

**FOREST COVER Reporting to RESULTS**  
**Required Data Items**

Jan 23, 2013 Version

Note: Free software required to create RESULTS forest cover submissions and a detailed manual of how to do it can be obtained from <http://www.woodfor.com/WLGML/>

| <b>CONTACT INFORMATION</b>      |             |            |
|---------------------------------|-------------|------------|
|                                 | Your Permit | Example    |
| <b>MOF Client Number</b>        |             | 12345678   |
| <b>Client Location Code</b>     |             | 00         |
| <b>Licensee Contact Name</b>    |             |            |
| <b>Licensee Contact Email</b>   |             |            |
| <b>Licensee Contact Phone #</b> |             | 2505551234 |
| <b>Forest District:</b>         |             |            |

Note: The OPENING and the STANDARDS UNIT must be defined before forest cover can be entered.

If these already exist in RESULTS, your service provider can likely access the required information.

If no, fill out the forms in SU\_n\_OPENING\_to\_RESULTS\_2012.doc.

| <b>OPENING KEY INFORMATION</b>   |  |       |
|--|--|-------|
| (See pages after tables for more information / how to choose)  |  |       |
| Choice A - For a first time submission, also works for subsequent submissions:                             |  |       |
| <b>Licence:</b>  |  | W0436 |
| <b>Cutting Permit:</b>   |  | CC    |
| <b>Cut Block:</b>  |  | 1     |
| Choice B - For subsequent submissions, if you know the Opening Number assigned by RESULTS:                 |  |       |
| <b>Opening Number:</b>   |  | CC    |
| <b>Admin Regime:</b><br><b>Pre-Forest Practices code?</b><br><b>Forest Practices Code?</b><br><b>FRPA?</b> |  |       |
| <b>New Opening or Update Existing RESULTS Opening?</b>   |  |       |

Instructions on how to fill out the following forms and definitions of terms are found *after* the blank forms.

| <b>FOREST COVER POLYGON INFORMATION</b>  |               |               |               |               |               |
|--|---------------|---------------|---------------|---------------|---------------|
|  | <b>Poly 1</b> | <b>Poly 2</b> | <b>Poly 3</b> | <b>Poly 4</b> | <b>Poly 5</b> |
| <b>Standard Unit ID:</b>                 |               |               |               |               |               |
| <b>Licencee ID:</b>                      |               |               |               |               |               |
| <b>Area:</b>                             |               |               |               |               |               |
| <b>Site Index:</b>                       |               |               |               |               |               |
| <b>Site Index Source:</b>                |               |               |               |               |               |
| <b>Reference Year</b>                    |               |               |               |               |               |
| <b>Tree Cover Pattern:</b>               |               |               |               |               |               |
| <b>Re-Entry Year:</b>                    |               |               |               |               |               |
| <b>Reserve Type:</b>                     |               |               |               |               |               |
| <b>Reserve Objective:</b>                |               |               |               |               |               |
| <b>Stocking Status</b>                   |               |               |               |               |               |
| <b>Stocking Type</b>                     |               |               |               |               |               |
| <b>Non-Mappable Area ID</b>              |               |               |               |               |               |
| <b>Non-Mappable Area Stocking Status</b> |               |               |               |               |               |
| <b>Non-Mappable Area Stocking Type</b>   |               |               |               |               |               |
| <b>Non-Mappable Area Hectares</b>        |               |               |               |               |               |



| LAYER INFORMATION FOR A FOREST COVER POLYGON |  |  |  |  |  |  | Polygon#: _____ |  |
|--|--|--|--|--|--|--|-----------------|--|
| Layer Code:                                  |  |  |  |  |  |  |                 |  |
| Basal Area:                                  |  |  |  |  |  |  |                 |  |
| Crown Closure:                               |  |  |  |  |  |  |                 |  |
| Total Stems:                                 |  |  |  |  |  |  |                 |  |
| Total Well Spaced:                           |  |  |  |  |  |  |                 |  |
| Well Spaced:                                 |  |  |  |  |  |  |                 |  |
| Free Growing:                                |  |  |  |  |  |  |                 |  |
| Damage Agent:                                |  |  |  |  |  |  |                 |  |
| Damage Incidence (%):                        |  |  |  |  |  |  |                 |  |
| Damage Incidence (ha):                       |  |  |  |  |  |  |                 |  |
| Species 1                                    |  |  |  |  |  |  |                 |  |
| Species 1 Percent                            |  |  |  |  |  |  |                 |  |
| Species 1 Avg Age:                           |  |  |  |  |  |  |                 |  |
| Species 1 Avg Height                         |  |  |  |  |  |  |                 |  |
| Species 2                                    |  |  |  |  |  |  |                 |  |
| Species 2 Percent                            |  |  |  |  |  |  |                 |  |
| Species 2 Avg Age:                           |  |  |  |  |  |  |                 |  |
| Species 2 Avg Height                         |  |  |  |  |  |  |                 |  |
| Species 3                                    |  |  |  |  |  |  |                 |  |
| Species 4                                    |  |  |  |  |  |  |                 |  |
| Species 5                                    |  |  |  |  |  |  |                 |  |
| Species 6                                    |  |  |  |  |  |  |                 |  |





## 1. RESULTS Forest Cover Submission

### 1.1 Introduction

Reporting forest cover is more than a little complicated at first glance, but once you get used to it, it is not so bad.

The general principle is that you need to tell RESULTS about all the different vegetation types found within the Opening you have defined. The table below illustrates some common spatial relationships.

| Opening                                 |   |                                  |                     |                       |
|---|---|----------------------------------|---------------------|-----------------------|
| SU 1                                    |   | SU 2                             |                     |                       |
| Forcov: Part of SU 1 that is PI Leading | Forcov: Part of SU 1 that is Sx Leading | Forcov: Sx Leading on Moist Site | Forcov: NP-Man Made | Forcov: Reserve Patch |
| Contains non-mappable rock outcrops.    |   |                                  |                     |                       |

- You will report forest cover for each SU. The forest cover will be NSR for the period before regeneration.
- A SU can contain more than one forest cover polygon if differing regeneration outcomes have occurred.
- Any forest cover polygon can have an estimated percentage of non-mappable non-forest area. These are areas that are too small or too dispersed to map effectively.
- Mappable areas (> 0.25 ha in general) of reserves, non-forested land or non-productive land within an opening are reported as forest cover polygons. They have no forest cover, but they are reported here, in forest cover.
- Total area of Forest Cover polygons must equal total area of Opening.

### 1.2 Data Required

We need to add:

- forest cover polygons (spatial data) that fill the Opening,
- inventory and silvicultural layer or layers in each forested polygon, and tree species information for each layer above.
- Entries for NSR or non-forested forest cover polygons.

### 1.3 What Are We Mapping Here?

What you need is a shape file that contains polygons for the various vegetation units you wish to report on.

The total area of your forest cover polygons must equal the opening area.

Forest cover polygons often mirror SU polygons, but an SU can be subdivided into different forest cover polygons if regeneration outcomes are different.



Forest cover polygons also may be created for natural NP areas, man-made NP areas and reserve patches, where these things are large enough and contiguous enough to map. Such features can also be dealt with as non-mappable areas within a forest cover polygon.

RISS-ls<sup>1</sup> states that the preferred minimum size is 0.25 ha, but notes that RESULTS can cope with polygons down to 0.1 ha in size (RISS-ls page 32).

RISS-ls pages 31 to 38 addresses what to map and how to do it. There are fascinating distinctions like we do map a permanent CP road but we do not map a permanent RP road. You really should skim that section of RISS-ls in case something in there applies to your situation.

## 2. Opening Key

RESULTS uses descriptors called "keys" to identify each unique cut block. Two commonly used keys are TenureID key and OpeningID key.

- **TenureID Key:** Licence Number, Cutting Permit Name, Cut Block number.  
You must use the Tenure key for a first submission to RESULTS, i.e. to tell RESULTS about a block it has not heard of before.

The Licence Number, Cutting Permit Name, Cut Block number must be known to FTA, or RESULTS will not create a new entry.

You have to exactly match what FTA believes a block is called. One character different is not an exact match.

Data entry over time in FTA has not been consistent. Or example, a woodlot can be called W0666 on one CP entry in FTA, and WL666 on another. You have to know and use the right one.

- **OpeningID Key:** the Opening Number assigned by RESULTS  
Opening Number is assigned when a block is first entered in RESULTS.  
Blocks not yet in RESULTS have no OpeningID as they "don't exist" as far as RESULTS is concerned. You have to use the Tenure key.

It is, to say the least, **very, very important** to get the key right.

You can use the TenureID Key for an opening that already exists in RESULTS if you want. You do not have to use OpeningID key, but OpeningID key is a clearer-to-the-human link to the existing RESULTS data.

Given the variable quality legacy data from the early days of RESULTS for Woodlots still stuck in the system, it is impossible to predict what RESULTS knows and does not know about older blocks.

I recommend checking the Tenure ID key info in FTA using MapView before using TenureID key, just to verify that you and the ESF system agree.

Likewise, it is wise to check the Opening Number for known-to-RESULTS blocks in online RESULTS or in MapView before using the OpeningID key.

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<sup>1</sup> [http://www.for.gov.bc.ca/his/results/RISS\\_ls\\_3b\\_ed\\_Jan1.pdf](http://www.for.gov.bc.ca/his/results/RISS_ls_3b_ed_Jan1.pdf)



Detailed instructions are contained in the WLGML manual in Section 10.4.

### 3. Admin Regime

The legal framework used to authorize your harvest affects how your stocking standards get reported / entered.

Real old block under a PHSP or SMP? Pre-Code.

Block permitted under Forest Practices Code / Woodlot Licence Forest Management Regulation (WLFMR) / Forest Development Plan? Code.

Newish block permitted under Forest and Range Practices Act (FRPA) / Woodlot Licence Planning and Practices Regulation (WLPPR) / Woodlot Licence Plan? FRPA.

### 4. Attributes Required for Forest Cover Polygon

We will start with the forested forest cover polygon. The first step is to fill in the main data field for the polygon.

- 1. Standard Unit ID.** Conditional entry. Is the forest cover polygon within a Standards Unit? And is it required to be reforested?  
If yes, provide the Standard Unit ID. If no, leave blank.  
From your Site Plan. What did you call this SU in your site plan? Call it the same thing here.
- 2. Licencee ID.** Mandatory entry. A unique identifier for the forest cover polygon assigned by the licensee.  
In RESULTS web site, this field is referred to as Polygon ID.  
No duplicates permitted. Can be up to 30 characters long, but short is better. e.g., 1, 2, 3; or X, Y, Z.  
This label shows up in MapView as the polygon descriptor.
- 3. Area.** The gross area in hectares, one decimal place, of the forest cover polygon.
- 4. Site Index.** Conditional entry. Required if tree species are entered in this polygon. i.e. if this is a forested area.  
SI 50 standards. Integer, 2 characters. (i.e. 22, not 21.7)  
Specifications not clear on conditionality for NSR areas, but it seems logical to enter for NSR that will be forested in future.  
For multi-storey stands, the SI is for the layer with the highest volume or next due for harvest (the layer with the greatest site occupancy; e.g., mature, pole, or sapling layer).  
For reserves, the SI may be based on previous stand information applied to the mature layer, or to the layer with the greatest site occupancy.
- 5. Site Index Source.** Conditional entry. Must be filled if Site Index is filled, must be blank if Site Index is blank.  
Where did your SI 50 data come from?  
Choices are:

A Site index from adjacent stand



- C SI from site index curve
- E SI from BEC
- H SI from stand before harvest
- I SI from growth intercept
- M SI from G,M,P,L Site Class Conversion
- O SI from provincial SIBEC rollover
- S SI assigned by District Silv. Section

H is a good answer if you are not clear on the fine details of GMPL Site Class Conversion vs site index curve vs SIBEC.

6. **Reference Year.** Mandatory entry. Integer, 4 characters. e.g. 2010

Must not be greater than current year

The year the forest cover polygon data was collected. Typically the year of the survey

For roads and other NP areas, the reference year may be different from the survey date, and will be the date the road was measured or the block area was determined.










7. **Tree Cover Pattern.** Conditional. Integer, 1 character.

Applies to polygons, including reserves, in which trees are retained as part of the silvicultural system or disturbance characteristic. Leave blank if no overstory.

The example polygon does have some dispersed mature retention, so this value is filled in.

This code describes the spatial arrangement of residual patches of overstory in Layer 1.



1.  Single to very few (<4) occurrences of limited extent, circular to irregular shape.
2.  Single to very few (<4) occurrences of limited extent, linear or elongated shape.
3.  Several (>3) sporadic occurrences of limited extent, circular to irregular shape.
4.  Several (>3) sporadic occurrences of limited extent, linear or elongated shape.
5.  Intimately intermixed units, often with gradational transitions from one to the other.
6.  Discontinuous but extensive occurrences, parallel to sub-parallel elongated in shape.
7.  Limited continuous occurrence with few inclusions.
8.  Continuous occurrence with several inclusions.
9.  Continuous occurrence with very few inclusions.

8. **Re-Entry Year.** Conditional entry. Integer, 4 characters. e.g. 2045

The year the next harvest entry is expected to occur in the opening.

Applies to partial-cut silvicultural systems in which a subsequent harvest entry is planned prior to the end of the rotational planning cycle.

Required where Reserve Objective = TIM (timber).

If there will not be a harvest "planned prior to the end of the rotational planning cycle", leave this field blank.

A 0 value will not be accepted, as it means year 0 which does not compute.

9. **Reserve Type.** Conditional entry. 1 character.

"Required if a reserve or a retention area is associated with the forest cover polygon." This means required if the polygon itself is a reserve, like a wildlife tree patch, or if the polygon contains reserved timber, like dispersed seed trees or timber that will be cut in a later harvest.

Valid codes are:

- |      |             |
|------|-------------|
| D    | Dispersed   |
| G    | Group       |
| N    | No Reserve  |
| Null | No Reserves |

A reserved patch is a Group reserve.





"Retained live or standing dead trees that are pole size or larger for purposes other than regeneration" is a Dispersed reserve. (Those dead trees better not be for regeneration!).

Retained small groups of trees dispersed around a harvest unit is a... you better read the manuals. Please review RISS-Is page 32-33 and *Submitting Forest Cover To Results For Openings With Treed Retention*<sup>2</sup> if you are unsure about how to classify reserves.

Classifying and coding Reserves has been a challenge for RESULTS. There used to be more reserve codes, but they were recently retired in an attempt to get greater consistency.

10. **Reserve Objective.** Conditional. 3 characters.

Required if Reserve Type = G or D.

A code that identifies the reason for leaving the reserve.

A reserve, dispersed or grouped, that will be harvested before the next rotation is coded as TIM for timber.

If a reserve will remain standing until the next rotation, select the code which best defines the primary reserve purpose from the list.

Valid codes are:

|      |                               |
|------|-------------------------------|
| BIO  | Biodiversity                  |
| BOT  | Botanical Forest Products     |
| CHR  | Cultural Heritage Resource    |
| CWD  | Coarse Woody Debris           |
| FH   | Forest health                 |
| FUE  | Fuel Management               |
| MSM  | MSMA Treated Area             |
| OTH  | Other                         |
| REC  | Recreation                    |
| RMA  | Riparian Management Area      |
| SEN  | Sensitive Site                |
| TER  | Terrain Stability             |
| TIM  | Timber management             |
| VIS  | Visual                        |
| WTR  | Wildlife Tree Retention Goals |
| Null | No Reserves                   |

11. **Stocking Status.** Mandatory entry. 3 characters.

A code indicating the growing space occupancy according to the latest silviculture survey.

Stocking status of areas in the net area to be reforested is described as not satisfactorily restocked (NSR), immature (IMM) or mature (MAT).

In a multi-storied stand, select the code which describes the stocking status of the next layer to be harvested, the layer with the highest site occupancy.

Stocking status is also used to describe non-forested and non-productive polygons.

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<sup>2</sup> [http://www.for.gov.bc.ca/his/results/Forest\\_Cover\\_Retention\\_Submissions.pdf](http://www.for.gov.bc.ca/his/results/Forest_Cover_Retention_Submissions.pdf)



Valid codes are:

- A Alpine
- AF Alpine Forest
- C Cultivated
- G Gravel Bar
- IMM Immature
- L Lake
- M Meadow
- MAT Mature
- NC Non-commercial
- NF Non-forest
- NP Non-productive
- NSR Not Satisfactorily Restocked
- OR Open Range
- R Rock
- RES Residual
- S Swamp
- U Urban

12. **Stocking Type.** Mandatory entry. 3 characters.

Code to add more information on stocking status.

In a multi-storied stand, select the code which describes the stocking type of the next layer to be harvested, the layer with the highest site occupancy.

Valid codes are:

- Null No stocking type required
- ART Artificial
- BR Brush
- FOR Forested
- NAT Natural
- NPL Non-plantable
- PL Plantable
- RD Road
- UNN Unnatural

Note that there are only some allowed Stocking Status / Stocking Type combinations. The allowed combinations are shown in the table below.

| Stocking Status | Stocking Type |
|-----------------|---------------|
| A               | NAT           |
| AF              | FOR           |
| C               | UNN           |
| G               | NAT           |
| IMM             | ART           |
| IMM             | NAT           |
| L               | NAT           |
| M               | NAT           |
| MAT             | ART           |
| MAT             | NAT           |
| NC              | BR            |



|     |     |
|-----|-----|
| NC  | FOR |
| NF  | NAT |
| NP  | FOR |
| NP  | NAT |
| NP  | RD  |
| NP  | RHR |
| NP  | UNN |
| NSR | NAT |
| NSR | NPL |
| NSR | PL  |
| OR  | NAT |
| R   | NAT |
| RES | NAT |
| S   | NAT |
| U   | UNN |

13. **Non-Mappable Areas - ID.** Conditional entry. Required if non-mappable areas defined. 3 characters.

Non-Mappable areas are used to describe inclusions of NP Areas (e.g., rock or swamp) that are too small or too dispersed to map but which should be deducted from the Net Area to be Reforested.

The Non-Mappable Area ID is an identifier for the non-mapped component defined by the licensee. ID must be unique within the forest cover polygon.

14. **Non-Mappable Areas - Stocking Status.** Conditional entry. Required if non-mappable areas defined. 3 characters.

The same data requirements as discussed under 11. Stocking Status above, except entry cannot be IMM or MAT, as these are by definition NP areas.

NSR would seem to be unsuitable as well, but it is not specifically mentioned in the literature.

15. **Non-Mappable Areas - Stocking Type.** Conditional entry. Required if non-mappable areas defined. 3 characters.

The same data requirements as discussed under 12. Stocking Type above, with same constraints on Stocking Status / Stocking Type combinations.

16. **Non-Mappable Areas - Area.** Conditional entry. Required if non-mappable areas defined. Area in hectares, one decimal point.

## 5. Forest Cover Polygon - Layer Entry

This is obviously complicated stuff. Not if you are a regen surveyor with years of experience under your belt, but a bit much for everyone else. If you have a regen survey report from a certified surveyor, you can try supplying that to your RESULTS submission provider and skip inputting the details yourself.

And/or, you can give this form and materials to your regen surveyor and tell them to fill it out, and then give that info to your RESULTS service provider.



## 5.1 What Are Layers?

A Layer holds information about the trees in a polygon. Layers are vertically stratified: Mature, Pole, Sapling, Regen. The table below provides the layer specs. As you note, we are dividing the forest into height classes using stem diameter classes to 1/100<sup>th</sup> of a centimeter, but that's the way we are told to do it.

| Layer Code | Description                                | Notes   |
|------------|--|---|
| [blank]    | Inventory - even-aged                      | Blank only valid for even-aged stand  |
| S          | Silviculture - even-aged stand             | Silviculture label for even-aged stand.<br>Cannot have without corresponding inventory layer. |
| 1          | Inventory Mature Layer - uneven-aged       | Trees > 12.5 cm dbh - based on all commercial trees.  |
| 1S         | Silviculture Mature Layer - uneven-aged    | Trees > 12.5 cm dbh - based on all well-spaced trees.   |
| 2          | Inventory Pole Layer - uneven-aged         | Trees 7.5 to 12.49 dbh - based on all commercial trees.                                       |
| 2S         | Silviculture Pole Layer - uneven-aged      | Trees 7.5 to 12.49 dbh - based on all well-spaced trees.                                      |
| 3          | Inventory Sapling Layer - uneven-aged      | Trees 1.3 to 7.49 dbh - based on all commercial trees.  |
| 3S         | Silviculture Sapling Layer - uneven-aged   | Trees 1.3 to 7.49 dbh - based on all well-spaced trees.                                       |
| 4          | Inventory Regeneration Layer - uneven-aged | Trees < 1.3 dbh - based on all commercial trees.  |
| 4S         | Regeneration Layer - uneven-aged           | Trees < 1.3 dbh - based on all well-spaced trees.   |

Generally, layers are already determined by the silvicultural surveyor who assessed your block. The only common exception is the one in our example block: a dispersed overstory of retained mature trees, that the surveyor ignored as they have no relevance to future harvest.

Some stands have all 4 layers, some have only 1.

If our example FC Polygon 1 was NSR and had no residual stocking, or was not forested, we would not add layers. However, as it does have trees, we need to add *at least* an even aged Inventory layer and an even-aged Silviculture layer. We may need to add other layers to describe it properly.

Why are there Inventory and Silviculture layers? Because Inventory wants to track what is growing on the site at all times. But Silviculture wants to track what the future crop trees are and how they are doing. In theory, the two should coincide in managed forests once we are past free to grow.

Inventory information is required for all forested polygons within an opening, inside and outside of SUs.



Silviculture information is required for polygons that are inside SUs. A polygon with a silviculture entry must also have an inventory entry. The silviculture entries track information that is used for monitoring legal reforestation obligations.

The fundamental divide in the layer structure is between Even-Aged and Un-Even Aged management. You can not mix uneven-aged Inventory layers with even aged Silviculture layers, or vice versa. This can be a bit clunky. If there are more than 2 m<sup>2</sup>/ha of basal area retained in a harvest unit, or if your site plan discusses dispersed retention objectives, you will report the retained stems in an Un-Even Aged Inventory layer, which forces you to report your very even-aged plantation of young trees as an Un-Even Aged Silviculture layer as well. It is how it is.

The simple layer situation is, of course, a full on clearcut. The overstory is gone, the only growing stock is young planted trees. Add an Even Aged Inventory layer and an Even Aged Silviculture layer and you are done.

Consider an example of a regenerated clearcut with some retained dispersed overstory. We would add a Layer 1 - Mature Inventory Layer for the overstory, a Layer 4 - Regen Inventory Layer for the regeneration, and a Layer 4S Silviculture Layer for the regeneration. The retained overstory has nothing to do with long term Silviculture and crop trees, so we do not enter it in the Silviculture data set. While it is tempting to use the even-aged silviculture layer S, as the silvicultural component of the stand will be managed on an even aged basis, this is not the correct approach, as we have defined multiple Inventory layers.

## **5.2 Inventory Layer Entry - Retained Overstory**

**Important: The layer data entry table is a "one size fits all" table. It contains all the possible entry blanks for all types of layers. Only a subset of the available entries is used for any particular layer.**

We will start with an **Inventory Layer with the overstory trees**. The following fields are used.

### 1. **Layer Code.** What layer are we reporting?

Conditional entry, required if you have tree species growing on a site.

2 character code selected from drop down list.

Valid codes are:

|    |                                     |
|----|-------------------------------------|
| I  | Inventory Layer, even-aged stand    |
| S  | Silviculture Layer, even-aged stand |
| 1  | Inv Mature, uneven aged             |
| 1S | Silviculture Layer 1, uneven aged   |
| 2  | Inv Pole, uneven aged               |
| 2S | Silviculture Layer 2, uneven aged   |
| 3  | Inv Sapling, uneven aged            |
| 3S | Silviculture Layer 3, uneven aged   |
| 4  | Inv Regen, uneven aged              |
| 4S | Silviculture Layer 4, uneven aged   |

Technically speaking, the I code is supposed to be a <Blank>, but the program converts it to a <Blank> in the submission.



There was once a V Veteran code. This code has been retired and should not be used. Veterans are now described as an overstory layer, like the one we are discussing here.

2. **Basal Area.** Basal area per hectare of overstory trees.

Conditional entry. Required for Inventory Layer 1 in openings where basal area is part of a stocking or retention standard. Optional for Layer 1S in these situations.

Integer, 3 characters, no decimals. e.g.: 2

Not used in layers 2, 2S, 3, 3S, 4, 4S.

For inventory layer, basal area of all stems > 12.5 cm DBH.

For silviculture label, basal area of well spaced preferred and acceptable stems > 12.5 cm DBH.

In the example block, the site plan specified that there would be an average of 6 m<sup>2</sup>/ha retained basal area, with a range of 0 to 14 m<sup>2</sup>/ha. So we report our result: 2 m<sup>2</sup>/ha, following a windthrow event.

3. **Total Well Spaced.** Does not apply to an inventory layer. Leave as 0.

4. **Crown Closure.** The percentage of ground area covered by the vertically projected crowns of the tree cover in the layer.

Conditional. Required if trees are entered for layer.<sup>3</sup>

Integer, 3 characters, no decimals. e.g.: 25

In multi layer stands crown closure describes the crown closure of each stand layer, submitted separately for each separate stand layer.

Crown closure is very interesting parameter that is almost never "measured", it is estimated. And those estimates can vary a lot between people. Give it your best shot.

5. **Total Stems.** Stems per hectare in the inventory layer being reported.

Integer, 6 characters, no decimals. e.g.: 125 or 1850

6. **Well Spaced.** Does not apply to an inventory layer. Leave as 0.

7. **Free Growing.** Does not apply to an inventory layer. Leave as 0.

8. **Damage Agent.** Insect, disease, or other factor that has caused tree damage in the layer.

Conditional entry. Required where damage agent is present within the layer.

3 characters.

Different layers can have the same damage agent code.

9. **Incidence %.** The percent of host species within the layer impacted by the damage agent.

Conditional entry. Required where damage agent is present within the layer.

Integer, 3 characters, no decimals. e.g.: 25 meaning 25%.

10. **Incident Area.** Number of hectares affected by the damage agent.

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<sup>3</sup> Yes, that is a roundabout way of saying mandatory, as we would not even *be* here if there were no trees growing. I'm just quoting the manuals!



Conditional entry. Required where damage agent is present within the layer.

Number, 5 characters, 1 decimals. e.g.: 4.2

### **5.3 Inventory Layer Entry - Regeneration**

Onwards to the next layer. In our example, the layer describing the Inventory-Regeneration layer is next.

Remember, if this was a simple clearcut, we would not have multiple layers, just an even-aged inventory layer and an even-aged silviculture layer.

We are filling in an Inventory Layer with regeneration. The following fields are used.

1. **Layer Code.** What layer are we reporting?

Conditional entry, required if you have tree species growing on a site.

2 character code selected from drop down list.

We have used 4 Inv Regen, uneven aged because a) we are using uneven-aged layers to report the presence of a retained overstory component, and b) this layer contains regeneration.

2. **Basal Area.** Does not apply to regeneration. Leave as 0.

3. **Total Well Spaced.** Does not apply to an inventory layer. Leave as 0.

4. **Crown Closure.** The percentage of ground area covered by the vertically projected crowns of the tree cover in the layer.

Conditional. Required if trees are entered for layer.

Integer, 3 characters, no decimals. e.g.: 25

In multi layer stands crown closure describes the crown closure of each stand layer, submitted separately for each separate stand layer.

Crown closure is very interesting parameter that is almost never "measured", it is estimated. And those estimates can vary a lot between people. Give it your best shot.

5. **Total Stems.** Stems per hectare in the inventory layer being reported.

Integer, 6 characters, no decimals. e.g.: 125 or 1850

6. **Well Spaced.** Does not apply to an inventory layer. Leave as 0.

7. **Free Growing.** Does not apply to an inventory layer. Leave as 0.

8. **Damage Agent.** Insect, disease, or other factor that has caused tree damage in the layer.

Conditional entry. Required where damage agent is present within the layer.

3 characters.

The damage agent codes table is huge. It is located at the end of this document.

Different layers can have the same damage agent code.

9. **Incidence %.** The percent of host species within the layer impacted by the damage agent.

Conditional entry. Required where damage agent is present within the layer.

Integer, 3 characters, no decimals. e.g.: 25 meaning 25%.

10. **Incident Area.** Number of hectares affected by the damage agent.





Conditional entry. Required where damage agent is present within the layer.

Number, 5 characters, 1 decimals. e.g.: 4.2

#### **5.4 Silviculture Layer Entry - Regeneration**

Onwards to the silviculture layer. There is only one layer of trees that are silviculturally relevant in this block, the regeneration. So we have only one Silviculture layer.

We are filling in a Silviculture Layer with regeneration. The following fields are used.

1. **Layer Code.** What layer are we reporting?

Conditional entry, required if you have tree species growing on a site.

2 character code selected from drop down list.

We have used 4S Silviculture Layer 4, uneven aged because a) we are using uneven-aged layers to report the presence of a retained overstory component, and b) this layer contains the Silvicultural information on the regeneration layer.

2. **Basal Area.** Does not apply to regeneration.

Basal area can apply to Silviculture Layer 1 if basal area is part of the stocking standard to be achieved.

Leave as 0.

3. **Total Well Spaced.** The total well spaced stems per hectare in silviculture layer, disregarding the M-value<sup>4</sup>. From the regen survey summary report.

Integer, 6 characters, no decimals. e.g.: 1025

Conditional entry: Required for all polygons within an SU where well-spaced stems/ha are a specified regeneration target.

Trees are healthy, preferred, or acceptable species, and well-spaced using the minimum inter-tree distance in the stocking standards

The total well spaced trees must be  $\leq$  the total stems reported in the corresponding inventory layer.

4. **Crown Closure.** The percentage of ground area covered by the vertically projected crowns of the tree cover in the layer.

Conditional. Required if trees are entered for layer.

Integer, 3 characters, no decimals. e.g.: 25

In multi layer stands crown closure describes the crown closure of each stand layer, submitted separately for each separate stand layer.

Crown closure is very interesting parameter that is almost never "measured", it is estimated. And those estimates can vary a lot between people. Give it your best shot.

5. **Total Stems.** Total stems is allegedly not required in silviculture layers, but submissions fail without it, so we'll put it in.

---

<sup>4</sup> The M-value has to do with the maximum number of well spaced trees per plot that can count towards restocking. It is used to ensure that areas with dense stocking cannot compensate for / obscure the presence of areas with very thin stocking. See discussion on pages 24 and 35 of *Silviculture Survey Procedures Manual - Stocking and Free Growing Survey - April 1, 2009*.





The value to enter is the Stems per hectare in the Inventory Layer that is paired with this Silviculture Layer. In this case, 6467.

Integer, 6 characters, no decimals. e.g.: 125 or 1850

6. **Well Spaced.** The total well spaced stems per hectare in silviculture layer, considering the M-value. From the regen survey summary report.

Integer, 6 characters, no decimals. e.g.: 1025

Conditional entry: Required for all polygons within an SU where well-spaced stems/ha are a specified regeneration target.

Trees are healthy, preferred, or acceptable species, and well-spaced using the minimum inter-tree distance in the stocking standards

The total well spaced trees must be  $\leq$  the total stems reported in the corresponding inventory layer.

7. **Free Growing.** The number of free-growing stems per hectare in this silviculture layer based on the M-value.

Conditional entry: Required for all polygons within an SU where well-spaced stems/ha are a specified regeneration target and there are free growing stems to report.

Integer, 6 characters, no decimals. e.g.: 1025

Must be  $\leq$  Total Stems reported in total stems reported in the corresponding inventory layer.

Must be  $\geq$  the minimum stocking standard if SU is declared free-growing

Does not apply to an inventory layer.

If zero or does not apply, enter a 0 not a blank.

8. **Damage Agent.** Insect, disease, or other factor that has caused tree damage in the layer.

Conditional entry. Required where damage agent is present within the layer.

3 characters. Select from damage agent codes list, at end of documents.

Different layers can have the same damage agent code.

9. **Incidence %.** The percent of host species within the layer impacted by the damage agent.

Conditional entry. Required where damage agent is present within the layer.

Integer, 3 characters, no decimals. e.g.: 25 meaning 25%.

10. **Incident Area.** Number of hectares affected by the damage agent.

Conditional entry. Required where damage agent is present within the layer.

Number, 5 characters, 1 decimals. e.g.: 4.2

### **5.5 Forest Cover Polygon/Layer - Tree Species Entry**

Having established the Layer structure within Polygon 1, one now populate the layers with tree cover data.

Exactly what one would expect for forest cover entry:



- Enter species in order of importance, most prevalent species in the layer first. You may have up to 6 tree species in a polygon.
- Enter the percent of the layer that the species makes up. Generally, a straight transcription from the regen survey. Total of all species percents must equal 100.
- Enter average age. Only entered for the two most two most prevalent species in the layer.
- Enter average height in meters. Only entered for the two most two most prevalent species in the layer.

Valid tree species codes are:

| Code | Description                    |
|------|--------------------------------|
| AC   | Poplar                         |
| ACB  | Balsam Poplar                  |
| ACT  | Black Cottonwood               |
| AT   | Trembling Aspen                |
| AX   | Poplar Hybrid                  |
| BA   | Amabilis Fir                   |
| BB   | Balsam Fir                     |
| BG   | Grand Fir                      |
| BL   | Subalpine Fir                  |
| BP   | Noble Fir                      |
| CW   | Western Red Cedar              |
| DR   | Red Alder                      |
| EA   | Alaska Paper Birch             |
| EP   | Paper Birch                    |
| FDC  | Douglas-Fir (Coast)            |
| FDI  | Douglas-Fir (Interior)         |
| HM   | Mountain Hemlock               |
| HW   | Western Hemlock                |
| LA   | Alpine Larch                   |
| LS   | Siberian Larch                 |
| LT   | Tamarack                       |
| LW   | Western Larch                  |
| MB   | Bigleaf Maple                  |
| PA   | Whitebark Pine                 |
| PF   | Limber Pine                    |
| PJ   | Jack Pine                      |
| PLC  | Lodgepole Pine (Coast)         |
| PLI  | Lodgepole Pine (Interior)      |
| PR   | Red Pine                       |
| PW   | Western White Pine             |
| PY   | Yellow Pine                    |
| SB   | Black Spruce                   |
| SE   | Engelmann Spruce               |
| SS   | Sitka Spruce                   |
| SW   | White Spruce                   |
| SX   | Spruce Hybrid                  |
| SXL  | White X Sitka (Picea X Lutzii) |
| SXS  | Sitka X Unknown Hybrid         |
| SXW  | White X Engelmann              |



|    |                   |
|----|-------------------|
| TW | Western Yew       |
| VB | Bitter Cherry (N) |
| YC | Yellow Cedar      |

## 6. Reporting Non Forested Polygons

Non-forested areas like permanent roads, landings, swamps etc are also reported to forest cover.

The only fields required are:

- Licence ID
- Area
- Reference Year
- Stocking Status
- Stocking Type

These fields have all been discussed previously. A few notes:

- The Reference Year may pre-date the regen survey. It would be a bit of a stretch to assert we only found a main access road during the regen survey..
- There is no SU ID because the non-forested areas in this case are not part of the Net Area to be Reforested, so are not in a Standards Unit.
- The other blank fields all apply directly to vegetation or reserves, and this is a non-vegetated area and is not a reserve.

## 7. Reporting Reserves

The example block used above contains no reserves. Therefore, I used an different block for an example of this one. Typical Kootenay cut block:



The screenshot shows the RESULTS software interface. On the left, a map displays several forest cover polygons outlined in red and blue. The main window is divided into several sections:

- Top Left:** A map showing the spatial distribution of forest cover polygons.
- Top Right:** Submission details including Submitter Email (tomb@netidea.com), Submitter Phone number (2502267792), District Code (DAB), Client Code (00142700), Client Location code (00), Client Contact (Tom Bradley), and Submission Date (2011-01-17).
- Middle Right:** Identification options: Timber Mark Identifier (unselected) and Opening ID Identifier (selected). Fields for Timber Mark, Cut Block ID, and Opening ID (1063509) are present.
- Bottom Left:** A tree view showing the submission structure: Submission > Opening > SUs > Forest Cover Polygons > FC Polygon 1 (selected). Other polygons include FC Polygon 2, 3, 4, and 5.
- Bottom Right:** Data entry form for a forest cover polygon. Fields include:
  - Area: 2.2
  - Reference Year: 2005
  - Reserve Type: G
  - Reserve Objective: WTR
  - Stocking Status: IMM
  - Stocking Type: NAT
  - SU ID: (empty)
  - Site Index: 18
  - Tree Cover Pattern: 9
  - Licensee ID: WTP
  - Site Index Source: H
  - Re Entry Year: (empty)

Again, no real surprises. The field contents have all been discussed previously. A few notes:

- The Reference Year is 2005 not 2009 because the reserves were located and mapped in 2005. It would be a stretch to assert we only found them in the 2009 regen survey.
- There is no SU ID because the reserves are not part of the Net Area to be Reforested, so are thus not in a Standards Unit.
- There is no re-entry year as we do not plan on logging these areas during the next rotation.
- Stocking Status is Immature because the forest in this area is LwFd leading and 95 years old. While eminently merchantable, it is still "Immature" per MoFLNRO specifications.
- Because this is a forested polygon, we also report the forest cover in an Inventory layer. A silviculture layer is not required for a group reserve that does not have a TIMBER reserve objective.

The MoF guide to reporting forested Reserves in harvested areas is worth a read if you have a more complex situation on your hands. It can be obtained from:

[http://www.woodfor.com/WLGML/Submitting\\_Forest\\_Cover\\_to\\_Results\\_for\\_Openings\\_with\\_Treed\\_Retention.pdf](http://www.woodfor.com/WLGML/Submitting_Forest_Cover_to_Results_for_Openings_with_Treed_Retention.pdf)

Or just go to <http://www.woodfor.com/WLGML/> and look around, you'll find it.





**Table 1: Pest Species Code Table**

| <b>Corporate Pest Species Code Table</b> |   |             |  |
|--|---|-------------|--|
| <b>Code</b>                              | <b>Description</b>  | <b>Code</b> | <b>Description</b>   |
| A  | Animal Damage   | I           | Insects  |
| AB                                       | Bear  | IA          | Aphids   |
| AC                                       | Cattle  | IAB         | Balsam Woolly Adelgid ( <i>Adelges piceae</i> )                |
| AD                                       | Deer  | IAC         | Giant Conifer Aphid ( <i>Cinara</i> spp.)                      |
| AE                                       | Elk   | IAG         | Cooley Spruce Gall Adelgid ( <i>Adelges cooleyi</i> )          |
| AH                                       | Hare or Rabbit  | IAL         | Larch (Lw) Cone Woolly Aphid ( <i>Adelges lariciatus</i> )     |
| AM                                       | Moose   | IAS         | Green Spruce Aphid ( <i>Elatobium abietinum</i> )              |
| AO                                       | Pika ( <i>Ochotona</i> spp.)  | IB          | Bark Beetles   |
| AP                                       | Porcupine   | IBB         | Western Balsam Bark Beetle ( <i>Dryocoetes confusus</i> )      |
| AS                                       | Squirrel  | IBD         | Douglas-fir Beetle ( <i>Dendroctonus pseudotsugae</i> )        |
| AV                                       | Vole  | IBE         | Silver Fir Beetle ( <i>Pseudohylesinus sericeus</i> )          |
| AX                                       | Birds   | IBF         | Fir Engraver Beetle ( <i>Scolytus ventralis</i> )              |
| AZ                                       | Beaver  | IBH         | Hylurgops Beetle ( <i>Hylurgops rugipennis</i> )               |
| C  | Cone and Seed Insects   | IBI         | Engraver Beetles ( <i>Ips</i> spp.)                            |
| CAH                                      | Cone Resin Midge ( <i>Asynapta hopkinsi</i> )   | IBL         | Lodgepole Pine Beetle ( <i>Dendroctonus murrayanae</i> )       |
| CBC                                      | Fir (Fd) Cone Moth ( <i>Barbara colfaxiana</i> )                                      | IBM         | Mountain Pine Beetle ( <i>Dendroctonus ponderosae</i> )        |
| CBX                                      | Fir Cone Moth ( <i>Barbara</i> spp.)  | IBP         | Twig Beetles ( <i>Pityogenes</i> , <i>Pityophthorus</i> spp.)  |
| CCP                                      | Douglas-fir Cone Scale Midge ( <i>Camptomyia pseudotsugae</i> )                       | IBR         | Fir Root Bark Beetle ( <i>Pseudohylesinus granulatus</i> )     |
| CDC                                      | Spruce (Sx) Cone Gall Midge ( <i>Kaltenbachiola (Dasineura) canadensis</i> )          | IBS         | Spruce Beetle ( <i>Dendroctonus rufipennis</i> )               |
| CDD                                      | Fir Seed Midge ( <i>Kaltenbachiola (Dasineura) abiesemia</i> )                        | IBT         | Red Turpentine Beetle ( <i>Dendroctonus valens</i> )           |
| CDR                                      | Spruce (Sx) Cone Axis Midge ( <i>Kaltenbachiola (Dasineura) rachiphaga</i> )          | IBW         | Western Pine Beetle ( <i>Dendroctonus brevicomis</i> )         |
| CDX                                      | Kaltenbachiola ( <i>Dasineura</i> ) Midges ( <i>Kaltenbachiola (Dasineura) spp.</i> ) | ID          | Defoliators  |
| CEA                                      | Fir Seed Maggot ( <i>Earomyia abietum</i> )   | ID1         | Leaf Beetles ( <i>Chrysomela</i> spp.)                         |
| CEB                                      | Spruce Cone Maggot ( <i>Earomyia barbara</i> )  | ID2         | Bruce Spanworm ( <i>Operophtera bruceata</i> )                 |
| CEQ                                      | ( <i>Earomyia aquilonia</i> )   | ID3         | Winter Moth ( <i>Operophtera brumata</i> )                     |
| CEX                                      | <i>Earomyia</i> Maggots ( <i>Earomyia</i> spp.)                                       | ID4         | Cottonwood Sawfly ( <i>Nematus currani</i> )                   |
| CFP                                      | Fir (Fd) Cone Beetle ( <i>Ernobius punctulatus</i> )                                  | ID5         | Fall Webworm ( <i>Hyphantria cunea</i> )                       |
| CHX                                      | Budworms ( <i>Choristoneura</i> spp.)   | ID6         | Aspen Leaf Miner ( <i>Phyllocristis populiella</i> )           |
| CIA                                      | Fir Coneworm ( <i>Dioryctria abietivorella</i> )                                      | ID7         | Woolly Alder Sawfly ( <i>Eriocampa ovata</i> )                 |
| CIP                                      | Fir (Fd) Coneworm ( <i>Dioryctria pseudotsugella</i> )                                | ID8         | Aspen Leaf Roller ( <i>Pseudexentera oregonana</i> )           |
| CIR                                      | Spruce (Sx) Coneworm ( <i>Dioryctria reniculelloides</i> )                            | ID9         | Birch Leaf Skeletonizer ( <i>Buccalatrix</i> spp.)             |
| CIS                                      | Pine (Py) Coneworm ( <i>Dioryctria rossi</i> )  | IDA         | Black Army Cutworm ( <i>Actebia fennica</i> )                  |
| CIV                                      | Ponderosa pine (Py) Coneworm ( <i>Dioryctria auranticella</i> )                       | IDB         | Two-year Budworm ( <i>Choristoneura biennis</i> )              |
| CIX                                      | Coneworms ( <i>Dioryctria</i> spp.)   | IDC         | Larch Casebearer ( <i>Coleophora laricella</i> )               |
| CLO                                      | Western Conifer Seed Bug ( <i>Leptoglossus occidentalis</i> )                         | IDD         | Western Winter Moth ( <i>Erranis tiliaria vancouverensis</i> ) |
| CMA                                      | Ponderosa pine (Py) Seed Chalcid ( <i>Megastigmus albifrons</i> )                     | IDE         | Eastern Spruce Budworm ( <i>Choristoneura fumiferana</i> )     |
| CMC                                      | Spruce (Sx) Seed Chalcid ( <i>Megastigmus piceae</i> )                                | IDF         | Forest Tent Caterpillar ( <i>Malacosoma disstria</i> )         |
| CML                                      | Subalpine fir (BI) Seed Chalcid ( <i>Megastigmus</i>                                  | IDG         | Greenstriped Forest Looper ( <i>Melanolophia imitata</i> )     |



|     |   |     |  |
|-----|---|-----|--|
|     | lasiocarpae)  |     |  |
| CMP | Fir Seed Chalcid (Megastigmus pinus)                        | IDH | Western Blackheaded Budworm (Acleris gloverana)          |
| CMR | (Megastigmus rafni)   | IDI | Pine Needle Sheath Miner (Zellaria haimbachi)            |
| CMS | Fir (Fd) Seed Chalcid (Megastigmus spermotrophus)           | IDJ | Gray Forest Looper (Caripeta divista)                    |
| CMT | Hemlock Seed Chalcid (Megastigmus tsugae)                   | IDK | Northern Tent Caterpillar (Malacosoma californicum)      |
| CMX | Seed Chalcids (Megastigmus spp.)                            | IDL | Western Hemlock Looper (Lambdina fiscellaria lugubrosa)  |
| CNP | Pine Cone Beetle (Conophthorus ponderosae)                  | IDM | Gypsy Moth (Lymantria dispar)                            |
| CPS | Spruce Gall Adelgid (Pineus similis)                        | IDN | Birch Leaf Miner (Fenusa pusilla)                        |
| CRX | Cone Scale Midges (Resseliella spp.)                        | IDO | Filament Bearer (Nematocampa fiamentaria)                |
| CSN | Spiral Spruce Cone Borer (Strobilomyia neanthracina)        | IDP | Larch Sawfly (Pristophora erichsoni)                     |
| CTO | Fir (Fd) Cone Gall Midge (Contarinia oregonensis)           | IDQ | Hemlock Needle Miner (Epinotia tsugana)                  |
| CTW | Fir (Fd) Cone Scale Midge (Contarinia washingtonensis)      | IDR | Alder Sawfly (Eriocampa ovata)                           |
| CVP | White pine (Pw) Cone Borer (Eucosma ponderosa)              | IDS | Balsam Fir Sawfly (Neodiprion abietis)                   |
| CVR | Lodgepole pine (Pl) Cone Borer (Eucosma recissoriana)       | IDT | Douglas-fir Tussock Moth (Orgyia pseudotsugata)          |
| CYC | Spruce (Sx) Seed Midge (Mayetiola carpophaga)               | IDU | Satin Moth (Leucoma salicis)                             |
| CYP | Ponderosa pine (Py) Seedworm (Cydia piperana)               | IDV | Variiegated Cutworm (Peridroma saucia)                   |
| CYS | Spruce (Sx) Seedworm (Cydia strobilella)                    | IDW | Western Spruce Budworm (Choristoneura occidentalis)      |
| CYT | Cedar (Cw) Cone Midge (Mayetiola thujae)                    | IDX | Large Aspen Tortrix (Choristoneura conflictana)          |
| CYX | Seedworms (Cydia spp.)                                      | IDY | Birch-Aspen Leafroller (Epinotia solandriana (Linnaeus)) |
| D   | Diseases  | IDZ | Western False Hemlock Looper (Nepytia freemani)          |
| DB  | Broom Rusts   | IEA | Unidentified Aspen Defoliation                           |
| DBF | Fir Broom Rust (Melampsorella caryophyllacearum)            | IEB | Hemlock Sawfly (Neodiprion tsugae)                       |
| DBS | Spruce Broom Rust (Chrysomyxa arctostaphyli)                | IEC | Larch Budmoth (Zairaphera improbana)                     |
| DD  | Stem Decay  | IED | Larch Looper (Semiothis sexmaculata)                     |
| DDA | White Mottled Rot (Ganoderma applanatum)                    | IEF | Cottonwood Leaf Skeletonizer (Phyllonoryctes apparella)  |
| DDB | Birch Trunk Rot (Fomes fomentarius)                         | IEG | Lodgepole pine Sawfly (Neodiprion burkei)                |
| DDC | Brown Cubical Rot of Birch (Piptoporus betulinus)           | IEH | Phantom Hemlock Looper (Nepytia phantasmaria)            |
| DDD | Sulfur Fungus (Laetiporus sulphureus)                       | IEI | Saddleback Looper (Ectropis crepuscularia)               |
| DDE | Rust Red Stringy Rot (Echindontium tinctorium)              | IEJ | Willow Leafminer (Micrurapteryx salicifoliella)          |
| DDF | Brown Crumbly Rot (Fomitopsis pinicola)                     | IS  | Shoot Insects  |
| DDG | Sterile Conk Trunk Rot of Birch (Inonotus obliquus)         | ISA | Bronze Birch Borer (Agrilus anxius)                      |
| DDH | Hardwood Trunk Rot (Phellinus ignarius)                     | ISB | Western Cedar Borer (Trachykele blondeli)                |
| DDO | Cedar Brown Pocket Rot (Poria sericeomollis)                | ISC | Poplar Borer (Saperda calcarata)                         |
| DDP | Red Ring Rot (Phellinus pini)                               | ISE | European Pine Shoot Moth (Rhyacionia buoliana)           |
| DDQ | Quinine Conk Rot (Fomitopsis officinalis)                   | ISG | Gouty Pitch Midge (Cecidomyia piniinopsis)               |
| DDT | Aspen Trunk Rot (Phellinus tremulae)                        | ISP | Pitch Nodule Moths (Petrova species)                     |
| DF  | Foliage Diseases  | ISQ | Sequoia Pitch Moth (Vespamima sequoiae)                  |
| DFA | Western pine Aster Rust (Coleosporium asterum)              | ISS | Western Pine Shoot Borer (Eucosma sonomana)              |
| DFB | Delphinella Tip Blight (Delphinella spp.)                   | ISW | Poplar and Willow Borer (Cryptorhynchus lapathi)         |
| DFC | Large-spored Spruce-Labrador tea Rust (Chrysomyxa ledicola) | IW  | Weevils  |
| DFD | Spruce Needle Cast (Lirula macrospora)                      | IWC | Conifer Seedling Weevil (Steremnius carinatus)           |
| DFE | Elytroderma Needle Cast (Elytroderma deformans)             | IWM | Magdalis Species (Magdalis spp.)                         |



|     |   |     |  |
|-----|---|-----|--|
| DFF | Marssonina Leaf Blights ( <i>Marssonina</i> spp.)                           | IWP | Lodgepole pine Terminal Weevil ( <i>Pissodes terminalis</i> )  |
| DFG | Cottonwood Leaf Rust ( <i>Melampsora occidentalis</i> )                     | IWS | White pine Weevil (on Spruce) ( <i>Pissodes strobi</i> )       |
| DFH | Larch Needle Blight ( <i>Hypodermella laricis</i> )                         | IWW | Warrens Root Collar Weevil ( <i>Hylobius warreni</i> )         |
| DFI | <i>Linospora</i> Leaf Blotch ( <i>Linospora tetraspora</i> )                | IWY | <i>Cylindrocopturus</i> Weevil ( <i>Cylindrocopturus</i> spp.) |
| DFJ | <i>Phaeoseptoria</i> Needle Cast ( <i>Phaeoseptoria contortae</i> )         | IWZ | Yosemite Bark Weevil ( <i>Pissodes schwartzii</i> )            |
| DFK | <i>Septoria</i> Leaf Spot ( <i>Septoria populicola</i> )                    | M   | Mite Damage ( <i>Trisetacus</i> spp.)                          |
| DFL | Pine Needle Cast ( <i>Lophodermella concolor</i> )                          | N   | Non-Biological (Abiotic) Injuries                              |
| DFM | Larch Needle Cast ( <i>Meria laricis</i> )                                  | NAV | Avalanche or Snow Slide  |
| DFN | <i>Leptomelanconium</i> Needle Blight ( <i>Leptomelanconium pinicola</i> )  | NB  | Fire   |
| DFO | <i>Lophodermium</i> Needle Cast ( <i>Lophodermium seditiosum</i> )          | NCA | Aspen Decline  |
| DFP | Fir Fireweed Rust ( <i>Pucciniastrum epilobi</i> )                          | NCB | Birch Decline  |
| DFR | Douglas-fir needle cast ( <i>Rhabdocline pseudotsugae</i> )                 | NCY | Yellow cedar (Yc) Decline                                      |
| DFS | <i>Dothistroma</i> Needle Blight ( <i>Dothistroma septosporum</i> )         | ND  | Drought  |
| DFT | <i>Sirococcus</i> Tip Blight ( <i>Sirococcus conigenus</i> )                | NF  | Flooding   |
| DFU | Cedar Leaf Blight ( <i>Didymascella thujina</i> )                           | NG  | Frost  |
| DFX | Brown Felt Blight ( <i>Herpotrichia</i> spp.)                               | NGC | Frost Crack  |
| DFY | <i>Hendersonia</i> Needle Cast ( <i>Hendersonia pinicola</i> )              | NGH | Frost Heaved   |
| DFZ | <i>Rhizosphaera</i> Needle Cast ( <i>Rhizosphaera kalkhoffii</i> )          | NGK | Shoot/Bud Frost Kill   |
| DL  | Disease Caused Dieback  | NH  | Hail   |
| DLD | <i>Dermea</i> Canker ( <i>Dermea pseudotsugae</i> )                         | NK  | Fumekill   |
| DLF | Red Flag Disease ( <i>Potebniamyces balsamicola</i> )                       | NL  | Lightning  |
| DLK | Conifer Cytospora Canker ( <i>Leucostoma kunzei</i> )                       | NN  | Road Salt  |
| DLP | <i>Phomopsis</i> Canker ( <i>Phomopsis lokoyae</i> )                        | NR  | Redbelt  |
| DLS | <i>Sydowia</i> (Sclerophoma) Tip Dieback ( <i>Sclerophoma pithyophila</i> ) | NS  | Slide  |
| DLV | Aspen-Poplar Twig Blight ( <i>Venturia</i> spp.)                            | NW  | Windthrow  |
| DM  | Dwarf Mistletoe   | NWS | Windthrow - Soil Failure                                       |
| DMF | Douglas-fir Dwarf Mistletoe ( <i>Arceuthobium douglasii</i> )               | NWT | Windthrow - Treatment or Harvest-related                       |
| DMH | Hemlock Dwarf Mistletoe ( <i>Arceuthobium tsugense</i> )                    | NX  | Wind scarring or rubbing                                       |
| DML | Larch Dwarf Mistletoe ( <i>Arceuthobium laricis</i> )                       | NY  | Snow or Ice (includes snow press)                              |
| DMP | Lodgepole pine Dwarf Mistletoe ( <i>Arceuthobium americanum</i> )           | NZ  | Sunscald   |
| DR  | Root Disease  | P   | Cone and Seedling Fungal Pathogens                             |
| DRA | Armillaria Root Disease ( <i>Armillaria ostoyae</i> )                       | PAX | ( <i>Alternaria</i> spp.)                                      |
| DRB | Black Stain Root Disease ( <i>Leptographium wageneri</i> )                  | PBC | Gray Mould ( <i>Botrytris cinerea</i> )                        |
| DRC | Laminated Root Rot (cedar strain) ( <i>Phellinus weirii</i> )               | PCD | ( <i>Neonectria radicola</i> )                                 |
| DRL | Laminated Root Rot (Fd form) ( <i>Inonotus sulphurascens</i> )              | PCF | Seed or Cold Fungus ( <i>Caloscypha fulgens</i> )              |
| DRN | Annosus Root Disease ( <i>Heterobasidion annosum</i> )                      | PCP | Inland Spruce Cone Rust ( <i>Chrysomyxa pirolata</i> )         |
| DRR | <i>Rhizina</i> Root Disease ( <i>Rhizina undulata</i> )                     | PFX | ( <i>Fusarium</i> spp.)  |
| DRS | Schweinitzii Butt Rot ( <i>Phaeolus schweinitzii</i> )                      | PPG | Damping-off Disease ( <i>Phoma glomerata</i> )                 |
| DRT | <i>Tomentosus</i> Root Rot ( <i>Inonotus tomentosus</i> )                   | PPX | ( <i>Penicillium</i> spp.)                                     |
| DS  | Stem Diseases (Cankers and Rusts)   | PTX | ( <i>Trichothecium</i> spp.)                                   |
| DSA | <i>Atropellis</i> Canker (Lodgepole pine) ( <i>Atropellis piniphila</i> )   | T   | Treatment Injuries   |





|     |   |     |                                       |
|-----|---|-----|---------------------------------------|
| DSB | White pine Blister Rust ( <i>Cronartium ribicola</i> )          | TC  | Chemical Injury                       |
| DSC | Comandra Blister Rust ( <i>Cronartium comandrae</i> )           | TL  | Logging Wounds                        |
| DSE | Sooty Bark Canker ( <i>Encoelia pruinosa</i> )                  | TM  | Other Mechanical Damage (non-logging) |
| DSG | Western Gall Rust ( <i>Endocronartium harknessii</i> )          | TP  | Planting (incorrectly planted)        |
| DSH | Hypoxylon Canker ( <i>Entoleuca (Hypoxylon) mammatum</i> )      | TPM | Planting (poor microsite)             |
| DSP | Cryptosphaeria Canker ( <i>Cryptosphaeria populina</i> )        | TR  | Pruning Wound                         |
| DSR | Ceratocystis Canker ( <i>Ceratocystis fimbriata</i> )           | TT  | Thinning or Spacing Wound             |
| DSS | Stalactiform Blister Rust ( <i>Cronartium coleosporioides</i> ) | V   | Problem Vegetation                    |
| DST | Target Canker ( <i>Nectria galligena</i> )                      | VH  | Herbaceous Competition                |
| DSY | Cytospora Canker ( <i>Cytospora chrysosperma</i> )              | VP  | Vegetation Press                      |
|     |   | VS  | Shrub Competition                     |
|     |   | VT  | Tree Competition                      |