield Curve
GYM
PSP
TVol (m3/ha)
200
100
0
0
10
20
30
40
50
Total Age (yrs)

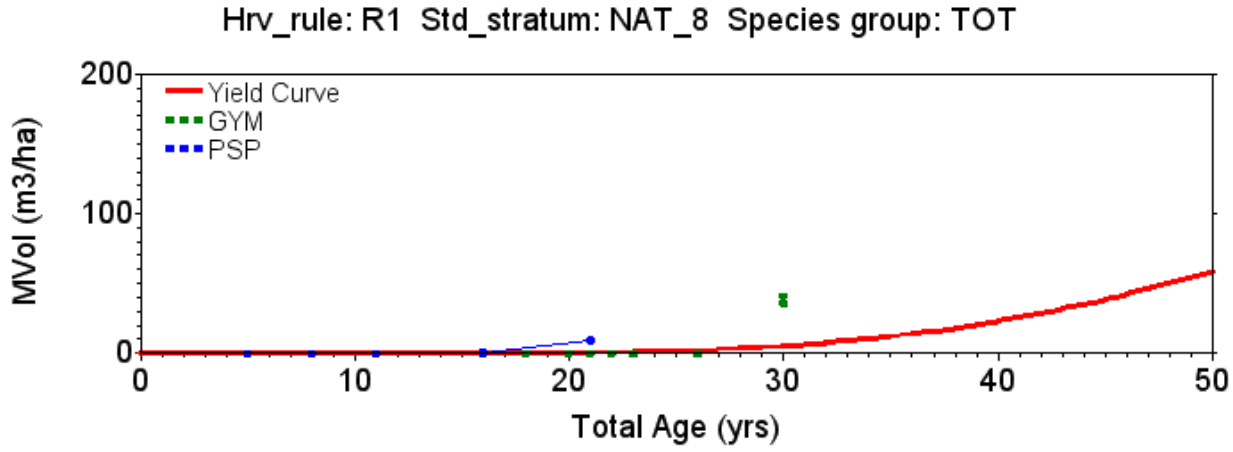

Hrv_rule: R2 Std_stratum: C_SW Species group: TOT
Yield Curve
GYM
PSP
TVol (m3/ha)
200
100
0
0
10
20
30
40
50
Total Age (yrs)

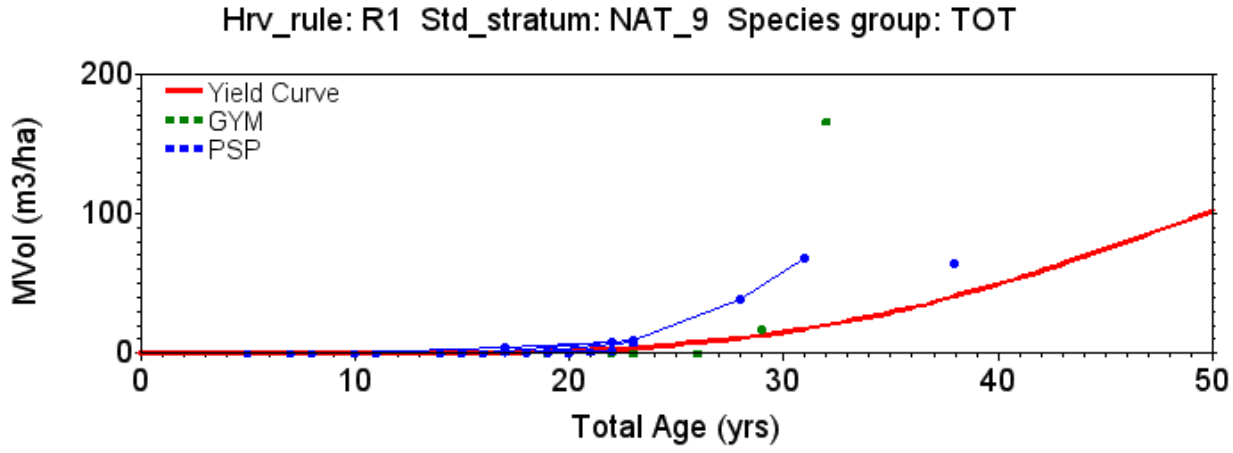

Hrv_rule: R2 Std_stratum: CD_PLHW Species group: TOT
Yield Curve
GYM
PSP
TVol (m3/ha)
200
100
0
0
10
20
30
40
50
Total Age (yrs)

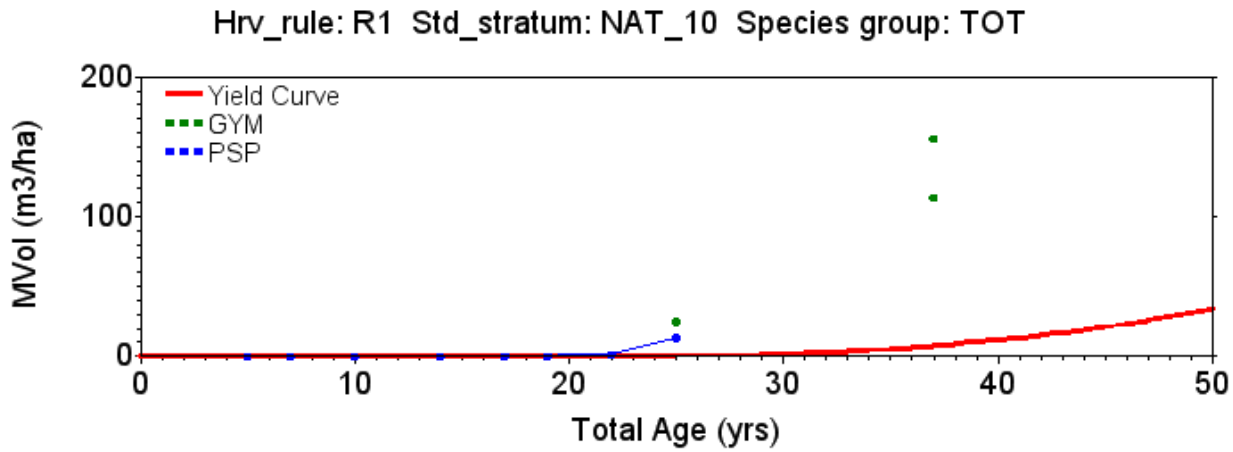

Hrv_rule: R2 Std_stratum: CD_SWHW Species group: TOT
Yield Curve
GYM
PSP
TVol (m3/ha)
200
100
0
0
10
20
30
40
50
Total Age (yrs)

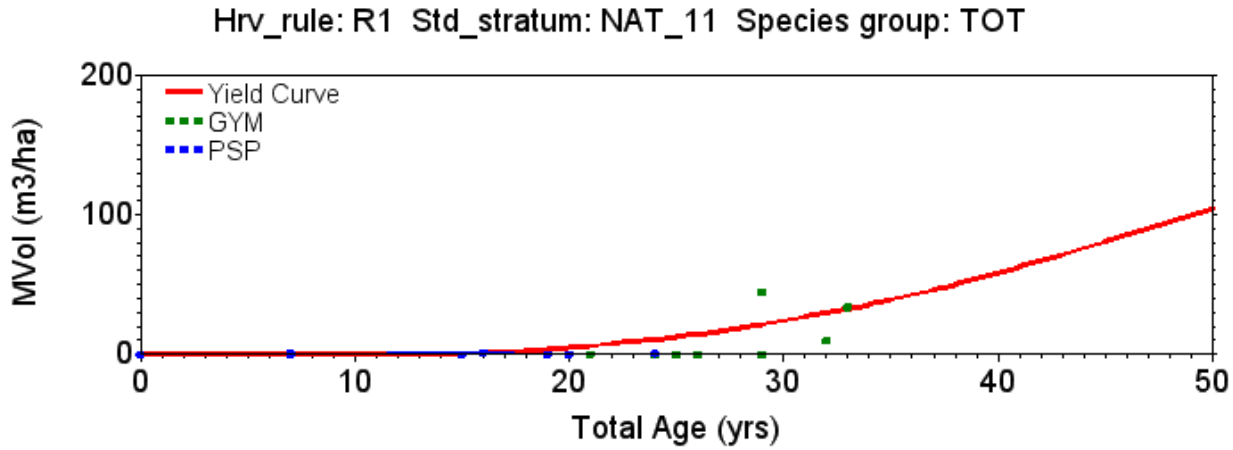
Merchantable Volume (m^3/ha)

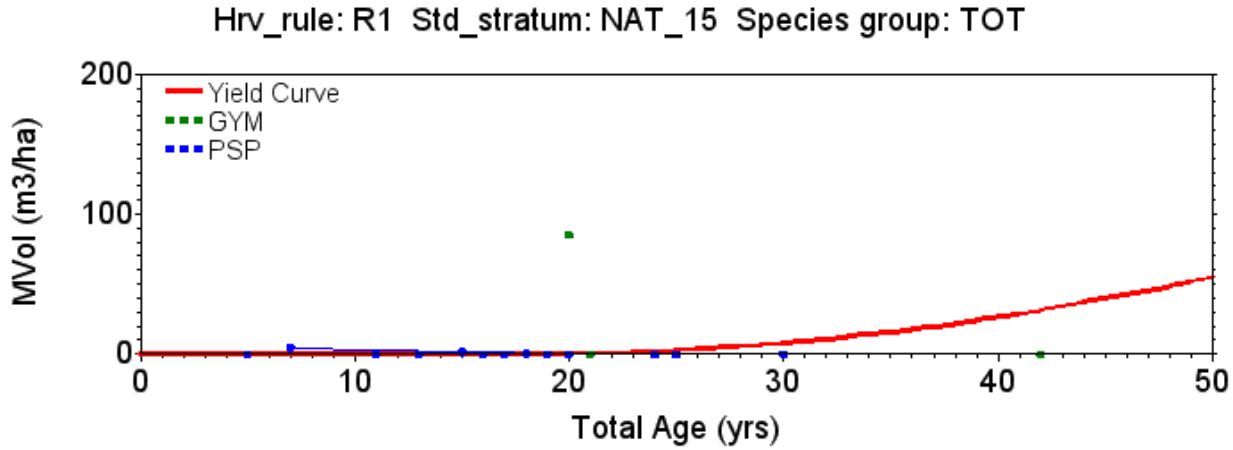


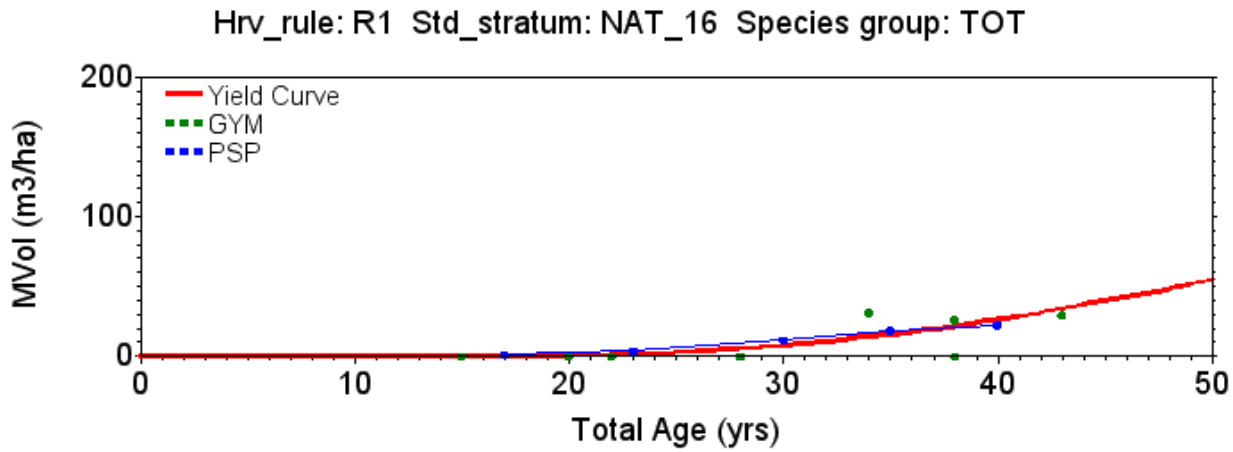


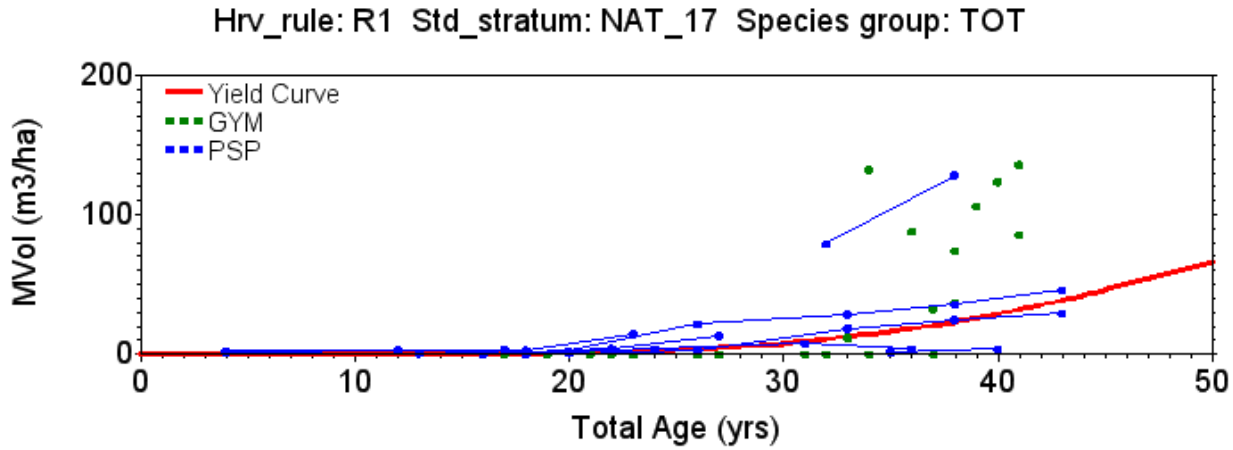


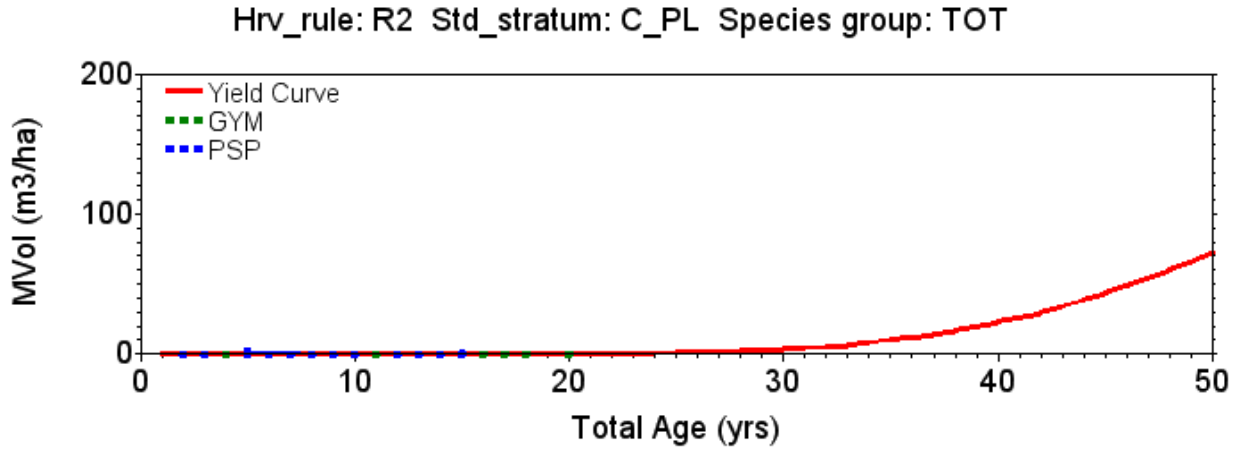

Hrv_rule: R1 Std_stratum: NAT_10 Species group: TOT
Yield Curve
GYM
PSP
MVol (m3/ha)
200
100
0
0
10
20
30
40
50
Total Age (yrs)

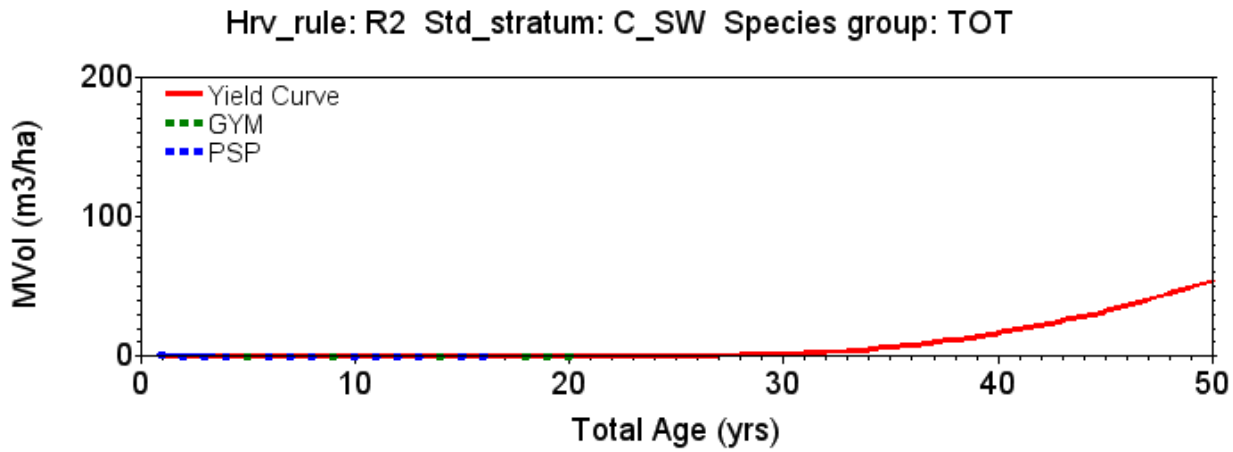

Hrv_rule: R1 Std_stratum: NAT_11 Species group: TOT
Yield Curve
GYM
PSP
MVol (m3/ha)
200
100
0
0
10
20
30
40
50
Total Age (yrs)

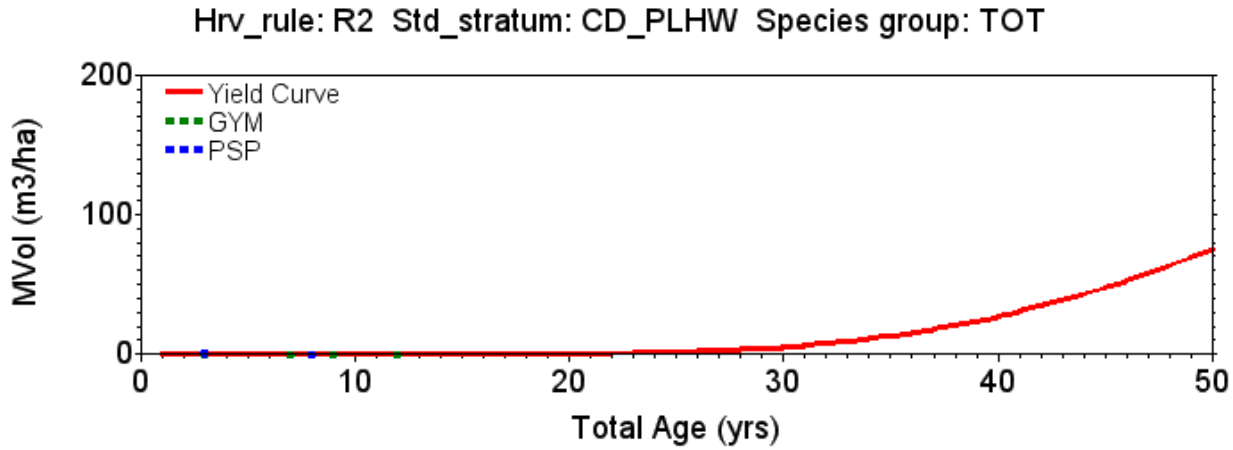

Hrv_rule: R1 Std_stratum: NAT_15 Species group: TOT
Yield Curve
GYM
PSP
MVol (m3/ha)
200
100
0
0
10
20
30
40
50
Total Age (yrs)

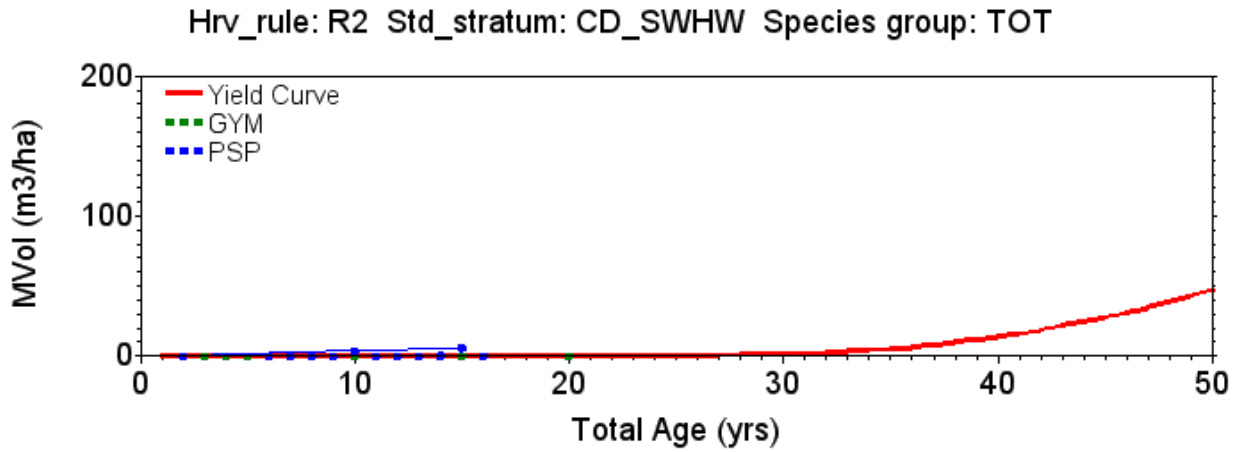

Hrv_rule: R1 Std_stratum: NAT_16 Species group: TOT
Yield Curve
GYM
PSP
MVol (m3/ha)
200
100
0
0
10
20
30
40
50
Total Age (yrs)


Hrv_rule: R1 Std_stratum: NAT_17 Species group: TOT
Yield Curve
GYM
PSP
MVol (m3/ha)
200
100
0
0
10
20
30
40
50
Total Age (yrs)


Hrv_rule: R2 Std_stratum: C_PL Species group: TOT
Yield Curve
GYM
PSP
MVol (m3/ha)
200
100
0
0
10
20
30
40
50
Total Age (yrs)


Hrv_rule: R2 Std_stratum: C_SW Species group: TOT
Yield Curve
GYM
PSP
MVol (m3/ha)
200
100
0
0
10
20
30
40
50
Total Age (yrs)


Hrv_rule: R2 Std_stratum: CD_PLHW Species group: TOT
Yield Curve
GYM
PSP
MVol (m3/ha)
200
100
0
0
10
20
30
40
50
Total Age (yrs)


Hrv_rule: R2 Std_stratum: CD_SWHW Species group: TOT
Yield Curve
GYM
PSP
MVol (m3/ha)
200
100
0
0
10
20
30
40
50
Total Age (yrs)