MERRITT TIMBER SUPPLY AREA
SAMPLE PLANS
FOR

YOUNG STAND MONITORING
MATURE INVENTORY AUDIT
20KM GRID MONITORING

Prepared by:
Forest Analysis and Inventory Branch
Ministry of Forests and Lands

Project Number:

March 2013

TABLE OF CONTENTS

1.0   INTRODUCTION

1.1   Background

There is a need for the continued maintenance of a forest growth and yield monitoring program in the Merritt Timber Supply Area (TSA) to estimate growth of young stands, to report on the status and growth of the mature standing timber inventory, and to support a broader region-wide Ministry monitoring initiative. A major concern has been the need to quantify impacts of AAC increases in the TSA by as much as 200% relative to 1996 levels, as a result of the ongoing mountain pine beetle epidemic.

Previously completed growth and yield projects in the Merritt TSA include: 1) Change monitoring inventory (CMI) ground sampling program established in 2005 as requested by the Regional Executive Director; and 2) a VRI Phase II ground sampling program established in 1999 as part of a statistical inventory adjustment on the TSA.

Current growth and yield needs can be met through a combined approach of establishing new ground samples together with re-measuring previously established ground samples, to complement an expanded growth and yield monitoring and audit program for the TSA.

1.2   Terms of Reference

This sample plan was completed by R. de Jong, Forest Analysis and Inventory Branch (FAIB). The subsequent ground sampling phase will be coordinated by R. Bilek, FAIB.

1.3   Goals and Objectives

The primary goal of the growth and yield monitoring program is to provide a level of comfort (reduced risk for decision makers) on the actual volumes, volume growth, and health of all stands on the Merritt TSA.   The specific objectives are listed separately for each of the three separate sampling programs: Young Stand Monitoring (YSM), Mature Inventory Audit, and 20km Monitoring.

1.4   Total Program Sample Size

The sample size for all three sampling programs combined is summarized in two scenarios depending on budget limitations: The first scenario (Batch 1) involves randomly selecting a subset from all available mature audit samples, while the second scenario involves establishment and re-measurement of all available samples.

Total sample size for all three programs is 135 ground samples under a batch 1 scenario (minimum), and 161 samples for batch 1&2 combined (preferred) (Table 1).

Table 1. Total sample size by program, sample type and batch.

Program	New Samples	Re-Measured Samples		Total Samples	
		Batch 1	Batch 1&2	Batch 1	Batch 1&2
YSM	43	15	15	58	58
Mature Audit	-	50	76	50	76
20km Monitoring	25	2	2	27	27
Total	68	67	93	135	161

2.0   YOUNG STAND MONITORING SAMPLE PLAN

2.1   Objectives

The objective of the young stand monitoring (YSM) program is to "check the accuracy of growth and yield assumptions of key timber attributes of young stands used in timber supply review (TSR) for a management unit." [1] The TSR assumptions include stand volume, site index, age, species composition and conversion, pest and disease incidence and operational adjustment factors (OAFs).

2.2   Overview

The YSM sample design provides a set of representative sample points from a 4-km grid across young stands between 15 and 50 years of age on the Merritt TSA. The grid size and origin was chosen to complement a previously established CMI program[2] by retaining as many original CMI plots for re-measurement, while establishing new YSM plots from an expanded target population.

2.3   Target Population

The target population for the Merritt TSA YSM program is all young stands between 15 and 50 years of age in the Crown area of the TSA as of the end of 2012.[3] This age range is used to limit sampling to stands that have merchantable volume and that are generally of (but not restricted to) post-harvest origin. The target population will evolve over time as mature stands are disturbed (e.g., by harvesting, fire, blow down, epidemic infestation), subsequently regenerated and attain age 15 years, and as the previously younger stands mature (> 50 years). Of the total TSA, 9% are in young stands 15-50 years of age (Table 2).

Table 2. Area netdown summary of YSM target population.

Netdown Summary	Removed (ha)	Remaining (ha)	% of TSA	% of Crown
Total TSA		1,132,800	100%	
Private / Parks / Reserves	211,600	921,200	81%	
Crown		921,200	81%	100%
>50 years	754,800	166,400	15%	18%
<= 14 years	69,200	97,200	9%	11%
Target Pop 15 - 50 yrs		97,200	9%	11%

---

[1] Page 8 of "A Framework For Implementing Young Stand Growth Monitoring in B.C.", FLNRO Discussion Paper ver. 2.2, January 13, 2012.

[2] Change Monitoring Inventory for the Merritt IFPAs – Project Implementation Plan ver.2. Prepared for Stuart Aird NSIFS, by J.S. Thrower and Associates Ltd. September 6, 2005. Project MTI-603.

[3] The LRDW VRI coverage was based on projections updated to January 2011. The age criteria was based on the attribute "PROJ_AGE_1" to be between 15 and 50 years of age, updated to the end of 2012 (ie., by adding 2 years to PROJ_AGE_1). The crown portion was based on the LRDW ownership coverage excluding private land, parks and reserves (ie., excluding OWN= 40,50,51,52,53,54,60,61,63,67,68,99).

2.4   Sample Size

The sample size for the YSM program will be 58 YSM samples between 15 – 50 years of age (as of the end of 2012). The original CMI program included the establishment of 36 samples on a 2km grid[4], based on a target population of stands at least 20 years of age established on or after 1960 in the vegetated treed portion of the THLB.[5] With the expanded target population of the YSM program to include all stands 15 – 50 years old regardless of origin, it was necessary to move to a 4km grid multiple of the original 2km CMI grid. This resulted in a YSM sample size of 58 grid points, of which 15 grid points were previously established CMI samples (Figure 1, Figure 2, Appendix 1).   An additional 21 grid points <15 years of age were identified as future recruitment YSM samples that would enter the target population over the next 10 years.
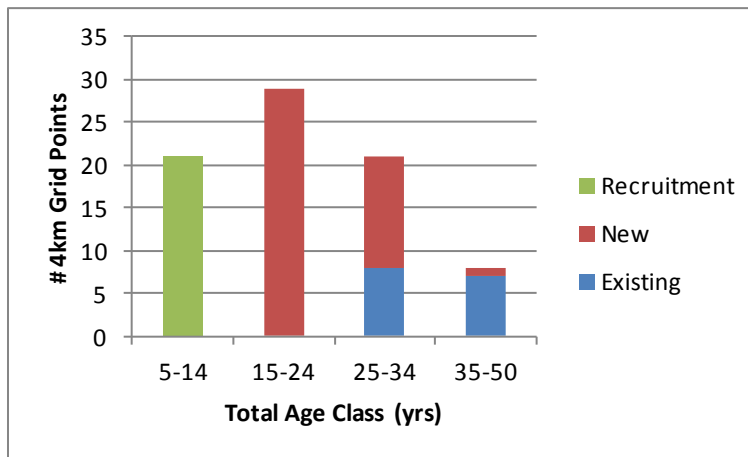

Figure 1.   Sample size of new and previously established YSM samples on the 4km grid, including current target population (15-50yrs) and future recruitment (5-14yrs).

2.5   Risk of Using Projected Age Only

The VRI-based projected age attribute was used as a consistent and reliable measure to define the current YSM target population, however there is risk that not all the desired population may have been included. For example, by separately reviewing the harvest and natural disturbance dates[6] on the 4km grid, an additional 4 samples were identified with a disturbance history since 1962 (due to either harvest or natural event), and an additional 25 samples identified as potential future recruitment samples. Therefore, with future updates to the projected age attribute (from those currently missing ages), the YSM target population could increase to 62 samples (15 - 50 years old), and 46 recruitment samples (< 15 years old).

---

[4] The CMI 2km grid originated at UTM Nad83 Zone:10 Easting:618000 Northing:5430000. The YSM 4km grid was based on this same reference point shifted 2km north. Note this grid is unrelated to the NFI grid.
[5] CMI sample ground establishment was consistent with MoF Change Monitoring Procedures in effect as of 2005.
[6] The VRI attributes 'HARVEST_DATE' and 'EARLIEST_NONLOGGING_DIST_DATE' were assessed for any records dated 1962 or later.
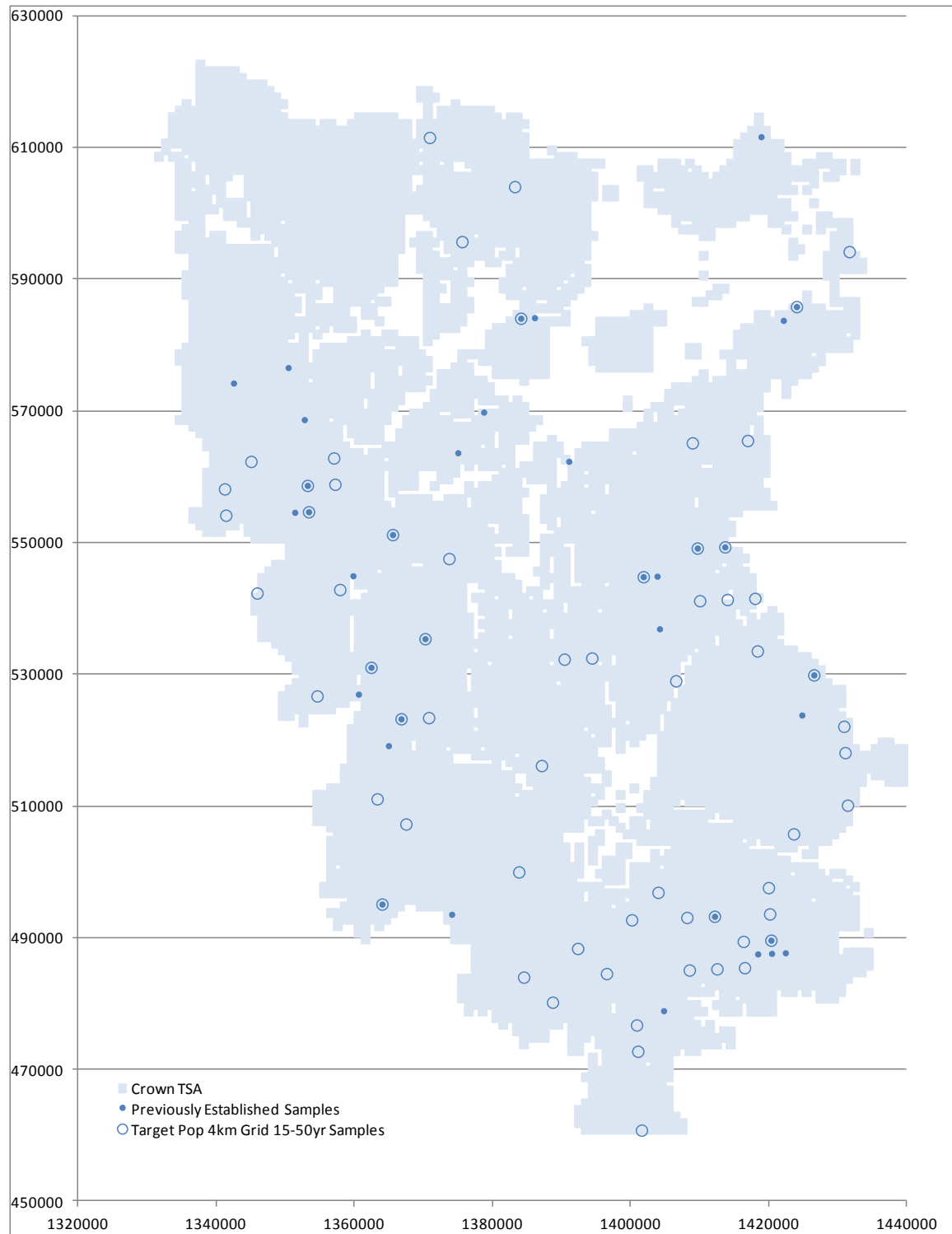
Figure 2. Merritt TSA YSM samples, including established CMI samples on original 2km grid (solid point), and new YSM samples on new 4km grid (open circle). Note that overlapping grid points are CMI samples to be maintained and re-measured under the new YSM program.

2.6 Plot Design

The sample plots are fixed-area permanent sample plots (PSPs), and the establishment and measurement follows current BC CMI standards and procedures (Figure 3).[7] The main plot is 400 m^2 (11.28 m radius) where all trees greater than 9.0 cm are measured and tagged. Trees between 4 and 9 cm are measured and tagged in the small tree plot (100 m^2, 5.64 m radius), and all trees less than 4 cm dbh and greater than 30 cm tall are counted in the regeneration plot (19.6 m^2, 2.50 m radius).
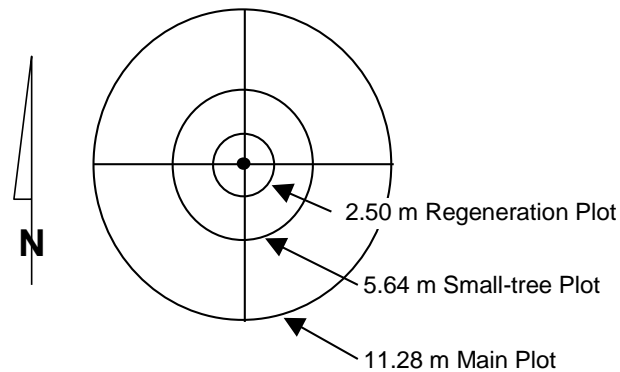
Figure 3. YSM sample plot.

2.7 Plot Measurements

All plot and tree re-measurement will follow current CMI standards using CMI certified field crews. Information that will not be collected include:

- Ecological data plots. A visual estimate of the biogeoclimatic site series will be recorded on the Ecology Header (EH) card.
- Forage production micro plots
- Soils data
- Old growth data
- Coarse woody debris transects.

Recommended variation from standards includes accounting for differences with 2005 tree tagging methods, and classification of residual trees.

2.7.1 Tree Tags

As part of the 2005 CMI establishment, tree tags were located at breast height. For the 15 samples to be re-measured in 2013, these tree tags should remain as originally located. However, for all new samples established, tree tags will be positioned at stump height as stated in current CMI standards.

---

[7] BC Ministry of Forests, Lands and Resource Management Operations. June 2012. Change Monitoring Inventory BC. Change Monitoring procedures for provincial reporting. Ver. 1.0. 202pp. + appendices. (http://archive.ilmb.gov.bc.ca/risc/pubs/teveg/nficmp2012/CMI%20Procedures_ver1_2012_Final.pdf).

2.7.2 Residual Trees

The CMI standards specify that trees are classed as residual if they are present in even aged stands as living remnants of a former stand, or occur as the occasional large stem of an older age class than the stand as a whole. While no change from the standards are proposed here, it is important that all trees clearly not part of the young stand population be identified as residuals. The intent is that the residual component can be summarized with and without the young stand component as part of the plot compilation phase and subsequent comparison against TSR-based management plan assumptions.

2.8   Analysis & Interpretation

All samples (new and previously established) lie on the 4km grid and will be established in the target population; therefore weighting will not be required between new and previously established samples. First-measurement results can be used to audit the yield of young stands from all samples, plus provide an indication of change from the smaller subset of 15 re-measured samples. After the second measurement is completed, differences between measured and predicted growth and yield for the main attributes of interest can be estimated. Potential inventory attributes to examine include volume, site index, species composition, stand structure, and pest or disease incidence.

2.9   Future Modification

The size of the YSM program will increase over time as future recruitment YSM samples enter the minimum age of 15 years. It is estimated that an additional 21 new grid points currently < 15 years old will be part of the target population over the next 10 years.

The sample size may be decreased in the future by randomly dropping some plots in the older stands where the comfort of predicting stand yield is higher.

New tree measurements could also be added to the YSM program. For example, height to live crown, crown width, branch size, and tree taper could be included in future measurement cycles, to provide linkages with wood quality model predictions.

3.0   MATURE INVENTORY AUDIT SAMPLE PLAN

3.1   Objectives

- To audit mature stands from the VRI Phase 1 Inventory.

3.2   Overview

The NSIFS initiated a VRI Phase II ground sampling program in 1999 across the Merritt TSA as part of a statistical adjustment of the forest inventory.[8] A total of 125 phase II ground samples were established between 1999 and 2000 in the VT portion of the TSA. Sample selection was made by the MoF using a multiple pass ordered systematic design. Statistical adjustment was completed in 2003[9], and updated in 2009[10] following completion of NVAF destructive sampling. A subset of these ground samples will be re-measured in 2013 to provide an unbiased audit of the overall inventory of stands greater than 50 years of age, as well as to evaluate change in the growth and yield over the past 14 years.

3.3   Target Population

The original target population of the phase II samples was the VT portion of all stands in the TSA. The current target population has changed following updates for depletions and growth, changes to ownership / new parks, and by restricting the projected age to stands > 50 years. Of the total TSA area, 67% are in stands greater than 50 years of age (Table 2).

3.4   Sample Size

The sample size has been reduced from the 125 originally established ground samples down to 76, due to exclusions for private land / new parks, NVAF destructive sampling program, operational harvesting since establishment, and from samples falling outside the new target population (Table 3, Figure 4, Appendix 1).

Table 3. Netdown of VRI Phase II samples for re-measurement.

Netdown Summary	Removed (# Samples)	Remaining (# Samples)	% of Total Established	% of Crown
Total # Samples Established		**125**	**100%**	
Private / Parks / Reserves	8	117	94%	
Crown		117	**94%**	**100%**
NVAF Destructive Sampling	34	83	66%	71%
Harvested > 1999	3	80	64%	68%
Non forested	2	78	62%	67%
Young stands 15 - 50 yrs	2	76	61%	65%
Crown VT 51+ yrs		76	61%	65%

---

[8] VRI in the Merritt TSA – Project Implementation Plan. Prepared for Kamloops Forest Region, MoF, by J.S. Thrower and Assoc., June 1999.

[9] VRI Statistical Adjustment for the Merritt TSA – 2003 Update. Prepared for the NSIFS by J.S. Thrower and Assoc., March 2003.

[10] Merritt TSA - Documentation and Analysis for VRI Statistical Adjustment. Prepared for the NSIFS by Jahraus and Assoc., Nov 2009.
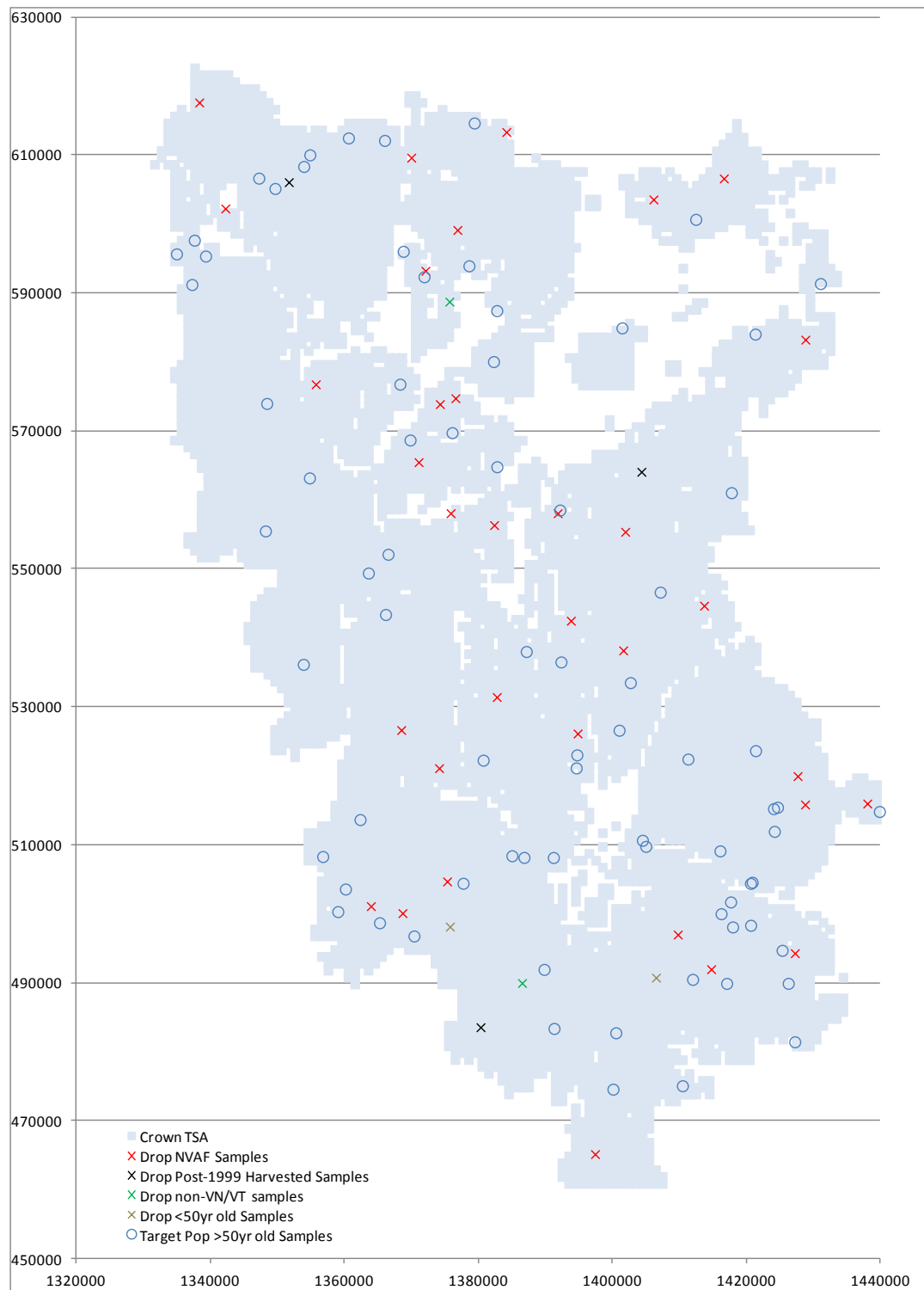
Figure 4. Merritt TSA phase II ground samples for re-measurement (circle), and phase II samples dropped (crosses).

3.5   Plot Design

Ground samples were established as five-point clusters. There will be no changes to original plot design for re-measurement.

3.6   Plot Measurements

The original sample establishment was consistent with VRI ground sampling standards of 1999.[11] All sample re-measurements will follow 2012 VRI ground sampling methods[12], with additional tree distance measurements noted below. Any difference between ground sampling standards will be noted, with any discrepancy defaulting to 2012 protocols. All plot and tree re-measurement will be completed using VRI Phase II certified field crews. Horizontal distance measurements from each tree to plot centre will be required (from all plots in each 5-point cluster). These measurements will be used for computing growth and yield change attributes from variable-radius plots.

3.7   Batch Samples

The total number of samples available for re-measurement (76 samples) were randomly[13] split into two batches, comprising 50 samples in batch 1, with all remaining 26 samples allocated to batch 2. The intent is that all batch 1 samples will be re-measured, with batch 2 samples also re-measured in their sorted order as funding permits.

3.8   Analysis & Interpretation

A multiple pass ordered systematic (MPOS) sample design was used in the original sample selection for the phase II ground samples. Samples were selected in eight passes, with sample size in each pass ranging from 2 to 18 samples. For subsequent analyses, samples will be assigned to their appropriate sample selection passes, and weights will be computed.

All samples selected and used for destructive NVAF sampling were removed from the current sample list because of the destructive sampling on auxillary plots. Since NVAF ground samples were selected by age group, confirmation will be required if the mature age group was sampled more intensively than its area representation. If so, additional weighting will be required for the analysis.

A visual comparison was made between the target population total landbase area, vs. the total sample list (batch 1 & 2 combined) for the inventory attributes of projected age (to 2012), projected height of the leading species, total merchantable volume (12.5cm utilization), leading species, and BGC zone (Figure 5, Figure 6). Across all attributes the two distributions compare reasonably well, suggesting the remaining 76 phase II sample point clusters are an unbiased sample of the target population.

---

[11] VRI Ground Sampling Manual ver. 4.0. Ministry of Forests, March 1999.

[12] VRI Ground Sampling Procedures ver. 4.9.1. Ministry of Forests, Lands and Natural Resource Operations. March 2012.
http://archive.ilmb.gov.bc.ca/risc/pubs/teveg/vri_gs_2012/VRI_GS_Manual_Ver_491_2012_Final.pdf

[13] Each sample was assigned a random value using the SAS function RANUNI with a starting seed(567468). Batch 1 was assigned to the first 50 samples sorted by the random value. The remaining batch 2 samples will be re-measured in the sorted order as funding permits.
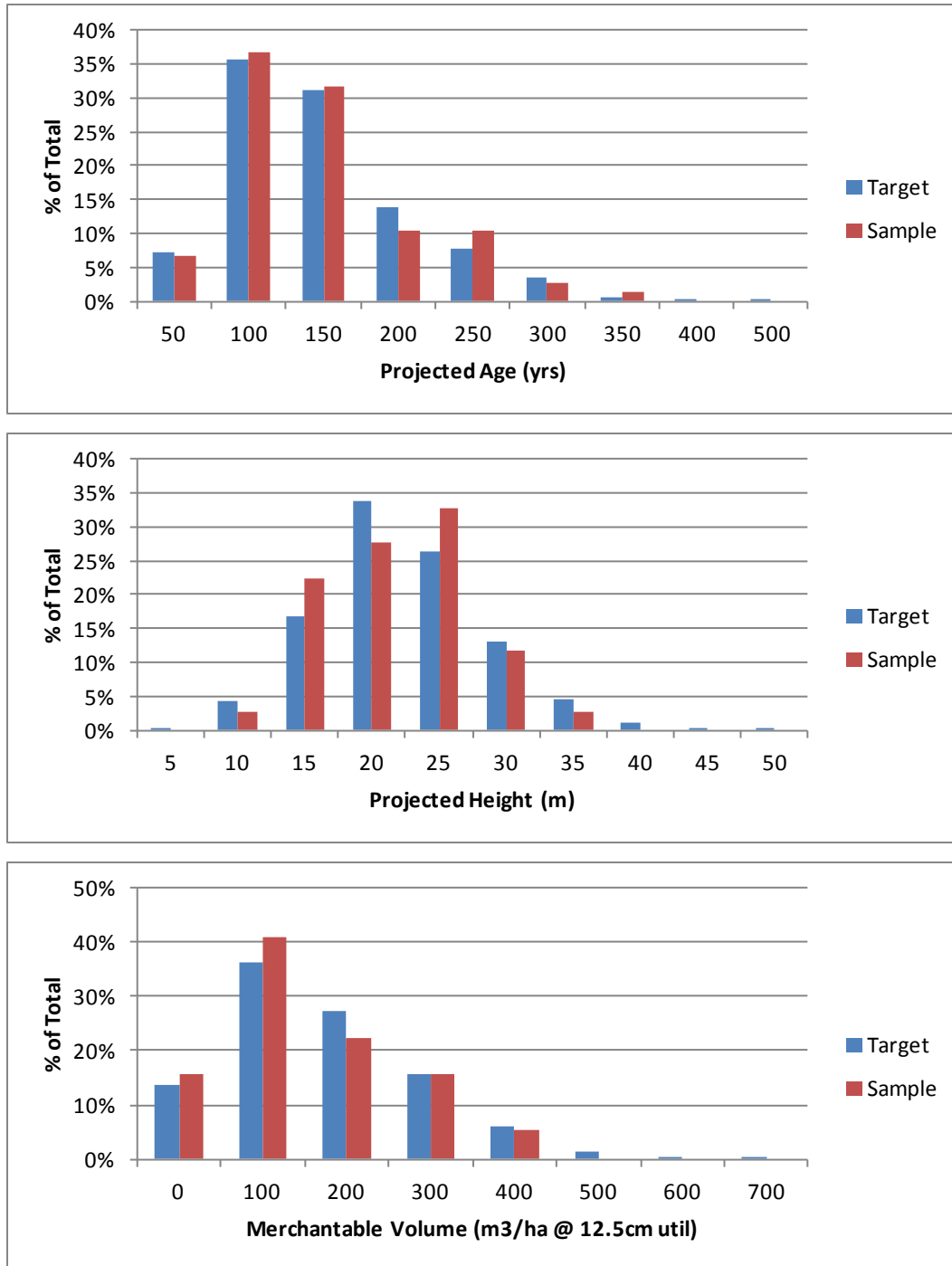
Figure 5. Target population vs. sample list (batch 1 & 2) comparison for inventory attributes projected age, projected height, and merchantable volume.
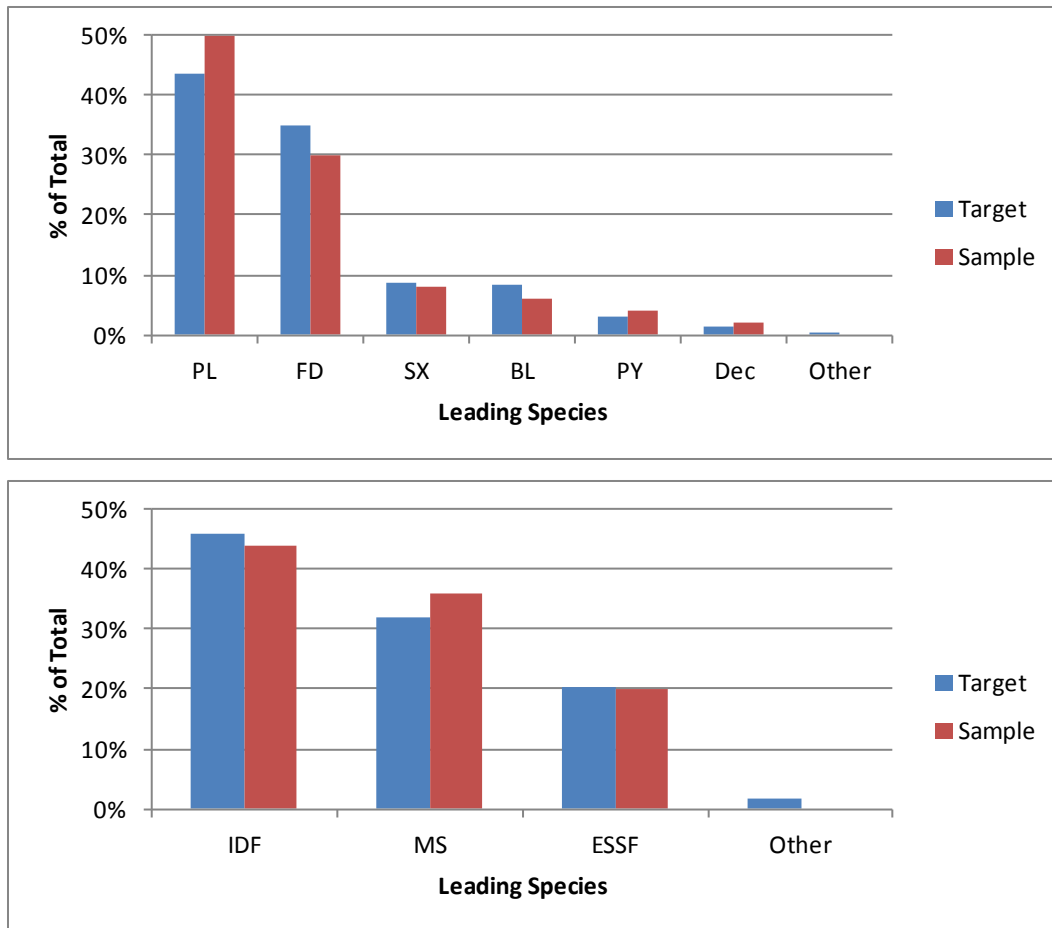
Figure 6. Target population vs. sample list (batch 1 & 2) comparison for inventory attribute classes of leading species and BGC zone.

4.0   20KM GRID MONITORING SAMPLE PLAN

4.1   Objectives

- Establish a 20km grid monitoring program across the entire TSA to support FAIB region-wide business needs.

4.2   Sample Size

Monitoring plots will be established across the full NFI 20km grid in the Merritt TSA, comprising a total of 27 grid points. These grid points are generally described by the inventory attributes as private land / parks (22%), Crown up to 50 years of age (18%), and over 50 years of age (59%) (Table 4, Figure 7, Appendix 1).

Table 4. Breakdown of 20km monitoring plots by classification.

Classification Summary	Total # Grid Points	% of Total Established
Private / Parks / Reserves	6	22%
Crown < 15 yrs old	3	11%
Crown 15 - 50yrs	2	7%
Crown 51+ yrs	16	59%
Total # Samples Established	**27**	**100%**

4.3   Plot Design

Samples points located in private land, parks and reserves, will be air photo interpreted. All other sample points will be established as fixed-area PSPs, and establishment and measurement will follow current BC CMI standards and procedures.[7]

4.4   Established NFI Plots

Two sample points on the 20km grid were previously established under the federal NFI monitoring program initiative in 2001 and 2003. These two samples will be re-measured in 2013, and will follow previously established NFI standards.

4.5   Analysis

In addition to addressing FAI region-wide business needs, the 20km monitoring plots will also be used to augment the YSM program (by an additional 2 samples) and the Mature audit program (by an additional 16 samples).
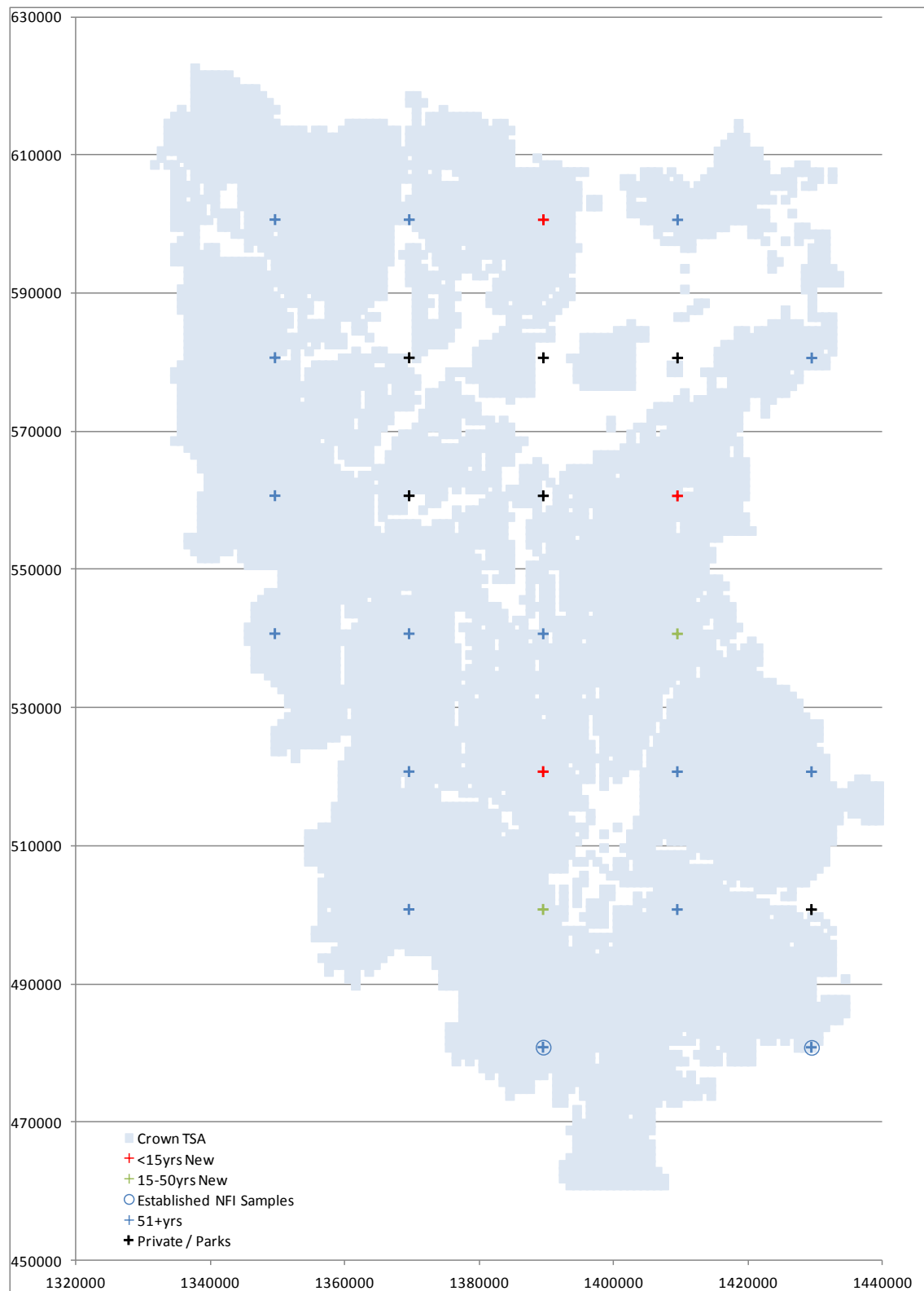
Figure 7. 20km Grid Monitoring sample points by inventory classification (colored hatches), and previously established NFI samples (open circles).

5.0   APPENDIX 1 – SAMPLE LISTS

Selected Sample lists are included for each of the three sample plan programs: YSM (Table 5), Mature Inventory Audit (Table 6, Table 7), and 20km Grid Monitoring programs (Table 8).

Table 5. Young Stand Monitoring Sample List.

New Sample ID			Original Sample ID			BC Albers Map		BC Albers GPS		Estab-Year	Proj Age to 2012	History Label	Owner-ship
Project	Type Code	Sample #	Project	Type Code	Sample #	X Coord	Y –Coord	X – Coord	Y – Coord				
DMEM	MO1	0041				1401595	460769				26	L85	62
DMEM	MO1	0042				1401061	472742				23	L77	62
DMEM	MO1	0043				1400883	476734				37	L75	62
DMEM	MO1	0044				1388704	480190				17	L95	62
DMEM	MO1	0045				1384527	484004				21	L88	62
DMEM	MO1	0046				1396527	484539				18	L96	62
DMEM	MO1	0047				1408526	485076				27	L80	62
DMEM	MO1	0048				1412525	485256				29	L82	62
DMEM	MO1	0049				1416525	485435				23	L77	62
DMEM	MO1	0050				1392349	488353				15	L99	62
DMEM	MO1	0051				1416346	489427				26	L73	62
DMEM	MO1	0052				1400170	492703				23	L84	62
DMEM	MO1	0053				1408169	493061				23	L72	62
DMEM	MO1	0054				1420167	493599				19	L94	62
DMEM	MO1	0055				1403992	496874				19	L91	62
DMEM	MO1	0056				1419988	497591				31	L71	62
DMEM	MO1	0057				1383818	499976				24	L79	62
DMEM	MO1	0058				1367467	507254				25	L89	62
DMEM	MO1	0059				1431446	510108				17	L94	62
DMEM	MO1	0060				1363292	511071				24	L86	62
DMEM	MO1	0061				1387108	516128				20	L85	79
DMEM	MO1	0062				1431087	518093				18	L92	62
DMEM	MO1	0063				1430908	522086				24	L77	62
DMEM	MO1	0064				1370761	523408				25	L69	62
DMEM	MO1	0065				1354591	526697				27	L79	62
DMEM	MO1	0066				1406566	529000				19	L85	62
DMEM	MO1	0067				1390398	532283				18	L90	62
DMEM	MO1	0068				1394395	532460				24	L84	62
DMEM	MO1	0069				1418380	533530				26	L85	62
DMEM	MO1	0070				1410029	541161				17	L86	62

New Sample ID			Original Sample ID			BC Albers Map		BC Albers GPS		Estab-Year	Proj Age to 2012	History Label	Owner-ship
Project	Type Code	Sample #	Project	Type Code	Sample #	X Coord	Y –Coord	X – Coord	Y – Coord				
DMEM	MO1	0071				1414026	541339				28	L86	62
DMEM	MO1	0072				1418023	541518				19	L78	62
DMEM	MO1	0073				1357886	542855				22	L82	62
DMEM	MO1	0074				1373700	547555				21	L68	62
DMEM	MO1	0075				1341195	558138				18	L96	62
DMEM	MO1	0076				1357184	558839				23	N71	62
DMEM	MO1	0077				1345017	562310				28	L85	62
DMEM	MO1	0078				1408963	565131				21	L78	62
DMEM	MO1	0079				1416955	565487				19	L85	62
DMEM	MO1	0080				1431688	594170				16	L98	62
DMEM	MO1	0081				1375583	595691				32	L80	62
DMEM	MO1	0082				1383221	604038				21	L92	62
DMEM	MO1	0083				1370885	611507				26	L78	62
DMEM	MR1	0007	DME2	MO1	0007	1426553	529894	1426556	529893	2006	28	L79	62
DMEM	MR1	0012	DME2	MO1	0012	1353362	554667	1353364	554667	2005	35	L72	62
DMEM	MR1	0013	DME2	MO1	0013	1353187	558664	1353189	558663	2005	42	N71	62
DMEM	MR1	0017	DME2	MO1	0017	1363996	495096	1363994	495095	2007	42		62
DMEM	MR1	0018	DME2	MO1	0018	1362412	531044	1362409	531048	2007	52	N38	62
DMEM	MR1	0020	DME2	MO1	0020	1366762	523231	1366761	523225	2007	33	L76	62
DMEM	MR1	0021	DME2	MO1	0021	1365530	551198	1365534	551202	2005	46	L68	62
DMEM	MR1	0022	DME2	MO1	0022	1370232	535392	1370232	535397	2005	32	L76	62
DMEM	MR1	0025	DME2	MO1	0025	1384102	584051	1384105	584051	2007	40	N60	62
DMEM	MR1	0028	DME2	MO1	0028	1401858	544800	1401852	544807	2005	29	L73	62
DMEM	MR1	0031	DME2	MO1	0031	1412168	493240	1412177	493236	2006	34	L74	62
DMEM	MR1	0032	DME2	MO1	0032	1409674	549151	1409682	549153	2007	30	L81	62
DMEM	MR1	0033	DME2	MO1	0033	1413670	549329	1413663	549328	2005	32	L76	62
DMEM	MR1	0034	DME2	MO1	0034	1420345	489607	1420349	489612	2006	30	L72	62
DMEM	MR1	0037	DME2	MO1	0037	1424055	585822	1424051	585831	2007	41	N60	62
Total													**58**

Table 6. Mature Inventory Audit Sample List – Batch 1

New Sample ID			Original Sample ID			BC Albers Map		BC Albers GPS		Estab-Year	Proj Age to 2012	History Label	Owner-ship	Sample Order
Project	Type Code	Sample #	Project	Type Code	Sample #	X Coord	Y –Coord	X – Coord	Y – Coord					
DME1	QR1	0004	DME1	QO1	0004			1417961	498081	1999	81	I07	62	28
DME1	QR1	0005	DME1	TO1	0005			1400100	474561	2000	132	I03	62	26
DME1	QR1	0006	DME1	TO1	0006			1407151	546621	2000	148	I05	62	47
DME1	QR1	0009	DME1	QO1	0009			1401442	584931	1999	120	L61	62	40
DME1	QR1	0014	DME1	QO1	0014			1348202	555496	1999	202	I03	62	27
DME1	QR1	0015	DME1	TO1	0015			1424192	511942	2000	135	I03	62	3
DME1	QR1	0016	DME1	TO1	0016			1391296	483366	2000	242	I05	62	49
DME1	QR1	0017	DME1	TO1	0017			1427243	481431	2000	244	I07	62	35
DME1	QR1	0018	DME1	TO1	0018			1362337	513648	2000	102		62	9
DME1	QR1	0027	DME1	TO1	0027			1353861	536153	2000	132		62	11
DME1	QR1	0036	DME1	QO1	0036			1348400	573977	1999	162	I07	62	38
DME1	QR1	0044	DME1	TO1	0044			1354837	610020	2000	75	I03	62	6
DME1	QR1	0045	DME1	QO1	0045			1386814	508162	1999	122	I03	62	44
DME1	QR1	0050	DME1	TO1	0050			1389812	491926	2000	142	I07	62	19
DME1	QR1	0051	DME1	QO1	0051			1334923	595664	1999	242	I05	62	23
DME1	QR1	0053	DME1	QO1	0053			1417665	501706	1999	87	I07	62	30
DME1	QR1	0054	DME1	TO1	0054			1416077	509110	2000	121	I04	62	18
DME1	QR1	0056	DME1	QO1	0056			1421387	523641	1999	221	I05	62	8
DME1	QR1	0057	DME1	TO1	0057			1417772	561045	2000	153		62	13
DME1	QR1	0059	DME1	QO1	0059			1404496	510645	1999	224		62	5
DME1	QR1	0063	DME1	QO1	0063			1382263	580051	1999	82		62	33
DME1	QR1	0064	DME1	TO1	0064			1353921	608338	2000	92	I04	62	2
DME1	QR1	0066	DME1	QO1	0066			1392334	536505	1999	142	I03	62	24
DME1	QR1	0070	DME1	TO1	0070			1420655	498326	2000	142	I04	62	32
DME1	QR1	0071	DME1	QO1	0071			1337222	591220	1999	172	I07	62	43
DME1	QR1	0072	DME1	TO1	0072			1379383	614638	2000	290	I07	62	7
DME1	QR1	0073	DME1	TO1	0073			1402692	533505	2000	82	I03	62	41
DME1	QR1	0074	DME1	QO1	0074			1424072	515232	1999	122		62	12
DME1	QR1	0077	DME1	TO1	0077			1370384	496773	2000	154		62	22
DME1	QR1	0078	DME1	TO1	0078			1439877	514820	2000	233		62	14

New Sample ID			Original Sample ID			BC Albers Map		BC Albers GPS		Estab-Year	Proj Age to 2012	History Label	Owner-ship	Sample Order
Project	Type Code	Sample #	Project	Type Code	Sample #	X Coord	Y –Coord	X – Coord	Y – Coord					
DME1	QR1	0079	DME1	QO1	0079			1404994	509761	1999	224		62	46
DME1	QR1	0080	DME1	QO1	0080			1382745	587438	1999	273		62	25
DME1	QR1	0084	DME1	TO1	0084			1400518	482738	2000	72	I04	62	34
DME1	QR1	0085	DME1	TO1	0085			1411986	490485	2000	111	I07	62	39
DME1	QR1	0093	DME1	TO1	0093			1416245	500000	2000	87	I07	62	36
DME1	QR1	0096	DME1	TO1	0096			1410467	475060	2000	204	I10	62	42
DME1	QR1	0097	DME1	QO1	0097			1394607	521135	1999	117		62	21
DME1	QR1	0099	DME1	QO1	0099			1394709	523032	1999	81	L82	62	1
DME1	QR1	0104	DME1	TO1	0104			1426265	489905	2000	71	I04	62	29
DME1	QR1	0105	DME1	QO1	0105			1349631	605143	1999	112	I07	62	31
DME1	QR1	0106	DME1	TO1	0106			1411294	522423	2000	142	I03	62	20
DME1	QR1	0108	DME1	QO1	0108			1421329	584034	1999	62	I05	62	15
DME1	QR1	0110	DME1	QO1	0110			1420633	504394	1999	142		62	48
DME1	QR1	0111	DME1	TO1	0111			1339266	595348	2000	252		62	4
DME1	QR1	0112	DME1	QO1	0112			1392160	558525	1999	163	I04	62	16
DME1	QR1	0119	DME1	QO1	0119			1376072	569739	1999	122	I03	62	45
DME1	QR1	0120	DME1	QO1	0120			1377713	504414	1999	122	I07	62	37
DME1	QR1	0123	DME1	TO1	0123			1360149	503580	2000	374		62	10
DME1	QR1	0156	DME1	TO1	0156			1391195	508150	2000	244	I07	79	50
DME1	QR2	0116	DME1	QR1	0116			1417074	489897	2006	209	I07	62	17
Total														**50**

Table 7. Mature Inventory Audit Sample List – Batch 2.

New Sample ID			Original Sample ID			BC Albers Map		BC Albers GPS		Estab-Year	Proj Age to 2012	History Label	Owner-ship	Sample Order
Project	Type Code	Sample #	Project	Type Code	Sample #	X Coord	Y –Coord	X – Coord	Y – Coord					
DME1	QR1	0010	DME1	TO1	0010			1378592	593934	2000	142	I04	62	73
DME1	QR1	0011	DME1	TO1	0011			1380715	522259	2000	124	I04	62	69
DME1	QR1	0019	DME1	QO1	0019			1420888	504562	1999	172		62	61

New Sample ID			Original Sample ID			BC Albers Map		BC Albers GPS		Estab-Year	Proj Age to 2012	History Label	Owner-ship	Sample Order
Project	Type Code	Sample #	Project	Type Code	Sample #	X Coord	Y –Coord	X – Coord	Y – Coord					
DME1	QR1	0020	DME1	TO1	0020			1347210	606643	2000	152	I03	62	72
DME1	QR1	0047	DME1	TO1	0047			1356759	508291	2000	149		62	75
DME1	QR1	0048	DME1	QO1	0048			1368783	596031	1999	82	L47		66
DME1	QR1	0049	DME1	QO1	0049			1369799	568680	1999	122		62	63
DME1	QR1	0052	DME1	TO1	0052			1365992	612113	2000	303	I04	62	56
DME1	QR1	0065	DME1	QO1	0065			1424665	515437	1999	132		62	68
DME1	QR1	0068	DME1	QO1	0068			1412461	600671	1999	67	L71	62	71
DME1	QR1	0069	DME1	TO1	0069			1382761	564801	2000	223	I04	62	70
DME1	QR1	0075	DME1	TO1	0075			1431071	591362	2000	153	I05	62	62
DME1	QR1	0087	DME1	TO1	0087			1365241	498688	2000	72	I07	62	55
DME1	QR1	0090	DME1	QO1	0090			1366511	552109	1999	142		62	76
DME1	QR1	0091	DME1	TO1	0091			1337588	597647	2000	222		62	53
DME1	QR1	0092	DME1	QO1	0092			1354776	563183	1999	252		62	60
DME1	QR1	0094	DME1	TO1	0094			1363573	549394	2000	123		62	58
DME1	QR1	0095	DME1	QO1	0095			1360593	612470	1999	141	I07	62	57
DME1	QR1	0100	DME1	QO1	0100			1387150	538014	1999	91	I05	62	59
DME1	QR1	0109	DME1	QO1	0109			1371890	592347	1999	111	I04	62	67
DME1	QR1	0113	DME1	QO1	0113			1425354	494693	1999	80	I07	62	65
DME1	QR1	0114	DME1	TO1	0114			1366139	543382	2000	122	I07	62	54
DME1	QR1	0117	DME1	QO1	0117			1368286	576773	1999	142		62	74
DME1	QR1	0118	DME1	QO1	0118			1359015	500308	1999	123		62	51
DME1	QR1	0126	DME1	TO1	0126			1385009	508403	2000	152	I04	62	52
DME1	QR1	0144	DME1	TO1	0144			1401010	526600	2000	84	I03	62	64
Total														**26**

Table 8. 20km Monitoring Sample List.

New Sample ID			Original Sample ID			BC Albers Map		BC Albers GPS		Estab-Year	Proj Age to 2012	History Label	Owner-ship
Project	Type Code	Sample #	Project	Type Code	Sample #	X Coord	Y –Coord	X – Coord	Y – Coord				
KAM1	FO1	0001				1349579	540701				222		62
KAM1	FO1	0002				1349589	560672				80	I03	62
KAM1	FO1	0003				1349598	580651				222	I03	62
KAM1	FO1	0004				1349607	600639				142		62
KAM1	FO1	0005				1369534	500783						62
KAM1	FO1	0006				1369545	520733				262		62
KAM1	FO1	0007				1369555	540693				294	I07	77
KAM1	FO1	0008				1369566	560662				82	I04	40
KAM1	FO1	0009				1369576	580641						40
KAM1	FO1	0010				1369584	600628				102		77
KAM1	FO1	0011				1389509	500775				20	L78	62
KAM1	FO1	0012				1389520	520724				10	L02	62
KAM1	FO1	0013				1389531	540684				122	L84	62
KAM1	FO1	0014				1389543	560653						63
KAM1	FO1	0015				1389553	580630						40
KAM1	FO1	0016				1389562	600616				8	L04	62
KAM1	FO1	0017				1409483	500767				88	I05	62
KAM1	FO1	0018				1409496	520717				77	I03	62
KAM1	FO1	0019				1409507	540676				15	L99	62
KAM1	FO1	0020				1409520	560642					L08	62
KAM1	FO1	0021				1409529	580619						40
KAM1	FO1	0022				1409540	600605				131	L71	77
KAM1	FO1	0023				1429456	500760				148		52
KAM1	FO1	0024				1429469	520709						62
KAM1	FO1	0025				1429505	580609				213	I05	62
KAM1	FR1	0090	CMI2	FO1	0090	1389496	480835	1389498	480858	2001	98	I03	62
KAM1	FR1	0395	CMI2	FO1	0395	1429443	480821	1429441	480823	2003	144	I07	69
Total													**27**