

Kamloops 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 Kamloops TSA (TSA). This included Volume Audit (VA) and Air Call (AC) 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 in two separate files; north and south. 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**.
- The Ministry also provided "selection blocks" for the VRI provided separately for the north and south areas of the TSA. These blocks were clipped to the TSA_Net boundary (called these North_Block_Clip and South_Block_Clip).
- Clipped each of the VRI Shapefile to the respective block clips. (Called these VRI_North_Clip and VRI_South_Clip)
- 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 create a new file (called this VRI_Poly_North_Net and VRI_Poly_South_Net).

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

Table 1: Kamloops TSA Landbase Summary

Land Classification	Area (ha)	% of Proj Area
Total TSA Area	2,655,823	100
Net-downs	836,432	31.49%
Parks	624,691	23.52%
Private	177,715	6.69%
Federal	34,026	1.28%
Net Area	1,819,391	68.51%
Non Vegetated	114,142.00	4.30%
Vegetated	1,705,249.00	64.21%
Non-Treed	238,900.00	9.00%
Treed	1,466,349.00	55.21%

- 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 of the VRI data by joining the Excel tables to VRI_Poly_North_Net and VRI_Poly_South_Net (call these VRI_North_Net and VRI_South_Net).
- Merged these two files and called the new file Kamloops_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 Kamloops_VRI_net selected for VT and Projec_age≥51 and created a new file (called it Kamloops_VA). The total area of the volume audit population is 1,148,043 ha or 78% of the VT.
- Selected for VT>30 and called this Air_Call_Pop. The total area of the air call population is 1,235,749 ha or 84% 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: Kamloops Volume Audit Species Distribution

Species	Area	%
FD	484012	42.2%
SX	262084	22.8%
B	209997	18.3%
PL	71998	6.3%
HW	49944	4.4%
CW	35244	3.1%
AT	22799	2.0%
EP	11855	1.0%
PY	48	0.0%
PW	25	0.0%
XC	14	0.0%
PA	10	0.0%
XH	10	0.0%
JR	3	0.0%
Total	1148043	100.0%

Table 3: Volume Audit Age Class Summary

Age Class	Area	%
3	40,811	4%
4	96,451	8%
5	201,698	18%
6	153,302	13%
7	199,280	17%
8	391,880	34%
9	64,622	6%
Total	1,148,043	100%

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

Table 4: Volume Audit population Strata Definition

Strata	Leading Species
1	Douglas Fir
2	Spruce
3	Balsam
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 Hectares Represented by each plot	Replacement Samples
FD	484,012	42.2%	29	16,690	13
Spruce	262,084	22.8%	16	16,380	7
Balsam	209,997	18.3%	13	16,154	5
Other	191,950	16.7%	12	15,996	5
Total	1,148,043	100.0%	70		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 (see Peter Ott email of March 13, 2013)

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 # of Polygons
FD	32532	10844	1	0-10844	0-16	11044
			2	10844-216881	17-30	10718
			3	216881+	31+	10770
Spruce	189974	6325	1	0-6325	0-20	6493
			2	6326-12651	23-36	6303
			3	12652+	37+	6177
Balsam	13313	4438	1	0-4438	0-14	4162
			2	4439-8877	15-29	4378
			3	8878+	30+	4501
Other	13823	4608	1	0-4608	0-15	4621
			2	4609-9217	16-38	4639
			3	9217+	39+	4563

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
FD	1	148,981	31%	9	4
	2	159,047	33%	10	4
	3	175,985	36%	10	5
Total		484,013	100%	29	13
Spruce	1	65,517	25%	4	2
	2	87,741	33%	5	2
	3	108,827	42%	7	3
Total		262,085	100%	16	7
Balsam	1	50,878	24%	3	1
	2	66,438	32%	4	2
	3	92,682	44%	6	2
Total		209,998	100%	13	5
Other	1	51,619	27%	3	1
	2	55,944	29%	4	2
	3	84,387	44%	5	2
Total		191,950	100%	12	5
Grand Total		1,148,046		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. No samples fell in recent cutover.
- 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 were 101-200.

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	40,811	4%	2	3%
4	96,451	8%	7	10%
5	201,698	18%	11	16%
6	153,302	13%	6	9%
7	199,280	17%	12	17%
8	391,880	34%	28	40%
9	64,622	6%	4	6%
Total	1,148,043	100%	70	100%

Table 9: Volume Audit Height Class Comparison

Height Class	Population Area	Pop %	Samples	%
1	28,469	2%	2	3%
2	314,348	27%	16	23%
3	575,333	50%	38	54%
4	217,804	19%	14	20%
5	12,081	1%	0	0%
6	9	0%	0	0%
Total	1,148,043	100%	70	100%

Table 10: Volume Audit Species Comparison

Species	Population Area	%	Samples	%
FD	484012	42.2%	29	41%
SX	262084	22.8%	16	23%
B	209997	18.3%	13	19%
PL	71998	6.3%	2	3%
HW	49944	4.4%	5	7%
CW	35244	3.1%	1	1%
AT	22799	2.0%	2	3%
EP	11855	1.0%	2	3%
PY	48	0.0%		0%
PW	25	0.0%		0%
XC	14	0.0%		0%
PA	10	0.0%		0%
XH	10	0.0%		0%
JR	3	0.0%		0%
Total	1148043	100.0%	70	100%

Table 11: Volume Audit Strata Comparison

Stratum	Population Area	% of Area	No of Samples	%
FD	484,012	42.2%	29	41%
Spruce	262,084	22.8%	16	23%
Balsam	209,997	18.3%	13	19%
Other	191,950	16.7%	12	17%
Total	1,148,043	100.0%	70	100%

Table 12: Air Call Age Class Comparison

Age Class	Population Area	%	Samples	%
2	54,957	4%	7	7%
3	73,560	6%	7	7%
4	96,451	8%	11	11%
5	201,698	16%	14	14%
6	153,302	12%	12	12%
7	199,280	16%	18	18%
8	391,880	32%	27	27%
9	64,622	5%	4	4%
Total	1,235,749	100%	100	100%

Table 13: Air Call Height Class Comparison

Ht Class	Population Area	%	Samples	%
1	71,652	6%	8	8%
2	358,607	29%	31	31%
3	575,597	47%	46	46%
4	217,804	18%	15	15%
5	12,081	1%	0	0%
6	9	0%	0	0%
Total	1,235,749	100%	100	100%

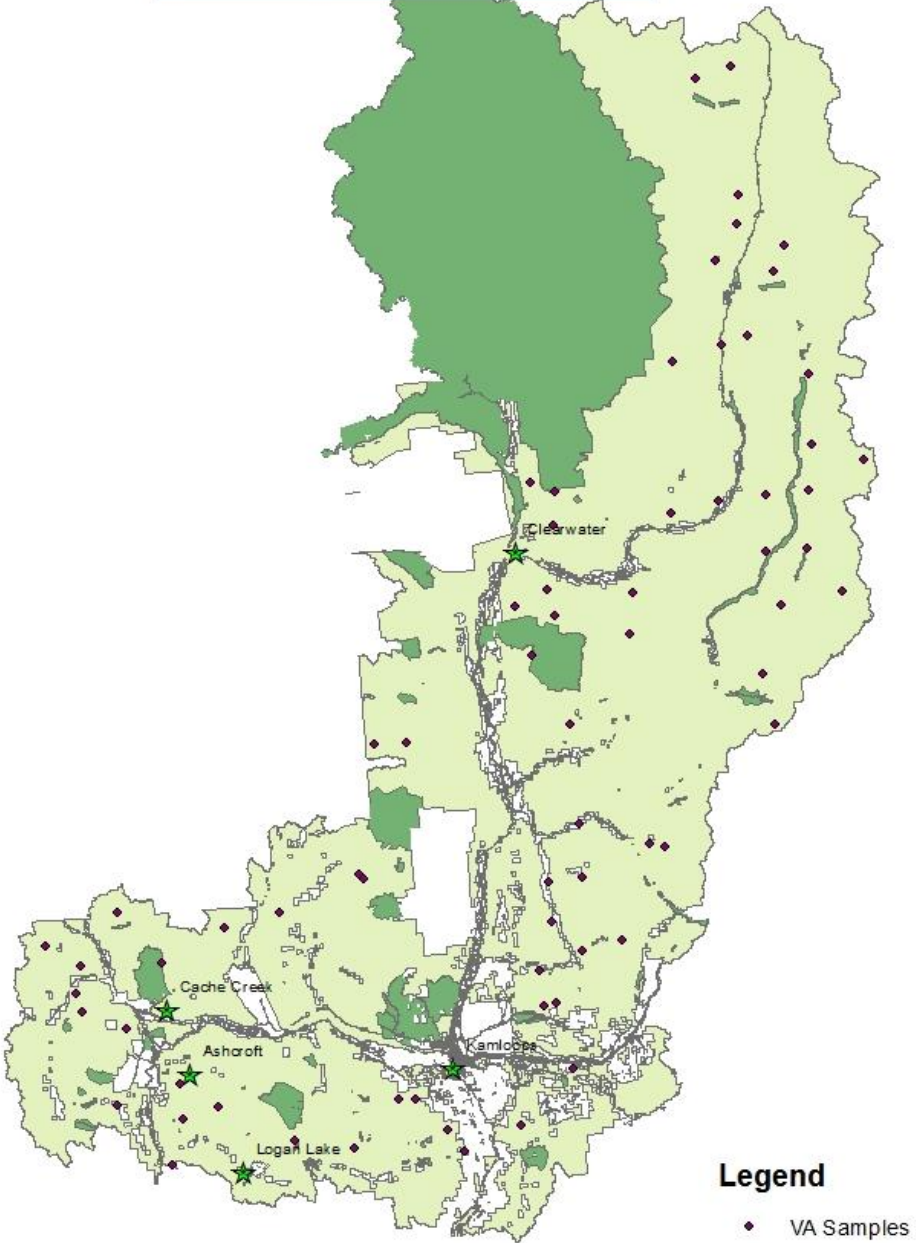
Table 14: Air Call Species Comparison

Species	Population Area	%	Samples	%
FD	500,400	40%	38	38%
S	286,270	23%	22	22%
B	232,105	19%	21	21%
P	85,096	7%	9	9%
H	53,046	4%		0%

CW	38,816	3%	5	5%
AT	25,439	2%	2	2%
EP	14,473	1%	3	3%
LW	76	0%		0%
XC	14	0%		0%
XH	11	0%		0%
JR	3	0%		0%
Total	1,235,749	100%	100	100%

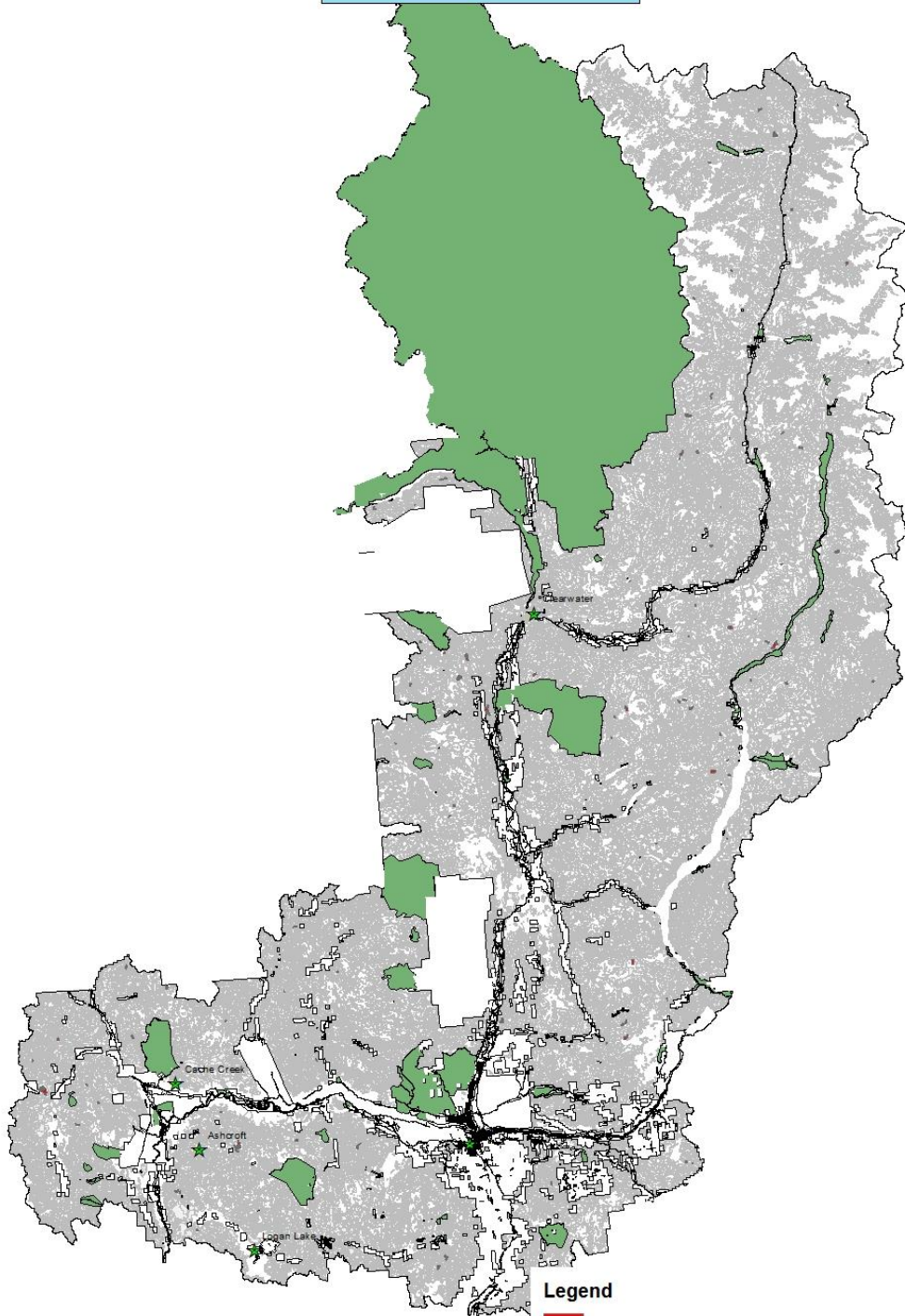
The following maps show the distribution of VA and Air Call samples within the TSA. The samples are well distributed across the TSA.

Kamloops Volume Audit Sample Distribution



- Legend**
- ◆ VA Samples
 - Parks

Kamloops Air Call Sample Distribution



- Legend**
- Kamloops_Air_Call_Samples
 - Parks
 - Kamloops_VA

7) Sample Lists and their Use

The following are sample lists for YSM 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.

Kamloops VA Sample List

Sample	Type	Sub Strata	POLYGON_NU	UTMs	Lead Sp	Sp%	Age	Ht	BA	Stems/ha
1	I	FD1	092P00494777973	10N6148325651958	FDI	100	142	22	10	100
2	I	FD1	092I07405942931	10N6156235626608	FDI	100	152	20	15	250
3	I	FD1	092I05463645739	10N6243185596816	FDI	90	172	16	2	100
4	I	FD1	092I09347890952	10N6063265640522	FDI	100	162	25	5	100
5	I	FD1	082M06300198766	11N3240385730428	FDI	70	82	18	15	250
6	I	FD1	092I09601857936	10N6500915650410	FDI	60	122	25	15	300
7	I	FD1	082L06175787868	11N2880515613702	FDI	100	92	16	16	500
8	I	FD1	092I05477211558	10N6270455606499	FDI	100	152	25	8	200
9	I	FD1	092I06010400755	10N7004805602039	FDI	100	152	19	8	120
10	I	FD2	092I09530885939	10N6379555647541	FDI	90	112	21	25	300
11	I	FD2	092I09301673554	10N5988285645252	FDI	100	152	24	25	300
12	I	FD2	092I06475036268	10N6268885614308	FDI	99	112	18	22	650
13	I	FD2	092I08349645169	10N6062945630618	FDI	90	112	20	18	350
14	I	FD2	092I08339227593	10N6049665634578	FDI	100	92	15	18	400
15	I	FD2	092P01044691875	10N7087305654516	FDI	95	127	28	20	300
16	I	FD2	082M01183109147	11N2958875666033	FDI	80	112	23	30	600
17	I	FD2	092I08038386054	10N7064865627688	FDI	100	165	36	23	250
18	I	FD2	082M00272586653	11N3104525660052	FDI	100	152	26	28	350
19	I	FD2	082M04247793202	11N3118955705548	FDI	40	137	30	30	375
20	I	FD3	082M00186962367	11N2951235654435	FDI	50	72	23	35	850
21	I	FD3	082L08187202852	11N2932235638647	FDI	90	137	32	55	450
22	I	FD3	092I06852234262	10N6739685608825	FDI	100	132	20	32	600
23	I	FD3	092I04937657264	10N6878485597001	FDI	95	121	28	40	450
24	I	FD3	082M03171551760	11N2967335687806	FDI	75	152	30	45	450
25	I	FD3	092I06391823302	10N6128955610023	FDI	100	132	24	36	650
26	I	FD3	082M06421483840	11N3435225719472	FDI	60	102	30	70	600
27	I	FD3	092I08054046361	10N7091795628139	FDI	100	172	35	42	350

28	I	FD3	092I06871834068	10N6775545608465	FDI	50	77	20	31	800
29	I	FD3	092I05914700137	10N6842545601664	FDI	100	202	28	39	350
30	I	Spruce1	092P00701692762	10N6675355657847	SX	85	132	21	11	225
31	I	Spruce1	092P02862929592	10N6790855685868	SE	70	162	22	15	325
32	I	Spruce1	082M09575436571	11N3576145756410	SX	60	72	17	20	150
33	I	Spruce1	082M06150827099	11N2982855730979	SE	40	81	24	5	50
34	I	Spruce2	092P00809012309	10N6686855656695	SE	95	132	22	32	580
35	I	Spruce2	092P02820129361	10N6720735685778	SX	90	162	31	25	325
36	I	Spruce2	083D01545062883	11N3558765784679	SX	70	202	32	35	200
37	I	Spruce2	092P06000986849	10N7039735714209	SX	50	82	26	30	300
38	I	Spruce2	092I06521743076	10N6347475608761	SX	95	177	26	25	275
39	I	Spruce3	082M07156441862	11N2996155738276	SE	80	71	14	40	800
40	I	Spruce3	082M07120242444	11N2945935740831	SX	60	82	24	45	600
41	I	Spruce3	083D03485279393	11N3473305796770	SX	65	252	28	50	400
42	I	Spruce3	082M06573224362	11N3523565719154	SX	40	82	24	45	700
43	I	Spruce3	082M00294146404	11N3137505659028	SE	90	212	31	42	450
44	I	Spruce3	082M09302668221	11N3285585762739	SE	80	232	33	55	400
45	I	Spruce3	082M05142909126	11N2952275717246	SE	65	172	28	40	500
46	I	Balsam1	082M08581187629	11N3562965741345	BL	50	52	10	5	150
47	I	Balsam1	082M05151545695	11N2961095711485	BL	55	222	23	10	75
48	I	Balsam1	083D05479235858	11N3491695824592	BL	55	127	10	1	75
49	I	Balsam2	092P05023930416	10N7071985703349	BL	85	202	22	24	550
50	I	Balsam2	082M03416558191	11N3393785693276	BL	40	52	11	20	500
51	I	Balsam2	083D01459141044	11N3406775783391	BL	90	182	17	20	125
52	I	Balsam2	082L08138654526	11N3020695640047	BL	85	62	16	17	850
53	I	Balsam3	082M07646205701	11N3672055736724	BL	90	142	15	35	475
54	I	Balsam3	082M07422461218	11N3452025731866	BL	60	222	24	45	300
55	I	Balsam3	083D01534239953	11N3528085779626	BL	70	202	22	35	300
56	I	Balsam3	083D05430774149	11N3411805822886	BL	90	152	18	40	275
57	I	Balsam3	082M02433521976	11N3408055682305	BL	60	182	22	40	600
58	I	Balsam3	082M04441167138	11N3454025707735	BL	70	102	22	30	275
59	I	Other1	092I05797397749	10N6641035598459	PLI	75	137	23	15	250

60	I	Other1	092I09450311472	10N6241345640443	PLI	85	137	18	10	200
61	I	Other1	092I05619348784	10N6509995600740	AT	80	89	12	0	400
62	I	Other2	092I09034950275	10N7058625635124	EP	97	70	20	30	600
63	I	Other2	092I10049136790	10N7090465645892	AT	85	92	24	22	400
64	I	Other2	083D00499791441	11N3455615766320	HW	50	302	35	30	150
65	I	Other2	082M05518158707	11N3589195708937	HW	35	92	16	35	550
66	I	Other3	082M07462370478	11N3346895731693	EP	50	71	23	40	550
67	I	Other3	082M07576511759	11N3544215731396	HW	50	82	22	60	800
68	I	Other3	083D00463880396	11N3394745765281	HW	40	227	33	70	275
69	I	Other3	082M05252088659	11N3137385714489	HW	80	277	37	60	285
70	I	Other3	083D02485025727	11N3462465790652	CW	40	252	30	70	300
71	R	FD1	092I06631358609	10N6533215617045	FDI	90	132	19	6	130
72	R	FD1	092P01694496900	10N6494485665352	FDI	100	62	17	10	500
73	R	FD1	082M01343325071	11N3237515672679	FDI	85	147	32	10	100
74	R	FD1	092I08531607415	10N6372235633164	FDI	100	227	25	5	175
75	R	FD2	082M03177703050	11N2977545689491	FDI	40	127	27	25	300
76	R	FD2	082M03257266791	11N3121565694116	FDI	85	137	28	25	300
77	R	FD2	092I08606998324	10N6502675633990	FDI	100	92	19	24	250
78	R	FD2	092P04001194886	10N7028705693827	FDI	40	162	31	30	600
79	R	FD3	092P07002485976	10N7048015729498	FD	90	117	27	45	800
80	R	FD3	082M06592957432	11N3563885723885	FDI	40	72	24	50	575
81	R	FD3	092P04811616046	10N6708765697245	FDI	95	142	32	40	350
82	R	FD3	092I06393341786	10N6127905607625	FDI	90	192	32	42	400
83	R	FD3	082M03232614860	11N3070755691434	FDI	80	127	31	40	400
84	R	Spruce1	082M05524680474	11N3602665711588	SE	60	252	28	15	150
85	R	Spruce1	083D03453180663	11N3420615799763	SE	85	92	15	5	75
86	R	Spruce2	092P00704933526	10N6680965659224	SX	90	142	25	21	300
87	R	Spruce2	092I09284574527	10N5959025646981	SX	60	122	22	25	400
88	R	Spruce3	092P05909874162	10N6883855710492	SX	75	128	38	56	650
89	R	Spruce3	083D04392557737	11N3334555812974	SX	70	252	33	45	275
90	R	Spruce3	082M05551673632	11N3486445718517	SX	50	102	28	70	700
91	R	Balsam1	082M05333051919	11N3273975717996	BL	50	82	17	5	145

92	R	Balsam2	083D03469630960	11N3448295800118	BL	100	142	17	20	200
93	R	Balsam2	083D06523460619	11N3577715831868	BL	75	142	15	20	400
94	R	Balsam3	082M08398269409	11N3260165748333	BL	60	182	24	45	350
95	R	Balsam3	082M05128797433	11N2925785714657	BL	60	142	22	40	500
96	R	Other1	092I06597083832	10N6305115610248	PLI	100	92	17	15	500
97	R	Other2	082M00287334174	11N3124045655569	AT	50	82	20	22	550
98	R	Other2	092I06511576298	10N6332015614531	PLI	100	91	22	38	800
99	R	Other3	082M06592037095	11N3560275723425	HW	40	72	26	65	600
100	R	Other3	083D03513785996	11N3535425807482	CW	50	352	33	85	175

Kamloops Air Call Sample List

Sample	POLYGON_NU	Area	BA	Stems/ha	Lead Spp	Sp%	AGE	Ht
101	092I08962893347	38.47	23	600	FDI	100	102	21
102	082L09123630581	45.51	7	600	BL	65	42	12
103	083D02446376351	7.00	60	180	CW	50	302	37
104	092I04883292704	23.41	22	1657	PLI	80	52	13
105	092P06003096268	30.50	25	250	FDI	40	92	24
106	092I09691976949	4.44	10	250	SX	45	82	21
107	092I04719112613	6.42	10	300	PLI	75	62	16
108	092I09403441338	18.94	20	450	FDI	90	112	16
109	083D05599803277	41.89	20	300	BL	85	127	10
110	092I09446477496	23.89	30	400	FDI	70	142	25
111	082L08267703677	1.54	9	650	EP	50	32	9
112	092I08631778441	8.90	30	175	FDI	100	152	27
113	092P05990398947	13.86	44	625	SX	55	128	33
114	092P00605434976	13.03	25	400	FDI	90	152	25
115	082M05476193105	0.94	45	375	BL	60	232	29
116	082L05290385766	9.51	32	400	FDI	95	142	27
117	083D04418879768	4.68	40	350	BL	85	177	19
118	082M04197488482	5.16	20	375	BL	85	137	22

119	092P05910405877	52.15	44	675	BL	64	188	28
120	082M03340805572	8.92	60	450	CW	45	252	35
121	083D05480486293	14.27	10	200	BL	95	177	17
122	082M06301424851	4.80	38	750	FD	50	78	28
123	092I08292784613	143.24	22	400	FDI	100	152	17
124	092P02901440020	10.37	7	150	BL	75	102	17
125	092I09311730995	19.37	10	600	PLI	60	72	14
126	092I06533987738	110.81	10	225	FDI	65	92	20
127	082M03343483827	5.74	45	650	FDI	60	122	28
128	092P05917918379	49.84	40	375	FDI	75	137	37
129	092P06960210319	7.94	25	350	SE	50	123	26
130	082M01340795942	3.72	27	400	FDI	80	92	28
131	082M09444165557	3.34	15	1200	BL	60	37	9
132	082L05298035639	3.14	15	900	PLI	100	42	14
133	082M06220597824	2.13	25	300	ACT	60	42	24
134	082M04414915213	15.00	65	475	SX	40	202	29
135	092I06607228459	20.09	27	700	FDI	100	72	16
136	092I07005096897	4.33	2	60	FDI	100	112	21
137	082M03331918808	11.85	35	550	BL	70	132	14
138	082M05344422121	38.93	20	4414	BL	70	35	9
139	092I07360673157	6.81	14	450	FDI	100	72	13
140	082M05491040276	20.26	45	600	SE	40	92	23
141	082M04281242925	15.60	20	450	SE	80	137	24
142	092I06023123151	8.68	37	500	FDI	97	122	24
143	082M04216422029	35.58	10	175	BL	85	137	21
144	092I09507197816	12.13	15	400	PLI	90	82	14
145	082L08267035914	4.14	42	400	FDI	75	132	29
146	092I09093278428	2.72	5	250	FDI	100	87	15
147	092I09519743289	4.99	1	200	SX	90	62	15
148	092P04942651840	94.29	46	350	FDI	100	122	34
149	092P08953857320	1.83	30	675	PLI	50	142	23
150	083D00320650840	18.55	40	325	BL	75	162	20

151	082M05393321008	2.27	6	385	BL	60	122	15
152	082M04523015411	9.04	65	500	CW	50	127	27
153	092I08279648372	7.10	25	500	PLI	95	112	19
154	082M06168292975	2.37	10	40	SX	70	142	30
155	092I06042242078	8.98	40	440	FDI	100	122	23
156	082M09383403504	42.61	40	800	SX	40	62	23
157	092P00496359938	21.28	5	900	FDI	90	77	9
158	092P05847934983	12.65	40	500	SE	85	143	29
159	082M01252575321	8.25	14	650	SX	85	52	16
160	082M09532014402	24.34	35	250	BL	80	202	25
161	092I04926931952	0.25	28	400	FDI	100	112	22
162	092P08802896884	19.05	60	650	FDI	70	163	35
163	082L08191400492	2.74	8	175	FDI	100	158	24
164	082M09408516195	7.67	45	500	SX	50	132	23
165	092I06461592135	36.60	16	600	FDI	100	112	15
166	092I08346795363	4.60	30	400	FDI	90	152	21
167	083D05678076877	6.04	25	300	SE	55	352	21
168	092P00758309401	7.66	5	150	PLI	70	92	18
169	082M02333132626	4.68	60	550	FDI	40	122	28
170	092P09989780537	27.84	55	650	FDI	50	163	33
171	092I04893253928	24.09	28	1500	PLI	60	52	13
172	082M07321252216	13.58	45	650	FDI	40	102	26
173	092P01613027325	5.90	2	40	AT	80	122	26
174	082M06407939954	7.41	10	900	SX	50	32	9
175	082M07575521512	32.94	50	400	SE	60	202	29
176	083D02689217224	22.13	25	700	BL	75	92	14
177	082M04101611030	9.83	20	450	BL	75	147	18
178	082M05401139940	76.10	60	600	FDI	40	92	26
179	082M03323744218	54.10	20	800	CW	30	37	13
180	082M04370295486	4.51	42	600	FDI	90	97	24
181	092P02996658674	9.51	6	700	SX	100	32	10
182	082L08114973047	35.94	20	650	BL	70	82	18

183	092I07335730449	18.38	15	400	FDI	100	82	18
184	082M04287073109	13.25	27	400	SE	60	187	27
185	082M08332867030	1.37	3	50	BL	60	162	20
186	082M04396562066	29.67	12	200	SE	60	107	23
187	092I10013988948	8.35	24	450	FDI	80	117	24
188	082M09391858426	47.68	55	425	SE	80	232	33
189	083D03520743980	12.78	30	360	SX	45	202	24
190	092P00941923216	3.24	13	850	EP	85	67	15
191	092I07513292006	4.72	1	600	FDI	100	32	5
192	092I06782797787	21.70	31	600	FDI	100	112	20
193	082L08115311272	40.83	20	800	BL	60	72	16
194	083D00563352837	0.37	60	250	CW	60	302	31
195	092I05583637330	18.89	6	450	FDI	100	72	15
196	083D02399112946	7.63	20	150	BL	70	142	22
197	092P04829507725	6.99	35	450	FDI	60	92	23
198	082M09305203833	17.23	40	500	SE	50	102	23
199	092P04079432335	0.07	16	1039	EP	60	42	14
200	083D00615724939	5.18	30	175	SE	60	222	22

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

