**Permanent Data History 1986~2011**

Lixi Kong Updated 01/23/2014

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# 1. Tree/Sapling Data

***Old master file for 1986~1998 tree/sapling data:***

[*R:\MOOSHUBB\longterm\Permplots\Permplot98\mas98.ssd*](../../Permplots/Permplot98/mas98.sas7bdat)

***Modified master file for 1986~1998 tree/sapling data created in 2011:***

[*R:\MOOSHUBB\longterm\lixi kong\pp\_tr\_seg2011\mas98new.ssd*](../pp_tr_seg2011/mas98new.sas7bdat)

Relevant modifications were made on *mas98.ssd* to create *mas98new.ssd*; 1988 remeasurement data and 1989 winter injury data were also merged in which were not included in *mas98.ssd*.

## 1.1 Data collected in 1986

***Plots sampled:*** Permanent plot 1~15 (plot 1~3 are met stations) on East side, 4 10m \* 10m subplots in each plot and 4 additional spruce ears in plot 4~15.

* Both dead and live trees (>=5cm) were tagged and measured for DBHs, heights, etc. We did NOT tag any saplings in 1986, but counted number of saplings in 4 2\*2m quadrat in three non-free subplots for plot 4~15.

Dead wood data found on old Verbatim floppy disks:

## 1.2 Data collected in 1987

### 1.2.1 Revisiting 1986 plots

Before 1987 field season started, some of the old crew went back to 1986 plots and collected some data that were forgot or couldn’t collected in 1986. A couple of new trees were tagged by chance also. Corrections were made, and missing data were added referring to hand written hard copies. Sometimes 87 data was collected on a separate sheet with a date noted; sometimes there were some notes with a 87 date marked on data sheet used in 1986

Data entered by Noah/Lixi in Jan.2013, and corrections were done in 02-08-2013. Data entered by Noah/Lixi: *R:\MOOSHUBB\longterm\lixi kong\MAS98NEW \Raw Data\8687REME*

* Plot 4~6: CLONG, CAZLNG, CPERP in mas98 were from 87. There were some CLONG and PEREP data collected in 86 that were missing before, but got entered by Noah/Lixi in Jan.2013
* Plot 7: CLONG, CAZLNG, CPERP in mas98 were collected in 1986. No new data entered
* Plot8: CLONG, CAZLNG, CPERP in mas98 were collected in 1986. Tree 652 and 764 missed HT in 86 but were collected in 87. Ht87(assuming this is HT to the top of live crown) entered by Noah/Lixi in Jan2013.
* Plot9: Most HT, CRHT, CLONG, CAZLNG, CPERP in mas98 were collected in 1986. Tree 4(splot1), 328(splot1), 389(splot2), 393(splot2), 145(splot3), 324(splot4) miss CLONG, CAZLNG, CPREP, HTTCR,CRHT in 86 and got collected in 1987, all data are already in mas98, we just need to name time by year correctly except for tree 393 and 145 that had both HTTCR and TOTHT, they got corrected too.
* Plot10: CLONG, CAZLNG, CPERP in mas98 were collected in 1986. No new data entered.
* Plot 11: CLONG, CAZLNG, CPERP in mas98 were collected in 1986. Tree 141 (splot1), 293(splot2), 279(splot3), 209(splot4) HTTCR/CRHT were collected in 1987. Data are already in mas98, but need to be named by year correctly.
* Plot12: For CLONG, CAZLNG, CPERP, HTTCR, CRHT(HTBCR), data were collected for conifer in 1986, and deciduous in 1987, because it was September when crew visited plot12, and deciduous already lost their leaves. Data already included in mas98, need to be name correctly. There are a few tree had both HTTCR and TOTHT collected and this got corrected too.

Also, in subplot 2, tree 753 and 730 were newly tagged in 1987, DBH data recorded in mas98.ssd were collected in 1987.

* Plot13: All CLONG, CAZLNG, CPERP were collected in 1986, tree 924(splot2), 932(splot4), 980(splot4) have HT and CRHT collected in both 1986 and 1987. HT/CRHT stored in mas98 were TOTHT/CRHT from 1987, HTTCR87 missing and got entered. HTTCR/CRHT collected in 1986 was calculated by slope etc, referring to hard copy in Jan.2013
* Plot 14: All CLONG, CAZLNG, CPERP were collected in 1986 for subplot 1. All trees in subplot 2 were collected for TOTHT/HTTCR and CRHT(HTBCR) only in 87 except for tree 572, 587, 589, 593, 600, 1001(renamed from 536), and 1583(renamed from 583) , and HT were only collected in subplot2. HT/CRTH stored in mas98 for these trees were from 1986, data from 87 for these trees were added. Some HTBCR were entered as CRHT in 1986, corrected this.
* Plot 15: HT, CRHT, CLONG, CAZLNG, CPERP were only collected in subplot2 in 1987. TOTHT/HTTCR/CRHT data already in mas98 need to be named with year 87 correctly. CLONG, CAZLNG, CPERP data were entered by Noah/Lixi in Jan.2013.

\* Some data that were already in mas98 were also entered by Noah/Lixi and double checked with data in mas98 for errors.

### 1.2.2 New plots on the West Side sampled

Permanent plot 16~27 on West side, 4 10m\*10m subplots and 4 additional spruce ears in each plot.

* Both dead and live trees (>=5cm) were tagged and measured for DBHs. Heights were only recorded for four ABBA trees.
* Live Saplings (dbh < 5cm and a height of >= lm) were tagged on plot 16~27, excluding additional spruce ears in 1987.
* If there were 50 or more saplings of any one species on the whole plot, then sapling data were collected only in the free subplot for all species except spruce (For a complete list of free subplots, see [APPENDIX 1](#_APPENDIX_1_Permanent)). Spruce data were always collected on all four subplots, regardless of the number of saplings (spruce or others) on the plot as a whole. This rule was not precisely followed. Jiudgments were made in 2011 by Lixi/DRP whether a subplot was sampled for saplings in a species. Details see [APPENDIX 2](#_APPENDIX_2_Sapling). (Two variables CSAP8687 and CSAP98 were created for saplings other than PIRU to represent whether certain subplot was sampled for saplings other than PIRU in 1986/87 or 1998. RECRUIT updated according to these two variables. Double check this!)
* DBHs were NOT measured for saplings but heights and declines class data (for ABBA, BECO, and PIRU) were collected. Some plants miss all 1987 data and only have tag numbers and species. For plants that had DBH87 missing, some were saplings, and some were trees that we forgot to collect DBH. Details see [APPENDIX 3](#_APPENDIX_3_Plants).
* For Plot 16~plot20; plot 22~plot 26, tree heights and crown heights only collected on spruce; In Plot21 and plot27, we only collected tree heights on spruce; crown height not done.
* 1987 Height data: on the hardcopies, there is both “TREEHT” and “HT to Live Crown” columns for tree, Except for plot 22, 23, 24, 26, 27 which had no hardcopies of HTs (data logger was probably used), and when there is a dead top, TREEHT in mas98 is the TOTHT, in other words, TPCRN is missing in mas98 (10 trees found), and some CRHTs was calculated as TOTHT-BSCRN, which should be corrected. TPCRN that were missing were entered and added to master file by Lixi on 02-08-2013. Data entered:

*R:\MOOSHUBB\longterm\lixi kong\MAS98NEW\Raw Data\87HT*

* Dead sapling count data: Dead saplings were counted for all subplots in each plot. No relevant hand written data sheets were found for the whole plot of 22, 26, 27, and some other subplot, where data logger was probably used (There could be additional data in those data loggers). This part of data were never entered before 2013, and were entered by Lixi in 2013 referring to hand written hard copies, merged with 88 saplings count data, and added to the new master file eventually:

*R:\MOOSHUBB\longterm\lixi kong\MAS98NEW\Raw Data\DSAPCNT87.xls*

*R:\MOOSHUBB\longterm\lixi kong\MAS98NEW\Raw Data\dsapcnt8788.ssd*

*R:\MOOSHUBB\longterm\Permplots\Permplots2\dsap8887.dat*

*87 data not the same as what lixi entered from hard copies? Should check hard copies again? Headings seem to be PIRU, ABBA, BECO*

## 1.3 Data collected in 1988

***Plots sampled:*** Permanent plot: 4~15, 4 10m\*10m subplots in each plot.

### 1.3.1 Sapling data

* Live Saplings and only saplings were tagged on plot 4~15 in 1988, excluding additional spruce ears. If there were 50 or more saplings of any one species on the whole plot, then sapling data were collected only in the free subplot. Spruce data were always collected on all four subplots, regardless of the number of saplings (spruce or others) on the plot as a whole. Besides height and decline class (for ABBA and PIRU only), extension growth from 1987~1983 for all species, and number of dead PIRU, ABBA and BECO saplings in subplot in question (this was tallied separately for each subplot) were also counted. DBHs were NOT collected.
* Counts of dead saplings were not originally included in old master file *mas98.ssd*. Count original data in R:\MOOSHUBB\longterm\Sapling1\sap88.ssd

SAS program Lixi created to edit sap88.ssd:

*R:\MOOSHUBB\longterm\lixi kong\MAS98NEW\dsapcnt88.sas*

Edited SAS data set:

*R:\MOOSHUBB\longterm\lixi kong\MAS98NEW\dsapcnt88.ssd*

**PLOT**

**SUBPLOT**

**DSAPP88/DSAPA88/DSAPB88:** count of dead PIRU, ABBA, or BECO saplings in the subplot collected in 1988. Unlike the “50 rule” for tagging live saplings, dead saplings were looked for on the whole plot (we got this conclusion from comparing available dead sapling count data with subplots where saplings were tagged). When a count was missing, we assumed no dead saplings of that species found, and added a 0. Plot 10, subplot 3 and 4; plot 14, subplot 2 have two different set of counts, and they were added up to get a total count. Plot 5, subplot 3 has two set of same counts (DSAPA88), DSAPA88 was left as missing.

### Remeasurement of 86 tagged trees

Remeasurements of crown position, decline class (DECM & DECW) were made for 1986 tagged trees on east side permanent plot 4~15.

* Data were estimated for all 1986 tagged spruce trees in regular plots and additional spruce ears;
* Data were estimated for randomly chosen firs equal in number to the spruce, and firs which were not chosen had only crow position estimated and a note to indicate if they were dead;
* For all the other species, only crown positions were estimated and a note was made to indicate if a tree was dead;
* Crown position for standing dead trees: if branches which at one time had needles on them were still visible, then crown position was estimated as though the tree was still alive; a 0 was entered for crown position if these branches were no longer on the tree. This protocol was followed only for plot 13, 14, and 15 though.
* Original SAS data set:

*R:\MOOSHUBB\longterm\Permplots\Permplots2\reme88.ssd01;*

*R:\MOOSHUBB\longterm\Permplots\Permplots2\* *permreme.ssd01*

Both filed were last produced in 1995. *Reme88.ssd01* looks like the original data set, and *permreme.ssd01* merged 1988 remeasurement data with relevant 1986 data, some corrections were also made. Details can check “COMPUTER LOG-3” (starting from page 108) and “Computer Log 4-a”. We will trust and use permreme.ssd01 as corrected 1988 remeasurement data set. Both files were transformed to SAS9 file *reme88.ssd* and *permreme.ssd* by Lixi in 2011

* SAS program Lixi created to edit 1988 remeasurement data and edited data set

*R:\MOOSHUBB\longterm\lixi kong\MAS98NEW\reme88.sas*

*R:\MOOSHUBB\longterm\lixi kong\MAS98NEW\reme88.ssd*

**PLOT**

**SUBPLOT**

**TAG**

**SPECIES:** species, which should correspond to SPECIES in mas98.ssd

**DBH:** DBH collected for 86 trees, which should correspond to DBH in mas98.ssd

**TREEHT:** tree height collected for 86 trees, which should correspond to TREEHT in mas98.ssd

When merging *permrem.ssd* with *mas98.ssd* by PLOT, SUBPLOT, TAG, SPECIES, DBH TREEHT, There were 60 plants not match. This is because *mas98.ssd* was created after 1988, and some SUBPLOT, TAG, SPECIES got changed. Lixi looked at them one by one referring to mas98.ssd then made relevant corrections in *reme88.sas* so it can update *mas98.ssd* well with re-measurement data. Details see [APPENDIX4.](#_APPENDEX4_Correction_made) For a complete list of plants that species identification got changed in 1998, see [APPENDIX5](#_APPENDIX5__)

**STAT88:** status created basing on decline class data

There are two plants come alive in 1988, so corrected STAT86 to ALIVE, and DECM86 to 3. One of them had COND98 & DECAY98 collected, so corrected YRMORT=1998; the other didn’t have any data in 1998, so corrected YRMORT=., and left STAT98 as missing. (It was dead in 2010) Details see the table below:

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| P | SP | TAG | SP | CL | STA86 | STA88 | YRM | DBH86 | HT86 | DECM86 | CR88 | DECM88 | DECW88 | DBH98 | SNH98 | COD98 | DECAY98 |
| 4 | 3 | 833 | PIRU | P | DEAD | ALIVE | 1986 | 14.2 | 12.9 | 4 | c | 3 | 3 | 0 | 5 | 2 | 2 |
| 11 | 4 | 154 | PIRU | A | DEAD | ALIVE | 1986 | 25.3 |  | 4 | c | 3 | 3 |  |  |  |  |

**CPOS88:**  d, c, i, o. crown position collected for both live and dead 86 trees. In the original data set, some CPOS88 was equal to0, and they were set as missing here.

**DECM88:** 0~5. In protocol, we have been using 1~4. 5 was treated the same as 4 when STAT88 was created.

**DECW88:** 0~5. In protocol, we have been using 1~4.

* A field was created to check 0 and 5 values:

R:\MOOSHUBB\longterm\lixi kong\MAS98NEW\REME88CHECK.xls

* When both DECM88 and DECW88=0: if live in 98, set STAT88=ALIVE; if dead in 86 and no data collected in 1998 to indicate live (such as DBH), set STAT88=DEAD; if YRMORT=1998, then leave STAT88 as missing. DECM88/DECW88 were set as missing.
* When DECM88 NE 0 but DECW88=0: DECW88 was set as missing, and STAT88 was set according to DECM88.
* When one of DECM88 and DECW88=5: Set STAT88=DEAD for all of them
* STAT88 was set as missing for those which were dead in 1998 when merged with 1998 data. Lixi 05/10/2012

## 1.4 Data collected in 1989, 1990, and 1991

### 1.4.1 Winter damage collected in 1989

* Randomly selected Red spruce trees in all permanent plots were examined for winter damage. Each tree’s live crown was divided into three equal sections by height. The three sections were examined on each aspect of the tree (N, E, S, and W). So a total of 12 sections were assessed for each tree for winter damage. An equal number of balsam fir trees were examined. But no injury were observed, so no data entered. Some species got changed from PIRU to ABBA in 1998 though.
* Randomly selected Red spruce saplings were examined for winter damage. The height of each sapling’s live crown was divided into two equal sections “Low” and “Up”. An overall assessment was also made. So a total of 3 assessments were made for each sapling. An equal number of balsam fir saplings were also examined, but no injury was observed, so no data entered. Some saplings only have one “ALL” assessment.

SAS program: *R:\MOOSHUBB\longterm\Permplots\Permplots2\Windam.arq\windam89.sas*

This program was rerun by Lixi in 2011 to create permanent SAS data set:

*R:\MOOSHUBB\longterm\lixi kong\PPwd\_rg8990\pwdamms.ssd*

**CLASS**: 1=Tree; 2=Sapling.

All the plants had CLASS=1 had DBH greater than 5 in previous years.

**PLOT**:

**TAG**:

**DAMDATE**: Date when winter damage data was collected.

**DECM**: 1, 2, 3, 4. Decline class measured in 1989 for previously tagged PIRU trees and saplings. (only 4 ABBA trees have DECM89. SP might got changed?).

**OLDER88**: Whether characteristic winter damage is visible on 1987 or older growth. 1=Yes; 0= No.

**ORIENT:** Cardinal directions on which the section assessed is centered. E, W, S, N. Only for trees.

**ALT:** Relative height in the live crown of the section assessed. For trees, it’s LO, MID, and UP; for saplings, it’s LO, UP, and ALL.

**DAM:** Damage class (1 to 8):

1=no winter damage visible

2= >=0 and <10% orange or missing needles

3= >=10% and <50% orange or missing needles

4= >=50% and <90% orange or missing needles

5= >=90% and <=100%orange or missing needles

6=dead tree or sapling

7=no live foliage in section being assessed or no 1988 growth to assess

8=not visible (i.e. view blocked by other crowns)

To merge this part of data with mas98.ssd, we took average of DAM excluding 6, 7, 8 values (if a tree has 5 DAMs equal to 2; 4 DAMs equal to 3; and 3 equal to 7, then we take average as: (5\*2+4\*3)/9

**EXP:** Degree of exposure to wind, measured in plot 13, 14, and plot 16~27 for some PIRU trees.

1=protected. Definitely protected from the main force of the wind by the canopy of other trees

2=Intermediate. Not definitely protected or definitely exposed. This category is used when the section does not fit into class 1 or 3.

3=definitely exposed to the main force of the wind, not blocked by the canopies of other trees.

To merge this part of data with mas98.ssd, we took average of EXP.

**BUDDATE:** Date when buds data were collected

**LIVEBUD:** Number of live buds of ten examined in section for some PIRU trees. An “11” indicates absence of live foliage to assess in the section.

To merge this part of data with mas98.ssd, we took average of LIVEBUD excluding 11 values.

**ASPECT**: E or W.

**ELEV**: L, M, or H.

**SOIL:** S or H.

In the winter injury paper “winter injury to subalpine red spruce: influence of prior vigor and effects on subsequent growth” that already published, there are 139 PIRU trees and 171 PIRU saplings (total of 310). *pwdamms.ssd* has 140 PIRU trees(2 non-PIRU trees) and 170 PIRU saplings (10 non-PIRU saplings).

After merging the data with mas98.ssd by PLOT and TAG, there are some plants with species other than PIRU but had winter injury data. For some of them, species were changed from PIRU to ABBA in 1998. For some of them reasons remain unknown, probably was just sampled by chance. Kept the data for these plants for now. Details see [**APPENDIX 6**](#_APPENDIX_5_Plants)

After merging pwdamms.ssd with mas98.ssd, there are some saplings (CLASS=2) had DBH86/87 way bigger than 5. Also some of them came back alive in 1989 (All come back alive trees were included in the table below), details see [APPENDIX 6](#_APPENDIX_6_1989). We decided to leave it for now.

### 1.4.2 Extension growth for PIRU sapling (Discovered recently. data not merged in master file yet!)

All 76 saplings assessed for winter injury on east side in 1989 were measured for extension growth for 1984-1988. Then a random sample of 45 of them were measured for EX1990, and also recorded for whether the 1988 apical bud died prior to 1989 EX.

No relevant Protocols found.

*Original Data set:*

Data for the 76 saplings:

*R:\MOOSHUBB\longterm\Permplots\Permplots1\Windam\xgrowdam.ssd01*

**ELEV/ASPCL/SOIL/TREE\_SAP**

**PLOT**

**TAG**

**DECM:** decline class collected in 1988.

**DECM89/ALT/DAM/EXP:** data from winter injury data collected in 1989. Details see above documentation for “*pwdamms.ssd”.* DAM is the estimation for ALL section.

**PERCDAM:** % foliar damage corresponding to DAM collected in 1989.If DAM=1, PERCDAM=0; DAM=2, PERCDAM=5; DAM=3, PERCDAM=30; DAM=4, PERCDAM=7-; DAM=5, PERCDAM=95.

**MNPRCDAM:** mean % foliar damage calculated basing on PERCDAM.

**ESTDAM:**

**E1987, E1986, E1985:** Extension growth. Not collected for all plants in this data set.

**X3/X2:** average extension growth of 3 years or 2 years of 1987 and 1986.

After merging with mas98.ssd, “xgrowdam” has 77 saplings had EX measured, 2 of which were not PIRU (both ABBA), and they were not plants that SPEC identification got changed in/after 1998.

Data for the 45 saplings:

*R:\MOOSHUBB\longterm\Permplots\Permplots1\Windam\wd90sapl.ssd01*

**PLOT**

**TAG**

**DAMAGE:** mostly equal to PERCDAM in xgrowdam.ssd.01. Some are different

**APIBUD88: L, D, and ‘?’**

**BROWSED: Y, N. or 8.**

**NEWLEAD: N, Y**

**LIVEBUD:** only one observation for one plant. New data?

**TOTALBUD:** only one observation for one plant. New data? This could include dead buds.

**GROWTH:** extension growth? Radial growth?

**YEAR:** 1987, 1988, 1989, 1990, 8788, 8990. When YEAR=8788 or 8990, GROWTH is equal to the average of GROWTH for the year of 1987 and 1988, or 1989 and 1990

**After merging the two data sets, E1987 doesn’t match GROWTH for year of 1987 There are some plants in the second data set that are not in the first data set.**

These ssd01 file were transferred to csv file in SAS viewer, read in SAS, and edited by Lixi:

*SAS program/data set (by lixi):*

R:\MOOSHUBB\longterm\lixi kong\PPwd\_rg8990\sapex8990.sas

R:\MOOSHUBB\longterm\lixi kong\PPwd\_rg8990\sapex8990.ssd

### 1.4.3 Cored data for trees collected in 1989~1991 (Discovered recently. data not merged in master file yet!)

* **Cores taken in 1989 for dominant ABBA trees**: To determine stand age of each plot, two increment cores were taken from two dominant (or codominant if dominant is not available) balsam fir trees closest to the midpoint of two randomly chosen sides in 1989. They were not tagged before?

*Original SAS program to read/edit dat file:*

R:\MOOSHUBB\longterm\Permplots\Permplots2\pagcr89.sas (last modified in Nov 1989)

*DAT raw data:*

R:\MOOSHUBB\longterm\Permplots\Permplots2\pagcr89.dat (last modified in 1995)

*Lixi recreated SAS program referring to old code 2013 and produced permanent SAS data sets:*

R:\MOOSHUBB\longterm\lixi kong\PPwd\_rg8990\pagcrms.sas

R:\MOOSHUBB\longterm\lixi kong\PPwd\_rg8990\pagcrms.ssd

**PLOT**

**DBH**

**CRPOS**

**DECM**

**AGE**

**OLDER:** 0= whole core measured; 1=section(s) skipped.

* **Cores taken in 1989 for ABBA/PIRU trees**: to measure five year radial increment growth, cores were taken from tree located in the center 10\*10 (protocol says 10\*10, paper says 5\*5, or maybe ABBA and PIRU were sampled in different areas?) meter area of each plot. Three (or less than three if not available) trees in each DBH class(5~10cm; 10~15cm; 15~20cm; 20~25cm; 25~30cm) were chosen randomly from the three plots in each stratum. Two cores were taken for each tree chosen at DBH from the right and left side of the tree as you look upslope. Trees with DBH >12.5cm were cored with increment hammer. Some cores were rejected according to certain criteria, details see 89 protocol.

*Original SAS program to read/edit dat file:*

R:\MOOSHUBB\longterm\Permplots\Permplots2\pcore89.sas (last modified in 1990)

*DAT raw data:*

R:\MOOSHUBB\longterm\Permplots\Permplots2\pcore89.dat (last modified in 1995)

**PLOT**

**TAG**

**RL**

**RG88-RG84:** radial growth in 0.01mm

**DATE**

* Beside the PIRU plant mentioned in the paper, ABBA trees and PIRU that were not sampled for winter injury were also sampled for RG.
* 28 PIRU sampled for radial growth and also had WD89 estimated, which is consistent with the paper, while 2 of them were changed to ABBA in 1998 (plot 8, 565 and plot 11 789).
* Plot 12, 235 was “tagged in 2010”
* There are two Plot 14, 585, one was ABBA, and one was PIRU. One was dead in 1986; Data from RG is probably for the one that was alive in 1986?
* plot 13, 170 tree was dead in 1989
* Plot 27, tree 339 was dead in 1989.
* **Cores taken in 1990~1991 for PIRU trees**: to measure the effects of winter injury on subsequent growth, in 1989, Between Oct1990 and Oct 1991, 98 cores were taken from 50 were taken from most damaged(had >50% foliar loss) and least damaged(<10% foliar loss) spruce trees with DBH greater than 15cm which were assessed for winter injury in 1989. Annual radial growth were measured for 1987-1990(similar to 1989, roughly two cores for each tree, one from the left, one from the right).

*SSD01 raw file:*

R:\MOOSHUBB\longterm\Permplots\Permplots1\Windsam\wdrg91a.ssd01 (this only has RG as early as for 1981)

R:\MOOSHUBB\longterm\Permplots\Permplots1\Windsam\wdrg91e.ssd01

R:\MOOSHUBB\longterm\Permplots\Permplots1\Windsam\wdrg91w.ssd01(these two data sets have RG as early as 1980, so will use these two data sets)

SSD01 files were read in SAS viewer, transferred to csv file, so Lixi can check and edit them in SAS.

Average already taken for two cores?

East side cored for 1980~1990, west side only 1984~1990.

**PLOT**

**TAG**

**CLASS:** All equal to indicate “trees”. Plot 10, tree 792 had CLASS=2(sapling) in 1989 winter injury data, which was checked and included in APPENDIX 6. This proves again CLASS in 1989 winter injury data could have errors.

**DAMLEVEL:** damage level. Low(<10% foliar loss from 1989 winter injury data) or Hig(>50% foliar loss in 1989 winter injury data)

**YEAR:** year for radial growth.

**GROWTH:** radial growth for certain year.

**ELEVAT**

**ELEV**

**ASPCL**

**DECM:** decline class collected in 1989 winter injury data.

**MNPRCBUD:** mean % bud damage calculated basing on LIVEBUD IN 1989 winter injury data set (% bud damge=(10-LIVEBUD)\*10)

**MNPRCDAM**: mean % foliar damage calculated basing on DAM in 1989 winter injury data set.

*SAS program/data set (by Lixi):*

R:\MOOSHUBB\longterm\lixi kong\PPwd\_rg8990\PPcoremas91.sas

R:\MOOSHUBB\longterm\lixi kong\PPwd\_rg8990\ppcoremas91v.ssd

R:\MOOSHUBB\longterm\lixi kong\PPwd\_rg8990\ppcoremas91h.ssd

51 plants were sampled for radial growth, 23 on the east, 28 on the west; 21 has high WD; 30 has low WD; while the paper said 50 plants in total were sampled in 199/91, with 23 on the east, 27 on the west; 21 has high WD, and 29 had low WD. From reproducing Fig2 a in the paper, I figure plot 27, plant 932 was not included in the paper(SPEC changed to ABBA in 1998). Plot 12, tree 591, SPEC also changed to ABBA in 1998.

Plot 13, 932 had YRTAG=2010.

Some tag numbers got changed in 1998!!

### 1.4.4 Inventory of dead trees

(Collected in 1988 on the East, and 1989 on the West).

Electric file not found yet.

## 1.5 Data collected in 1998

***Plots sampled:*** Permanent plot 4~27, 4 subplots and 4 additional spruce ears in each plot.

* Live individuals (trees or saplings) tagged in 1986, 1987, and 1988 were revisited, some were missed in 1998
* New live trees were tagged in regular subplots, and new PIRU trees were tagged in additional spruce ears.
* New live saplings were tagged in regular plots. Unlike in 1987/88, DBHs were measured for saplings, and when a sapling was not tall enough to measure DBH, 0 was recorded for DBH in 1998. **Except plot 11, subplot1, 98592 miss DBH98, HT98=1.8. This one should be a sapling in 1998 though. Details see** [**APPENDIX 3**](#_APPENDIX_3_Plants)**.** If 50 or more saplings of one species were counted in the entire plot then sapling data for that species was only collected in the free subplot. PIRU and BECO sapling data was collected in all four subplots regardless of the number found in the plot.
* NO saplings tagged in additional spruce ears.
* Some plants were recorded as found untagged in 1998, but high possible previously tagged. (NYR).
* Winter injury classes were recorded for PIRU saplings and trees 0 values were recorded for all species, should set as missing? 1 values were recorded for ABBA, PIRU, and one SOAM. (0 and 1 probably both mean nothing) Ice damage level from the January 1998 ice storms were also recorded for sapling and trees in all species? (0 or 1 values for all species).
* A few trees had TOTHT98<TPCRN98, relevant corrections were made referring to hardcopies (Lixi 02/08/2013):

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| PLOT | SPLOT | TAG | CENS1 | CENS2 | TOTHT98 | TPCRN98 | Corrected TPCRN98 | SP | DBH98 | DBH |
| 8 | 2 | 964 | 1986 | 1998 | 11.2 | 12 | 11.2 | Beco | 14.2 | 14.3 |
| 10 | 2 | 285 | 1986 | 1998 | 10.4 | 10.7 | 10.4 | Beco | 11 | 10.4 |
| 11 | 1 | 329 | 1988 | 1998 | 3.5 | 3.52 | No data. Set as missing | Abba | 5 | . |
| 15 | 3 | 638 | 1986 | 1998 | 6.2 | 6.5 | No data. Set as missing | Abba | 7.5 | 6.5 |
| 15 | 3 | 98285 | . | 1998 | 4.5 | 5.8 | No data. Set as missing | Abba | 5.4 | . |
| 21 | 1 | 111 | 1987 | 1998 | 7.7 | 11.7 | 7.7 | Abba | 0 | 19.2 |
| 25 | 3 | 227 | 1987 | 1998 | 2.5 | 3.9 | Dead top. HTBCR=4.9. Set as missing | Beco | 6.5 | 6.4 |
| 26 | 2 | 996 | 1987 | 1998 | 3.5 | 3.6 | No data. Set as missing | Abba | 6.7 | 6.1 |

## 1.6 Data collected in 2010

***Plots sampled:*** permanent plot 4~27, 4 subplots and 4 additional spruce ears in each plot.

* Trees or saplings tagged before 2010 and were still alive until 1998 were re-visited. Some were missed in 2010. Some individuals who were dead before were also collected data for survivorship and notes were made if they came alive in 2010.
* New live trees were tagged in both regular subplots and additional spruce ears.
* New live saplings were tagged in four regular subplots and four additional spruce ears for each plot. This was the first time saplings were tagged in additional spruce ears. The same as in 1998, DBHs were collected for saplings, and when a sapling is not tall enough to measure a DBH, 0 was recorded for DBH. There are a few exceptions as follows, details see [APPENDIX 3](#_APPENDIX_3_Plants).
* For additional spruce, because field crew didn’t bring old data with them, so they didn’t look for specific trees, there are some potential missing data, which will be checked after 2010.

**SAS data set:** [*R:\MOOSHUBB\longterm\lixi kong\Perm2010\pptree10.ssd*](pptree10.sas7bdat) (only 2010 data)

[*R:\MOOSHUBB\longterm\lixi kong\Perm2010\pptreemas10.ssd*](pptreemas10.sas7bdat) (2010 data merged with 1986~1998 old data)

**TAG:** some trees were retagged in 2010. Old tag numbers were retained in merged SAS data sets, so it won’t cause problems when merge with earlier data. They got corrected in 1986~2010 master file though. Details see “Corrections2010updated”. New trees were tagged. There is a few

**SPFINAL:** some species were corrected in 2010. See “Corrections2010updated”. Species for new trees were identified. Some are missing.

**BQUADX/BQUADY:** data for new trees were collected, based on visual estimate of position, so it’s not a measurement.

**DBH10:** DBHs was measured for live trees and saplings in all 4 subplots in each plot and live PIRU trees and saplings in additional spruce ear. Some are missing.

**CRPOS10**: For plot 4~6, crown positions were identified for live trees and sapling in all 4 subplots for each plot; for plot 7~27, data were only collected for live trees and saplings in the free subplot for each plot; Data collected for live PIRU trees and saplings in 4 additional spruce ears in all plots. Some are missing, mostly for saplings. Plot25, splot1, tree 178 has CPOS10=p. Confirmed with raw data, it was a “p”. Set as missing Lixi Dec.2012

**DECM10:** For plot 4~6, Decline class data were collected in all 4 subplots for coniferous trees and saplings such as Abba and Piru; For plot 7~27, data only collected in the free subplot. Some are missing, for dead/living trees; Data were collected for PIRU trees and saplings in 4 additional spruce ears in each plot, some are missing. (We could set DECM for dead plans as 4).

**HT10:** For plot 4~6, tree/sapling heights were measured for living trees and saplings in all 4 subplots; for plot 7~27, tree/sapling heights were only measured in the free subplot. Some are missing. NOT measured for additional spruce.

**COND10:** Condition data for regular trees/saplings and additional spruce trees/saplings which were newly dead in 2010 were collected. Some are missing, but no apparent pattern found. Some CONDs were also collected for previous dead additional spruce.

**DECAY10:** Decay data for regular trees/saplings and additional spruce trees/saplings which were newly dead or found not available in 2010 were collected. Some are missing, but no apparent pattern found. Some DECAYs were also collected for previous dead additional spruce.

**NOTE10:**

* “D” - dead; “N/A” - not available. Both “D” and “N/A” are considered as “dead in year 2010” when updating “YRMORT”.
* “CS”-trees species of which were identified differently comparing to data from previous years. Details see “correction2010updated”. SPFINAL were corrected.
* “CAC” - 2010 come back alive trees that could be newly tagged plants with tags taken from previously tagged dead plants, which need to be field check in the future (We compared DBH or other data from previous years and 2010, and decided they were not so possible to be the same plant and should be field checked later) 0.1 was added to the tag number to distinguish them from previously tagged plants. Details see “correction2010updated” or “field check after 2010”.
* AOL10: For plot 4, 5, angle of lean data were collected in all 4 subplots; plot 6, 7, 11, 12, 15 have AOL data in the free subplot.

## 1.7 Field Check 2011

No systematic data were collected in 2011 for permanent plots, but some field checks were done for tag numbers, DBH/DAH, HT, STATUS, and CII.

Details see the file: R:\MOOSHUBB\longterm\lixi kong\Correction&Fieldcheck\Field check after 2010 updated with 2011 field check.doc

## 1.8 Old master file mas98.ssd

Original SAS data set: *R:\MOOSHUBB\longterm\Permplots\Permplot98\mas98.ssd*

Lixi edited this file, made relevant corrections, and added some data that were not included before:

SAS program: *R:\MOOSHUBB\longterm\lixi kong\MAS98NEW\mas98new.sas*

SAS data set: *R:\MOOSHUBB\longterm\lixi kong\MAS98NEW\mas98new.ssd*

Explanation of variables (Lixi updated the old documentation):

*R:\MOOSHUBB\longterm\lixi kong\MAS98NEW\Column headings of mas98 updated.*

## 1.9 Master file for data collected from 1986 to 2010

New mas98 file: basing on *mas98.ssd,* which was the old master file for transect and permanent data collected till 1998, some edition/correction were made(Details see “Column headings of mas98 updated in 2012.docx in the same folder). The new data set is:

R:\MOOSHUBB\longterm\lixi kong\PPTRSEGpooled\mas98new.ssd

Data collected in 2010 and field check done in 2011 were merged with “mas98new” data set to create permanent tree/sapling master data set for data collected from 1986~2011:

[*R:\MOOSHUBB\longterm\lixi kong\Perm2010\pptreemas10.ssd*](pptreemas10.sas7bdat)

**PPLOT:** plot number

**SPLOT**: subplot number. Some recorded in 86 got changed in 1998, which was discovered from merging 1988 re-measurement data with mas98.ssd. Details see [APPENDIX4](#_APPENDIX4_Correction_made). Lixi also corrected them basing on BQUDX/BQUDY after all.

**SPLOT98**: subplot number before correction made in 2010.

**BQUDX/BQUDY**: Quadrat numbers. When they are missing, and BPCRDX/BPCRDY are not, they were calculated according to BPCRDX/BPCRDY (all saplings).

**BQCRDX/ BQCRDY**: Distance along X axis (N to W) /Y axis (N to E) within a 2\*2 quadart from center of the plant. It was only recorded for 1986 tagged trees, 1987 tagged trees and saplings, 1988 tagged saplings, and 1998 tagged trees and saplings. Whey they are missing, and BPCRDX/BPCRDY are available, they were calculated from BPCRDX/BPCRDY

**BPCRDX/BPCRDY**: Distance along X/Y axis from center of the plant within the whole plot. When they were missing, they were calculated from BQUDX/BQUDY and BQCRDX/BQCRDY

**CQUDX86/CQUDY86**: Qudart number along X axis (N to W) /Y axis (N to E) from center of the crown collected in 1986 only

**CQCRDX86/CQCRDY86**: Distance along X axis (N to W) /Y axis (N to E) within a 2\*2 quadart from center of the crown collected in 1986 only

**TAG**: tag number used since 1998. Duplicated tag numbers were marked (add .1 to the duplicated TAG number), and these tree went field check file. Plants come back live in 2010 could be 2010 newly tagged plants with old tag taken from dead previously tagged plants, so 0.1 was added to these plants and a NOTE10 of ‘CAC’ was added. We should field check later. Details see R:\MOOSHUBB\longterm\lixi kong\Correction&Fieldcheck\Porblems and Corrections 2010”

**TAGOLD:** old tag numbers used in 1986, 1987, or 1988. Added by Lixi in 2013. Details see “Master file history\_Tag changes.doc”.

**SPEC**: species abbreviations. Some recorded in earlier years got correction in later. This is the most updated species name. For change made in 1998 see APPENDIX5 for those corrected in 2010, we can refer to NOTE10 and “problems and corrections 2010.dox”

**CLASS:** P=permanent regular plots; A =additional spruce ears; M=met stations.

**YRTAG:** tagging year. For 86, 87, 88, 98 tagged plants, this was derived from CENSUS1/CENSUS2 in mas98.ssd. In 2010, this was derived from merging 2010 data with data collected before. There are some plants had CENSUS1=1987 or 1988, which indicates a YRTAG of 1987/1988 but had no data collected. Details see the table below. No corrections made. All plants had CENSUS1=1986 had a DBH recorded. All plant had CENSUS1=. And CENSUS2=1998, which indicates a YRTAG of 1998 had at least a DBH98 or TOTHT98 recorded.

Plants had CENSUS1=1987, but no data collected in 1987

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| PLT | SPL | TAG | SPEC | CL | YRTAG | YRM | STAT89 | STAT98 | STAT10 | WD89 | WD89A | DEC89 | DBH98 | TOTHT98 | DBH10 | HTTCR10 |
| 16 | 2 | 1001 | PIRU | P | 1987 | 1998 | ALIVE | DEAD | DEAD | 0 | 2.00 | 2 |  |  |  |  |
| 21 | 3 | 651 | ABBA | P | 1987 |  |  | ALIVE | ALIVE |  |  |  | 1.1 | 1.8 | 5.80 | 3.74 |
| 21 | 4 | 652 | PIRU | P | 1987 |  |  | ALIVE | ALIVE |  |  |  | 0.4 | 1.3 | 3.65 |  |
| 22 | 4 | 30 | PIRU | A | 1987 |  |  | ALIVE | ALIVE |  |  |  | 14.8 |  | 16.10 |  |
| 24 | 1 | 754 | ABBA | P | 1987 | 2010 |  | ALIVE | DEAD |  |  |  | 0.9 | 1.5 |  |  |
| 24 | 3 | 1001 | ABBA | P | 1987 | 1998 |  | DEAD | DEAD |  |  |  |  |  |  |  |
| 25 | 3 | 226 | ABBA | P | 1987 |  |  | ALIVE | ALIVE |  |  |  | 11.4 | 8.7 | 13.20 |  |
| 27 | 1 | 1407 | UNID | P | 1987 | 1998 |  | DEAD | DEAD |  |  |  |  |  |  |  |
| 27 | 2 | 6 | ABBA | P | 1987 |  |  | ALIVE | ALIVE |  |  |  | 13.1 | 7.2 | 15.80 |  |

Plants had CENSUS1=1988, but had no data collected in 1988:

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| PL | SPL | TAG | SPEC | CL | YRTAG | YRM | STAT98 | STAT10 | DBH98 | TOTHT98 | DBH10 | HTTCR10 |
| 11 | 1 | 1 | ABBA | P | 1988 | 1998 | DEAD | DEAD |  |  |  |  |
| 11 | 1 | 883 | ABBA | P | 1988 | 2010 | ALIVE | DEAD | 4.5 | 2.5 |  |  |
| 13 | 1 | 57 | BECO | P | 1988 |  | ALIVE | ALIVE | 2.9 | 3.5 | 2.98 |  |
| 14 | 1 | 2001 | PIRU | P | 1988 | 1998 | DEAD | DEAD |  |  |  |  |
| 14 | 1 | 2002 | PIRU | P | 1988 | 1998 | DEAD | DEAD |  |  |  |  |
| 15 | 2 | 1 | ABBA | P | 1988 |  | ALIVE | ALIVE | 3.1 | 4 | 3.60 | 2.21 |

**YRREC:** Year of recruitments. Except the first census year, for trees, this is equal to YRTAG; and for saplings, this depends on YRTAG and whether this subplot was looked for sapling in previous census (CSAP8687 and CSAP98)

**STAT86**: ALIVE or DEAD. Status for 1986 tagged trees in regular east side permanent plots and additional spruce ears. Created in 2011 basing on YRMORT from mas98.ssd. Two trees came back alive in 1988. STAT86/YRMORT was crosschecked with DECM86, When YRMORT=1986, DECM86 all equal to 4 or 5; when DECM86 is equal to 4 or 5, all had YRMOR=1986. No corrections needed.

**STAT87**: ALIVE or DEAD. Status for 1987 tagged trees in regular west permanent plots, additional spruce ears, and saplings in regular west side plots. Created in 2011 basing on YRMORT from mas98.ssd. STAT87/YRMORT was crossed check this with DECM87: When YRMORT=1987, all DECM87 is equal to 4 or 5; and when DECM87 is equal to 4 or 5, all YRMORT is 1987, so no corrections needed.

**STAT88**: Status for 1988 tagged saplings in regular east and west side permanent plots and re-measurements for 1986 tagged trees. Only new live saplings were tagged in 1988, so STAT88 for them are all equal to ALIVE. STAT88 for 86 trees were created basing on DECM88.

**STAT89:** status for previously tagged PIRU trees and saplings, which were created basing on DECM collected for winter injury data in 1989. 4 plants came back alive in 1989, and we decided to set 1989 relevant data missing for these plants.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| PL | SPL | TAG | SPEC | CL | YRTAG | STAT86 | STAT87 | STAT88 | STAT89 | STAT98 | DBH86 | DBH87 | DECM88 | DECW88 | WD89OL | WD89AV | DECM89 |
| 9 | 1 | 494 | PIRU | A | 1986 | DEAD |  | DEAD | ALIVE | DEAD | 5.5 |  | 4 | 4 | 0 | 1.67 | 1 |
| 11 | 4 | 640 | BECO | P | 1986 | ALIVE |  | DEAD | ALIVE | DEAD | 10.6 |  | 4 | 4 | 0 | 2.00 | 2 |
| 13 | 4 | 59 | ABBA | P | 1986 | DEAD |  | DEAD | ALIVE | DEAD | 5.6 |  | 4 | 4 | 1 | 3.00 | 2 |
| 17 | 3 | 611 | ABBA | P | 1987 |  | DEAD |  | ALIVE | DEAD |  | 20.1 |  |  | 0 | 4.67 | 2 |

**STAT98**: ALIVE, DEAD, NF, PD. This was created basing on YMORT and CODE98A in mas98.ssd, so there is no “come back alive” issue. There are a few 86, 87,88 tagged plants that had no data collected in 1998, if they were alive in 2010, will add STAT98, otherwise, STAT98 was left missing. This was crosschecked this with DECM98. Details see [APPENDIX7.](#_APPENDIX_7_YRMORT/STAT) A few plants had STAT98=NF, but some data recorded, checked hard copies and made relevant corrections:

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| PPLOT | SPLOT | TAG | SPEC | CLASS | SNHT98 | COND98 | DECAY98 | hardcopies |
| 18 | 4 | 351 | ABBA | P | 0.4 | 2 | 4 | Note” tag not found, found near mapped location. STAT98 was corrected to PD, and set NOTE98=TNF |
| 23 | 4 | 325 | SOAM | P |  | 1 | 3 |  |
| 23 | 4 | 747 | ABBA | P | 1 | 2 | 3 |  |
| 24 | 2 | 372 | PIRU | P | 1 | 2 | 1 |  |

**STAT10**: ALIVE, DEAD, NF (not found), or NFC (for additional spruce, field crew didn’t bring old data sheet during data collection, which means they didn’t look for specific additional spruces. So if a status was missing (assumed it was not found) for additional spruce, we should double check in the future. Some were checked in 2011, some not) Status for old live plants and 2010 newly tagged trees/saplings in regular plots and additional spruce ears. Some plants dead in 1998 were also collected for status in 2010. This variable was created basing on “Notes” recorded in 2010. Relevant corrections were made if they came alive in 2010. Cross checked this with DECM10 and some corrections were made. Details see [APPENDIX7.](#_APPENDIX_7_YRMORT/STAT)

**YRCA:** year of “come back alive”. It’s equal to 1988 or 2010. Four plant sonly. There might be plants that were identified as dead in 1986/1987 but came back alive in 1998. Since this was already corrected in mas98.ssd, so we don’t know which plants they were. Could check code created mas98.ssd to identify plants come back alive in 1998.

**YRMORT**: year of mortality. It’s equal to 1986, 1987, 1988, 1989, 1998, 2010, or 2011. When it’s missing, it means until the last year when a STAT was collected, the plant was still alive. This was recorded for as 1986, 1987, and 1998 or missing in mas98.ssd, and was updated after adding in 1988 re-measurement, 1989 winter injury data, a2010 data, and 2011 field check.

**DBH86**: DBH measurements collected in 1986 for permanent regular trees (>=5cm) and additional spruce tree on plot 1~15. All trees tagged in 1986 had DBH86 recorded except for plot 9, subplot 4, additional spruce 175, which I couldn’t find on 86 hard copy, found on 98 hard copy, and it was tagged as 98660 then crossed out and marked as 175 with a note “has rod no tag doesn’t seem to be in”. it was outside the add circles (and that’s why DBH86 was not measured).

**HTTCR86**: Height to the top of live crown collected for 1986 tagged trees. This was NOT collected for all trees; some trees didn’t collected for height in 1986 were collected for height in 1987. For plot 14 and 15, Heights were only collected in subplot 2 in 1987.

**CRHT86**: crown height (from base of crown to top) collected in 1986, which is equal to HTTCR86-HTBCR86 (height to the base of the crown). HTBCR86 were recorded on hardcopies, but not included in *mas98.ssd.*

**CLONG86**: the longest width of a tree crown collected in 1986.

**CAZLNG86:** azimuth of the longest portion of a tree’s crown. This was always collected when CLONG86 and CPERP86 were collected except one tree.

**CPERP86**: Width in the perpendicular direction of the longest portion of the crown. Not collected for all trees. Out of 1314 plants, 42 plants have CLONG86<CPERP86; 73 plants have CLONG86=CPERP86; and the rest all have CLONG>CPERP86. Field crew probably reversed longest length and width sometimes. It doesn’t matter much when we calculated the area though.

**DECM86**: 1, 2, 3, 4, **5**. Cross checked this with STAT86/YRMORT:

**DBH87**: recorded for TREES only in 1987, DBH87 for sapling are missing.

**HTTCR87**: Height to the top of live crown collected for trees and saplings tagged in 1987 (mostly for PIRU) and some trees tagged in 1986. Data for 1986 trees were entered in Lixi/Noah in 2013. Only one column was used to record height in *mas98.ssd* which was TOTHT, while there is both TOTHT and HTTCR recorded on hard copies for trees, so HTTCR were added by Lixi in 2013 referring to hard copies, except for plot 22, 23, 24, 26, 27 which had no hardcopies of HTs.. Most 87 tagged trees miss heights though, a few missing for saplings. Dead trees would only have a TOTHT87 but not HTTCR87.

**TOTHT87**: Total heights (including the dead top if there is one) collected in 1987 for 1987 newly tagged tree/saplings and some 1986 tagged trees. Saplings were only collected for one Height on the hard copies, which should be HTTCR, so TOTHT87 was set to be the same as HTTCR87 for saplings. DATA for 86 tagged trees were missing in *mas98* and entered by Lixi/Noah in 2013 too

**CRHT87**: Height of a crown collected in 1987 for 87 newly tagged trees (DBH87>=5cm) and some 86 tagged trees.(recorded as HT to the base and top of the crown).

**CPOS87:** crown position for both live and dead trees (>=5cm). Some were for 86 tagged trees.

**CLITOP87**: angle to the top of a tree's crown measured with a clinometer, recorded for trees only.

**DECM87**: Collected for both trees and saplings. 1, 2, 3, 4, **5.** 5 could be dead but snapped off, but uncertain, for sure it was dead. PAP

**DECW87**

**DSAPP87/DSAPA87/DSAPB87:** dead PIRU/ABBA/BECO saplings count in 1987. Entered in 2013. Missing for some subplots/plots where no hand written hard copies could be found.

**HT88**: tree height collected in 1988 for 86 tagged trees and 88 tagged new saplings in m.

**CPOS88**: Crown position measured in 1988 for 86 tagged live or dead trees.

**DECM88:** 0, 1, 2, 3, 4, **5.** Decline class collected for 1986 tagged trees.

**DECW88**

**DSAPP88/DSAPA88/DSAPB88:** dead PIRU/ABBA/BECO saplings count in 1988. DSAPA88 was set as missing for plot 5, subplot 3, because there are two sets of same data.

**EX87-EX83**: extension growth collected for 1988 tagged saplings. No 0 values found.

**WD89OL:** Whether characteristic winter damage is visible on 1987(1989?) or older growth. 1=Yes; 0= No.

**WD89AV**: Average winter damage

**EXWI89**: Degree of exposure to wind

**DECM89**

**LVBD89**: Number of live buds of ten examined in section for some PIRU trees

**DBH98**: DBH measured for live and dead trees and saplings that were tall enough in 1998. Saplings that was not tall enough to be measured for DBH had DBH98 equal to 0. Some DBH98 were missing. If DBH98 is equal to 0 for a dead plant, it was set as missing. Plants with TOTHT98 less than 1.37 but DBH98 greater than 0 were double checked and no corrections needed. It is probably because breast height was estimated along the stem, but heights were measured vertically and the plant was leaning. If TOTHT98 is taller than 1.37 and DBH98 is equal to 0, DBH98 was set as missing. Details see [APPENDIX 8](#_APPENDIX_=8_DBH).

DBH decrease not adjusted yet. DBH jumped more than one DBH class not adjusted yet.h

**TOTHT98**: Total height measured in 1998 for both trees and saplings. It’s the height to the dead top when a tree has a dead top, and it would be larger than HTTCR98 in that case. When a tree doesn’t have a dead top, TOTHT98 is equal to HTTCR98.HT decrease not checked or adjusted neither.

**HTTCR98:** Height to the top of live crown for both trees and saplings. Some are missing when TOTHT98 is available. When HTTCR98 is missing and the plant is alive, HTTCR98 was set to be the same as TOTHT98.

**HTBCR98**: height to the base of live crown

**CRHT98**: crown height (from base of crown to top), which is calculated as HTTCR98-HTBCR98.

**SNHT98**: height in which a tree has snapped, recorded mostly for dead plants, and 2 live plants, see DECAY98.

**SNAZ98**: azimuth (direcion) an individual has snapped or tipped-up

**CRBASE98**: angle to the base of a tree crown

**CRPOS98**: crown position for trees and some saplings. Mostly collected for live plants, only a few for dead plants.

**DECM98**: 1, 2, 3, 4.

**DECW98**

**COND98:**1=standing dead; 2=snapped off; 3=tipped up; 4=leaning;

**DECAY98:** 1=recently dead, has fine twigs and bark; 2=older, has large branches, likely losing bark; 3=advanced stages of decay , may have some bark; 4=on the ground, soft, punky, bark falls off easily; 5=punky to core; 6=snagging; 7=no found (in the protocol but not found for DECAY98).

Plants had COND98 or/and DECAY98 collected, but had STAT98=’ALIVE’ (YRMORT=. In mas98.ssd): if still LIVE in 2010 or found evidence on hand written hardcopies, COND/DECAY98 was set missing.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| pl | spl | tag | spec | stat86 | stat87 | stat98 | stat10 | decm98 | dbh98 | totht98 | dbh10 | cond98 | decay98 | 1998 hardcopies |
| 4 | 1 | 123 | SOAM |  |  | ALIVE | NF |  | 0 | 1.2 |  | 2 |  | Note: “ Snapped off 1m” |
| 4 | 4 | 98880 | SOAM |  |  | ALIVE | NF |  | 0 | 1.2 |  | 2 |  | Note:” snapped at 1.1m” |
| 11 | 2 | 1190 | BECO | ALIVE |  | ALIVE | ALIVE |  | 9.8 | 10.1 | 9.80 | 1 | 3 | It was DEAD(tag was 190) |
| 13 | 3 | 945 | ABBA | ALIVE |  | ALIVE | ALIVE | 2 | 8.2 | 7.2 | 10.70 | 1 |  | Should set COND98 missing |
| 14 | 1 | 661 | PIRU | ALIVE |  | ALIVE | ALIVE | 1 | 9.5 | 6.6 | 10.40 | 1 |  | Should set COND98 missing |
| 14 | 4 | 646 | BECO | ALIVE |  | ALIVE | DEAD |  | 10.7 | 5.4 |  | 1 |  | Note:”only one live branch, almost dead”. |
| 21 | 2 | 125 | PIRU |  | ALIVE | ALIVE | DEAD | 2 | 29.8 | 13.2 |  | 3 | 1 | Had TOTHT, and HTCR, seems to be alive. |

**AOL98**

**NOTE98:** created basing on mainly CODE98A in mas98.ssd

* HTC: height measured by clinometer
* NL=new leader
* NYR=no precise year of recruitment. Plants that were in plot but not tagged in 1986/87, and were tagged in 1998.
* OUT=plants outside the plot. But since we have been collecting data on them, so we keep them in our data set.
* PM=precise measurements. Trees measured from the tree core.
* **RL=old tag lost, relabeled plants. Not sure if relabeled with the same number or not.**
* ST1-#/ST2-#/ST3-#/ST4-#/ST5-#: Individual sharing base with 1, 2, 3, 4, or 5 other stems. When it shares base with 2 or more other stems, # is the tag number of one of the other stems.
* TM=tag moved. New DBH location due to injury.
* TG=tag found on the ground. For dead plants. STAT98 would be set as PD (possible dead).
* TNF=tag not found. Dead tree in mapped location. STAT98 was set as PD.
* CUT=tree cut down by trail. YRMORT was set as 1998 if not dead in 1986/1987.
* NTD=newly tagged dead trees.

**WD98:** the level of winter injury an individual has in 1998. Only had values of 0 and 1, while 1 means no winter damage visible. 0s were set as missing.

**ICE98:** the level of ice damage a tree suffered from the January 1998 ice storm. Only had values of 0 and 1, and 0s were set as missing.

**DBH10**

**HTTCR10:**

Three plants had HT slightly larger than 1.37 and DBH10 equal to 0, they were set as missing:

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| PPLOT | SPLOT | TAG | SPEC | CLASS | **DBH98** | **TOTHT98** | **DBH10** | **HTTCR10** |
| 8 | 3 | 98899 | ABBA | P | **0** | **1.2** | **0.00** | **1.48** |
| 8 | 3 | 98973 | ABBA | P | **0** | **1.3** | **0.00** | **1.47** |
| 23 | 4 | 1317 | ABBA | P |  |  | **0.00** | **1.38** |

Plants with HT less than 1.37, but DBH10 greater than 0: one observation looks like typo on datalogger.

PAP: Could be 1.57.still a very short fat plant, should probably set as missing. Other short fat plants could be snapped. Probably vertical height and breast height along the stem for a leaning plant. Or height was measured on a sloped plot vertically above the ground, if measured from different sides, would get different heights. **Breast height is supposed to be measured along the stem!**

**Allometry: whether to exclude these leaning plant?**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| pplot | splot | tag | spec | YRMORT | DBH98 | TOTHT98 | HTTCR98 | dbh10 | httcr10 | CPOS10 |
| 4 | 3 | 9264 | ABBA |  |  |  |  | 4.9 | **0.157** | **O** |
| 13 | 2 | 98172 | ABBA |  | 0 | 1.1 | 1.1 | 0.91 | 1.14 | O |
| 14 | 2 | 293 | ABBA |  | 0 | 0.9 | 0.9 | 1 | 1.29 | O |
| 14 | 2 | 98114 | ABBA |  | 0 | 1 | 1 | 1.06 | 1.08 | O |
| 14 | 2 | 98115 | ABBA |  | 0.2 | 1.4 | 1.4 | 1.2 | 1.3 | O |
| 16 | 2 | 98612 | ABBA |  | 3.7 | 2.8 | 2.8 | 5.3 | 1.37 | O |
| 20 | 3 | 662 | ABBA |  | 3.6 | 3.2 | 3.2 | 4.63 | 1.2 | O |
| 20 | 3 | 666 | PIRU |  | 0 | 0.6 | 0.6 | 1.37 | 0.48 | O |
| 26 | 4 | 259 | ABBA |  |  |  |  | 0.23 | 1.27 | O |
| 26 | 4 | 261.2 | ABBA |  |  |  |  | 0.31 | 1.37 | O |
| 26 | 4 | 272 | ABBA |  |  |  |  | 0.19 | 1.32 | O |

**DECM10:** For plot 4~6, Decline class data were collected in all 4 subplots for coniferous trees and saplings such as Abba and Piru; For plot 7~27, data only collected in the free subplot. Some are missing. It was collected for PIRU trees and saplings in 4 additional spruce ears in each plot, some are missing.

**CPOS10:** crown position for trees and saplings. Mostly collected for live plants, only a few for dead plants

**COND10:** 1=standing dead; 2=snapped off; 3=tipuped up; 4=leaning; 7? Only one 7. Dead in 1986. No other data collected in 2010.

**DECAY10:** 1=recently dead; 2=older, has larger branches, likely losing bark; 3=advanced stages of decay, may have some bark; 4,=on ground, soft, punky, bark falls off easily; 5=punky to core; 6=sagging; 7=not found;, 8 11

COND10 or DECAY10 collected for live plants: make STAT/COND/DECAY missing. Field check in the future; ask PAP.

If two or more variables to indicate it was live (expecially DBH), we can probably trust it’s live. Data could be shifted. PAP

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| PL | SPL | TAG | SPEC | YRTAG | STAT10 | DBH98 | DBH10 | HTTCR98 | HTTCR10 | COND10 | DECAY10 | DECM10 | CPOS10 |
| 5 | 3 | 98962 | ABBA | 1998 | ALIVE | 5.4 | 5.70 | 3.9 | 3.75 | 1 | 1 | 1 | o |
| 6 | 2 | 46 | ABBA | 1986 | ALIVE | 12.3 | 15.60 | 5.6 | 8.96 | 1 |  |  | i |
| 11 | 1 | 889 | ABBA | 1988 | ALIVE | 7.2 | 11.70 | 4.9 | 8.34 | 1 | 2 | 1 | i |
| 12 | 1 | 174 | PIRU | 1988 | ALIVE | 1.2 | 1.66 | 1.8 |  |  | 8 |  |  |
| 13 | 2 | 933 | BECO | 1986 | ALIVE | 9.8 | 12.60 | 6.4 | 6.97 |  | 8 |  | c |
| 20 | 3 | 662 | ABBA | 1987 | ALIVE | 3.6 | 4.63 | 3.2 | 1.2 |  | 8 | 1 | o |
| 24 | 2 | 2063 | ABBA | 2010 | ALIVE |  | 5.90 |  |  | 2 | 1 |  |  |
| 27 | 4 | 331 | ABBA | 1987 | ALIVE | 13.7 | 20.50 | 8.2 |  |  | 8 |  |  |

All plants had DECAY10 equal to 7, 8, or 11, sorted by DECAY10, STAT10. (all data collected in 2010 are included in the table). PAP might know this.

STAT10 might be more reliable than DECAY10.

When a tree was found, set DECAY10 as missing. Probably just an error field crew made. PAP

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| PL | SPL | TAG | SPEC | YRTAG | STAT98 | STAT10 | DBH98 | DBH10 | HTTCR98 | HTTCR10 | COND10 | DECAY10 | DECM10 | CPOS10 |
| 4 | 1 | 98819 | ACSP | 1998 | ALIVE | DEAD | 3.9 |  | 5.8 |  |  | 7 |  |  |
| 4 | 2 | 17 | SOAM | 1988 | ALIVE | DEAD | 2.2 |  | 4.6 |  |  | 7 |  |  |
| 4 | 3 | 5 | SOAM | 1988 | DEAD | DEAD |  |  |  |  |  | 7 |  |  |
| 4 | 3 | 6 | SOAM | 1988 | DEAD | DEAD |  |  |  |  |  | 7 |  |  |
| 4 | 4 | 98851 | ACSP | 1998 | ALIVE | DEAD | 0.5 |  | 1.8 |  |  | 7 |  |  |
| 5 | 1 | 797 | ABBA | 1986 | DEAD | DEAD |  |  |  |  |  | 7 |  |  |
| 5 | 1 | 98971 | ABBA | 1998 | ALIVE | DEAD | 0.5 |  | 1.5 |  | 3 | 7 |  |  |
| 5 | 4 | 98980 | ABBA | 1998 | ALIVE | DEAD | 3.4 |  | 3.3 |  |  | 7 |  |  |
| 6 | 3 | 98389 | BEAL | 1998 | ALIVE | DEAD | 1.7 |  | 1.5 |  |  | 7 |  |  |
| 7 | 1 | 602 | ABBA | 1986 | DEAD | DEAD |  |  |  |  |  | 7 |  |  |
| 9 | 2 | 932 | ABBA | 1988 | DEAD | DEAD |  |  |  |  |  | 7 |  |  |
| 10 | 2 | 947 | PIRU | 1988 | DEAD | DEAD |  |  |  |  |  | 7 |  |  |
| 11 | 1 | 118 | ABBA | 1988 | DEAD | DEAD |  |  |  |  |  | 7 |  |  |
| 11 | 1 | 384 | ABBA | 1988 | ALIVE | DEAD | 4.9 |  | 4 |  | 4 | 7 |  |  |
| 11 | 1 | 389 | ABBA | 1988 | ALIVE | DEAD | 2.7 |  | 3.3 |  |  | 7 | 4 |  |
| 11 | 1 | 392 | ABBA | 1988 | ALIVE | DEAD | 1.2 |  | 1.9 |  |  | 7 | 4 |  |
| 11 | 1 | 653 | ABBA | 1988 | ALIVE | DEAD | 0.7 |  | 1.4 |  |  | 7 | 4 |  |
| 11 | 1 | 1411 | ABBA | 1988 | DEAD | DEAD |  |  |  |  |  | 7 |  |  |
| 11 | 1 | 98385 | PIRU | 1998 | ALIVE | DEAD | 0 |  | 1.2 |  | 4 | 7 |  |  |
| 11 | 1 | 98465 | ABBA | 1998 | ALIVE | DEAD | 0.9 |  | 2 |  | 4 | 7 |  |  |
| 11 | 1 | 98583 | ABBA | 1998 | ALIVE | DEAD | 0 |  | 1.1 |  |  | 7 | 4 |  |
| 11 | 1 | 98591 | ABBA | 1998 | ALIVE | DEAD | 0.4 |  | 1.6 |  |  | 7 | 4 |  |
| 11 | 1 | 98999 | ABBA | 1998 | ALIVE | DEAD | 0 |  | 1.3 |  | 4 | 7 |  |  |
| 11 | 2 | 630 | ABBA | 1988 | ALIVE | DEAD | 1.1 |  | 1.6 |  |  | 7 |  |  |
| 11 | 3 | 160 | ABBA | 1986 | DEAD | DEAD |  |  |  |  |  | 7 |  |  |
| 12 | 1 | 952 | BECO | 1986 | DEAD | DEAD |  |  |  |  |  | 7 |  |  |
| 12 | 2 | 753 | BECO | 1987 | DEAD | DEAD | 8.8 |  |  |  |  | 7 |  |  |
| 12 | 2 | 908 | BECO | 1986 | DEAD | DEAD | 7.6 |  |  |  |  | 7 |  |  |
| 12 | 4 | 523 | PIRU | 1986 | DEAD | DEAD |  |  |  |  |  | 7 |  |  |
| 13 | 4 | 82 | ABBA | 1986 | DEAD | DEAD |  |  |  |  |  | 7 |  |  |
| 25 | 2 | 832 | PIRU | 1987 | DEAD | DEAD |  |  |  |  |  | 7 |  |  |
| 25 | 2 | 869 | PIRU | 1987 | DEAD | DEAD |  |  |  |  |  | 7 |  |  |
| 4 | 1 | 123 | SOAM | 1988 | ALIVE | NF | 0 |  | 1.2 |  |  | 7 |  |  |
| 4 | 1 | 213 | SOAM | 1988 | ALIVE | NF | 0.5 |  |  |  |  | 7 |  |  |
| 4 | 1 | 227 | SOAM | 1988 | ALIVE | NF | 0.5 |  | 1.4 |  |  | 7 |  |  |
| 4 | 1 | 233 | BEAL | 1988 | ALIVE | NF | 2 |  | 0.9 |  |  | 7 |  |  |
| 4 | 1 | 98336 | BECO | 1998 | ALIVE | NF | 4.5 |  | 5.7 |  |  | 7 |  |  |
| 4 | 1 | 98340 | ACSP | 1998 | ALIVE | NF | 4.3 |  | 6 |  |  | 7 |  |  |
| 4 | 1 | 98367 | BECO | 1998 | ALIVE | NF | 3.6 |  | 5.4 |  |  | 7 |  |  |
| 4 | 1 | 98379 | ABBA | 1998 | ALIVE | NF | 0 |  | 1.3 |  |  | 7 |  |  |
| 4 | 1 | 98385 | ABBA | 1998 | ALIVE | NF | 0 |  | 1.2 |  |  | 7 |  |  |
| 4 | 1 | 98388 | ABBA | 1998 | ALIVE | NF | 1.2 |  | 1.9 |  |  | 7 |  |  |
| 4 | 1 | 98544 | ABBA | 1998 | ALIVE | NF | 0.5 |  | 1.4 |  |  | 7 |  |  |
| 4 | 1 | 98811 | ABBA | 1998 | ALIVE | NF | 1.5 |  | 1.8 |  |  | 7 |  |  |
| 4 | 1 | 98829 | ACSP | 1998 | ALIVE | NF | 2.3 |  | 6.6 |  |  | 7 |  |  |
| 4 | 1 | 98831 | ACSP | 1998 | ALIVE | NF | 3.7 |  | 4.9 |  |  | 7 |  |  |
| 4 | 1 | 98840 | ACSP | 1998 | ALIVE | NF | 2 |  | 2.2 |  |  | 7 |  |  |
| 4 | 1 | 98890 | ACSP | 1998 | ALIVE | NF | 1.7 |  | 1.4 |  |  | 7 |  |  |
| 4 | 2 | 201 | SOAM | 1988 | ALIVE | NF | 0 |  | 0.9 |  |  | 7 |  |  |
| 4 | 2 | 203 | ABBA | 1988 | ALIVE | NF | 1 |  | 1.7 |  |  | 7 |  |  |
| 4 | 2 | 215 | ABBA | 1988 | ALIVE | NF | 0 |  | 1.2 |  |  | 7 |  |  |
| 4 | 2 | 98339 | ACSP | 1998 | ALIVE | NF |  |  | 1.5 |  |  | 7 |  |  |
| 4 | 2 | 98361 | ACSP | 1998 | ALIVE | NF | 2.4 |  | 3 |  |  | 7 |  |  |
| 4 | 2 | 98701 | ACSP | 1998 | ALIVE | NF | 7.4 |  | 7.4 |  |  | 7 |  |  |
| 4 | 2 | 98702 | ACSP | 1998 | ALIVE | NF | 6.8 |  | 6.4 |  |  | 7 |  |  |
| 4 | 2 | 98752 | ACSP | 1998 | ALIVE | NF | 0.5 |  | 1.7 |  |  | 7 |  |  |
| 4 | 2 | 98753 | ACSP | 1998 | ALIVE | NF | 3.5 |  | 3.9 |  |  | 7 |  |  |
| 4 | 2 | 98864 | ACSP | 1998 | ALIVE | NF | 0.5 |  | 2 |  |  | 7 |  |  |
| 4 | 2 | 98893 | ACSP | 1998 | ALIVE | NF | 2.8 |  | 4.5 |  |  | 7 |  |  |
| 4 | 3 | 98806 | ACSP | 1998 | ALIVE | NF | 1 |  | 1.7 |  |  | 7 |  |  |
| 4 | 3 | 98812 | ACSP | 1998 | ALIVE | NF | 5.9 |  | 3.9 |  |  | 7 |  |  |
| 4 | 3 | 98846 | ACSP | 1998 | ALIVE | NF | 0.5 |  | 2 |  |  | 7 |  |  |
| 4 | 3 | 98848 | ACSP | 1998 | ALIVE | NF | 2.7 |  | 4.2 |  |  | 7 |  |  |
| 4 | 4 | 107 | ACSA | 1988 | ALIVE | NF | 1 |  | 2.3 |  |  | 7 |  |  |
| 4 | 4 | 98813 | ABBA | 1998 | ALIVE | NF | 1 |  | 1.6 |  |  | 7 |  |  |
| 4 | 4 | 98815 | ABBA | 1998 | ALIVE | NF | 0 |  | 1.2 |  |  | 7 |  |  |
| 4 | 4 | 98842 | ACPE | 1998 | ALIVE | NF | 1 |  | 2.1 |  |  | 7 |  |  |
| 4 | 4 | 98849 | ABBA | 1998 | ALIVE | NF | 0 |  | 1.1 |  |  | 7 |  |  |
| 4 | 4 | 98856 | ABBA | 1998 | ALIVE | NF | 1.3 |  | 1.8 |  |  | 7 |  |  |
| 4 | 4 | 98877 | ABBA | 1998 | ALIVE | NF | 0 |  | 1.1 |  |  | 7 |  |  |
| 4 | 4 | 98880 | SOAM | 1998 | ALIVE | NF | 0 |  | 1.2 |  |  | 7 |  |  |
| 4 | 4 | 98884 | ACSP | 1998 | ALIVE | NF | 1 |  | 2.5 |  |  | 7 |  |  |
| 5 | 1 | 813 | ABBA | 1988 | ALIVE | NF | 3.4 |  | 3 |  |  | 7 |  |  |
| 5 | 1 | 816 | ABBA | 1988 | ALIVE | NF | 1.8 |  | 1.9 |  |  | 7 |  |  |
| 5 | 1 | 98957 | ABBA | 1998 | ALIVE | NF | 0 |  | 1.2 |  |  | 7 |  |  |
| 5 | 3 | 98906 | ABBA | 1998 | ALIVE | NF | 2.2 |  | 2.7 |  |  | 7 |  |  |
| 5 | 3 | 98927 | ABBA | 1998 | ALIVE | NF | 0 |  | 1.3 |  |  | 7 |  |  |
| 6 | 1 | 98366 | ACSP | 1998 | ALIVE | NF | 1.3 |  | 2.2 |  |  | 7 |  |  |
| 6 | 2 | 614 | ABBA | 1988 | ALIVE | NF | 0.5 |  | 1.5 |  |  | 7 |  |  |
| 7 | 1 | 557 | ABBA | 1988 | ALIVE | NF | 0 |  | 1 |  |  | 7 |  |  |
| 7 | 4 | 98887 | ABBA | 1998 | ALIVE | NF | 1.4 |  | 2 |  |  | 7 |  |  |
| 7 | 4 | 98976 | ABBA | 1998 | ALIVE | NF | 0.5 |  | 1.2 |  |  | 7 |  |  |
| 8 | 3 | 565 | ABBA | 1986 | ALIVE | NF | 8.1 |  | 6.6 |  |  | 7 |  |  |
| 8 | 3 | 918 | ABBA | 1988 | ALIVE | NF | 4.3 |  | 4.4 |  |  | 7 |  |  |
| 8 | 3 | 919 | ABBA | 1988 | ALIVE | NF | 3.6 |  | 3.5 |  |  | 7 |  |  |
| 8 | 3 | 920 | ABBA | 1988 | ALIVE | NF | 2.5 |  | 2.6 |  |  | 7 |  |  |
| 8 | 3 | 923 | ABBA | 1988 | ALIVE | NF | 0 |  | 1 |  |  | 7 |  |  |
| 9 | 2 | 147 | ABBA | 1988 | ALIVE | NF | 1 |  | 1.7 |  |  | 7 |  |  |
| 9 | 2 | 171 | ABBA | 1988 | ALIVE | NF | 1.5 |  | 1.9 |  |  | 7 |  |  |
| 9 | 2 | 458 | PIRU | 1988 | ALIVE | NF | 1.5 |  | 1.9 |  |  | 7 |  |  |
| 9 | 2 | 494 | PIRU | 1988 | ALIVE | NF | 2.1 |  | 2.7 |  |  | 7 |  |  |
| 9 | 2 | 496 | ABBA | 1988 | ALIVE | NF | 1.7 |  | 2 |  |  | 7 |  |  |
| 9 | 2 | 909 | ABBA | 1988 | ALIVE | NF | 2 |  | 1.9 |  |  | 7 |  |  |
| 9 | 2 | 999 | ABBA | 1988 | ALIVE | NF | 1.3 |  | 1.3 |  |  | 7 |  |  |
| 11 | 1 | 168 | ABBA | 1988 | ALIVE | NF | 1.9 |  | 2.2 |  |  | 7 |  |  |
| 11 | 1 | 192 | ABBA | 1988 | ALIVE | NF | 1.1 |  | 1.8 |  |  | 7 |  |  |
| 11 | 1 | 327 | PIRU | 1988 | ALIVE | NF | 0.5 |  | 1.2 |  |  | 7 |  |  |
| 11 | 1 | 358 | ABBA | 1988 | ALIVE | NF | 2.4 |  | 3 |  |  | 7 |  |  |
| 11 | 1 | 404 | ABBA | 1988 | ALIVE | NF | 1.2 |  | 1.7 |  |  | 7 |  |  |
| 11 | 1 | 547 | ABBA | 1988 | ALIVE | NF | 2.2 |  | 1.9 |  |  | 7 |  |  |
| 11 | 1 | 687 | ABBA | 1988 | ALIVE | NF | 3.2 |  | 4.4 |  |  | 7 |  |  |
| 11 | 1 | 688 | ABBA | 1988 | ALIVE | NF | 0.8 |  | 1.4 |  |  | 7 |  |  |
| 11 | 1 | 741 | ABBA | 1988 | ALIVE | NF | 4.9 |  | 3.4 |  |  | 7 |  |  |
| 11 | 1 | 905 | ABBA | 1988 | ALIVE | NF | 2.1 |  | 2.4 |  |  | 7 |  |  |
| 11 | 1 | 98313 | ABBA | 1998 | ALIVE | NF | 0.6 |  | 1.4 |  |  | 7 |  |  |
| 11 | 1 | 98316 | ABBA | 1998 | ALIVE | NF | 0 |  | 1 |  |  | 7 |  |  |
| 11 | 1 | 98319 | ABBA | 1998 | ALIVE | NF |  |  | 1.4 |  |  | 7 |  |  |
| 11 | 1 | 98324 | ABBA | 1998 | ALIVE | NF | 0 |  | 1.1 |  |  | 7 |  |  |
| 11 | 1 | 98333 | ABBA | 1998 | ALIVE | NF | 0 |  | 1 |  |  | 7 |  |  |
| 11 | 1 | 98464 | ABBA | 1998 | ALIVE | NF | 1.8 |  | 2 |  |  | 7 |  |  |
| 11 | 1 | 98536 | ABBA | 1998 | ALIVE | NF | 0 |  | 1.2 |  |  | 7 |  |  |
| 11 | 1 | 98547 | ABBA | 1998 | ALIVE | NF | 0.6 |  | 1.7 |  |  | 7 |  |  |
| 11 | 1 | 98550 | ABBA | 1998 | ALIVE | NF | 0.6 |  | 1.5 |  |  | 7 |  |  |
| 11 | 1 | 98551 | ABBA | 1998 | ALIVE | NF | 0 |  | 1.2 |  |  | 7 |  |  |
| 11 | 1 | 98553 | ABBA | 1998 | ALIVE | NF | 0 |  | 1.3 |  |  | 7 |  |  |
| 11 | 1 | 98589 | ABBA | 1998 | ALIVE | NF | 1 |  | 1.6 |  |  | 7 |  |  |
| 11 | 1 | 98596 | ABBA | 1998 | ALIVE | NF | 0.9 |  | 1.5 |  |  | 7 |  |  |
| 11 | 4 | 612 | PIRU | 1988 | ALIVE | NF |  |  | 1.4 |  |  | 7 |  |  |
| 12 | 3 | 98547 | ABBA | 1998 | ALIVE | NF | 0 |  | 1.3 |  |  | 7 |  |  |
| 13 | 2 | 98198 | ABBA | 1998 | ALIVE | NF | 0 |  | 1.3 |  |  | 7 |  |  |
| 18 | 1 | 98593 | ABBA | 1998 | ALIVE | NF |  |  | 1.4 |  |  | 7 |  |  |
| 20 | 1 | 98101 | PIRU | 1998 | ALIVE | NF | 0 |  | 1.2 |  |  | 7 |  |  |
| 20 | 2 | 561 | ABBA | 1987 | ALIVE | NF | 2 |  | 1.5 |  |  | 7 |  |  |
| 23 | 4 | 98155 | ABBA | 1998 | ALIVE | NF | 0 |  | 1.3 |  |  | 7 |  |  |
| 23 | 4 | 98158 | ABBA | 1998 | ALIVE | NF | 0 |  | 1.1 |  |  | 7 |  |  |
| 23 | 4 | 98312 | ABBA | 1998 | ALIVE | NF | 0 |  | 1.1 |  |  | 7 |  |  |
| 23 | 4 | 98353 | SOAM | 1998 | ALIVE | NF | 0.6 |  | 1.7 |  |  | 7 |  |  |
| 23 | 4 | 98382 | ACSP | 1998 | ALIVE | NF | 0.6 |  | 1.4 |  |  | 7 |  |  |
| 23 | 4 | 98384 | ABBA | 1998 | ALIVE | NF | 0 |  | 1.3 |  |  | 7 |  |  |
| 24 | 1 | 98041 | ABBA | 1998 | ALIVE | NF | 0.4 |  | 1.4 |  |  | 7 |  |  |
| 24 | 1 | 98047 | BECO | 1998 | ALIVE | NF | 0 |  | 1 |  |  | 7 |  |  |
| 24 | 1 | 98209 | BECO | 1998 | ALIVE | NF | 0.4 |  | 1.4 |  |  | 7 |  |  |
| 24 | 1 | 98210 | BECO | 1998 | ALIVE | NF | 0.5 |  | 1.6 |  |  | 7 |  |  |
| 24 | 1 | 98220 | ABBA | 1998 | ALIVE | NF | 0 |  | 1.3 |  |  | 7 | 1 | o |
| 24 | 1 | 98261 | ABBA | 1998 | ALIVE | NF | 2.5 |  | 2.9 |  |  | 7 |  |  |
| 24 | 1 | 98292 | BECO | 1998 | ALIVE | NF | 0.4 |  | 1.5 |  |  | 7 |  |  |
| 24 | 1 | 98410 | ABBA | 1998 | ALIVE | NF | 0.9 |  | 2 |  |  | 7 |  |  |
| 24 | 1 | 98417 | BECO | 1998 | ALIVE | NF | 0 |  | 1 |  |  | 7 |  |  |
| 24 | 1 | 98723 | BECO | 1998 | ALIVE | NF | 0 |  | 1.1 |  |  | 7 |  |  |
| 24 | 1 | 98786 | ABBA | 1998 | ALIVE | NF | 0 |  | 1.2 |  |  | 7 |  |  |
| 24 | 1 | 98790 | BECO | 1998 | ALIVE | NF | 0 |  | 1 |  |  | 7 |  |  |
| 25 | 4 | 98806 | ABBA | 1998 | ALIVE | NF |  |  | 4 |  |  | 7 |  |  |
| 12 | 1 | 174 | PIRU | 1988 | ALIVE | ALIVE | 1.2 | 1.66 | 1.8 |  |  | 8 |  |  |
| 13 | 2 | 933 | BECO | 1986 | ALIVE | ALIVE | 9.8 | 12.60 | 6.4 | 6.97 |  | 8 |  | c |
| 20 | 3 | 662 | ABBA | 1987 | ALIVE | ALIVE | 3.6 | 4.63 | 3.2 | 1.2 |  | 8 | 1 | o |
| 27 | 4 | 331 | ABBA | 1987 | ALIVE | ALIVE | 13.7 | 20.50 | 8.2 |  |  | 8 |  |  |
| 4 | 2 | 216 | SOAM | 1988 | ALIVE | DEAD | 1.1 |  | 2.5 |  |  | 8 |  |  |
| 4 | 2 | 221 | SOAM | 1988 | ALIVE | DEAD | 1.9 |  | 2.5 |  |  | 8 |  |  |
| 4 | 2 | 98870 | ACSP | 1998 | ALIVE | DEAD | 0.5 |  | 2.3 |  |  | 8 |  |  |
| 4 | 2 | 98889 | ACSP | 1998 | ALIVE | DEAD | 2.9 |  | 4.7 |  |  | 8 |  |  |
| 5 | 1 | 744 | BECO | 1986 | DEAD | DEAD |  |  |  |  |  | 8 |  |  |
| 5 | 1 | 767 | BECO | 1986 | DEAD | DEAD |  |  |  |  |  | 8 |  |  |
| 5 | 1 | 801 | ACPE | 1988 | DEAD | DEAD |  |  |  |  |  | 8 |  |  |
| 5 | 1 | 803 | PRPE | 1988 | DEAD | DEAD |  |  |  |  |  | 8 |  |  |
| 5 | 1 | 804 | ACPE | 1988 | DEAD | DEAD |  |  |  |  |  | 8 |  |  |
| 5 | 1 | 805 | ACPE | 1988 | DEAD | DEAD |  |  |  |  |  | 8 |  |  |
| 5 | 1 | 807 | ACPE | 1988 | DEAD | DEAD |  |  |  |  |  | 8 |  |  |
| 5 | 1 | 814 | ABBA | 1988 | DEAD | DEAD |  |  |  |  |  | 8 |  |  |
| 5 | 1 | 820 | ABBA | 1988 | DEAD | DEAD |  |  |  |  |  | 8 |  |  |
| 5 | 1 | 833 | ABBA | 1988 | DEAD | DEAD |  |  |  |  |  | 8 |  |  |
| 5 | 3 | 98909 | ACSP | 1998 | ALIVE | DEAD | 2.9 |  | 3.7 |  |  | 8 | 4 |  |
| 6 | 2 | 619 | PRPE | 1988 | DEAD | DEAD |  |  |  |  |  | 8 |  |  |
| 7 | 1 | 359 | ABBA | 1986 | DEAD | DEAD |  |  |  |  |  | 8 |  |  |
| 7 | 1 | 820 | ABBA | 1986 | DEAD | DEAD |  |  |  |  |  | 8 |  |  |
| 8 | 3 | 911 | ABBA | 1988 | DEAD | DEAD | 0.3 |  |  |  |  | 8 |  |  |
| 8 | 3 | 1910 | ABBA | 1988 | DEAD | DEAD | 0 |  |  |  |  | 8 |  |  |
| 9 | 4 | 315 | ABBA | 1986 | DEAD | DEAD | 9.6 |  |  |  |  | 8 |  |  |
| 10 | 1 | 790 | PIRU | 1988 | DEAD | DEAD |  |  |  |  |  | 8 |  |  |
| 10 | 3 | 71 | BECO | 1986 | DEAD | DEAD | 7 |  |  |  |  | 8 |  |  |
| 10 | 3 | 853 | ABBA | 1988 | DEAD | DEAD | 1.6 |  |  |  |  | 8 |  |  |
| 10 | 3 | 855 | ABBA | 1988 | DEAD | DEAD | 0 |  |  |  |  | 8 |  |  |
| 10 | 3 | 864 | ABBA | 1988 | DEAD | DEAD | 1.1 |  |  |  |  | 8 |  |  |
| 11 | 1 | 331 | ABBA | 1988 | DEAD | DEAD |  |  |  |  |  | 8 |  |  |
| 11 | 1 | 98571 | ABBA | 1998 | ALIVE | DEAD | 0 |  | 1.3 |  |  | 8 |  |  |
| 11 | 4 | 183 | BECO | 1986 | DEAD | DEAD | 7.6 |  |  |  |  | 8 |  |  |
| 14 | 2 | 190 | ABBA | 1988 | DEAD | DEAD |  |  |  |  |  | 8 |  |  |
| 14 | 2 | 957 | ABBA | 1988 | DEAD | DEAD |  |  |  |  |  | 8 |  |  |
| 14 | 2 | 958 | ABBA | 1988 | ALIVE | DEAD | 3 |  | 3 |  |  | 8 |  |  |
| 14 | 2 | 1267 | BECO | 1988 | DEAD | DEAD |  |  |  |  |  | 8 |  |  |
| 14 | 2 | 1296 | BECO | 1988 | DEAD | DEAD |  |  |  |  |  | 8 |  |  |
| 14 | 2 | 1959 | ABBA | 1988 | DEAD | DEAD |  |  |  |  |  | 8 |  |  |
| 18 | 1 | 187 | PIRU | 1987 | DEAD | DEAD |  |  |  |  |  | 8 |  |  |
| 18 | 1 | 270 | PIRU | 1987 | DEAD | DEAD |  |  |  |  |  | 8 |  |  |
| 18 | 1 | 380 | ABBA | 1987 | DEAD | DEAD | 7.6 |  |  |  |  | 8 |  |  |
| 18 | 3 | 266 | PIRU | 1987 | DEAD | DEAD |  |  |  |  |  | 8 |  |  |
| 21 | 1 | 111 | ABBA | 1987 | DEAD | DEAD |  |  | 7.7 |  |  | 8 |  |  |
| 22 | 3 | 23 | PIRU | 1987 | DEAD | DEAD |  |  |  |  |  | 8 |  |  |
| 22 | 4 | 25 | PIRU | 1987 | DEAD | DEAD |  |  |  |  |  | 8 |  |  |
| 24 | 2 | 378 | PIRU | 1987 | DEAD | DEAD |  |  |  |  |  | 8 |  |  |
| 26 | 1 | 939 | BECO | 1987 | DEAD | DEAD |  |  |  |  |  | 8 |  |  |
| 5 | 1 | 798 | PIRU | 1986 | DEAD | NF |  |  |  |  |  | 8 |  |  |
| 5 | 1 | 802 | SOAM | 1988 | ALIVE | NF | 0 |  | 1.1 |  |  | 8 |  |  |
| 5 | 1 | 818 | ABBA | 1988 | ALIVE | NF | 3 |  | 2.4 |  |  | 8 |  |  |
| 5 | 1 | 98901 | ACSP | 1998 | ALIVE | NF | 0 |  | 1.2 |  |  | 8 |  |  |
| 5 | 1 | 98907 | ABBA | 1998 | ALIVE | NF | 0 |  | 1.2 |  |  | 8 |  |  |
| 5 | 1 | 98967 | ABBA | 1998 | ALIVE | NF | 0 |  | 1.1 |  |  | 8 |  |  |
| 5 | 1 | 98970 | ABBA | 1998 | ALIVE | NF | 1 |  | 1.9 |  |  | 8 |  |  |
| 5 | 1 | 98976 | ABBA | 1998 | ALIVE | NF | 0.5 |  | 1.4 |  |  | 8 |  |  |
| 5 | 1 | 98996 | ABBA | 1998 | ALIVE | NF | 0.5 |  | 1.6 |  |  | 8 |  |  |
| 5 | 3 | 98919 | ABBA | 1998 | ALIVE | NF | 0.5 |  | 1.3 |  |  | 8 |  |  |
| 5 | 3 | 98920 | ABBA | 1998 | ALIVE | NF | 0.5 |  | 1.5 |  |  | 8 |  |  |
| 5 | 4 | 98392 | ACSP | 1998 | ALIVE | NF | 3.7 |  | 2.2 |  |  | 8 |  |  |
| 6 | 1 | 507 | ACPE | 1988 | ALIVE | NF | 2.2 |  | 1.7 |  |  | 8 |  |  |
| 6 | 1 | 638 | ACPE | 1988 | ALIVE | NF | 2.8 |  | 1.8 |  |  | 8 |  |  |
| 6 | 1 | 641 | ACPE | 1988 | ALIVE | NF | 1 |  | 2.5 |  |  | 8 |  |  |
| 6 | 1 | 834 | BEAL | 1988 | ALIVE | NF | 2 |  | 0.5 |  |  | 8 |  |  |
| 6 | 1 | 98359 | BEAL | 1998 | ALIVE | NF | 2.2 |  | 1.6 |  |  | 8 |  |  |
| 6 | 1 | 98628 | ABBA | 1998 | ALIVE | NF | 0.5 |  | 1.2 |  |  | 8 |  |  |
| 6 | 1 | 98634 | ACSP | 1998 | ALIVE | NF |  |  | 2.3 |  |  | 8 |  |  |
| 6 | 1 | 98654 | ACSP | 1998 | ALIVE | NF | 1 |  | 1.4 |  |  | 8 |  |  |
| 6 | 1 | 98655 | ACSP | 1998 | ALIVE | NF | 0 |  | 1.1 |  |  | 8 |  |  |
| 6 | 1 | 98661 | ACSP | 1998 | ALIVE | NF | 0 |  | 1.2 |  |  | 8 |  |  |
| 6 | 2 | 602 | ACPE | 1988 | ALIVE | NF | 0.5 |  | 1.5 |  |  | 8 |  |  |
| 6 | 2 | 607 | ACPE | 1988 | ALIVE | NF | 0 |  | 0.7 |  |  | 8 |  |  |
| 6 | 2 | 630 | BEAL | 1988 | ALIVE | NF | 2.7 |  | 5 |  |  | 8 |  |  |
| 6 | 2 | 698 | ACPE | 1988 | ALIVE | NF | 4.9 |  | 6 |  |  | 8 |  |  |
| 6 | 2 | 98352 | ABBA | 1998 | ALIVE | NF | 0 |  | 1 |  |  | 8 |  |  |
| 6 | 2 | 98385 | ACPE | 1998 | ALIVE | NF | 0 |  | 1.3 |  |  | 8 |  |  |
| 6 | 2 | 98676 | ACPE | 1998 | ALIVE | NF | 0.5 |  | 1.5 |  |  | 8 |  |  |
| 6 | 2 | 98684 | BEAL | 1998 | ALIVE | NF | 3 |  | 5.1 |  |  | 8 |  |  |
| 6 | 3 | 838 | BEAL | 1988 | ALIVE | NF | 3.1 |  | 6.4 |  |  | 8 |  |  |
| 6 | 3 | 903 | ACPE | 1988 | ALIVE | NF | 0 |  | 1 |  |  | 8 |  |  |
| 6 | 3 | 98382 | BEAL | 1998 | ALIVE | NF | 0 |  | 1.1 |  |  | 8 |  |  |
| 6 | 3 | 98383 | ACSA | 1998 | ALIVE | NF | 0 |  | 1.2 |  |  | 8 |  |  |
| 6 | 4 | 647 | ACSA | 1988 | ALIVE | NF | 0.5 |  | 1.5 |  |  | 8 |  |  |
| 6 | 4 | 650 | ACSA | 1988 | ALIVE | NF | 0 |  | 1.2 |  |  | 8 |  |  |
| 6 | 4 | 717 | ACPE | 1988 | ALIVE | NF | 0 |  | 1.2 |  |  | 8 |  |  |
| 6 | 4 | 727 | ACPE | 1988 | ALIVE | NF | 2.3 |  | 3.7 |  |  | 8 |  |  |
| 6 | 4 | 98014 | ABBA | 1998 | ALIVE | NF | 0.5 |  | 1.8 |  |  | 8 |  |  |
| 6 | 4 | 98330 | ACSP | 1998 | ALIVE | NF | 2.2 |  | 2.4 |  |  | 8 |  |  |
| 6 | 4 | 98363 | ACSP | 1998 | ALIVE | NF | 3.9 |  | 4.7 |  |  | 8 |  |  |
| 6 | 4 | 98626 | ACPE | 1998 | ALIVE | NF | 3.7 |  | 4.9 |  |  | 8 |  |  |
| 6 | 4 | 98647 | ACSP | 1998 | ALIVE | NF | 3.1 |  | 4.8 |  |  | 8 |  |  |
| 7 | 1 | 321 | PIRU | 1986 | DEAD | NF |  |  |  |  |  | 8 |  |  |
| 7 | 1 | 527 | ABBA | 1988 | ALIVE | NF | 0.9 |  | 1.7 |  |  | 8 |  |  |
| 7 | 1 | 535 | ABBA | 1988 | ALIVE | NF | 0 |  | 0.5 |  |  | 8 |  |  |
| 7 | 1 | 561 | ABBA | 1988 | ALIVE | NF | 0 |  | 1 |  |  | 8 |  |  |
| 7 | 1 | 98611 | ABBA | 1998 | ALIVE | NF | 0 |  | 1 |  |  | 8 |  |  |
| 7 | 1 | 981000 | ABBA | 1998 | ALIVE | NF | 0 |  | 1.1 |  |  | 8 |  |  |
| 7 | 3 | 98669 | ABBA | 1998 | ALIVE | NF |  |  | 1.4 |  |  | 8 |  |  |
| 7 | 3 | 98698 | ABBA | 1998 | ALIVE | NF | 0.9 |  | 1.5 |  |  | 8 |  |  |
| 7 | 4 | 98497 | ABBA | 1998 | ALIVE | NF | 0 |  | 1.1 |  |  | 8 |  |  |
| 7 | 4 | 98614 | ABBA | 1998 | ALIVE | NF | 4 |  | 3.5 |  |  | 8 |  |  |
| 7 | 4 | 98866 | ABBA | 1998 | ALIVE | NF | 0 |  | 1 |  |  | 8 |  |  |
| 7 | 4 | 98900 | ABBA | 1998 | ALIVE | NF | 0 |  | 1.1 |  |  | 8 |  |  |
| 8 | 3 | 5731 | ABBA | 1988 | ALIVE | NF | 1.1 |  | 1.7 |  |  | 8 |  |  |
| 8 | 4 | 98972 | ABBA | 1998 | ALIVE | NF | 4.9 |  | 3.8 |  |  | 8 |  |  |
| 9 | 2 | 110 | ABBA | 1986 | ALIVE | NF | 19.3 |  | 8.1 |  |  | 8 |  |  |
| 9 | 2 | 153 | ABBA | 1988 | ALIVE | NF | 3.2 |  | 3.6 |  |  | 8 |  |  |
| 9 | 2 | 164 | ABBA | 1988 | ALIVE | NF | 4.8 |  | 4.1 |  |  | 8 |  |  |
| 9 | 2 | 199 | ABBA | 1988 | ALIVE | NF | 6 |  | 4.1 |  |  | 8 |  |  |
| 9 | 2 | 469 | PIRU | 1988 | ALIVE | NF | 0 |  | 1.1 |  |  | 8 |  |  |
| 9 | 2 | 477 | ABBA | 1988 | ALIVE | NF | 2.6 |  | 3.1 |  |  | 8 |  |  |
| 9 | 2 | 908 | PIRU | 1988 | ALIVE | NF | 0.5 |  | 1.5 |  |  | 8 |  |  |
| 9 | 2 | 912 | ABBA | 1988 | ALIVE | NF | 1.7 |  | 2.2 |  |  | 8 |  |  |
| 9 | 2 | 913 | ABBA | 1988 | ALIVE | NF | 2.5 |  | 0.9 |  |  | 8 |  |  |
| 9 | 2 | 915 | ABBA | 1988 | ALIVE | NF | 1.3 |  | 1.5 |  |  | 8 |  |  |
| 9 | 2 | 931 | ABBA | 1988 | ALIVE | NF | 1.2 |  | 1.8 |  |  | 8 |  |  |
| 9 | 2 | 1165 | ABBA | 1988 | ALIVE | NF | 8.1 |  | 5.2 |  |  | 8 |  |  |
| 9 | 2 | 98499 | ABBA | 1998 | ALIVE | NF | 0.6 |  | 1.7 |  |  | 8 |  |  |
| 9 | 4 | 885 | ABBA | 1986 | ALIVE | NF | 5.7 |  | 4 |  |  | 8 |  |  |
| 10 | 3 | 419 | ABBA | 1988 | ALIVE | NF | 4.6 |  | 1.1 |  |  | 8 |  |  |
| 10 | 3 | 860 | ABBA | 1988 | ALIVE | NF | 4.3 |  | 3.9 |  |  | 8 |  |  |
| 10 | 3 | 861 | ABBA | 1988 | ALIVE | NF | 4.3 |  | 3.7 |  |  | 8 |  |  |
| 11 | 1 | 130 | ABBA | 1988 | ALIVE | NF | 1.3 |  | 1.7 |  |  | 8 |  |  |
| 11 | 1 | 140 | ABBA | 1988 | ALIVE | NF | 3.6 |  | 3.4 |  |  | 8 |  |  |
| 11 | 1 | 321 | ABBA | 1988 | ALIVE | NF | 0 |  | 1.1 |  |  | 8 |  |  |
| 11 | 1 | 336 | ABBA | 1988 | ALIVE | NF | 3.3 |  | 2.9 |  |  | 8 |  |  |
| 11 | 1 | 341 | ABBA | 1988 | ALIVE | NF | 2.4 |  | 2.2 |  |  | 8 |  |  |
| 11 | 1 | 348 | ABBA | 1988 | ALIVE | NF | 1.8 |  | 2.5 |  |  | 8 |  |  |
| 11 | 1 | 355 | PIRU | 1988 | ALIVE | NF |  |  | 1.6 |  |  | 8 |  |  |
| 11 | 1 | 368 | ABBA | 1988 | ALIVE | NF | 0.8 |  | 1.4 |  |  | 8 |  |  |
| 11 | 1 | 432 | ABBA | 1988 | ALIVE | NF |  |  | 1.4 |  |  | 8 |  |  |
| 11 | 1 | 435 | ABBA | 1988 | ALIVE | NF | 0 |  | 1.2 |  |  | 8 |  |  |
| 11 | 1 | 650 | ABBA | 1988 | ALIVE | NF | 0.3 |  | 0.4 |  |  | 8 |  |  |
| 11 | 1 | 651 | ABBA | 1988 | ALIVE | NF | 0 |  | 1.2 |  |  | 8 |  |  |
| 11 | 1 | 654 | ABBA | 1988 | ALIVE | NF | 0.6 |  | 1.4 |  |  | 8 |  |  |
| 11 | 1 | 661 | ABBA | 1988 | ALIVE | NF | 0.5 |  | 1.2 |  |  | 8 |  |  |
| 11 | 1 | 740 | ABBA | 1988 | ALIVE | NF | 4.9 |  | 3.8 |  |  | 8 |  |  |
| 11 | 1 | 743 | ABBA | 1988 | ALIVE | NF | 1.7 |  | 1.8 |  |  | 8 |  |  |
| 11 | 1 | 1414 | ABBA | 1988 | ALIVE | NF | 0 |  | 1 |  |  | 8 |  |  |
| 11 | 1 | 98318 | ABBA | 1998 | ALIVE | NF | 0 |  | 1 |  |  | 8 |  |  |
| 11 | 1 | 98332 | ABBA | 1998 | ALIVE | NF | 1.4 |  | 2 |  |  | 8 |  |  |
| 11 | 1 | 98472 | ABBA | 1998 | ALIVE | NF | 0.5 |  | 1.3 |  |  | 8 |  |  |
| 11 | 1 | 98515 | PIRU | 1998 | ALIVE | NF | 0 |  | 1.2 |  |  | 8 |  |  |
| 11 | 1 | 98534 | ABBA | 1998 | ALIVE | NF | 0 |  | 1 |  |  | 8 |  |  |
| 11 | 1 | 98537 | ABBA | 1998 | ALIVE | NF | 0.6 |  | 1.4 |  |  | 8 |  |  |
| 11 | 1 | 98538 | ABBA | 1998 | ALIVE | NF | 0 |  | 1.2 |  |  | 8 |  |  |
| 11 | 1 | 98549 | ABBA | 1998 | ALIVE | NF | 0 |  | 1.2 |  |  | 8 |  |  |
| 11 | 1 | 98555 | ABBA | 1998 | ALIVE | NF | 0 |  | 1.1 |  |  | 8 |  |  |
| 11 | 1 | 98881 | ABBA | 1998 | ALIVE | NF | 0 |  | 1.2 |  |  | 8 |  |  |
| 11 | 2 | 772 | PIRU | 1988 | ALIVE | NF | 0.2 |  | 1.5 |  |  | 8 |  |  |
| 11 | 3 | 956 | PIRU | 1988 | ALIVE | NF | 0.6 |  | 1.6 |  |  | 8 |  |  |
| 11 | 3 | 960 | PIRU | 1988 | ALIVE | NF | 3.5 |  | 3.3 |  |  | 8 |  |  |
| 12 | 1 | 971 | ABBA | 1986 | ALIVE | NF | 7.3 |  | 6.5 |  |  | 8 |  |  |
| 12 | 2 | 745 | ABBA | 1986 | ALIVE | NF | 18.4 |  | 16 |  |  | 8 |  |  |
| 12 | 2 | 98509 | PIRU | 1998 | ALIVE | NF | 0 |  | 1.3 |  |  | 8 |  |  |
| 12 | 2 | 98510 | PIRU | 1998 | ALIVE | NF | 0 |  | 1.2 |  |  | 8 |  |  |
| 12 | 3 | 186 | ABBA | 1988 | ALIVE | NF | 9 |  | 1.5 |  |  | 8 |  |  |
| 12 | 3 | 249 | ABBA | 1988 | ALIVE | NF | 0 |  | 0.9 |  |  | 8 |  |  |
| 12 | 4 | 377 | BECO | 1986 | ALIVE | NF | 5.2 |  | 5 |  |  | 8 |  |  |
| 13 | 1 | 199 | ABBA | 1986 | ALIVE | NF | 10.6 |  | 6.9 |  |  | 8 |  |  |
| 13 | 2 | 322 | PIRU | 1986 | ALIVE | NF | 7.5 |  | 5.3 |  |  | 8 |  |  |
| 13 | 2 | 331 | BECO | 1986 | ALIVE | NF | 6.7 |  | 4.2 |  |  | 8 |  |  |
| 13 | 2 | 430 | ABBA | 1988 | ALIVE | NF | 0 |  | 1.1 |  |  | 8 |  |  |
| 13 | 2 | 431 | ABBA | 1988 | ALIVE | NF | 0 |  | 1.2 |  |  | 8 |  |  |
| 13 | 2 | 446 | PIRU | 1988 | ALIVE | NF | 0 |  | 1.1 |  |  | 8 |  |  |
| 13 | 2 | 450 | ABBA | 1988 | ALIVE | NF | 4.4 |  | 4.1 |  |  | 8 |  |  |
| 13 | 2 | 462 | ABBA | 1988 | ALIVE | NF | 1 |  | 1.4 |  |  | 8 |  |  |
| 13 | 2 | 470 | ABBA | 1988 | ALIVE | NF | 1.1 |  | 1.5 |  |  | 8 |  |  |
| 13 | 3 | 983 | ABBA | 1986 | ALIVE | NF | 6.6 |  | 3.7 |  |  | 8 |  |  |
| 13 | 3 | 98055 | PIRU | 1998 | ALIVE | NF | 0 |  | 1.2 |  |  | 8 |  |  |
| 13 | 4 | 25 | BECO | 1988 | ALIVE | NF | 2.5 |  | 3.9 |  |  | 8 |  |  |
| 14 | 2 | 541 | ABBA | 1986 | ALIVE | NF | 14 |  | 9.9 |  |  | 8 |  |  |
| 14 | 2 | 566 | BECO | 1986 | DEAD | NF |  |  |  |  |  | 8 |  |  |
| 14 | 2 | 582 | ABBA | 1986 | ALIVE | NF | 6.8 |  | 6.7 |  |  | 8 |  |  |
| 14 | 2 | 1281 | ABBA | 1988 | ALIVE | NF | 1.9 |  | 1.9 |  |  | 8 |  |  |
| 14 | 2 | 1283 | ABBA | 1988 | ALIVE | NF | 4.1 |  | 3.7 |  |  | 8 |  |  |
| 14 | 2 | 98113 | ABBA | 1998 | ALIVE | NF | 0 |  | 1.1 |  |  | 8 |  |  |
| 14 | 2 | 98117 | ABBA | 1998 | ALIVE | NF | 0 |  | 1.2 |  |  | 8 |  |  |
| 14 | 3 | 557 | ABBA | 1986 | ALIVE | NF | 9.9 |  | 6.9 |  |  | 8 |  |  |
| 15 | 2 | 694 | ABBA | 1988 | ALIVE | NF | 1.6 |  | 1.7 |  |  | 8 |  |  |
| 16 | 1 | 833 | PIRU | 1987 | ALIVE | NF | 11.2 |  |  |  |  | 8 |  |  |
| 16 | 2 | 98621 | ABBA | 1998 | ALIVE | NF | 2.3 |  | 2.6 |  |  | 8 |  |  |
| 16 | 4 | 604 | ABBA | 1987 | ALIVE | NF | 6 |  | 6.8 |  |  | 8 |  |  |
| 17 | 4 | 98605 | ABBA | 1998 | ALIVE | NF | 0 |  | 1.3 |  |  | 8 |  |  |
| 18 | 2 | 336 | ABBA | 1987 | ALIVE | NF | 9.6 |  | 9.3 |  |  | 8 |  |  |
| 18 | 2 | 471 | ABBA | 1987 | ALIVE | NF | 4 |  | 3.5 |  |  | 8 |  |  |
| 18 | 4 | 208 | ABBA | 1987 | ALIVE | NF | 14.6 |  | 12.4 |  |  | 8 |  |  |
| 18 | 4 | 280 | BECO | 1987 | ALIVE | NF | 20.5 |  | 8.9 |  |  | 8 |  |  |
| 19 | 2 | 98182 | ABBA | 1998 | ALIVE | NF | 1.4 |  | 1.8 |  |  | 8 |  |  |
| 20 | 1 | 625 | ABBA | 1987 | ALIVE | NF | 4.3 |  | 3.4 |  |  | 8 |  |  |
| 20 | 1 | 98521 | PIRU | 1998 | ALIVE | NF | 0 |  | 1.1 |  |  | 8 |  |  |
| 20 | 2 | 565 | PIRU | 1987 | ALIVE | NF | 0.9 |  | 1.6 |  |  | 8 |  |  |
| 20 | 2 | 750 | ABBA | 1987 | ALIVE | NF | 1.9 |  | 1.7 |  |  | 8 |  |  |
| 20 | 3 | 552 | BECO | 1987 | ALIVE | NF | 5.2 |  | 6.4 |  |  | 8 |  |  |
| 20 | 4 | 456 | ABBA | 1987 | ALIVE | NF | 4.5 |  | 4 |  |  | 8 |  |  |
| 20 | 4 | 589 | ABBA | 1987 | ALIVE | NF | 0 |  | 0.6 |  |  | 8 |  |  |
| 20 | 4 | 590 | ABBA | 1987 | ALIVE | NF | 2.9 |  | 2.8 |  |  | 8 |  |  |
| 20 | 4 | 668 | BECO | 1987 | ALIVE | NF | 4.5 |  | 3.4 |  |  | 8 |  |  |
| 20 | 4 | 98178 | SOAM | 1998 | ALIVE | NF | 0 |  | 1.3 |  |  | 8 |  |  |
| 21 | 1 | 406 | ABBA | 1987 | ALIVE | NF | 0.7 |  | 1.3 |  |  | 8 |  |  |
| 21 | 1 | 411 | ABBA | 1987 | ALIVE | NF | 3.8 |  | 3 |  |  | 8 |  |  |
| 21 | 1 | 413 | ABBA | 1987 | ALIVE | NF | 0.5 |  | 1.2 |  |  | 8 |  |  |
| 21 | 1 | 98658 | SOAM | 1998 | ALIVE | NF | 0 |  | 1.1 |  |  | 8 |  |  |
| 21 | 2 | 136 | ABBA | 1987 | ALIVE | NF | 6.6 |  | 6.1 |  |  | 8 |  |  |
| 21 | 2 | 98517 | SOAM | 1998 | ALIVE | NF | 1 |  | 1.9 |  |  | 8 |  |  |
| 21 | 2 | 98523 | SOAM | 1998 | ALIVE | NF | 1 |  | 1.8 |  |  | 8 |  |  |
| 21 | 4 | 470 | ABBA | 1987 | ALIVE | NF | 3.4 |  | 3.2 |  |  | 8 |  |  |
| 21 | 4 | 98646 | ABBA | 1998 | ALIVE | NF | 0 |  | 1.2 |  |  | 8 |  |  |
| 21 | 4 | 98654 | SOAM | 1998 | ALIVE | NF | 0 |  | 1 |  |  | 8 |  |  |
| 21 | 4 | 98655 | ABBA | 1998 | ALIVE | NF | 0.3 |  | 1.5 |  |  | 8 |  |  |
| 23 | 1 | 869 | SOAM | 1987 | ALIVE | NF | 6.3 |  | 5 |  |  | 8 |  |  |
| 23 | 1 | 98325 | ACSP | 1998 | ALIVE | NF | 0.3 |  | 1.4 |  |  | 8 |  |  |
| 23 | 1 | 98337 | SOAM | 1998 | ALIVE | NF | 0.6 |  | 1.3 |  |  | 8 |  |  |
| 23 | 1 | 98339 | SOAM | 1998 | ALIVE | NF | 0 |  | 1 |  |  | 8 |  |  |
| 23 | 1 | 98964 | BECO | 1998 | ALIVE | NF | 0 |  | 1.1 |  |  | 8 |  |  |
| 23 | 1 | 98984 | SOAM | 1998 | ALIVE | NF | 3.4 |  | 3.6 |  |  | 8 |  |  |
| 23 | 1 | 98998 | SOAM | 1998 | ALIVE | NF | 1.1 |  | 1.4 |  |  | 8 |  |  |
| 23 | 2 | 98301 | PIRU | 1998 | ALIVE | NF | 5.6 |  |  |  |  | 8 |  |  |
| 23 | 3 | 98188 | ABBA | 1998 | ALIVE | NF | 5.5 |  | 5.2 |  |  | 8 |  |  |
| 23 | 3 | 98193 | PIRU | 1998 | ALIVE | NF | 1.2 |  | 2 |  |  | 8 |  |  |
| 23 | 3 | 98194 | PIRU | 1998 | ALIVE | NF | 0 |  | 1.3 |  |  | 8 |  |  |
| 23 | 3 | 98336 | ABBA | 1998 | ALIVE | NF | 5.7 |  | 5.2 |  |  | 8 |  |  |
| 23 | 4 | 98104 | ABBA | 1998 | ALIVE | NF | 1.6 |  | 1.3 |  |  | 8 |  |  |
| 23 | 4 | 98105 | ABBA | 1998 | ALIVE | NF | 0 |  | 1.2 |  |  | 8 |  |  |
| 23 | 4 | 98106 | ABBA | 1998 | ALIVE | NF | 0 |  | 1.3 |  |  | 8 |  |  |
| 23 | 4 | 98113 | ABBA | 1998 | ALIVE | NF | 0.5 |  | 1.4 |  |  | 8 |  |  |
| 23 | 4 | 98147 | ABBA | 1998 | ALIVE | NF | 0 |  | 1.2 |  |  | 8 |  |  |
| 23 | 4 | 98149 | ABBA | 1998 | ALIVE | NF | 0 |  | 1.3 |  |  | 8 |  |  |
| 23 | 4 | 98152 | ABBA | 1998 | ALIVE | NF | 0 |  | 1.3 |  |  | 8 |  |  |
| 23 | 4 | 98154 | ABBA | 1998 | ALIVE | NF | 0 |  | 1.1 |  |  | 8 |  |  |
| 23 | 4 | 98163 | ABBA | 1998 | ALIVE | NF | 0 |  | 1.3 |  |  | 8 |  |  |
| 23 | 4 | 98169 | ABBA | 1998 | ALIVE | NF | 0 |  | 1 |  |  | 8 |  |  |
| 23 | 4 | 98307 | ABBA | 1998 | ALIVE | NF | 0 |  | 1.1 |  |  | 8 |  |  |
| 23 | 4 | 98313 | ABBA | 1998 | ALIVE | NF | 0 |  | 1.2 |  |  | 8 |  |  |
| 23 | 4 | 98315 | ACSP | 1998 | ALIVE | NF | 0 |  | 1.3 |  |  | 8 |  |  |
| 23 | 4 | 98323 | ABBA | 1998 | ALIVE | NF | 0 |  | 1 |  |  | 8 |  |  |
| 23 | 4 | 98342 | ABBA | 1998 | ALIVE | NF | 0.3 |  | 1.4 |  |  | 8 |  |  |
| 23 | 4 | 98343 | ABBA | 1998 | ALIVE | NF | 0 |  | 1.3 |  |  | 8 |  |  |
| 23 | 4 | 98351 | ABBA | 1998 | ALIVE | NF | 0.4 |  | 1.5 |  |  | 8 |  |  |
| 23 | 4 | 98369 | ABBA | 1998 | ALIVE | NF | 0 |  | 1 |  |  | 8 |  |  |
| 23 | 4 | 98372 | ABBA | 1998 | ALIVE | NF | 0.5 |  | 1.7 |  |  | 8 |  |  |
| 23 | 4 | 98383 | ABBA | 1998 | ALIVE | NF | 0 |  | 1.1 |  |  | 8 |  |  |
| 23 | 4 | 98393 | ABBA | 1998 | ALIVE | NF | 0.7 |  | 1.6 |  |  | 8 |  |  |
| 23 | 4 | 98395 | ABBA | 1998 | ALIVE | NF | 0 |  | 1.1 |  |  | 8 |  |  |
| 23 | 4 | 98399 | ABBA | 1998 | ALIVE | NF | 0.5 |  | 1.5 |  |  | 8 |  |  |
| 24 | 1 | 467 | ABBA | 1987 | ALIVE | NF | 0.7 |  | 1.5 |  |  | 8 |  |  |
| 24 | 1 | 706 | ABBA | 1987 | ALIVE | NF | 11.4 |  | 3.6 |  |  | 8 |  |  |
| 24 | 1 | 886 | BECO | 1987 | ALIVE | NF | 1.2 |  | 2.3 |  |  | 8 |  |  |
| 24 | 1 | 98034 | ABBA | 1998 | ALIVE | NF | 2.8 |  | 3 |  |  | 8 |  |  |
| 24 | 1 | 98036 | ABBA | 1998 | ALIVE | NF | 0.8 |  | 1.6 |  |  | 8 |  |  |
| 24 | 1 | 98046 | ABBA | 1998 | ALIVE | NF | 0 |  | 1.3 |  |  | 8 |  |  |
| 24 | 1 | 98050 | ABBA | 1998 | ALIVE | NF | 2.9 |  | 3 |  |  | 8 |  |  |
| 24 | 1 | 98208 | BECO | 1998 | ALIVE | NF | 0.7 |  | 2.1 |  |  | 8 |  |  |
| 24 | 1 | 98222 | UNID | 1998 | ALIVE | NF | 0.7 |  | 1.4 |  |  | 8 |  |  |
| 24 | 1 | 98234 | ABBA | 1998 | ALIVE | NF | 0 |  | 1.1 |  |  | 8 |  |  |
| 24 | 1 | 98235 | ABBA | 1998 | ALIVE | NF | 0 |  | 1.1 |  |  | 8 |  |  |
| 24 | 1 | 98240 | ABBA | 1998 | ALIVE | NF | 0.6 |  | 1.6 |  |  | 8 |  |  |
| 24 | 1 | 98263 | BECO | 1998 | ALIVE | NF | 0.5 |  | 1.8 |  |  | 8 |  |  |
| 24 | 1 | 98265 | BECO | 1998 | ALIVE | NF | 0 |  | 1.3 |  |  | 8 |  |  |
| 24 | 1 | 98278 | BECO | 1998 | ALIVE | NF | 0.6 |  | 1.8 |  |  | 8 |  |  |
| 24 | 1 | 98295 | ABBA | 1998 | ALIVE | NF | 1.9 |  | 2.3 |  |  | 8 |  |  |
| 24 | 1 | 98329 | BECO | 1998 | ALIVE | NF | 1.4 |  | 2.3 |  |  | 8 |  |  |
| 24 | 1 | 98430 | ABBA | 1998 | ALIVE | NF | 0 |  | 1.1 |  |  | 8 |  |  |
| 24 | 1 | 98447 | ABBA | 1998 | ALIVE | NF | 0 |  | 1 |  |  | 8 |  |  |
| 24 | 1 | 98457 | BECO | 1998 | ALIVE | NF | 0 |  | 1 |  |  | 8 |  |  |
| 24 | 1 | 98468 | BECO | 1998 | ALIVE | NF | 0 |  | 1.2 |  |  | 8 |  |  |
| 24 | 1 | 98473 | BECO | 1998 | ALIVE | NF | 0 |  | 1.2 |  |  | 8 |  |  |
| 24 | 1 | 98474 | ABBA | 1998 | ALIVE | NF | 0 |  | 1 |  |  | 8 |  |  |
| 24 | 1 | 98482 | ABBA | 1998 | ALIVE | NF | 0.5 |  | 1.4 |  |  | 8 |  |  |
| 24 | 1 | 98484 | BECO | 1998 | ALIVE | NF | 0 |  | 1.3 |  |  | 8 |  |  |
| 24 | 1 | 98495 | ABBA | 1998 | ALIVE | NF | 0.5 |  | 1.6 |  |  | 8 |  |  |
| 24 | 1 | 98708 | ABBA | 1998 | ALIVE | NF | 0 |  | 1.2 |  |  | 8 |  |  |
| 24 | 1 | 98711 | ABBA | 1998 | ALIVE | NF | 0 |  | 1.2 |  |  | 8 |  |  |
| 24 | 1 | 98794 | BECO | 1998 | ALIVE | NF | 0.3 |  | 1.4 |  |  | 8 |  |  |
| 24 | 1 | 98795 | ABBA | 1998 | ALIVE | NF | 1.3 |  | 1.85 |  |  | 8 |  |  |
| 24 | 1 | 98848 | ABBA | 1998 | ALIVE | NF | 1.3 |  | 2.3 |  |  | 8 |  |  |
| 24 | 1 | 98852 | BECO | 1998 | ALIVE | NF | 0 |  | 1.3 |  |  | 8 |  |  |
| 24 | 1 | 98856 | ABBA | 1998 | ALIVE | NF | 2.2 |  | 2.7 |  |  | 8 |  |  |
| 24 | 1 | 98875 | BECO | 1998 | ALIVE | NF | 0 |  | 1.3 |  |  | 8 |  |  |
| 24 | 1 | 98884 | ABBA | 1998 | ALIVE | NF | 1.4 |  | 2 |  |  | 8 |  |  |
| 24 | 1 | 98885 | BECO | 1998 | ALIVE | NF | 0 |  | 1.2 |  |  | 8 |  |  |
| 24 | 1 | 98888 | ABBA | 1998 | ALIVE | NF | 0 |  | 1.2 |  |  | 8 |  |  |
| 24 | 1 | 98899 | ABBA | 1998 | ALIVE | NF | 1.8 |  | 2.2 |  |  | 8 |  |  |
| 24 | 2 | 733 | PIRU | 1987 | ALIVE | NF | 0 |  | 1.3 |  |  | 8 |  |  |
| 24 | 2 | 878 | ABBA | 1987 | ALIVE | NF | 2.9 |  | 2.4 |  |  | 8 |  |  |
| 24 | 2 | 98416 | ABBA | 1998 | ALIVE | NF | 5.9 |  | 4.9 |  |  | 8 |  |  |
| 24 | 4 | 323 | PIRU | 1987 | ALIVE | NF | 14.7 |  |  |  |  | 8 |  |  |
| 25 | 3 | 216 | PIRU | 1987 | ALIVE | NF | 0 |  | 0.6 |  |  | 8 |  |  |
| 26 | 1 | 98937 | ABBA | 1998 | ALIVE | NF | 5.3 |  | 3.9 |  |  | 8 |  |  |
| 26 | 4 | 189 | ABBA | 1987 | ALIVE | NF | 0 |  | 1 |  |  | 8 |  |  |
| 26 | 4 | 98079 | ABBA | 1998 | ALIVE | NF | 0 |  | 1.1 |  |  | 8 |  |  |
| 27 | 1 | 158 | ABBA | 1987 | ALIVE | NF | 0 |  | 0.8 |  |  | 8 |  |  |
| 27 | 1 | 407 | PIRU | 1987 | ALIVE | NF | 2 |  | 2 |  |  | 8 |  |  |
| 27 | 1 | 98966 | ABBA | 1998 | ALIVE | NF | 0.6 |  | 1.6 |  |  | 8 |  |  |
| 27 | 3 | 98918 | ABBA | 1998 | ALIVE | NF | 5.8 |  | 4 |  |  | 8 |  |  |
| 11 | 1 | 1129 | ABBA | 1988 | PD | PD |  |  |  |  |  | 8 |  |  |
| 25 | 1 | 241 | ABBA | 1987 | ALIVE | DEAD | 14.5 |  | 8.6 |  | 3 | 11 |  |  |

**AOL10**

**NOTE10**

* CAC: 2010 come back alive trees that could be newly tagged plants with tags taken from previously tagged dead plants, which need to be field check in the future (We compared DBH or other data from pervious years and 2010, and decided they were not so possible to be the same plant and should be field checked later) Detail see “Problems and Corrections 2010.dox”.
* CA: 2010 come back alive trees that got filed checked and confirmed in 2011.
* CS: plants with species identification changed in 2010.
* NTD: newly tagged dead plants
* RL#: Previously tagged plants were relabeled in 2010. # if the old tag number it had.
* Top broke of:

**ELEV**

**ELEVCL**

**ASP**

**ASPCL**

**SOILCL**

**SLOPE8687**: slope collected in 86/87 in percentage.

**SLOPCL8687**

**LAND**

**MICR**

**CHT8687/CHT98/CHT10:**

**MDBH8687/MDBH98/MDBH10**

## 1.10 Master file with estimated height and bole volume data added (this needs to be updates because subplot corrections. Lixi Feb.2013)

Noah estimated height and bole volume for permanent data in 2012. This part of data were added to pptreemas10.ssd master file. Details about the estimate see [HT and BV estimation Lixi](BV%20estimation/HT%20and%20BV%20estimation%20Lixi.docx)

**SAS program:** R:\MOOSHUBB\longterm\lixi kong\Perm2010\pptreemas10bv.sas

**SAS data set:** [*R:\MOOSHUBB\longterm\lixi kong\Perm2010\pptreemas10bv.ssd*](pptreemas10bv.sas7bdat)

Variables added:

EBV86/EBV87/EBV98/EBV10: estimated bole volume for 86, 87, 98, 10 live plants.

MBV86/MBV87/MBV98/MBV10: maximal bole volume for each plot in each year. Derived variable.

HTPRED86/HTPRED87/HTPRED98/HTPRED10: variable indicates whether height in a certain year was estimated. 1=estimated; NA=measured

CANHT86/CANHT87/CANHT98/CANHT10: canopy height for each plot in each year, which is the mean of co-dominant trees. Some adjustments were made because data availability issue. Details see [HT and BV estimation Lixi](file:///\\afs\northstar\users\d\drp\MOOSHUBB\longterm\lixi%20kong\Perm2010\BV%20estimation\HT%20and%20BV%20estimation%20Lixi.docx)

# 2. Herb/Shrub/Seedling data

## 2.1 Data collected in 1986

* In three randomly selected subplots (non-free subplots) in each of east side permanent plot 4~15, four 2\*2m quadrats were randomly selected as herb/shrub/seedling quadrats.
* Percentage of cover of shrub were estimated in four 2\*2 quadrat in the three subplots for each plot.
* number of seedling were counted in each of the four 2\*2 quadrat, except when there are more than fifteen seedlings within the 1x1 meter herbaceous plot (closest to the center of the plot), only that 1x1 meter plot is looked at for number of seedlings (Seedlings were also counted in met station 2 and 3);
* Number of saplings was counted in the four 2\*2 quadrats in three subplots for each plot.
* Percentage cover of plants (less than 1m) was estimated in four 1\*1m quadrats closest to the center of the plot in the herbaceous stripes. All species (tree, herb, or shrub species) within the 1\*1\*1 cube were sampled. Lixi couldn’t find electronic data, but found relevant data in hardcopies and entered then in Jan.2012 by Lixi/Noah.
* For a list of all species found in 1986, see [APPENDIX 5](#_APPENDIX_5_Permanent).(needs modification)

**Shrub cover, sapling and seeding count data:** [*R:\MOOSHUBB\longterm\Seedling\heshdat.ssd*](../../Seedling/heshdat.sas7bdat) (this data set also has substrate data)

PLOT

SUBPLOT

QUAD: Quadrat location

SPECIES: Species abbreviations. Some of them should be standardized, details see [APPENDIX 5.](#_APPENDIX_5_Herb/Shrub/Seedling)

SHRUB: Percentage of shrub cover divided by 12. This is confirmed by referring to hardcopies. Also, when it’s recorded as <1 in hard copy, it’s recorded as 0 in *heshdat.ssd.* In 2011 master file, we recovered shrub cover as “Integer (SHRUB\*12)”, and also added in those “<1” covers as 0.5 referring to hard copies.

SAPS: sapling counts in 2\*2 plots.

SEED: seedling counts in 1\*1 or 2\*2 plots.

PLOTSIZE: Area where seedlings were counted. Recorded as 1 if seedlings were counted in 1\*1, and if PLOTSIZE has missing data, it indicates seedlings were counted in 2\*2.

PLOT 4 SUBPLOT 3, ARNU, ARSPP are herb species, but have shrub cover data. Collected in 2\*2? Referring to hard copy, it also has shrub cover data for ARNU and ARSPP.

Need to change the SAS code which creates a complete list of all the species.

**Species cover data within the 1\*1\*1 cubes:**

**Raw data entered in 2012:** R:\MOOSHUBB\longterm\lixi kong\Perm2010\hss86.xls

**SAS data set which has all 1986 plant cover and count data created in 2012**: [*R:\MOOSHUBB\longterm\lixi kong\Perm2010\pphss86.ssd*](pphss86.sas7bdat)

PLOT

SUBPLOT

BQUADX

BQAUDY

SPECIES

PCTCOV: percentage of cover

COUNT: seedling counts

AREA: 1 or 4

SAPCNT: sapling counts

## 2.2 Data collected in 1987

* ABBA and PIRU Seedlings were counted in one quadrat in each of the three non-free subplot for permanent plot 16~27 in 1987.
* Herb\Shrub Data History in data history portfolio mentions “A.Smith collected Herb and Shrub data following an altered version of the “At. Moosilauke Permanent Plot Protocol, 1986”. A. Smith has the originals, and excel file not created until 29. Aug. 1989. “

SAS data set: [*R:\MOOSHUBB\longterm\Seedling\seed8687.ssd*](../../Seedling/seed8687.sas7bdat) (this data set also has some segment piru data)

PLOT

SUBPLOT

SPECIES

BQUADX

BQUADY

SEEDS: seedling counts in 1\*1 or 2\*2 area

AREA: areas where seedlings were counted. 1 or 4.

Comparing to herb strip maps from 1998 (details see” [R:\MOOSHUBB\longterm\lixi kong\Perm2010\Moos plot maps herb strips.pdf](Moos%20plot%20maps%20herb%20strips.pdf)”), there are quadrats are different than the maps:

Plot 17, subplot 1 has quadx= 2, and quady=3. quadx should be 1?

Plot 22, subplot 2 has quadx=7 and quady=4. It should be “quadx=4, quady=7”?

Plot 22, subplot 4 has quadx=4 and quady=8. It should be “quadx=7, quady=4”?

Plot27, subplot 3 has quadx=8 and quady=8. Quadx should be 9?

1987 was the first time they sampled these plots for herb/shrub/seedling data, and I can’t find herb/shrub/seedling hardcopies hard copies.

However, herbaceous strips were permanently marked with PVC, so we should have sampled the same quadrats each census year; it’s just a matter of what quadrat numbers we use in our data set. Should correct those quadrats basing on the herb strip maps for now.

PP herb\shrub\seeding master file still needs to be updates. Lixi 02/04/2012

## 2.3 Data collected in 1998

In Three 2\*2m quadrats in three non-free subplots in each of permanent plot 4~27, percentage cover of shrub species were estimated in 2\*2m quadrat; percentage cover of herb were estimated in 1\*1 herbaceous plot; seedling cover and count were estimated in 2\*2 plot, number of seedling were counted in 2\*2 quadrat, except when there are (equal or ?) more than fifteen seedlings within the 1x1 meter herbaceous plot, only that 1x1 meter plot is looked at for number of seedlings, and seedling percentage of cover were estimated in 1\*1 herbaceous plot.

Quadrats where seedlings were counted in 1\*1 but there are less than 15:

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| plot | subplot | bquadx | bquady | sp | cover | count | area |
| 12 | 2 | 3 | 9 | acspp | 0.5 | 1 | 1 |
| 21 | 2 | 2 | 10 | beco | 0 | 1 | 1 |

Data for plot 12, confirming with hard copy, count was only collected in 1\*1. Trust the data in plot 21 also. No correction needed. Lixi Nov.2012

**SAS data set:**

Shrub %cover and seedling count data: *R:\MOOSHUBB\longterm\Permplots\Permplot98\shrubsed.ssd*

Plot 8, subplot4, quadarts should be 7-1~7-4 rather than 6-1~6-4.

Why SHCOVER has data for some seedling species but area is equal to 4? So seedling cover in 2\*2 was also estimated? Some shrub species also have count data?

Seedling is everything less than 1m, so it could include shrub species, but not herb species? What’s the definition of SHRUB, how tall do they go?

**Shrub went as high as the tallest shrub, which is basically identified by species. It could include seedling species taller than 1 m too. But herb species shouldn’t be in shrub layer. PAP 01/23/2013**

Herb %cover and seedling %cover data: *R:\MOOSHUBB\longterm\Permplots\Permplot98\phrbsub.ssd*

This doesn’ have area, assume they were estimated in 1\*1?

Plot 8, subplot4, quadarts should be 7-1~7-4 rather than 6-1~6-4.

## 2.4 Data collected in 2003

Permanent plot 4~27 were revisited in 2003 in spring 5/20/03-7/3/03 and summer 7/10/03-9/8/03 (because some species don’t present in the summer). Referring to where herb/shrub/seedling data were collected in 1998, four qudrats in each non-free subplot for each plot were sampled, except for P15 (instead of subplot 4 we sampled before, subplot2 was sampled) and P24 (only subplot 4 was sampled). seedling counts in 1\*1 quadrats and species cover in the 1\*1 quadrats were collected in both spring and summer; “shrub cover in 2\*2 quadrats were collected in summer only” Field notes from Mellissa “shrub cover was not estimated in spring if the shrubs were not leafing out yet in that plot”. We only have data collected in 1\*1\*1 for now, and Mellissa is looking for data collected in 2\*2. Lixi 4/02/2013

Raw data:

*R:\MOOSHUBB\longterm\RawData 2003\Unsorted PP data.xls (Worksheet “PermPlots”)*

*R:\MOOSHUBB\longterm\RawData 2003\M Coppola data PP 2003.xls (this file only as spring data which is included in “Unsorted PP data”, should just ignore this file, and use “Unsorted PP data”)*

Season: spring or summer

Date: 5/20/2003~9/08/2003

ASPECT “east” or “west”

PLOT

ELEVATION: all at 2750’ elevation.

STRIP LOC: Subplot location. North=1; east=2; south=3; west=4.

SUBPLOT: Quadart number. 1 is the closest quadrat to the plot center.

SPECIES: Some species Melisa collected are not on our species list, four letter abbreviations were given to them.

“From what I can discern from the field notebook I have, it appears that hobblebush (*Viburnum* *lantanoides*) was the only species treated as a shrub. It is listed as Viburnum alnifolium in my spreadsheet (but that’s an older name). I refer to both Acer spicatum and Acer pennsylvanica as understory trees.” Mellissa 3/29/2013

* Carex intumscens: we have CASPP, give the abbreviation of CAIN to it.
* Rubus hispidus: we only have RUSPP. It was abbreviated as RUHI.
* Streptopus roseus: we have Streptopus amplexifolius. It was abbreviated as STRO.
* Thelpteris noveboracensis: we have thelypteris phegopteris. It was abbreviated as THNO.
* Sambucus Americana: All the Sambucus in Mellisa’s spreadsheets should be Sambucus racemosa, which is a newer name for Sambucus pubens on our species list.
* Araila racemosa: All the Araila should be Araila nudicaulis
* Phegopteris connectilis: the same as Thelypteris phegopteris
* Claytonia virginica: That should be Carolina spring-beauty (*Claytonia* *caroliniana*), which is a true spring ephemeral so it would not have been picked up in summer surveys as the species completely decomposes by early summer/late spring.
* Erythronium americanum: That is the only name for this species, but like the Claytonia listed above, it is a true spring ephemeral so it would not have been picked up in your previous summer surveys as the species completely decomposes by early summer/late spring.

**Send PAP a list of the uncertain species.**

COVER: estimate of percentage of cover for any plants less than 1m tall in the 1\*1 quadrat (coulbe be, herbaceous, shrub, and woody plant species) and shrub species (taller than 1m) within 2\*2 section

COUNT: Counts for woody plant species less than 1 m tall. Some herbaceous species were counted by chance.

NOTES:

* Check against summer data: Some species Mellissa was not sure in the spring and then checked in the summer, corrections were already made if any.
* last years: This refers to the dried up remains of last year’s Monotropa plants. They are dried up and dead but are still upright and have a small amount of cover in the plot. Should we count them?
* no species present: no tree, herbaceous or shrub plants found in the quadrat
* no count: “I’m not completely sure, but I think that is me acknowledging that I forgot to include counts along with my seedling cover.” Mellissa 3/29/2013
* Not a seedling: refers to a plant (mostly *Abies balsamea*) that was not rooted in the 1x1x1 but had cover within the subplot (in the 1x1x1) because of overhanging branches. 87 protocol says “Percent cover refers to the percentage of the area being analyzed that would be covered if the plants were laid flat on that surface.” Did we count overhanging percentage before?
* Maybe for cover, we counted overhanging, then for density, we only counted rooted in. PAP.

## 2.5 Data collected in 2010

* Permanent plot 4~27 were revisited in 2010. Data for plot 15 is missing. For plot 4, 5, 6, all the four quadrats in each of the three strip plots were sampled; for plot 7~27, in each strip plot, only the quadrat which is closest to the center were sampled.
* If certain species not found in plots, no records were entered.
* Shrub %cover data were estimated in 2\*2m quadrat; herb %cover data were estimated in 1\*1 herbaceous plot;
* Seedling %cover were estimated in 1\*1 herbaceous plot, and were counted in 1\*1 herbaceous plot, if there is less or equal to 15, then count the number of seedlings in 2\*2 quadrats. Some crew didn’t record the counts in 1\*1, but only counts in 2\*2. Some crew didn’t look for seedlings in 2\*2 when there is no seedling or 15 seedlings for certain species in 1\*1 plots. So we don’t know if there are any seedlings in 2\*2 when there are no records or 0s for 1\*1. Some %cover is missing while there is count value, and some counts are missing when there are %cover values. Set a code for areas where seedlings were counted to distinguish real recorded 1\*1, and those we assumed.

**SAS data set:** [*R:\MOOSHUBB\longterm\lixi kong\Perm2010\pphss2010.ssd*](ppherbshrub2010.sas7bdat)

PLOT

SUBPLOT

BQUADX

BQUADY

SPECIES

COVER

COUNT

PLOTSIZE

TYPE

## 2.6 Master file for data collected from 1986 to 2010 (Still needs to be modified!)

SAS data set:[*R:\MOOSHUBB\longterm\lixi kong\Perm2010\pphssmas10.ssd*](pphssmas10.sas7bdat) *(2003 data not merged in yet)*

PLOT

SUBPLOT

BQUADX

BQUADY

SPECIES: During data management, for each census year, a complete list of species found in that year was added to each quadrat, and those species we didn’t find were give cover or count value of 0.

TYPE: SAP(only for 1986 data), SEED, HERB, or SHRUB. UKSPP (unknown species doesn’t have a TYPE)

COVER: percentage of cover

COUNT: numbers of plants

AREA: 1(1m\*1m herbaceous plot) or 4 (2m\*2m quadrat)

CENSUS: 1986, 1987, 1998, or 2010.

**3. Substrate Data**

## 3.1 Data collected in 1986

For plot 4~15, in each of the three non-free subplots, four quadrats were sampled for substrate cover.

**SAS data set:** [*R:\MOOSHUBB\longterm\Seedling\heshdat.ssd*](../../Seedling/heshdat.sas7bdat)

ROCK: %cover of rock

BARESOIL: %cover of bare soil

WATER: %cover of water

LITTER: %cover of litter

WOODGR: %cover of dead wood on the ground > 5cm.

WOODARE: %cover of dead wood >5cm within 45° if horizontal, including other substrates growing on it.

BOLELI: %cover of live tree boles, cut off at 1m (from “Data history portfolio)

BOLEDE: %cover of dead tree bole, cut off at 1m

TIPUPS: number of tipups in quadrat

TIPUP: %cover of tipups

STUMPS: number of stumps (>5cm) in quadart

STUMP: %cover of stumps(>5cm)

MOSS: %cover of moss on the ground

Some percentages were recorded as”-1” in SAS file. Checking hardcopies, they were recorded as “<1”. Corrected them as “0.5”s in new master file. Lixi 05/31/2012

## 3.2 Data collected in 1987

Seedling Data History in data history portfolio indicates SUBSTRATE data were also collected, but “not in computer file”, but Lixi/Noah only found data for plot 16 on hardcopies in Jan.2012.

A.Smith probably collected this part of data too besides herb/shrub/seedling, whose data never got entered. 01/23/2013

## 3.3 Data collected in 1998

Plot 4~27 were revisited, and in each of the three non-free subplots, four quadrats were sampled for substrate cover.

**SAS data set:** [*R:\MOOSHUBB\longterm\Permplots\Permplot98\phrbsub.ssd*](../../Permplots/Permplot98/phrbsub.sas7bdat)

ROCK

BSOIL

H2O

LITTER

GWOOD: dead wood on the ground with DBH>1cm (different from 1986)

AWOOD: aerial wood (including other substrates growing on it, such as moss) with DBH>1cm (different from 1986)

BOLEA: live bole >5cm

BOLED: standing dead bole>5cm

TIPUP: tipup mound

STMP: stumps >5cm

MOSS: moss on the ground. If moss was growing over a rock or a log on the ground, it’s MOSS rather than rock

AMOSS: Moss growing on aerial wood. AMOSS is included in AWOOD, in other words, AMOSS should be <=AWOOD. There are 10 obs that had AMOSS >AWOOD. Corrections see **3.6**

## 3.4 Data collected in 2003

Between 7/10/2003 and 9/08/2003, following “1998 addendum protocol to permanent plot measurement” (Melissa’s thesis), Substrate data were collected for four 1\*1 quadrats on three subplots for each plot

Data from plot 19, 20, 24 are missing, Mellissa looked and couldn’t find the data. Lixi 7/30/2013

Raw data: R:\MOOSHUBB\longterm\RawData 2003\Unsorted PPdata (substrate worksheet)

**DATE:** date data were collected.

**ASPECT:** east, west.

**PPLOT**

**ELEVATION**

**STRIPLOC:** this represents the subplot location. East=subplot2; north=subplot1; south=subplot3, west=subplot4.

**QUAD:** 1, 2, 3, 4. this indicates the quadrat locations. 1 refers to the quadrat closest to the plot center, and 4 refer to the quadrat most far to the plot center.

**CODE**: notes that there is NO aerial substrate listed in “1998 amendendum protocol”, also some other substrates were not listed, such as rock, etc. So sometimes Melisa recorded a substrate as a code corresponding to the protocol, sometimes she wrote a description when she is unsure of how to code it.

* 1: moss
* 13: moss on dead wood on the ground>=5cm. plot 12, Subplot 4, quad1, has two 13s. one has cover of 50, one has cover of 5. Deleted the one with cover 5, and corrected 50 as 55.
* 15/moss on rock: moss on rock
* 16/ Moss on tree/moss on root: moss on standing live bole >=5cm.
* 17/ tip up w/moss: moss on tipup mound
* 2: litter (mixed if one not dominant)
* 25/litter on rock: mixed litter on rock
* 3: dead wood on the ground>=5cm
* 4/bare soil: bare soil
* 53: conifer litter on dead wood>=5cm
* 6: deciduous litter
* LITC: conifer litter
* Rock
* Stump
* Moss on stump
* Tip up
* Aerial wood/aerial log/ Overhanging log: WDA5
* Live tree: BLA5
* Aerial moss on log/overhanging log with moss/moss overhang: MSWDA5
* Snag: BLD5

COVER: estimated percentage of cover.

SAS program to edit raw data: R:\MOOSHUBB\longterm\lixi kong\2003data\PPSUB2003.sas

SAS data set: R:\MOOSHUBB\longterm\lixi kong\2003data\ppsub2003.ssd

**RCK**

**BSOIL**

**BLA5**

**BLD5**

**STP**

**TIP**

**LITT:** LITT=LITM+LITD+LITC+LITMRCK+LITCRCK+LITCWDG5

**LITM**

**LITD**

**LITC**

**LITMRCK**

**LITCRCK**

**LITCWDG5**

**MSSG**

**MSBLA5**

**MSRCK**

**MSTIP**

**MSSTP**

**MSWDG5**

**WDG5**

**WDA5**

**MSWDA5**

**SUMG:** SUMG=RCK+BSOIL+BLA5+BLD5+STP+TIP+LITM+LITD+LITC+LITMRCK+LITCRCK+LITCWDG5+MSSG+MSBLA5+MSRCK+MSTIP+MSSTP+MSWDG5+WDG5. Except plot 14, splot4, quadx4, quady2 has SUMG equal to 99, the rest all have SUMG equal to 100.

## 3.5 Data collected in 2010

Permanent plot 4~27 were revisited for substrate data. Data for plot 15 are missing. For plot 4, 5, 6, all the four quadrats in each of the three strip plots were sampled; for plot 7~27, in each strip plot, only the quadrat which is closest to the center were sampled.

**SAS data set:** *R:\MOOSHUBB\longterm\lixi kong\Perm2010\ppsubstrate10.ssd*

Substrate variables used in 2010 are all the same as 1998, **except that aerial wood is aerial wood not covered by moss.** In data management: “trace”, recorded as “t” was given a value of “0.1”. Data recorded as a range were given a value of the middle value of the range. Data recorded as “<1” were given a value of “0.5”

Plot 13, subplot 3, moss=995. Other substrate on the group adds up to 5.2, so it’s probably a 95?

## 3.6 Master file for data collected from 1986 to 2010

*SAS data set: R:\MOOSHUBB\longterm\lixi kong\Perm2010\ppsubmas10.ssd (not corrected for SUMG)*

*SAS data set:* ***R:\MOOSHUBB\longterm\lixi kong\Perm2010\ppsubmas10c.ssd (corrected for SUMG)***

PPLOT

SPLOT

CENS: census year. 1986, 1998, 2003, or 2010.

BQUDX/BQUDY: quadrat number, recorded in 1986, 1998, 2003, and 2010.

RCK: % cover of rock estimated in 1986, 1998, 2003, and 2010

BSOIL: % cover of bare soil estimated in 1986, 1998, 2003, and 2010

WATER: % cover of water estimated in 1986, 1998, and 2010. No water was found in 2003.

MSSG: % cover of moss on the ground estimated in 1986, 1998, 2003, and 2010. This didn’t include MOSS on other substrate on the ground in 2003, then was adjusted to include MSBLA5, MSRCK,MSTIP,MSSTIP, and MSWDG5.

MSBLA5: collected in 2003 only.

MSRCK: collected in 2003 only

MSTIP: collected in 2003 only

MSSTP: collected in 2003 only

MSWDG5: collected in 2003 only

LITT: % cover of litter estimated in 1986, 1998, and 2010. For 2003, this is the sum of LITM, LITC, LITD, LITMRCK, LITCRCK, and LITCWDG5.

LITM: collected in 2003 only. This did not include LITMRCK, and got corrected.

LITD: collected in 2003 only

LITC: collected in 2003 only. This didn’t include LITCRCK and LITCWDG5, and got corrected.

LITMRCK: collected in 2003 only

LITCRCK: collected in 2003 only

LITCWDG5: collected in 2003 only

WDG5: % cover of dead wood on the ground >5cm collected in 1986 and 2003.

WDG1:% cover of dead wood on the ground>1cm collected in 1998 and 2010

WDA5: %cover of aerial wood >5cm collected in 1986 and 2003. In 1986, WDA5 included moss on aerial wood. In 2003, it’s always either WDA5 or MSWDA5 was recorded, so WDA5 probably referred to WDA without MOSS growing on it?

MSWDA5: % cover of moss on aerial wood >=5cm estimated in 2003 only.

WDA1:% cover of aerial wood >1cm collected in 1998 and 2010.

MSWDA1: % cover of moss on aerial wood >1cm estimated in 1998 only. In 1998, WDA1 includes MSWDA1; and in 2010, WDA1 does NOT. In 1998, there are 10 quadrats had MSWDA1 greater than WDA1, while WDA was probably identified as aerial wood without moss growing on it. WDA1 was corrected to MSWDA1+WDA1, and noted in CORRECT variable:

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| PLOT | SPLOT | CENS | BX | BY | RCK | BSOIL | WATER | MSSG | LITT | BLA5 | BLD5 | TIPA | STPA | **MSWDA1** | **WDA1** | WDG1 | SUMG | SUMA |
| 8 | 1 | 1998 | 1 | 1 | 0 | 0 | 0 | 7 | 90 | 0 | 0 | 0 | 0 | **0.5** | **0** | 0.5 | 97.5 | 97.5 |
| 8 | 2 | 1998 | 3 | 8 | 0 | 0 | 0 | 50 | 45 | 2 | 0 | 0 | 0 | **0.5** | **0** | 0.5 | 97.5 | 97.5 |
| 10 | 4 | 1998 | 7 | 2 | 0 | 0 | 0 | 0.5 | 95 | 0 | 0 | 0 | 0 | **1** | **0.5** | 2 | 97.5 | 98 |
| 11 | 2 | 1998 | 3 | 7 | 0 | 0 | 0 | 50 | 50 | 0 | 0 | 0 | 1 | **3** | **0.5** | 0.5 | 101.5 | 102 |
| 11 | 3 | 1998 | 9 | 8 | 0 | 0 | 0 | 2 | 95 | 3 | 0 | 0 | 0 | **0.5** | **0** | 0.5 | 100.5 | 100.5 |
| 11 | 4 | 1998 | 10 | 3 | 0 | 0 | 0 | 10 | 90 | 0 | 0 | 0 | 0 | **1** | **0** | 0.5 | 100.5 | 100.5 |
| 11 | 4 | 1998 | 10 | 2 | 0 | 0 | 0 | 7 | 90 | 0 | 1 | 0 | 0 | **10** | **7** | 4 | 102 | 109 |
| 22 | 1 | 1998 | 3 | 3 | 0 | 0 | 0 | 55 | 40 | 1 | 0 | 0 | 6 | **2** | **1** | 1 | 103 | 104 |
| 25 | 2 | 1998 | 4 | 7 | 0 | 0 | 0 | 20 | 75 | 0 | 2 | 0 | 0 | **8** | **0.5** | 0.5 | 97.5 | 98 |
| 27 | 3 | 1998 | 9 | 7 | 4 | 0 | 0 | 30 | 65 | 0 | 3 | 0 | 0 | **7** | **0.5** | 2 | 104 | 104.5 |

BLA5: % cover of standing live bole with DBH>5cm estimated in 1986, 1998, 2003 and 2010

BLD5: % cover of standing dead with DBH>5cm estimated in 1986, 1998, 2003 and 2010.

TIPN: Count of tipups, only collected in 1986.

TIPA: % cover of tipups collected in 1986, 1998, 2003 and 2010.

STPN: Count of stumps, only collected in 1986.

STPA: % of stumps collected in 1986, 1998, 2003 and 2010.

SUMG: Sum of percentage of everything on the ground before correction.

* 1986:SUMG=RCK+BSOIL+WATER+LITT+WDG5+BLA5+BLD5+TIPA+STPA+MSSG which ranges from 55.5 to 163. When SUMG NE 100, LITT was adjusted to make SUMG 100. If sum of everything on the ground except LITT is already 100, then exclude it from the corrected data set (data from two quadrats were excluded).
* 1998/2010:SUMG= RCK+BSOIL+WATER+LITT+WDG1+BLA5+BLD5+TIPA+STPA+MSSG. In 1998, SUMG ranges from 37 to 112. In 2010, SUMG ranges from 89.1 to 103. For a lot of too small/big SUMG values (especially), SUMA is close to 100, so looks like WDA was treated as on the ground when field crew adjust LITT to make SUMG 100%. When SUMG NE 100, if SUMA is within 95 and 105, LITT was adjusted to make SUMG 100%
* 2003: SUMG=RCK+BSOIL+BLA5+BLD5+STPA+TIPA+LITT +MSSG +WDG5. All equal to 100, except one is equal to 99, where no LITT was found, so LITT and LITM was set to 1.
* SUMA: sum of percentage of everything including aerial substrates before correction.
* 1986: SUMG+WDA5
* 1998: SUMG+WDA1
* 2003: SUMG+WDA5+MSWDA5
* 2010: SUMG+WDA1+MSWDA1

CORRECT:

* 1: LITT was adjusted so SUMG is equal to 100.
* 2: WDA1 was adjusted to WDA1+MSWDA1 when MSWDA1 > WDA1.

SUMGC: sum of everything on the ground after correction. This is all 100.

**4. Canopy Density Data collected in 2003**

Densiometer readings were taken a 4m and 6m intervals along each strip plot. Four readings were taken in the four cardinal directions at each point and then averaged. Each plot was sampled twice in “spring” and “summer”.

SEASON: spring or summer. Notice that some of the “spring” was already in July.

DATE: date data were collected. “Spring” is between 5/20/2003 and 7/03/2003; “summer” is between 7/10/2003 and 9/08/2003

PPLOT

SPLOT: this was originally recorded as “Strip loc”, which equal to east, north, west, or south from Melissa’s data. And Lixi created subplot number basing on that.

OPEN4/OPEN6: This was originally named as “Canopy Density”, but densitometer readings whould be % openness. Average % of openness from four readings (not in the data set, already averaged) at 4m or 6m intervals.

ELEVCL

ASPCL

**5. Litter Depth Data collected in 2003**

Litter depth was a single measurement in each of the 3 subplots of a strip. It was measured just outside the far right corner, as referenced from the position of the observer standing closest to plot center along the strip plot. Measurements were taken from the top of the forest floor to the surface of mineral soil or rock. Four measurements were taken for each subplot

DATE: 7/10/2003~9/08/2003

PPLOT

SPLOT: the same as canopy openness data, this was orignilally recorded as “strip loc.” As east, west, south, and north, and lixi created subplot number basing on it.

STRIPLOC: this was originally recorded as “subplot” of 1, 2, 3, 4, but should be the quadrat numbers. What Order?

LITDEP: litter depth in cm

NOTES:

# APPENDIX 1 Permanent Plot Free Subplots List

|  |  |
| --- | --- |
| Plot | Free subplot |
| 4 | 4 |
| 5 | 1 |
| 6 | 1 |
| 7 | 1 |
| 8 | 3 |
| 9 | 2 |
| 10 | 3 |
| 11 | 1 |
| 12 | 3 |
| 13 | 2 |
| 14 | 2 |
| 15 | 2 |
| 16 | 2 |
| 17 | 4 |
| 18 | 1 |
| 19 | 2 |
| 20 | 3 |
| 21 | 3 |
| 22 | 3 |
| 23 | 4 |
| 24 | 1 |
| 25 | 1 |
| 26 | 4 |
| 27 | 1 |

# APPENDIX 2 Sapling tagged in each subplot in 1987/88, 1998, and 2010

Need to refer to judgments made for 1987/88 to figure out the rules!

This table below has numbers of saplings tagged in 1987/88, 1998 and 2010 in each subplot or plot for different species, and relevant free subplot. We assume in 2010, saplings in all species were tagged in all four subplots for each plot. For 1987/88, and 1998 tagged saplings, we referred to data for ABBA, and cross check it with data from other species to make a judgment whether a subplot was sampled for new saplings in one year for different species.

Only when in both year, the same subplot were sampled, we would say new tagged plants in later year are new recruitments in that year.

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| SP | PL | SB | free | **sbcnt8788** | **plcnt8788** | **subcnt98** | **plcnt98** | subc10 | plcnt10 | CSAP8788 | CSAP98 | CSAP10 |
| ABBA | 4 | 1 | 4 | **4** | **20** | **21** | **40** | 6 | 10 | Y | Y | All Ys below |
| ABBA | 4 | 2 | 4 | **9** | **20** | **5** | **40** | 1 | 10 | Y | Y |  |
| ABBA | 4 | 3 | 4 | **5** | **20** | **3** | **40** | 2 | 10 | Y | Y |  |
| ABBA | 4 | 4 | 4 | **2** | **20** | **11** | **40** | 1 | 10 | Y | Y |  |
| ABBA | 5 | 1 | 1 | **25** | **25** | **17** | **78** | 3 | 4 | Y to all species except acsa | Y |  |
| ABBA | 5 | 2 | 1 |  |  | **20** | **78** |  |  | N | Y |  |
| ABBA | 5 | 3 | 1 |  |  | **22** | **78** |  |  | N | Y |  |
| ABBA | 5 | 4 | 1 |  |  | **19** | **78** | 1 | 4 | N | Y |  |
| ABBA | 6 | 1 | 1 | **11** | **30** | **8** | **18** |  |  | Y | Y |  |
| ABBA | 6 | 2 | 1 | **2** | **30** | **6** | **18** |  |  | Y | Y |  |
| ABBA | 6 | 3 | 1 | **1** | **30** | **1** | **18** |  |  | Y | Y |  |
| ABBA | 6 | 4 | 1 | **16** | **30** | **3** | **18** | 1 | 1 | Y | Y |  |
| ABBA | 7 | 1 | 1 | **39** | **39** | **15** | **94** | 11 | 198 | Y | Y |  |
| ABBA | 7 | 2 | 1 |  |  | **23** | **94** | 8 | 198 | N | Y |  |
| ABBA | 7 | 3 | 1 |  |  | **31** | **94** | 127 | 198 | N | Y |  |
| ABBA | 7 | 4 | 1 |  |  | **25** | **94** | 52 | 198 | N | Y |  |
| ABBA | 8 | 1 | 3 |  |  | **10** | **33** | 7 | 9 | N | Y |  |
| ABBA | 8 | 2 | 3 |  |  | **2** | **33** |  |  | N | Y |  |
| ABBA | 8 | 3 | 3 | **45** | **45** | **9** | **33** | 1 | 9 | Y | Y |  |
| ABBA | 8 | 4 | 3 |  |  | **12** | **33** | 1 | 9 | N | Y |  |
| ABBA | 9 | 1 | 2 |  |  |  |  | 13 | 17 | N | N |  |
| ABBA | 9 | 2 | 2 | **94** | **94** | **8** | **8** |  |  | Y | Y |  |
| ABBA | 9 | 3 | 2 |  |  |  |  | 3 | 17 | N | N |  |
| ABBA | 9 | 4 | 2 |  |  |  |  | 1 | 17 | N | N |  |
| ABBA | 10 | 1 | 3 |  |  |  |  | 22 | 70 | N | N |  |
| ABBA | 10 | 2 | 3 |  |  |  |  | 25 | 70 | N | N |  |
| ABBA | 10 | 3 | 3 | **32** | **32** | **5** | **5** | 2 | 70 | Y | Y |  |
| ABBA | 10 | 4 | 3 |  |  |  |  | 21 | 70 | N | N |  |
| ABBA | 11 | 1 | 1 | **295** | **311** | **77** | **77** | 7 | 254 | Y | Y |  |
| ABBA | 11 | 2 | 1 | **13** | **311** |  |  | 77 | 254 | N | N |  |
| ABBA | 11 | 3 | 1 |  |  |  |  | 107 | 254 | N | N |  |
| ABBA | 11 | 4 | 1 | **3** | **311** |  |  | 63 | 254 | N | N |  |
| ABBA | 12 | 1 | 3 |  |  |  |  | 267 | 476 | N | N |  |
| ABBA | 12 | 2 | 3 |  |  |  |  | 52 | 476 | N | N |  |
| ABBA | 12 | 3 | 3 | **12** | **12** | **3** | **3** | 12 | 476 | Y | Y |  |
| ABBA | 12 | 4 | 3 |  |  |  |  | 145 | 476 | N | N |  |
| ABBA | 13 | 1 | 2 |  |  |  |  | 73 | 249 | N | N |  |
| ABBA | 13 | 2 | 2 | **76** | **76** | **20** | **20** | 4 | 249 | Y | Y |  |
| ABBA | 13 | 3 | 2 |  |  |  |  | 96 | 249 | N | N |  |
| ABBA | 13 | 4 | 2 |  |  |  |  | 76 | 249 | N | N |  |
| ABBA | 14 | 1 | 2 |  |  |  |  | 60 | 142 | N | N |  |
| ABBA | 14 | 2 | 2 | **62** | **62** | **10** | **10** | 21 | 142 | Y | Y |  |
| ABBA | 14 | 3 | 2 |  |  |  |  | 16 | 142 | N | N |  |
| ABBA | 14 | 4 | 2 |  |  |  |  | 45 | 142 | N | N |  |
| ABBA | 15 | 1 | 2 |  |  |  |  | 21 | 58 | N | N |  |
| ABBA | 15 | 2 | 2 | **105** | **105** | **2** | **2** | 7 | 58 | Y | Y |  |
| ABBA | 15 | 3 | 2 |  |  |  |  | 21 | 58 | N | N |  |
| ABBA | 15 | 4 | 2 |  |  |  |  | 9 | 58 | N | N |  |
| ABBA | 16 | 1 | 2 | **11** | **11** |  |  | 2 | 41 | Y | N |  |
| ABBA | 16 | 2 | 2 |  |  | **21** | **21** | 2 | 41 | N | Y |  |
| ABBA | 16 | 3 | 2 |  |  |  |  | 32 | 41 | N | N |  |
| ABBA | 16 | 4 | 2 |  |  |  |  | 5 | 41 | N | N |  |
| ABBA | 17 | 1 | 4 | **2** | **4** |  |  | 6 | 54 | N | N |  |
| ABBA | 17 | 2 | 4 | **2** | **4** | **3** | **27** | 3 | 54 | N | N |  |
| ABBA | 17 | 3 | 4 |  |  | **21** | **27** | 21 | 54 | N | N |  |
| ABBA | 17 | 4 | 4 |  |  | **3** | **27** | 24 | 54 | N | Y |  |
| ABBA | 18 | 1 | 1 | **10** | **23** | **9** | **9** | 24 | 564 | Y | Y |  |
| ABBA | 18 | 2 | 1 | **7** | **23** |  |  | 238 | 564 | Y | N |  |
| ABBA | 18 | 3 | 1 | **2** | **23** |  |  | 191 | 564 | Y | N |  |
| ABBA | 18 | 4 | 1 | **4** | **23** |  |  | 111 | 564 | Y | N |  |
| ABBA | 19 | 1 | 2 | **3** | **9** |  |  | 102 | 240 | Y | N |  |
| ABBA | 19 | 2 | 2 | **1** | **9** | **1** | **2** | 39 | 240 | Y | Y |  |
| ABBA | 19 | 3 | 2 | **5** | **9** | **1** | **2** | 27 | 240 | Y | N |  |
| ABBA | 19 | 4 | 2 |  |  |  |  | 72 | 240 | Y | N |  |
| ABBA | 20 | 1 | 3 | **22** | **67** |  |  | 62 | 217 | Y | N |  |
| ABBA | 20 | 2 | 3 | **26** | **67** |  |  | 21 | 217 | Y | N |  |
| ABBA | 20 | 3 | 3 | **5** | **67** |  |  | 98 | 217 | Y | N |  |
| ABBA | 20 | 4 | 3 | **14** | **67** |  |  | 36 | 217 | Y | N |  |
| ABBA | 21 | 1 | 3 | **12** | **25** | **1** | **8** | 8 | 185 | Y | N |  |
| ABBA | 21 | 2 | 3 | **5** | **25** |  |  | 60 | 185 | Y | N |  |
| ABBA | 21 | 3 | 3 | **3** | **25** |  |  | 61 | 185 | Y | N |  |
| ABBA | 21 | 4 | 3 | **5** | **25** | **7** | **8** | 56 | 185 | Y | N |  |
| ABBA | 22 | 1 | 3 |  |  |  |  | 8 | 66 | N | N |  |
| ABBA | 22 | 2 | 3 |  |  |  |  | 27 | 66 | N | N |  |
| ABBA | 22 | 3 | 3 | **23** | **23** | **11** | **11** | 8 | 66 | Y | Y |  |
| ABBA | 22 | 4 | 3 |  |  |  |  | 23 | 66 | N | N |  |
| ABBA | 23 | 1 | 4 |  |  |  |  | 58 | 168 | N | N |  |
| ABBA | 23 | 2 | 4 |  |  |  |  | 1 | 168 | N | N |  |
| ABBA | 23 | 3 | 4 |  |  |  |  | 23 | 168 | N | N |  |
| ABBA | 23 | 4 | 4 | **6** | **6** | **121** | **121** | 86 | 168 | Y | Y |  |
| ABBA | 24 | 1 | 1 | **40** | **43** | **276** | **276** | 124 | 862 | Y | Y |  |
| ABBA | 24 | 2 | 1 | **3** | **43** |  |  | 101 | 862 | N | N |  |
| ABBA | 24 | 3 | 1 |  |  |  |  | 207 | 862 | N | N |  |
| ABBA | 24 | 4 | 1 |  |  |  |  | 430 | 862 | N | N |  |
| ABBA | 25 | 1 | 1 | **54** | **54** | **5** | **6** | 14 | 140 | Y | Y |  |
| ABBA | 25 | 2 | 1 |  |  |  |  | 46 | 140 | N | N |  |
| ABBA | 25 | 3 | 1 |  |  |  |  | 45 | 140 | N | N |  |
| ABBA | 25 | 4 | 1 |  |  | **1** | **6** | 35 | 140 | N | N |  |
| ABBA | 26 | 1 | 4 |  |  |  |  | 36 | 129 | N | N |  |
| ABBA | 26 | 2 | 4 |  |  |  |  | 27 | 129 | N | N |  |
| ABBA | 26 | 3 | 4 |  |  |  |  | 14 | 129 | N | N |  |
| ABBA | 26 | 4 | 4 | **40** | **40** | **14** | **14** | 52 | 129 | Y | Y |  |
| ABBA | 27 | 1 | 1 | **76** | **76** | **21** | **21** | 23 | 83 | Y | Y |  |
| ABBA | 27 | 2 | 1 |  |  |  |  | 22 | 83 | N | N |  |
| ABBA | 27 | 3 | 1 |  |  |  |  | 22 | 83 | N | N |  |
| ABBA | 27 | 4 | 1 |  |  |  |  | 16 | 83 | N | N |  |
| ACPE | 4 | 1 | 4 | **3** | **9** |  |  |  |  |  |  |  |
| ACPE | 4 | 3 | 4 | **2** | **9** | **1** | **3** |  |  |  |  |  |
| ACPE | 4 | 4 | 4 | **4** | **9** | **2** | **3** |  |  |  |  |  |
| ACPE | 5 | 1 | 1 | **5** | **5** |  |  |  |  |  |  |  |
| ACPE | 6 | 1 | 1 | **14** | **36** | **4** | **7** |  |  |  |  |  |
| ACPE | 6 | 2 | 1 | **12** | **36** | **2** | **7** | 1 | 1 |  |  |  |
| ACPE | 6 | 3 | 1 | **1** | **36** |  |  |  |  |  |  |  |
| ACPE | 6 | 4 | 1 | **9** | **36** | **1** | **7** |  |  |  |  |  |
| ACPE | 17 | 1 | 4 |  |  |  |  | 7 | 19 |  |  |  |
| ACPE | 17 | 2 | 4 |  |  |  |  | 3 | 19 |  |  |  |
| ACPE | 17 | 3 | 4 |  |  |  |  | 3 | 19 |  |  |  |
| ACPE | 17 | 4 | 4 |  |  |  |  | 6 | 19 |  |  |  |
| ACPE | 18 | 1 | 1 |  |  |  |  | 16 | 93 |  |  |  |
| ACPE | 18 | 2 | 1 |  |  |  |  | 10 | 93 |  |  |  |
| ACPE | 18 | 3 | 1 |  |  |  |  | 18 | 93 |  |  |  |
| ACPE | 18 | 4 | 1 |  |  |  |  | 49 | 93 |  |  |  |
| ACPE | 21 | 3 | 3 |  |  |  |  | 1 | 1 |  |  |  |
| ACSA | 4 | 4 | 4 | **1** | **1** |  |  |  |  |  |  |  |
| ACSA | 5 | 2 | 1 | **1** | **1** |  |  |  |  |  |  |  |
| ACSA | 6 | 1 | 1 | **3** | **12** | **1** | **2** |  |  |  |  |  |
| ACSA | 6 | 2 | 1 | **2** | **12** |  |  |  |  |  |  |  |
| ACSA | 6 | 3 | 1 | **3** | **12** | **1** | **2** |  |  |  |  |  |
| ACSA | 6 | 4 | 1 | **4** | **12** |  |  |  |  |  |  |  |
| ACSP | 4 | 1 | 4 | **1** | **1** | **10** | **44** | 1 | 5 |  |  |  |
| ACSP | 4 | 2 | 4 |  |  | **20** | **44** | 4 | 5 |  |  |  |
| ACSP | 4 | 3 | 4 |  |  | **11** | **44** |  |  |  |  |  |
| ACSP | 4 | 4 | 4 |  |  | **3** | **44** |  |  |  |  |  |
| ACSP | 5 | 1 | 1 |  |  | **1** | **3** |  |  |  |  |  |
| ACSP | 5 | 3 | 1 |  |  | **1** | **3** |  |  |  |  |  |
| ACSP | 5 | 4 | 1 |  |  | **1** | **3** |  |  |  |  |  |
| ACSP | 6 | 1 | 1 |  |  | **5** | **9** |  |  |  |  |  |
| ACSP | 6 | 4 | 1 |  |  | **4** | **9** | 1 | 1 |  |  |  |
| ACSP | 7 | 3 | 1 |  |  | **1** | **1** |  |  |  |  |  |
| ACSP | 17 | 1 | 4 |  |  |  |  | 2 | 13 |  |  |  |
| ACSP | 17 | 2 | 4 |  |  |  |  | 2 | 13 |  |  |  |
| ACSP | 17 | 3 | 4 |  |  |  |  | 2 | 13 |  |  |  |
| ACSP | 17 | 4 | 4 |  |  |  |  | 7 | 13 |  |  |  |
| ACSP | 18 | 1 | 1 |  |  |  |  | 1 | 3 |  |  |  |
| ACSP | 18 | 2 | 1 |  |  |  |  | 2 | 3 |  |  |  |
| ACSP | 20 | 1 | 3 |  |  |  |  | 1 | 1 |  |  |  |
| ACSP | 23 | 1 | 4 |  |  | **1** | **3** |  |  |  |  |  |
| ACSP | 23 | 4 | 4 |  |  | **2** | **3** |  |  |  |  |  |
| BEAL | 4 | 1 | 4 | **4** | **12** |  |  |  |  |  |  |  |
| BEAL | 4 | 2 | 4 | **5** | **12** |  |  |  |  |  |  |  |
| BEAL | 4 | 3 | 4 | **2** | **12** |  |  |  |  |  |  |  |
| BEAL | 4 | 4 | 4 | **1** | **12** |  |  |  |  |  |  |  |
| BEAL | 6 | 1 | 1 | **4** | **25** | **1** | **4** |  |  |  |  |  |
| BEAL | 6 | 2 | 1 | **9** | **25** | **1** | **4** |  |  |  |  |  |
| BEAL | 6 | 3 | 1 | **10** | **25** | **2** | **4** | 1 | 1 |  |  |  |
| BEAL | 6 | 4 | 1 | **2** | **25** |  |  |  |  |  |  |  |
| BEAL | 18 | 1 | 1 | **1** | **1** |  |  |  |  |  |  |  |
| BEAL | 18 | 2 | 1 |  |  |  |  | 8 | 17 |  |  |  |
| BEAL | 18 | 3 | 1 |  |  |  |  | 5 | 17 |  |  |  |
| BEAL | 18 | 4 | 1 |  |  |  |  | 4 | 17 |  |  |  |
| BEAL | 19 | 1 | 2 |  |  |  |  | 1 | 1 |  |  |  |
| BEAL | 20 | 3 | 3 | **1** | **1** |  |  | 1 | 1 |  |  |  |
| BEAL | 21 | 3 | 3 |  |  |  |  | 1 | 1 |  |  |  |
| BEAL | 24 | 1 | 1 |  |  | **2** | **2** |  |  |  |  |  |
| BEAL | 24 | 4 | 1 |  |  |  |  | 1 | 1 |  |  |  |
| BECO | 4 | 1 | 4 | **1** | **3** | **3** | **4** |  |  |  |  |  |
| BECO | 4 | 4 | 4 | **2** | **3** | **1** | **4** |  |  |  |  |  |
| BECO | 6 | 3 | 1 | **3** | **3** |  |  |  |  |  |  |  |
| BECO | 13 | 1 | 2 | **1** | **14** | **3** | **6** |  |  |  |  |  |
| BECO | 13 | 2 | 2 | **1** | **14** | **2** | **6** |  |  |  |  |  |
| BECO | 13 | 3 | 2 |  |  | **1** | **6** |  |  |  |  |  |
| BECO | 13 | 4 | 2 | **12** | **14** |  |  |  |  |  |  |  |
| BECO | 14 | 2 | 2 | **2** | **3** |  |  |  |  |  |  |  |
| BECO | 14 | 4 | 2 | **1** | **3** |  |  |  |  |  |  |  |
| BECO | 15 | 2 | 2 | **2** | **2** |  |  |  |  |  |  |  |
| BECO | 16 | 1 | 2 | **1** | **1** |  |  |  |  |  |  |  |
| BECO | 18 | 1 | 1 | **1** | **2** |  |  |  |  |  |  |  |
| BECO | 18 | 2 | 1 |  |  |  |  | 1 | 1 |  |  |  |
| BECO | 18 | 3 | 1 | **1** | **2** |  |  |  |  |  |  |  |
| BECO | 19 | 2 | 2 | **1** | **7** |  |  |  |  |  |  |  |
| BECO | 19 | 3 | 2 | **5** | **7** |  |  |  |  |  |  |  |
| BECO | 19 | 4 | 2 | **1** | **7** |  |  | 1 | 1 |  |  |  |
| BECO | 20 | 3 | 3 | **2** | **6** |  |  |  |  |  |  |  |
| BECO | 20 | 4 | 3 | **4** | **6** |  |  |  |  |  |  |  |
| BECO | 21 | 4 | 3 |  |  |  |  | 2 | 2 |  |  |  |
| BECO | 22 | 2 | 3 |  |  | **1** | **1** |  |  |  |  |  |
| BECO | 23 | 1 | 4 |  |  | **1** | **1** |  |  |  |  |  |
| BECO | 24 | 1 | 1 | **12** | **12** | **46** | **46** | 17 | 55 |  |  |  |
| BECO | 24 | 2 | 1 |  |  |  |  | 1 | 55 |  |  |  |
| BECO | 24 | 3 | 1 |  |  |  |  | 19 | 55 |  |  |  |
| BECO | 24 | 4 | 1 |  |  |  |  | 18 | 55 |  |  |  |
| BECO | 25 | 1 | 1 | **31** | **31** |  |  | 1 | 1 |  |  |  |
| BECO | 25 | 2 | 1 |  |  | **18** | **29** |  |  |  |  |  |
| BECO | 25 | 3 | 1 |  |  | **5** | **29** |  |  |  |  |  |
| BECO | 25 | 4 | 1 |  |  | **6** | **29** |  |  |  |  |  |
| BECO | 26 | 4 | 4 |  |  | **2** | **2** |  |  |  |  |  |
| BECO | 27 | 1 | 1 | **1** | **1** |  |  |  |  |  |  |  |
| FAGR | 6 | 2 | 1 | **2** | **3** | **2** | **4** |  |  |  |  |  |
| FAGR | 6 | 3 | 1 |  |  | **1** | **4** |  |  |  |  |  |
| FAGR | 6 | 4 | 1 | **1** | **3** | **1** | **4** |  |  |  |  |  |
| FAGR | 18 | 4 | 1 |  |  |  |  | 1 | 1 |  |  |  |
| PIRU | 4 | 1 | 4 | **2** | **12** |  |  | 8 | 19 |  |  |  |
| PIRU | 4 | 2 | 4 | **1** | **12** |  |  | 4 | 19 |  |  |  |
| PIRU | 4 | 3 | 4 | **5** | **12** |  |  | 6 | 19 |  |  |  |
| PIRU | 4 | 4 | 4 | **4** | **12** |  |  | 1 | 19 |  |  |  |
| PIRU | 5 | 1 | 1 | **1** | **7** |  |  | 13 | 38 |  |  |  |
| PIRU | 5 | 2 | 1 | **2** | **7** | **1** | **2** | 16 | 38 |  |  |  |
| PIRU | 5 | 3 | 1 |  |  |  |  | 5 | 38 |  |  |  |
| PIRU | 5 | 4 | 1 | **4** | **7** | **1** | **2** | 4 | 38 |  |  |  |
| PIRU | 6 | 1 | 1 | **1** | **5** | **1** | **1** | 4 | 7 |  |  |  |
| PIRU | 6 | 2 | 1 | **3** | **5** |  |  | 2 | 7 |  |  |  |
| PIRU | 6 | 3 | 1 | **1** | **5** |  |  | 1 | 7 |  |  |  |
| PIRU | 7 | 4 | 1 | **2** | **2** |  |  |  |  |  |  |  |
| PIRU | 8 | 1 | 3 | **2** | **3** |  |  | 4 | 8 |  |  |  |
| PIRU | 8 | 3 | 3 | **1** | **3** |  |  |  |  |  |  |  |
| PIRU | 8 | 4 | 3 |  |  |  |  | 4 | 8 |  |  |  |
| PIRU | 9 | 1 | 2 |  |  |  |  | 4 | 16 |  |  |  |
| PIRU | 9 | 2 | 2 | **18** | **18** | **1** | **1** | 11 | 16 |  |  |  |
| PIRU | 9 | 3 | 2 |  |  |  |  | 1 | 16 |  |  |  |
| PIRU | 10 | 1 | 3 | **4** | **22** |  |  | 2 | 25 |  |  |  |
| PIRU | 10 | 2 | 3 | **10** | **22** |  |  | 8 | 25 |  |  |  |
| PIRU | 10 | 3 | 3 | **4** | **22** |  |  | 7 | 25 |  |  |  |
| PIRU | 10 | 4 | 3 | **4** | **22** |  |  | 8 | 25 |  |  |  |
| PIRU | 11 | 1 | 1 | **24** | **73** | **3** | **8** | 5 | 60 |  |  |  |
| PIRU | 11 | 2 | 1 | **12** | **73** | **1** | **8** | 18 | 60 |  |  |  |
| PIRU | 11 | 3 | 1 | **16** | **73** |  |  | 27 | 60 |  |  |  |
| PIRU | 11 | 4 | 1 | **21** | **73** | **4** | **8** | 10 | 60 |  |  |  |
| PIRU | 12 | 1 | 3 | **8** | **30** |  |  | 4 | 51 |  |  |  |
| PIRU | 12 | 2 | 3 | **6** | **30** | **5** | **13** | 18 | 51 |  |  |  |
| PIRU | 12 | 3 | 3 | **5** | **30** |  |  | 9 | 51 |  |  |  |
| PIRU | 12 | 4 | 3 | **11** | **30** | **8** | **13** | 20 | 51 |  |  |  |
| PIRU | 13 | 1 | 2 | **1** | **9** |  |  |  |  |  |  |  |
| PIRU | 13 | 2 | 2 | **7** | **9** | **2** | **3** | 16 | 18 |  |  |  |
| PIRU | 13 | 3 | 2 | **1** | **9** | **1** | **3** |  |  |  |  |  |
| PIRU | 13 | 4 | 2 |  |  |  |  | 2 | 18 |  |  |  |
| PIRU | 14 | 1 | 2 | **7** | **10** |  |  | 19 | 21 |  |  |  |
| PIRU | 14 | 2 | 2 | **2** | **10** |  |  | 1 | 21 |  |  |  |
| PIRU | 14 | 3 | 2 |  |  |  |  | 1 | 21 |  |  |  |
| PIRU | 14 | 4 | 2 | **1** | **10** |  |  |  |  |  |  |  |
| PIRU | 15 | 1 | 2 | **2** | **13** |  |  |  |  |  |  |  |
| PIRU | 15 | 2 | 2 | **3** | **13** |  |  | 3 | 4 |  |  |  |
| PIRU | 15 | 3 | 2 | **4** | **13** |  |  | 1 | 4 |  |  |  |
| PIRU | 15 | 4 | 2 | **4** | **13** |  |  |  |  |  |  |  |
| PIRU | 16 | 1 | 2 |  |  |  |  | 3 | 13 |  |  |  |
| PIRU | 16 | 2 | 2 |  |  | **1** | **3** | 4 | 13 |  |  |  |
| PIRU | 16 | 3 | 2 |  |  | **2** | **3** | 4 | 13 |  |  |  |
| PIRU | 16 | 4 | 2 | **1** | **1** |  |  | 2 | 13 |  |  |  |
| PIRU | 17 | 1 | 4 | **4** | **10** |  |  | 12 | 48 |  |  |  |
| PIRU | 17 | 2 | 4 | **4** | **10** |  |  | 17 | 48 |  |  |  |
| PIRU | 17 | 3 | 4 |  |  |  |  | 2 | 48 |  |  |  |
| PIRU | 17 | 4 | 4 | **2** | **10** |  |  | 17 | 48 |  |  |  |
| PIRU | 18 | 1 | 1 | **4** | **11** | **1** | **4** | 11 | 110 |  |  |  |
| PIRU | 18 | 2 | 1 | **3** | **11** | **1** | **4** | 49 | 110 |  |  |  |
| PIRU | 18 | 3 | 1 | **3** | **11** | **2** | **4** | 28 | 110 |  |  |  |
| PIRU | 18 | 4 | 1 | **1** | **11** |  |  | 22 | 110 |  |  |  |
| PIRU | 19 | 2 | 2 | **1** | **4** |  |  | 7 | 10 |  |  |  |
| PIRU | 19 | 3 | 2 | **2** | **4** |  |  | 2 | 10 |  |  |  |
| PIRU | 19 | 4 | 2 | **1** | **4** |  |  | 1 | 10 |  |  |  |
| PIRU | 20 | 1 | 3 | **7** | **18** | **5** | **10** | 17 | 52 |  |  |  |
| PIRU | 20 | 2 | 3 | **4** | **18** |  |  | 6 | 52 |  |  |  |
| PIRU | 20 | 3 | 3 | **1** | **18** | **1** | **10** | 7 | 52 |  |  |  |
| PIRU | 20 | 4 | 3 | **6** | **18** | **4** | **10** | 22 | 52 |  |  |  |
| PIRU | 21 | 1 | 3 | **1** | **1** |  |  | 8 | 37 |  |  |  |
| PIRU | 21 | 2 | 3 |  |  |  |  | 10 | 37 |  |  |  |
| PIRU | 21 | 3 | 3 |  |  |  |  | 1 | 37 |  |  |  |
| PIRU | 21 | 4 | 3 |  |  | **3** | **3** | 18 | 37 |  |  |  |
| PIRU | 22 | 1 | 3 |  |  | **1** | **3** |  |  |  |  |  |
| PIRU | 22 | 2 | 3 |  |  | **1** | **3** | 2 | 3 |  |  |  |
| PIRU | 22 | 3 | 3 | **1** | **1** |  |  |  |  |  |  |  |
| PIRU | 22 | 4 | 3 |  |  | **1** | **3** | 1 | 3 |  |  |  |
| PIRU | 23 | 2 | 4 |  |  | **1** | **4** | 1 | 2 |  |  |  |
| PIRU | 23 | 3 | 4 |  |  | **3** | **4** | 1 | 2 |  |  |  |
| PIRU | 24 | 1 | 1 |  |  | **1** | **5** | 1 | 12 |  |  |  |
| PIRU | 24 | 2 | 1 | **10** | **11** | **1** | **5** |  |  |  |  |  |
| PIRU | 24 | 3 | 1 |  |  | **3** | **5** | 2 | 12 |  |  |  |
| PIRU | 24 | 4 | 1 | **1** | **11** |  |  | 9 | 12 |  |  |  |
| PIRU | 25 | 1 | 1 | **3** | **14** |  |  | 3 | 18 |  |  |  |
| PIRU | 25 | 2 | 1 | **7** | **14** |  |  |  |  |  |  |  |
| PIRU | 25 | 3 | 1 | **1** | **14** |  |  | 3 | 18 |  |  |  |
| PIRU | 25 | 4 | 1 | **3** | **14** | **1** | **1** | 12 | 18 |  |  |  |
| PIRU | 26 | 1 | 4 | **1** | **7** |  |  |  |  |  |  |  |
| PIRU | 26 | 2 | 4 | **1** | **7** |  |  | 2 | 4 |  |  |  |
| PIRU | 26 | 3 | 4 | **1** | **7** |  |  | 2 | 4 |  |  |  |
| PIRU | 26 | 4 | 4 | **4** | **7** | **1** | **1** |  |  |  |  |  |
| PIRU | 27 | 1 | 1 | **5** | **7** | **1** | **1** |  |  |  |  |  |
| PIRU | 27 | 2 | 1 | **2** | **7** |  |  |  |  |  |  |  |
| PRPE | 4 | 1 | 4 | **2** | **3** |  |  |  |  |  |  |  |
| PRPE | 4 | 4 | 4 | **1** | **3** |  |  |  |  |  |  |  |
| PRPE | 5 | 1 | 1 | **1** | **1** |  |  |  |  |  |  |  |
| PRPE | 6 | 1 | 1 | **1** | **6** |  |  |  |  |  |  |  |
| PRPE | 6 | 2 | 1 | **4** | **6** |  |  |  |  |  |  |  |
| PRPE | 6 | 3 | 1 | **1** | **6** |  |  |  |  |  |  |  |
| PRPE | 7 | 3 | 1 |  |  |  |  | 1 | 1 |  |  |  |
| PRPE | 13 | 2 | 2 |  |  | **1** | **1** |  |  |  |  |  |
| PRPE | 14 | 1 | 2 |  |  | **1** | **1** | 1 | 1 |  |  |  |
| PRPE | 18 | 1 | 1 | **1** | **2** |  |  |  |  |  |  |  |
| PRPE | 18 | 2 | 1 | **1** | **2** |  |  |  |  |  |  |  |
| SOAM | 4 | 1 | 4 | **4** | **19** |  |  |  |  |  |  |  |
| SOAM | 4 | 2 | 4 | **6** | **19** | **1** | **2** |  |  |  |  |  |
| SOAM | 4 | 3 | 4 | **5** | **19** |  |  |  |  |  |  |  |
| SOAM | 4 | 4 | 4 | **4** | **19** | **1** | **2** |  |  |  |  |  |
| SOAM | 5 | 1 | 1 | **1** | **2** |  |  |  |  |  |  |  |
| SOAM | 5 | 4 | 1 | **1** | **2** |  |  |  |  |  |  |  |
| SOAM | 7 | 3 | 1 | **2** | **2** |  |  | 9 | 10 |  |  |  |
| SOAM | 7 | 4 | 1 |  |  |  |  | 1 | 10 |  |  |  |
| SOAM | 9 | 2 | 2 |  |  | **1** | **1** |  |  |  |  |  |
| SOAM | 17 | 1 | 4 |  |  | **1** | **1** |  |  |  |  |  |
| SOAM | 17 | 4 | 4 |  |  |  |  | 1 | 1 |  |  |  |
| SOAM | 18 | 1 | 1 | **1** | **1** |  |  |  |  |  |  |  |
| SOAM | 18 | 2 | 1 |  |  |  |  | 2 | 11 |  |  |  |
| SOAM | 18 | 3 | 1 |  |  |  |  | 1 | 11 |  |  |  |
| SOAM | 18 | 4 | 1 |  |  |  |  | 8 | 11 |  |  |  |
| SOAM | 19 | 1 | 2 |  |  |  |  | 49 | 65 |  |  |  |
| SOAM | 19 | 2 | 2 | **1** | **1** |  |  | 6 | 65 |  |  |  |
| SOAM | 19 | 3 | 2 |  |  |  |  | 1 | 65 |  |  |  |
| SOAM | 19 | 4 | 2 |  |  |  |  | 9 | 65 |  |  |  |
| SOAM | 20 | 1 | 3 |  |  |  |  | 6 | 20 |  |  |  |
| SOAM | 20 | 2 | 3 |  |  |  |  | 1 | 20 |  |  |  |
| SOAM | 20 | 3 | 3 |  |  |  |  | 12 | 20 |  |  |  |
| SOAM | 20 | 4 | 3 | **2** | **2** | **1** | **1** | 1 | 20 |  |  |  |
| SOAM | 21 | 1 | 3 |  |  | **1** | **4** |  |  |  |  |  |
| SOAM | 21 | 2 | 3 |  |  | **2** | **4** | 9 | 15 |  |  |  |
| SOAM | 21 | 3 | 3 |  |  |  |  | 2 | 15 |  |  |  |
| SOAM | 21 | 4 | 3 |  |  | **1** | **4** | 4 | 15 |  |  |  |
| SOAM | 22 | 2 | 3 |  |  | **1** | **1** |  |  |  |  |  |
| SOAM | 22 | 3 | 3 |  |  |  |  | 1 | 1 |  |  |  |
| SOAM | 23 | 1 | 4 |  |  | **6** | **7** |  |  |  |  |  |
| SOAM | 23 | 4 | 4 |  |  | **1** | **7** |  |  |  |  |  |
| SOAM | 24 | 1 | 1 |  |  | **2** | **3** | 1 | 2 |  |  |  |
| SOAM | 24 | 2 | 1 |  |  |  |  | 1 | 2 |  |  |  |
| SOAM | 24 | 3 | 1 |  |  | **1** | **3** |  |  |  |  |  |
| U | 24 | 1 | 1 |  |  | **1** | **1** |  |  |  |  |  |
| UNID | 6 | 3 | 1 | **1** | **1** |  |  |  |  |  |  |  |

# APPENDIX 3 Plants miss initial size class information in 1987, 1998, and 2010

In order to distinguish saplings and plants which miss initial DBHs, we decided to set initial DBHs as 0s when we are sure they were saplings when first tagged, and leave initial DBHs as missing when we are not sure. 12/07/2011

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| PL | SUBP | TAG | SP | TAGYR | YRMORT | DBH98 | DBH10 | HT98 | HT10 | CRPOS98 | CRPOS10 | Notes from Lixi/DRP 12/02/2011 |
| 16 | 2 | 1001 | PIRU | 1987 | 1998 |  |  |  |  |  |  | Leave dbh87 as missing |
| 21 | 3 | 651 | ABBA | 1987 |  | 1.1 | 5.8 | 1.8 | 3.74 |  | o | Sap in 87. Leave DBH87 as missing |
| 21 | 4 | 652 | PIRU | 1987 |  | 0.4 | 3.65 | 1.3 |  |  |  | Sap in 87. Leave DBH87 as missing |
| 24 | 1 | 754 | ABBA | 1987 | 2010 | 0.9 |  | 1.5 |  |  |  | Sap in 87. Leave DBH87 as missing |
| 24 | 3 | 1001 | ABBA | 1987 | 1998 |  |  |  |  |  |  | Leave dbh87 as missing |
| 25 | 3 | 226 | ABBA | 1987 |  | 11.4 | 13.2 | 8.7 |  | 2 |  | Leave dbh87 as missing |
| 27 | 1 | 1407 | UNID | 1987 | 1998 |  |  |  |  |  |  | Leave dbh87 as missing |
| 27 | 2 | 6 | ABBA | 1987 |  | 13.1 | 15.8 | 7.2 |  | 4 |  | Leave dbh87 as missing |
| 11 | 1 | 98592 | ABBA | 1998 | 2010 |  |  | 1.8 |  |  |  | It was a sapling in 1998, but HT >1.37, so leave DBH98 as missing |
| 19 | 2 | 347 | ABBA | 2010 |  |  |  |  | 1.07 |  |  | Should be a sapling, and HT <1.37, Set DBH10=0 |
| 19 | 3 | 1073 | ABBA | 2010 |  |  |  |  | . |  |  | Leave dbh10 as missing |
| 19 | 3 | 1080 | ABBA | 2010 |  |  |  |  | . |  |  | Leave dbh10 as missing |
| 20 | 3 | 62 | ABBA | 2010 |  |  |  |  | 1.33 |  |  | Field checked in 2011. DAH11=2.6. should be a saplings in 2010. Set DBH10=0, 2011 data added too. |
| 24 | 4 | 133 | ABBA | 2010 |  |  |  |  |  |  |  | Two 133s. Identified as the same tree. But regarding big difference in DBH=0 & 1.58, still need to be field checked. |
| 24 | 4 | 501 | ABBA | 2010 |  |  |  |  |  |  |  | Leave dbh10 as missing |
| 24 | 4 | 2165 | ABBA | 2010 |  |  |  |  |  |  |  | Two 2165s. DBH=0 & 1.85, still need to be field checked |
| 24 | 4 | 2166 | ABBA | 2010 |  |  |  |  |  |  |  | Two 2166s. DBH=0 & 2.71 still need to be field checked |
| 24 | 4 | 2328 | ABBA | 2010 |  |  |  |  |  |  |  | Two 2328s. DBH=0 & 0.72 still need to be field checked |
| 25 | 4 | 373 | ABBA | 2010 |  |  |  |  |  |  |  | Checked in 2011. DAH11=3, HT11=119. Should be a sapling in 2010. Set DBH10=0, 2011 data added too. |

# APPENDIX4 Correction made for 1988 re-measurement data

1988 re-measurement data set doesn’t merge with m*as98.ssd* completely; this is because SPLOT, TAG, SPECIES for some 1986 trees got changed/corrected in *mas98.ssd* after 1988. They are listed as follows:

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| PLOT | SPLOT | TAG | SPECIES | DBH | TREEHT | DECM88 | DECW88 | CRPOS88 | **Corrections (referring to mas98.ssd)** |
| 5 | 3 | 730 | abba | 16.1 | 10.4 | 0 | 0 | i | **SPLOT=4** |
| 6 | 1 | 892 | piru | 10.4 | 8.25 | 4 | 4 | i | **SPLOT=2** |
| 7 | 1 | 901 | beco | 18.8 | 11.8 | 0 | 0 | c | **TAG=1901** |
| 7 | 2 | 523 | beco | 23.3 | 13.4 | 0 | 0 | d | **TAG=1523** |
| 7 | 2 | 524 | piru | 9.3 | 6.9 | 2 | 2 | i | **TAG=1524** |
| 7 | 2 | 817 | piru | 21.5 | 8.63 | 2 | 1 | i | **DBH=12.5** |
| 8 | 1 | 575 | abba | 5.6 | 4.54 | 1 | 2 | o | **TAG=1575** |
| 8 | 2 | 525 | abba | 9.2 | 6.1 | 4 | 4 | i | **TAG=1525** |
| 8 | 2 | 663 | abba | 9.8 | 10.7 | 0 | 0 |  | **SP=PIRU** |
| 8 | 3 | 570 | abba | 16.9 | 9.55 | 0 | 0 | i | **TAG=1570** |
| 9 | 1 | 133 | abba | 23.6 | 11.4 | 1 | 1 | c | **TAG=1133** |
| 9 | 1 | 135 | abba | 7.2 | 5.01 | 0 | 0 | o | **TAG=1135** |
| 9 | 1 | 139 | abba | 7.6 | 6.53 | 2 | 1 | i | **TAG=1139** |
| 9 | 1 | 140 | abba | 6.7 | 5.82 | 0 | 0 | i | **TAG=1140** |
| 9 | 1 | 142 | abba | 8.2 | 6.01 | 0 | 0 | i | **TAG=1142** |
| 9 | 1 | 488 | abba | 7.6 | 4.91 | 4 | 4 | o | **TAG=1488** |
| 10 | 2 | 670 | piru | 20.2 | 9.17 | 4 | 4 | d | **TAG=1670** |
| 10 | 4 | 29 | abba | 16.8 | 12.8 | 1 | 1 | c | **TAG=1029** |
| 10 | 4 | 851 | abba | 6.1 | 6.03 | 2 | 2 | o | **TAG=890** |
| 10 | 4 | 853 | abba | 9.7 | 5.25 | 2 | 2 | o | **TAG=1853** |
| 10 | 4 | 862 | beco | 11.2 | 11.7 | 0 | 0 | c | **TAG=1862** |
| 11 | 1 | 116 | abba | 20.3 | 15.6 | 1 | 1 | d | **TAG=1116** |
| 11 | 1 | 118 | piru | 13.5 | 11.1 | 4 | 4 | c | **TAG=1118;SPLOT=2** |
| 11 | 1 | 124 | piru | 14.2 | 12.5 | 4 | 4 | c | **TAG=1124** |
| 11 | 2 | 125 | beco | 15 | 11.3 | 0 | 0 | c | **TAG=1125** |
| 11 | 2 | 148 | beco | 11 | 10.1 | 0 | 0 | c | **TAG=1148** |
| 11 | 2 | 190 | beco | 9.4 | 9.28 | 0 | 0 | c | **TAG=1190** |
| 11 | 2 | 197 | abba | 5.5 | 3.55 | 2 | 1 | o | **TAG=1197** |
| 11 | 2 | 404 | abba | 10.4 | 11.2 | 4 | 4 | c | **TAG=1404** |
| 11 | 2 | 772 | beco | 12.4 | 10.5 | 0 | 0 | c | **TAG=7721** |
| 12 | 1 | 938 | piru | 13 |  | 2 | 2 | i | **DBH=10** |
| 12 | 1 | 940 | piru | 11.6 | 10 | 4 | 4 | c | **TAG=1940** |
| 12 | 1 | 946 | abba | 7.2 | 8.4 | 4 | 4 | i | **TAG=1946** |
| 12 | 2 | 933 | abba | 8.1 | 6.04 | 1 | 1 | i | **TAG=1933** |
| 12 | 2 | 935 | beco | 11.7 | 12 | 0 | 0 | c | **TAG=1935** |
| 12 | 2 | 936 | piru | 7.2 | 5.53 | 4 | 4 | o | **TAG=1936** |
| 12 | 2 | 937 | abba | 6.7 | 5.7 | 1 | 1 | i | **TAG=1937** |
| 12 | 2 | 941 | abba | 14.7 | 13.6 | 1 | 1 | c | **TAG=1941** |
| 12 | 2 | 942 | abba | 7 | 6.03 | 2 | 2 | i | **TAG=1942** |
| 12 | 2 | 943 | piru | 10 | 8.16 | 4 | 4 | i | **TAG=1943** |
| 12 | 2 | 944 | beco | 11.4 | 10 | 0 | 0 | c | **TAG=1944** |
| 12 | 2 | 945 | beco | 10.4 | 10.5 | 0 | 0 | c | **TAG=1945** |
| 12 | 3 | 115 | piru | 9.6 | 7.54 | 2 | 1 | i | **SPLOT=4** |
| 12 | 3 | 869 | beco | 12.5 | 11.1 | 0 | 0 | c | **SPLOT=4** |
| 12 | 4 | 730 | beco | 11 | 10.5 | 0 | 0 | c | **SPLOT=2** |
| 13 | 4 | 126 | pyde | 5.1 | 4.54 | 5 | 5 | i | **SPLOT=2** |
| 14 | 1 | 28 | piru | 12.8 |  | 4 | 4 | c | **TAG=1028** |
| 14 | 2 | 390 | piru | 12.7 |  | 4 | 4 |  | **SPLOT=2** |
| 14 | 2 | 507 | beco | 17 | 8.1 | 0 | 0 | c | **TAG=1507** |
| 14 | 2 | 536 | abba | 9.1 | 6.2 | 1 | 1 | c | **TAG=1001** |
| 14 | 2 | 547 | abba | 13.8 | 8.6 | 2 | 2 | d | **TAG=1547** |
| 14 | 2 | 557 | abba | 10.2 | 5.2 | 1 | 2 | i | **TAG=1557** |
| 14 | 2 | 564 | beco | 12.3 | 6.3 | 0 | 0 | c | **TAG=1564** |
| 14 | 2 | 571 | abba | 6.3 | 3.3 | 1 | 2 | o | **TAG=1571** |
| 14 | 2 | 581 | piru | 13.5 | 9 | 4 | 4 | d | **TAG=1581** |
| 14 | 2 | 583 | beco | 9.1 | 5.52 | 0 | 0 | c | **TAG=1583** |
| 14 | 2 | 599 | abba | 9.8 | 5.5 | 4 | 4 | i | **TAG=1599** |
| 14 | 3 | 582 | abba | 12.9 |  | 1 | 1 | d | **TAG=1006** |
| 14 | 4 | 535 | piru | 8 |  | 4 | 4 | i | **TAG=585** |
| 15 | 4 | 685 | abba | 14.4 |  | 0 | 0 | c | **TAG=1000** |

# APPENDIX5 Plants had Species identification changed in 1998

This table was created by comparing variable SPECIES (sp8687) and SPFINAL(sp98) in mas98.ssd. Details see SAS program: R:\MOOSHUBB\longterm\lixi kong\MAS98NEW\SPchange.sas

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| PLOT | SUBPLOT | TAG | sp8687 | sp98 |
| 4 | 1 | 125 | PYDE | ACSP |
| 4 | 3 | 4 | BEAL | BEPA |
| 4 | 3 | 813 | BEAL | BEPA |
| 4 | 3 | 989 | BEAL | BEPA |
| 5 | 4 | 765 | BECO | BEAL |
| 6 | 1 | 635 | ACPE | ACSA |
| 6 | 2 | 45 | BECO | BEPA |
| 6 | 2 | 611 | BEAL | ABBA |
| 6 | 3 | 697 | UNDE | UNID |
| 6 | 4 | 603 | UNDE | BEAL |
| 7 | 2 | 817 | PIRU | ABBA |
| 7 | 2 | 889 | ABBA | BECO |
| 8 | 3 | 3 | BECO | BEPA |
| 8 | 3 | 565 | PIRU | ABBA |
| 8 | 4 | 261 | BECO | ABBA |
| 9 | 2 | 389 | BECO | BEAL |
| 9 | 3 | 145 | BEAL | BECO |
| 11 | 1 | 129 | PIRU | ABBA |
| 11 | 1 | 323 | PIRU | ABBA |
| 11 | 1 | 971 | PIRU | ABBA |
| 11 | 2 | 757 | PIRU | ABBA |
| 11 | 2 | 789 | PIRU | ABBA |
| 11 | 2 | 1125 | BECO | BEAL |
| 11 | 3 | 279 | BECO | ABBA |
| 12 | 1 | 519 | PIRU | ABBA |
| 12 | 1 | 580 | UNID | ABBA |
| 12 | 1 | 591 | PIRU | ABBA |
| 12 | 1 | 957 | PIRU | ABBA |
| 12 | 2 | 138 | BECO | BEPA |
| 12 | 2 | 912 | BECO | BEPA |
| 12 | 2 | 920 | PIRU | ABBA |
| 12 | 2 | 922 | BECO | BEPA |
| 12 | 2 | 931 | BECO | BEPA |
| 12 | 2 | 947 | BECO | BEPA |
| 12 | 2 | 953 | BECO | BEPA |
| 12 | 2 | 958 | BECO | BEPA |
| 12 | 2 | 961 | BECO | BEPA |
| 12 | 2 | 967 | PIRU | ABBA |
| 12 | 2 | 979 | PIRU | ABBA |
| 12 | 2 | 987 | PIRU | ABBA |
| 12 | 2 | 988 | BECO | BEPA |
| 12 | 2 | 1944 | BECO | BEPA |
| 12 | 2 | 1945 | BECO | BEPA |
| 12 | 3 | 682 | PIRU | ABBA |
| 13 | 2 | 1077 | ABBA | PIRU |
| 14 | 1 | 603 | ABBA | PIRU |
| 14 | 4 | 268 | BECO | ABBA |
| 16 | 2 | 632 | ABBA | BECO |
| 16 | 2 | 637 | BECO | ABBA |
| 16 | 4 | 668 | BECO | BEAL |
| 17 | 4 | 879 | PIRU | ABBA |
| 17 | 4 | 882 | PIRU | ABBA |
| 18 | 1 | 314 | BEAL | BECO |
| 18 | 4 | 259 | BEAL | BECO |
| 18 | 4 | 265 | BEAL | PRPE |
| 19 | 3 | 805 | BECO | ABBA |
| 20 | 4 | 153 | BECO | BEAL |
| 20 | 4 | 523 | BECO | BEAL |
| 21 | 4 | 113 | BEAL | BECO |
| 21 | 4 | 117 | BEAL | BECO |
| 22 | 2 | 964 | ABBA | PIRU |
| 23 | 4 | 88 | PYDE | BECO |
| 25 | 2 | 800 | ABBA | BECO |
| 25 | 4 | 977 | BEAL | SOAM |
| 25 | 4 | 978 | BEAL | SOAM |
| 26 | 3 | 53 | PIRU | ABBA |
| 27 | 1 | 407 | ABBA | PIRU |
| 27 | 1 | 932 | PIRU | ABBA |
| 27 | 4 | 400 | BECO | BEPA |

# APPENDIX 6 1989 winter injury data issues.

Plants with CLASS=2(saplings) in 1989, but had DBH in previous year larger than 5. This table also includes all plants that “come back alive in 1989” (bold)

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| PL | SPL | TAG | SPEC | CL | TAGY | STAT86 | STAT87 | STAT88 | STAT89 | STAT98 | DBH86 | DEC86 | DBH87 | DEC87 | WD89AV | EXWI89 | DECM89 |
| **9** | **1** | **494** | **PIRU** | **A** | **1986** | **DEAD** |  | **DEAD** | **ALIVE** | **DEAD** | **5.5** | **4** |  |  | **1.67** |  | 1 |
| 10 | 2 | 792 | PIRU | P | 1986 | ALIVE |  | ALIVE | ALIVE | ALIVE | 18.6 | 2 |  |  | 1.45 |  | 1 |
| **11** | **4** | **640** | **BECO** | **P** | **1986** | **ALIVE** |  | **DEAD** | **ALIVE** | **DEAD** | **10.6** |  |  |  | **2.00** |  | 2 |
| 13 | 4 | 58 | ABBA | P | 1986 | ALIVE |  |  | ALIVE | ALIVE | 7.3 | 2 |  |  | 2.33 |  | 2 |
| **13** | **4** | **59** | **ABBA** | **P** | **1986** | **DEAD** |  | **DEAD** | **ALIVE** | **DEAD** | **5.6** | **4** |  |  | **3.00** |  | 2 |
| 13 | 4 | 72 | ABBA | P | 1986 | ALIVE |  |  | ALIVE | ALIVE | 5.6 | 2 |  |  | 3.67 |  | 2 |
| 14 | 1 | 948 | PIRU | P | 1986 | ALIVE |  | ALIVE | ALIVE | ALIVE | 14.4 | 2 |  |  | 2.00 |  | 2 |
| 14 | 1 | 949 | ABBA | P | 1986 | ALIVE |  | ALIVE | ALIVE | ALIVE | 5.4 | 1 |  |  | 1.00 |  | 2 |
| 14 | 2 | 1001 | ABBA | P | 1986 | ALIVE |  | ALIVE | ALIVE | ALIVE | 9.1 | 2 |  |  | 2.00 |  | 3 |
| 14 | 3 | 1002 | ABBA | P | 1986 | ALIVE |  | ALIVE | ALIVE | ALIVE | 8.5 | 2 |  |  | 1.67 |  | 3 |
| **17** | **3** | **611** | **ABBA** | **P** | **1987** |  | **DEAD** |  | **ALIVE** | **DEAD** |  |  | **20.1** | **4** | **4.67** |  | 2 |
| 17 | 3 | 616 | PIRU | A | 1987 |  | ALIVE |  | ALIVE | ALIVE |  |  | 23.7 | 2 | 3.33 |  | 2 |

Plants had winter injury data recorded in 1989, but had species not equal to PIRU after merged with mas98.ssd. Some had species changed from PIRU to ABBA in 1998. Some did not.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| PL | SB | TAG | CL | TAGY | YRM | SP | DBH86 | DBH87 | HT88 | BX | BY | WIN89 | EXP89 | DECM89 | older88 | DBH98 | Lixi Notes |
| 7 | 2 | 817 | P | 1986 |  | ABBA | 12.5 |  |  | 1 | 9 | 3.33 |  | 3 | 0 | 12.6 | Sp changed to ABBA in 1998 |
| 8 | 3 | 565 | P | 1986 |  | ABBA | 7.7 |  |  | 8 | 7 | 3.45 |  | 3 | 0 | 8.1 | The same as above |
| 11 | 2 | 789 | P | 1986 |  | ABBA | 22.5 |  |  | 3 | 8 | 2.45 |  | 2 | 0 | 24.8 | The same as above |
| 12 | 1 | 591 | P | 1986 | 1998 | ABBA | 15 |  |  | 1 | 2 | 5.00 |  | 3 | 0 | 14.6 | The same as above |
| 12 | 3 | 682 | P | 1986 |  | ABBA | 7.4 |  |  | 6 | 10 | 2.91 |  | 2 | 0 | 7.7 | The same as above |
| 12 | 2 | 979 | P | 1986 | 1998 | ABBA | 6.5 |  |  | 2 | 7 | 3.13 |  | 3 | 0 | 6.3 | The same as above |
| 27 | 1 | 932 | P | 1987 |  | ABBA |  | 14.1 |  | 1 | 4 | 3.67 | 1.33 | 1 | 0 | 15.8 | The same as above |
|  | | | | | | | | | | | | | | | | | |
| 7 | 1 | 524 | P | 1988 |  | ABBA |  |  | 2.21 | 3 | 3 | 2.50 |  | 3 | 0 | 3 |  |
| 11 |  | 909 |  |  |  |  |  |  |  |  |  | 2.00 |  | 3 | 0 |  | Omitted this plant. |
| 11 | 4 | 640 | P | 1986 | 1988 | BECO | 10.6 |  |  | 8 | 2 | 2.00 |  | 2 | 0 |  |  |
| 13 | 4 | 58 | P | 1986 |  | ABBA | 7.3 |  |  | 8 | 2 | 2.33 |  | 2 | 1 | 7.7 |  |
| 13 | 4 | 59 | P | 1986 | 1986 | ABBA | 5.6 |  |  | 6 | 3 | 3.00 |  | 2 | 1 |  | Didn’t found alive  In 2010 |
| 13 | 4 | 72 | P | 1986 |  | ABBA | 5.6 |  |  | 7 | 4 | 3.67 |  | 2 | 0 | 6.9 |  |
| 14 | 1 | 949 | P | 1986 |  | ABBA | 5.4 |  |  | 2 | 4 | 1.00 |  | 2 | 0 | 6.9 |  |
| 14 | 2 | 1001 | P | 1986 |  | ABBA | 9.1 |  |  | 3 | 8 | 2.00 |  | 3 | 0 | 11.5 | Tag was 536. |
| 14 | 3 | 1002 | P | 1986 |  | ABBA | 8.5 |  |  | 9 | 9 | 1.67 |  | 3 | 0 | 8.9 |  |
| 17 | 3 | 611 | P | 1987 | 1987 | ABBA |  | 20.1 |  | 10 | 7 | 4.67 |  | 2 | 0 |  | Didn’t find alive in 2010 |

# APPENDIX 7 YRMORT/STAT and DECM inconsistency correction

* When DECM86 is equal to 4 or 5, two plants had STAT86=ALIVE. If not come back alive in 88, set DECM as missing.

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| b0 | b1 | a0 | a1 | xb |  |  |  |  |  |  |
| 0.7321 | 2.268 | -1.4187 | -1.6712 | 1.066038 |  | 0.323698 |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |

Plants with YRMORT=1998 in mas98.ssd but had DECM98 ne 4 (When DECM98=4, all STAT98s are equal to ‘DEAD’):

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| PLOT | SPLT | TAG | SP | CL | YRTAG | STAT98 | STAT10 | YRMOR | DECM98 | DBH98 | TOTHT98 | COND98 | Corrections referring to hard copies |
| 11 | 4 | 732 | ABBA | P | 1986 | DEAD | DEAD | 1998 | 1 | 5.4 | . | . | COND98=4; DECAY98=2. DECM98=4 |
| 21 | 1 | 111 | ABBA | P | 1987 | DEAD | DEAD | 1998 | 2 | . | 7.7 | 2 | Double checked to be dead by PAP. DECM98 was set to be 4 |
| 21 | 4 | 506 | ABBA | P | 1987 | DEAD | DEAD | 1998 | 3 | . | 11.7 | . | Double checked to be dead by PAP. DECM98 was set to be 4 |

Plants with DECM10=4 and STAT10=’NF’

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| PL | SPL | TAG | SP | CL | YRTAG | STAT98 | STAT10 | YRMORT | DECM10 | COND10 | DECAY10 | corrections |
| 11 | 1 | 687 | ABBA | P | 1988 | ALIVE | NF | 2010 | 4 | . | 8 | Set DECM and COND missing, DECY10=7 |
| 11 | 1 | 688 | ABBA | P | 1988 | ALIVE | NF | 2010 | 4 | . | 8 | Same as above |
| 13 | 2 | 329 | PIRU | A | 1986 | NF | NF | 1998 | 4 | 2 | 2 | Same as above |

Plants with STAT10=’DEAD’ and DECM10 NE 4

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| PL | SPL | TAG | SP | CL | YRTAG | STAT98 | STAT10 | YRMORT | DECM10 | CPOS10 | corrections |
| 19 | 4 | 953 | PIRU | A | 1987 | DEAD | DEAD | 1987 | 1 | o | Set DECM missing |
| 19 | 4 | 956 | PIRU | A | 1987 | ALIVE | DEAD | 2010 | 1 | o | Set DECM missing |
| 19 | 4 | 963 | PIRU | A | 1987 | DEAD | DEAD | 1998 | 1 |  | Set DECM missing |

# APPENDIX8 DBH and HT inconsistency correction

Plants with HT98 greater than 1.37, but DBH98 equal to 0. DBH98 was set as missing if no corrections could be made referring to hard copies.

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| PLT | SP | TAG | SPEC | **DBH98** | **TOTHT98** | **HTTCR98** | **STAT10** | **hard copies** | **corrections** |
| 6 | 1 | 98634 | ACSP | **0** | **2.3** | **2.3** | **NF** | **Consistent** | **DBH98 was set as missing** |
| 25 | 4 | 98806 | ABBA | **0** | **4** | **4** | **NF** | **No DBH hard copies.**  **HTs consistent** | **DBH98 was set as missing** |
| 21 | 1 | 111 | ABBA | **0** | **7.7** | **7.7** | **DEAD** | **No DBH hard copies.**  **HTs consistent** | **DBH98 was set as missing** |
| 11 | 2 | 764 | PIRU | **0** | **10** | **10** | **DEAD** | **TOTHT98=1.1** | **Corrected it.** |
| 21 | 4 | 506 | ABBA | **0** | **11.7** | **11.7** | **DEAD** | **No DBH hard copies.**  **HTs consistent** | **DBH98 was set as missing** |

# APPENDIX9 Herb/Shrub/Seedling Species found in herbaceous plots in each census year

This needs to be updated Lixi May 2013

Species found in 1986

|  |  |  |
| --- | --- | --- |
| Species | Common name | Data collected |
| ABBA | Balsam fir | Seedling count |
|  |  |  |
| ACPE | Striped maple |  |
| BEAL | Yellow birch | Seedling count |
|  |  | Sapling count |
| BECO |  |  |
| BESPP (some were recorded as BETUL) | Unidentified birch | Seedling count |
|  |  | Sapling count |
| FAGR | American beech | Seedling count |
|  |  | Sapling count |
| PIRU | Red spruce | Seedling count |
|  |  | Sapling count |
| SOAM (old Abbr.: PYDE) | Mountain ash | Seedling count |
| PRPE | Pin cherry | Seedling count |
| ACPE | Striped maple | Shrub cover |
| ACSP | Mountain maple | Shrub cover |
| RIGL | Skunk currant | Shrub cover |
| SAPU | Red-berried elder | Shrub cover |
| VIAL | hobblebush | Shrub cover |
| VISPP |  | Shrub cover |
| RUSPP |  |  |
| ARNU |  | Herb cover |
| ARSPP |  |  |
| ASAC |  |  |
| ATFI |  |  |
| CASPP |  |  |
| CLBO |  |  |
| COCA |  |  |
| COGR |  |  |
| DRIN |  |  |
| DRSP |  |  |
| LYLU |  |  |
| MACA |  |  |
| MEVI |  |  |
| MOUN |  |  |
| OSCI |  |  |
| OXMO |  |  |
| TRBO |  |  |
| TRUN |  |  |
| UKMO |  |  |