Alberta
SUSTAINABLE RESOURCE DEVELOPMENT

PSP MANUALS MASTER APPENDICES

MARCH 2005

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1. SUGGESTED EQUIPMENT AND SUPPLIES

Accountable – Individual	Accountable - Crew	Expendable
Clinometer	Staff compass	Spiral nails (6.5 cm)
Surveyors hand compass	Axe	Blue tree marking paint
Metal diameter tape	Cloth tape(s) (50m)	Plot posts-metal (corner, regen and sapling)
Loggers tape	Photo holder	Pencils 2H and grease
Topofil	Camera	Geo-flagging tape (orange, blue and yellow)
Biltmore stick	Calipers (tree and seedling)	Aluminum tags-plot corner and tree
Claw hammer	Chainsaw, tool box, stretcher and necessary safety equipment	String
2 lb hammer	Canthook	Loggers crayon
Hammer holder	Whistle	Field notebook
Pocket calculator	Tally Sheets (TM 267, TM 249, Regen and Sectioning)	Paint pens/markers
Douglas protractor	Cruisers Vest	Tie plates
Hand lens	Hard Hat/with shield	
Tallyboard (metal 8x12)	ATV/snowmobile helmet	
Pocket First Aid Kit	Trapper Nelson backpack	
Flare gun with flares and bear bangers	Crayon holder	
Bear repellent	Seedling calipers	
Engineers scale (15 cm)		

2. PLOT TOPOGRAPHY

a. Location

1 – Hollow For plots located in local topographic depressions – collecting water
2 – Flat For plots located on flat terrain – receiving water
3 – Slope For plots on mid and upper slopes – shedding water
4 – Hilltop For plots located on ridge crests – shedding water

3. SOIL CODES

a. Erosion potential

1 – Slight When 0 to 25% of the area is, or could be eroded in a flood situation.
2 – Moderate When 26% to 75% of the area is, or could be eroded in a flood situation.
3 – High When more than 75% of the area is, or could be eroded in a flood situation.

b. Drainage Codes

1 – Very rapidly drained	Water is removed from the soil very rapidly relation to supply. Excess water flows downward very rapidly if underlying material is permeable. There may be very rapid subsurface flow during heavy rainfall provided there is a steep gradient. Soils have very low available water storage capacity (usually less than 2.5 cm) within the control section and are usually coarse textured, or shallow, or both. Water source is precipitation.
2 – Rapidly drained	Water is removed from the soil rapidly in relation to supply. Excess water flows downward if underlying material is permeable. Subsurface flow may occur on steep gradients during heavy rainfall. Soils have low available water storage capacity (2.5-4 cm) within the control section, and are usually coarse textured, or shallow, or both. Water source is precipitation.
3 – Well Drained	Water is removed from the soil readily but not rapidly. Excess water flows downward readily into underlying permeable material or laterally as subsurface flow. Soils have intermediate available water storage capacity (4-5m) within the control section, and are generally intermediate in texture and depth. Water source is precipitation. On slopes subsurface flow may occur for short durations but additions are equalled by losses.
4 – Moderately Well	Drained Water is removed from the soil somewhat slowly in relation to supply. Excess water is removed somewhat slowly due to low permeability, shallow water table, lack of gradient, or some combination of these. Soils have intermediate to high water storage capacity (5-6 cm) within the control section and are usually medium to fine textured. Precipitation is the dominant water source in medium to fine textured soils, precipitation and significant additions by subsurface flow are necessary in coarse textured soils.
5 – Imperfectly Supply	Drained Water is removed from the soil sufficiently slowly in relation to keep the soil wet for a significant part of the growing season. Excess water moves slowly downward if precipitation is major supply. If subsurface water or ground water, or both, is main source, flow rate may vary but the soil remains wet for a significant part of the growing season. Precipitation is main source if available water storage capacity decreases. Soils have a wide range in available water supply, texture, and depth, and are gleyed phases of well drained subgroups.
6 – Poorly drained	Water is removed so slowly in relation to supply that the soil remains wet for a comparatively large part of the time the soil is not frozen. Excess water is evident in the soil for a large part of the time. Subsurface flow or ground water flow, or both, in addition to precipitation are main water sources; there may also be a perched water table, with precipitation exceeding evapotranspiration. Soils have a wide range in available water storage capacity, texture, and depth and are gleyed subgroups, Gleysols and Organic soils.
7 – Very poor drained	Water is removed from the soil so slowly that the water table remains drained at or on the surface for the greater part of the time the soil is not frozen. Excess water is present in the soil for the greater part of the time. Ground water flow and subsurface is less important except where there is a perched water table with precipitation exceeding evapotranspiration. Soils have a wide range in available water storage capacity, texture, and depth, and are either Gleysolic or Organic.

4. TREE HEIGHT MEASUREMENT

The height of a tree is defined as the length between the point of germination and the tip of the terminal leader. Heights are measured using a clinometer (with the percent scale) and a 30 or 50m measuring tape. Tree height calculations must be completed on the reverse side of the PSP Tally Sheet (TM 249) (see Figure 4.2A). All data fields are required to be filled in except:

a) Only Slope distance and slope % or horizontal distance is used.
b) Correction Factor is only used when the bottom % reading is recorded at a different reference point other than the germination point. ie. DBH height = 1.3m
c) Check cruise height columns are not to be used by field crew members. This space is only filled in if there has been an actual check cruise completed.

It is very important that field crews understand the process of measuring height so that data is calculated correctly.

At a distance far enough away from the tree to keep the clinometer scale below 100%, take readings for the top % of the tree (tip of the terminal leader), top % to live crown, and the bottom % of the tree (germination point) as shown in Figures 4.1. This may be difficult for deciduous trees as the top of the tree may not be visible through the crown. The slope of the ground must also be measured and recorded if it is greater than 10%.

During remeasurement if the present height is shorter than the past height then a second height must be taken and recorded on the tally sheet directly below the previous measurement. It is advised that the horizontal distance be increased 5 to 10 meters before taking the second reading. It will be up to the cruisers discretion to decide which is the correct height data to be transferred to the front of the tally sheet. Put a line through the height information that is not used **-never erase height information**. On the front of the tally sheet record in comments **HT** to indicate that the height was double-checked in the field.

If live crown height is measured using a metric tape instead of the clinometer, record on the front of the PSP tally sheet (TM 249) in the comments section “height to L.C. measured directly” (Figure 2.14, tree #10).

You should be approximately 25% further than previous height; ie. previous height is 20.2m, you should be 25.2 m, 36.0m should be 43.0m

Also record the slope and slope distance or horizontal distance to the tree. To calculate the tree height, to the nearest 0.1 m, use the following formula:

$$\text{Slope Distance} \times \text{Slope Correction Factor} \times \frac{\text{Top reading \% - Bottom reading \%}}{100\%} = \text{Tree Height (m)}$$

or

$$\text{Horizontal Distance} \times \frac{\text{Top reading \% - Bottom reading \%}}{100\%} = \text{Tree Height (m)}$$

For example, is 22.8 m away on a slope of 15%. The Suunto readings are +80% and +12%. Therefore, the tree is:

$$22.8 \text{ m} \times 0.989^{*}x \quad \frac{+80 - (+12)}{100} = 22.55 \times 0.68 = 15.33 = 15.3\text{m}$$

*Obtained from table in Section 4.5

$$22.8 \times \frac{+80 - (+12)}{100} = 22.8 \times 0.68 = 15.5\text{m}$$

There are times when the germination point cannot be seen. In this situation, breast height is often used for the bottom % reading and a correction factor of 1.3 m is added on the calculated total height.

Trees with a lean that require height measurement should have the slope readings taken from a location perpendicular to the lean as shown in Figure 4.2. This will prevent an erroneous measurement that could result in a shorter or taller tree because of the lean.

If at all possible, all height measurements should be taken perpendicular to the slope.

Common errors made during tree height calculations are:

1) Misreading $\pm$ signs
   - bottom % readings may either read as positive or negative numbers. Bottom % reading are <u>always</u> subtracted from the top reading regardless on the $\pm$ sign of the number.

   ie: if the top % is +90 and bottom % is –3 then:

   +90 – (-3) = 93
   if the bottom % reading was +3 then:
   +90 – (+3) = 87

2) Not adding the appropriate correction factor, usually 1.3m (breast height). Zero fill if the bottom reading is taken at the germination point, or put line through column.

   a) adding the correction factor at the wrong time:

ie: top %	bottom %	Horizontal distance	Correction factor
+90	-3	20	+1.3

   Incorrect ([90 - (-3)] + 1.3) x .20 = 18.86 = 18.9

   Correct ([90 - (-3)] x .20) + 1.3 = 19.90 = 19.9

3) Miscalculating total height through standard arithmetic errors. Refer to Appendix 4.10.4 for rounding off procedures.

4) Total height information recorded with no calculations.

All tree height calculations must be recorded for each sample tree in the space provided otherwise, the data will be considered invalid and deleted.

TM 249 (Rev. 08/03)

Tree Number	Species	Top %	Top % to Live Crown	Bottom %	Not to Top of Tree	Not to Top of Live Crown	Slope Distance	% Slope	Horizontal Distance	Correction	Total Height	Height to Live Crown	Check Cruise Height	Tree Number
1	SW	92	33	+3	89	30	-	-	20.0	+1.3	19.1	7.3		1
4	SW	84	60	-1	85	61	22.0	13	21.8	-	18.4	13.3		4
7	SW	98	28	0	98	28	-	-	24.0	+1.3	24.8	8.0		7
10	SW	64	10	-2	66	12	-	-	20.0	+1.3	14.5	3.7		10
13	AW	73	63	+1	72	62	-	-	21.0	-	15.1	13.0		13
16	PB	99	80	0	99	80	-	-	25.0	+1.3	26.0	21.3		16
24	SW	No	Height	Forked	Top									

a. Determining Tree Height with a Laser Clinometer or Haglof Vertex

Before using the electronic instrument, be sure that you are familiar with the operators manual and the operation of the tool.

Only total tree height and height to live crown is recorded on the tree tally sheet. Indicate on the back of the sheet which tool was used.

The operator must have the blue direction dot in sight and double check the height of the tree if it does not grow or the height remains the same. Record both sets of numbers on the back of the tally sheets.

5. SLOPE CORRECTION FACTORS AND TABLES

To convert slope distance (S.D.) horizontal distance (H.D.)

H.D. = S. D. x slope distance factor

To convert horizontal distance (H.D. to slope distance (S. D.)

$$S.\,D. = \frac{H.\,D.}{\text{slope distance factor}}$$

SLOPE DISTANCE FACTORS

% Slope			% Slope			% Slope	
10	0.995		40	0.928		71	0.819
11	0.994		41	0.925		71	0.815
12	0.993		42	0.922		72	0.812
13	0.992		43	0.919		73	0.808
14	0.990		44	0.915		74	0.804
15	0.989		45	0.912		75	0.800
16	0.987		46	0.908		76	0.796
17	0.986		47	0.905		77	0.792
18	0.984		48	0.902		78	0.789
19	0.982		49	0.898		79	0.785
20	0.980		50	0.894		80	0.781
21	0.979		51	0.891		81	0.777
22	0.977		52	0.887		82	0.773
23	0.974		53	0.883		83	0.769
24	0.972		54	0.880		84	0.766
25	0.970		55	0.876		85	0.762
26	0.968		56	0.872		86	0.758
27	0.965		57	0.869		87	0754
28	0.963		58	0.865		88	0.751
29	0.960		59	0.861		89	0.747
30	0.958		60	0.857		90	0.743
31	0.955		61	0.854		91	0.740
32	0.952		62	0.850		92	0.736
33	0.950		63	0.846		93	0.732
34	0.947		64	0.842		94	0.729
35	0.944		65	0.838		95	0.725
36	0.941		66	0.835		96	0.721
37	0.938		67	0.831		97	0.718
38	0.935		68	0.827		98	0.714
39	0.932		69	0.823		99	0.711

6. USE AND CONSTRUCTION OF A BILTMORE STICK

Biltmore Sticks are used to measure diameter of saplings or tagged stems <9.1 cm as measuring a stem with a small diameter often results in a broken diameter tape. To use a Biltmore Stick, align "0" on one side of the stem, at breast height, and read the diameter on the other keeping the focal length at 64cm (metric equivalent of 25 in [1]). The following table shows the straight line distance from "0", to be marked on the stick, associated with the corresponding diameter (in centimeters).

[1] Avery, T.E. and H. E. Burkharl. 1983. Forest Measurements. 3rd ed. McGraw-Hill Inc., New York, N.Y. pp. 68-69

DBH	Biltmore	DBH	Biltmore
1.0	0.99	5.2	5.00
1.2	1.19	5.4	5.19
1.4	1.38	5.6	5.37
1.6	1.58	5.8	5.55
1.8	1.77	6.0	5.74
2.0	1.97	6.2	5.92
2.2	2.16	6.4	6.10
2.4	2.36	6.6	6.28
2.6	2.55	6.8	6.46
2.8	2.74	7.0	6.65
3.0	2.93	7.2	6.83
3.2	3.12	7.4	7.01
3.4	3.31	7.6	7.18
3.6	3.50	7.8	7.36
3.8	3.69	8.0	7.54
4.0	3.88	8.2	7.72
4.2	4.07	8.4	7.90
4.4	4.26	8.6	8.07
4.6	4.44	8.8	8.29
4.8	4.63	9.0	8.43
5.0	4.81		

7. ACCESS EVALUATION CODES

1. All Weather Road	All roads in this category are paved or are well traveled gravel roads. These roads are well drained with little possibility of washing out or flooding in heavy rain situations. In the winter, these roads are plowed on a regular basis.
2. Dry Weather Road	This type of road tends to be quite slippery in the spring and fall and becomes heavily rutted when wet. The shoulder on these roads are generally quite soft most of the year. Slopes on these roads should not exceed 10% as they are difficult to drive up or down when wet, even in a four wheel drive vehicle. Minor flooding or washouts can occur but the roads can still be traveled in a four wheel drive vehicle as the roads have solid bottoms.
3. Deteriorating Road	These roads are not used very often and are starting to grow over with grass, small shrubs, or small trees. During heavy rains they can be easily washed out or heavily rutted. It may be very difficult to travel on these roads even with a four wheel drive and the use of an all terrain vehicle should be considered.
4. All Terrain Vehicles only	Included in this category are seismic lines, old trails, and any roads inaccessible using a four wheel drive vehicle. If a plot is more than 1000m along a seismic line or trail, this access is to be indicated. If the distance is less than this, the remeasurement crew can walk to the plot.
5. Helicopter Access.	This access codes should be used only when there is no other way into the plot (i.e. cannot cross river, too far off roads to feasibly drive all terrain vehicle to etc.) It is important to remember to have a suitable location for a helicopter to land and take of from. Keep in mind that openings used for a landing may grow over within 10 years presenting a helicopter to land in the future
6. Unknown	This code is for office use only and is used when access has not been verified and maps do not provide any assistance.

8. LEGAL SURVEY SYSTEM OF ALBERTA

The province of Alberta has been surveyed using a system based on a grid framework. The largest divisions in this system are called meridians. In Alberta there are meridians numbered 4, 5 and 6. The fourth meridian, as shown in Figure 4.19 corresponds to the Alberta Saskatchewan border.

Each meridian has been divided into parcels of land, called townships, 36 square miles (93.2 square kilometers) in size. At six mile (9.654 kilometres) intervals, in a north-south direction, are divisions also called townships and are numbered 1 to 126 starting from the United States border and extending to the Northwest Territories border. The east-west six mile intervals are called "ranges" and are numbered westward from each meridian. The numbering of townships begin in the southeast corner of the province. An example of locating any given township is shown in Figure 4.19.

The grid system is further refined by taking each township and dividing it into 36-one square mile (1.604 square kilometers) parcels of land called "sections". The numbering scheme for each township is shown in Figure 4.19.

The last division in the survey system takes each section and divides it into 16 equal parts called "legal subdivisions" (LSD's). The numbering scheme of each section is demonstrated in Figure 4.19.

If a PSP was located using the example in Figure 4.19, the legal land description would be recorded as 13-1-87-18-4. This translates to Legal Subdivision 13 of Section 1 in Township 87, Range 18, West of the Fourth Meridian. If a PSP is located in two or more sections/legal subs, all legal descriptions are tallied and the location of plot enter is noted, i.e. if a PSP was located at the cross section of legal subs 11, 12, 13, and 14 then the following information would be tallied.

Recorded on Maintenance Sheet as:

11-1-87-18-4
12-1-87-18-4
13-1-87-18-4.1 (this would be recorded as the correct legal descriptions)
14-1-87-18-4

The center of the PSP falls in L.S. 13-recorded on the PSP Header Sheet (TM 267) during establishment or remeasurement.

9. FIELD SHEET HANDBOOK

a. Tally Sheet Instructions

The PSP field handbook contains instructions pertaining to data entry on the tally sheet, a summary of allowable errors, and a plot measurement summary.

b. General Information (Columns 1 – 37)

This information is recorded on the Header Sheet and every Tally Sheet.

[2] Alberta Bureau of Surveying and Mapping. 1986 Maps of Alberta Catalogue 1986-87. Government of Alberta ENR No. Ref 11 86 pp.iv.

Column 1-2
Agency: numeric, right justified, zero filled. As listed on the Agency list.

Column 3-12
Group Number: numeric, right justified, zero filled.

e.g.

0	2	0	= Group 20

Column 13
Sub Plot Number: numeric (1,2,3,4)

e.g.

1	= sub plot 1

Column 14-15
Measurement Number: numeric, '00' for an establishment plot, subsequent measurements would be 01, 02, 03, etc.

e.g.

0	3	= 3rd measurement

Column 16-18
Year: numeric; 1961

e.g

1	9	6	1

Column 20-21
Month: numeric, right justified, May=05, June=06, etc., zero filled.

e.g.

0	6	= June

Column 22-23
Day: numeric, right justified, zero filled.

e.g.

0	3	= 3rd day

Column 24-25
L.S.: (Legal Subdivision), numeric, right justified, zero filled, only use if known.

e.g.

1	3	= Legal subdivision 13

Column 26-27

Section: numeric, right justified, zero filled.

e.g.

0	2	= Section 2

Column 28-30

Twp.: (Township), numeric, right justified, zero filled.

e.g.

0	3	2	= Township 32

Column 31-32

Rge.: (Range), numeric, right justified, zero filled.

e.g.

0	3	= Range 3

Column 33

M.: (Meridian), numeric.

e.g.

5	= West of the 5th meridian

Column 34-36

Plot Type: Numeric, and left justified. First column is primary description. The remaining two columns are not defined yet; zero fill until further notice.

e.g.

3	0	0	= Thinned PSP

e.g.

0	0	0	= An untreated fire origin plot

Code

0 = No treatment
1 = Growth Intercept Plot
2 = Fertilized
3 = Thinned
4 = Drained
5 = Burned
6 = Mistletoe
7 = Immature (16-55 years)
8 = Paired Plot
9 = University of Alberta Plot

Column 37

Imp.: (Imperial), "X" if information is collected in imperial units; blank if collected in metric.

e.g.

X

= Indicates measurements done in imperial units.

c. Record 01 – Header Information (Columns 38-212)

Column 38-39

Record Type: previously filled as 01

Column 40-60

Plot Sizes (Tree, Sapling and Regen): numeric, recorded in square metres right justified. Plot sizes are determined in the office using the horizontal distances recorded on the plot maintenance form.

e.g.

		1	0	0	0	.0	= 1,000.0 m2

Column 61-71

Phase 1, 2 or 3 Overstorey - See PSP Header information for description.

Column 72-93

AVI Interpreted Overstorey: numeric and alpha using AVI ecological moisture regime, crown closure class, height and tree species composition.

Ecological moisture regime can be numeric or character. Small cap letter goes in column 72. If using numeric label this goes in column 73. Do not input both. Only one entry needed.

Ecological Moisture Regime Labels

Moisture Regime	Database Numeric Label	Database Character Label
Very xeric	0	d - dry
Xeric	1	d - dry
Subzeric	2	d - dry
Submesic	3	m – mesic (default)
Mesic	4	m – mesic (default)
Subhygric	5	m – mesic (default)
Hygric	6	w - wet
Subhygric	7	w - wet
Hygric	8	a - aquatic

Crown closure class can be numeric or character. Capital letter goes in column 74. If using numeric, label goes in column 75. Do not use both. Only one entry needed.

Crown Closure Class Labels

Crown Closure Class (%)	Database Numeric Label	Database Character Label
01-05		V
06-10	0	A
11-20	1	A
21-30	2	A
31-40	3	B
41-50	4	B
51-60	5	C
61-70	6	C
71-80	7	D
81-90	8	D
91-100	9	D

Height is recorded to the closest metre and is numeric and goes in columns 76 and 77. Input as 2 digits i.e.: 9m = 09.

Tree species composition is recorded in 10% classes and must add up to 100%. A maximum of 5 species. First letter is capitalized and second letter is small.

Species 1 (Alpha) in Columns 78-79
Species 1 % in Columns 80-81
Species 2 (Alpha) in Columns 82-83
Species 2 % in Columns 84
Species 3 (Alpha) in Columns 85-86
Species 3 % in Columns 87
Species 4 (Alpha) in Columns 88-89
Species 4 % in Columns 90
Species 5 (Alpha) in Columns 91-92
Species 5 % in Columns 93

e.g.

d	1	A	2	0	9	S	w	0	9	P	I	1			

Column 37

Imp: (Imperial), "X" if information is collected in imperial units; blank if collected in metric.

e.g.

X	= indicates measurement done in imperial units.

Column 94-108

Phase 1, 2 or 3 Understorey – See PSP Header information for description.

Column 109-128

AVI Interpreted Understorey: numeric and alpha using AVI crown closure class, height and tree species compositions.

Crown closure class can be numeric or a character. Capital letter goes in column 109. If using numeric, label goes in column 110. Do not use both. Only one entry needed.

Height is recorded to the closest metre and is numeric and goes in columns 111 and 112. Input as 2 digits i.e.: 9m=09.

Tree species composition is recorded in 10% classes and must add up to 100%. A maximum of 5 species. First letter is capitalized and second letter is small.

Species 1 (Alpha) in Columns 113-114
Species 1 % in Columns 115-116
Species 2 (Alpha) in Columns 117-118
Species 2 % in Columns 119
Species 3 (Alpha) in Columns 120-121
Species 3 % in Columns 122
Species 4 (Alpha) in Columns 123-124
Species 4 % in Columns 125
Species 5 (Alpha) in Columns 126-127
Species 5 % in Columns 128

e.g.

A	2	0	9	S	W	0	9	P	I	1

Column 129
Location: numeric

Code

1 = hollow
2 = flat
3 = slope
4 = hilltop

e.g.

3

= plot location on a slope

Column 130-132
% slope: average percent slope for the plot, numeric characters, right justified.

e.g.

0	1	5

= 15% slope

Column 133-134
Aspect: alpha characters, right justified

Code

N = North
S = South
E = East
W = West
NE = Northeast
NW = Northwest
SE = Southeast
SW = Southwest
NA = Non Applicable (Slope = "0")

e.g.

	N	= North

Column 135-138

Elevation: elevations in metres, numeric characters, right justified (convert feet to metres by multiplying by .3048).

e.g.

1	0	9	7	= 1097 m

Column 139

Erosion Potential: numeric. This describes the chance of water eroding down to or into the mineral soil layer and is based upon water flow, slope and soil type.

Code

1 = Slight – when 0 to 25% of the area is, or could be eroded in a flood situation.
2 = Moderate – when 25% to 75% of the area is, or could be eroded in a flood situation.
3 = High – when more than 75& of the area is, or could be eroded in a flood situation.

e.g.

2	= moderate erosion potential

Column 140

Drainage: numeric, for definitions of codes see Appendix 4.3 of the PSP Manual

Code

1 = Very rapidly drained
2 = Rapidly drained
3 = Well drained
4 = Moderately well drained

5 = Imperfectly drained
6 = Poorly drained
7 = Very poorly drained

e.g. 6 = poorly drained soil

Column 141-142

Depth to Mineral Soil: numeric, right justified, measured in cm or inches.

If greater than 99 cm, fill with 99. This will indicate a depth to mineral soil of 99 or greater.

e.g.

1	0	= 10cm

Column 143

Surface Vegetation-Type: numeric, nine possible types or combinations of grass, lichen/=moss, herbs (flowers and non-woody stems) and shrubs (woody stems). The dominant type is recorded.

Code

1 = grass
2 = grass + herbs
3 = grass + shrubs
4 = lichen/moss
5 = lichen/moss + herbs
6 = lichen/moss + shrubs
7 = herbs
8 = herbs + shrubs
9 = shrubs

e.g.

4

= lichen/moss

Column 144 -146

Surface Vegetation - % Ground Cover: numeric, right justified. Tally the percent of ground that is covered by surface vegetation type.

e.g.

	9	5

= 95% of ground covered by surface vegetation type

Column 147

Maintenance Report – Access: numeric (for definitions of Access codes see Appendix 4.8).

Code

1 = all weather road
2 = dry weather road
3 = deteriorating road

4 = all terrain vehicle
5 = helicopter
6 = unknown

Column 148
Plot Damage: numeric

1 = none
2 = natural damage
3 = manmade damage
4 = natural and manmade damage
5 = closed
6 = (this code is not used)
7 = plot was previously closed but has been reopened (office use only)

Column 149
Buffer Damage: numeric

1 = none
2 = natural damage
3 = manmade damage
4 = natural and manmade damage
5 = closed
6 = damage inside buffer greater than 20m from subplot
7 = plot was previously closed but has been reopened (office use only)

e.g. Comments: 2. (access) 1. (plot damage)
3. (buffer damage)

= dry weather road, none, manmade damage

Column 150-153
Establishment Year: numeric

e.g.

1	9	6	1	= 1961

Column 164
Plot Configuration

Column 180-183
Stand Origin

Column 184
Site Index/TPR: character

Column 185-186
Site Index/TPR: numeric

Column 187-190
Photo year

Column 191-198
Ecosite

Column 199-201
Aspect in Degrees

Column 202
Nutrient Regime

Column 203-204
Natural Region

Column 203-208
Minimum diameter Measured (mm)

Column 209-210
Stump Height (cm)

Column 211
Surface Expression

Column 212
Slope Position

d. Record 02 – Tree Information – header Sheet (Columns 1-37) – Tally Sheet (Columns 38-124)

Column 38-39
Record type: previously filled as 02

Column 40-43
Tree Number: numeric, right justified.

Tree numbers will be:

1. Consecutive i.e. 1 through 9997 (saplings included).
2. 0000 – representing a tree felled outside the plot to determine stump age and increments (pre-filled on Header Sheet).

e.g.

0	0	9	8	= tree #98

Column 44-45
Species: tree species, alpha characters

Code

FA = Alpine fir
FB = Balsam fir
FD = Douglas fir
LA = Alpine larch
LT = Tamarack
LW = Western larch
PF = Limber pine
PJ = Jack pine
PL = Lodgepole pine
PW = Whitebark pine
SB = Black spruce
SE = Englemann spruce
SW = White spruce
AW = Aspen
PB = Balsam poplar
BW = White birch
NO = Indicates No trees to tally in regeneration plot

e.g.

A	W	= Aspen

Column 46-49
DBH: (Diameter at Breast Height), one decimal place, numeric, right justified. In the computer the format is in millimeters (No Decimal).

e.g.

	3	2	.1	= 32.1 cm dbh

Column 50-53
Height: (Tree Height), one decimal place, numeric, right justified. In the computer the format is in decimeters (No Decimal).

e.g.

	3	0	.6	= 30.6 m tree height

Column 54-57
Height to Live Crown: (Tree Height from base to point of first branch of the crown), one decimal place, numeric, right justified. In the computer the format is in decimeters (No Decimal).

e.g.

	1	0	.5	= 10.5 m from tree base to live crown

Column 58
C.C. (Crown Class), alpha character

Code

D	Dominant	-crowns extend above the general level of the canopy
C	Codominant	-crowns form the general level of the canopy
I	Intermediate	-crowns below but extending into the bottom of the general level of the canopy
S	Suppressed	- crowns entirely below the general level of the canopy
O	Open-grown	-if the trees branches does not interact with another trees branches.

e.g. S = suppressed tree

Column 59-64
Condition Codes: (Tree condition codes) numeric. If the tree has no defect, record 00. Zero filling is not required. ***See Master Condition Code List***

e.g.

5	1	5	4			= tree with conks and a fork

e.g.

2	9					= tree cut down

e.g.

6	3	5	6	6	6	= tree with a stem disease, broken and a stem form defect

If there is not visible defect, a condition code 00 is recorded.

The following columns 65-76 are on Header Sheet only (TM 267)

Column 65-67
DBH Age: (Tree DBH age), numeric characters, right justified, zero filled

e.g.

1	1	6	= 116 yrs of age at DBH (1.3 m)

Column 68-70
Stump Age: (Tree stump age), numeric characters, right justified, zero filled.

e.g.

1	2	1	= 121 yrs of age at stump (.3 m)

Column 71-76
Stump Increment Width: increment width for the last 20 yrs. growth done in 2 measurements: 0 – 10 yrs, 11-20 yrs, numeric characters, right justified, one decimal place, zero filled. Entered as mm in digital file.

e.g.

0	2	3	0	1	5	= 2.3 cm increment for 0 – 10 yrs = 1.5 cm increment for 11 – 20 yrs

Column 77-79
Azimuth: azimuth of tree from plot center, numeric, right justified, 1 to 360^0

e.g.

0	2	0

= 20^0 from the plot centre

Column 80-82
Distance: distance of tree from plot center, numeric, right justified one decimal place. In the computer, the format is in decimeters (No Decimal).

e.g

0	6	.3

= 6.3 m from plot center

Column 83-89
Tree Plot size (m^2): numeric, right justified, go to one decimal place. Zero filled.
Tree Plot Size (m^2): numeric, right justified, go to one decimal place. Zero filled.

Column 97-103
Regen Plot Size (m^2)

Column 104-107
Establishment Year: numeric, right justified.

Column 108
Crown Status: "Y" indicates tree needs crown measurements. "Blank" indicates no crown measurement required.

Column 109-112
Crown Width North: recorded in decimeters (dm). Right justified.

Column 113-116
Crown Width West: recorded in decimeters (dm). Right justified.

Column 117-120
Crown Width West: recorded in decimeters (dm). Right justified.

Column 121-124
Crown Width East: recorded in decimeters (dm). Right justified.

e. Record 03 – Regen Information (Columns 38-85)

Column 38-39
Record Type: previously recorded as 03.

Column 40-43
Tree number: previously recorded as 9998.

Column 44-45
Species: tree species, alpha characters.

Column 40-48, 49-51, 52-54, 55-57, 58-60
Total (1-5): numeric, right justified, zero filled. Add in 3 plot sizes and establishment year from Page 41: numeric right justified, zero filled.

e.g.

0	0	2	= 2 regeneration of that species in that height class

Column 61-67
Tree Plot Size (m²): right justified.

e.g.

		1	0	0	0	.0	= 1,000.0 m²

Column 68-74
Sapling Plot Size (m²): right justified.

e.g.

			2	5	0	.0	= 250.0 m²

Column 75-81
Regen Plot Size (m²): right justified.

e.g.

				6	2	.0	= 62.0 m²

Column 81-85
Establishment Year: right justified.

e.g.

1	9	6	0	= 1960

f. Summary of Allowable Errors

Item	Allowable Error
Location of Plot Centre (Tie Point and Tie Line)	- 2% of the cruise line horizontal distance (e.g. 3m of a 150m tie line H.D.)
Plot Size (Sides) – Tree Plot	- 31.62 ± .25m (31.37 – 31.87m)
	38.73 ± .31m (38.72 – 39.04m)
	44.72 ± 0.36m (44.36 – 45.08m)
– Sapling/Regen Plot	- 7.90 ± .06m (7.84 – 7.96m)

	9.69 ± .08m (9.61 – 9.77m)
	11.09 ± .09m (11.09 – 11.27m)
Plot Size (bearings)	± 2°
No. of Trees Tallied and Species Identified	Tree plot - none
	Sapling plot - ±5% of total (e.g. 2- saplings±1) – no allowable error in identification
	Regen plot - ±10% (e.g. 20 regen ±2)
DBH	Diameter Breast height – 1.3m ± 6.5cm (±5%) diameter – ± 1.0 cm
Height and Height to Live Crown	±3% (e.g. 16.2m ± .5m)
Crown Class and Condition Codes	10% of stems tallied may have incorrect crown class or condition codes (e.g. 10 trees of 100 tallied)
Stem Mapping	Azimuth - ± 2°
	Distance - ± 0.5m
Section Lengths	± 5cm after "cookie" is cut
Perpendicular Cuts	± 10° from perpendicular
DHB and Stump Age	Conifers - ± 1 year
	Deciduous - ± 5 years
Increment Width	± 5% for each set of years

g. Plot Measurement Summary

Plot	Length of Side (m)	Area (ha)	Area (m^2)	Buffer Side (m)	Buffer Area ((m^2)
Tree	31.62	0.100	1,000	200	40,000
	38.73	0.150	1,500	237	56,250
	44.72	0.200	2,000	300	90,000
Sapling/Regen	7.90	0.006	62		
	9.69	0.009	94		
	11.18	0.012	125		

Plot	Stem Size	Tagged	Number Recorded
Tree	≥ 9.1 cm DBH	Yes	0001
			to 7999
Sapling	1.3 m in height	Yes	8001
Regen	≥ 0.10 height up to a height of <= 1.29 m	No	9998
Outside of Plot	Representatives of stand age	No	0000

h. Rounding-Off

The following rules are to be followed for rounding off height measurements on sample trees.

1) Delay rounding off numbers as long as possible, preferably to the last stage, as rounding can significantly affect the accuracy of the final answer.

2) If the digit to be rounded is followed by a digit greater than 5, round up.

e.g. 10.66 ……. 10.7
16.394……. 16.4 (6, 9 & 7 are greater than 5)
21.17 ……. 21.2

3) If the digit to be rounded is followed by a digit less than 5, leave as is.

e.g. 10.64 ……. 10.6
10.339 …….. 16.3 (4, 3 & 1 are less than 5)
21.11 ……. 21.1

4) If the digit to be rounded is followed by a 5 then:

a) If the digits following the 5 are greater than 0, round up.

e.g. 10.651 …….. 10.7
16.359 …….. 16.4
21.154 …….. 21.2

b) If the digit being rounded is followed by a 5 and no other digits then:

i) If the digit being rounded is odd, round up.
10.55 …… 10.6
16.35 …… 16.4
21.15 …… 21.2

ii) If the digit being rounded is even, leave as is.
10.65 ……. 10.6
16.45 ……. 16.4
21.25 ……. 21.2
25.5 ……25.0

NOTE: The number 0 is considered to be an even number.

10. MISTLETOE AND IMMATURE PLOT TYPES

In September 1989 two new plot types were introduced:

i) 600 – mistletoe plot type

ii) 700 - immature plot type (16 - 55 years old)

iii) The mistletoe plot type is established and re-measured according to the procedures outlines in Section 2.0. The severity of the mistletoe on the infected stem(s) is recorded using the 6 digit Hawksworth Mistletoe Rating System (see Figure 4.12 for rating system). Trees are sectioned in accordance with the A.F.S. Tree Sectioning Procedures Manual (see also Section 2.1.4.7).

Starting in 2000 field season in the immature plot, we do not have a minimum DBH requirement. All trees ≥ 1.3m in height will be tagged and measured in the 1/16 sapling/regen plot.

iv) In the remainder of the plot, all trees ≥ 9.1cm at DBH are numbered and measured. Diameters, crown class and condition codes are assigned to each tree stem. Heights are measured according to procedures outlined in Section 2.1.4.4. All tagged trees are stem mapped.

NOTE: On the stems that are too small to withstand a nail, DBH is marked with a blue painted band so that future measurements are taken at the same point. A numbered tree tag is then placed loosely around the stem or a branch so as to prevent girdling of the stem. Seedling calipers or a baltimore stick is used to take sapling diameters.

When sectioning the immature plots three representative trees within the buffer are cut. When bucking, use 1.0m section lengths.

In very dense stands, trees on the boundary of the tree plot, but not in the plot can have a yellow or orange vertical strip painted on them, facing into the tree plot. This will assist future re-measurements crews in determining border line trees.

11. ASCII FORMAT OF PSP TREE DATA, RECORDS 1, 2 AND 3

STANDARD SAMPLE PLOT FILE FORMATS
KEYPUNCH AND MASTER FILES
(Format as of February, 2000)

There are 4 record types found in these standard sample plot files:

a) Plot Header records (Type 01)
b) Tree description Records (Type 02)
c) Regeneration Records (Type 03)
d) GPS Records (Type 04)
e) Detail of Plot Treatment (Type 05)

All numeric variables are right justified and character variables are left justified.

Variable's abbreviated name is located before the variable description.

Record types are identified by a 2 digit code found in columns 38-39. A list of variables found in each record type is described below:

There are 15 different plot types and are as follows: Please advise FMD if plot type is not on list and put plot type in next available 2 digit position. Zero filled:

Ptype: plot type

1.) PSP Regular
2.) PSP Stand Dynamics Survey
3.) PSP Reforestation Monitor Plot
4.) TSP Operational Cruise
5.) TSP Inventory
6.) TSP Large Scale Photography
7.) Mistletoe
8.) Thinned
9.) Fertilized
10.) Herbicide
11.) Pruned
12.) Spruce Budworn
13.) Cleaned
14.) Thinned and Fertilized
15.) Herbicide and Thinned

There are 3 different plot configuration types and are as follows: Please advise FMD if plot configuration is not on list and put plot configuration in next available position.

Pconfig: plot configuration

Fixed area (Any shape) - 1

Fixed area subplot - 2

Variable radius (Prism) plot - 3

There are 34 different Agency codes but this can be expanded. Please advise FMD if agency is not on list and put agency in next available 2-digit position. Zero filled. List is as follows:

Agency

01 – Alberta Forest Service	02 – B.C. Forest Service
03 – Saskatchewan Forest Service	04 – Pedology Consulting
05 – B.C. Forest Products.	06 – Proctor and Gambler
07 – Champion Forest Products	08 – Canfor (N.C.F.I)
09 – Ziedler Plywood Ltd.	10 – Makin Consulting
11 – Montreal Engineering	12 – Blue Ridge Lumber Co.
13 – Pelican – Spruce Sawmil	14– Special Projects
15 – University of Alberta	16 – Canadian Forest Service
17 – Alberta Newsprint	18 – Alpac
19 – Canadian Forest Products	20 – Daishowa-Marubeni International
21 – Manning Diversified Forest Products	22 – Millar Western
23 – Slave Lake Pulp Corp	24 – Spray Lake Sawmill
25 – Sundance	26 – Sunpine
27 – Tolko – High Prairie	28 – Tolko – High Level
29 – Vanderwell	30 – Weldwood
31 – Weyerhaeuser – Drayton Valley	32 – Weyerhaeuser - Edson
33 - Weyerhaeuser – Grande Prairie	34 – Weyerhaeuser – Saskatchewan
35 – Weyerhaeuser – Slave Lake	

There are 3 different measurement types (number) and are as follows:

Measure: measurement number

TSP Always = 0

PSP Establishment = 0

PSP Re-measurement = 1, 2, 3, etc.

In Record Type "01", subplot variable indicates if there is subplots within the plot. If "No" subplots (1 in record Type 1) then Subplot variable in other records left blank. Otherwise enter appropriate subplot number.

a. RECORD TYPE "01" – STANDARD SAMPLE PLOT HEADER RECORDS

Column		Description		ASCII Format
1-2		Ag: Agency		I2
3-12		Plot: Plot number		I10
13		Subplot: Subplot number (1 = No subplots and 2 = Subplots)		I1
14-15		Measure: Measurement number		I2
16-19		Year: Year of measurement		I4
20-21		Month: Month of measurement		I2
22-23		Day: Day of measurement		I2
24-25		LSD: Legal subdivision		I2
26-27		Sec: Section		I2
28-30		Twp: Township		I3
31-21		Rge: Range		I2
33		Mer: Meridian		I1
34-36		Ptreat: Plot treatment		I3
37		Imp: Imperial		A1
38-39		Recty: Record Type (Always '01')		I2
40-46		Plotsize: Plot size (m^2)		F7.1
47-53		Sapsize: Sapling Plot size (m^2)		F7.1
54-60		Regsize: Regen Plot size (m^2)		F7.1
61-71		Phase 1, 2 or 3 Overstorey		A11
61		Dense: Overstorey Density class		A1
62		Htphase: Overstorey Height class		I1
63-64		Spph1: Overstorey Species 1		A2
65-66		Spph1: Overstorey Species 2		A2
37-38		Spph1: Overstorey Species 3		A2
69-70		Brack: Overstorey Bracketed Species		A2
71		Com: Overstorey Stand Commercialism		A1
72-93		AVI Interpreted Overstorey		A22
72		Moistch: Moisture Regime (Alpha-small letter)		A1
73		Moistnu: Moisture Regime (Numeric)		I1
74		Crcch: Crown Closure Class (Alpha-cap letter)		A1
75		Crcnu: Crown Closure Class (Numeric)		I1
76-77		Htc: Height to closest metre		I2

78-79		Sp1: Species 1 (Capital + small)		A2
80-81		Per1: Species 1 Percent (10% classes)		I2
82-83		Sp2: Species 2 (Capital + small)		A2
84		Per2: Species 2 Percent (10% classes)		I1
85-86		Sp3: Species 3 (Capital + small)		A2
87		Per3: Species 3 Percent (10% classes)		I1
88-89		Sp4: Species 4 (Capital + small)		A2
90		Per4: Species 4 Percent (10% classes)		I1
91-92		Sp5: Species 5 (Capital + small)		A2
93		Per5: Species 5 Percent (10% classes)		I1
94-108		Phase 1, 2 or 3 Understorey		A15
94		Denseu: Understorey Density class		A1
95		Htphaseu: Understorey Height class		I1
96-97		Spph1u: Understorey Species 1		A2
98-99		Spph2u: Understorey Species 2		A2
100-101		Spph3u: Understorey Species 3		A2
102-103		Bracku: Understorey Bracketed		A2
104		Commu: Understorey Stand Commercialism		A1
105-108		Soringinu: Understorey Stand Origin		I4
109-128		AVI Interpreted Understorey		A20
109		Crcchu: Crown Closure Class (Alpha-cap letter)		A1
110		Crcchu: Crown Closure Class (Numeric)		I1
111-112		Hrcu: Height to closest metre		I2
113-114		Spu1: Species 1 (Capital + small)		A2
115-116		Peru1: Species 1 Percent (Capital + small)		I2
117-118		Spu2: Species 2 (Capital + small)		A2
119		Peru2: Species 2 Percent (Capital + small)		I1
120-121		Spu3: Species 3 (Capital + small)		A2
122		Peru3: Species 3 Percent (Capital + small)		I1
123-124		Spu4: Species 4 (Capital + small)		A2
125		Peru4: Species 4 Percent (Capital + small)		I1
126-127		Spu5: Species 5 (Capital + small)		A2
128		Peru5: Species 5 Percent (Capital + small)		I1
129		Locate: Location		I1
130-132		Slope: Slope percent		I3

133-134		Aspect: N, W, NE, NW, etc. NA= No Aspect		A2
135-138		Elev: Elevation (m)		I4
139		Eros: Erosion potential		I1
140		Drain: Drainage		I1
141-142		DMS: Depth to mineral soil (cm)		I2
143		SVT: Surface vegetation type		I1
144-146		Gnd: Ground cover percent		I3
147		Access		I1
148		Pldam: Plot damage		I1
149		Budam: Buffer damage		I1
150-153		Estyr: Establishment Year		I4
162-163		Ptype: Plot Type		I2
164		Pconfig: Plot Configuration		I1
180-183		Storigin: Stand origin		I4
184		SIA: Site Index/TPR		A1
185-186		SII: Site Index/TPR		I2
187-190		Photo: Photo year		I4
191-193		Struct: Stand Structure		A3
194-198		Ecosite		A5
199-201		AspDeg: Aspect in Degrees		I3
202		Nutri: Nutrient Regime		A1
203-204		Nregion: Natural region		I2
205-208		Mindbh: Minimum Diameter measured (mm)		I 4
209-210		Stumpht: Stump Height (cm)		I2
211		Surf: Surface Expression		A1
212		Slopepos: Slope Position		A1

b. RECORD TYPE "02" – STANDARD TREE DESCRIPTION RECORD

Column		**Description**		**ASCII Format**
1-2		Ag: Agency		I2
3-12		Plot: Plot number		I10
13		LPSPSub: LFS PSP Subplot number		I1
14-15		Measure: Measurement number		I2
16-19		Year: Year of measurement		I4

20-21		Month: Month of measurement		I2
22-23		Day: Day of measurement		I2
24-25		LSD: Legal subdivision		I2
26-27		Sec: Section		I2
28-30		Twp: Township		I23
31-32		Rge: Range		I2
33		Mer: Meridian		I1
34-36		Ptreat: Plot treatment		I3
37		Imp: Imperial		A1
38-39		Recty: Record Type (Always '02')		I
40-43		Tree: Tree number		I
44-45		Sp: Species (Caps)		A2
On No Tally Plots Enter Tree = 0001 and Sp= NO)				
46-49		Dbh: Diameter Breast Height (mm)		I4
50-53		Ht: Height (dm)		I4
54-57		Htlcrn: Height to live crown (dm)		I4
58		Cclass: Crown Class		A1
59-60		Cond1: Condition Code 1		I2
61-62		Cond2:Condition Code 2		I2
63-64		Cond3:Condition Code 3		I2
65-67		Dbhage: Diameter Breast Age		I3
68-70		Stumpage: Stump Age		I3
71-73		Inc10: Increment Prev. 10 yrs (mm)		I4
74-76		Inc20: Increment Prev. 11-20 yrs (mm)		I4
77-79		Azimuth		I3
80-82		Distance (dm)		I3
83-89		Plotsize: Plot/subplot size (m^2)		F7.1
90-96		Sapsize: Sapling Plot size (m^2)		F7.1
97-103		Regsize: Regen Plot size (m^2)		F7.1
104-107		Estyr: Establishment year		I4
108		Crstat: Crown status		A1
109-112		Crn: Crown Width North (dm)		I4

113-116		Crw: Crown Width West (dm)		I4
117-120		Crs: Crown Width South (dm)		I4
121-124		Cre: Crown Width East (dm)		I4
125-126		Subplot: Subplot number		I2
127-141		Stand: Stand/Polygon number		I15
142-146		Stump: Stump Diameter (mm)		I5

c. RECORD TYPE "03" – STANDARD REGENERATION RECORD

Column		**Description**		**ASCII Format**
1-2		Ag: Agency		I2
3-12		Plot: Plot number		I10
13		LPSPSub: LFS PSP Subplot number		I1
14-15		Measure: Measurement number		I2
16-19		Year: Year of measurement		I4
20-21		Month: Month of measurement		I2
22-23		Day: Day of measurement		I2
24-25		LSD: Legal subdivision		I2
26-27		Sec: Section		I2
28-30		Twp: Township		I3
31-32		Rge: Range		I4
33		Mer: Meridian		I1
34-36		Ptreat: Plot treatment		I3
37		Imp: Imperial		A1
38-39		Recty: Record Type (Always '03')		I2
40-43		Tree: Tree number		I4
44-45		Sp: Species (Caps)		A2
(On No Tally Plots Enter Sp=NO)				
46-48		Regen 1: Regeneration in height class 1		I3
49-51		Regen 2: Regeneration in height class 2		I3
52-54		Regen 3: Regeneration in height class 3		I3
55-57		Regen 4: Regeneration in height class 4		I3
58-60		Regen 5: Regeneration in height class 5		I3

61-67		Plotsize: Plot size (m²)		F7.1
68-74		Sapsize: Sapling Plot size (m²)		F7.1
75-81		Regsize: Regen Plot size (m²)		F7.1
82-85		Estyr: Establishment Year		I4
86-87		Subplot: Subplot number		I2

d. RECORD TYPE '04' – STANDARD GPS RECORDS

Column		**Description**		**ASCII Format**
1-2		Ag; Agency		I2
3-12		Plot: Plot number		I10
13-14		Sec: Section		I2
15-17		Twp: Township		I3
18-19		Rge: Range		I2
20		Mer: Meridian		I1
21-22		Subplot: Subplot number		I2
23-37		Stand: Stand/Polygon number		I15
38-39		Reacty: Record Type (Always '04')		I2
40-44		Declong: Longitude Dec. Degrees		F15.10
45-59		Declat: Latitude Dec. Degrees		F15.10
60-70		Easting		F11.5
71-81		Northing		F11.5
82-85		UTM		I4
86-87		NAD (Preferable 83)		I2

e. DETAIL OF PLOT TREATMENT (TYPE 05) - On progress

12. TREE SPECIES CODE

Only the following species will be measured:

Common Name Genus/Species	Scientific Name Code	Species
Fir	Abies	
Alpine fir	A. lasiocarpa	FA
Balsam fir	A. balsamea	FB
Birch	Betula	
White birch	B. papyrifera	BW
Douglas-fir	Pseudotsuga	
Douglas-fir	P. menziesii	FD
Larch	Larix	
Alpine larch	L. lyalii	LA
Tamarack	L. laricina	LT
Western larch	L. occidentalis	LW
Pine	Pinus	
Limber pine	P. flexilis	PF
Jack pine	P. banksiana	PJ
Lodgepole pine	P. contorta	PL
Whitebark pine	P. albicaulis	PW
Poplar	Poplus	
Aspen (White Poplar)	P. tremuloides	AW
Balsam poplar (Black poplar)	P. balsamifera	PB
Spruce	Picea	
Black spruce	P. mariana	SB
Englemann spruce	P. englemannii	SE
White spruce	P. glauca	SW

13. PLANT SPECIES CODE

TREE LAYER

Species Code	Latin Name	Common Name
ABIE BAL	Abies balsamifera	Balsam Fir
ABIE LAS	Abies lasiocarpa	Alpine Fir
BETU PAP	Betula papyrifera	White Birch
DC		Dead conifer
DD		Dead Deciduous
LARI OCC	Larix occidentalis	Western Larch
LARI LAR	Larix laricina	Larch
LARI LYA	Larix lyallii	Alpine Larch
PICE MAR	Picea mariana	Black Spruce
PICE GLA	Picea glauca	White Spruce
PICE ENG	Picea engelmannii	Engleman Spruce
PINU CON	Pinus contorta	Lodgepole Pine
PINU FLE	Pinus flexilis	Limber Pine
PINU ALB	Pinus albicaulis	Whitebark Pine
POPU BAL	Populus balsamifera	Balsam Poplar
POPU TRE	Populus tremuloides	Aspen
PSEU MEN	Pseudotsuga menziesii	Douglas Fir

SHRUB LAYER

Species Code	Latin Name	Common Name
ARCT UVA	Arctostaphylos uvaursi	Bearberry, Kinnickkinnick
ALNU CRI	Alnus crispa	Green Alder
ALNU TEN	*Alnus tenuifolia*	River Alder
AMEL ALN	Amelanchier alnifolia	Saskatoon Berry
BERB REP	*Berberis repens*	Creeping Mahonia
BETU GLA	Betula glandulosa	Dwarf Birch
BETU PUM	Betula pumila v. glandulifera	Swamp Birch
BETU OCC	*Betula occidentalis*	Water Birch
CHIM UMP	*Chimaphila umbellata*	Prince's Pine
CLEM OCC	*Clematis occidentalis*	Purple clematis
CORN STO	Cornus stolonifera	Red Osier Dogwood
CORY COR	*Corylus cornuta*	Beaked Hazelnut
GAUL HIS	*Gaultheria hispidula*	Creeping Snowberry
JUNI COM	Juniperus communis	Ground Juniper
JUNI HOR	Juniperus horizontalis	Creeping Juniper
LEDU GRO	Ledum groenlandicum	Labrador Tea
LINN BOR	Linnaea borealis	Twinflower
LONI DIO	Lonicera dioica v. glaucescens	Twining honeysuckle

Species Code	Latin Name	Common Name
LONI INV	*Lonicera involucrata*	Bracted Honeysuckle
LONI UTA	Lonicera utahensis	Red Twinberry
MENZ FER	*Menziesia ferruginea*	MenziesiaPLO
HOR	*Oplopanax horridum*	Devil's Club
OXYC MIC	Oxycoccus microcarpus	Small Bog Cranberry
POTE FRU	Potentilla fruticosa	Shrubby Cinquefoil
POTE NOR	*Potentilla norvegica*	Rough Cinquefoil
PRUN PEN	*Prunus pensylvanica*	Pin Cherry
PRUN VIR	*Prunus virginiana*	Choke Cherry
PRUN SP	*Prunus species*	Cherry
RHOD ALB	*Rhododendron albiflorum*	White-flowered Rhododendron
RIBE GLA	*Ribes glandulosum*	Skunk Currant
RIBE HIR	Ribes hirtellum	Wild Gooseberry
RIBE HUD	*Ribes hudsoniaum*	Northern Black Currant
RIBE LAC	Ribes lacustre	Bristly Black Currant
RIBE OXY	Ribes oxyacanthoides	Wild Gooseberry
RIBE TRI	Ribes triste	Wild Red Currant
RIBES SP	*Ribes species*	
ROSA ACI	Rosa acicularis	Prickly Rose
ROSA SP	*Rosa species*	Rose
ROSA WOO	*Rosa woodsii*	Common Wild Rose
RUBU IDA	Rubus idaeus	Wild Red Raspberry
RUBU PAR	*Rubus parviflorus*	Thimble Berry
RUBU SP	*Rubus species*	Raspberry Species
SALI ATH	Salix athabascensis	Willow
SALI BAR	Salix barklayi	Barclay's Willow
SALI BEB	Salix bebbiana	Beaked Willow
SALI GLA	Salix glauca	Smooth Willow
SALI MYR	Salix myrtillifolia	Myrtle-leaved willow
SALI PED	Salix pedicellaris	Bog Willow
SALI PET	Salix petiolaris	Basket Willow
SALI PYR	Salix pyrifolia	Balsam Willow
SALI SCO	Salix scouleriana	Willow
SALI SP	Salix species	Willow
SAMB RAC	*Sambucus Racemosa*	Red Elderberry
SHEP CAN	Shepherdia canadensis	Canadian Buffaloberry
SORB SCO	Sorbus scopulina	Mountain Ash

Species Code	Latin Name	Common Name
SPIR BET	Spiraea betulifolia	Birch-leaved Spirea
SPIR DEN	Spiraea densiflora	Pink Meadowsweet
SPIR SP	*Spiraea species*	Meadowsweet
SYMP ALB	Symphoricarpos albus	Snowberry
SYMP OCC	*Symphoricarpos occidentalis*	Wolfberry
VACC CAE	Vaccinium caespitosum	Dwarf Bilberry
VACC MEM	*Vaccinium membranaceum*	Tall Bilberry
VACC MYR	Vaccinium myrtilloides	Blueberry
VACC MYT	Vaccinium myrtillus	Low Bilberry
VACC SCO	*Vaccinium scoparium*	Grouse-berry
VACC ULI	*Vaccinium ulignosum*	Bog Bilberry
VACC VIT	Vaccinium vitis-idaea v. minus	Bog Cranberry
VIBU EDU	Viburnum edule	Lowbush Cranberry
VIBU OPU	*Viburnum opulus*	High-bush Cranberry

GRASS LAYER

Species Code	Latin Name	Common Name
(POA species - Record 1st 3 letters of genus and 1st 4 letters of species)		
AGRO RIP	Agropyron riparium	Steambank Wheatgrass
AGRO SMI	Agropyron smitthi	Western Wheatgrass
AGRO SUB	Agropyron subsecundum	Bearded Wheatgrass
AGRO TRA	Agropyron trachycaulum	Slender Wheatgrass
ALOP AEQ	*Alopecurus aequalis*	Water Foxtail
AGRO SCA	*Agrostis Scabra*	Hair Bentgrass
AGRO SP	*Agropyron species*	
AVEN FAT	*Avena fatua*	Wild Oat
BROM CAR	*Bromus carinatus*	Brome
BROM INE	Bromus inermis	Awnless Brome
BROM CIL	*Bromus ciliatus*	Fringed Brome
BROM VUL	*Bromus vulgaris*	Columbia Brome
CALA CAN	Calamagrostis canadensis	Bluejoint Marsh Reed
CALA INE	Calamagrostis inexpansa	Northern Reed Grass
CALA NEG	Calamagrostis neglecta	Narrow, Plains Reed Grass
CALA PUR	Calamagrostis purpurascens	Purple Reed Grass
CALA RUM	*Calamgrostis rubescens*	Pinegrass
CARE AQU	Carex aquatilis	Water Sedge
CARE BEB	Carex bebbi	Sedge

Species Code	Latin Name	Common Name
CARE BRU	Carex brunnescens	Brownish Sedge
CARE CON	Carex concinna	Beautiful Sedge
CARE DIS	Carex disperma	Two-seeded Sedge
CARE FOE	Carex foenea	Sedge
CARE GYN	Carex gynocrates	Northern Bog Sedge
CARE HOU	*Carex houghtoniana*	Carex
CARE LAS	Carex lasiocarpa	Hairy-fruited Sedge
CARE LEP	Carex leptales	Bristle Stalked Sedge
CARE OBT	*Carex obtusata*	Blunt Sedge
CARE PRA	Carex praticola	Sedge
CARE RIC	Carex richardsonii	Richardson's Sedge
CARE ROS	Carex rostrata	Beaked Sedge
CARE SP	Carex species	Carex Species
CARE UMB	Carex umbellata	Umbellate Sedge
CARE VAG	Carex vaginata	Sheathed Sedge
CINN LAT	*Cinna latifolia*	*Drooping Wood Reed*
DANT PAR	Danthonid parryi	Parry's Oatgrass
DESC CAE	Deschampsia caespitosa	Tufted Hair Grass
DIST STR	*Distichlis stricta*	Salt Grass
ELYM INN	Elymus innovatus	Hairy Wild Rye
ELYM SP	*Elymus species*	Wild Rye
ERIO POL	*Eriophorum polystachion*	Cotton Grass
ERIO SP	*Eriophorum species*	Cotton Grass
FEST OCC	*Festuco occidentalis*	Western Fescue
FEST PRA	*Festuca pratensis*	Meadow Fescue
FEST RUB	Festuca rubra	Red Fescue
FEST SAX	Festuca saximontana	Sheet Fescue
FEST SCA	Festuca scabrella	Rough Fescue
FEST SP	Festuca species	Fescue Species
GYLYC STR	Glyceria striata	Fowl Manna Grass
GRASS SP		*Grass species*
HIER ALP	*Hierochloe Alpina*	Alpine Sweetgrass
HIER ODO	*Hierochloe odorata*	Common Sweetgrass
HORD JUB	*Hordeum jubatum*	Foxtale Barley
JUNC BAL	Juncus balticus	Wire Rush
KOEL CRI	Koeleria cristata	June Grass
LUZU PAR	Luzula parviflora	Small-flowered Woodrush
ORYZ ASP	Oryzopsis asperifolia	Mountain Rice Grass
ORYZ PUN	*Oryzopsis pungens*	Short-awned Rice Grass
PANI SP	*Panicum species*	Panic Grass
PHLE PRA	Phleum pratense	Timothy Grass

Species Code	Latin Name	Common Name
PHRA AUS	*Phragmites australis*	Reed
POA GLAU	Poa glauca	Bluegrass
POA INTE	Poa interior	Bluegrass
POA PALU	Poa palustris	Fowl Bluegrass
POA PRAT	Poa pratensis	Kentucky Bluegrass
POA SP	*Poa species*	
SCHI PUR	Schizachne purpurascens	False Melic
TRIS SPI	Trisetum spicatum	Spike Trisetum
XERO TEN	*Xerophyllum tenax*	Bear Grass

HERB LAYER

Species Code	Latin Name	Common Name
ANAP MAR	*Anaphalis margaritacea*	Pearly Everlasting
ACHI MIL	Achillea millefolium	Common Yarrow
ACHI SIB	*Achillea sibirica*	Yarrow
ACHI SP	*Achillea species*	Yarrow Species
ACTA RUB	Actaea rubra	Red Baneberry
AGOS GLA	Agoseris glauca	Pale False Dandelion
AGOS SP	*Agoseris species*	False Dandelion
ALLI CER	Allium cernum	Nodding Onion
ANEM MUL	Anemone multifida	Windflower, Cutleaf Anemone
ANTE MIC	*Antennaria microphylla*	Rossy Pussytoes
ANTE SP	*Antennaria species*	
ANTE NEG	Antennaria neglecta	
ANTE PUL	Antennaria pulcherrima	Showy Everlasting
ANTE RAC	Antennaria racemosa	Racemose Everlasting
ANTE ROS	Antennaria rosea	Rosy Everlasting
APOC AND	Apocynum androsaemifolium	Spreading Dogbane
AQUI BRE	Aquilegia brevistyla	Blue Columbine
AQUI FLA	*Aquilegia flavescens*	Yellow Columbine
ARAL NUD	Aralia nudicaulis	Wild Sarasparilla
ARCE AME	Arceuthobium americanum	Dwarf Mistletoe
ARNI CHA	Arnica chamissonis	Leafy Arnica
ARNI COR	Arnica cordifolia	Heart-leaved Arnica
ARNI LAT	*Arnica latifolia*	Mountain Arnica
ARNI LON	Arnica longifolia	Long-leaved Arnica
ARNI SP	*Arnica species*	Arnica
ASTR SP	*Astragalus species*	Milk Vetch
ARTE CAM	Artemisia campestris	Plains Wormwood
ARTE FRI	Artemisia frigida v. americanus	Pasture Sage

Species Code	Latin Name	Common Name
ASTE CIL	Aster ciliolatus	Lindley's Aster
ASTE CON	Aster conspicuous	Showy Aster
ASTE FOL	Aster folicaeus	Aster
ASTE JUN	Aster junciformis	Rush Aster
ASTE LAE	Aster laevis	Smooth Aster
ASTE SP	Aster species	Aster species
ASTR ALP	Astragalus alpinus	Alpine Milk Vetch
ASTR EUC	Astragalus eucosmus	Milk Vetch
ASTR FRI	Astragalus frigidus	American Milk Vetch
ASTR STR	Astragalus striatus	Ascending Purple Milk Vetch
BOTR VIR	*Botrychium virginianum*	Grape Fern
CALY BUL	Calypso bulbosa	Venus' Slipper
CAMP ROT	Campanula rotundifolia	Bluebell, Harebell
CAST MIN	Castilleja miniata	Red Indian Paintbrush
CAST PAR	*Catilleja parviflora*	Small Flowered Paintbrush
CAST SP	Castilleja species	Paintbrush
CERA ARV	Cerastium arvense	Field Chickweed
CERA SP	Cerastium species	Chickweed species
CHRY IOW	Chrysoplenium iowense	Golden Saxifrage
CHRY LEU	*Chrysanthemum leucanthemum*	Ox-eye Daisy
CICU MAC	*Cicuta maculata*	Water Hemlock
CIRS ARV	*Cirsium arvense*	Canada Thistle
CIRS HOO	*Cirsium hookerianum*	White Thistle
CIRS SP	*Cirsium species*	Thistle Species
CIRS VUL	*Cirsium vulgare*	Bull Thistle
CORA MAC	*Corallorhiza maculata*	Spotted Coralroot
CORA TRI	Corallorhiza trifida	Pale Coralroot
CORN CAN	*Corn canadensis*	Bunch Berry
CORY AUR	Corydalis aurea	Yellow Corydalis
CORY SEM	Corydalis sempervirens	Pink/Pale Corydalis
CORY SP	*Corydalis species*	Corydalis
CREP SP	*Crepis species*	Hawksbeard species
CREP TEC	*Crepis tectorum*	Annual Hawksbeard
CYST FRA	Cystopteris fragilis	Bladder Fern
DELP GLA	Delphinium glaucum	Tall Larkspur
DISP TRA	Disporum trachyearpum	Fairy-bells
DODE RAD	Dodecatheon radicatum	Shooting Star
DRAB AUR	Draba aurea	Golden Whitlow-Grass
DRYO CRI	*Dryopteris cristata*	Fern
DRYO EXP	*Dryopteris expansa*	Spiny Woodfern
DRYO SP	*Dryopteris species*	Fern
DRYO SPI	Dryopteris spinulosa	Narrow Spinulose Shield Fern
ERIG GLA	*Erigeron glabellus*	Wild Daisy

Species Code	Latin Name	Common Name
EPIL ANG	Epilobium angustifolium	Fireweed
EQUI ARV	Equisetum arvense	Field Horsetail
EQUI PRA	Equisetum pratense	Meadow Horsetail
EQUI SCI	Equisetum scirpoides	Dwarf Scouring Rush
EQUI SP	*Equisetum species*	Horsetail Species
EQUI SYL	Equisetum sylvaticum	Woodland Horsetail
EQUI VAR	Equisetum variegatum	Variegated Horsetail
ERIG PER	Erigeron peregrinus v. callianthemus	Wondering Daisy
ERIG SP	Erigeron species	Fleabane
FRAG VIR	Fragaria virginiana	Wild Strawberry
GAIL ARI	Gaillardia aristata	Gaillardia
GALE TET	*Galeopsis tetrahit*	Hemp Nettle
GALI BOR	Galium boreale	Northern Bedstraw
GALI TRI	Galium triflorum	Sweet-Scented Bedstraw
GENT AMA	Gentianella amarella	Felwort, Northern Gentian
GENT SP	*Gentianella species*	Gentian species
GEOC LIV	Geocaulon lividum	Bastard Toadflax
GERA RIC	Geranium richardsonii	Richardson Geranium
GERA SP	*Geranium species*	Geranium
GERA VIS	*Geranium viscosissimum*	Sticky purple geranium
GEUM ALE	Geum aleppicum	Yellow Avens
GEUM MAC	Geum macrophyllum	Yellow Avens
GEUM RIV	Geum rivale	Purple or Water Avens
GEUM TRI	Geum triflorum	Old Man's Whiskers
GOOD REP	Goodyera repens	Rattlesnake Plantain
GYMN DRY	Gymnocarpium dryopteris	Oak Fern
HABE HYP	Habenaria hyperborea	Northern Green Orchid
HABE OBT	Habenaria obtusata	Blunt-leaved Orchid
HABE ORB	Habenaria orbiculata	Round-leaved Orchid
HABE VIR	Habenaria viridis v. bracteata	Bracted Orchid
HALE DEF	Halenia deflexa	Spurred Gentian
HEDY ALP	Hedysarum alpinum v. americanum	American Hedysarum
HEDY SP	*Hedysarum species*	Hedysarum
HERA LAN	Heracleum lanatum	Cow Parsnip
HIER ALB	*Hieracium albiflorum*	White hawkweed
HIER CAN	Hieracium canadense	Canada Hawkweed

Species Code	Latin Name	Common Name
HIER SP	*Hieracium species*	Hawkweed species
HIER UMB	Hieracium umbellatum	Narrow-leaved Hawkweed
LATH OCH	Lathyrus ochroleucus	Cream-coloured Vetchlin
LATH VEN	*Lathyrus venosus*	Peavine
LILI PHI	Lilium philadelphicum	Western Wood Lily
LINU LEW	Linum lewisii	Wild Blue Flax
LIST BOR	Listera borealis	Western Twayblade
LIST COR	Listera cordata	Heart-leaved Twayblade
LYCH DRU	Lychnis drummondii	Drummond's Cocle
LYCO ANN	Lycopodium annotinum	Stiff Club-Moss
LYCO COM	Lycopodium complanatum	Ground Cedar
LYCO SP	*Lycopodium species*	Club-moss
LUPI ARG	*Lupinus argenteus*	Perennia lupine
MAIA CAN	Maianthemum canadense	Wild Lily-of-the-Valley
MELI ALB	*Melilotus alba*	White sweet clover
MELI OFF	*Melilotus officinalis*	Yellow sweet clover
MERT PAN	Mertensia paniculata	Tall Mertensia, Lungwort
MITE NUD	Mitella nuda	Bishop's Cap, Mitrewort
ORCH ROT	Orchis rotundifolia	Round-leaved Orchid
ORTH SEC	*Orthilia secunda*	One-Sided Wintergreen
OSMO CHI	Osmorhiza chilensis	Blunt-fruited Sweet Cicely
OSMO DEP	Osmorhiza depauporata	Sweet Cicely
OXYT CAM	Oxytropis campestris	Late Yellow Locoweed
OXYT SER	Oxytropis sericeus v. spicata	Early Yellow Locoweed
OXYT SPL	*Oxytropis splendens*	showy loco-weed
PARN FIM	Parnassia fimbriata	Fringed Grass-of Parnas
PARN PAL	*Parnassia palustris*	Northern grass-of parnassus
PEDI BRA	*Pedicularis bracteosa*	Bracted lousewort
PEDI CAP	*Pedicularis capitata*	Few-flowered lousewort
PEDI GRO	Pedicularis groenlandicam	Elephant Head
PEDI LAB	Pedicularis labradoricam	Labrador Lousewort
PENS PRO	Penstemon procerus	Slender Blue Beardtongue
PETA PAL	Petasites palmatus	Palmate-leaved Coltsfoot
PETA SAG	Petasites sagittatus	Arrow-leaved Coltsfoot

Species Code	Latin Name	Common Name
PICR ECH	*Picris echioides*	Bristly ox-tongue
PLAN MAJ	*Plantago major*	common plantain
POLY BIS	Polygonum bistortoides	Western Bistort
POLY CAE	Polygonum caeruleum spp. occidentale	Jacob's Ladder
POLY VIV	Polygonum viviparum	Alpine Bistort
POTE ARG	Potentilla arguta	White Cinquefoil
POTE GLA	Potentilla glandulosa spp. pseudorupestris	Cinquefoil
POTE GRA	Potentilla gracilis	Graceful Cinquefoil
PYRO ASA	Pyrola asarifolia	Common Pink Wintergreen
PYRO BRA	*Pyrola bracteata*	Large wintergreen
PYRO CHL	*Pyrola chlorantha*	Green Wintergreen
PYRO ORB		
PYRO SP	Pyrola species	Wintergreen
RANU ACR	*Ranunculus acris*	Tall buttercup
RHIN CRI	Rhinanthus cristagalli	Yellow Rattle
RHIN MIN	*Rhinanthus minor*	Yellow rattle
RUBU ARC	Rubus arcticus	Dwarf Raspberry
RUBU PED	*Rubus pedatus*	Five-leaved bramble
RUBU PUB	Rubus pubescens	Dewberry
RUBU SP	*Rubus species*	
RUME ACE	*Rumex acetosa*	Green sorrel
RUME OCC	Rumex occidentalis v. fenestratus	Western Dock
SAXI BRO	Saxifraga bronchialis	Prickly Saxifrage
SCIR VAL	*Scirpus validus*	Common great bulrush
SCUT GAL	*Scutellaria galericulata*	Skullcap
SEDU STE	Sedum stenopetalum	Common Stonecap
SELA DEN	Selaginella densa	Prairie Selaginella
SENE CAN	Senecio canus	Prairie Groundsel
SENE PAU	Senecio pauperculus	Balsam Groundsel
SENE PSE	*Senecio pseudaureus*	Stream bank butterweed
SENE SP	*Senecio species*	Graundsel
SENE TRI	*Senecio triangularis*	Arrow-leaved groundsel
SMIL RAC	*Smilacina racemosa*	False Solomon's Seal
SMIL STE	Smilacina stellata	Star-flowered Solomon Seal
SMIL TRI	Smilacina trifolia	Three-leaved Solomon Seal
SOLI CAN	*Solidago canadensis*	Canada goldenrod
SOLI GIG	*Solidago gigantea*	Goldenrod
SOLI MUL	Solidago multiradiata	Alpine Goldenrod

Species Code	Latin Name	Common Name
SOLI SP	*Solidago species*	Goldenrod species
SOLI SPA	*Solidago spathulata*	Spike Like Golden Rod
SONC ARV	*Sonchus arvensis*	Perennial sow thistle
SONC SP	*Sonchus species*	Sow thistle
SPIR ROM	Spiranthes romanzoffiana	Ladies' Tresses
STEL CAL	*Stellaria calycantha*	Northern starwort
STEL LON	Stellaria longifolia	Long-leaved Chickweed
STEL SP	*Stellaria species*	Starwort species
STEN OCC	Stenanthium occidentale	Bronze Bells
STRE AMP	Streptopus amplexifolius	Twisted Stalk
TANA VUL	*Tanacetum vulgare*	Common tansy
TARA CER	*Taraxacum ceratophrum*	Horned Dandelion
TARA OFF	Taraxacum officinale	Common Dandelion
TARA SP	*Taraxacum species*	
THAL VEN	Thalictrum venulosum	Veiny Meadow Rue
THER RHO	*Thermopsis rhombifolia*	Golden bean
TRIF AUR	*Trifolium aureum*	Hop clover
TRIF PRA	*Trifolium pratense*	Red Cover
TRIF REP	Trifolium repens	White Clover
TRIF SP	*Trifolium species*	Clover Species
THPH LAT	*Typha latifolia*	Cattail
URTI DIO	*Urtica dioica*	Common nettler
VERA ESC	*Veratrum eschscholtzii*	False hellebore
VERO SP	*Veronica species*	
VERO WOR	*Veronica wormskioldii*	Alpine Speedwell
VICI AME	Vicia americana	Wild Vetch
VIOL ADU	Viola adunca	Early Blue Violet
VIOL CAN	*Viola canadensis*	Canada Violet
VIOL REN	Viola renifolia	Kidney-leaved Violet
VIOL RUG	Viola rugulosa	Western Canada Violet
VIOL SP	*Viola species*	Violet
ZIZI APT	Zizia aptera	Meadow Parsnip
ZYGA ELE	Zygadenus elegans	Death Camas

MOSSES AND LIVERWORTS

Species Code	Latin Name	Common Name
AMBL SER	Amblystegium serpens	
ANAS HEL	Anastrophyllum helleranum	
AULA PAL	Aulacomnium palustre	Glow Moss
AULA SP	*Aulacomnium species*	
BARB HAT	Barbilophozia hatcheri	Liverwort
BRAC OED	*Brachythecium Oedipum*	Short-leaved Ragged Moss
BRAC SAL	Brachythecium salebrosum	
BRAC STA	Brachythecium starkei	
BRAC TUR	Brachythecium turgidum	
BRYU CAE	Bryum caespiticium	
BRYU PSE	Bryum pseudotriquetrum	
CALL GIG	Calliergon giganteum	
CALY SPH	Calypogeja sphagnicola	
CAMP CHR	Campylium chrysophyllum	
CAMP HIS	Campylium hispidulum	
CAMP STE	Campylium stellatum	
CEPH LUN	Cephalozia lunufifolia	
CERA PUR	Ceratodon purpureus	Fire Moss
CLAD BAC	*Cladonia bacillaris*	
CLIM DEN	Climacium dendroides	
DICR ACU	Dicranum acutifolium	
DICR CON	Dicranum condensatum	
DICR ELO	Dicranum elongatum	
DICR FLA	Dicranum flagellare	
DICR FRA	Dicranum fragilifolium	
DICR FUS	Dicranum fuscenscens	
DICR GRO	Dicranum groenlandicum	
DICR MUE	Dicranum muehlenbeckii v.cirratum	
DICR POL	Dicranum polysetum	
DICR SCO	Dicranum scoparium	
DICR SP	Dicranum species	
DICR UND	Dicranum undulatum	
DIST CAP	Distichium capillaceum	
DREP ADU	Drepanocladus aduncus	
DREP REV	Drepanocladus revolvens	
DREP UNC	Drepanocladus uncinatus	
DREP VER	Drepanocladus vernicosus	
EURH PUL	Eurhynchium pulchellum	
FUNA HYG	Funaria hygrometrica	
GEOC GRA	Geocalyz graveolans	
HEDW CIL	Hedwigia ciliate	

Species Code	Latin Name	Common Name
HYLO SP	*Hylocomium species*	
HYLO SPL	Hylocomium splendens	Stair Step Moss
HYPN PRA	Hypnum pratense	
HYPN REV	Hypnum revolutum	
JAME AUT	Jamesoniella autumnalis	
LEPI REP	Lepidozia reptans	
LEPT PYR	Leptobryum pyriforme	
LOPH GUT	Lophozia guttulata	
LOPH INC	Lophozia incisa	
LOPH LON	Lophozia longidens	
LOPH VEN	Lophozia ventricosa	
MNIU SP	*Mnium species*	
MNIU SPI	Mnium spinulosum	
MYLI ANO	Mylia anomala	
MYUR JUL	Myurella julacea	
ONCO WAH	Oncophorus wahlenbergii	
ORTH RUP	Orthotrichum rupestre	
ORTH SPE	Orthotrichum speciosum	
PLAG ASP	Plagiochila asplenoides	
PLAG CUS	Plagiomnium cuspidatum	
PLAG DRU	Plagiomnium drummondii	
PLAG MED	Plagiomnium medium	
PLEU SCH	Pleurozium schreberi	
POHL NUT	Pohlia nutans	
POLY ALP	*Polytrichum Alpinum*	Stiff-leaved Polytrichum
POLY COM	Polytrichum commune	
POLY JUN	Polytrichum juniperinum	
POLY SP	*Polytrichum Species*	
POLY STR	Polytrichum strictum	
PTIL CIL	Ptilium ciliare	
PTIL CRI	Ptilium crista-castrensis	Knight's Plume
PTIL PUL	Ptilium pulcherrimum	
PYLA POL	Pylaisiella polyantha	
RHIZ PSE	Rhizomnium pseudopunctatum	
RHYT RUG	Rhytidium rugosum	
SPHA ANG	Sphagnum angustifolium	
SPHA CAP	*Sphagnum capillaceum*	Common red sphagnum
SPHA FUS	Sphagnum fuscum	
SPHA SP	*Sphagnum Species*	
SPHA WAR	Sphagnum warnstorfii	
SPLA AMP	Splachnum ampullaccum	
APLA SPH	Splachnum sphaericum	
TAYL SER	Tayloria serrata	

Species Code	Latin Name	Common Name
TETR ANG	*Tetraplodon angustatus*	
TETR MIN	*Tetraplodon minoides*	
TETR PEL	Tetrphis pellucida	
THUI ABI	Thuidium abietinum	
THUI REC	Thuidium recognitum	
TIMM AUS	Timmia austriaca	
TOME NIT	Tomenthypnum nitens	
TORT MUC	Tortula mucronifolia	
TORT RUR	Tortula ruralis	
TRIT EXS	*Tritomaria exsecta*	

LICHENS

Species Code	Latin Name	Common Name
BACI SPH	*Bacidian sphaeroides*	
BRYO FRE	Bryoria fremontii	
BRYO FUS	Bryoria fuscescens	
CETR CUC	Cetraria cucullata	
CETR ERI	Cetraria ericetorum	
CETR HAL	Cetraria halei	
CETR ISL	Cetraria islandica	
CETR NIV	Cetraria nivalis	
CETR PIN	Cetraria pinastri	
CLADI SP	*Cladina Species*	
CLAD BOT	Cladonia botrytes	
CLAD CAR	Cladonia carneola	
CLAD CEN	Cladonia cenotea	
CLAD CHL	Cladonia chlorophaea	
CLAD COC	Cladonia coccifera	
CLAD CON	Cladonia coniocraea	
CLAD COR	Cladonia cornuta	
CLAD DEF	Cladonia deformis	
CLAD ECM	Cladonia ecmocyna	
CLAD FIM	Cladonia fimbriata	
CLAD GRA	Cladonia gracilis	
CLAD MIT	Cladonia multiformis	
CLAD PLE	Cladonia pleurota	
CLAD PYX	Cladonia pyxidata	
CLAD RAN	Cladonia rangiferina	
CLAD SP	*Cladonia Species*	
EVER MES	Evernia mesomorpha	
HYPO BIT	Hypogymnia bitteri	

Species Code	Latin Name	Common Name
HYPO PHY	Hypogymnia physodes	
ICMA ERI	Icmadophila ericetorum	Spraypaint Lichen
LETH VUL	Letharia vulpina	
LOBA PUL	*Lobaria pulmonaria*	Lungwort
PARM ALE	Parmeliopsis aleurites	
PARM AMB	Parmeliopsis ambigua	
PARM HYP	Parmeliopsis hyperopta	
PARM SUL	Parmelia suleata	
PELT APH	Peltigera aphthosa	Green Dog Lichen
PELT CAN	Peltigera canina	
PELT MAL	Peltigera malacea	
PELT POL	Peltigera polydactyla	
PELT SP	*Peltigera species*	
PHYS ADS	Physicia adscendens	
PLAG SP	*Plagiomnium species*	Leafy moss
PLAT GLA	Platismatia glauca	
RAMA FAS	Ramalina fastigiata	
RAMA POL	Ramalina pollinaria	
STER TOM	Stereocaulon tomentosum	
USNE GLA	Usnea glabrescens	
USNE HIR	Usnea hirta	
USNE SOR	Usnea sorediifera	
USNE SUB	Usnea subfloridana	
USNE SP	Usnea species	
XANT POL	Xanthoria polycarpa	
XANT STR	Xanthoria	

14. COMMON PROBLEMS

Duplicate Tree Numbers

Try to determine the "oldest" tree and assume that is the initial tagged tree. If this can't be done, assume the tree with the largest DBH and/or height is the original tree. The condition and age of the tree tag may give a clue as to what tree was originally tagged as well. Number the other tree with the next available sequential number.

Past crews would also assign a sapling number to a seedling that has grown to 1.1cm DBH. If it is certain that 2 different numbers were used on the same stem, assume the tree is the one with the lower number (regen number).

In all cases fully document this in the comments column beside the appropriate tree(s).

Establishment crews would also rarely follow the proper initial numbering sequence in the regen plots. Use extreme care when measuring these plots.

15. RECORDING DATA

All measurements taken on these plots must be recorded on the appropriate tally sheets. Data entered on the sheets is later entered into a computer so legibility is very important. All header lines must be completed.

1) All letters must be capitalized.

2) Use only those species codes listed in Appendix 6.1 and 6.2.

3) Asterisks, numeric characters in alphabetic fields (e.g. B3 in the species columns) and alphabetic characters in numeric fields (e.g. H in DBH columns) are not acceptable.

4) Comments are written in the shaded areas only. Comments written elsewhere on the tally sheets are not acceptable.

5) Alphabetic characters that are commonly illegible are:

   N that looks like W
   C that looks like L or O
   D that looks like P or O
   I that looks like T or L

6) Numeric characters that are commonly illegible are:

   2 that is 'looped' and looks like 0
   6 and 9 that looks like 0 or 4
   0 incompletely closed and looks like 6
   5 that looks like S
   7 and 1 mistaken for each other
   Scientific (European) 7 is not acceptable

The number is written as open (i.e. four not 4).

16. GENERAL INFORMATION (CSTM 101)

Column	Name	Data Entry
1	Record Type	03 - cruise tally 04 - cruise vegetation 05 - plot vegetation 06 - regeneration (planted & natural) 61 - regen height class tallies 07 - sapling 08 - tree plot 09 - plot retreatment 1 record type per page.
3	Group Number	2 digits, right justified.
5	Plot Number	5 digits - zero fill, right justified.
8	Plot Type	Leave blank.
10	Year	Last 2 digits of year are recorded e.g. 1996 recorded as 96.
12	Month	Right justified, zero filled e.g. June is recorded as 06.
14	Day	Right justified zero filled. Note the date is the same on all tally sheets even if the plot took several days to remeasure with the exception of the vegetation tally sheet CSTM 102, which the actual date is recorded.
15	Crew Identification	Full crew names, initials are not acceptable e.g. John Smith, Mary Jones.
16	Regen Plot	Fill in the number of regeneration plot in which pinned seedlings are found. For planted seedlings outside the regen plots but within the pre 1993 sapling plot, code regen # as 5.

Column	Name	Data Entry
17	Tree Number	Fill in as required.
21	Species	Recorded as 2 capitalized letters as given in Appendix 6.1.
23	Diameter	Numeric, right justified, tree must be > 1.3 m tall to have diameter recorded. Measurements to nearest millimeter.
27	Height	Numeric right justified. Regen & sapling exclude current years growth and measure to nearest centimeter. Trees (>9.1cm DBH) - measure and record total height for all trees. Refer to Appendix 6.3
35	Crown Class	Crown class is recorded on trees and saplings as one letter (D, C, I, S or O). Refer to Appendix 6.9
36	Condition Codes	Left justified, recorded as a 2 digit number. Do not zero fill e.g. a leaning tree with conks is recorded as 51,58, blank. If a tree has no defect it is recorded as '00'. Refer to Appendix 6.5
42	Azimuth	Right justified, recorded as 1^{o}-360^{o}. Only 360^{o} can be used, not 0^{o}.
45	Distance	Right justified, measured to nearest decimeter on all saplings and trees (standing dead as well). Record declination in comments. Note that 2 stems cannot have identical azimuths and distances.

17. GENERAL INFORMATION (CSTM 100)

Columns	Refer to section 4.1
1-16	Refer to section 4.1
17	Species - recorded as 2 capitalized letters as given in Appendix 6.1
19-54	Height classes - recorded to nearest centimeter, excluding current years growth. Right justified, zero filled.

18. EXAMPLE OF A TIE PLATE

1. FOREST MANAGEMENT PROJECT

PERMANENT SAMPLE PLOT NO *456*

TIE POINT *'A' 75* M *C 180°* TO *P.C.*

LS.	SEC.	TWP.	RGE.	W. MER.
1	*36*	*101*	*19*	*4*

FOR MORE INFORMATION CONTACT ALBERTA FOREST SERVICE

RANGER STATION AT *Fort McMurray*

OR FOREST MEASUREMENT AT 427-8474

PLEASE DO NOT DISTURB THIS MARKER