

8.0 YIELD CURVE DEVELOPMENT

8.1 Introduction

This document contains a detailed description of the methods used in predicting volume estimates for the Vanderwell Contractors (1971) Ltd. Forest Management Agreement (FMA) area. The document is divided into four main sections (as defined in the April 1998 Interim Forest Management Planning Manual). The sections are as follows:

- ◆ Volume Sampling;
- ◆ Yield Curve and Volume Table Development;
- ◆ Cull Deductions;
- ◆ Data Sets.

8.2 Volume Sampling

8.2.1 Plot Allocation and Measurement Procedures

Sampling Program

The volume sampling program, which was designed in consultation with Vanderwell and the Forest Service (now called Public Lands and Forest Division), included the collection of detailed field information describing the density and volume, by species, for individual sample strata.

Purpose of Sampling Programs

The objective of the volume sampling program was to acquire field data to develop deciduous and conifer volume estimates, for specific sub-populations of the productive forest landbase. The stratified sample design included the collection of cruise plot data describing the density, volume and piece size distribution, by species, for individual sample strata. The intent of the volume sampling programs was to provide temporary sample plot data for the construction of empirical yield curves.

Strata Definitions

Forest stands with similar characteristics were aggregated into a finite set of sampling strata to aid in plot allocation and to increase sample precision. Strata were assigned by evaluating AVI overstorey attributes for forest stands on the 1998 productive landbase. All AVI stands less than ten metres in height (AVI overstorey) were assumed to have no merchantable volume and therefore were not sampled.

Figure 8-1 outlines the volume strata assignment decision rules¹¹.

¹¹ These strata were used only for the volume sampling program. The yield strata were determined independently of the volume sampling strata.

FIGURE 8-1: VOLUME SAMPLING STRATA

| STAND ATTRIBUTE | POTENTIAL CLASSES |
|-----------------|-------------------|
| Density | ◆ "A" |
| (3 classes) | ◆ "B" |
| | ◆ "C" or "D" |
| Height | ◆ 10 - 15m |
| (5 classes) | ◆ 16 - 18m |
| | ◆ 19 - 21m |
| | ◆ 22 - 24m |
| | ◆ 25m + |
| Species Group | ◆ "D" |
| (4 classes) | ◆ "CD" |
| | ◆ "DC" |
| | ◆ "C" |

Stand Selection and Plot Allocation

Individual stands within each township were assigned stratum labels and aggregated into sub-population lists. Sample stands were selected at random from each stratum. Sample intensity was proportional to stratum area, importance and inherent variability in each stratum. Individual plots were randomly located along the longest axis within each selected stand. A total of six plots were selected per stand. The entire stand, up to and including the perimeter, was eligible for measurement (i.e. will be included in the sample population).

Field Measurement Procedures

Table 8-1 outlines the plot configuration and measurements that were used in the program.

TABLE 8-1: PLOT CONFIGURATION

| Plot Attributes | Description |
|------------------------|--|
| Plot Size | 100 m ² (5.64 m radius) |
| Plot Shape | Circular |
| DBH Limits | 10.0 cm for individual tree measurements of DBH, height, condition etc. Small-tree dot tally, by species, for trees 5.0 to 9.9 cm dbh |
| Measurement Records | <ul style="list-style-type: none">◆ Tree species◆ DBH (to nearest 0.1 cm)◆ Total height (to nearest 0.1 m)◆ Damage code, cull suspect class◆ Dwarf Mistletoe Rating (DMR)¹² |
| Sample Tree | <ul style="list-style-type: none">◆ Stump diameter (at 0.3 m to nearest 0.1 cm)◆ Total age (at 1.3 m) |

The following information was also recorded at each plot in all programs:

- ◆ Date;
- ◆ Cruiser identification;
- ◆ Location (township, range, meridian, stand number and plot number);
- ◆ Traverse notes;
- ◆ Tie point location, traverse distance/bearing;
- ◆ Plot disturbance indicator (landuse flag) to indicate whether all or part of the plots was intersected by seismic or hand-cut lines.

Quality Control Checks

Quality control checks were implemented to ensure that the highest quality standards possible were achieved. It was common for entire plots to be re-measured as part of the check cruise program. The check programs ran over the entire length of each volume sampling program. Field staff were notified of all check plot findings. If significant problems were found, the field crew responsible was directed to return to the site and correct the errors.

All data was 'double-entered' to ensure that the cruise data was accurately key punched. Any inconsistencies or concerns that the data-entry personnel had were identified and

¹² The Dwarf Mistletoe Rating system used for the Vanderwell cruise program was the 6 - Class system from "Hawksworth, 1977. *The 6 - Class Dwarf Mistletoe System*. USDA Forest Service Gen. Tech. Rep RM-48."

addressed by technical forestry staff. Silvacom has developed a quality control program that examines each tree in the keypunched file for validity of the data. Examples of the edit checks are:

- ◆ Evaluate ratio of DBH to height;
- ◆ Check for valid species and cull suspect class;
- ◆ Ensure plot number, stand number, and stratum label are correct;
- ◆ Ensure plot size is correct.

8.2.2 Plot Removal

Several plots were removed from the plot data prior to yield curve development as they were located in stands that were labeled as merchantability deletions from the landbase. Table 8-2 outlines the number of plots that were removed from the data set as a result of merchantability deletions. All plots removed from the data set prior to yield curve development were assigned a yield curve number of '0' (YCNUM = 0). 'No tally' plots falling in merchantable stands were included in all calculations. A spatial distribution of all sampled stands is provided in Map 8-12.

TABLE 8-2: REMOVED PLOTS

| Deletion Description | Number of Plots Removed |
|-----------------------------|--------------------------------|
| Unmerchantable | 12 |
| Wet Moisture Regime | 12 |
| TOTAL | 24 |

8.2.3 Burned Plots

The majority of the plots that were sampled in 1998 were burned in the Chilsholm and Mitsue fires. Statistical analysis was completed to compare the volume averages of the plots that were burned to the plots that were not burned. This analysis was used to ascertain as to whether or not the burned plots could be pooled with the unburned plots for yield curve development. Preliminary analysis tested burned vs. unburned plots by first classifying plots into yield class by 10-year age class combinations. However, the results indicated that majority of the yield class by age class combinations did not have matching burned/ unburned plots for comparison. Therefore, age classes were re-classified into 30-year age class groups (50-70, 80-100 and 100+) in order to minimize this problem. Separate analyses were done for conifer and deciduous volumes. In order to make statistically defensible decision, four different tests were carried out to compare the burned and unburned plots: 1) two sample t-test with a normality assumption, 2) the

median test, 3) the Wilcoxon rank sum test and 4) the Van der Waerden test. All tests were done at 5% ($\alpha = 0.05$) probability level. Thus statistical significance implies the test probability must be less than 0.05. Table 8-3 presents a summary of tests and the conclusions arrived at. Appendix 20 provides the detail results of this analysis with graphs of the distribution of conifer and deciduous volumes. With the exception of the 50-70 age class group in the deciduous yield class and the 80-100 age class group in the mixedwood yield class, the overall numbers show no statistical difference between the burned plots and the unburned plots. As a result of this, both the burned and unburned plots were used in the yield curve development.

TABLE 8-3: SUMMARY OF STATISTICAL CONCLUSIONS OF VOLUME COMPARISON TESTS

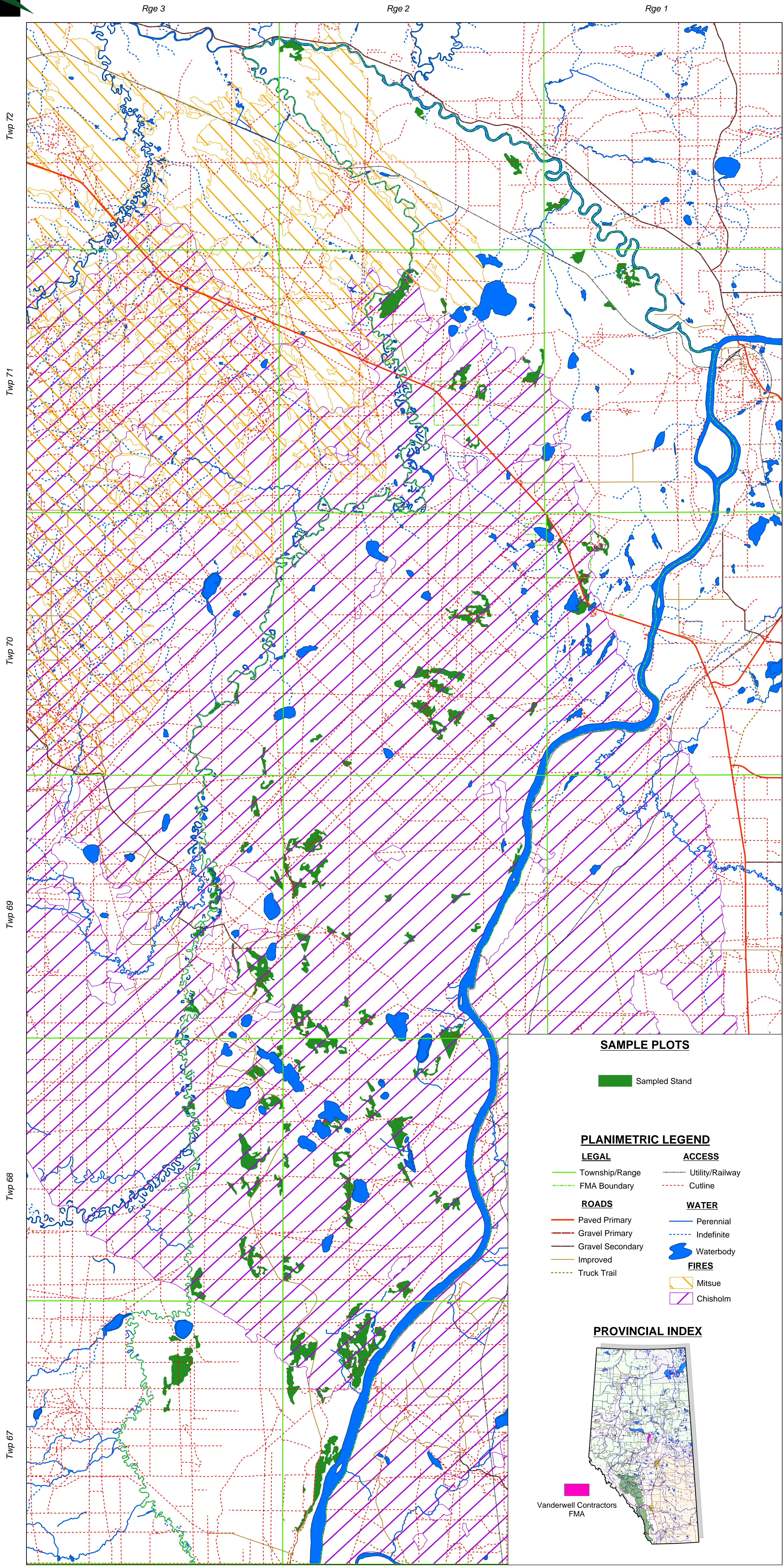
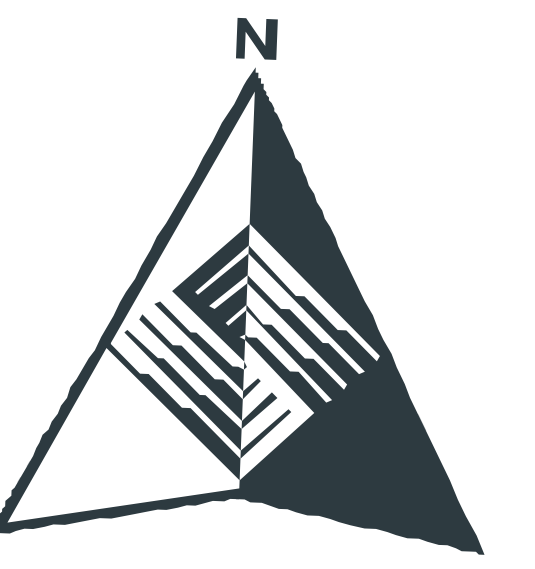
| Yield Class | Age Class | T-Test | | Median Test | | Wilcoxon Rank Sum Test | | Van der Waerden Test | | ¹³ Over All Conclusion | |
|-------------|-----------|--------------------------|--------|-------------|--------|------------------------|--------|----------------------|--------|-----------------------------------|--------|
| | | ¹⁴ Convo I | Decvol | Convol | Decvol | Convol | Decvol | Convol | Decvol | Convol | Decvol |
| C-PL | 50-70 | - | - | - | - | - | - | - | - | - | - |
| | 80-100 | ¹⁵ ns | ns | ns | ns | ns | s | ns | ns | ns | ns |
| | 110+ | - | - | - | - | - | - | - | - | - | - |
| C-SW | 50-70 | - | - | - | - | - | - | - | - | - | - |
| | 80-100 | ns | s | ns | ns | ns | ns | ns | s | ns | ns |
| | 110+ | ns | ns | ns | ns | ns | ns | ns | ns | ns | ns |
| MIX | 50-70 | ns | ns | ns | ns | ns | ns | ns | ns | ns | ns |
| | 80-100 | s | ns | s | ns | s | s | s | s | s | s |
| | 110+ | ns | ns | ns | ns | ns | ns | ns | ns | ns | ns |
| DEC | 50-70 | s | s | s | s | s | s | s | s | s | s |
| | 80-100 | ns | ns | ns | ns | ns | ns | ns | ns | ns | ns |
| | 110+ | ns | ns | ns | ns | ns | ns | ns | ns | ns | ns |

¹³ The conclusion as to whether there is a significant difference in volume between the burned and unburned plots is based on what the majority of the statistical tests indicate at 5% probability level. In case of a tie, the conclusion is that there is no difference in conifer volume in a pure deciduous stand or deciduous volume in a pure conifer stand.

¹⁴ Convol and Decvol represent conifer and deciduous volumes respectively.

¹⁵ In Table 8-3, “ns” means not statistically significant, and “s” is statistically significant at 5% probability level. Cells with significant test statistics are shaded yellow.

DISTRIBUTION OF VOLUME SAMPLING DATA



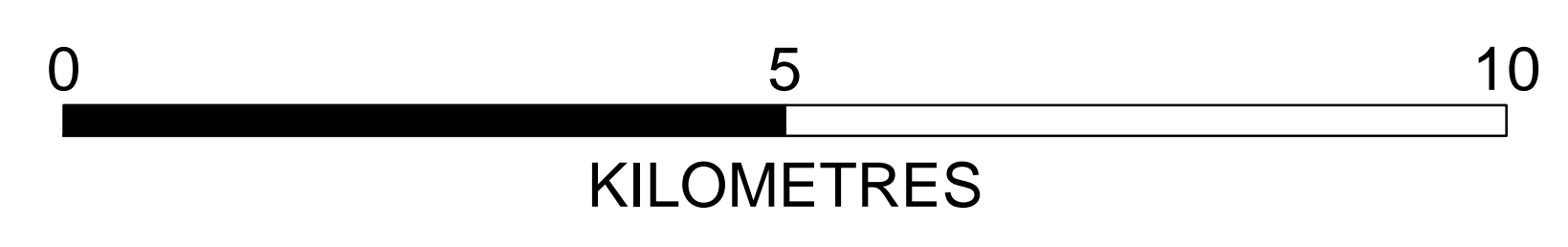
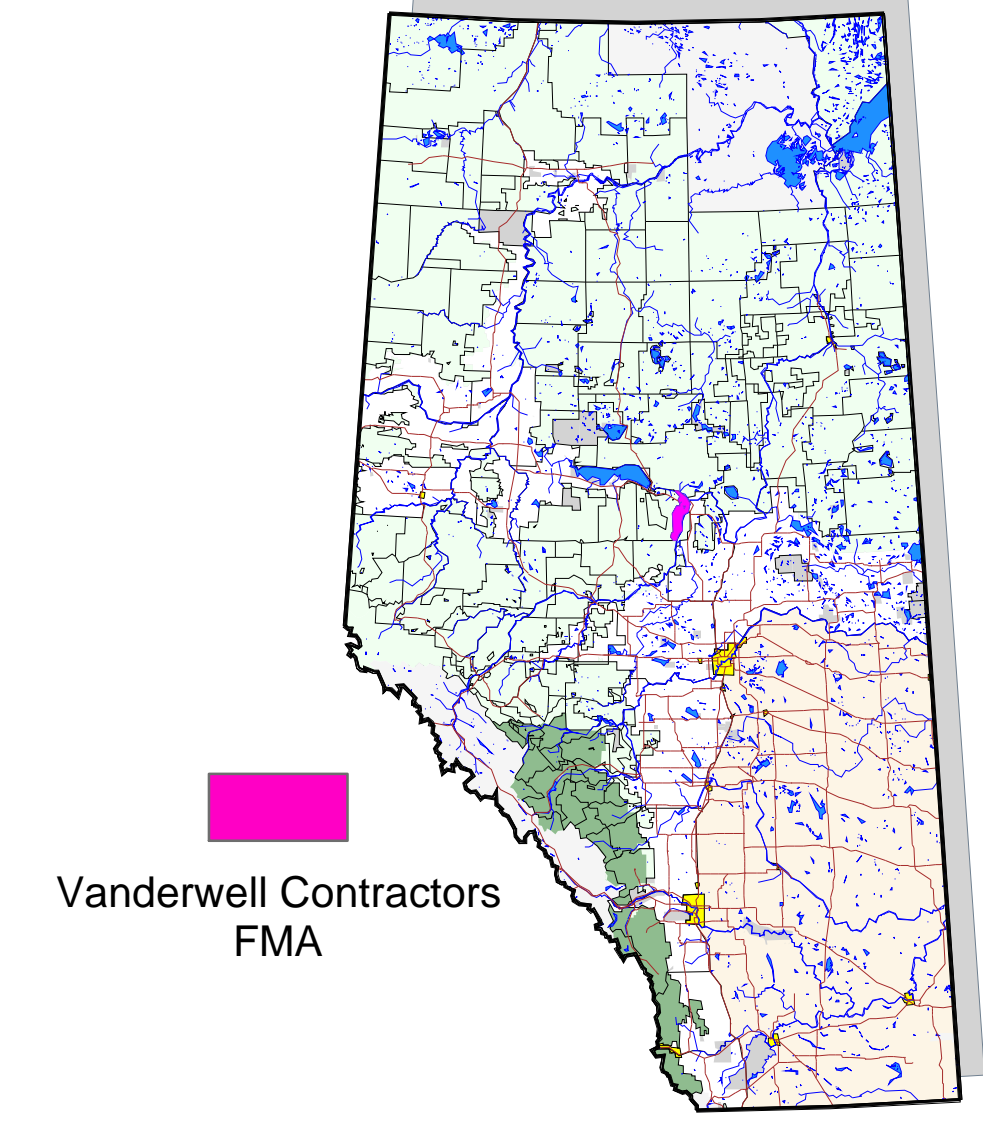
SAMPLE PLOTS

Sampled Stand

PLANIMETRIC LEGEND

- | | |
|------------------|-----------------|
| LEGAL | ACCESS |
| Township/Range | Utility/Railway |
| FMA Boundary | Cutline |
| ROADS | WATER |
| Paved Primary | Perennial |
| Gravel Primary | Indefinite |
| Gravel Secondary | Waterbody |
| Improved | FIRES |
| Truck Trail | Mitsue |
| | Chisholm |

PROVINCIAL INDEX



8.2.4 Plot Compilation

Tree Species

The species included in the plot volume calculations are outlined in Table 8-4.

TABLE 8-4: MERCHANTABLE SPECIES

| Species | Volume Type |
|----------------------|-------------|
| White Spruce (SW) | Conifer |
| Black Spruce (SB) | Conifer |
| Lodgepole Pine (PL) | Conifer |
| Jack Pine (PJ) | Conifer |
| Balsam Fir (FB) | Conifer |
| Larch (LT) | Conifer |
| Trembling Aspen (AW) | Deciduous |
| Balsam Poplar (PB) | Deciduous |
| White Birch (BW) | Deciduous |

Utilization Standards

A 15/11 utilization standard for both conifer and deciduous species was applied. The minimum DBH assumed to equate to a 15-cm stump diameter is provided in Table 8-5. These minimum DBH values were determined using the stump diameter and breast height diameter model with coefficients determined by natural sub-region as presented on pages 66 – 67 of Huang (1994): *Ecologically-based individual tree volume estimation for major Alberta tree species. Rep 1: Methods of formulation and statistical foundations.*

TABLE 8-5: MINIMUM DBH (cm) FOR 15 cm STUMP

| Species | Central Mixedwood Sub-Region |
|--------------------------------|-------------------------------------|
| White Spruce (SW) | 13.5 |
| Black Spruce (SB) | 13.7 |
| Lodgepole Pine (PL) | 13.3 |
| Balsam Fir (FB) | 13.6 |
| Larch (LT) ¹⁶ | 13.7 |
| Trembling Aspen (AW) | 13.7 |
| Balsam Poplar (PB) | 13.5 |
| White Birch (BW) ¹⁷ | 13.6 |

Height Calculation

The total height used in the volume calculations for most trees was the measured height including lean. When measured heights were not available, the heights were determined using the height-diameter model with coefficients determined by natural sub-region as presented on pages 63 and 65 of Huang (1994): *Ecologically-based individual tree volume estimation for major Alberta tree species. Rep 1: Methods of formulation and statistical foundations.*

Tree Volume Calculations

Individual tree volumes were calculated using Kozak's variable exponent taper equation with coefficients determined by natural sub-region. This equation, its coefficients and the methods used to determine tree volumes were presented in Huang (1994): *Ecologically-*

¹⁶ This is equivalent to the minimum DBH used for Black Spruce. No natural sub-region coefficients were given for Larch and the provincial average was not considered reasonable for this area. The provincial average was equal to 13.1-cm which is considerably less than the minimum DBH used for the other conifer species in this natural sub-region. In all other calculations including height and volume calculations, the coefficients specific to Larch were used.

¹⁷ This is equivalent to the minimum DBH used for ALL deciduous species. No natural sub-region coefficients were given for White Birch and the provincial average was not considered reasonable for this area. The provincial average was equal to 13.0-cm which is considerably less than the minimum DBH used for the other deciduous species in this natural sub-region. In all other calculations including height and volume calculations, coefficients specific to White Birch were used.

based individual tree volume estimation for major Alberta tree species. Rep 1: Methods of formulation and statistical foundations. The process involved the following steps:

- ◆ Determine the merchantable height of the tree using an iterative technique applied to the taper model to calculate at what height the specified top diameter occurs;
- ◆ Divide the merchantable length into 10 equal sections;
- ◆ Determine the diameter at the top, middle and bottom of each section (using the taper model);
- ◆ Calculate the volume of each section using Newton’s formula;
- ◆ Sum the volumes for all sections to estimate the total merchantable tree volume.

No minimum log length was assumed in the tree volume calculations.

8.2.5 Age Class Assignments to Plot Data

The AVI was matched to the plot data, and the age (AGE)¹⁸ was calculated using the overstorey AVI origin (ORIGIN) and the year of data collection as the source year (i.e. AGE = 1998 – ORIGIN). An age class was assigned according to the classes defined in Table 8-6.

TABLE 8-6: 10 YEAR AGE CLASS ASSIGNMENT

| Age (years) | Age class | Age (years) | Age class |
|-------------|-----------|-------------|-----------|
| 0-9 | 0 | 100-109 | 100 |
| 10-19 | 10 | 110-119 | 110 |
| 20-29 | 20 | 120-129 | 120 |
| 30-39 | 30 | 130-139 | 130 |
| 40-49 | 40 | 140-149 | 140 |
| 50-59 | 50 | 150-159 | 150 |
| 60-69 | 60 | 160-169 | 160 |
| 70-79 | 70 | 170-179 | 170 |
| 80-89 | 80 | 180-189 | 180 |
| 90-99 | 90 | 190-199 | 190 |
| | | 200+ | 200 |

¹⁸ In the landbase, deciduous stands with a conifer understorey, as identified in the AVI, are aged based on the understorey origin in accordance with the 1998 landbase process.

8.2.6 Yield Curve Stratification

Species Group

The primary stratification criteria used was species group composition. The percentage of conifer species from the overstorey/understorey in each forested stand was calculated from the AVI and a species group (SPGRP) was assigned as follows:

- ◆ C – 80% or greater;
- ◆ CD – 50%¹⁹ and greater but less than or equal to 79%;
- ◆ DC – 21% and greater but less than 50%;
- ◆ D – 0% and greater but less than or equal to 20%.

Table 8-7 provides the frequency and percentage of plots that fell within each species group as well as the net area in each category.

TABLE 8-7: PLOT AND AREA DISTRIBUTION: SPECIES GROUP

| Species Group | % Conifer Crown Closure | NUMBER OF PLOTS | % OF TOTAL PLOTS | NET AREA (HA) | % OF TOTAL NET AREA |
|---------------|-------------------------|-----------------|------------------|---------------|---------------------|
| C | 80-100% | 234 | 33 | 1919 | 38 |
| CD | 50-79% | 114 | 16 | 140 | 3 |
| DC | 21-50% | 132 | 19 | 160 | 3 |
| D | 0-20% | 228 | 32 | 2879 | 56 |
| Total | | 708 | 100 | 5099 | 100 |

After reviewing the Table 8-7 summary, it was concluded that the ‘CD’ and ‘DC’ species group designations should be grouped into one mixedwood category (Very few plots and a small amount of net landbase).

Leading Species

For the conifer strata, leading species was also considered as a predictor in the yield curve stratification. Table 8-8 provides the frequency and percentage of plots that fell within each leading species for the conifer species group as well as the net area in each category.

¹⁹ Leading species is used to assign species group when the percentage of conifer species is 50%.

TABLE 8-8: PLOT AND AREA DISTRIBUTION: LEADING SPECIES

| Leading Species | Name of Leading Species | NUMBER OF PLOTS | % OF TOTAL PLOTS | NET AREA (HA) | % OF TOTAL NET AREA |
|-----------------|-------------------------|-----------------|------------------|---------------|---------------------|
| LT | Tamarack | 0 | 0 | 2 | 0 |
| P | Undifferentiated Pine | 108 | 46 | 752 | 39 |
| SB | Black Spruce | 0 | 0 | 73 | 4 |
| SW | White Spruce | 126 | 54 | 1093 | 57 |
| Total | | 234 | 100 | 1919 | 100 |

Yield Curve Strata and Yield Curve Number Assignment

Yield curve strata and yield curve number were assigned to the plot data using the following AVI attributes:

- ◆ Species group (SPGRP);
- ◆ Leading Species (SP1).

Yield curve strata and number assignment are described in Table 8-9.

TABLE 8-9: YIELD CURVE STRATA AND NUMBER ASSIGNMENT

| CROWN | SPGRP | Leading SPECIES (SP1) | MERCH | YC_STRAT | YCNUM |
|-------|--------|-----------------------|-------|----------|-------|
| ALL | C | P | 0 | C-PL | 1 |
| ALL | C | SW | 0 | C-SW | 2 |
| ALL | DC, CD | ALL | 0 | MIX | 3 |
| ALL | D | ALL | 0 | DEC | 4 |

Regenerated Yield Curves

The yield curves provided in this document are the set of yield curves that will be used in the timber supply analysis. Complete information on regeneration and transition assumptions will be provided in the timber supply analysis section of the Integrated Detailed Forest Management Plan document.

Yield Class Assignments to the Landbase

Detailed descriptions of the yield strata assignments to the landbase will be provided in the net landbase documentation section of the Integrated Detailed Forest Management Plan document.

8.3 Yield Curve and Volume Table Development

8.3.1 Modeling Procedures Tested and Evaluated

Empirical yield tables (15/11 utilization) were developed directly from the volume sampling data. These yield tables along with other statistics about the plot data are presented in section 8.3..2. The two parameter nonlinear model was then examined using plot based methodology to predict conifer and deciduous yields.

8.3.1.1 Two Parameter Nonlinear Model

$$y = ax^b e^{(-ax)}$$

where:

- y = Predicted merchantable volume (m³/ha) – conifer or deciduous
- a, b = Predicted nonlinear regression coefficients
- x = 10 year age class
- e = Base of the natural logarithm (~2.71828)

8.3.1.2 Two Parameter Nonlinear (Guide curve) Model for pine leading conifer

$$y = (a + ct_0)x^b e^{(-ax)}$$

where:

- $t_0(0, 1)$ = Identifies pine leading conifer group (0) and total conifer group (1)
- c = Predicted nonlinear regression coefficient

8.3.1.3 Two Parameter Nonlinear (Guide curve) Model for deciduous

$$y = (a + dt_1)x^b e^{(-ax)}$$

where:

- $t_1(0, 1)$ = Identifies the deciduous yield class (0) and all yield classes combined (1)
- d = Predicted nonlinear regression coefficient

The two parameter model without guide curve (8.3.1.1) was used to fit the plot data for both conifer and deciduous yield for all yield strata. However, model (8.3.1.1) did not produce a solution with declining yield at the older age classes for deciduous yield in the pine leading conifer (C-PL) yield stratum, and the conifer yield in the deciduous (DEC) yield stratum due to a data gap in these age classes (See Figures 8.2 and 8.3). The two parameter guide curve (8.3.1.2) was used to ensure that deciduous yield in the C-PL stratum decline with age in the older age classes. The combined deciduous yield of the

two conifer yield strata (C-PL and C-SW) was used as the guide curve. For the conifer yield in the DEC stratum, the two parameter guide (8.3.1.3) was used with the guide curve defined by the combined conifer yield in all yield strata.

8.3.2 Final Yield Curves (15/11 Utilization)

A summary of the models used and the resulting coefficients and fit statistics are given in Table 8-10 and Table 8-11.

TABLE 8-10: NONLINEAR MODEL COEFFICIENTS AND FIT STATISTICS (15/11 CONIFER UTILIZATION)

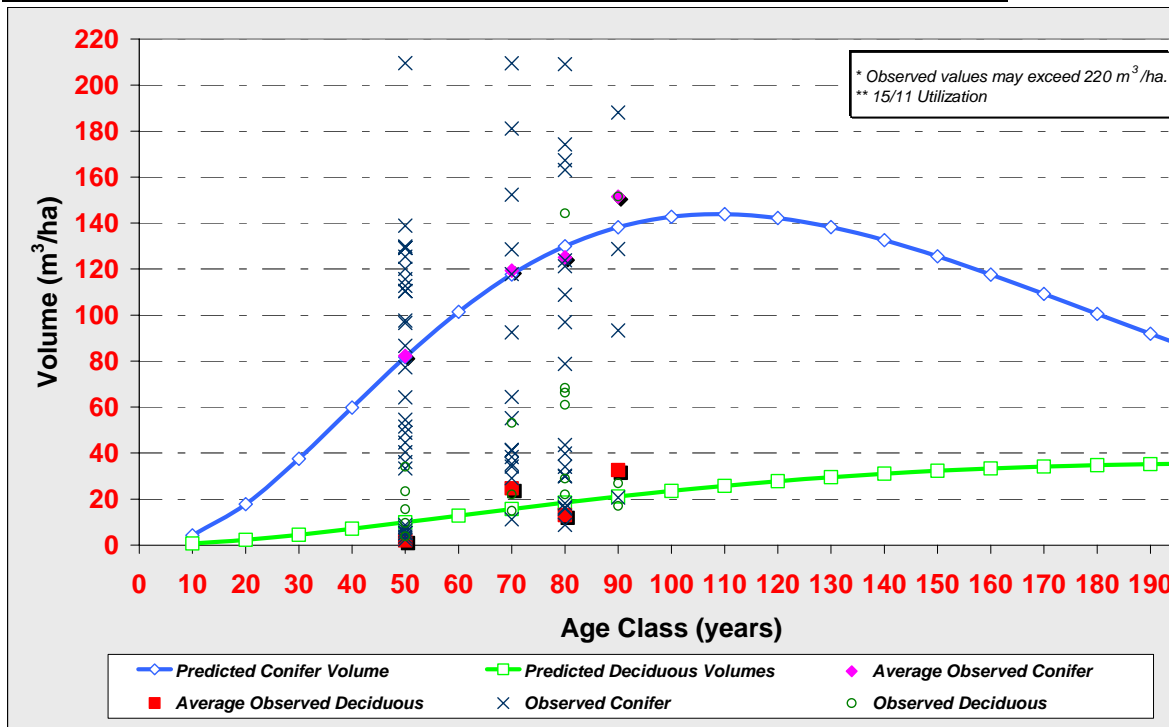
| Model Form (Heading Number) | Yield Curve | Yield Stratum | Conifer Statistics | | | | |
|-----------------------------------|----------------|---------------------------|--------------------|---------------|-----------|----------------|----------------|
| | | | A | B | D | T ₁ | R ² |
| 3.1.1 | 1 | PINE LEADING CONIFER | 0.0218860 | 2.382394 4 | | | 0.03300 |
| 3.1.1 | 2 | SPRUCE LEADING CONIFER | 0.0231028 | 2.469316 8 | | | 0.00471 |
| 3.1.1 | 3 | MIXEDWOOD | 0.0297501 | 2.4504062 | | | 0.00433 |
| 3.1.3 | 4 | DECIDUOUS | 0.0162840 | 2.159138 7 | 0.0128820 | 0 | 0.09026 |

TABLE 8-11: NONLINEAR MODEL COEFFICIENTS AND FIT STATISTICS (15/11 DECIDUOUS UTILIZATION)

| Model Form (Heading Number) | Yield Curve | Yield Stratum | Deciduous Statistics | | | | |
|-----------------------------------|----------------|---------------------------|----------------------|---------------|---------------|----------------|----------------|
| | | | A | B | C | T ₀ | R ² |
| 3.1.2 | 1 | PINE LEADING CONIFER | 0.0091103 | 1.903840 7 | 0.006799 1 | 0 | 0.05049 |
| 3.1.1 | 2 | SPRUCE LEADING CONIFER | 0.0240885 | 2.177874 1 | | | 0.00262 |
| 3.1.1 | 3 | MIXEDWOOD | 0.0288182 | 2.2995693 | | | 0.00496 |
| 3.1.1 | 4 | DECIDUOUS | 0.0196045 | 2.3060011 | | | 0.03249 |

The following pages contain the final proposed yield curves and yield tables for the 15/11 conifer and deciduous utilization, along with the net area by yield curve and age class. For modeling purposes an additional five yield curves were developed, descriptions of how and why these were developed is included in Appendix 18, Table 18.1.

Figure 8-2: Yield Curve 1: PINE LEADING CONIFER (C-PL)



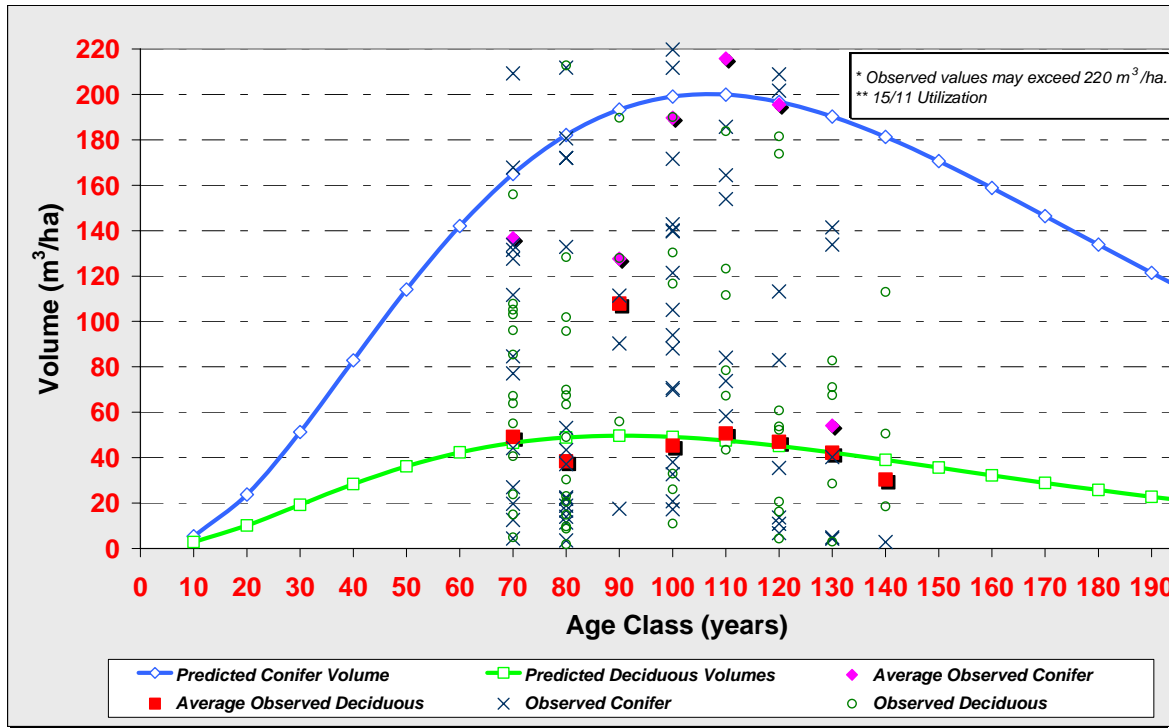
Yield Table 1: PINE LEADING CONIFER (C-PL)

| Yield Curve Coefficients | A | B | C | T ₀ | r ² |
|--------------------------|-----------|-----------|-----------|----------------|----------------|
| Conifer | 0.0218860 | 2.3823944 | | | 0.03300 |
| Deciduous | 0.0091103 | 1.9038407 | 0.0067991 | 0 | 0.05049 |

15/11 Conifer and Deciduous Utilization

| Age class (YRS) | Observed Average Volume (M ³ /HA) | | Predicted Volume (M ³ /HA) | | Mean Annual Increment (M ³ /HA/YR) | | Net Area (HA) |
|-----------------|--|-----------|---------------------------------------|-----------|---|-----------|---------------|
| | Conifer | Deciduous | Conifer | Deciduous | Conifer | Deciduous | |
| 0 | | | 0 | 0 | 0.00 | 0.00 | 14 |
| 10 | | | 4 | 1 | 0.42 | 0.07 | 0 |
| 20 | | | 18 | 2 | 0.89 | 0.11 | 0 |
| 30 | | | 38 | 4 | 1.25 | 0.15 | 0 |
| 40 | | | 60 | 7 | 1.50 | 0.18 | 0 |
| 50 | 82 | 2 | 82 | 10 | 1.64 | 0.20 | 51 |
| 60 | | | 101 | 13 | 1.69 | 0.21 | 88 |
| 70 | 119 | 25 | 118 | 16 | 1.68 | 0.22 | 295 |
| 80 | 125 | 13 | 130 | 18 | 1.62 | 0.23 | 16 |
| 90 | 151 | 33 | 138 | 21 | 1.54 | 0.23 | 272 |
| 100 | | | 143 | 24 | 1.43 | 0.24 | 15 |
| 110 | | | 144 | 26 | 1.31 | 0.23 | 0 |
| 120 | | | 142 | 28 | 1.19 | 0.23 | 0 |
| 130 | | | 138 | 29 | 1.06 | 0.23 | 0 |
| 140 | | | 133 | 31 | 0.95 | 0.22 | 0 |
| 150 | | | 126 | 32 | 0.84 | 0.22 | 0 |
| 160 | | | 118 | 33 | 0.74 | 0.21 | 0 |
| 170 | | | 109 | 34 | 0.64 | 0.20 | 0 |
| 180 | | | 101 | 35 | 0.56 | 0.19 | 0 |
| 190 | | | 92 | 35 | 0.48 | 0.19 | 0 |
| 200 | | | 83 | 35 | 0.42 | 0.18 | 0 |

Figure 8-3: Yield Curve 2: SPRUCE LEADING CONIFER (C-SW)



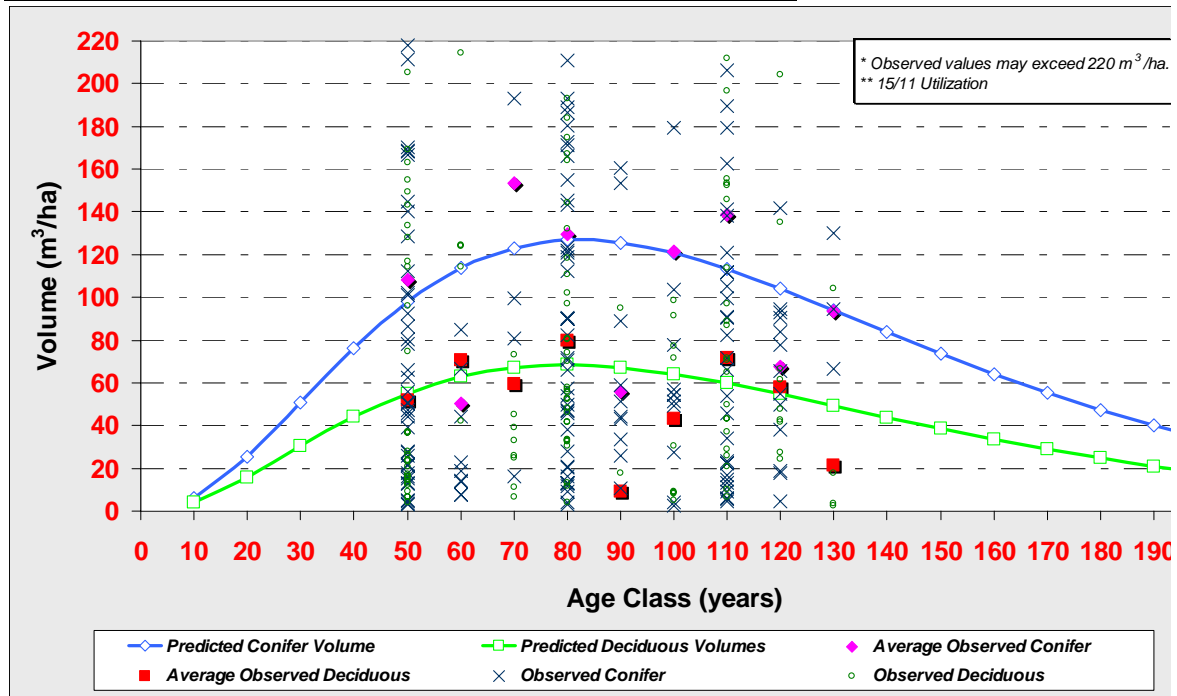
Yield Table 2: SPRUCE LEADING CONIFER (C-SW)

| Yield Curve Coefficients | A | B | C | r ² |
|--------------------------|-----------|-----------|---|----------------|
| Conifer | 0.0231028 | 2.4693168 | | 0.00471 |
| Deciduous | 0.0240885 | 2.1778741 | | 0.00262 |

15/11 Conifer and Deciduous Utilization

| Age class (YRS) | Observed Average Volume (M ³ /HA) | | Predicted Volume (M ³ /HA) | | Mean Annual Increment (M ³ /HA/YR) | | Net Area (HA) |
|-----------------|--|-----------|---------------------------------------|-----------|---|-----------|---------------|
| | Conifer | Deciduous | Conifer | Deciduous | Conifer | Deciduous | |
| 0 | | | 0 | 0 | 0.00 | 0.00 | 147 |
| 10 | | | 5 | 3 | 0.54 | 0.29 | 0 |
| 20 | | | 24 | 10 | 1.19 | 0.51 | 0 |
| 30 | | | 51 | 19 | 1.71 | 0.64 | 0 |
| 40 | | | 83 | 28 | 2.07 | 0.71 | 0 |
| 50 | | | 114 | 36 | 2.28 | 0.72 | 0 |
| 60 | | | 142 | 42 | 2.37 | 0.71 | 43 |
| 70 | 137 | 49 | 165 | 47 | 2.36 | 0.66 | 46 |
| 80 | 226 | 38 | 182 | 49 | 2.28 | 0.61 | 33 |
| 90 | 128 | 108 | 193 | 50 | 2.15 | 0.55 | 272 |
| 100 | 190 | 45 | 199 | 49 | 1.99 | 0.49 | 37 |
| 110 | 216 | 51 | 200 | 48 | 1.82 | 0.43 | 336 |
| 120 | 195 | 47 | 197 | 45 | 1.64 | 0.38 | 155 |
| 130 | 54 | 42 | 190 | 42 | 1.46 | 0.32 | 15 |
| 140 | 296 | 30 | 181 | 39 | 1.30 | 0.28 | 40 |
| 150 | | | 171 | 36 | 1.14 | 0.24 | 43 |
| 160 | | | 159 | 32 | 0.99 | 0.20 | 0 |
| 170 | | | 146 | 29 | 0.86 | 0.17 | 0 |
| 180 | | | 134 | 26 | 0.74 | 0.14 | 0 |
| 190 | | | 121 | 23 | 0.64 | 0.12 | 0 |
| 200 | | | 109 | 20 | 0.55 | 0.10 | 0 |

Figure 8-4: Yield Curve 3: MIXEDWOOD (MIX)



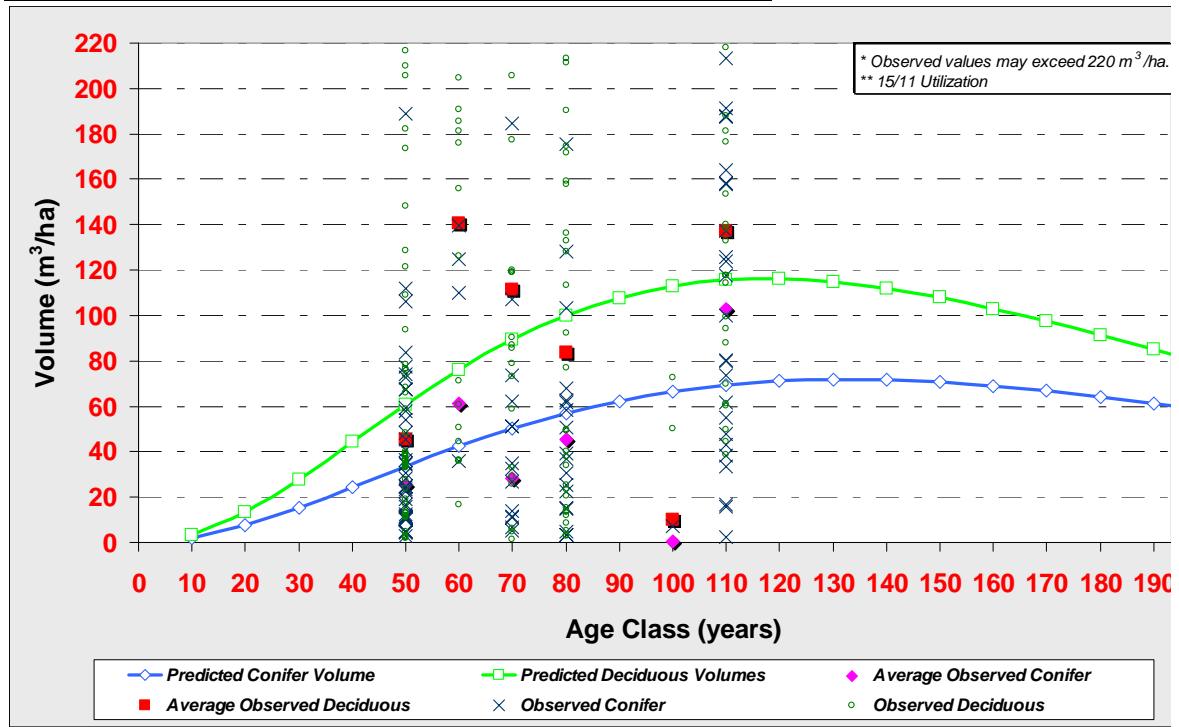
Yield Table 3: MIXEDWOOD (MIX)

| Yield Curve Coefficients | A | B | C | r ² |
|--------------------------|-----------|-----------|---|----------------|
| Conifer | 0.0297501 | 2.4504062 | | 0.00433 |
| Deciduous | 0.0288182 | 2.2995693 | | 0.00496 |

15/11 Conifer and Deciduous Utilization

| Age class (YRS) | Observed Average Volume (M ³ /HA) | | Predicted Volume (M ³ /HA) | | Mean Annual Increment (M ³ /HA/YR) | | Net Area (HA) |
|-----------------|--|-----------|---------------------------------------|-----------|---|-----------|---------------|
| | Conifer | Deciduous | Conifer | Deciduous | Conifer | Deciduous | |
| 0 | | | 0 | 0 | 0.00 | 0.00 | 7 |
| 10 | | | 6 | 4 | 0.62 | 0.43 | 0 |
| 20 | | | 25 | 16 | 1.27 | 0.79 | 0 |
| 30 | | | 51 | 30 | 1.69 | 1.01 | 0 |
| 40 | | | 76 | 44 | 1.91 | 1.10 | 0 |
| 50 | 108 | 52 | 98 | 55 | 1.96 | 1.10 | 1 |
| 60 | 50 | 71 | 114 | 63 | 1.89 | 1.05 | 33 |
| 70 | 154 | 59 | 123 | 67 | 1.76 | 0.96 | 34 |
| 80 | 130 | 80 | 127 | 68 | 1.59 | 0.85 | 29 |
| 90 | 56 | 9 | 126 | 67 | 1.40 | 0.75 | 108 |
| 100 | 121 | 43 | 121 | 64 | 1.21 | 0.64 | 15 |
| 110 | 139 | 71 | 113 | 60 | 1.03 | 0.54 | 64 |
| 120 | 68 | 58 | 104 | 55 | 0.87 | 0.46 | 0 |
| 130 | 94 | 21 | 94 | 49 | 0.72 | 0.38 | 10 |
| 140 | | | 84 | 44 | 0.60 | 0.31 | 0 |
| 150 | | | 74 | 39 | 0.49 | 0.26 | 0 |
| 160 | | | 64 | 34 | 0.40 | 0.21 | 0 |
| 170 | | | 55 | 29 | 0.33 | 0.17 | 0 |
| 180 | | | 47 | 25 | 0.26 | 0.14 | 0 |
| 190 | | | 40 | 21 | 0.21 | 0.11 | 0 |
| 200 | | | 34 | 18 | 0.17 | 0.09 | 0 |

Figure 8-5: Yield Curve 4: DECIDUOUS (DEC)



Yield Table 4: DECIDUOUS (DEC)

| Yield Curve Coefficients | A | B | d | t | r ² |
|--------------------------|-----------|-----------|-----------|---|----------------|
| Conifer | 0.0162840 | 2.1591387 | 0.0128820 | 0 | 0.09026 |
| Deciduous | 0.0196045 | 2.3060011 | | | 0.03249 |

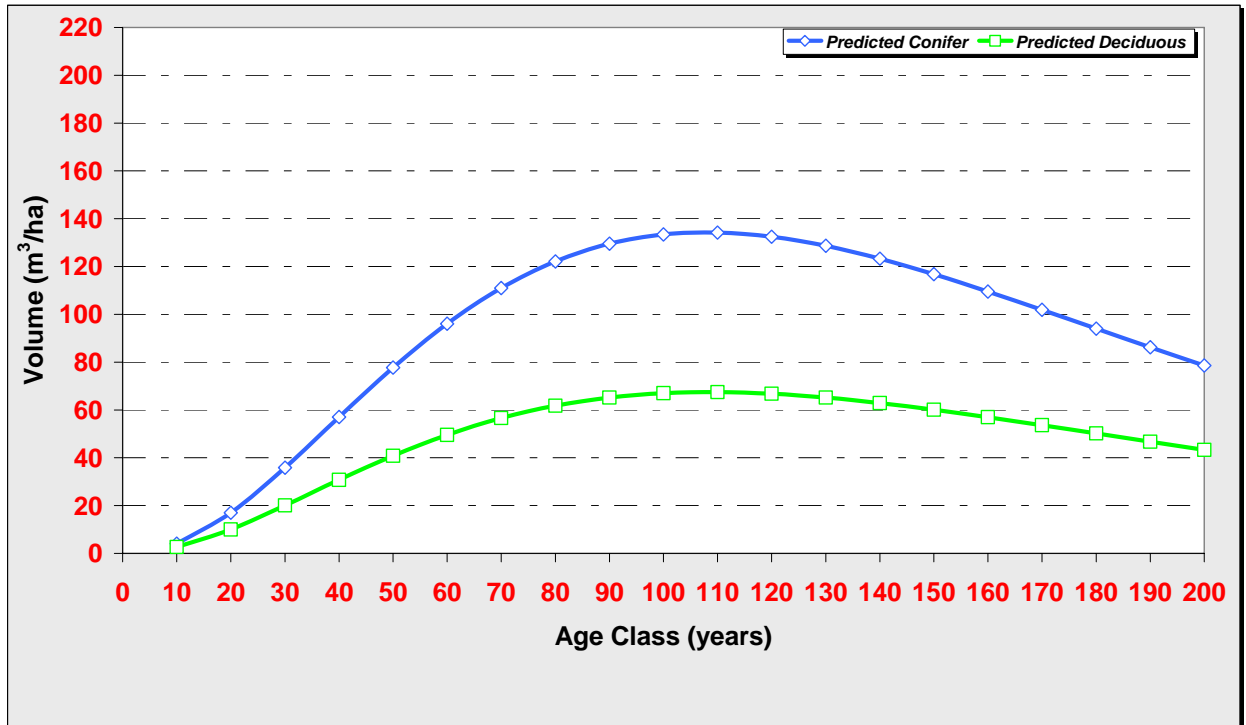
15/11 Conifer and Deciduous Utilization

| Age class (YRS) | Observed Average Volume (M ³ /HA) | | Predicted Volume (M ³ /HA) | | Mean Annual Increment (M ³ /HA/YR) | | Net Area (HA) |
|-----------------|--|-----------|---------------------------------------|-----------|---|-----------|---------------|
| | Conifer | Deciduous | Conifer | Deciduous | Conifer | Deciduous | |
| 0 | | | 0 | 0 | 0.00 | 0.00 | 155 |
| 10 | | | 2 | 3 | 0.20 | 0.33 | 0 |
| 20 | | | 8 | 13 | 0.38 | 0.66 | 0 |
| 30 | | | 15 | 28 | 0.52 | 0.92 | 0 |
| 40 | 25 | 46 | 24 | 44 | 0.61 | 1.11 | 0 |
| 50 | 61 | 141 | 34 | 61 | 0.67 | 1.22 | 26 |
| 60 | 28 | 111 | 42 | 76 | 0.71 | 1.27 | 155 |
| 70 | 45 | 84 | 50 | 89 | 0.72 | 1.28 | 1325 |
| 80 | | | 57 | 100 | 0.71 | 1.25 | 635 |
| 90 | 1 | 10 | 62 | 108 | 0.69 | 1.20 | 345 |
| 100 | 103 | 137 | 66 | 113 | 0.66 | 1.13 | 0 |
| 110 | | | 69 | 116 | 0.63 | 1.05 | 42 |
| 120 | | | 71 | 116 | 0.59 | 0.97 | 196 |
| 130 | | | 72 | 115 | 0.55 | 0.88 | 0 |
| 140 | | | 72 | 112 | 0.51 | 0.80 | 0 |
| 150 | | | 71 | 108 | 0.47 | 0.72 | 0 |
| 160 | | | 69 | 103 | 0.43 | 0.64 | 0 |
| 170 | | | 67 | 97 | 0.39 | 0.57 | 0 |
| 180 | | | 64 | 91 | 0.36 | 0.51 | 0 |
| 190 | | | 61 | 85 | 0.32 | 0.45 | 0 |
| 200 | | | 58 | 79 | 0.29 | 0.39 | 0 |

8.3.3 Area Weighted Composite Yield Curve

The following graph is an area weighted composite yield curve of the predicted yields for the FMA areas.

**FIGURE 8-6: AREA WEIGHTED COMPOSITE YIELD CURVE – 15/11
CONIFER & DECIDUOUS UTILIZATION**



8.4 Cull Deductions

Cull deductions were not applied during the development of these yield curves. A 3% conifer cull and 7% deciduous cull will be applied to the yield curves during the timber supply analysis.

8.5 Data Sets

The following data sets have been prepared and are were submitted on cd to SRD in April of 2004.

1. Vanderwell raw tree data (Vanderwell_RAWTREEDATA.DBF) – see Table 8-12 for the data structure document.
2. Vanderwell individual tree compilation (Vanderwell_COMPILEDTREE.DBF) – see Table 8-13 for the data structure document.
3. Vanderwell plot compilation (Vanderwell_COMPILEDPLOT.DBF) – see Table 8-14 for the data structure document.
4. Vanderwell plot AVI data (Vanderwell_YCAVI.DBF) – see Table 8-15 for the data structure document.
5. Predicted conifer 15/11 utilization and deciduous 15/11 utilization yields by strata and age class (Vanderwell_YC_all.dbf) – see table 8-16 for the data structure document.

TABLE 8-12: VANDERWELL RAW TREE DATA STRUCTURE AND DESCRIPTION

Number of data records: 11,313

| Field Number | Field Name | Field Type | Field Width | No. of Decimals | Field Description |
|--------------|------------|------------|-------------|-----------------|--|
| 1. | TWP | Numeric | 3 | 0 | Township |
| 2. | RGE | Numeric | 2 | 0 | Range |
| 3. | MER | Numeric | 1 | 0 | Meridian |
| 4. | STAND | Numeric | 5 | 0 | Forest stand number |
| 5. | PLOTNO | Numeric | 4 | 0 | Plot number |
| 6. | PSIZE | Numeric | 5 | 3 | Plot area (ha) |
| 7. | PTYPE | Numeric | 8 | 2 | Plot type <ul style="list-style-type: none"> ◆ 1 – Prism; ◆ 2 – Fixed area. |
| 8. | DATE | Character | 10 | | Cruise date (yyyy/mm/dd) |
| 9. | NAMES | Character | 20 | | Cruiser initials |
| 10. | STRATUM | Character | 5 | | Volume sampling stratum |
| 11. | TREENO | Numeric | 4 | 0 | Tree number |
| 12. | SPECIES | Character | 2 | | Tree species <ul style="list-style-type: none"> ◆ AW – Trembling Aspen; ◆ BW – White Birch; ◆ PB – Balsam Poplar; ◆ PL – Lodgepole Pine; ◆ SW – White Spruce; ◆ SB – Black Spruce; ◆ FB – Balsam Fir; ◆ LT – Tamarack Larch; ◆ DD- Dead deciduous; ◆ DC- Dead coniferous; |
| 13. | DBH | Numeric | 6 | 1 | Measured diameter (cm) at breast height (1.3-m) |
| 14. | STUMP | Numeric | 6 | 1 | Measured diameter (cm) at stump height (0.3-m) |
| 15. | HEIGHT | Numeric | 6 | 1 | Measured tree height (m) including lean |
| 16. | D_CODE | Character | 2 | | Tree damage codes <ul style="list-style-type: none"> ◆ CR – Crook; ◆ FT – Forked Top; ◆ BT – Broken top; ◆ SW – Sweep; ◆ BD – Bark damage. |
| 17. | CSC | Character | 1 | | Cull suspect class <ul style="list-style-type: none"> ◆ C – Conk; ◆ S – Scars; ◆ O – Old broken top; ◆ N – Non-suspect; |
| 18. | DBHAGE | Numeric | 3 | 0 | Measured tree age (yrs) at DBH (1.3-m) |

**TABLE 8-13: VANDERWELL COMPILED TREE DATA
STRUCTURE AND DESCRIPTION**

Number of data records: 11,313

| Field Number | Field Name | Field Type | Field Width | No. of Decimals | Field Description |
|--------------|------------|------------|-------------|-----------------|--|
| 1. | TWP | Numeric | 3 | 0 | Township |
| 2. | RGE | Numeric | 2 | 0 | Range |
| 3. | MER | Numeric | 1 | 0 | Meridian |
| 4. | STAND | Numeric | 5 | 0 | Forest stand number |
| 5. | PLOTNO | Numeric | 4 | 0 | Plot number |
| 6. | PSIZE | Numeric | 5 | 3 | Plot area (ha) |
| 7. | PTYPE | Numeric | 8 | 2 | Plot type <ul style="list-style-type: none"> ◆ 1 – Prism; ◆ 2 – Fixed area. |
| 8. | DATE | Character | 10 | | Cruise date (yyyy/mm/dd) |
| 9. | NAMES | Character | 20 | | Cruiser initials |
| 10. | STRATUM | Character | 5 | | Volume sampling stratum |
| 11. | TREENO | Numeric | 4 | 0 | Tree number |
| 12. | SPECIES | Character | 2 | | Tree species <ul style="list-style-type: none"> ◆ AW – Trembling Aspen; ◆ BW – White Birch; ◆ PB – Balsam Poplar; ◆ PL – Lodgepole Pine; ◆ SW – White Spruce; ◆ SB – Black Spruce; ◆ FB – Balsam Fir; ◆ LT – Tamarack Larch; ◆ DD- Dead deciduous; ◆ DC- Dead coniferous; ◆ ‘ ‘ – No tally plot. |
| 13. | DBH | Numeric | 6 | 1 | Measured diameter (cm) at breast height (1.3-m) |
| 14. | STUMP | Numeric | 6 | 1 | Measured diameter (cm) at stump height (0.3-m) |
| 15. | HEIGHT | Numeric | 6 | 1 | Measured tree height (m) including lean |
| 16. | D_CODE | Character | 2 | | Tree damage codes <ul style="list-style-type: none"> ◆ CR – Crook; ◆ FT – Forked Top; ◆ BT – Broken top; ◆ SW – Sweep; ◆ BD – Bark damage. |
| 17. | CSC | Character | 1 | | Cull suspect class <ul style="list-style-type: none"> ◆ C – Conk; ◆ S – Scars; ◆ O – Old broken top; ◆ N – Non-suspect |
| 18. | DBHAGE | Numeric | 3 | 0 | Measured tree age (yrs) at DBH (1.3-m) |
| 19. | STUMP_C | Numeric | 6 | 2 | Calculated stump (cm) <ul style="list-style-type: none"> ◆ Defaults to the measured stump where available |
| 20. | HEIGHT_C | Numeric | 6 | 2 | Calculated height (m) <ul style="list-style-type: none"> ◆ Defaults to the measured height where available |
| 21. | MERCHHT | Numeric | 6 | 2 | Merchantable tree height (m) <ul style="list-style-type: none"> ◆ 15/11 conifer utilization standard – Tree height to 11 cm top; ◆ 15/11 deciduous utilization standard – Tree height to 11 cm top. |
| 22. | GMV | Numeric | 8 | 6 | Gross merchantable tree volume <ul style="list-style-type: none"> ◆ Conifer species – 15/11 utilization; ◆ Deciduous species – 15/11 utilization. |

**TABLE 8-14: VANDERWELL COMPILED PLOT DATA
STRUCTURE AND DESCRIPTION**

Number of data records: 732

| Field Number | Field Name | Field Type | Field Width | No. of Decimals | Field Description |
|--------------|------------|------------|-------------|-----------------|---|
| 1. | STRATUM | Character | 15 | | Volume sampling stratum |
| 2. | TWP | Numeric | 3 | 0 | Township |
| 3. | RGE | Numeric | 2 | 0 | Range |
| 4. | MER | Numeric | 2 | 0 | Meridian |
| 5. | STAND | Numeric | 5 | 0 | Forest stand number |
| 6. | PLOTNO | Numeric | 4 | 0 | Plot number |
| 7. | PSIZE | Numeric | 5 | 3 | Plot area (ha) |
| 8. | PTYPE | Numeric | 2 | 0 | Plot type <ul style="list-style-type: none"> ◆ 1 – Prism; ◆ 2 – Fixed area. |
| 9. | CON_VOL | Numeric | 12 | 6 | Conifer volume (m3/ha) at a 15/11 utilization standard |
| 10. | CON_TREE | Numeric | 12 | 6 | Conifer density (trees/ha) at a 15/11 utilization standard |
| 11. | DEC_VOL | Numeric | 12 | 6 | Deciduous volume (m3/ha) at a 15/11 utilization standard |
| 12. | DEC_TREE | Numeric | 12 | 6 | Deciduous density (trees/ha) at a 15/11 utilization standard |
| 13. | NETDOWN | Numeric | 14 | 6 | Updated 2003 Netdown items – identifies all landbase categories: <ul style="list-style-type: none"> ◆ 1 – Saulteaux Natural Area; ◆ 2 – Hondo Natural Area; ◆ 3 – Nonforested; ◆ 4 – Lake Buffer; ◆ 5 – River Buffer 60m; ◆ 6 – Stream Buffer 30 m; ◆ 7 – Merchantability Deletion; ◆ 8 –Anthropogenic Non-Forested Updates; ◆ 9 – Landuse Dispositions; ◆ 10 – Potentially Productive; ◆ 11– Wet Moisture Regime; ◆ 0 – Net Landbase. |
| 14. | AGECLASS | Numeric | 3 | 0 | 10 year age class (years) |
| 15. | YC_STRAT | Character | 4 | | Yield curve stratum <ul style="list-style-type: none"> ◆ C-PL – Pine leading conifer; ◆ C-SW – Spruce leading conifer; ◆ MIX – Mixedwoods; ◆ DEC – Deciduous. |
| 16. | YCNUM | Numeric | 8 | 2 | Yield curve number assigned to the yield curve strata as follows: <ul style="list-style-type: none"> ◆ 1 – C-PL; ◆ 2 – C-SW; ◆ 3 – MIX; ◆ 4 – DEC; |
| 17. | FIREFLAG | Numeric | 8 | 2 | Burned plots identification flag <ul style="list-style-type: none"> ◆ 0 – Plot not burned; ◆ 1 – Plot burned. |

TABLE 8-15: VANDERWELL PLOT AVI DATA STRUCTURE AND DESCRIPTION

Number of data records: 732

| Field Number | Field Name | Field Type | Field Width | No. of Decimals | Field Description |
|---------------------------|------------|------------|-------------|-----------------|---|
| UNIQUE LINKS TO PLOT DATA | | | | | |
| 1. | TWP | Numeric | 3 | 0 | Township |
| 2. | RGE | Numeric | 2 | 0 | Range |
| 3. | MER | Numeric | 2 | 0 | Meridian |
| 4. | STAND | Numeric | 5 | 0 | Forest stand number |
| 5. | PLOTNO | Numeric | 4 | 0 | Plot number |
| AVI OVERSTOREY ATTRIBUTES | | | | | |
| 6. | MOIST | Character | 1 | | Moisture regime identified as follows: ◆ D – Dry; ◆ M – Mesic; ◆ W – Wet. |
| 7. | CROWN | Character | 1 | | Crown closure classes identified as follows: ◆ A – 6-30% crown closure; ◆ B – 31-50% crown closure; ◆ C – 51-70% crown closure; ◆ D – 71-100% crown closure. |
| 8. | HEIGHT | Numeric | 2 | 0 | Stand height (in metres) |
| 9. | SP1 | Character | 2 | | Species 1 identified as follows: ◆ AW – Trembling Aspen; ◆ BW – White Birch; ◆ FB – Balsam Fir; ◆ PB – Balsam Poplar; ◆ LT – Larch; ◆ P – Pine; ◆ PL – Lodgepole Pine; ◆ SB – Black Spruce; ◆ SW – White Spruce. |
| 10. | PER1 | Numeric | 2 | 0 | Species 1 percent |
| 11. | SP2 | Character | 2 | | Species 2 identified as follows: ◆ AW – Trembling Aspen; ◆ BW – White Birch; ◆ FB – Balsam Fir; ◆ PB – Balsam Poplar; ◆ LT – Larch; ◆ P – Pine; ◆ PL – Lodgepole Pine; ◆ SB – Black Spruce; ◆ SW – White Spruce. |
| 12. | PER2 | Numeric | 2 | 0 | Species 2 percent |
| 13. | SP3 | Character | 2 | | Species 3 identified as follows: ◆ AW – Trembling Aspen; ◆ BW – White Birch; ◆ FB – Balsam Fir; ◆ PB – Balsam Poplar; ◆ LT – Larch; ◆ P – Pine; ◆ PL – Lodgepole Pine; ◆ SB – Black Spruce; ◆ SW – White Spruce. |
| 14. | PER3 | Numeric | 2 | 0 | Species 3 percent |

| | | | | | |
|-----------------------------------|---------|-----------|---|---|---|
| 15. | SP4 | Character | 2 | | Species 4 identified as follows: <ul style="list-style-type: none"> ◆ AW – Trembling Aspen; ◆ BW – White Birch; ◆ FB – Balsam Fir; ◆ PB – Balsam Poplar; ◆ LT – Larch; ◆ P – Pine; ◆ PL – Lodgepole Pine; ◆ SB – Black Spruce; ◆ SW – White Spruce. |
| 16. | PER4 | Numeric | 2 | 0 | Species 4 percent |
| 17. | SP5 | Character | 2 | | Species 5 identified as follows: <ul style="list-style-type: none"> ◆ AW – Trembling Aspen; ◆ BW – White Birch; ◆ FB – Balsam Fir; ◆ PB – Balsam Poplar; ◆ LT – Larch; ◆ P – Pine; ◆ PL – Lodgepole Pine; ◆ SB – Black Spruce; ◆ SW – White Spruce. |
| 18. | PER5 | Numeric | 2 | 0 | Species 5 percent |
| 19. | STR | Character | 1 | | Stand structure identified as follows: <ul style="list-style-type: none"> ◆ C – Complex |
| 20. | STRVAL | Numeric | 2 | 0 | Stand structure value |
| 21. | ORIGIN | Numeric | 4 | 0 | Stand origin (years) |
| 22. | TPR | Character | 1 | | Timber productivity rating identified as follows: <ul style="list-style-type: none"> ◆ G – Good; ◆ M – Medium; ◆ F – Fair. |
| 23. | MOD1 | Character | 2 | | Stand modifier 1 identified as follows: <ul style="list-style-type: none"> ◆ BU – Burn/Partial Burn; ◆ CL – Clearing; ◆ CW – Abandoned Wellsite; ◆ ST – Scattered Timber; ◆ TH – Thinned. |
| 24. | EXT1 | Numeric | 1 | 0 | Stand modifier 1 extent identified as follows: <ul style="list-style-type: none"> ◆ 1 – Light, 1-25% loss of crown closure or land area affected; ◆ 3 – Heavy, 51-75% loss of crown closure or land area affected; ◆ 5 – Entire, 95-100% loss of crown closure or land area affected. |
| 25. | YEAR1 | Numeric | 4 | 0 | Stand modifier 1 year |
| 26. | MOD2 | Character | 2 | | Stand modifier 2 |
| 27. | EXT2 | Numeric | 1 | 0 | Stand modifier 2 extent |
| 28. | YEAR2 | Numeric | 4 | 0 | Stand modifier 2 year |
| 29. | NAT_V | Character | 2 | | Naturally non-forested vegetated land |
| 30. | NAT_CL | Numeric | 2 | 0 | Naturally non-forested vegetated shrub closure |
| 31. | ANTH_V | Character | 3 | | Anthropogenic vegetated land |
| 32. | ANTH_N | Character | 3 | | Anthropogenic non-vegetated land |
| 33. | NAT_N | Character | 3 | | Naturally non-vegetated land |
| AVI UNDERSTOREY ATTRIBUTES | | | | | |
| 34. | U_MOIST | Character | 1 | | Moisture regime identified as follows: <ul style="list-style-type: none"> ◆ M – Mesic; ◆ W – Wet. |

| | | | | | |
|-----|----------|-----------|---|---|---|
| 35. | U_CROWN | Character | 1 | | Crown closure identified as follows: <ul style="list-style-type: none"> ◆ A – 6-30% crown closure; ◆ B – 31-50% crown closure; ◆ C – 51-70% crown closure. |
| 36. | U_HEIGHT | Numeric | 2 | 0 | Stand height (metres) |
| 37. | U_SP1 | Character | 2 | | Species 1 identified as follows: <ul style="list-style-type: none"> ◆ AW – Trembling Aspen; ◆ PB – Balsam Poplar; ◆ BW – White Birch; ◆ FB – Balsam Fir; ◆ LT – Larch; ◆ P – Pine; ◆ PL – Lodgepole Pine; ◆ SB – Black Spruce; ◆ SW – White Spruce. |
| 38. | U_PER1 | Numeric | 2 | 0 | Species 1 percent |
| 39. | U_SP2 | Character | 2 | | Species 2 identified as follows: <ul style="list-style-type: none"> ◆ AW – Trembling Aspen; ◆ PB – Balsam Poplar; ◆ BW – White Birch; ◆ FB – Balsam Fir; ◆ LT – Larch; ◆ P – Pine; ◆ PL – Lodgepole Pine; ◆ SB – Black Spruce; ◆ SW – White Spruce. |
| 40. | U_PER2 | Numeric | 2 | 0 | Species 2 percent |
| 41. | U_SP3 | Character | 2 | | Species 3 identified as follows: <ul style="list-style-type: none"> ◆ AW – Trembling Aspen; ◆ PB – Balsam Poplar; ◆ BW – White Birch; ◆ FB – Balsam Fir; ◆ LT – Larch; ◆ P – Pine; ◆ PL – Lodgepole Pine; ◆ SB – Black Spruce; ◆ SW – White Spruce. |
| 42. | U_PER3 | Numeric | 2 | 0 | Species 3 percent |
| 43. | U_SP4 | Character | 2 | | Species 4 <ul style="list-style-type: none"> ◆ AW – Trembling Aspen; ◆ PB – Balsam Poplar; ◆ BW – White Birch; ◆ FB – Balsam Fir; ◆ LT – Larch; ◆ P – Pine; ◆ PL – Lodgepole Pine; ◆ SB – Black Spruce; ◆ SW – White Spruce. |
| 44. | U_PER4 | Numeric | 2 | 0 | Species 4 percent |
| 45. | U_SP5 | Character | 2 | | Species 5 <ul style="list-style-type: none"> ◆ AW – Trembling Aspen; ◆ PB – Balsam Poplar; ◆ BW – White Birch; ◆ FB – Balsam Fir; ◆ LT – Larch; ◆ P – Pine; ◆ PL – Lodgepole Pine; ◆ SB – Black Spruce; ◆ SW – White Spruce. |

| | | | | | |
|---|----------|-----------|---|---|---|
| 46. | U_PER5 | Numeric | 1 | 0 | Species 5 percent |
| 47. | U_STR | Character | 1 | | Stand structure |
| 48. | U_STRVAL | Numeric | 1 | 0 | Stand structure value |
| 49. | U_ORIGIN | Numeric | 4 | 0 | Stand origin (years) |
| 50. | U_TPR | Character | 1 | | Timber productivity rating identified as follows: <ul style="list-style-type: none"> ◆ G – Good; ◆ M – Medium; ◆ F – Fair; ◆ U – Unproductive. |
| 51. | U_MOD1 | Character | 2 | | Stand modifier 1 identified as follows: <ul style="list-style-type: none"> ◆ BU – Burn/Partial Burn; ◆ CL – Clearing; ◆ CW – Abandoned Wellsite; ◆ ST – Scattered Timber; ◆ TH – Thinned. |
| 52. | U_EXT1 | Numeric | 1 | 0 | Stand modifier 1 extent identified as follows: <ul style="list-style-type: none"> ◆ 1 – Light, 1-25% loss of crown closure or land area affected; ◆ 3 – Heavy, 51-75% loss of crown closure or land area affected; ◆ 5 – Entire, 95-100% loss of crown closure or land area affected. |
| 53. | U_YEAR1 | Numeric | 4 | 0 | Stand modifier 1 year |
| 54. | U_MOD2 | Character | 2 | | Stand modifier 2 |
| 55. | U_EXT2 | Numeric | 1 | 0 | Stand modifier 2 extent |
| 56. | U_YEAR2 | Numeric | 4 | 0 | Stand modifier 2 year |
| 57. | U_NAT_V | Character | 2 | | Naturally non-forested vegetated type identified as follows: <ul style="list-style-type: none"> ◆ HG – Herbaceous Grassland; ◆ SC – Closed Shrub; ◆ SO – Open Shrub. |
| 58. | U_NAT_CL | Numeric | 2 | 0 | Naturally non-forested vegetated shrub closure |
| 59. | U_ANTH_V | Character | 3 | | Anthropogenic vegetated type |
| 60. | U_ANTH_N | Character | 3 | | Anthropogenic non-vegetated type |
| 61. | U_NAT_N | Character | 3 | | Naturally non-vegetated type |
| Calculated Fields From 1998 Landbase | | | | | |
| 62. | SPGRP | Character | 2 | | Overstorey species group identified as follows: <ul style="list-style-type: none"> ◆ C - Conifer; ◆ CD – Mixedwood – conifer dominant; ◆ DC – Mixedwood – deciduous dominant; ◆ D - Deciduous. |
| 63. | USPGRP | Character | 2 | | Understorey species group identified as follows: <ul style="list-style-type: none"> ◆ C - Conifer; ◆ CD – Mixedwood – conifer dominant; ◆ DC – Mixedwood – deciduous dominant; ◆ D - Deciduous. |
| 64. | LANDBASE | Character | 3 | | Landbase identified as follows: <ul style="list-style-type: none"> ◆ Con – Conifer; ◆ Dec - Deciduous. |
| 65. | CUTBLOCK | Numeric | 8 | 2 | Cutblocks identified as follows: <ul style="list-style-type: none"> ◆ 1 –Cutblock. |

| | | | | | |
|--------------------------|----------|-----------|----|---|---|
| 66. | MERCH | Numeric | 8 | 2 | Merchantability test deletions identified as follows: <ul style="list-style-type: none"> ◆ 1 – TPR ‘U’; ◆ 2 – Larch SP1; ◆ 3 – Larch SP2; ◆ 4 – Conifer, A density, height ≤ 6 m and origin <1930; ◆ 5 – Conifer, A density, height > 6 m but ≤ 12 m and origin <1930; ◆ 6 – Conifer, A density, height > 6 m but ≤ 12 m and origin <1930; ◆ 7 – Conifer, B density, height ≤ 6 m and origin <1930; ◆ 8 – Conifer, B density, height > 6 m but ≤ 12 m and origin <1900; ◆ 9 – Conifer, C density, height ≤ 6 m and origin <1930; ◆ 10 – Conifer, C density, height > 6 m but ≤ 12 m and origin <1900; ◆ 11 – Conifer, D density, height ≤ 6 m and origin <1930; ◆ 12 – Conifer, D density, height > 6 m but ≤ 12 m and origin <1900; ◆ 13 – SB leading and TPR = ‘F’; ◆ 14 – SB leading and TPR = ‘M’. |
| 67. | OLDNET | Character | 8 | | 1998 Net Landbase categories identified as follows: <ul style="list-style-type: none"> ◆ NR1 – Saulteaux Natural Area; ◆ NR2 – Hondo Natural Area; ◆ Nonfor – Nonforested; ◆ LAK – Lake Buffer; ◆ S60 – River Buffer 60m; ◆ S30 – Stream Buffer 30 m; ◆ Merch – Merchantability Deletion. |
| CALCULATED FIELDS | | | | | |
| 68. | AGE | Numeric | 14 | 6 | Stand age |
| 69. | UAGE | Numeric | 14 | 6 | Understorey age |
| 70. | AGECLASS | Numeric | 3 | 0 | 10 year age class |
| 71. | CUTFLAG | Numeric | 14 | 6 | Update cutblock identified as follows: <ul style="list-style-type: none"> ◆ 1 - Update cutblocks. |
| 72. | PLANCC | Numeric | 14 | 6 | Planned cutblocks identified as follows: <ul style="list-style-type: none"> ◆ 1 –Planned cutblock. |
| 73. | BURN_FLG | Numeric | 14 | 6 | Burn areas identified as follows: <ul style="list-style-type: none"> ◆ 1 - Chisholm; ◆ 2 - Mitsue. |
| 74. | BURNCODE | Character | 2 | | Burn code identified as follows: <ul style="list-style-type: none"> ◆ B – Burn; ◆ PB – Partial burn; ◆ I – Island. |
| 75. | CCSTATUS | Numeric | 14 | 6 | Cutblock status identified as follows: <ul style="list-style-type: none"> ◆ 1 – Cutblock in the net landbase; ◆ 2 – Cutblock not in the net landbase. |
| 76. | CUT_SPGP | Character | 3 | | Cutblock species group identified as follows: <ul style="list-style-type: none"> ◆ C - Conifer; ◆ CD – Mixedwood – conifer dominant; ◆ DC – Mixedwood – deciduous dominant; ◆ D - Deciduous. |

| | | | | | |
|-----|-----------|-----------|----|---|--|
| 77. | NEWSPGP | Character | 3 | | Updated species group identified as follows: <ul style="list-style-type: none"> ◆ C - Conifer; ◆ CD – Mixedwood – conifer dominant; ◆ DC – Mixedwood – deciduous dominant; ◆ D - Deciduous. |
| 78. | NETDOWN20 | Numeric | 14 | 6 | Updated 2003 Netdown items – identifies all landbase categories: <ul style="list-style-type: none"> ◆ 1 – Saulteaux Natural Area; ◆ 2 – Hondo Natural Area; ◆ 3 – Nonforested; ◆ 4 – Lake Buffer; ◆ 5 – River Buffer 60m; ◆ 6 – Stream Buffer 30 m; ◆ 7 – Merchantability Deletion; ◆ 8 – Anthropogenic Non-Forested Updates; ◆ 9 – Landuse Dispositions; ◆ 10 – Potentially Productive; ◆ 11– Wet Moisture Regime; ◆ 0 – Net Landbase. |

²⁰ To net down the landbase, select only records where the “NETDOWN” field is equal to “0”.

TABLE 8-16: PREDICTED 15/11 CONIFER AND 15/11 DECIDUOUS UTILIZATION YIELD DATA STRUCTURE AND DESCRIPTION

Number of data records: 80

| Field Number | Field Name | Field Type | Field Width | No. of Decimals | Field Description |
|--------------|------------|------------|-------------|-----------------|--|
| 1. | YC_STRAT | Character | 4 | | Yield curve stratum <ul style="list-style-type: none"> ◆ C-PL – Pine leading conifer; ◆ C-SW – Spruce leading conifer; ◆ MIX – Mixedwoods; ◆ DEC – Deciduous. |
| 2. | YCNUM | Numeric | 8 | 2 | Yield curve number assigned to the yield curve strata as follows: <ul style="list-style-type: none"> ◆ 1 – C-PL; ◆ 2 – C-SW; ◆ 3 – MIX; ◆ 4 – DEC; |
| 3. | AGECLASS | Numeric | 11 | 0 | 10 year age class (years) |
| 4. | AD | Numeric | 13 | 6 | 'a' coefficient – deciduous 15/11 volumes |
| 5. | BD | Numeric | 13 | 6 | 'b' coefficient – deciduous 15/11 volumes |
| 6. | CD | Numeric | 12 | 6 | 'c' coefficient – deciduous 15/11 volumes |
| 7. | AC | Numeric | 13 | 6 | 'a' coefficient – conifer 15/11 volumes |
| 8. | BC | Numeric | 13 | 6 | 'b' coefficient – conifer 15/11 volumes |
| 9. | CC | Numeric | 12 | 6 | 'c' coefficient – conifer 15/11 volumes |
| 10. | CONVOL | Numeric | 13 | 6 | Predicted conifer volume at 15/11 utilization standard (m3/ha) |
| 11. | DECVOL | Numeric | 13 | 6 | Predicted deciduous volume at 15/11 utilization standard (m3/ha) |
| 12. | CONMAI | Numeric | 13 | 6 | Predicted conifer mean annual increment at 15/11 utilization standard (m3/ha/yr) |
| 13. | DECMAI | Numeric | 13 | 6 | Predicted deciduous mean annual increment at 15/11 utilization standard (m3/ha/yr) |