

100 Mile TSA VRI Sample Selection Report (Volume Audit and Air Calls)

Nona Phillips Forestry Consulting

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1) Introduction

In February of 2014 Nona Phillips Forestry Consulting was contracted to develop a Vegetation Resources Vegetation Inventory (VRI) ground sampling plan for the 100 Mile Timber Supply Area (TSA). This included Volume Audit (VA) and Air Call samples. This document outlines the procedures undertaken in the project's sample selection process. The format follows the outline in section 7.2 of the *Sample Selection Procedures for Ground Sampling*.

2) Data assembly Process

All the shapefile data was obtained from Chris Mulvihill, the project coordinator with Ministry of Forests, Lands & Natural Resource Operations ('the Ministry'). This included VRI data in the VRIMS format clipped to the outside TSA boundary. Matt Makar provided an Access Query database to extract Rank 1 Layer data from the VRIMS data.

Exclusions:

The following process was undertaken to net down the land base.

- Created Shapefiles for all the removals. Selected for Private (code 40), Parks (codes 51, 63, and 67), IR (code 52), and any other ownerships specified by the contract. Called this Landbase_exclusions.
- Dissolved the above file to make the erase from the land base more efficient and called it Landbase_Exclusions_Dissolved.
- Erased the Netdown_dissolve shape from the TSA Boundary file. Created a new shapefile called TSA_Net.
- Clipped the VRI Shapefile to TSA_Net. Call this VRI_net_prelim.
- Conducted a "Repair Geometry" on the file.
- Added a new field for each called New_Area and calculated the field.
- Eliminated polygons less than .01ha and created a new file (called this VRI_Poly_Net).

The table below is a summary of the area of the TSA.

Table 1: 100 Mile TSA Landbase Summary

Land Classification	Area (ha)	% of Proj Area
Total TSA Area	1,235,978	100
Net-downs	175,113	14.17%
Parks	53,264	4.31%
Private	116,451	9.42%
Federal	5,398	0.44%
Net Area	1,060,865	85.83%
Non Vegetated	53,363.00	4.32%
Vegetated	1,007,502.00	81.51%
Non-Treed	129,363.00	10.47%
Treed	878,139.00	71.05%

- Extracted Rank 1 Layer data from the VRIMS using Matt Makar’s Access Query. Exported this new file to Excel (provided more reliable results when joining to the shape than the Access format).
- Created a new shapefile class of the VRI data by joining the Excel tables to the VRI_Poly_Net file exporting the data (called this 100 Mile_VRI_Net)
- Created a new field called Proj_Ht and calculated.
- Created new fields for height class and Age Class and calculated.

3) Creation of Population Shapefiles

- From 100 Mile_VRI_net selected for VT and Projec_age≥51 and create a new file (call it 100 Mile_VA). The total area of the volume audit population is 716,549 ha or 82% of the VT.
- Selected for VT>30 and called this Air_Call_Pop. The total area of the air call population is 770,593 ha or 88% of the VT.

4) Sample Selection for the Volume Audit Population

4.1 Stratification

In order to make decisions about stratification, a summary by leading species was run. This provided the leading species distribution shown below.

Table 2: Species Distribution for Volume Audit

Species	Area	%
FD	370211	51.7%
SX	151091	21.1%
PL	111965	15.6%
AT	49850	7.0%
BL	29106	4.1%
CW	3058	0.4%
EP	1039	0.1%
PY	146	0.0%
PA	67	0.0%
BA	16	0.0%
Total	716549	100.0%

Table 3: Age Class Summary for Volume Audit

Age Class	Area	%
3	28,267	4%
4	86,364	12%
5	122,662	17%
6	113,602	16%
7	123,286	17%
8	215,736	30%
9	26,632	4%
Total	716,549	100%

Based on this information, the Ministry staff identified the following strata for the 100 Mile TSA VA ground sampling project.

Table 4: Volume Audit population Strata Definition

Strata	Leading Species
1	Douglas Fir
2	Spruce & Balsam
3	Pine
4	Other

Shapefiles were created for each stratum.

The number of samples for the Volume Audit population was specified by the Ministry in the Contract Schedule A document. They specified that there would be 70 initial samples and 30 replacements in the Volume Audit population.

Table 5: Distribution of Ground Samples - Volume Audit Population

Stratum	Population Area	% of Area	No of Samples	# of Hectars Represented by each plot	Replacement Samples
FD	370,211	51.7%	36	10,284	15
Sp & Balsam	180,213	25.2%	18	10,012	7
Pine	112,178	15.7%	11	10,198	5
Other	53,947	7.5%	5	10,789	3
Total	716,549	100.0%	70	10,236	30

4.2) Sub-stratification

For the Volume Audit population sub-stratification was carried out the same way for all 4 strata. The process is described below.

- Exported the attribute table from each of the stratum shapefiles
- In these new worksheets, sorted data by Basal Area (BA)
- Determined the number of polygons in each stratum
- Divided total number of polygons by 3 to determine the number of polygons (approx) that should be in each sub-stratum.
- Used the “number of polygons per sub-strata” figure determined above in the table sorted by BA to find the BA figure that would be used to divide the sub-strata.

The table below shows the criteria defining the sub-strata.

Table 6: Criteria for Sub-stratification of Volume Audit Population

Strata	# of Polygons	Div by 3	Sub Strat	Target Polygon Range	BA	Actual no of Polygons
FD	21787	7263	1	0-7263	0-14	6967
			2	7264-14526	15-25	7984
			3	1452+	26+	6837
Sp & Bal	15112	5037	1	0-5037	0-15	5487
			2	5038-10074	16-30	5650
			3	10075+	31+	3975
Pine	8276	2759	1	0-2759	0-10	3683
			2	2760-5518	11-20	2476
			3	5519+	21+	2117
Other	5779	1926	1	0-1926	0-15	1987
			2	1927-3852	16-30	2289
			3	3853+	31+	1503

Sample distribution in the Volume Audit population was based on area representation of the sub-strata. The table below shows this distribution.

Table 7: Distribution of Samples in VA Sub-strata

Strata	Sub-strata	Area	%	Samples	Replacements
Douglas Fir	1	111,329	30%	11	5
	2	130,773	35%	13	5
	3	128,108	35%	12	5
Total		370,210	100%	36	15
Spruce & Balsam	1	51,682	29%	5	2
	2	69,876	39%	7	3
	3	58,654	33%	6	2
Total		180,212	100%	18	7
Pine	1	47,159	42%	5	2
	2	35,831	32%	3	2
	3	29,189	26%	3	1
Total		112,179	100%	11	5
Other	1	14,089	26%	1	1
	2	20,096	37%	2	1
	3	19,762	37%	2	1
Total		53,947	100%	5	3
Grand Total		716,548		70	30

4.3 Sample Polygon Selection

Volume audit samples were chosen using the probability proportional to size with replacement technique (PPSWR).

- An Excel random number spreadsheet was obtained from the Ministry that creates random numbers from a “seed”. Random numbers between 0 and the total area of each sub-stratum were produced for samples and replacement samples in each of the sub-stratum. As well, one extra random number per stratum was produced for a contingency sample in the event that a sample was eliminated during the sample location stage.
- Accumulated area tables were produced for each of the sub-stratum. This was done by selecting for the sub-strata criteria in the strata shapefiles and exporting the table.
- Two new columns were added to the accumulated area table for recording the samples that were chosen (I for initial, R for replacement and C for contingency) and sample number. The accumulated volume table was then sorted by I/R and then by sample number. All other rows were deleted (saved as Samp list full – sub-stratum). Another table was created from this with just mapsheet, polygon, selection, and area columns (called Samp list part-sub-strat). Using the random numbers generated for each sub-stratum, polygons were selected. A polygon was selected from the accumulated area table if the random number was larger than the accumulated area of the polygon immediately preceding it and less than or equal to its accumulated area.
- Initial Sample Polygons were selected first followed by replacement sample polygons then by contingency samples.

Initial sample numbers were numbered 1 to 70 and alternate samples were numbered 71-100.

4.4 Location of Samples Within Polygons

For each population, samples were located within selected polygons using an Arcmap 10.1 GIS program as follows:

- A new shapefile was created for samples with the following fields:

FID_1	Sample_no	Strata	Sub-strat	X	Y

*FID_1 is to link with the Objectid field in the immature VRI shapefile for joining these two files later on.

- The population, 100m grid (obtained from the Ministry), and Landsat shapefiles were displayed on an Arcview map.
- Sample polygons were displayed using the selection tool in the population attribute table.
- For each polygon to be sampled, random numbers were generated (with a range between 1 and the total number of dots in the polygon) for each selected polygon using “=Randbetween(1,X)” function in an Excel spreadsheet. The random numbers were recorded in a new column in this spreadsheet.
- The sample was located at the location of the randomly selected dot.
- The location was then checked against the Landsat image to see if any samples fell in a recent cutover. **The original sample 70 was in a cutover and was replaced with a contingency sample in the same sub-stratum.**
- After sample location was complete for a population, UTM coordinates were calculated then the sample shapefile was joined to the population VRI shapefile so that all veg information would be included in the sample file.

5) Sample Selection for Air Call Samples

Selected sample polygons as described in **Sample Polygon Selection** above (except there was no stratification). The sample numbers will be 101-200.

Created the sample list.

6) Quality Assurance

The following identifies the QA points in the sample selection process.

- Checked Supplied VRI shapefile.
- Repaired geometry following clipping
- Checked polygon lines after clip and erase processes
- Checked distribution between VT and total area
- Checked for data gaps and did not find any.
- Checked UTM outputs correct
- Checked sample lists to make sure ages and species correspond to correct population, strata and sub-strata
- Checked sample distribution on map of TSA
- Checked sample distribution against population distribution by age class, species, and height class and these were very close (see tables below)

The following tables show how the sample distribution compares to the population distribution for age class, height class, leading species, and (for Volume Audit only) strata. Sample and populations compare quite closely.

Table 8: Volume Audit Age Class Comparison

Age Class	Area	%	Samples	%
3	28,267	4%	1	1%
4	86,364	12%	10	14%
5	122,662	17%	10	14%
6	113,602	16%	8	11%
7	123,286	17%	11	16%
8	215,736	30%	26	37%
9	26,632	4%	4	6%
Total	716,549	100%	70	100%

Table 9: Volume Audit Height Class Comparison

Height Class	Population Area	Population %	Samples	Sample %
1	1346	3%		0%
2	15947	31%	18	26%
3	26860	53%	40	57%
4	6660	13%	12	17%
5	139	0%		0%
8	1	0%		0%
Total	50953	100%	70	100%

Table 10: Volume Audit Species Comparison

Species	Area	%	Samples	%
FD	370211	51.7%	36	51%
SX	151091	21.1%	16	23%
PL	111965	15.6%	11	16%
AT	49850	7.0%	5	7%
BL	29106	4.1%	2	3%
CW	3058	0.4%		0%
EP	1039	0.1%		0%
PY	146	0.0%		0%
PA	67	0.0%		0%
BA	16	0.0%		0%
Total	716549	100.0%	70	100%

Table 11: Volume Audit Strata Comparison

Stratum	Population Area	% of Area	No of Samples	% of Samples
FD	370,211	52%	36	51%
Sp & Balsam	180,213	25%	18	26%
Pine	112,178	16%	11	16%
Other	53,947	7%	5	7%
Total	716,549	100%	70	100%

Table 12: Air Call Age Class Comparison

Age Class	Population Area	%	Samples	%
2	33,530	4%	5	5%
3	48,781	6%	10	10%
4	86,364	11%	10	10%
5	122,662	16%	15	15%
6	113,602	15%	11	11%
7	123,286	16%	17	17%
8	215,736	28%	29	29%
9	26,632	3%	3	3%
Total	770,593	100%	100	100%

Table 13: Air Call Height Class Comparison

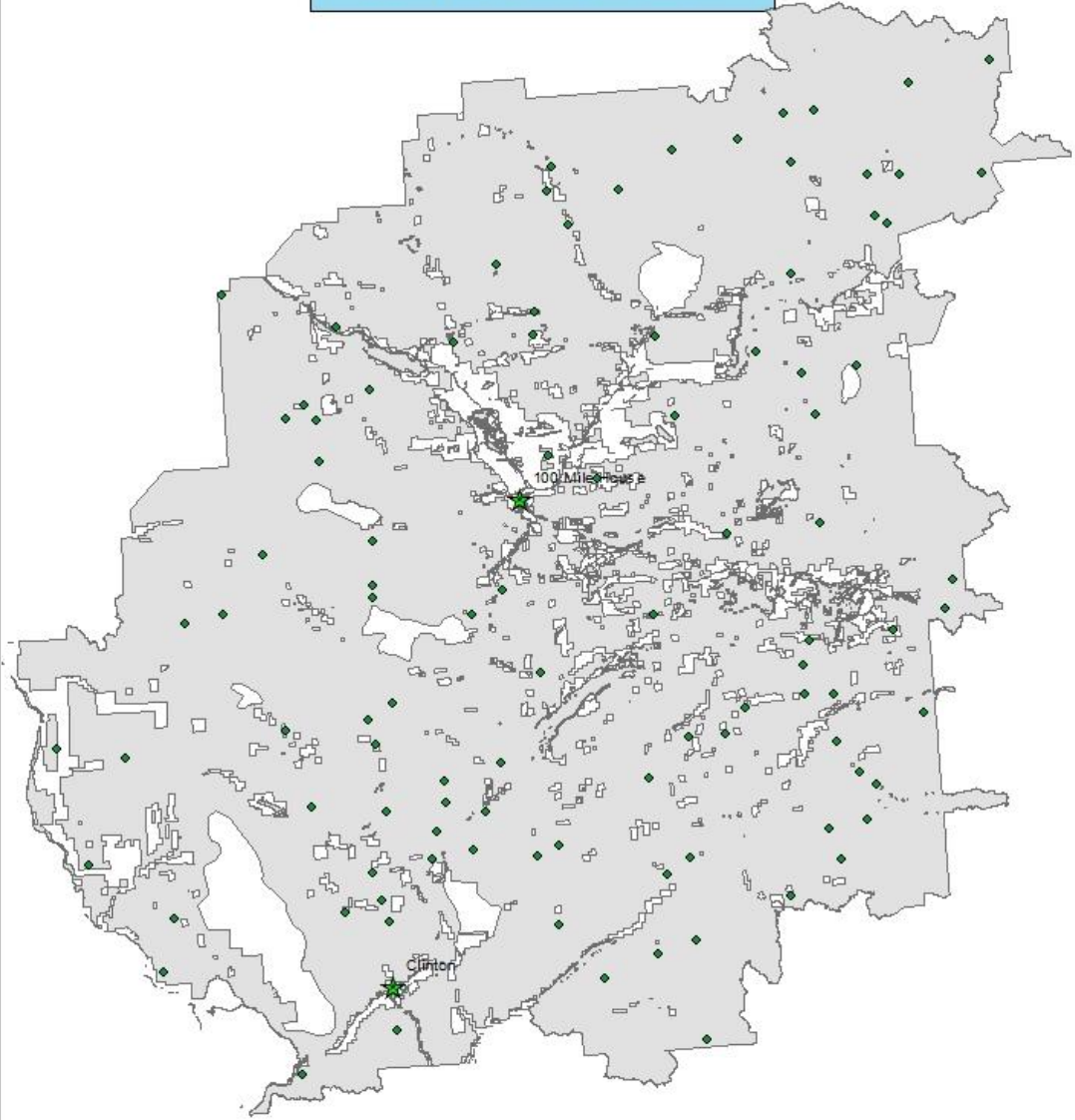
Ht Class	Population Area	%	Samples	%
1	47,280	6%	6	6%
2	224,685	29%	32	32%
3	381,690	50%	48	48%
4	114,596	15%	14	14%
5	2,342	0%		0%
8	1	0%		0%
Total	770,593	100%	100	100%

Table 14: Air Call Species Comparison

Species	Population Area	%	Samples	%
FD	388,794	50%	52	52%
SX	157,822	20%	19	19%
PA	136,703	18%	12	12%
AT	52,498	7%	8	8%
B	30,217	4%	8	8%
CW	3,151	0%		0%
EP	1,408	0%	1	1%
Total	770,593	100%	100	100%

The following maps show the distribution of VA and Air Call samples within the TSA. The samples are well distributed across the TSA.

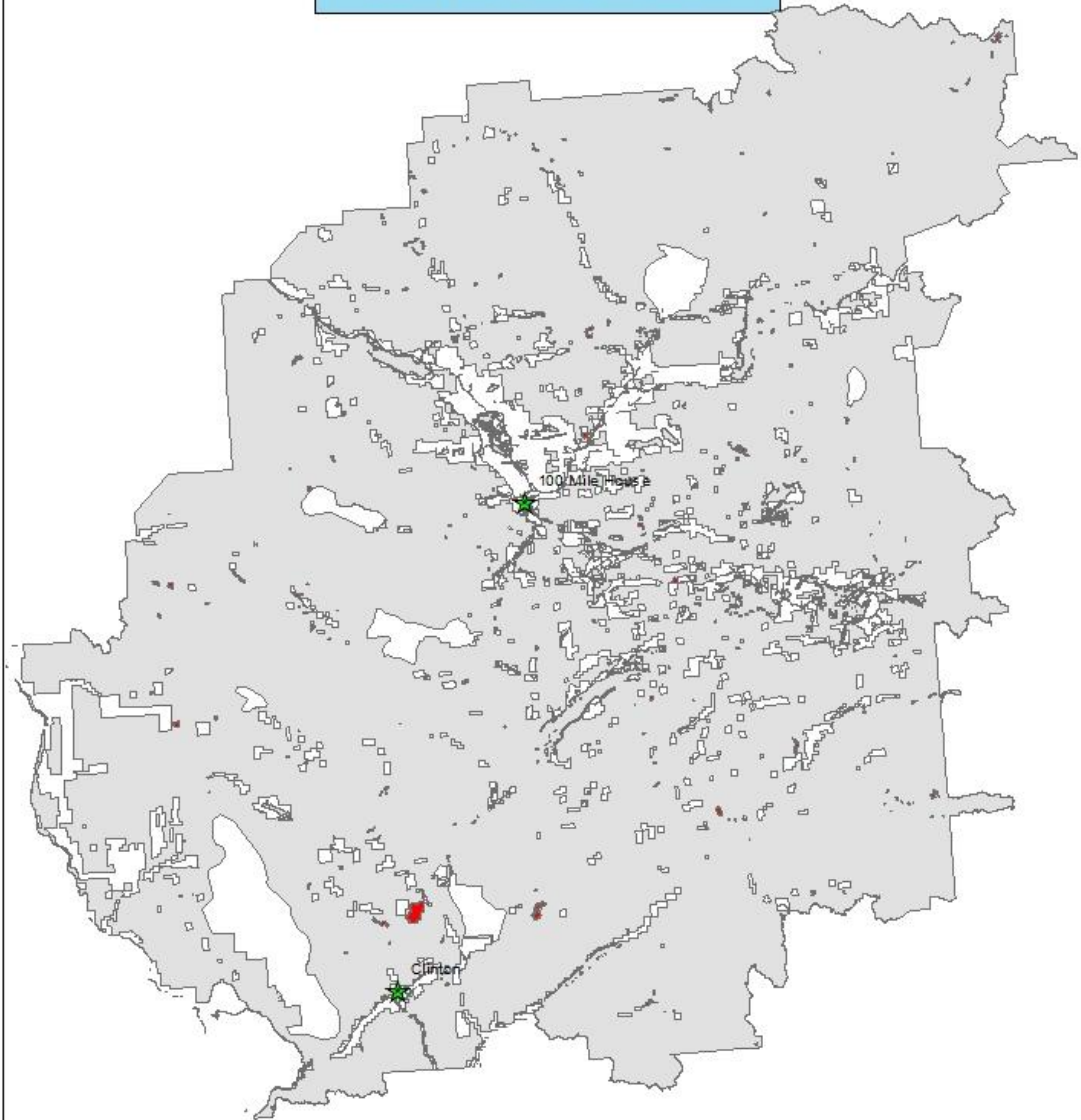
100 Mile Volume Audit
Sample Distribution



Legend

◆ Samples

100 Mile Air Call Sample Distribution



Legend

 Air Call Sample Polygons

7) Sample Lists and their Use

The following are sample lists for Volume Audit and Air Calls.

The Volume Audit list contains initial samples for data collection and replacement samples in the event that some of the initial samples need to be replaced during the data collection phase. For the Volume Audit population (51+) there are 70 initial samples and 30 replacement samples. The initial samples are numbered 1 to 70 and the replacements are numbered 71-100.

During the Volume Audit sampling project, samples can be rejected at the field sampling stage if they are in an unsafe location or in a recent cutover. When replacing samples they must be from the same stratum and sub-stratum (Basal Area Class). The project manager must be consulted if samples are rejected.

The Air Call sample list (31+) included 100 polygons that will be sampled. There are no alternate samples. The samples are numbered 101 to 200.

The shapefiles for each of the samples include all of the data fields from the original supplied VRI database.

100 Mile Volume Audit Sample List

Sample	Type	Sub_Strat	UTM Zone	X	Y	POLYGON_NU	BA	Stems/ha	Sp	Sp%	Ht	Age
1	I	DOUG FIR 1	10	606537	5684349	092P03337216845	5	125	FDI	50	22	72
2	I	DOUG FIR 1	10	573959	5708688	092P05140000378	5	45	FDI	100	28	202
3	I	DOUG FIR 1	10	560235	5678351	092O03066982106	10	550	FDI	100	18	203
4	I	DOUG FIR 1	10	598354	5712536	092P05382263212	10	200	FDI	100	19	123
5	I	DOUG FIR 1	10	620569	5746717	092P08403233896	10	200	FDI	60	20	73
6	I	DOUG FIR 1	10	611580	5682928	092P02467536215	10	300	FDI	50	19	62
7	I	DOUG FIR 1	10	580381	5750664	092P09167625244	5	156	FDI	100	23	144
8	I	DOUG FIR 1	10	604325	5677239	092P02325682555	1	25	FDI	100	16	83
9	I	DOUG FIR 1	10	632754	5686407	092P03588868860	5	75	FDI	100	26	143
10	I	DOUG FIR 1	10	638678	5652615	092P00533848886	5	100	FDI	90	25	142
11	I	DOUG FIR 1	10	588089	5734408	092P07215065752	12	200	FD	85	24	228
12	I	DOUG FIR 2	10	609772	5678202	092P02357573313	25	250	FDI	100	34	253
13	I	DOUG FIR 2	10	578907	5709675	092P05168420997	15	225	FDI	100	20	137
14	I	DOUG FIR 2	10	570830	5671087	092P01129798137	15	250	FDI	100	26	253
15	I	DOUG FIR 2	10	565418	5691739	092O04093860156	15	600	FDI	90	15	102
16	I	DOUG FIR 2	10	556682	5693418	092O04041341097	15	150	FDI	100	27	262
17	I	DOUG FIR 2	10	594892	5745829	092P08251852590	15	450	FD	85	20	118
18	I	DOUG FIR 2	10	638126	5732530	092P07510165999	20	300	FDI	90	25	123
19	I	DOUG FIR 2	10	591973	5733939	092P07240655358	25	400	FD	65	24	188
20	I	DOUG FIR 2	10	636028	5742938	092P08596391826	25	550	FDI	65	23	93
21	I	DOUG FIR 2	10	627734	5725051	092P06552791438	15	400	FDI	95	15	73
22	I	DOUG FIR 2	10	598939	5737542	092P07379007740	20	250	FDI	100	28	163
23	I	DOUG FIR 2	10	644118	5717247	092P05653167473	15	250	FDI	70	26	183
24	I	DOUG FIR 2	10	600100	5697443	092P04396534339	15	450	FDI	80	22	113
25	I	DOUG FIR 3	10	619351	5700408	092P04409536611	30	250	FDI	100	35	253
26	I	DOUG FIR 3	10	634513	5674017	092P02501001600	35	875	FDI	85	22	73
27	I	DOUG FIR 3	10	586544	5650391	092I09227716333	30	450	FDI	90	26	162
28	I	DOUG FIR 3	10	597011	5695475	092P04279413362	35	350	FDI	75	32	182
29	I	DOUG FIR 3	10	610099	5743166	092P08341681402	35	500	FDI	60	27	143

30	I	DOUG FIR 3	10	569333	5664247	092O02022164222	30	1200	FDI	100	16	133
31	I	DOUG FIR 3	10	620338	5743722	092P08403382012	30	400	FDI	85	34	153
32	I	DOUG FIR 3	10	650276	5670521	092P01697049737	40	530	FDI	70	31	202
33	I	DOUG FIR 3	10	598578	5669382	092P01395907672	35	725	FDI	100	24	132
34	I	DOUG FIR 3	10	637503	5675988	092P02521652633	30	475	FDI	70	28	143
35	I	DOUG FIR 3	10	621562	5728147	092P06414572907	40	900	FDI	100	21	93
36	I	DOUG FIR 3	10	623573	5765115	093A00516374811	30	500	FDI	50	25	103
37	I	SPR&Bal 1	10	671781	5706419	092P04813851582	15	200	SE	40	25	122
38	I	SPR&Bal 1	10	661996	5684321	092P02762458166	15	350	SX	75	23	92
39	I	SPR&Bal 1	10	666354	5756135	092P09872540482	10	250	SX	50	22	83
40	I	SPR&Bal 1	10	670037	5773906	093A00886031082	10	300	BL	100	18	242
41	I	SPR&Bal 1	10	680473	5776555	093A01947402991	5	200	BL	100	16	162
42	I	SPR&Bal 2	10	659763	5685921	092P03748879094	20	250	SX	75	32	162
43	I	SPR&Bal 2	10	657041	5690046	092P03733401627	20	575	SX	50	21	72
44	I	SPR&Bal 2	10	664993	5757096	092P09861851040	20	300	SX	60	28	93
45	I	SPR&Bal 2	10	625455	5757721	092P09530460522	25	200	SX	65	32	153
46	I	SPR&Bal 2	10	614916	5711214	092P05479172834	25	600	SX	100	22	123
47	I	SPR&Bal 2	10	653108	5696226	092P03708045062	25	700	SX	85	22	107
48	I	SPR&Bal 2	10	657081	5675027	092P02735542678	30	635	SX	70	24	122
49	I	SPR&Bal 3	10	655650	5678894	092P02727574648	45	635	SX	80	30	142
50	I	SPR&Bal 3	10	672848	5710177	092P05819923649	35	450	SE	90	28	133
51	I	SPR&Bal 3	10	668225	5762264	092P09879624299	50	400	SX	50	34	163
52	I	SPR&Bal 3	10	653768	5770711	093A00792288850	35	750	SX	80	22	112
53	I	SPR&Bal 3	10	598189	5711041	092P05381742334	35	500	SX	60	26	143
54	I	SPR&Bal 3	10	656910	5696159	092P03730434994	45	650	SX	60	31	142
55	I	PINE 1	10	586355	5694436	092P03216032270	10	350	PLI	65	16	92
56	I	PINE 1	10	597869	5692188	092P03384371145	5	200	PLI	60	17	92
57	I	PINE 1	10	617925	5676945	092P02404432998	5	400	PLI	80	13	53
58	I	PINE 1	10	637837	5665363	092P01525326294	5	250	PLI	60	16	62
59	I	PINE 1	10	625939	5661081	092P00456673610	8	1333	PLI	100	11	80
60	I	PINE 2	10	598792	5683485	092P02393456163	15	700	PLI	95	18	71
61	I	PINE 2	10	589132	5684606	092P03234856560	20	550	PLI	75	17	82

62	I	PINE 2	10	584237	5717153	092P05298035454	20	450	PLI	40	22	122
63	I	PINE 3	10	632967	5663875	092P01597185432	35	1200	PLI	60	17	62
64	I	PINE 3	10	653071	5699932	092P04706327248	25	350	PLI	50	25	112
65	I	PINE 3	10	632044	5761842	092P09567343170	25	450	PLI	50	18	113
66	I	OTHER 1	10	645543	5694956	092P03663184107	15	150	AT	75	32	142
67	I	OTHER 2	10	610784	5708290	092P05355550985	20	450	AT	85	20	83
68	I	OTHER 2	10	592834	5670761	092P01259918513	20	450	AT	80	24	128
69	I	OTHER 3	10	660503	5679982	092P02755075473	45	635	AT	60	30	142
70	I	OTHER 3	10	668501	5693346	092P03897013683	35	625	AT	65	28	142
71	R	DOUG FIR 1	10	654611	5737318	092P07706389260	10	240	FDI	60	23	73
72	R	DOUG FIR 1	10	613753	5689139	092P03477929720	5	250	FDI	100	16	72
73	R	DOUG FIR 1	10	592144	5728625	092P07242052623	5	100	FD	95	18	118
74	R	DOUG FIR 1	10	605082	5680809	092P02329444672	5	250	FDI	70	16	73
75	R	DOUG FIR 1	10	620243	5668136	092P01417507402	5	60	FDI	100	29	162
76	R	DOUG FIR 2	10	648840	5740475	092P07672301090	25	400	FDI	60	28	113
77	R	DOUG FIR 2	10	656182	5732041	092P07716506065	15	325	FDI	100	23	93
78	R	DOUG FIR 2	10	590465	5736108	092P07233426890	20	507	FD	80	20	72
79	R	DOUG FIR 2	10	634168	5707269	092P05593760994	25	600	FDI	60	25	143
80	R	DOUG FIR 2	10	598501	5718236	092P06380536683	25	750	FDI	100	26	153
81	R	DOUG FIR 3	10	638078	5691379	092P03520351708	45	725	FDI	90	27	162
82	R	DOUG FIR 3	10	598877	5655558	092P00399289529	35	600	FDI	60	26	152
83	R	DOUG FIR 3	10	653772	5750175	092P08796486830	30	800	FDI	60	18	63
84	R	DOUG FIR 3	10	678833	5761999	092P09940844573	35	650	FDI	50	26	103
85	R	DOUG FIR 3	10	664130	5762544	092P09755254305	35	375	FDI	40	33	243
86	R	SPR&Bal 1	10	657585	5770944	093A00715078993	15	600	BL	90	16	162
87	R	SPR&Bal 1	10	596759	5675867	092P02281421548	10	400	SX	60	17	73
88	R	SPR&Bal 2	10	654397	5764472	093A00797385212	30	750	SE	50	21	112
89	R	SPR&Bal 2	10	639170	5766740	093A00607736147	30	650	BL	40	20	142
90	R	SPR&Bal 2	10	654093	5703138	092P04710889090	25	400	SX	85	24	92
91	R	SPR&Bal 3	10	642792	5691573	092P03648771821	35	495	SX	100	30	142
92	R	SPR&Bal 3	10	647625	5767673	093A00660886415	40	425	SE	90	30	201
93	R	PINE 1	10	661657	5738111	092P07746679813	0	585	PLI	80	25	111

94	R	PINE 1	10	606459	5687155	092P03335118449	2	150	PLI	85	14	72
95	R	PINE 2	10	597597	5672127	092P01286959316	15	800	PLI	65	14	88
96	R	PINE 2	10	622842	5762142	092P09414682943	20	400	PLI	80	20	53
97	R	PINE 3	10	615936	5753028	092P09471057347	35	750	PLI	85	24	133
98	R	OTHER 1	10	620684	5678226	092P02421453565	10	425	AT	65	17	53
99	R	OTHER 2	10	664866	5704020	092P04775649766	30	400	AT	75	25	102
100	R	OTHER 3	10	656173	5718121	092P05719177927	40	450	AT	50	28	123

100 Mile Air Call Sample List

Sample	POLYGON_NU	AREA	BA	Stems/ha	Lead Spp	Sp%	AGE	Ht
101	092P09673591521	4.91	35	350	FDI	100	203	34
102	092P08456196175	10.16	40	650	FDI	50	163	30
103	092P07536844838	39.22	35	600	FDI	90	133	27
104	092P06581812201	5.45	25	450	SX	50	93	24
105	092P08679142716	7.84	10	150	FDI	70	203	30
106	092P03697861384	56.73	50	675	FDI	75	142	31
107	092P03591818513	11.38	40	700	FDI	95	142	27
108	092P08446683809	3.52	1	50	SX	100	73	16
109	092P01401170539	2.99	20	725	AT	90	63	18
110	092P04587984988	24.17	15	500	FDI	60	72	18
111	092P00333773445	13.80	10	150	FDI	100	122	16
112	093A01944823478	8.74	20	500	BL	95	222	21
113	092P01733100354	4.85	40	600	AT	55	142	29
114	092P08218360422	44.27	5	100	FD	100	248	26
115	092P00586462058	34.04	45	450	SX	100	141	30
116	092P04401358786	11.72	30	750	FDI	60	83	23
117	092P05124923491	34.38	2	1200	PLI	70	32	4
118	092P06332507126	2.87	1	150	SX	100	53	9
119	092P05175534164	41.40	10	350	FDI	85	82	15
120	092P00225176529	3.17	10	1000	FDI	100	32	7

121	092P00666258905	7.17	20	350	FDI	100	122	17
122	092P05779486977	5.53	25	450	SX	60	102	25
123	092P03397883067	2.35	25	300	SX	60	142	26
124	092P08303305823	9.94	5	2000	FDI	60	48	8
125	092P02132160099	6.67	20	850	FDI	90	83	16
126	092P07735135919	16.49	10	200	AT	60	93	25
127	092P06233510465	21.09	15	400	PL	65	128	20
128	092P07247513070	15.01	27	400	FD	75	158	25
129	093A00699646428	9.32	30	450	SE	80	131	28
130	092P03221452559	1.92	10	550	FDI	90	72	15
131	092P08579342760	0.63	15	175	AT	70	93	26
132	092P02254762246	7.62	25	550	AT	85	113	25
133	092P07612227071	8.89	45	440	FDI	50	203	36
134	092P01609920292	16.02	3	225	PLI	85	52	13
135	092P06215032285	0.06	10	1250	PL	95	33	10
136	092P08493780673	1.05	10	400	FDI	60	53	14
137	092P06123548884	3.17	12	300	FD	95	118	20
138	092P05231860269	13.34	20	450	SX	85	132	26
139	092P01330904287	11.20	45	725	FDI	85	142	29
140	092P05505713903	38.85	15	528	AT	80	74	17
141	092P05114883621	21.22	20	175	FDI	80	182	28
142	092P06187846641	8.00	15	650	PL	45	73	17
143	092P01499838970	140.34	20	700	FDI	80	81	22
144	093A00656646048	5.94	10	900	BL	60	42	12
145	092P01310718892	398.08	10	100	FDI	100	143	23
146	092P05219912742	40.82	30	600	PLI	70	92	20
147	092P06452492387	8.92	35	500	AT	50	103	28
148	092P01256265833	5.35	15	250	FDI	75	242	27
149	092P07379714530	4.02	15	500	FDI	60	53	15
150	093A00606750433	8.13	12	200	BL	60	162	18
151	092P04129803052	51.24	30	675	FDI	95	122	21
152	092P06658383356	10.00	15	400	FDI	90	103	19

153	092P06579398557	16.28	30	450	FDI	80	163	28
154	092P00268338751	8.84	35	400	FDI	60	202	30
155	092P05228543582	3.23	25	325	SX	80	162	28
156	092P04500677338	3.85	40	400	FDI	80	162	35
157	092P05692368199	2.55	25	1000	SX	85	83	15
158	092P06334698016	10.82	10	1000	FDI	75	33	11
159	092P04636330788	3.12	35	450	FDI	60	123	26
160	093A00521577108	4.22	5	100	SX	80	112	28
161	092P05756785550	10.60	20	350	SX	40	122	25
162	092P03581512305	6.93	35	700	SX	50	127	24
163	092O05010235409	8.49	20	225	FDI	100	202	20
164	092P08669633492	13.85	25	800	EP	60	53	14
165	093A01955814950	3.34	10	400	BL	100	122	18
166	092P04486427777	0.79	5	550	PLI	100	43	12
167	092P00589422798	9.24	4	342	PLI	100	139	14
168	092P02336080818	0.01	10	400	FDI	70	93	18
169	093A00826781498	11.08	5	100	BL	100	152	16
170	092P07580288786	14.71	20	600	FDI	60	53	23
171	092P03154127894	3.39	10	800	PLI	40	42	8
172	092P05152462142	8.18	30	600	PLI	85	122	20
173	092P02229150823	10.23	25	500	FDI	55	253	25
174	092P03513538946	2.60	10	300	FDI	60	87	21
175	092P02898067757	36.49	40	800	AT	75	112	24
176	092P01290326554	4.05	20	125	FDI	100	302	32
177	093A00815490831	9.34	15	250	SE	60	202	28
178	093A01948594818	58.62	15	350	BL	90	162	22
179	092P04158823525	15.15	35	400	FDI	85	112	26
180	092P01570737396	8.62	10	325	FDI	100	72	21
181	092P03590060132	9.45	35	900	FDI	100	122	19
182	092P03401821157	4.11	20	350	SX	60	152	26
183	092P06579447992	29.13	20	400	PLI	40	113	25
184	092P08538442565	64.15	25	650	FDI	60	73	20

185	092P01283528109	71.43	10	75	FDI	100	338	28
186	093A00632309552	33.29	5	200	BL	90	202	12
187	092P06652813751	73.81	30	400	FDI	80	183	30
188	092P05244709471	5.70	8	400	SX	90	62	12
189	093A00517314008	22.39	30	500	FDI	40	103	25
190	092P05775884379	9.98	45	450	SX	80	132	32
191	092P09293816965	1.85	16	800	FD	80	33	11
192	092I09101874078	4.31	20	700	PLI	40	102	15
193	092P08324640643	3.63	5	150	FDI	100	123	22
194	092P05116111203	9.15	25	750	FDI	80	92	18
195	092P02638796467	53.82	3	35	FDI	100	237	32
196	092P02338905479	2.89	10	500	FDI	100	83	16
197	092P05678668110	4.11	25	600	SX	55	83	23
198	092P08554463316	13.91	20	300	SX	50	73	26
199	092P04519724804	1.47	25	200	FDI	80	92	25
200	093A00600230122	37.87	5	200	BL	70	122	15

8) Selection Issues

There were no selection issues.

9) Roles and Responsibilities

All work was completed by Nona Phillips Forestry Consulting with no work being contracted out. Blake Foster performed the GIS work to net down the land base, develop strata and sub-strata and select samples. Nona Phillips oversaw the process and reviewed the product.

Prepared by: Blake Foster  Date: April 12/14

I believe that all steps were carried out correctly and the distribution is random as guided by the VRI Standard, *Sample Selection Procedures for Ground Sampling, Draft Version 4.0.*

Reviewed by: Nona Phillips, R.P.F.  April 12, 2014

