The Forestry Corp.

Manning Diversified Forest Products Ltd.
Volume Sampling Plan

Prepared For:

Manning Diversified Forest Products Ltd.

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1. Introduction

1.1. Background

Manning Diversified Forest Products Ltd. (Manning Diversified) has coniferous rights within Forest Management Units (FMU) P6 and P9, located in northwestern Alberta. The Company requires a volume sampling program designed to enhance sample plot data previously collected within these areas. The objective of the volume sampling program is to collect sufficient data for the creation of robust empirical yield curves and operational estimates for each of the two FMUs, for use in Manning Diversified's Detailed Forest Management Plan (DFMP).

1.2. Previous Sampling

A volume sampling program was initiated by Manning Diversified in 2000 (Greenlink 2003). A systematic grid of 522 sample plots was installed across FMUs P9 and P6, 405 of which fell into merchantable stands[1]. Field data were collected over three field seasons, between 2000 and 2002. Although the sample plots were intended for volume sampling, the design was also intended to provide the option of converting some or all of the plots to permanent sample plots at a later date.

Sample plots were comprised of a fixed-area, 15.96 m radius tree plot, within which a 7.98 m radius sapling plot and a 3.99 m radius regeneration plot were nested. In "dense" plots, plot sizes were decreased to 11.28/5.64/2.82 m radii, and in "super dense" plots, plot sizes were decreased to 7.98/3.99/1.99 m radii. All trees and saplings were tagged and measured within their respective plots, while regeneration was tallied (no tagging) within the regeneration plot. The plot center was permanently marked and GPS'd for relocation purposes.

[1] Based on criteria outlined in Section 2.1 of this document.

2. Landbase and Stratification

In order to determine where plots need to be located, the landbase must first be defined. Stratified random sampling is an efficient way to obtain representative samples of subpopulations of interest. Because these data are to be used to develop empirical yield curves, the stratification should mimic how they will be "applied" as yield curves (i.e., the landbase should be stratified into subpopulations which represent, as closely as possible, the strata which will be used to develop empirical yield curves).

2.1. Landbase

Empirical yield curves will apply only to stands which are suitable for harvesting, and therefore only these stand types will be included in the sampling frame. Deletions are necessary to define or identify stands within the net landbase, by removing stands that would be considered non-productive or non-merchantable. All deletions described in this document were based on AVI 2.1 attributes.

A stand was deemed a non-productive wetland if:

1. The moisture regime was wet; except if
2. The leading species was AW, SW, PL or PB; and
3. Stand height was greater than or equal to 18 m; and
4. Crown closure was > 30%.

Other areas were removed if:

1. The NONFORTYPE field was not blank;
2. The ANTHVEG field was not blank;
3. The ANTHNONVEG field was not blank; or
4. The NATNONVEG field was not blank.

Broad cover group was assigned to both layer 1 and layer 2 (if present) for each stand, based on each layer's AVI 2.1 attributes. Broad cover group was defined as:

Table 1. Definition of broad cover groups.

Broad Cover Group	Percent Conifer	Percent Deciduous
C	80-100	0-20
CD	50-79	21-50
DC	21-49	51-79
D	0-20	80-100

All 'A' density stands and those 'B', 'C' or 'D' density deciduous stands with a layer 2 coniferous understory (D/U stands) were placed into the landbase according to their **layer 2** attributes. Stands with a C, CD and DC layer 2 were placed into the coniferous landbase, while stands with a D layer 2 were placed into the deciduous landbase.

All other stands were placed into the landbase according to their **layer 1** attributes. C, CD and DC stands were placed into the coniferous landbase, while D stands were placed into the deciduous landbase. Within layer 1, CD and DC stands were redefined as CD/U or DC/U stands, respectively, if their layer 2 was a C, CD or DC (coniferous) stand type.

Coniferous deletions were applied to the layer used in defining landbase (layer 2 for A density stands and D/U stands, and layer 1 for all other stands). Within the coniferous landbase, stands with any of the following attributes were removed:

1. The TPR was 'U';
2. The density was 'A' [2];
3. The first or second species was 'Lt';
4. The first species was deciduous and the third species was 'Lt'; or
5. The first species was 'Sb', the percent Sb was ≥ 50% and the TPR was not 'G'.

Any D/U stands which were deleted from the conifer landbase based on their layer 2 attributes were treated as follows:

1. If the first layer 2 species was 'Sw', then the stand was returned to the net conifer landbase;
2. If the layer 2 density was 'B', 'C', or 'D' and the leading layer 2 species was 'Pj' or 'Pl', the stand was returned to the net conifer landbase; and
3. All other stands were placed in the deciduous landbase and subjected to deciduous deletions according to their layer 1 attributes.

Deciduous deletions were applied to the layer used in defining landbase (layer 2 for A density stands, and layer 1 for all other stands), and stands with any of the following attributes were removed:

1. The TPR was 'U' or 'F'; or
2. The density was 'A' [3].

A conceptual flow chart is provided (Figure 1).

[2] For deletions based on layer 2 attributes only.
[3] For deletions based on layer 2 attributes only.

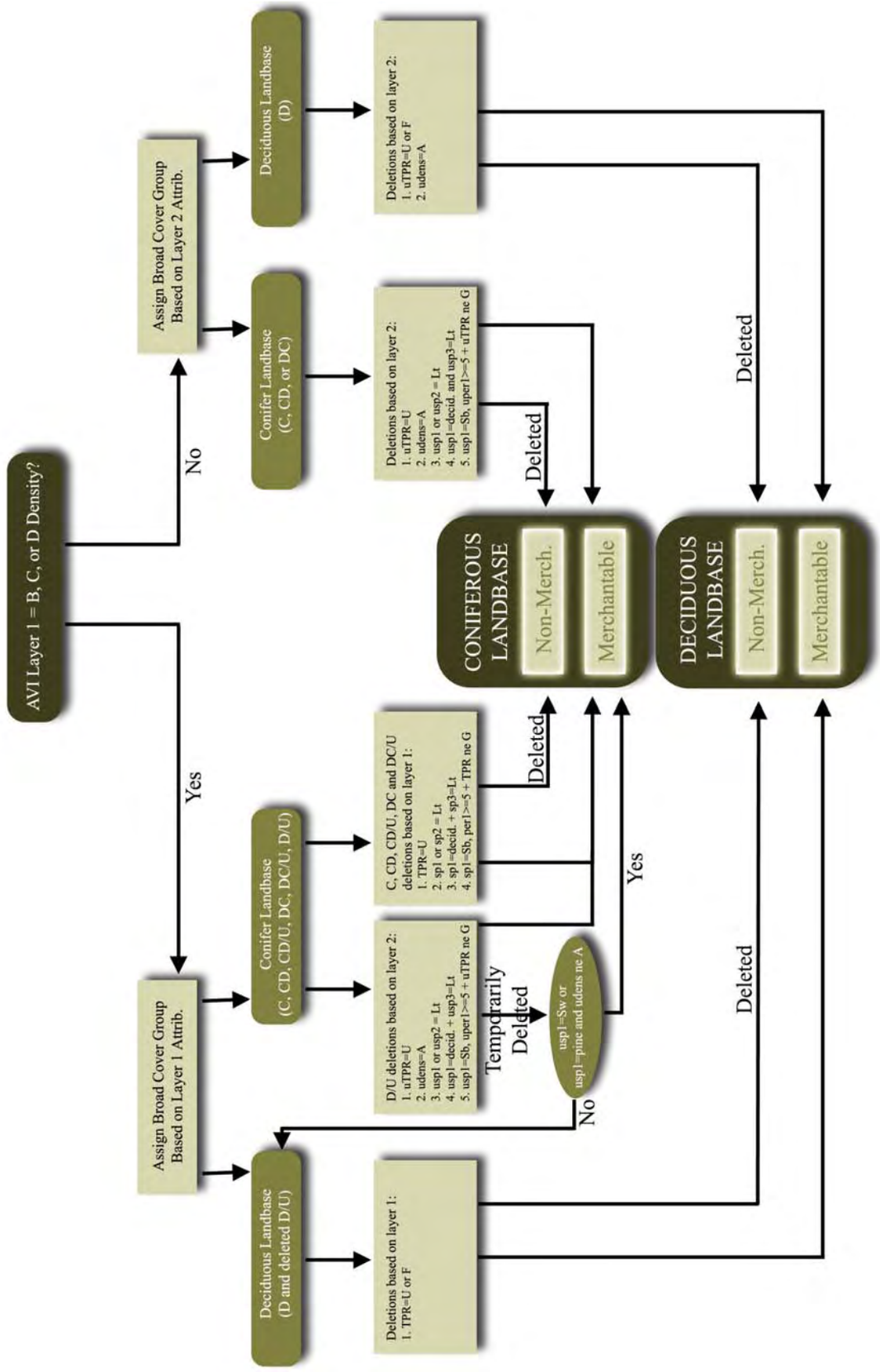

Figure 1. Flow chart describing deletions.

2.2. Resulting Landbase

The resulting merchantable and non-merchantable areas by FMU is provided in Table 2.

Table 2. Total area (ha) by FMU and merchantability.

	Merchantable Total Area (ha)	Non-Merchantable Total Area (ha)	Gross Total Area (ha)
FMU P6	181888.8	113862.2	295751.0
FMU P9	140093.0	158054.3	298147.3
Total	321981.8	271916.5	593898.3

All stands within the net landbase were placed into preliminary strata. B, C, and D density stands were stratified based on their layer 1 attributes, while A density stands were stratified based on their layer 2 attributes. Strata were based on stand attributes, including broad cover group, leading species, density class and/or FMU. The total area by preliminary stratum and age class[4] is provided in Tables 3 (FMU P6) and 4 (FMU P9).

Table 3. Total area (ha) by preliminary stratum[5] and age class, FMU P6.

	Age Class						Total
Stratum	1-20	21-40	41-60	61-100	101-140	141+	Area (ha)
C-FB-B		1.9					1.9
C-PL-B	2.4	1474.0	1.0	559.2	1095.2	213.8	3345.6
C-PL-CD		77.1	57.1	1167.7	3050.2	401.9	4754.1
C-SB-B			41.4	264.1	82.4	75.5	463.5
C-SB-CD			182.0	1097.7	1032.7		2312.4
C-SW-B		470.2	352.8	4560.7	11453.9	10151.3	26988.9
C-SW-CD		459.1	998.8	11820.0	7425.7	2241.1	22944.6
CD-PL-B		803.2		3.6	17.9		824.6
CD-PL-CD		4.0	17.7	189.9	148.8	25.2	385.7
CD-SB-CD			13.6				13.6
CD-SW-B		36.8	19.5	194.9	386.1	360.4	997.6
CD-SW-CD		20.3		697.3	855.2	678.6	2251.4
CD/U-PL-B			2.6	165.4	84.6	5.8	258.4
CD/U-PL-CD			16.7	205.8	559.2	10.4	792.2
CD/U-SB-B					5.7		5.7
CD/U-SW-B		7.0	19.8	411.8	2146.1	714.6	3299.2
CD/U-SW-CD				232.0	1246.8	169.1	1647.9
DC-B		127.0	69.9	516.5	445.1	77.7	1236.2
DC-CD		213.8	13.0	833.5	735.9	208.2	2004.4
DC/U-B		123.6	53.5	1604.7	2040.4	254.4	4076.6
DC/U-CD		4.8	11.7	2875.6	2955.6	241.7	6089.4
D-B		316.3	584.5	1656.7	988.2	108.8	3654.5
D-CD		680.9	922.0	5797.7	2585.0	45.0	10030.6
D/U-B		1217.0	698.8	7131.7	3810.4	317.4	13175.2
D/U-CD		4042.0	1745.4	44882.1	18868.6	796.7	70334.7
Total Area (ha)	2.4	10078.9	5821.7	86868.4	62019.7	17097.7	181888.8

[4] Age was calculated as 2003-AVI origin. For stands with deletions based on layer 2 attributes, the layer 2 AVI origin was used.

[5] The stratum naming convention is as follows:

- conifer and conifer leading mixedwoods: (Broad Cover Group)(/U if conifer understory present)-(Leading Conifer Species)-(Crown Closure Class);
- deciduous and deciduous leading mixedwoods: (Broad Cover Group)(/U if conifer understory present)-(Crown Closure Class).

Table 4. Total area (ha) by preliminary stratum and age class, FMU P9.

Stratum	Age Class						Total Area (ha)
	1-20	21-40	41-60	61-100	101-140	141+	
C-PL-B		27.5	1509.9	1549.2	128.9		3215.5
C-PL-CD		31.5	11595.1	4729.8	146.9		16503.3
C-SB-B		14.3	372.7	337.9	45.7	19.0	789.7
C-SB-CD		2.5	834.5	312.0	8.6		1157.6
C-SW-B		37.8	738.6	2866.1	2066.2	438.6	6147.3
C-SW-CD		40.6	970.0	1961.5	1170.9	153.8	4296.7
CD-PL-B			178.8	87.1	11.2		277.1
CD-PL-CD			1020.6	487.9			1508.5
CD-SB-B			39.0	7.4			46.4
CD-SW-B			44.2	57.4	48.7	44.3	194.6
CD-SW-CD			44.0	86.4	53.5		183.9
CD/U-PL-B			262.1	262.5	8.0		532.6
CD/U-PL-CD			631.9	472.7	25.8		1130.4
CD/U-SW-B			15.9	394.2	120.2		530.3
CD/U-SW-CD			25.6	210.8	35.9		272.2
DC-B		17.1	481.7	339.3	17.6		855.7
DC-CD			1544.5	386.4	18.5		1949.4
DC/U-B			518.7	921.3	48.1		1488.1
DC/U-CD			1011.6	1971.6	432.6		3415.9
D-B		350.7	8924.9	4998.8	132.5		14406.9
D-CD		88.7	42012.6	11995.6	276.6		54373.6
D/U-B		869.7	1540.1	1082.5	78.0		3570.4
D/U-CD		1615.4	12186.6	8492.6	826.9	125.4	23246.8
Total Area (ha)	0.0	3095.8	86503.7	44011.0	5701.3	781.2	140093.0

2.3. Sample Stratification

Many of the strata within each FMU were represented by very small areas, or formed logical combinations with other strata. In order to provide a reasonable number of strata and sufficient area within strata, CD and DC stands were combined to form a mixedwood type. For certain strata, B and CD crown closure classes were combined. Black spruce stands, whether pure conifer or mixedwood stand types, were combined to form a single stratum. Because of potential differences in conifer growth between FMUs, separate strata were retained for pine and white spruce leading conifer stands in the two FMUs.

This stratification resulted in a total of fourteen strata, 8 of which are "combined" strata (stratum is based on the combined areas from FMUs P6 and P9) and 6 of which are FMU-specific strata. The results of sample stratification are summarized in Table 5, and the total merchantable area for the new strata is summarized by age class and presented in Table 6.

These fourteen strata form the basis for the volume sampling program. Allocation of the required number of plots and stand selection will be based upon these defined strata (see next Section).

Table 5. Results of sample stratification.

New Stratum	Initial Stratum	FMU	Area (ha)
C-PL-BCD-P6	C-PL-B	P6	3345.6
	C-PL-CD	P6	4754.1
C-PL-BCD-P9	C-PL-B	P9	3215.5
	C-PL-CD	P9	16503.3
C-SB-BCD-COMB	CD/U-SB-B	P6	5.7
	CD-SB-B	P6	13.6
		P9	46.4
	C-SB-B	P6	463.5
		P9	789.7
	C-SB-CD	P6	2312.4
		P9	1157.6
C-SW-B-P6	C-FB-B	P6	1.9
	C-SW-B	P6	26988.9
C-SW-B-P9	C-SW-B	P9	6147.3
C-SW-CD-P6	C-SW-CD	P6	22944.6
C-SW-CD-P9	C-SW-CD	P9	4296.7
MW-BCD-COMB	CD-PL-B	P6	824.6
		P9	277.1
	CD-PL-CD	P6	385.7
		P9	1508.5
	CD-SW-B	P6	997.6
		P9	194.6
	CD-SW-CD	P6	2251.4
		P9	183.9
	DC-B	P6	1236.2
		P9	855.7
	DC-CD	P6	2004.4
		P9	1949.4
MW/U-B-COMB	CD/U-PL-B	P6	258.4
		P9	532.6
	CD/U-SW-B	P6	3299.2
		P9	530.3
	DC/U-B	P6	4076.6
		P9	1488.1
MW/U-CD-COMB	CD/U-PL-CD	P6	792.2
		P9	1130.4
	CD/U-SW-CD	P6	1647.9
		P9	272.2
	DC/U-CD	P6	6089.4
		P9	3415.9
D/U-B-COMB	D/U-B	P6	13175.2
		P9	3570.4
D/U-CD-COMB	D/U-CD	P6	70334.7
		P9	23246.8
D-B-COMB	D-B	P6	3654.5
		P9	14406.9
D-CD-COMB	D-CD	P6	10030.6
		P9	54373.6
Total			321981.8

Table 6. Total area (ha) by stratum[6] and age class, based on revised strata.

Stratum	Age Class 1-20	21-40	41-60	61-100	101-140	140+	Total Area (ha)
C-PL-BCD-P6	2.4	1551.1	58.1	1727.0	4145.5	615.7	8099.7
C-PL-BCD-P9		58.9	13105.0	6279.0	275.9		19718.8
C-SB-BCD-COMB		16.7	1483.3	2019.1	1175.2	94.6	4788.9
C-SW-B-P6		472.2	352.8	4560.7	11453.9	10151.3	26990.9
C-SW-B-P9		37.8	738.6	2866.1	2066.2	438.6	6147.3
C-SW-CD-P6		459.1	998.8	11820.0	7425.7	2241.1	22944.6
C-SW-CD-P9		40.6	970.0	1961.5	1170.9	153.8	4296.7
MW-BCD-COMB		1222.2	3433.9	3880.0	2738.6	1394.5	12669.2
MW/U-B-COMB		130.5	872.5	3759.9	4447.4	974.8	10185.2
MW/U-CD-COMB		4.8	1697.5	5968.5	5255.9	421.2	13347.9
D/U-B-COMB		2086.7	2238.9	8214.2	3888.4	317.4	16745.6
D/U-CD-COMB		5657.4	13932.0	53374.7	19695.4	922.1	93581.5
D-B-COMB		667.1	9509.4	6655.5	1120.6	108.8	18061.4
D-CD-COMB		769.6	42934.7	17793.3	2861.6	45.0	64404.2
Total	2.4	13174.7	92325.4	130879.4	67721.0	17878.9	321981.8

[6] The stratum naming convention is as follows:
- conifer leading stands: C-(Leading Conifer Species)-(Crown Closure Class)-(FMU);
- mixedwood (DC and CD broad cover group) stands: MW(/U if conifer understory present)-(Crown Closure Class)-(FMU);
- deciduous stands: D(/U if conifer understory present)-(Crown Closure Class)-(FMU).

Where COMB=combined stratum, FMUs P6 and P9 combined.

3. Volume Sampling

3.1. Statistical Issues

The standard size for fixed-area sample plots used in volume sampling in Alberta is generally a 5.64 m (0.01 ha) radius plot, and multiple plots are generally sampled per stand. The initial sampling program (systematic grid) utilized plots with a radius of 15.96 m, with occasional plot size reductions down to 7.98 m, and only one plot per stand was sampled.

Smaller plots generally show higher variability between samples. Larger plots tend to encompass more variability because they cover a larger area, and thus have lower variability between samples. This means that, within a given age range, the error structure may vary between existing data (one large plot per stand) and new data (multiple small plots per stand). As such, certain assumptions regarding the distribution of observations are not met and the variance estimates will be incorrect, potentially affecting hypothesis testing based on combined data. However, the parameter estimates for regression will not be biased, and therefore empirical yield curves and operational volume tables will still predict the mean condition.

The second issue, that of different numbers of plots per stand, must also be addressed in terms of effects on predictions. A simple example is as follows: if one large plot is placed in a productive stand, and three plots are placed in a less productive stand, the overall mean will be biased downwards. However, if plots from both sampling programs are selected such that they are individually representative of the landbase (e.g., randomly sampled), the resulting estimates will be unbiased[7]. In this case, because the initial plots were selected using a grid system, and additional stands will be selected using stratified random sampling, the resulting predictions will be free from systematic bias.

[7] Dr. Andrew Robinson, Assistant Professor, University of Idaho. Pers. Comm. 2003.

3.2. Landbase Issues

Seismic disturbance is becoming an increasingly important issue in many forested areas of Alberta. Seismic disturbance varies in frequency (number of disturbances) and intensity (size of disturbances). Some seismic disturbances can be identified on aerial photos and incorporated into inventories, while others cannot, and the ability to identify disturbances may rely of factors other than the width of the seismic disturbance, such as linearity, angle of photograph, and forest cover and composition, to name a few.

In the past, the main method for incorporating seismic disturbances into estimates of the standing volume in merchantable stands was not to avoid seismic disturbances, but to incorporate them into estimates of plot volume. However, this only gives a static snapshot of the degree of seismic disturbance across the landbase, which can only be updated by discarding plots and resampling.

Avoiding seismic disturbance and employing alternate methods of estimating seismic disturbance across the landscape will provide:

1) volumes for undisturbed stands, which can be updated using estimates of the current level of seismic disturbance, without discarding volume sampling information; and
2) ground data to compare size (width) of seismic disturbance against photo-interpreted estimates.

The intention of this sampling design is to sample volume and age within undisturbed plots, by either moving or offsetting plots to avoid seismic disturbance. For large seismic disturbances, crews will discard one plot location and move to the next pre-selected plot location. However, based on the anticipated frequency of smaller (< 5 m wide) seismic lines, it is possible that all pre-selected plot locations will be intersected by small seismic disturbances, requiring too much "running around" by field crews. As such, plots will be offset in these cases, to reduce extraneous workload.

In both cases, measurements of the original plot location will be made, in order to provide estimates of the proportion of the plot area intersected by seismic disturbance. In order to obtain an unbiased estimate of the level of seismic disturbance, only the first three sampled plots will be used.

The previous volume sampling program was grid based, and neither moving nor offsetting were employed. However, individual cover types, including seismic disturbances, were sketch mapped, and sampled stems were assigned to the various cover types. Therefore, the data set can be selected such that only stems sampled within the target cover type are used in volume calculations, and the effective plot size can be adjusted to reflect the total undisturbed area. A minimum effective plot size of 150 m^2 will be required in order for the plot to be used in subsequent data analyses and modelling.

3.3. Proposed Sampling Design

TSP sampling will be used to intensify the number of plots available for empirical yield curve development for the 14 identified strata. The sampling frame is all merchantable

stands ≥ 41 years of age within FMUs P6 and P9. Stands will be classified by stratum and age class, with a goal of sampling 15 plots per stratum/age class combination.

Three plots will be sampled within randomly selected stands. Six plot locations will be pre-selected within each stand, and plot locations will be moved to the next pre-selected location if the plot area is intersected by a mappable disturbance. Mappable disturbances include seismic lines ≥ 5 m in width, well sites, or harvested areas. If the plot is intersected by an unmappable seismic disturbance (< 5 m in width), then the plot will be offset rather than moved. Prior to moving or offsetting plots, measurements of the area of the plot disturbed by seismic lines will be made.

To maintain some similarity in plot sizes, the minimum plot size from grid-based sampling will be used for additional TSP sampling (7.98 m radius) for trees (≥ 9.1 cm DBH). In order to obtain information relevant to understanding understory stand dynamics, a sapling (> 1.3 m tall with a DBH < 9.1 cm) plot will also be established, using the minimum plot size from grid-based sampling (3.99 m radius). No regeneration plots will be established.

While trees and saplings will not be tagged, measurements will be compatible with the initial Volume Sampling Manual (2001). Species, DBH, crown class, and condition code will be measured for each live tree or sapling. In order to create a link between ground sampled data and inventory labels, each sampled stem will be assigned to a canopy layer, as defined by the AVI 2.1 inventory label[8]. Heights will not be subsampled for trees (DBH ≥ 9.1 cm), since good height equations already exist (e.g., Huang 1994) and can be used to predict height for volume calculations. Because of the interest in understory trees, combined with the potential variability in height growth expected in non-dominant canopy positions (competitive effect interacting with species-specific response), saplings will be subsampled for total height within the 3.99 m radius plot.

Each identified canopy layer (based on AVI 2.1 inventory labels) will be sampled for age stems. In all cases, species to be sampled will be selected based on AVI inventory labels rather than field observations[9]. Each canopy layer will be sampled from within the 7.98 m radius plot, regardless of whether the stem being sampled is a sapling or a tree.

Top Height stems are defined as the 100 largest DBH stems of a given species per hectare that are relatively straight, undamaged, healthy and not "wolf", "super dominant" or veteran stems. Top Height stems are suitable for Site Index prediction if they lack evidence of periods of suppression or repression[10]. Stems from each layer will be assessed for suitability as both Top Height and Site Index stems, and those stems which are suitable on both counts will be preferentially sampled. Where Top Height stems are not suitable for Site Index prediction (e.g., show signs of suppression/repression), ages will be taken at both breast and stump height, since this reduces confidence in the applicability of years to breast height models.

[8] In the event that an understory layer is present but has not been identified in the AVI label, the field call will be used.

[9] Some exceptions will require use of the field call, such as an incompatible AVI call. See the Volume and Age Sampling Field Manual (The Forestry Corp. 2003) for more details.

[10] Suppressed trees are those whose height growth has been slowed by competition from trees or other vegetation. Repressed trees are those whose height growth has been slowed by competition resulting from excessive stand density. Both can occur in Top Height trees.

3.4. Required Number of Plots

There are currently 405 plots which fall within merchantable stands, as defined in section 2.3. Of these, 389 are within the selected sampling frame, which is all merchantable stands ≥ 41 years of age. These 389 plots were classified into a matrix based upon stratum and age class (Table 7).

The target sample size is 15 plots per stratum/age class combination. Subtracting the current number of plots from the goal of 15 plots, the required number of plots for sampling is provided in Table 8, along with total area. Table 9 summarizes the required number of plots relative to the number of merchantable stands available for sampling. A total of 568 additional plots are required. Eligible stands (e.g., merchantable stands ≥ 41 years of age) will be classified into a sampling matrix based on stratum and age class, and stands will be randomly selected from within this matrix for sampling. The probability of selection will be proportional to stand area.

In older age classes, where a sufficient number of stands is not available (e.g., stratum C-PL-ABCD-P9), the number of plots required will be reduced, or reallocated within other age classes, as deemed appropriate.

Table 7. Current number of plots by age class and stratum.

STRATA	41-60	61-100	101-140	141+	Total
C-PL-ABCD-P6		3	6		9
C-PL-ABCD-P9	22	9	1		32
C-SB-ABCD-COMB		4			4
C-SW-AB-P6		7	11	13	31
C-SW-AB-P9	2	1	2		5
C-SW-CD-P6		20	12	3	35
C-SW-CD-P9	1	2			3
MW-ABCD-COMB	2	2	4	2	10
MW/U-AB-COMB	1	1	12	1	15
MW/U-CD-COMB		6	9		15
D/U-AB-COMB	4	15	9	1	29
D/U-CD-COMB	12	67	26	2	107
D-AB-COMB	13	6			19
D-CD-COMB	49	23	3		75
Total Number of Plots	104	153	87	20	389

Stratification of polygons by age class will ensure that a representative sample of the range of stand ages will be obtained. This is particularly important at the young and older ages, which are important for anchoring empirical yield curve forms. After initial volume sampling, if it is determined that additional sampling is required to improve the range of sampled understory ages, some additional stands may be selected based on understory age attributes.

Table 8. Number of plots to be sampled versus area available for sampling by age class and stratum.

	Age Class											
	<40		41-60		61-100		101-140		141+		Total	Total
STRATA	# Plots	Area (ha)	# Plots	Area (ha)	# Plots	Area (ha)	# Plots	Area (ha)	# Plots	Area (ha)	Plots	Area (ha)
C-PL-BCD-P6	0	1553.5	15	58.1	12	1727.0	9	4145.5	15	615.7	51	8099.7
C-PL-BCD-P9	0	58.9	0	13105.0	6	6279.0	14	275.9	15		35	19718.8
C-SB-BCD-COMB	0	16.7	15	1483.3	11	2019.1	15	1175.2	15	94.6	56	4788.9
C-SW-B-P6	0	472.2	15	352.8	8	4560.7	4	11453.9	2	10151.3	29	26990.9
C-SW-B-P9	0	37.8	13	738.6	14	2866.1	13	2066.2	15	438.6	55	6147.3
C-SW-CD-P6	0	459.1	15	998.8	0	11820.0	3	7425.7	12	2241.1	30	22944.6
C-SW-CD-P9	0	40.6	14	970.0	13	1961.5	15	1170.9	15	153.8	57	4296.7
MW-BCD-COMB	0	1222.2	13	3433.9	13	3880.0	11	2738.6	13	1394.5	50	12669.2
MW/U-B-COMB	0	130.5	14	872.5	14	3759.9	3	4447.4	14	974.8	45	10185.2
MW/U-CD-COMB	0	4.8	15	1697.5	9	5968.5	6	5255.9	15	421.2	45	13347.9
D/U-B-COMB	0	2086.7	11	2238.9	0	8214.2	6	3888.4	14	317.4	31	16745.6
D/U-CD-COMB	0	5657.4	3	13932.0	0	53374.7	0	19695.4	13	922.1	16	93581.5
D-B-COMB	0	667.1	2	9509.4	9	6655.5	15	1120.6	15	108.8	41	18061.4
D-CD-COMB	0	769.6	0	42934.7	0	17793.3	12	2861.6	15	45.0	27	64404.2
Total	0	13177.1	145	92325.4	109	130879.4	126	67721.0	188	17878.9	568	321981.8

NOTE: The number of plots to be sampled is equal to 15 (the required number of plots for each age class) minus the current number of plots. Where the current number of plots exceeds the required number of plots, the value is set to zero.

Table 9. Number of plots to be sampled versus number of stands eligable[11] for sampling by age class and stratum.

	41-60		61-100		101-140		141+		Total	Total
STRATA	# Plots	# Stands	# Plots	# Stands	# Plots	# Stands	# Plots	# Stands	Plots	# Stands
C-PL-BCD-P6	15	5	12	83	9	210	15	34	51	332
C-PL-BCD-P9	0	750	6	366	14	16	15		35	1132
C-SB-BCD-COMB	15	86	11	110	15	61	15	4	56	261
C-SW-B-P6	15	19	8	287	4	654	2	542	29	1502
C-SW-B-P9	13	56	14	173	13	109	15	20	55	358
C-SW-CD-P6	15	47	0	693	3	414	12	85	30	1239
C-SW-CD-P9	14	62	13	124	15	60	15	7	57	253
MW-BCD-COMB	13	244	13	226	11	149	13	54	50	673
MW/U-B-COMB	14	67	14	217	3	257	14	57	45	598
MW/U-CD-COMB	15	121	9	299	6	207	15	21	45	648
D/U-B-COMB	11	133	0	418	6	215	14	19	31	785
D/U-CD-COMB	3	664	0	2193	0	863	13	43	16	3763
D-B-COMB	2	503	9	294	15	46	15	3	41	846
D-CD-COMB	0	1487	0	620	12	92	15	3	27	2202
Total	145	4244	109	6103	126	3353	188	892	568	14592

NOTE: Stratum/age class combinations with few or no eligible stands are highlighted.

[11] Eligible stands are >40 years of age, 5 ha or larger, with no clearcut notation in AVI modifier 1.

4. Literature Cited

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