**Segment Data History 1988-2012**

Lixi Kong Updated 10/28/2014

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# *For Soil/Slope Data collected in 1986/1987, see “[Segsoil Data History 8687.docx](../SegTrSoil/Segsoil%20Data%20History%208687.docx)”*

# *1. Tagged seedling/sapling Data*

*East side contour were surveyed in 1988: LE1860 (2750’/840m), ME2020(3250’/990m), HE140, and HE1080(both High East are at 3750’/1140m) (51 segments in total).*

## *1. 1Data collected in 1988*

*PIRU seedlings (*(height <1m) *were tagged on the whole segment within the 2m wide band. After collecting data for a spruce seedling, the nearest ABBA seedling of the same height class was also tagged and measured.*

SAS Data Set: [R:\MOOSHUBB\longterm\Contour89\eastbaby.ssd](../../Contour89/eastbaby.sas7bdat)

*This part of data was merged with 1989 data as* ***contour.ssd****, which will be explained later.*

## *1.2 Data collected in 1989*

*25 randomly chosen segments on WEST aspect from 2750’, 3250’, and 3750’ elevations were surveyed in 1989 at contour LW1900, MW1600, HW400, and HW600. All 1989 data were merged with 1988 data as* ***contour.ssd***

### *1.2.1 Tagged seedling in 1989*

*Measurements were collected on the first 5 PIRU seedlings encountered in the 1m band and the first 5 ABBA seedlings encountered in the 1\*1 quadrats. First year seedlings were only tagged and measured if no older seedlings were available. No distinction between older and first year seedlings was made for the first four segments at low elevation.*

### *1.2.2 Tagged sapling in 1989*

*Measurements were collected on the first 3 PIRU saplings and the first 3 ABBA saplings on the whole segment (4m wide).* *Saplings were skipped if there was no 1989 growth or if the leader was damaged due to browsing or mechanical injury in such a way that the year of the extension growth was in question.*

## *1.3 Combined data set for 1988 and 1989 data*

SAS data set: [R:\MOOSHUBB\longterm\Contour89\contour.ssd](../../Contour89/contour.sas7bdat)

*This data set has combined seeding, sapling, herb, substrate, and prism data collected in 1988 and 1989, and was last modified in 2004, there is still problems need to be corrected. Details see below*

**CONTOUR:** Contour designation of the segment

**SEGMENT:** Beginning pace number of the segment. Contour 1860 pace 280 was corrected as pace 260 in 1998/1999. Put it in “Field check after 2011” file.

**ELEV:** Descriptions of elevation and aspect. Eg. “LOWEAST”.

**SPECIES:** seedling or sapling species. 1=ABBA; 2=PIRU. Some are missing, which means segments we didn’t sample for seedlings. (They might have seglength, slope pirsm data)

**NUMBER:** Tag numbers. For 1988 seedlings, all tag numbers are <=1000. For 1989 seedling, they are all 1, 2, 3, 4, or 5; for 1989 saplings, they are all 1, 2, or 3. Columns where tag numbers were missing were usually for recording data other than demographic data such as herb cover data.

**PACE:** note keeper’s pace from the start of the segment to the seedling/sapling collected 1988, NOT in1989. Similar to “ALONG” in 98/99 data, but the unit here is “pace”.

**HEIGHT:** height for all 1988/1989 tagged seedling or saplings in cm. Negative heights indicate a plan was growing below the base

(Checking on height units:

HT88: all one decimal, all height <100, except LE560 ABBA 2 has height of 101, smallest values is 0.7. We can trust the height unit is always cm.

HT89: all plants which have substrate data (collected for seedlings) has height less than 100, all plants which don’t have substrate data have heights larger than 100, so we can trust the height unit is cm. )

**SUBSTRAT:** Substrate type Seedlings grow on collected in1988 and 1989. In 1988, Substrate types are: “1”= moss ; “2”=litter; “3”=wood>5cm diameter; “4”=bare soil. In 1989, besides these four types, the second number in this column if it exists indicates if moss was over another substrate: 1 = moss; 2 = litter; 3 = deadwood > 5cm diameter; 4 = bare soil; 5 = rock; 6 = live wood (e.g. roots)

**MINAGE**: age or minimum age for 1988 seedlings depending on REFMINAGE, ranging from 1 to 54; minimum age of 1989 seedlings, ranging from 1 to 43..

**REFMINAG:** for 1988 seedlings, if REFMINAGE=0, then MINAGE represents age; if REFMINAGE=1, then MINAGE represents minimum age.

**DECM:** decline class of saplings, only collected in 1989.

**SEGLEN:** the length of segment in m, collected in1988 and 1989. Two Mid East segments miss data.

**CLASS:** A**=**seedling; B=sapling. For tagged plants: only seedlings were tagged in 1988. In 1989, all the plants have ht89 less than 100cm has CLASS=A; all those have ht89 greater than 100cm have CLASS=B. CLASS also indicates whether it’s sapling counts or seedling counts used with ABBADEN/PIRUDEN.

**ABBADEN:** Number of ABBA seeding >1yr in 1\*1m quad (4 measurements per segment) or number of ABBA saplings in 4m band collected in 1989(1 measurement per segment). (Can use CLASS to tell whether it’s seedling or sapling density.)

**ABBA1YR:** number of 1st year ABBA seedings collected in 1989. 4 measurements per segment. Some are missing.

**PIRUDEN:** For 1988 data, this represents total number of 1yr and >1yr PIRU seedlings, collected in 2\*seglength, which can be got by counting 1988 tagged PIRU seedlings in each segment. For 1989 data, this represents Number of PIRU seedling >1yr in one 1\*seglenth in each segment, or number PIRU saplings in 4m band.

In this SAS data set, there is no PIRUDEN with CLASS of “B” (saplings), found relevant data in raw data. This is corrected in 2011 seed/sap density master file denmas99.ssd.

**PIRU1YR:** Number of 1st year PIRU seedlings collected in 1989. One measurement for each segment.

**EXT1~EXT50:** Extension growth from 1989~1940. No data for E1940~E1943. In 1988, only collected Extension growth for as many as 10 years from 1987~1978. In 1989, starting with PE1989 (this might only be half a year extension growth), XG was measured for as many years as possible for all seedlings; and for saplings, XG was measure for as many years as possible on the first sapling of each species encountered. The second and third sapling of each species in each segment had only 10 years of extension growth measured, starting with 1989 growth.

**PPOINT:** The prism point where we collected prism data in 1988 or 1989. 1=begin segment, 2=mid segment, 3=end segment. This got changed in 1998: 2=end segment; 3=mid segment.

**ALIVE:** Number of live PIRU at prism point, collected in 1988 or 1989. For 1988, only has data at prism point 3. Data for live PIRU at prism point 1 collected in 1988 are in “R:\MOOSHUBB\longterm\Seedling\prism88.ssd” as mentioned before.

**DEAD:** Number of dead PIRU at prism point, collected in 1989. Data for 1988 are in “R:\MOOSHUBB\longterm\Seedling\prism88.ssd”.

**SNAG:** Number of snag PIRU at prism point, collected in 1989.

**SLOPE:** According to protocol,Slope at HE segment was measured in 1988. However, SLOPE data here should be prism DEAD count data from 1988. This will be corrected in 2012 prism master file. Some slope data were found in soil data hard copy collected in 1986/1987. Not added to master file yet. Lixi 04/13/2012

**H1~H15/ S1~S8/ T1~T16:** Percentage of each herb/shrub/tree speices in 1\*1m quadrat, in 1988 or 1989. In 1988 data, some covers were recorded as “999”, which means “trace”. It will be set as “0.5” in 2011 segment master file, which is consistent with 1998/1999 data. In 1989 data, there is no “999”s.

Some cover data are missing, and some are 0s. In 2011 segment master file, each segment will have all species, and species that were not found will have cover of 0. 88/89 and 98/99 species list are different though.

**HDATE:** The date herb\shurb\tree data were collected

**BOLELIVE:** Percentage of live bole in herb quad, collected in 1989.

**BOLEDEAD:** Percentage of standing dead , collected in 1989.

**BARESOIL:** Percentage of bare soil, collected in 1989.

**ROCK:** Percentage of rock, collected in 1989.

**WATER:** Percentage of water, collected in 1989.

**WOODGR:** Percentage of woodground, collected in 1989.

**MOSS:** Percentage of moss, collected in 1989.

**LITTER:** Percentage of litter, collected in 1989.

**TOTALCVR:** Total percent cover in herb layer (Including herb, shrub, and tree species <= 1m) not including the seedling in 50cm radius circle centered on the seedling, collected in 1988 only, Not in1989. Got this definition from old data history, On hardcopy, these data were marked as “w/seedling(%)”, so this should be “percent cover in herb layer including the seeding”. Will rename this correctly in master file. Lixi 4/13/2012

**HERBCOVR:** Percent cover in herb layer including the seedling in 50cm radius circle centered on the seedling, collected in1988 only, not in1989. Checking hardcopy, these data were marked as “%cover minus tree” or “%herbcover-baby or “w/o seedling(%)”) on hardcopy. So the definition of HERBCOVER should be switched with TOTALCVT. Will rename this correctly in master file. Lixi 4/13/2012

**HERB1, 2, 3:** Three species of herbs, shrubs, or trees, with highest cover in 50cm radius circle on a seedling. Species with <5% cover were omitted. Data starts with a T (tree species), S(shrub specie), or H (herb species), and followed by the species code. Species with <5% cover were omitted. Collected in 1988 only, not in 1989.

**DISP:** Protocol mentions segment displacement data were collected in both 1988 and 1989. Found 1988 displacement in “prism88.ssd” mentioned in 1.3. No 1989 electronic or hard copy data found yet.

Still couldn’t find 1989 pace (along) data neither.

## *1.4 Data collected in 1998*

### *1.4.1 Seedlings tagged in 1988 and revisited in 1998*

*Seedlings tagged in1988 were revisited in 1998 for survivorship and height, some of them were missed and there are some plants sampled in 1998 but missed from 88/89 data.*

**SAS data set:** [R:\MOOSHUBB\longterm\Moos1999\Datasets\seed88.ssd](../../Moos1999/Datasets/seed88.sas7bdat)

This data set has data collected in both 1998 and 1999. Explanations of variable in this data set see “Seedlings tagged in 1988 and revisited in 1999

61 plants in ME2020 seg1880 was missed in 1988/1989 data, but was sampled in 1998, and has HT88/MINAGE88 in 1998/99/00remesurement data set. Found all the plants on hard copy, they were recorded as in seg880 in 1988 but adjusted as in seg 1880 in 1989. Also we did visit seg880 in 2011 but no data for these tagged trees were found, so they should be in seg 1880. Not corrected yet. Lixi 4/13/2012

Some other plants also in LE1860 missed in 1988/1989, but have data in 1998/99/00 remeasurement data set, Details see <reme88noyrtag.xls>

Found them on hardcopies. For those in seg320, it said “additional tagged along segment 320-340, fixed wires”. 325 in seg880; 507, 509, 510 in seg1180 were added in 1998. 508, 511 were added in 2000. (When they add new trees to data sheet, does that mean previously tagged tree found but missed in old data sheet or newly tagged plants?). Not corrected yet. Lixi 4/13/2012

### *1.4.2 New seedling/sapling tagged in 1998*

*Data were collected from 2750’, 3250’, and 3750’ elevations in randomly chosen segments on East and West sides in 1998.*

*We went back to some of the 1988 segments, displaced the segment and tagged new plants on them. So even though in the data set, they look like the same segment, but they are actually not the same physical segments. For a complete list of segments where new plants were tagged in 1988 and 1998, see* [*APPENDIX 1*](#_APPENDIX_1)*.*

*All spruce seedlings/saplings in 1m and 4m wide band were tagged. Then starting from the beginning of the segment, find the first 5 spruce at each height class, then tag the closest fir at the same height class to each of them. If no spruce seedlings/saplings found, then fir from each height class which are closest to the point where first 1\*1 fir quadrat was placed were tagged. If a height class was not represented by spruce, then another fir was tagged from another randomly selected height class. Additional fir saplings were tagged if the first five had no 1998 growth or the leader was damaged. For some segment, birch seedlings/saplings were NOT tagged in the whole segment. A few maples were tagged by chance.*

## *1.5 Data collected in 1999*

### *1.5.1 Seedlings tagged in 1988 and revisited in 1999*

*Seedlings tagged in1988 and were still alive in 1998 were revisited in 1999 for survivorship and terminal leader condition. Some were missed and there are some plants sampled in 1999 but missed in 88/89 data.*

[SAS data set: R:\MOOSHUBB\longterm\Moos1999\Datasets\seed88.ssd](../../Moos1999/Datasets/seed88.sas7bdat)

**CONTID**

**SEGID:**

**TAGNO:**

**SPECIES:** 1 missing. Contour 1860, pace 880, tag325 (found tagged and dead in1998, but missing from 1988 data). Information went “field check after 2011”

**ALONG:** measured distance along the contour segment collected in 1998.

**DUPDOWN** measured distance up or down slope from the segment baseline collected in 1998.

**HT88:** Height measured in1988.

**HT98:** Collected for live individuals in 1998 in cm.

**STAT98:** ALIVE, DEAD, NF, or MISSING DATA. 73 individuals are not in1988/1989 main file “contour.ssd”

**CODE98:** Codes: 2, 4, 5, 6, 7, 11, 16, 23, 24, 25. For 1988 and 1998 tagged plants. When CODES98=., 4, 7, 11, 24, 25, the plant is alive; when CODE98=5 or 6, it’s DEAD; when CODE98=2, it’s NF; when CODE98=16, it’s MISSING DATA. Still there is other codes we don’t know. CODE98 here seems corresponds to CODE98A for permanent/transect data, except that CODE98A only has values between 1 and 20.

**STAT99:** Status in 1999. ALIVE, DEAD or NF. A few were missed in 1999 for plants which were still alive in 1998; A few were missed for plants we missed in 1998 which were alive in 1988; Two seedlings come alive in 1999 (STAT98=’DEAD’ and STAT1999=’ALIVE’); Two plants missed in 1998, and DEAD or NF in 1999, considering YRMORT for them are 1999.

**TERM99:** Collected for live individuals in 1999.

**HTBROWS:** Browse height

**SOIL:** Soil Type.M=Mineral or Spodosol ; H = Histosol; HM=mixed.

**BEG\_EST:** Soil type for beginning of segment; estimated from SOIL

**END\_EST:** Soil type for end of segment; estimated from SOIL

**NOTES:** notes collected in 1998 and 1999.

### *1.5.2 Seedling/Sapling tagged in 1998 and revisited in 1999*

*All 1998 tagged plants were revisited in 1999 for survivorship, terminal leader condition, and seedling substrate type. A few 1998 tagged plants (30) had height re-measurements in 1999 by chance. Data see 1998, 1999, and 2000 combined file segtree.ssd, which will be explained later.*

### *1.5.3 New seedling/sapling tagged in 1999*

*New seedlings/saplings were tagged in (1) some segments where plants were tagged in 1998 (2) Some other segments where new plants were tagged were never visited before 1999. For a complete list, see* [*APPENDIX 1*](#_APPENDIX_1)*. We found a note on log book written on July.08.1999 that first year seedlings were not tagged except for PIRU, so* ***1st PIRU seedlings were tagged in 1999.***

*Before 07/21, tagging method remains the same as 1998 except that species other than fir, spruce, and birch were also tagged in the seedling 1m wide band. 5 additional ABBA seedlings and 5 additional ABBA saplings were tagged in 1998 segments; Starting 07/21/1999, we stopped tagging ABBA seedlings and saplings in 1998 segments, only in 1999 segments. And once 30 seedlings/saplings were tagged, tagging were ceased until reaching a distance to the nearest meter. The distance where tagging was ceased was recorded and the individuals in the REMAINING segment were counted. Relevant data see “seed\_den.ssd”, “sap\_den.ssd”, and “segplot.ssd” in “R:\MOOSHUBB\longterm\Moos1999\Datasets” which will be explained later. According to these data, this “30 rule” was not applied to any saplings. In some segments only 0~25cm tall SOAM seedlings were tagging, and tagging was ceased before there were 30 individuals. This is not a problem to calculate density in the whole segment, can’t use number of tagged seedlings to calculate density, because in some segments, only 0~25cm tall SOAM seedlings were tagged.*

*Other useful notes found on log book: seg 174, which is ME2020, seg 1580 was flooded, and all the seedlings tagged in 1998 were gone.*

## *1. 6. Data collected in 2000*

### *1.6.1 Seedlings tagged in 1988 and revisited in 2000*

*In 2000, the same physical data sheets used in 1999 were used for data collected and this part of data were not entered as excel file until Sep.2011 by Noah/Lixi. So this part of data was not included in 1998. 1999, 2000 master file segtree.ssd, but will be merged in 2011 master files.*

**Data entered in 2011 by Noah/Lixi:** [R:\MOOSHUBB\longterm\Moos1999\Lixi Edit\seed88\_00.xls](../../Moos1999/Rawdata_2000/seed88_00.xls)

**TAG:** There are some tagged plants found in 2000, but missed from old data.

**SPECIES**: Some species got changed in 2000.

**STAT00:** A, D, or NF. Mostly collected for individuals which were still alive in 1999. Some individuals came alive in 2000.

**TERM00:** Terminal leader. Some are missing.

**CII00:** Collected for plants which were still alive in 2000. Some are missing.

1=No direct light (crown is not lit directly vertically or laterally);

1.5=Low lateral light;

2=Medium lateral light;

2.5=High lateral light;

3=Some vertical light (10–90% of the vertical projection of the crown is exposed to vertical light);

4=Crown completely exposed to vertical light, lateral light blocked within some or all of the 90° inverted cone encompassing the crown;

5=Crown completely exposed to vertical and lateral light within the 90° inverted cone encompassing the crown

([Clark and Clark, 1992](http://www.sciencedirect.com/science/article/pii/S0378112707000849#bib3))

**NOTES00:** Recorded whenspecies changed, plants came back alive in 2000, tagged plants found in field but missed from old data set, etc.

### *1.6.2 Seedlings/Saplings tagged in 1998 and 1999 and revisited in 2000*

*All 1998 and 1999 tagged seedlings and saplings in 128 segments were checked for survivorship and mortality. GLI photographs were taken at ten segments on three of each contour on East side also in 2000.*

## *1.7 1998, 1999, and 2000 tagged Seedling/Sapling Data set*

*SAS programs produced SAS data sets are in:*

*R:\MOOSHUBB\longterm\Moos1999\Edit\_Update.*

*SAS data sets are in: R:\MOOSHUBB\longterm\Moos1999\Datasets*

*SAS programs were created by Kevin in 2000. Some codes were rerun by Lixi in2010/2011 to produce permanent SAS data sets. No changes made to original SAS programs*

SAS data set: [R:\MOOSHUBB\longterm\Moos1999\Datasets\segtree.ssd](../../Moos1999/Datasets/segtree.sas7bdat)

SAS program: [R:\MOOSHUBB\longterm\Moos1999\Edit\_Update\sedsap\_edit\_merge.sas](../../Moos1999/Edit_Update/sedsap_edit_merge.sas)

**SEGID:** Segid assigned to each segment, created in1999. To match it with segment aspect and pace, check these two files: R:\MOOSHUBB\longterm\Moos1999\Datasets\contid;

R:\MOOSHUBB\longterm\Moos1999\Datasets\segid.

Segment with CONTID 6 and SEGID 235 should be 325. This error might be caused by misentry in raw data. (raw data are in “R:\MOOSHUBB\longterm\Moos1999\Rawdata”)

**ALONG:** measured distance along the contour segment.

**DUPDOWN:** measured distance up or down slope from the segment baseline.

**TAGNO:** For 1998 tagged plants, 98001<=TAGNO<=989632; for 1999 tagged plants, TAGNO<=999 or TAGNO>=990075

**SPECIES:** species identification for individuals tagged in 1998 and 1999. 3 are missing.

Contour 2020, pace 600, 98175 & 98903 (tagged in1998, not found in1999, don’t have any data recorded in 1998)

98175 sp=3(BECO); 98903 sp=2(PIRU). Didn’t find these 2 plants in 2011. Also found some other data on hard copy which were missing in SAS file. SPEC for these 2 plants Added to new master file. Lixi 5/14/2012

Contour 1860 pace 680 tag 991144 (tagged in1999, not found in 2000, has a note of “ACSP TAG”, so it could be a ACSP?).

On hard copy, it’s a BESPP, also has other data. Didn’t have any data for this plant in 2011. Lixi 5/14/2012

**SP:** Species codes for some of the 1998 individuals, a lot are missing. Correspond to SPECIES. Should trust SPECIES and could ignore SP.

**CODE98:** 16 or 23.

**DECM:** Decline class for saplings collected in 1998.

**STAT98:** Status of seedlings or sapling tagged in 1998. Some are missing. They should all be “ALIVE”.

**STAT99:** Status of seedlings and saplings observed in 1999, for both individuals tagged in 1998 and individuals newly tagged in 1999). It’s ALIVE, DEAD, or NF (not found). 3 individuals tagged in1998 miss this data, but they got resampled in 2000.

**HT98:** Height of tagged seedlings or saplings in cm for 1998 tagged plants. 11 are missing.

**HT99:** Heights in cm were measured for all live individuals newly tagged in 1999 (8 are missing). A few individuals tagged in1998 were re-measured for heights (30 of them. Some measurements were taken when a seedling grow into a sapling). Individuals with height of 0 should be set as missing.

**SUB98:** Seedling Substrate type code. 1 = moss; 2 = litter; 3 = wood > 5cm diameter; and 4 = bare soil. The second number in this column if it exists indicates if substrate listed before was over another substrate: (e.g. 13 = moss over dead wood): 3 = deadwood > 5cm diameter; 5 = rock; 6 = live wood (e.g. roots); 7 = tipup mound (added 8-20-98) A few are missing.

**SUBSTR:** Seedling substrate type descriptions collected in 1999 for both individuals tagged in 1998 (still alive in 1999) and 1999 newly tagged individuals. In 1999, we started to categorized litter into: conifer litter, deciduous litter, and mixed litter

**ON:** If these substrates occur on deadwood, rock, live wood or tipup mounds. for both individuals tagged in 1998 (still alive in 1999) and 1999 newly tagged individuals

**E99~E55:** Extension growth from 1999 to 1955 if applies for ABBA and PIRU seedling/saplings. For seedlings, in 1998, measure as many years extension growth as we can, starting with XG98, but in 1999, only measured as many as 11 yrs, starting with XG99; for saplings, measured as many as 10 yrs extension growth in 1998 and 11yrs in 1999. One BECO was measured for XGs by chance. There is a few e98/e99 0 values for species other than ABBA and PIRU (only has e98 or e99=0 no other data), corrected as missing.

**REMAIN:** Distance remaining for 1998 tagged ABBA and PIRU plants in cm.For seedlings, this is the distance remaining from the last positively identified extension growth measurement to the root collar.For saplings, this is the distance remaining from the tenth yr XG to the root collar if 10yrs XGs were measured; or the distance remaining from the last positively identified XGs to the root collar if less than 10yr XGs were measure. This variable should be merged with DISTREM1.

**DISTREM1:** Distance remainingfrom the tenth yr XG to the root collar if 10yrs XGs were measured; or the distance remaining from the last positively identified XGs to the root collar if less than 10yr XGs were measure for 1999 tagged ABBA/PIRU seedlings and saplings in cm.

**DISTREM2:** Distance remaining after counting minimal age for 1998 tagged ABBA/PIRU saplings and 1999 tagged ABBA/PIRU seedlings and saplings in cm. Distrem2 should always be smaller or equal to DISTREM1.

**MINAGE:** ABBA and PIRU Seedling or Sapling’s minimum age counted to the root collar collected in1998. (When the technician was uncertain about the extension growth, measurements were stopped and an estimate of the number of additional years to the seedling/sapling's root collar was added to the years measured for extension to get a minimum age.)

**MINAGE2:** This has some data from MINAGE. Might be redundant, could consider omitting this.

**MINAGE99:** Minimum age for 1999 tagged ABBA and PIRU seedlings/saplings.

**NOTE98~NOTE55:** Notes for extension growth, Recorded as codes. 1 = lateral branch becomes terminal leader; 2 = browsed; 3 = no growth; 4 = dead top; 5 = individual has no dominant leader. There is no data for NOTE55-NOTE76

**TERM99:** Terminal leader status in 1999 for both individuals newly tagged in1999 and those tagged in1998. It’s H/HEALTHY, NO DOMINANT, NO GROWTH, BROWSED, BROKEN, INSECT, DEAD, or other descriptions if none of the above applies.

**EXTNOTES:** Notes for 1999 extension growth, year in which when there is a new leader.

**NOTES:** Relevant notes for some 1998 or 1999 tagged individuals.

**FLAG:** ? Only has one entry.

**SOIL:** Soil Type.M=Mineral or Spodosol ; H = Histosol; HM=mixed

**BEG\_EST:** Soil type for beginning of segment; estimated from SOIL

**END\_EST:** Soil type for end of segment; estimated from SOIL

**STAT2000:** Status of trees or saplings observed in 2000 (for all individuals either tagged in1998 or 1999). It’s ALIVE, DEAD, NF, or MD.

**CII2000:** Crown illumination index collected in 2000. 0 values were set as missing in new master file.

**TREE:** “Seed” or “Sapling” identification for individuals tagged in 1998 and 1999, according to height measured at tag year. Some are missing. rather than field observation. This is not a good variable. We might not need this.

**TAGYEAR:** Year in which the seedling or sapling were tagged. 1998 or 1999

**DEADYEAR:** Year in which seedling or sapling were identified as dead. 1999 or 2000.

## *1.8 Data collected in 2010*

*Segment sampled: Seg13, Seg21, Seg48, Seg25, Seg54, Seg5, Seg10, Seg323, Seg 345, Seg409, Seg465, Seg471, Seg474, Seg477, and Seg508.*

*Seg13, Seg21, Seg48 sampled on 07/08/2010 followed full protocol according to 1998 protocol. The other segments sampled are supposed to follow fast protocol, which only requires re-measurements of seedlings and saplings tagged before. Data to be collected include STATUS, CII, Extension growth from 2010 to 2008, Terminal Leader Condition, and DECM for saplings.*

### *1.8.1 Data collected following full protocol:*

R:\MOOSHUBB\longterm\lixikong\Segment2010/segseedsapfull10.ssd

**TAGNO:** new seedlings and saplings were tagged.

**SPECIES:** species identifications for new seedlings and saplings.

**SUB10:** Substrate type for some individuals

**STAT10:**

**HT10:** Heights in cm of alive seedlings and saplings.

**DECM10:**

**CII10:**

**TERM10:**

**E10~E98:** Extension growth from 2010~1998, only collected for some individuals. Two E03?

**COND10:** Condition class, only collected for some individuals

**DECAY10:** Decay class, only collected for some individuals.

**MINAGE:** Minimum age. Only collected for some individuals.

**DISTTOGD:** Distance to grid. Only collected for some individuals.

### *1.8.2Data collected following fast protocol:*

R:\MOOSHUBB\longterm\lixikong\Segment2010/segseedsapfast10.ssd

**STAT10:** collected for all the tagged individuals. AL=alive; DE=dead; TF=plant not found, but tag found; NO=not available. Neither plant or tag found. PF=probably found. individual re-measured but identity not 100% certain because tag not attached

**HT10:** Heights in cm for alive seedlings or saplings. Seg54, individual 991937 didn’t have height.

**CII10:** Crown illumination index for alive seedlings or saplings. Missing for seedlings in seg25, and plant 991933 in seg54.

**DECM10:** fast protocol requires collecting decline class for saplings. In field data, decm were collected for both seedlings and saplings, and some are missing.

**DBH10:** fast protocol doesn’t require collecting this, but in field data, in some segments, DBH were collected for alive saplings (a few seedings).

**TERM10:** Terminal leader condition. HE=healthy; NO=no dominant leader; NG=no growth; BR=broken off or browsed off; DE=dead; or other notes if none of the above applies. Some are missing.

**E10~E08:** Extension growth from 2010 to 2008. Some are missing.

## *1.9 Data collected in 2011*

* *Revisited EAST side individuals tagged in1988 and were still alive in 1999, (1988\_2000 remeasurement data not entered yet at the beginning of field season) and record status and height. Some of the segments which only have a few individuals were omitted considering time limit, but some of these omitted segments might get sampled opportunistically.*
* *Revisited all individuals tagged in 1998&1999 and were still alive in 2000, and record status and height. Data for LE600 are missing. Some individuals were missed by chance.*

**SAS data set:** *R:\MOOSHUBB\longterm\lixi kong\Segment2011\seg2011.ssd*

**TAG:** Some plants got retagged and corrected for tag number in old data set.

**SPECIES:** Sometimes field crew didn’t bring old data with them, and recorded some species as UKSP (unknown species). In order not to update species name from old data to UKSP, species columns were omitted from this data set. Relevant species corrections will be made in 2011 master file.

**ALONG/DUPDOWN:** New along/dupdown data were recorded only if they were felt to be very far off comparing to old data. Also collected for 1988 tagged individuals which didn’t have along/dupdown.

**STATUS:** A=alive; D=dead; NF=not found; PD=probably dead (found a dead individual at the exact location as an old individual but no tag found.); PF=probably found (found a live individuals at the exact location as an old individual but no tag found.) How to deal with NO?? NF?

**HEIGHT:** Height re-measurements in cm, for “alive” individuals, and “probably found” individuals.

**NOTES:** Some notes are just extra information; some notes might lead to corrections on master file, basing on which “SegCorrections2011.xlsx” was created, and relevant notes were standardized:

* RL: relabeled. Some plants were retagged in 2011.
* TC: Tag correction. Tag number recorded wrong in old data set.
* CA: individuals NF or D before but found alive in 2011.
* LN: leaning
* SN: snapped
* ALONG ##: When note specifies as “coordinate correction”, along usually represents actual length of a plant rather than the location ALONG data. A new variable LENGTH11 was created in 2011 master file basing on this information.

## *1.10* *Master File for Tagged Seedling/Sapling 1988~2011*

SAS program: *R:\MOOSHUBB\longterm\lixi kong\Segment2011\seesapmas11.sas*

Master file with data from 1988 to 2011(2003 and 2010 data are not included)**:**

*R:\MOOSHUBB\longterm\lixi kong\Segment2011\seesapmas11.ssd*

For details of available/missing data for each census year, check data availability tables:

*R:\MOOSHUBB\longterm\lixi kong\Segment2011\SEGMISS.pdf*

*R:\MOOSHUBB\longterm\lixi kong\Segment2011\SEGMISS\_Abba.pdf*

**CONTNAM:** contour name

**STPACE:** Beginning pace of a segment.

**CLASS:** S=segment

**ASPCL:** E or W.

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

**SGLEN8889:** Segment length in m for 88/89 segments

**SGLEN9899:** Segment length in m for 98/99 segments.

**SGDSP88:** segment displacement recorded in 1988.

**SGLEN9899:**

**SDSP1:** The first species where the tagging of seedling ceased before the end of the segment

**DSDSP1:** Distance from the beginning to where tagging was ceased in a segment for SDSP1

**NSDSP1:** Total count of SDSP1 in the whole segment

**SDSP2:** A second species where the tagging of seedling ceased before the end of the segment

**DSDSP2:** Distance from the beginning to where tagging was ceased in a segment for SDSP2

**NSDSP2:** Total count of SDSP2 in the whole segment

**TAG:** Tag number. Individuals tagged in 1989 all have tag numbers of 1~5 for PIRU and ABBA; Most of the plans tagged in 1998 have tag numbers starting with “98”, a few start with “198” and “298”; Most of 199 tagged plants have tag numbers starting with “99”, some were tagged with just random tag numbers.

**YRTAG:** Year in which individual was tagged. 1988, 1989, 1998, or 1999.

**SPEC** 4 letter abbreviations of species names.

**PALONG:** keeper’s pace from the start of the segment to the seedling/sapling, which is accurate to +/-1 pace. Similar to ALONG used in1998/1999, but unit here is pace.

**ALONG/ DISUPDN:** Distance from the start of the segment to the individualin cm?and Distance up or down from the segment baseline of the individual in m? This ismeasured for 1988 tagged individuals (seedlings and saplings) who were still alive in 1998, some are missing though; NOT measured for 1989 tagged individuals; Measured for 1998/1999 tagged individuals. Some DUPDOWN are missing for 1999 tagged individuals

**STAT88:** All are equal to “ALIVE” for 1988 tagged plants

**STAT89:** All are equal to “ALIVE” for 1989 tagged plants

**STAT98:** Recorded for 1988 and 1998 tagged individuals. ALIVE, DEAD, NF or left as blank for missing data. They are all equal to ALIVE for 1998 tagged individuals.

**STAT99:** Recorded for: 1988 tagged individuals which were still alive in 1998, and 1998 & 1999 tagged individuals. All equal to ALIVE for 1999 tagged individuals.

**STAT00:** Collected for previously tagged individuals which were still alive in 1999.

**STAT11:** ALIVE, DEAD, NF, PD, or PF. This is collected for 98/99 tagged plants which were still alive in 2000, and some 88 tagged plants.

**YRMORT:** Year of mortality

**HT88**: Height collected for 1988 tagged seedlings in cm.

**HT89**: Height collected for 1989 tagged seedling/saplings in cm.

**HT11:** Re-measurement of heights in cm for previously tagged and still live plants

**STMLEN11:** stem length measured in 2011 for some live plants. The data is extracted from Notes made in 2011(the notes is written as along #).

**AGE88:** total age for 88 tagged seedlings. No 0 values. Plants with AGE88 missing ,equal to 1 or <=(count of EXs+1) were double checked:

* AGE88=1: leave it
* AGE88 missing: leave it
* AGE88 <= (count of EXs+1): if <, set missing, if equal, leave it.

**MINAGE88:** minimal age for 88 tagged seedlings. No 0 values. Plants with MINAGE88 missing or equal to 1, or <=(count of EXs+1) were double checked:

* MINAGE88=1: set as missing
* MINAGE88 missing: leave it
* MINAGE88 <=(count of EXs+1): if <, set as missing, if equal leave it.

**MINAGE89:** minimal age for 89 tagged seedlings only. Plants with MINAGE89 missing, equal to1, or <= count of EXs were double checked:

* MINAGE89=1: set as missing.
* MINAGE89 missing: all saplings. Leave them
* MINAGE89<=count of EXs: If <, set MINAGE89 as missing, if equal, leave it.

**PEX89:** EX measured in 1989 for 89 tagged plants. This might not be a full year EX, so named it differently to distinguish.

**EX88-EX44:** Extension growth measured for 1988/1989 tagged plants in cm. EX88-EX55 could be for 1998/1999 plants. Details see “EX98-EX55”. In 1988, only collected Extension growth for as many as 10 years from 1987~1978. In 1989, starting with PE1989 (this might only be half a year extension growth), XG was measured for as many years as possible for all seedlings; and for saplings, XG was measure for as many years as possible on the first sapling of each species encountered. The second and third sapling of each species in each segment had only 10 years of extension growth measured, starting with 1989 growth.

For 1988/1989 plants, individuals with EX equal to 0 were double checked, and we decided to trust the 0s.

**SUB88:** Substrate type 1988 seedlings grow on.

* WDG5: dead wood on the ground >5cm (if <5cm, it was probably identified as litter)
* LITT: litter (whether it was deciduous or conifer was not distinguished)
* MSS: moss

Protocol says “in general, a handwritten note was made if this was moss over rock, litter, or wood--see the fieldnotes of the appropriate date”. Found some data on hard copies, “Notes” column, need to find/enter them. Details see file [SUBON88](../../Contour89/Lixi%20Edit/SUBON88.xls). Leave this part of data for now.

**SUB89/ SUBON89:** Substrate type 1989 seedlings grow on.

* BSOIL
* WDG5
* LITT
* MSS: a more general definition of moss.
* MSS on BSOIL: a more detailed substrate type. This will be treated the same as MSS when comparing with plot quadrat data.
* MSS on WDG5: a more detailed substrate type. This will be treated the same as MSS when comparing with plot quadrat data.
* MSS on LITT: a more detailed substrate type. This will be treated the same as MSS when comparing with plot quadrat data.

**DECM89:** Decline class collected for 1989 tagged saplings.

**TCVR88:** Total percent cover in herb layer (Including herb, shrub, tree species <=1m) including the seedling in 50cm radius circle centered on the seedling, collected for 1988 tagged seedlings.

**NFCVR88:** Percent cover in herb layer in 50cm radius circle centered on the seedling, excluding the focal seedling collected for 1988 tagged seedlings.

**HRB1/HRB2/HRB3:** Abbreviations of three species of herbs, shrubs, or trees, with highest cover in 50cm radius circle on a seedling. If it’s shrub ACSP or ACPE, it’s recorded as “ACSP\_SH” and “ACPE\_SH”.

**BRHT99:** Browsing height.

**TERM00:**

**CII00:** Crown illumination index, collected for all live 1988, 1998 and 1999 tagged individuals in 2000.

**DECM98:** Decline class collected for 1998 tagged saplings.

**SUB98/SUBON98:** substrate type seedlings grow on

* BSOIL
* WDG1:
* LITT
* MSS: this is a general category. Similar as year of 1989
* Below are all on the ground
* MSS on WDG5
* MSS on RCK
* MSS on TIP
* ‘’ on WDG1: only one plant. found hand written hard copy, and it should be MSS on WDG1. Corrected.

**SUB99/ SUBON99:** substrate seedling grow on for 1999 tagged and 1998 tagged seedlings which were still alive in1999.

* BSOIL
* BSOIL on RCK
* LITC
* LITC on BLA5
* LITC on WDG5
* LITC on RCK
* LITC on TIP
* LITD
* LITD on WDG5
* LITD on RCK
* WDG5
* LITM: some were recorded as “LITTER”, some “MIXED LIT”. “LITTER” was corrected to LITM.
* LITM on BLA5
* LITM on WDG5
* LITM on RCK
* LITM on TIP
* MOSS
* MOSS on BLA5
* MOSS on WDG5
* MOSS on RCK
* MOSS on TIP
* ‘’ on RCK: only one plant. No hand written hard copies found. Corrected it to RCK.

Above substrate on another one would be treated as the surface substrate

**HT98:** Individuals tagged in1988 and were still alive in1998 were re-measured for height in cm in 1998. 73 miss height in1988 data set but were found tagged and resampled in 1998/1999. 67 1988 tagged individuals were missed in1998/1999. 6 1998 tagged live plants miss HT98, one has no SPEC.

**Checking on height unit:**

all 1 decimal, except one is 2 decimal.

All plants with ht <100 has substrate data, and ht >=100 all don’t have substrate data except one, also cross check with available ht99 ht11 remeasurements. There is some big difference between ht98 and ht99.

Also checking csv raw data, sapling data and seedling data are in different files, in sapling files, all the heights are >=100, in seedling file, all the heights are <100.

Missing height:

HE1860, tag98816 was found in 1999 “without a plant in it, no data recorded in 1998, but two beco seedlings were found within reach of the tag wire”, so one of them were tagged as 98816, one of them were tagged as 98611 in 1999. Should change tag year to 1999?

LW seg 1480, 98484 was “not in 98 data set but is tagged in field” according to 1999 field notes. Should add a note “PTG”

ME, seg1080, 98364, can’t find this plant on either 1998 or 1999 hardcopy, but it was on 2000 data sheet. Tag year?

ME, seg1620, only found on 2000 data sheet. There is a note“Add along& up”. Along=15.2, disupdn=0.11;

For the rest, all found height on 1998 hard copy, and some other data. Lixi 5/14/2012

**HT99:** Heights measured for 1999 tagged plants in cm, and only 30 Individual tagged in 1998 were re-measured for height in 1999**.**

**Checking on height unit:**

NOT all plants with height <100 have substrate, all plants have height >=100 don’t have substrate data.

In 1999 sapling raw data(csv file), most of heights are larger than 100, which means units should be cm, but there is some have values smaller than 10.

Missing ht:

HE460, seg280, 990785, 990786, in 2000 hard copy, it says “not entered in 98. ADD”. One dead, one NF in 2011

HW620, seg300, 41, and 589: 41, 589, and 509 were added on 2000 hard copy.

LE1860, seg680, 991144: found ht and some other data on hard copy.

ME2020, seg1320, 990441: “only 4 fir tagged in 1999”, but on hard copy, can’t find 990441. It was in 2000 printed out data sheet.

MW1580, seg340, 992996: in 2000 printed out data sheet.

Lixi 5/14/2012

When HT > STEMLEN and D1RM99 is two digits, we set D1RM99 as missing. Otherwise leave them

**PEX99:** Extension growth collected for 1999 tagged plants and some 1998 tagged plants (16 of them). This might not have growth of a whole year, so it was named differently to distinguish with other EXs (PEX=partial extension growth).

**PEX98:** Extension growth collected for 1998 tagged plants.

**EX98-EX55:** Extension growth collected for 1999 and 1998 tagged plants. EX88-EX55 could be for 1988/89 tagged plants. For seedlings, in 1998, measure as many years extension growth as we can, starting with XG98, but in 1999, only measured as many as 11 yrs, starting with XG99; for saplings, measured as many as 10 yrs extension growth in 1998 and 11yrs in 1999. One BECO(MW, seg 1120, 390) and one SOAM(MW, seg1480, 98816) were measured for XGs by chance. There is a few plants in species other than ABBA and PIRU had PEX98 and only PEX98=0, PEX98 were corrected as missing.

Some Individuals have tag year of 1998 but also have E99 recorded. Some relevant Notes found on hand written hard copy:

LE, seg 1160: “99 buds on ABBA and PIRU allowed for a confident 99 XG on 98 tagged individual, thus it was recorded.” And only EX99 were recorded for some plants

ME, seg1820: 98570 “fir seedling in 98, is sapling in 99”. No other data found on hard copies

HE1080, SEG 20, 98870 “grow into saplings”. E99 was recorded

LW1900, SEG340, 98187 “has become sapling in 99”

LW1900, seg1480, 98484 “was not in 98 data but is tagged in field. Took new measurement in 99” No other data found

**ENOTE98~ENOTE77:** Notes for extension growth recorded for 1998 tagged plants.

1=new leader.

2=browse off, no extension growth

3=not browsed, just no growth. **When EX=0, ENOTE is not always recorded as 3. Should we add it?**

4=dead top.

5=no dominant leader.

EXs were checked referring to ENOTEs for 1998 tagged plants, and relevant corrections were made as below:

* ***New leaders****:* If there is one or more 1s from ENOTE. Any EXs for years before the year of the first is note reliable for year, except if there is a 2 the year after, then we don’t trust EX for the year of 1 neither (only one plant). And it is possible the new leader almost has no growth, which means EX for the year of new leader could be 0.
* ***Browsed off on the top, and not able to identify year of browsing, so not able to measure EXs:*** An ENOTE of 2 recorded for year of 98, and PEX98=0, with rest of EXs missing, then PEX98 should be set as missing
* ***top browsed off, then a new leader came out and survived for one or more than one year (Since we don’t know how many year growths we’ve lost, it’s hard to follow up with EXs for the years before top browsed off)***
* An ENOTE of 2 is recorded for year of 98 and PEX98>0, with the rest of EXs missing, then the ENOTE is for the year of 97;
* An ENOTE of 2 is recorded for year of 98, and including PEX98, all EXs are > 0, we should leave PEX98 as missing, and all the EXs are not reliable for year
* An ENOTE of 2 recorded for year of 98, PEX98=0, and there are non-zero EXs collected for the year before 98, they are not reliable for year, PEX98 should still be set as missing;
* An ENOTE of 2 was recorded for year other then 98, which indicates a 1 the year after, EX for the year of 2 should be set as missing regardless whether EX for the year of 2 is zero or non-zero, and all EXs for years before the year of 1 are not reliable for year.
* ***Top browsed off, a new leader came out and browsed off again:*** ENOTE98=ENOTE97=2, EX98=EX97=0 and there are other EXs measured. Should set EX98 and EX97 as missing, and the rest of EX all not reliable.
* ***No growth for a certain year:*** If one or more 3s are recorded for any years, EX for corresponding years should be 0.
* ***A dead top/multiple dead tops (new leaders have dead tops):*** a 4 or more than one 4 recorded for certain years with corresponding EXs equal to 0, those EXs should be set as missing. And we trust all the other EXs because we can still see years from a dead top.
* ***No dominant leader, no EX could be measured:*** A 5 is recorded for year of 98, and PEX98=0 EX for 98 should be set as missing. If EXs were measured for years before 98, they are not reliable for year.
* ***No dominant leader, EXs still measured, but not meaningful/reliable:*** only one plant (ME, seg1620, 98872). ENOTE97=1, ENOTE96=5? EXs after the year of 5 is not meaningful should be set as missing. EX for the year before 5 are not reliable for year.
* ***More than one new leaders coming out after top browsed off:*** ENOTE98=4, ENOTE97=5 with EX98=EX97=0, both EXs should be set as missing.

**ENOTE99:** year(s) in which lateral becomes dominant leader (new leader). The latest year of a new leader would be YRREX

**NL99\_1/NL99\_2/NL99\_3:** Variables derived from ENOTE99. The first, second, and third year when there was a new leader for 1999 tagged plants.

Plants with EX for any year equal to 0 for 1999 tagged plants were double checked:

**TERM99**: Terminal leader recorded in1999, collected for 1988 tagged individuals which were still alive in1999; and for live 1998/1999 tagged individuals. PEX99 was cross checked with TERM99, and relevant corrections were made if needed

* HE=health
* UN=unhealth
* IN=insects
* ND=no dominant leader. If PEX99=0 then it should be set as missing, and ALL EXs not reliable for year; if PEX99 >0, we trust the data, and no corrections are needed.
* NG=no growth. If PEX99=0 then retain the 0, no correction needed. No plants had PEX99 >0 and TERM99=’NG’
* DE=dead top. If PEX99=0, EX99 should be missing, trust the EXs.
* BRS=browsed off (renamed this from BR to BRS to better distinguish with “broken”). If PEX99=0, PEX99 should be missing. All other EXs not reliable for year; If PEX99 gt 0, then retain extension growth data, and all EXs are not reliable for year.
* BK=broken. If PEX99=0, PEX99 should be missing. All other EXs not reliable for year; If PEX99 gt 0, then retain extension growth data, and all EXs are not reliable for year.
* DEFOLIAT:
* LITTLE F:
* CANT ASS: can’t access
* TREE LAY
* 1

**NOTES9899:** Data were truncated. Notes from 98 might have not been all entered.

**YRREX:** A new variable indicating year till which EXs data are reliable. this would be the lasted year a new leader came out or a top browsed off; for other plants, this is the earliest year an EX was estimated.

**MINAGE98:** minimal age collected for 98 tagged plants. Plants with MINAGE98=0, missing, or MINAGE98 <= Count of EXs were double checked and relevant corrections were made:

* Corrected data that were misentered referring to available hard copies
* When MINAGE98=0 and ENOTE98=2, and no EXs recorded, MINAGE98 should be set as missing.MINAGE98 could be non-zero though.
* If MINAGE98=Count of EXs: D1RM98 should be equal to D2RM98, details see the correction for D1RM98/D2RM98
* If MINAGE missing or equal to 1: sometimes there are more than one year EXs measured, but to be conservative, we decided to leave missing as missing, and set 1 as missing (1 is not really meaningful).
* If MINAGE98 < Count of EXs: Leave as missing, regardless if it’s consistent with hard copies.

**DIRM98:** This was collected for 1998 tagged ABBA and PIRU. This is distance remaining from the last positively identified extension growth measurement to the root collar for seedlings; and distance remaining from the tenth XG to the root collar if more than 10 years XGs were recognizable or the distance remaining from the last positively identified XGs to the root collar if less than 10yr XGs were measured.

**D2RM98:** Distance remaining after counting minimal age for 1998 tagged ABBA/PIRU saplings only. This was NOT collected for 98 seedlings.

Plants with D1RM98 and/or D2RM98 equal to 0 or D1RM98 <=D2RM98 were double checked and relevant corrections were made as below:

* If MINAGE=count of EXs, D1RM should be equal to D2RM, (D2RM was not collected for seedlings in 1998). For saplings, if D1RM98 ne D2RM98 and D2RM98=0, make D2RM98 missing.(only one case: HW620, seg180, tag 98754)
* D1RM98=D2RM98=0:Some data were misentered, and the other two were top browsed, D1RM98 and D2RM98 should be set both as missing.
* D1RM98=0 and D2RM98 missing: When D1RM98=0, MINAGE98 should be equal to count of EXs, and MINAGE should be the actual AGE. Set D1RM98 as missing, except those we found hand written hard copies.
* D1RM98=0 and D2RM98 >0 (D1RM98<D2RM98):only one (top browsed, no EXs collected), set D1RM98 as missing
* D1RM98 > 0 and D2RM98=0: MINAGE should be larger than count of EXs. If not, set MINAGE as missing.“average EX/yr\*(MINAGE-count of EXs)” was crosschecked with “HT-sum of EXs.” We decided to trust the data. Retain the 0s.
* D1RM=D2RM (both non-zeros): MINAGE should be equal to count of EXs. Data look OK. No corrections needed.
* 1998 Protocol was incorrect about the collecting method: “the convention was vertical distance, other measured along the stem”. This could be the reason why we have HT>sum of XGs+d1rm. So we leave the data when HT> sum of XGs+D1RM

**MINAGE99:** Seedling/saplings’ minimum age measured at tag year. All are non-zero. Plants with MINAGE99 missing or MINAGE99 <= count of EXs were double checked:

* MINAGE99 missing: leave as missing
* MINAGE < count of EXs: leave as missing.
* 3 1998 tagged individuals have MINAGE99:

LW1900, seg 1480, 98484 (has d1rm98, d2rm98, E99, E98, and minage99): note on hard copy “98484 was not in 98 data set but is tagged in field. Took new measurements in 99”. Corrected data marked as collected in 1998 to 1999.

ME2020, SEG1080, 98364: has similar data as 98484. Can’t find this on hard copy.

ME2020,SEG1880, 98573. HT98=13. MINAGE98=6, d1rm98=15. MINAGE99=3. On hard copy: d1rm98=3. Should correct d1rm98=3? Don’t know where 15 come from.

**D1RM99:** distance remaining from the tenth XG to the root collar if more than 11 years XGs were recognizable or the distance remaining from the last positively identified XGs to the root collar if less than 11 yrs XGs were measured for 1999 tagged ABBA/PIRU seedlings and saplings.

**D2RM99:** Distance remaining after counting minimal age for 1999 tagged ABBA/PIRU seedlings and saplings. Plants with D1RM99 and/or D2RM99 equal to 0 or D1RM99<=D2RM99 were double checked:

* When MINAGE99=count of EXs, D1RM99 should be equal to D2RM99. If D2RM99 is not equal to D1RM99, then leave as missing.
* D1RM99=D2RM99=0: MINAGE should be equal to count of EXs Set both D1RM and D2RM as missing if not consistant
* D1RM99 > 0 and D2RM99=0: Data misentered were corrected. MINAGE should be larger than count of EXs, except sometimes there is a little distance that was note counted as EX(usually 0~1.5cm), under the condition of which D2RM would still be recorded as 0 because we read all the EXs
* D1RM99<D2RM99: Set both D1RM99 and D2RM99 as missing
* D1RM99=D2RM99(both non-zeros): MINAGE should be equal to count of EXs. If not equal, set MINAGE as missing

**CODE98:** 16 or 23. Recorded for 1998 tagged ABBA or PIRU. need to be looked up

**FLAG:** unknown

**SOILCL:** need to be updated

**TREE:** “SEED” or “SAP” according to HEIGHT collected at tag year.

* When TREE=seed, except two plants miss HT, one 1998 tagged plant had HT98=100, the rest all have HTs in the tag year < 100
* When TREE=sap, all plants have HTs in the tag year >=100

**SEG88:** If this is equal to 1, it indicates the segment was sampled in 1988. Could omit this

**EXCNT:** number of EX measured. Could omit this.

**NOTES00**

**NOTES11**

Found by chance: LE pace 720, 1 yr old seedlings were tagged.

# *2. Seedling/Sapling count data*

## *2.1 Data collected in 1988*

*Piru seeding (both 1yr and older than 1yr) was counted in 2m wide strips in 1988, this part of data was included in contour.ss. No sapling density data was collected in 1988.*

*R:\MOOSHUBB\longterm\Contour89\contour.ssd*

**PIRUDEN:** PIRU older seedling counts

**PIRU1YR:** 1st year PIRU seedling counts.

**CLASS: A.** It refers to seedlings

## *2.2 Data collected in 1989*

*First year and older than 1yr ABBA seedlings were counted in 4 1\*1 quadrats in spruce band in each segment; first year and older than 1yr PIRU seedlings were counted 1m\*segment length band.* *In the first 3 LW segments we sampled, 1st year and older are not distinguished, they are: LW520, LW640, LW840. LW340 was one of the earliest LW segment we sampled, but we do have data for 1st yea and older separately, so maybe filed crew went back and resampled it.*

*ABBA and PIRU saplings were counted in 4m\*segment length (the whole segment) in the same segments where seedlings were sampled*

These data are all in contour.ssd as well:

**ABBADEN:** ABBA older seedling or sapling counts.

**ABBA1YR:** 1st year ABBA seedling counts.

**PIRUDEN:** PIRU older seedling or sapling counts

**PIRU1YR:** 1st year PIRU seedling counts.

**CLASS: A=** seedlings; B=saplings

## *2.3 Data collected in 1998 and 1999*

***In 1998 for seedlings,*** *each segment was divided into 3 equal sections, and one 1\*1m fir plot was randomly selected in each of the three sections, where fir seedlings by age and height class were counted; Seedlings of other species (older than 1 year) were counted in the whole 1m wide seedling band. Starting on 8/24, a*fter 20 birch seedlings were tagged, protocol calls for counting REMAINING birch seedlings in rest of the 1m band, but after looking at hard copies, they usually count all the seedlings in the entire 1m band, even when when they counted the remaining birch seedlings, in csv raw file or SAS file, the count is for the entire segment.

***In 1998 for sapling,*** *in the same segment where seedlings were sampled,* ***s****aplings in all species were counted in 4m\*seglength band.*

***In 1999 for seedlings,*** *Before 7/21/99, Fir seedling were counted by height class in three 1\*1 quadrats, following 1998 protocol. Starting 7/21/99 only two 1 x 1 quadrats were sampled. In one 1 x 1 m quadrat first year and older fir seedlings were counted, and in the second 1 x 1 m quadrat only older fir seedlings (NO first year fir seedling)were counted..*

*For seedlings in other species, since we tagged seedlings older than one year for all species, were didn’t count them in field, but we could calculate them by summing up tagged seedling in different species.*

***In 1999 for saplings,*** *Sapling density will be obtained by counting number of tagged saplings except for ABBA which we counted in 4m band and FAGR in 3 segments where they were not sampled due to high abundance*(LE1860, SEG 40, 80 and 180. Seg 180 we both tagged and counted.)*.*

***Skeleton segments:*** *In 1998, there are some* ***“skeleton”*** *segments, where ABBA seedling/sapling density data, prism, herb cover, substrate data were not collected. This was not precisely followed though. All the plots where we didn’t sample ABBA seedling or sapling density, we sampled them in 1999.*

### *2.3.1 1998 and 1999 fir seedling density*

R:\MOOSHUBB\longterm\Moos1999\Datasets\fir98\_99.ssd

**SPECIES:** Species code. All equal to 1 (balsam fir).

**POS:** positions of the three quadrats

**DENSITY:** Fir seedling were counted by height class in 1\*1 quadrats within the 1m/. for some of 1999 segment, count for first year ABBA seedling are missing because we didn’t sample them.

**CONTID:** Contour ID

**SEGID:** Segment ID

**HTCLSS:** Height class. 1=0-10cm tall 1st year; 2= 0-10cm tall older than 1st year; 3=10-25cm tall; 4= 25-50cm tall; 5= 50-75cm tall; 6=75-100cm tall

**CENSUS:** 1998 or 1999.

### *2.3.2 1998 and 1999 seedling density data for other species*

R:\MOOSHUBB\longterm\Moos1999\Datasets\seed\_den.ssd

Referring to raw data file: R:\MOOSHUBB\longterm\Moos1999\Rawdata\_98\seden.csv, this SAS file misses all the 0 counts! I don’t know if we should trust these 0 counts, if these 0s are true, not including them could overestimate the mean density. Also one question to ask is that is it possible for in some segments, we didn’t look for certain species. Is there any hard copies?

**SEGID:** segment ID

**CONTID:** contour ID

**TOTCOUNT:**

In 1998, since were didn’t tag all species other than fir, spruce, and birch, so we counted number of older than one year seedlings in the 1m\*seglen band for all species other than fir. Because we did tag all spruce in the whole segment, so counts for spruce here should be equal to the total number of tagged spruce in 1998.

In 1999, since we tagged seedlings older than one year for all species, were didn’t count seedling numbers, TOTCOUNT were calculated by totaling the number of live seedlings (could includes seedlings tagged in1998 and still alive in 1999 and 1999 newly tagged seedlings) in the while segment in the SAS program, except for those species where we stopped tagging at certain meters, for which TOTCOUNT is the number of remaining seedlings field crew counted in the remaining segment. For these species, TOTCOUNT in this data set should be equal to TOTCNT1 or TOTCNT2 in “segplot.ssd”, which will be explained later. Cross check 1998 TOTCOUNT here with total number of tagged seedlings in segtree.ssd, and should correct it when TOTCOUNT have no data, but in the same segment, relevant seedlings were tagged. Only correct for PIRU.

Should check and correct height before correct this? Yes

**SPECIES:** Species codes. Details see “Codes98”. For each segment, should add all species, and set those were didn’t find as 0 TOTCOUNT. Be careful about skeleton segments.

**CENSUS:** Year in which numbers of seedlings were counted, or were calculated from totaling live tagged individuals.

### *2.3.3 1998 and 1999 sapling density data*

R:\MOOSHUBB\longterm\Moos1999\Datasets\sap\_den.ssd

**SEGID:** Segment ID

**CONTID:** Contour ID

**TOTCOUNT:** In 1998, we only tagged ABBA, PIRU, and BIRCH saplings. All saplings, including fir were counted in 4m\*seglen band, except in skeleton segments; in 1999, ABBA were counted in 4m\*seglen in each segment, and FAGR saplings were counted in 3 segments but not tagged where they were not tagged due to high abundance, for the other species, count was calculated as counting number of tagged sapings. 1999 TOTCOUNT for fir saplings and FAGR saplings in those 3 segments here are duplicated with ABSAPDEN and FAGRSAPS in “segplot.ssd” which will be explained later(they were cross checked, and correct for error referring to hard copies.). For all other species, TOTCOUNT were calculated from totaling live saplings in 1999 in each segment in SAS program.

Should do the same corrections as seedlings.

**SPECIES:** Species codes.

**CENSUS:** 1998 or 1999.

### *2.3.4 Other seedling/sapling data at plot level*

R:\MOOSHUBB\longterm\Moos1999\Datasets\segplot.ssd

**CONID**

**SEGID**

**SEGLEN:** Segment length

**DISP:** Displacement up or down

**PROTOCL:** Full98=prisms, herb squares, abba tagged in 98; Full99 means this was done in 99. Skeleton plots from 98 were converted in 99 to full protocol, thus FULL99.

**ABSAPDEN:** Number of ABBA sapling counted in 4m\*seglen in 1999. Data are included in “sap\_den.ssd”

**FAGRSAPS**: Total count of FAGR saplings in 3 segments where FAGR saplings were not tagged due to their incredible presence. All missing values for this column suggests that FAGR saplings were tagged if present. Data are included in “sap\_den.ssd”

**SEDSP1:** 4 letter code to identify species in segment where the tagging of seedling ceased before the end of the segment.

**SPAREA1:** Whole meter where tagging was ceased.

**TOTCNT1:**  Tcount of SEDSP1 in the ENTIRE segment.

**SEDSP2:** Same description as SEDSP1, but for a second species in the segment.

**SPAREA2:** Same as SPAREA1

**TOTCNT2:**  Same as TOTCNT1.

**SOAM:** Total count of 1st year SOAM seedling in 1m\*seglen band. This is not included in any of the seedling/sapling count data mentioned before.

R:\MOOSHUBB\longterm\Moos1999\Datasets\segid.ssd

All data in segid.ssd are included in “segtree.ssd” except:

**SEEDREM:** If it’s equal to 1, it’s a segment which has 1988 tagged seedlings

***2.4 Updated Master File for Seedling/sapling Density***

### *2.4.1 Mater file for seedling density 1988~1999*

This file was created in 2014, putting up all the relevant information from old SAS files: ***controur.ssd***, ***fir98\_99.ssd***, ***seed\_den.ssd, segplot.ssd,*** and tagged individual master file created by Lixi ***seesapmas11.ssd.*** Cross checking was done referring to all available data sheets, log books, csv and SAS file managed by Kevin in “Moos1999” folder. (The main SAS file created by Kevin for tagged individual seedlings and saplings are ***segtree.ssd)***

for the purpose of soil paper. This has seedling density data from 1988 to 1999

SAS program: R:\MOOSHUBB\longterm\lixi kong\Segment2011\seedenmas99.sas

SAS data set: R:\MOOSHUBB\longterm\lixi kong\Segment2011\seedenmas99.ssd

* **ABBA**: in 1989, we counted 1st year and older than 1st year separately in 4 1\*1 quadrats for each segment (position not recorded) except in the first 3 LW segments we sampled, 1st year and older are not distinguished, they are: LW520, LW640, LW840. LW340 was one of the earliest LW segment we sampled, but we do have data for 1st yea and older separately, so maybe filed crew went back and resampled it; in 1998 and 1999, we counted them by age and height class separately in 3 quadrats in 1998 and 3 or 2(one count both 1st year and older; one only count older seedlings) quadrats in 1999 for each segment.
* **PIRU**: in 1988, we counted 1st year and older than 1st year seedlings together in 2m band: ALL; In 1989, we counted 1st year and older than 1st year separately; in 1998 and 1999, we only counted older than 1st year seedlings(this is not true, need to update this!). Starting 1989, they were always counted in 1m band.
* **SOAM**: In 1998, we only counted older than 1st year seedlings in 1m band; in 1999 we counted some 1st year in 1m band(in segments completed after 7/12). We counted older than 1st year only in segments where tagging was ceased before end of the segment and the count was for the area where we didn’t tag them, and the rest for which we tagged all, counts were calculated in SAS.
* **BIRCH**: In 1998, starting on 8/24/, after 20 birch tagged, the remaining birch in the remaining segment was counted, but the distance where tagging was stopped was not recorded; In 1999, We counted older than 1st year only when tagging was ceased before end of the segment and the count was for the area where we didn’t tag them, and the rest for which we tagged all, counts were calculated in SAS.
* **Other species:** In 1998, we counted older than 1st year seedlings in 1m band; in 1999, we only counted older than 1st year only when tagging was ceased before end of the segment and the count was for the area where we didn’t tag them, and the rest for which we tagged all, counts were calculated in SAS.

**CONTNAM**

**STPACE**

**SGLEN**

**POS**

**CENS**

**ASPCL**

**ELEVCL**

**SPEC**

**SZCL:** age and height class: 1YR: 1st year seedlings (it’s specifically 0-10cm tall 1st year seedlings for 1998 and 1999); >1YR: older than 1st year seedlings; ALL: 1YR and older than 1YR together; 0-10: 0-10cm tall older than 1st year; 10-25: 10-25cm tall; 25-50: 25-50cm tall; 50-75: 50-75cm tall; 75-100: 75-100cm tall

**DISTCEAS99:** only recorded for ACSA, BEAL, BECO, and SOAM.

**CEAS98:** fir birch, if we stopped tagging after we reached about 20 seedlings, CEAS98=1.

**CNT:** This is always the filed count or count of tagged individuals done in SAS for the entire 1\*1 quadrts for ABBA or 2m or 1m band for other speciesregardless of whether we stopped tagging before end of the segment**.** Some CNT is missing: for ABBA, we didn’t sample 1st year in some segments where CNT will be missing; for other species, sometimes we are not sure about the count on the entire sampled area, so we left CNT missing.

**DENHA:** Density of seedlings per hectare

**OLDCNTTAG:** for seedlings that we tagged on the whole segment, this was calculated in SAS by Kevin by counting the tagged individuals including LIVE and DEAD and NF plants in 1999 (this seems to be counted on 1998 data sheets). This got corrected in CNT as only LIVE seedlings in 1999.

**CNTTAG:** derived counts. Count of tagged seedlings, generated in SAS.

***All checking done by SPEC is listed bellowed:***

***There are 63 skeleton segments from 1998, 27 of them were completely skipped, not just for ABBA.***

**SGLEN*:***

* LE 1860, segment 1380, in different files, it was recorded as 33.75 and 33.8, will use 33.8
* ME2020, segment 920, in different files, it was recorded as 27.75 or 27.8, will use 27.8.
* Me2020, seg 1180 had seglen=33 in segplot.csv file(in this folder R:\MOOSHUBB\longterm\Moos1999\Rawdata), 33.3 in seden.csv(in this folder R:\MOOSHUBB\longterm\Moos1999\Rawdata\_98). Will use 33.3

**ABBA**: we should always collect density for ABBA for each age and height class in each segment where we sampled for seedling density in 1989, 1998, and 1999 except a few earliest LW segments in 1989, skeleton segments in 1998, and some segments in 1999 where 1st year ABBA seedlings were not counted.

* Some segments in 1989 only had counts for older seedlings; Protocol says “No distinction between older and first year seedlings was made for the first four segments done at low elevation.” And it seems to be applied for both ABBA and PIRU. Referring to hard copy, the first four segments sampled at Low elevation are seg 340, seg 520, 640, and 840. LW, seg340 actually had counts for 1st and older ABBA seedlings, field crew probably went back to re-sample it.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Contnam | STPACE | quadrats | Notes | Corrections |
| HW400 | 220 | All four | Referring to other HW segments where we had 1st counts which are quite high, it’s unlikely they didn’t find any 1st in this segment, so we’ll treat this as missing data. | Treat this as missing data.  Keep the data the way it is now. |
| HW400 | 340 | All four | Same as above | Same as above |
| LW1900 | 520 | All four | One of the first 4 LW segments sampled, so the count should be for 1st and older seedlings together. There are some non-zero counts. | The counts is larger than 5,  So we can’t separate 1st and  Older year. |
| LW1900 | 640 | All four | Same as above | All counts are 0s, so no 1st year or older ABBA seedlings found. We should add 0 counts for 1st seedlings. |
| LW1900 | 840 | All four | Same as above | The count is larger than 5,  So we can’t separate 1st and  Older year. |

* In 1998. I double checked all segments with no ABBA data with whether it’s a skeleton segments, all consistent except for **LE1860, seg 1620** which is supposed to be a full protocol plots, and there is only a count of 1 for BEAL in old SAS file. On hard copy, I found more data:

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| SPEC | POS | 0-10y | 0-10old | 10-25 | 25-50 | 50-75 | 75-100 | Total | Notes |
| PRPE |  |  |  |  |  |  |  | 3 | Add the data |
| POTR |  |  |  |  |  |  |  | 1 | Since the species was only found in this segment, we’ll not add this, but make a note here. |
| PIRU |  |  |  |  |  |  |  | 0 | Add the data |
| SOAM |  |  |  |  |  |  |  | 15 | Add the data |
| ABBA | 2 |  | 2 | 1 |  |  |  | 3 | Add the data |
| ABBA | 11 |  | 1 |  |  |  |  | 1 | Add the data |
| ABBA | 24 |  | 1 |  |  |  |  | 1 | Add the data |

* In 1999 protocol says for some segments, we only counted 1st year seedlings, the other we counted both 1st and older seedlings, but in actual data, for some of the segments, only counted older seedlings instead of 1st year: randomly checked a few hard copies, the data is consistent. It’s an error in protocol.

Besides that all segments have a record for ABBA for each age and height class except for the 2 segments below:

**HE 1080, seg120** only had data for one quadrat, which is 1st count of 450.

Missing data found on hard copy:

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| POS | 0-10y | 0-10old | 10-25 | 25-50 | 50-75 | 75-100 | Total | Notes |
| 2 | 450 | **114** | **80** | **1** |  |  | **646?** | Add the data. Ignore the total. |
| 12 | **63** | **13** | **65** | **7** |  |  | **148** | Add the data |
| 21 |  |  |  |  |  |  | **0** | Add the data |

**HW620, seg360 only had data in 1 quadrat:** on hard copy, there is another position recorded as 23, but no counts were written done, should we all assume 0? Treat this as missing data.

* Cross check between 1998 and 1999 count data done in the same quadrats: 1999 counts were done in some or all of the quadrats we sampled in 1998, is it possible the count for 1st year seedlings in 1998 is 0, but hundreds in 1999 in the same quadrats? After checking a few segments for hand written hardcopies, we decided to believe the big change in 1st year ABBA seedlings between 1998 and 1999.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| CONTNAM | STPACE | pos | SZCL | CNT98 | CNT99 | Lixi NOTE |
| HE1080 | 180 | 5 | 1YR | 0 | 308 |  |
| HE1080 | 380 | 14 | 1YR | 0 | 160 |  |
| HE1080 | 540 | 14 | 1YR | 0 | 212 |  |
| HE1080 | 700 | 0 | 1YR | 0 | 202 |  |
| HE1080 | 700 | 19 | 1YR | 0 | 103 |  |
| HE1080 | 860 | 18 | 1YR | 0 | 190 |  |
| HE1080 | 980 | 13 | 1YR | 0 | 194 |  |
| HE140 | 20 | 6 | 1YR | 0 | 136 | Confirmed with hard copy |
| HE460 | 40 | 2 | 1YR | 0 | 21 |  |
| HE460 | 200 | 7 | 1YR | 0 | 222 |  |
| HE460 | 320 | 6 | 1YR | 0 | 18 |  |
| HW400 | 60 | 8 | 1YR | 0 | 120 |  |
| HW400 | 220 | 3 | 1YR | 0 | 57 |  |
| HW400 | 340 | 1 | 1YR | 0 | 60 |  |
| HW400 | 340 | 17 | 1YR | 0 | 60 |  |
| HW400 | 340 | 27 | 1YR | 0 | 15 |  |
| HW620 | 40 | 7 | 1YR | 0 | 156 |  |
| HW620 | 180 | 3 | 1YR | 0 | 18 |  |
| HW620 | 360 | 20 | 1YR | 0 | 113 |  |
| HW620 | 480 | 3 | 1YR | 0 | 58 |  |
| LE1860 | 40 | 5 | 1YR | 0 | 0 | Confirmed with hard copy |
| LE1860 | 180 | 13 | 1YR | 0 | 0 |  |
| LE1860 | 320 | 15 | 1YR | 0 | 5 |  |
| LE1860 | 480 | 6 | 1YR | 0 | 37 | Confirmed with hard copy |
| LE1860 | 680 | 1 | 1YR | 0 | 6 |  |
| LE1860 | 800 | 1 | 1YR | 0 | 12 |  |
| LE1860 | 960 | 1 | 1YR | 0 | 9 |  |
| LE1860 | 960 | 16 | 1YR | 0 | 31 |  |
| LE1860 | 1160 | 14 | 1YR | 0 | 15 |  |
| LE1860 | 1340 | 1 | 1YR | 0 | 79 |  |
| LE1860 | 1440 | 8 | 1YR | 0 | 6 |  |
| LE1860 | 1780 | 2 | 1YR | 0 | 1 |  |
| LW1900 | 60 | 8 | 1YR | 0 | 41 |  |
| LW1900 | 220 | 9 | 1YR | 0 | 53 |  |
| LW1900 | 340 | 2 | 1YR | 0 | 86 |  |
| LW1900 | 520 | 7 | 1YR | 0 | 44 |  |
| LW1900 | 520 | 27 | 1YR | 0 | 0 |  |
| LW1900 | 840 | 3 | 1YR | 0 | 156 |  |
| LW1900 | 1000 | 5 | 1YR | 0 | 16 |  |
| LW1900 | 1140 | 3 | 1YR | 0 | 4 |  |
| LW1900 | 1280 | 3 | 1YR | 0 | 10 |  |
| LW1900 | 1480 | 4 | 1YR | 0 | 5 |  |
| LW1900 | 1620 | 4 | 1YR | 0 | 5 |  |
| LW1900 | 1800 | 10 | 1YR | 0 | 50 |  |
| ME2020 | 0 | 4 | 1YR | 0 | 92 | Confirmed with hard copy |
| ME2020 | 0 | 16 | 1YR | 0 | 247 | Confirmed with hard copy |
| ME2020 | 160 | 6 | 1YR | 0 | 58 |  |
| ME2020 | 160 | 15 | 1YR | 0 | 91 |  |
| ME2020 | 160 | 25 | 1YR | 0 | 61 |  |
| ME2020 | 340 | 13 | 1YR | 0 | 28 |  |
| ME2020 | 480 | 8 | 1YR | 0 | 31 |  |
| ME2020 | 700 | 15 | 1YR | 0 | 32 |  |
| ME2020 | 800 | 18 | 1YR | 0 | 91 |  |
| ME2020 | 1180 | 9 | 1YR | 0 | 9 |  |
| ME2020 | 1180 | 18 | 1YR | 0 | 4 |  |
| ME2020 | 1180 | 23 | 1YR | 0 | 31 |  |
| ME2020 | 1320 | 8 | 1YR | 0 | 30 |  |
| ME2020 | 1320 | 13 | 1YR | 0 | 19 |  |
| ME2020 | 1320 | 29 | 1YR | 0 | 20 |  |
| ME2020 | 1480 | 4 | 1YR | 0 | 344 |  |
| ME2020 | 1620 | 13 | 1YR | 0 | 51 |  |
| ME2020 | 1820 | 24 | 1YR | 0 | 19 |  |
| ME2020 | 1920 | 15 | 1YR | 0 | 451 |  |
| MW1580 | 60 | 4 | 1YR | 0 | 281 |  |
| MW1580 | 180 | 9 | 1YR | 0 | 43 |  |
| MW1580 | 340 | 5 | 1YR | 0 | 56 |  |
| MW1580 | 520 | 2 | 1YR | 0 | 57 |  |
| MW1580 | 520 | 20 | 1YR | 0 | 0 |  |
| MW1580 | 700 | 8 | 1YR | 0 | 206 |  |
| MW1580 | 840 | 11 | 1YR | 0 | 66 |  |
| MW1580 | 1000 | 18 | 1YR | 0 | 74 |  |
| MW1580 | 1120 | 7 | 1YR | 0 | 40 |  |
| MW1580 | 1480 | 14 | 1YR | 0 | 496 | Confirmed with hard copy |

**PIRU**:

* In 1988, we counted 1st year and older PIRU together, but we can distinguish 1st year and older PIRU seedlings by looking at AGE/MINAGE data, all MINAGE are larger than 1. Still there are some plants had both AGE/MINAGE missing:

**Everything taller than 7cm are NOT first year seedlings!**

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| CONTNAM | STPACE | TAG | YRTAG | SPEC | HT88 | AGE88 | MINAGE88 | EX87 | EX86 | CNT | Hardcopies |
| HE1080 | 160 | 993 | 1988 | PIRU | 43 | . | . | . | . | 4 |  |
| LE1860 | 560 | 5 | 1988 | PIRU | 87 | . | . | . | . | 4 |  |
| LE1860 | 1840 | 25 | 1988 | PIRU | 19 | . | . | . | . | 14 |  |
| ME2020 | 440 | 313 | 1988 | PIRU | 39 | . | . | 3.3 | . | 1 |  |
| ME2020 | 720 | 221 | 1988 | PIRU | 66.7 | . | . | . | . | 1 |  |
| ME2020 | 880 | 231 | 1988 | PIRU | 45.3 | . | . | . | . | 11 |  |
| ME2020 | 880 | 233 | 1988 | PIRU | 27.6 | . | . | . | . | 11 |  |
| ME2020 | 920 | 253 | 1988 | PIRU | 28.6 | . | . | . | . | 122 |  |
| ME2020 | 920 | 259 | 1988 | PIRU | 20.2 | . | . | 0 | 1.1 | 122 |  |
| ME2020 | 920 | 273 | 1988 | PIRU | 30.8 | . | . | . | . | 122 |  |
| ME2020 | 920 | 274 | 1988 | PIRU | 47.3 | . | . | . | . | 122 |  |
| ME2020 | 920 | 413.1 | 1988 | PIRU | 14 | . | . | . | . | 122 |  |
| ME2020 | 1000 | 30 | 1988 | PIRU | 85.6 | . | . | . | . | 21 |  |
| **ME2020** | **1080** | **449** | **1988** | **PIRU** | **2.8** | **.** | **.** | **.** | **.** | **184** | **NOTE: “no ext on age-only stump left. It’s browsed, not a 1st year.”** |
| ME2020 | 1080 | 466 | 1988 | PIRU | 13.8 | . | . | . | . | 184 |  |
| **ME2020** | **1080** | **480** | **1988** | **PIRU** | **5.2** | **.** | **.** | **.** | **.** | **184** | **NOTE: “minimal age needed. 9-16-88. Could be 1st year or not.”** |

* in 1989, 1st year seedlings were only tagged if no older seedlings are available for that height class, I checked MINAGE89, all of them for PIRU are larger than 1, and for those miss MINAGE89, only 2 have only EX89 recorded, which are in MW1600 STPACE520, and STPACE700, and it corresponds to count for 1st PIRU seedlings for these 2 segments are 1s. No corrections needed.
* For all census year, in all segments where we collected density data, we should always look for PIRU to tag or count, so for each segment, there should always be a record for PIRU (for each age class if applies), except 3 earliest LW segments done in 1989 where we didn’t distinguish 1st and older seedlings when we count:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| CONTNAM | STPACE | SPEC | AGE | CNT | Notes/correcionts |
| LW1900 | 520 | PIRU | >1YR | 3 | Only 3 PIRU seedlings tagged. None of them could be 1st year seedlings. The count is less than 5, which indicates all PIRU were tagged. Should add count of 0 for 1st seedlings. |
| LW1900 | 640 | PIRU | >1YR | 1 | 4 individuals with exactly the same measurements, maybe they are the same one. I double checked 1989 data, this is the only plant had duplicated records. It has more than 1 year EX, so it’s a older seedlings as well. Should add count of 0 for 1st seedlings. |
| LW1900 | 840 | PIRU | >1YR | 0 | Only 1 PIRU seedlings tagged. And it’s a older seedling. Should add count of 0 for 1st seedlings. |

After this correction, in 1989 segments where ABBA is counted, there is always a count for 1st and older PIRU seedlings, so no corrections needed.

* In 1998, for each segment where we sampled seedling density data, there is always a row for PIRU count, so no correction is needed.
* In 1999, there is not always a row for PIRU for each segment, there won’t be a row created counting number of tagged individuals neither if no PIRU seedlings were tagged. We should probably add the 0s. Also notice that PIRU is very rare at H elevation, so there will be a lot of count=0 added at H for 1999.
* Found this by chance: LE seg720, 991262 is the only PIRU we have in SAS file, it has a note of 1 yr old on hard copy, another 2 1yr old were sampled on hard copy, but not included in SAS: Leave it out so we don’t overestimate density.
* For year 1988 and 1998, CNTTAG should always be equal to CNT. When CNTTAG is missing, which means no tagged individuals CNT should be 0. PIRU that had CNT (for 1988, I checked the count for 1st year and older together we originally collected) not consistent with CNTTAG are listed in the table below: according to what we can find on hard copies, we’ll trust the tagged individuals instead of the count.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| CONTNAM | STPACE | CENS | CNT | CNTTAG | Lixi note |
| LE1860 | 880 | 1988 | 72.00 | 73 |  |
| ME2020 | 880 | 1988 | 33.00 | 11 | The count could have taken some of the 1880 segment PIRU seedlings into account, which is not correct. On hard copies, we found they correct some of the 880 pace number to 1880. Also on log book, count of tagged ABBA and PIRU seedlings were recorded as 20, which was confirmed with SAS tagged individual file. |
| ME2020 | 1880 | 1988 | 33.00 | 56 | See above |
| ME2020 | 920 | 1988 | 121.00 | 122 |  |
| LW1900 | 340 | 1998 | 1.00 | 2 | On hand written hard copy, we measured 2 PIRU seedlings, but count for PIRU was only 1. |
| LW1900 | 1140 | 1998 | 14.00 | 15 | Count confirmed with hand written hard copies, no hand written hard copies for tagged seedlings |
| ME2020 | 600 | 1998 | 1.00 | . | On print out hard copy, there is one tagged PIRU 98903, but in SAS file from Kevin, this plan doesn’t have a SPEC. SPEC added. |
| ME2020 | 920 | 1998 | 37.00 | 40 | On hand written hard copy, count was 37; and referring to both hand written and printout copies, there was data for 39 PIRU seedlings. |
| ME2020 | 1080 | 1998 | . | 18 | No hard copy about count data, but print out hard copies indicate there were 18 PIRU seedlings measured. |
| ME2020 | 1620 | 1998 | 14.00 | 15 | On hand written hard copies, count was 14, and there were data recorded for 15 tagged PIRU seedlings. |

* For 1999, we didn’t count seedlings and we always tagged all the PIRU seedlings, so COUNT is calculated as counting number of live tagged PIRU seedlings in SAS. Kevin counted both NF and DEAD seedlings, and I corrected this.(We looked at 1998 tagged individual data and made sure no 1st year PIRU seedlings were tagged/counted starting 1998. We were wondering about this because we counted 1st year ABBA seedlings in 1998)

**BIRCH:** Crosscheck birch with below criterions and list all in the table below that didn’t meet:

* In 1998 before 8/24, we were supposed to tag and count all the birch, so CNT should be equal to CNTTAG.
* In 1998 after 8/24, When CNTTAG98 <20, which indicates there were less than 20 individuals on the whole segment, there should be either no CNT, or the CNT should be equal to CNTTAG.
* In 1998 after 8/24, CNTTAG98 should not be too much bigger than 20.
* In 1999, before 7/21 we tagged all birch seedlings in the entire segment, even in segments where birch was only tagged in part of the segment in 1998. We didn’t count the numbers in field, so CNT is supposed to be generated by counting tagged LIVE birch seedlings. Kevin’s CNT counted DEAD and NF seedlings, and Lixi corrected this already.
* In 1999, if there is DISTCEAS recorded, which means tagging is ceased before end of the segment, CNTTAG should be around 30. Protocol says count the rest of birch in the rest of segment, but the CNT stored in SAS file from Kevin seems to be for the entire segment.

**Note all the issues in protocol!**

All the data that didn’t meet the above criterion are listed in the table below. After checking hard copies for the problematic data, we found:

* CNT is always in the entire segment, regardless whether we stopped tagging somewhere before end of the segment or we tagged them all, except for the first segment listed in the table, which we should correct CNT as the count in the entire segment
* In 1998 before 8/24, we didn’t always tag all birch seedlings, for some segments, we stopped tagging somewhere and counted the total in the entire segment.
* For the birch which we didn’t tag all, I added a new variable CEAS98=1.
* Some counts got switched between BECO and SOAM, we should correct the count for both.
* There could be inconsistency between CNT and CNTTAG even on hard copies, we always trust CNTTAG for this case.
* Some inconsistency is caused by change in species. We should trust CNTTAG for this case.
* Sometimes when we tag all the birch, we didn’t count, CNT end up to be 0

Cnt was misentered, we should trust CNTTAG for this case.

* We believe in 1998 and 1999, we always looked for birch to tag or count, so we should add all birch species(BECO, BEAL, and BESPP) to each segment, and add 0 counts while nothing is tagged.

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 1998 data: | | | | | | | | | | |
| CONTNAM | SPACE | CENS | SGLEN | SPEC | CNT | DATE98 | CNTTAG | MAXAL | Hard copies | corrections |
| HE1080 | 120 | 1998 | 29 | BECO | 48 | 82098 | 49 | 7.94 | Note” BECO seedling tagged in first 8m only-in data logger”; “1st 8m= remaining=48 total ” (confusing!) | 48 is in the rest of segment, correct count to 97. Add CEAS98=1 |
| HE1080 | 180 | 1998 | 27.2 | BECO | 80 | 82098 | 25 | 19.55 | Note” tagged 26 BECO seedlings only up to 20m along, 54 BECO seedlings in rest of strip”. | Add CEAS98=1 |
| HE1080 | 240 | 1998 | 27.2 | BECO | 1 | **82898** | 1 | 18.05 | 1 tagged BECO and count of 1 for BECO found on hard copy. |  |
| HE1080 | 380 | 1998 | 33.4 | BECO | 85 | **82898** | 21 | 14.8 | The count was recorded under “Number of seedlings in entire segment” column on hand written hard copies. | Add CEAS98=1 |
| HE1080 | 540 | 1998 | 29 | BECO | 4 | **82898** | 4 | 28.29 | Count of 4 recorded under “number of seedlings in entire segment” and 4 tagged BECO found on hard copy |  |
| HE1080 | 700 | 1998 | 30 | BECO | 22 | **90198** | 23 | 9.6 | The count was recorded under “Number of seedlings in entire segment” column on hand written hard copies. |  |
| HE1080 | 900 | 1998 | 30.3 | BECO | 20 | **90198** | . | 8.6 | BECO has count of 0, followed by a row for SOAM which had count of 20 on hand-written hard copy, maybe they got switched during data entry. In SAS Older SOMA had a count of 0, which should be corrected to 20. | Correct for both BECO and SOAM. |
| HE1080 | 1040 | 1998 | 31 | BECO | 10 | **90198** | 9 | 27 | Count was recorded as 10, but there is only 9 tagged BECO on print-out hard copy | Trust CNTTAG |
| HE140 | 20 | 1998 | 23.9 | BECO | 43 | 82098 | 36 | 22.94 | BECO has count of 43 under “number of seedling in entire segment”, and all 43 birch seedlings were recorded as BESPP on hand-written hard copies. | Change CNT to be equal to CNTTAG. 1 |
| HE140 | 20 | 1998 | 23.9 | BESPP | . |  | 7 | 22.94 | See above | CNT should be 7 |
| HE460 | 40 | 1998 | 26.5 | BECO | 26 | **83198** | 23 | 8.33 | The count was recorded under “Number of seedlings in entire segment” column on hand written hard copies. With a note” additional BECOs 3”. | Add CEAS98=1 |
| HE460 | 120 | 1998 | 24.9 | BECO | 3 | **83198** | 3 | 23.23 | Count of 3 recorded under “number of seedlings in entire segment” and 3 tagged BECO found on hard copy |  |
| HE460 | 200 | 1998 | 30.5 | BECO | 0 | 81398 | 45 | 30.14 | 45 tagged BECO found on hard copy, but count data is missing. | CNT sould be set as 45 |
| HE460 | 280 | 1998 | 25.6 | BECO | 0 | 81398 | 2 | 9.83 | 2 tagged BECO seedling found on hard copy, but count is missing. |  |
| HE460 | 320 | 1998 | 25.1 | BECO | 0 | 81398 | 33 | 9.14 | Only 33 tagged BECO seedling on hard copy, count is missing |  |
| HW400 | 60 | 1998 | 30.1 | BECO | 3 | 82898 | 3 | 16.02 | 3 tagged BECO seedlings and count of 3 found on hard copy. |  |
| HW400 | 220 | 1998 | 22.2 | BEAL | 20 | **82498** | . | 17.46 | No counts for BEAL found, SOAM had count of 20 though. | Correct for both BECO and SOAM |
| HW400 | 220 | 1998 | 22.2 | BECO | 7 | **82498** | 6 | 17.46 | BECO had count of 7 under “number of seedlings in entire segment” |  |
| HW620 | 180 | 1998 | 29.9 | BECO | 11 | 82898 | 13 | 28.58 | BECO had count of 13, followed by SOAM with count of 11, maybe they got switched | Correct for both BECO and SOAM |
| HW620 | 480 | 1998 | 27.5 | BECO | 4 | 82398 | 29 | 5.7 | BECO had count of 45, followed by SOAM with count of 4. | 45 is in the entire segment. Correct for both BECO and SOAM. Add CEAS98=1 |
| HW620 | 480 | 1998 | 27.5 | BESPP | . | . | 1 | 5.7 | All birch was recorded as BECO, maybe one of them was corrected as BESPP. |  |
| LE1860 | 320 | 1998 | 40 | BEAL | 18 | **90498** | 16 | 29.3 | The count was recorded under “Number of seedlings in entire segment” column. There are 19 seedlings were BEAL on print-out hardcopies, 98636 and 98631 were corrected to ACSP.; 98644 was corrected to BESPP.. | Trust CNTTAG |
| LE1860 | 320 | 1998 | 40 | BECO | 2 | **90498** | 2 | 29.3 | The count was recorded under “Number of seedlings in entire segment” column. |  |
| LE1860 | 320 | 1998 | 40 | BESPP | . | . | 1 | 29.3 | On print-out hard copy, 98644 had specie code of 4, which is BEAL, but in SAS file from Kevin, it was corrected to BESPP | Trust CNTTAG, add CNT=1 |
| LE1860 | 400 | 1998 | 27.35 | BEAL | 2 | 81998 | . | . | 98352, 98380 were BEAL on hand written hard copies, and was correct as AMSPP in SAS file from Kevin. One of them had note “not birch” | Set count as 0 |
| LE1860 | 480 | 1998 | 37 | BEAL | 10 | 81998 | 30 | 18.7 | Some of the BESPP recorded on hand written had copy was corrected as BEAL or BECO in Kevin’s SAS file. | Trust CNTTAG, correct CNT |
| LE1860 | 480 | 1998 | 37 | BESPP | 56 | 81998 | 22 | 18.7 | See above |  |
| LE1860 | 600 | 1998 | 34.4 | BESPP | 2 | **82698** | 2 | 19.15 | On hand written hard copy, there are data for 2 tagged BESPP, and BESPP count was recorded as 2 under “number of seedlings in entire segment” with a note” nothing else” |  |
| LE1860 | 680 | 1998 | 31.1 | BESPP | 4 | **82698** | . | 20.66 | 4 tagged BESPP and count of 4 were found on hand written hard copies, they were corrected to BEAL in SAS data set. |  |
| LE1860 | 940 | 1998 | 33.6 | BESPP | 3 | **82698** | 2 | 33.57 | Birch had count of 9 for “number of seedlings in entire segment”. Print-out hard copy had 8 tagged BECO, and 1 BESPP. In SAS file, 1 of the BECO was corrected to BESPP, 1 BECO was corrected as BEAL. |  |
| LE1860 | 1160 | 1998 | 32.6 | BEAL | 1 | **82698** | 1 | 19.37 | Count and number of tagged individual confirmed with hard copy. Looks like the count is for the while plot |  |
| LE1860 | 1220 | 1998 | 32 | BESPP | 4 | **90298** | 4 | 28.69 | 4 tagged BESPP and count of 4 for BESPP recorded on hand written hard copies |  |
| LE1860 | 1340 | 1998 | 37.2 | BECO | 10 | **90298** | 10 | 36.8 | 10 tagged BECO and count of 10 for BESPP recorded on hand written hard copies |  |
| LE1860 | 1380 | 1998 | 33.75 | BEAL | 5 | **90298** | 5 | 33.5 | 5 tagged BEAL and count of 5 for BEAL recorded on hand written hard copies |  |
| LE1860 | 1380 | 1998 | 33.75 | BESPP | 2 | **90298** | 2 | 33.5 | 2 tagged BESPP and count of 2 for BESPP recorded on hand written hard copies |  |
| LE1860 | 1620 | 1998 | 33.5 | BEAL | . | . | 1 | 2.85 | On hand written hard copy, one tagged BEAL was measured, and count for BEAL was recorded as 1 | Add CNT=1 |
| LE1860 | 1780 | 1998 | 34 | BEAL | 5 | **90398** | 5 | 12.15 | 5 tagged BEAL and count of 5 for BEAL recorded on hand written hard copies |  |
| LE1860 | 1780 | 1998 | 34 | BESPP | 1 | **90398** | 1 | 12.15 | 1 tagged BESPP and count of 1 for BESPP recorded on hand written hard copies |  |
| LE1860 | 1840 | 1998 | 30 | BEAL | 1 | **90498** | 1 | 13.57 | 1 tagged BEAL and count of 1 for BEAL recorded on hand written hard copies |  |
| LW1900 | 60 | 1998 | 33.4 | BEAL | 46 | **90998** | 19 | 18.45 | Count note on hard copy: “Beal(all sheets) total 46”, since there is multiple data sheets for this segment. | Add CEAS98=1 |
| LW1900 | 60 | 1998 | 33.4 | BESPP | . | **.** | 3 | 18.45 | 3 tagged BESPP found on hard copy, count is missing. |  |
| LW1900 | 340 | 1998 | 32 | BEAL | 3 | **90898** | 4 | 27.2 | 4 tagged BEAL individual and count of 3 for BEAL were recorded on hard copy |  |
| LW1900 | 520 | 1998 | 33.7 | BEAL | 11 | **90898** | 10 | 30.58 | Count of 11 was recorded on hard copy, and only 8 tagged BEAL on hard copy. 1 BECO and 1 BESPP on hard copy were changed to BEAL in S AS file |  |
| LW1900 | 520 | 1998 | 33.7 | BECO | 2 | **90898** | 1 | 30.58 | See above |  |
| LW1900 | 520 | 1998 | 33.7 | BESPP | 12 | **90898** | 10 | 30.58 | See above |  |
| LW1900 | 640 | 1998 | 33.3 | BEAL | 1 | **90898** | 1 | 18.65 | Count of 1 and 1 tagged BEAL found on hard copy |  |
| LW1900 | 840 | 1998 | 30 | BESPP | . | **.** | 2 | 7.52 | No count for BESPP found on hard copies. 2 tagged BEALs on print-out hard copy were changed to BESPP in SAS file |  |
| LW1900 | 1000 | 1998 | 31.7 | BEAL | 1 | **90898** | 2 | 29.94 | Count for BEAL on hard copy was 2 instead of 1 | Correct CNT |
| LW1900 | 1000 | 1998 | 31.7 | BESPP | . | **.** | 3 | 29.94 | .No counts recorded for BESPP on hard copies. 3 BEAL on print-out hard copies were changed to BESPP in SAS file. |  |
| LW1900 | 1140 | 1998 | 27.5 | BEAL | 18 | **90898** | 17 | 25.55 | Count of 18 confirmed with hard copy. One BEAL on print-out hard copy was changed to BESPP in SAS file. |  |
| LW1900 | 1140 | 1998 | 27.5 | BESPP | . | . | 1 | 25.55 | See above |  |
| LW1900 | 1280 | 1998 | 23.3 | BEAL | 3 | **91198** | 3 | 19.58 | 3 tagged BEAL and count of 3 confirmed with hard copy |  |
| LW1900 | 1620 | 1998 | 23.5 | BECO | 2 | **91198** | 3 | 19.7 | Count confirmed with hard copy. One BEAL on hand-written hard copy was changed to BECO in SAS file |  |
| LW1900 | 1800 | 1998 | 27 | BEAL | 4 | **91198** | 4 | 20.99 | 4 tagged BEAL and count of 4 confirmed with hard copy |  |
| LW1900 | 1800 | 1998 | 27 | BESPP | 2 | **91198** | 2 | 20.99 | 2 tagged BESPP and count of 2 confirmed with hard copy |  |
| ME2020 | 160 | 1998 | 31.5 | BECO | 0 | 82198 | 1 | 9.69 | Hard copy had count for BECO of 0, but one tagged BESPP on hard copy was corrected as BECO. |  |
| ME2020 | 600 | 1998 | 28 | BECO | 4 | 82198 | 3 | 25.46 | Note on hard copy” BECO 4 on seedling count, but only 3 tagged?” |  |
| ME2020 | 740 | 1998 | 28.9 | BECO | 1 | **82598** | 1 | 27.94 | BECO had count of 1 recorded under “seedling count”. |  |
| ME2020 | 800 | 1998 | 29.5 | BECO | 17 | **82598** | 17 | 24.88 | BECO had count of 17 recorded under “seedling count”. |  |
| ME2020 | 980 | 1998 | 25.5 | BECO | 3 | **90398** | 3 | 17.7 | BIRCH had count of 3, and there are 2 tagged BECO, and 1 tagged BESPP on hard copy, the BESPP was corrected to BECO in SAS file. |  |
| ME2020 | 1080 | 1998 | 28.5 | BECO | . | . | 15 | 11.8 | Hand written hard copy with count missing; there are 15 tagged BECO on print-out hard copies. |  |
| ME2020 | 1180 | 1998 | 33.3 | BECO | 2 | **82698** | 2 | 25.46 | Count and number of tagged BECO confirmed with hard copy |  |
| ME2020 | 1200 | 1998 | 28.3 | BECO | 17 | **83198** | 17 | 26.89 | Count of 17 recorded under “number of seedlings in entire segment” |  |
| ME2020 | 1320 | 1998 | 32.8 | BECO | 2 | **90298** | 2 | 23.12 | Count of 2 recorded under “number of seedling in entire segment” |  |
| ME2020 | 1580 | 1998 | 35.8 | BECO | 5 | **83198** | 5 | 28.3 | Count and number tagged individual confirmed with hard copy |  |
| ME2020 | 1620 | 1998 | 27.8 | BECO | 12 | **83198** | 12 | 23.35 | Count and number tagged individual confirmed with hard copy |  |
| ME2020 | 1820 | 1998 | 37 | BECO | 1 | **90198** | 1 | 22.44 | Count and number tagged individual confirmed with hard copy |  |
| ME2020 | 1880 | 1998 | 35 | BECO | 2 | **90198** | 2 | 19 | Count and number tagged individual confirmed with hard copy |  |
| ME2020 | 1920 | 1998 | 33.6 | BECO | 1 | **90198** | 1 | 10.33 | Count and number tagged individual confirmed with hard copy |  |
| ME2020 | 2000 | 1998 | 38.6 | BECO | 1 | **90298** | 1 | 0.7 | Hard copy missing |  |
| MW1580 | 180 | 1998 | 29.7 | BECO | 30 | **91498** | 3 | 10.85 | On the hard copy, most species were recorded as 3, which is BECO, but in SAS file from Kevin they are BESPP, BEAL, or BECO |  |
| MW1580 | 180 | 1998 | 29.7 | BESPP | . | **.** | 15 | 10.85 | See above |  |
| MW1580 | 340 | 1998 | 28.5 | BECO | 1 | **91498** | 1 | 27.15 | Count and number tagged individual confirmed with hard copy |  |
| MW1580 | 520 | 1998 | 28.5 | BEAL | 2 | **91498** | 2 | 27.81 | Count and number tagged individual confirmed with hard copy |  |
| MW1580 | 700 | 1998 | 30.3 | BECO | 2 | **91498** | 2 | 14.92 | Count and number tagged individual confirmed with hard copy |  |
| MW1580 | 840 | 1998 | 29.2 | BEAL | 0 | 80398 | 2 | 28.06 | On hard copy, there is 14 “BECO” tagged, but in SAS file from Kevin, 2 of them were changed into BEAL |  |
| MW1580 | 840 | 1998 | 29.2 | BECO | 14 | 80398 | 12 | 28.06 | See above |  |
| MW1580 | 1280 | 1998 | 31.5 | BECO | 0 | 72898 | 2 | 14.85 | 2 tagged BECO found on hand-written hard copy, no counts recorded. | FALSE 0 cnt SHOULD BE 2 |
| MW1580 | 1480 | 1998 | 30.5 | BECO | 0 | 73198 | 21 | 29.82 | 21 tagged BECO found on hand-written hard copy. No counts for BECO found. | FALSE 0 cnt SHOULD BE 21 |
|  | | | | | | | | | | |
| I corrected count for birch from 1999, which KEVIN counted DEAD and NF seedlings as well in SAS. Below are birch seedlings had DISTCEAS99 recorded | | | | | | | | | | |
| CONTNAM | STPACE | CENS | SGLEN | SPEC | CNT | CNTTAG | DSITCEAS | - | Hard copy | corrections |
| LW1900 | 60 | 1999 | 33.4 | BEAL | 31 | 30 | 25 |  | No relevant information found on hard copy | We trust the count is in the entire segment |
| LW1900 | 100 | 1999 | 31.1 | BEAL | 65 | 31 | 22 |  | Note: BEAL seedling 30 in 0-22m, total=65” | Same as above |
| HE1080 | 180 | 1999 | 27.2 | BECO | 77 | 32 | 21 |  | Note: BECO seedlings were tagged up to 21 m, 45 more BECO seedling in rest of segment | Same as above |
| HE1080 | 380 | 1999 | 33.4 | BECO | 62 | 26 | 16 |  | NOTE: Birch not tagged after 16, but after 16, an additional 32 were counted (total 62)” | Same as above |
| HW620 | 480 | 1999 | 27.5 | BECO | 39 | 41 | 10 |  | Note: 39 BECO seedlings tagged from 0-10m, none in rest of segment, seedling are primarily concentrated on two moss covered logs”. The difference should be caused by change in spec | Same as above |

* In 1999 data, MW760 had a count of 1 for BECO, but this plot was not sampled. Looking at row data for tagged individuals in 1999, a BECO was tagged with segid of 418, which correspond to seg760, but the individuals above it and below it all had segid of 416 which correspond to seg720, so it’s an error. There is actually 3 live BECO seedlings in 1999 for seg720. I corrected this for both density data and tagged individuals data.
* In both 1998 and 1999, we believe we also look for BIRCH (BECO, BEAL, BESPP) to tag or count in each segment where we sampled seedling density data, so we should add a record for BECO, BEAL for each segment, and add count of 0 if applies. We don’t need to add BESPP, because we won’t look at BESPP separately, we’ll always add up BECO+BEAL+BESPP, as long as there is always a record for BECO and BEAL, we won’t overestimate the mean. Notice because we did count seedling in field in 1998, only 2 segments listed as below miss a record for BEAL or BECO, but in 1999, since we didn’t count in field, a lot of segments don’t have any tagged BEAL or BECO and won’t have a count.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| CONTNAM | STPACE | CENS | SPEC |  |
| ME2020 | 1080 | 1998 | BEAL | No hand written hard copy found. On the print-out hardcopy for tagged individuals, no BEAL |
| LE1860 | 1620 | 1998 | BECO | On hand written hard copy, there is no counts for BECO recorded. |

***Other species***

* In 1998, we were not supposed to tag any seedlings other than ABBA, BIRCH, and PIRU (Still, we have 3 ACSP, 13 AMSPP, 1 SOAM tagged in 1998, some of these are caused by change in species) so CNT should not be less than CNTTAG. There are 4 segments had CNT missing, but there is tagged individual, so for these segments, we don’t know the density on the whole 1 m band.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| CONTNAM | STPACE | CENS | SGLEN | SPEC | DATE98 | CNTTAG | Notes/corrections | correction |
| LE1860 | 320 | 1998 | 40 | ACSP | . | 2 | No count recorded for ACSP on hard copies, 2 tagged BEAL was corrected to ACSP in SAS file. | Have CNT as missing, so we don’t use it for density calculation |
| LW1900 | 1140 | 1998 | 27.5 | ACSP | . | 1 | 98321 which was a BEAL on print-out hardcopy was corrected as ACSP. | Have CNT as missing, so we don’t use it for density calculation |
| LE1860 | 400 | 1998 | 27.4 | AMSPP | 81998 | 2 | 98352, 98380 were BEALs on hand written hard copies, and was correct as AMSPP in SAS file from Kevin. One of them had note “not birch” | Have CNT as missing, so we don’t use it for density calculation |
| LE1860 | 480 | 1998 | 37 | AMSPP | . | 11 | on hard copy, some of the BESP were corrected as AMSPP in SAS file. | Have CNT as missing, so we don’t use it for density calculation |

* ***In 1999,*** when there is a DISTCEAS99 recorded, CNTTAG should not be too much less than 30. CNTTAG should not be too much bigger than 30 neither. Those had DISTCEAS99 recorded, but CNTTAG ne 30 are listed in the table below:

***For SOAM, we are not sure about the HTCL that we tagged or/and counted, so we can’t do 1999 density for older SOAM, we can still use 1st count data from 1999.***

***We won’t do density on AMSPP.***

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| CONTNAM | STPACE | CENS | SGLEN | SZCL | SPEC | CNT | CNTTAG | DISTCEAS | MAXHT99 | Lixi Note |
| HE1080 | 580 | 1999 | 30 | >1YR | SOAM | 15 | 5 | 8 |  | Hand written hard copy notes: ended at meter 8, 10 more between 8m and 30m, 5 tagged, 15 total |
| LE1860 | 1620 | 1999 | 33.5 | >1YR | SOAM | 21 | 5 | 3 |  | No relevant notes on hard copies |
| LW1900 | 840 | 1999 | 30 | >1YR | SOAM | 5 | 5 | 14 |  | No relevant information found on hard copy |
| ME2020 | 400 | 1999 | 30 | >1YR | SOAM | 5 | 5 | 24 |  | No relevant information found on hard copy |
| ME2020 | 1920 | 1999 | 33.6 | >1YR | SOAM | 14 | 5 | 8 |  | No relevant information found on hard copy |
| ME2020 | 2000 | 1999 | 38.6 | >1YR | SOAM | 6 | 5 | 31 |  | No relevant information found on hard copy |
| MW1580 | 60 | 1999 | 22 | >1YR | SOAM | 9 | 5 | 7 |  | No relevant information found on hard copy |
| MW1580 | 1120 | 1999 | 29 | >1YR | SOAM | 21 | 5 | 8 |  |  |
| HE1080 | 900 | 1999 | 30.3 | >1YR | SOAM | 19 | 6 | 23 |  | Hand written hard copy notes: tagged 6 SOAM (0-25cm) from 0 to 23 m, 13 more found in rest of segment. |
| HE1080 | 1040 | 1999 | 31 | >1YR | SOAM | 23 | 6 | 13 | 11 | Hand written hard copy notes: soam 6 (0-25cm) in 0-13m, total density 23 |
| LE1860 | 1720 | 1999 | 34.3 | >1YR | SOAM | 8 | 6 | 2 | 8 | Hand written hard copy notes: SOAM (0-25cm) 6 in 0-2m; 8 total |
| ME2020 | 600 | 1999 | 28 | >1YR | SOAM | 26 | 6 | 12 |  | No relevant information found on hard copy |
| ME2020 | 920 | 1999 | 27.8 | >1YR | SOAM | 66 | 6 | 16 |  | Note: need to check old seedlings data” 3 SOAM~13-14M |
| MW1580 | 900 | 1999 | 30.4 | >1YR | SOAM | 20 | 6 | 14 |  | Note: SOAM seedling <25cm tall measured to 14m(already in database!) |
| HE1080 | 860 | 1999 | 30.3 | >1YR | SOAM | 9 | 7 | 14 | 27 | Note: SOAM 0-25 cm 2 after meter 14+7 tagged 9 total. |
| LE1860 | 1380 | 1999 | 33.8 | >1YR | SOAM | 9 | 7 | 23 |  | No relevant notes on hard copies |
| LE1860 | 480 | 1999 | 37 | >1YR | SOAM | 8 | 8 | 2 |  | No relevant notes on hard copies |
| LE1860 | 1780 | 1999 | 34 | >1YR | SOAM | 30 | 8 | 11 |  | No relevant notes on hard copies |
| MW1580 | 280 | 1999 | 28.7 | >1YR | SOAM | 17 | 8 | 2 |  | No relevant information found on hard copy |
| MW1580 | 840 | 1999 | 29.2 | >1YR | SOAM | 16 | 9 | 8 |  | Note: SOAM tagged up to 8 meters(<25cm tall) |
| ME2020 | 700 | 1999 | 28.5 | >1YR | SOAM | 57 | 11 | 3 |  | No relevant information found on hard copy |
| MW1580 | 180 | 1999 | 29.7 | >1YR | SOAM | 39 | 11 | 8 |  | Note: SOMA(0-25CM) 8 tagged in first 8m, total=39 |
| LW1900 | 1140 | 1999 | 27.5 | >1YR | SOAM | 14 | 12 | 13 |  | No relevant information found on hard copy |
| MW1580 | 340 | 1999 | 28.5 | >1YR | SOAM | 50 | 14 | 3 |  | Note: good amount of SOMA seedlings(some 25cm and older). (0-25cm) older SOAM 45 |
| HE1080 | 980 | 1999 | 28.8 | >1YR | SOAM | 18 | 19 | 21 |  | NOTE: soam(0 to 25cm) 17 in 0-21 m tagged, 6 in 0-4m \*forgot about first 5(0-25cm) SOAM protocol. 18 in entire segment. |
| ME2020 | 1400 | 1999 | 36 | >1YR | SOAM | 42 | 31 | 8 |  | NOTE: 31 soma seedlings were tagged in 0-8m along segment, 11 in rest of segment |
| MW1580 | 700 | 1999 | 30.3 | >1YR | SOAM | 50 | 31 | 15 |  | Note: 31 SOAM seedlings tagged from 0-15m, 29 in rest of segment |
| MW1580 | 1480 | 1999 | 30.5 | >1YR | SOAM | 48 | 31 | 22 |  | Note: 31 SOAM seedlings tagged from 0-22m. 17 SOAM in rest of segment. |
| LE1860 | 1440 | 1999 | 31.8 | >1YR | ACSA | 49 | 33 | 19 |  | Hand written hard copies: ACS seedlings 33 in 0-19m; 49 seedlings total |
| LE1860 | 240 | 1999 | 34.8 | >1YR | ACSA | 56 | 34 | 7 |  | No relevant notes on hard copies |
| LE1860 | 180 | 1999 | 32.8 | >1YR | ACSA | 49 | 38 | 24 |  | Hand written hard copies: ACSA seedlings 39 in 0-24m total=49 |
| LW1900 | 580 | 1999 | 35.5 | >1YR | ACSA | 423 | 130 | 8 |  | Note: lots of sugar maple seedlings and saplings. The tagging of seedlings ended at 8m. 13 more seedlings were tagged within the 8m and should be added to the final “tagged seedling count”. After the 8m mark 294 ACSA seedlings were counted. |
| LE1860 | 400 | 1999 |  |  | AMSPP | . | 2 |  |  | No relevant information found on hard copy |
| LE1860 | 480 | 1999 |  |  | AMSPP |  | 13 |  |  | No relevant information found on hard copy |
| LE1860 | 1720 | 1999 |  |  | AMSPP |  | 1 |  |  | No relevant information found on hard copy |

* *Did we count all SOAM 1st year seedlings in 1999 after 7/12?No.*
* *In 1998 and 1999, we should look for all OTHER SPEC in all segments to count or/and tag, so we should add all species to each segment, and count of 0 if applies except for 1st year and older SOAM. We don’t need to add AMLA, which is really rear, ACPE, ACSA, and ACSP are only found at Low elevation, so we don’t add count=0 at other elevations; Don’t need to add ACSPP, AMSPP, or UKDE. Also notice ACPE, and ACSPP are only found in 1998, we should make species list the same between 1998 and 1999.*

### *2.4.2 Mater file for Sapling density 1989~1999*

This file is created in 2014 putting up all relevant information from old SAS files: ***contour.ssd***, ***segplot.ssd, sap\_den.ssd***, and tagged individual master file created by Lixi ***seesapmas11.ssd.*** Cross checking was done referring to all available data sheets, log books, csv and SAS file managed by Kevin in “Moos1999” folder. (The main SAS file created by Kevin for tagged individual seedlings and saplings are ***segtree.ssd)***

SAS program: R:\MOOSHUBB\longterm\lixi kong\Segment2011\sapdenmas99.sas

SAS data set: R:\MOOSHUBB\longterm\lixi kong\Segment2011\sapdenmas99.ssd

***Definition of seedling/saplings:***

PROTOCOLS 1998 mentioned “ a seedling was defined as woody plant that was less than 1m tall”. A sapling was defined as a woody plant that was 1 m or taller”. This 1m cut off is arbitrary, but it might influence the seedling/sapling density except for ABBA which we always count rather than counting tagged individuals.

We have 5 PIRU that was tagged in 1988 and had height in 1998 equal to just 100. They won’t influence density, because we didn’t tag new plants in 1988 segments in 1998 and we don’t know the density in 1988 segments in 1998. Another PIRU and SOAM that were tagged in 1999, and had HT99 equal to 100, strictly they should be counted as saplings.

* Mislabeled segment:

We never sampled HW400, seg180, but it has a BECO count of 1 from 1999 in ***sap\_den*** file, but in 1999 we are supposed to get sapling density by counting number of tagged individuals. On HW400, we sampled seg60, 100, 220, 280, and 340, only found 3 BECO saplings in seg280. Referring to raw csv file, HW400, seg 180 has SEGID of 469, but all the record above and below this BECO had segid of 496, which is HW620, seg300. Which should have had 5 tagged BECO saplings, but the count recorded in sap\_den is 4, so this 1 BECO should have been in HW620, seg300. This is already corrected in tagged individual file, need to correct for density data.

* Cross check ABBASAPDEN In ***segplot*** file and TOTCOUNT in ***sap\_den*** file for 1999 ABBA saplings, all consistent except a few only had ABBASAPDEN, but not TOTCOUNT:

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| PACE | CONTNAM | SGLEN | SKELE | CENS | SPEC | ABBASAPDEN | TOTCNT | Notes | corrections |
| 100 | LW1900 | 31.1 | SK98 | 1999 | ABBA | 0 | . | Nothing was recorded for ABBA sapling count on hard copy. No live tagged ABBA saplings in this segment. | TOTCNT should be 0. |
| 280 | LW1900 | 31.7 | SK98 | 1999 | ABBA | 195 | . | A count of 195 for ABBA saplings were recorded on hand written hard copy | TOTCNT should be 195 |
| 120 | HE1080 | 29 | SK98 | 1999 | ABBA | 0 | . | Note on hard copy” No sapling in segment”. No live tagged saplings in any species in this segment. | TOTCNT should be 0. |
| 40 | LE1860 | 32.5 |  | 1999 | ABBA | 0 | . | A count of 0 for ABBA saplings were recorded on hand written hard copy | TOTCNT should be 0. |
| 180 | LE1860 | 32.8 |  | 1999 | ABBA | 0 | . | A count of 0 for ABBA saplings were recorded on hand written hard copy | TOTCNT should be 0. |
| 240 | LE1860 | 34.8 | SK98 | 1999 | ABBA | 0 | . | Nothing was recorded for ABBA sapling count on hard copy. No live tagged ABBA saplings in this segment | TOTCNT should be 0. |

* Cross check count stored in old files made with Kevin and number of tagged live saplings counted by Lixi:

In 1998, we always tagged all PIRU and BIRCH, so count should be equal to number of tagged individuals.

In 1999, we didn’t count saplings in field except ABBA, sapling density is supposed to be get by counting number of tagged individuals because we tagged all saplings except ABBA.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| CONT | PACE | CENS | SPEC | CNT | CNTTAG | Notes | Corrections |
| HE460 | 40 | 1998 | BECO | 1 | . | On hand written hard copy, a 0 count was recorded for BECO saplings. | Correct CNT as 0. |
| HE460 | 280 | 1998 | BECO | 7 | . | On hand written hard copy, a count of 7 was recorded for BECO saplings, but in tagged individual SAS file from Kevin, all 7 BECO saplings were tagged in 1999, only 2 BECO seedlings were tagged in 1998. Could it be we missed them in 1998, but they were there, and were saplings in 1998? | Trust the count data? Yes. |
| MW1580 | 1120 | 1998 | BECO | 5 | . | On hand written hard copy, BECO has a count of 0, below it’s SOAM, which had a count of 5. | Correct CNT as 0, make sure the count for SOAM is correct |
| MW1580 | 1280 | 1998 | BECO | 1 | . | On hand written hard copy, BECO sapling has a count of 1 , which had height of 690cm, but no tag number or other data recorded. There is no BECO sapling tagged in this segment in 1998 in segtree.ssd | Trust count data? Yes. |
|  | | | | | | | |
| LE1860 | 1840 | 1999 | BEAL | 1 | . | No sapling count recorded on hard copy. In segtree file, there is only one BEAL seedling tagged in 1998 with HT98=68cm, we didn’t resampled HT99 for it. Maybe this one was taken into account when Kevin calculated CNT. | Correct count as 0 |
| LW1900 | 640 | 1999 | BECO | 2 | . | No relevant count data found on hard copy. No BECO at all tagged in this segment. This might be due to change in spec | Correct CNT as 0. |
| LW1900 | 1840 | 1999 | BECO | 1 | . | No relevant count data found on hard copy. No BECO at all tagged in this segment. This might be due to change in spec | Correct CNT as 0. |
| LE1860 | 40 | 1999 | FAGR | 83 | . | FAGR has account of 83 on hand written hard copy. Also a note” BEECH saplings were not tagged but were flagged with pink flagging” One of the 2 segments where FAGR is not tagged due to high abundance | No corrections needed |
| LE1860 | 80 | 1999 | FAGR | 43 | . | FAGR saplings has a count of 43 on hand-written hard copy. Also a note” We flagged FAGR saplings-did not tag any. Total density=43”. One of the 2 segments where FAGR is not tagged due to high abundance | No corrections needed |
|  | | | | | | | |
| LE1860 | 1440 | 1998 | BEAL | . | 1 | No sapling count data sheet. But confirmed with tagged individual SAS file from Kevin, there is one BEAL sapling tagged in 1998 | Correct CNT as 1. |
| LE1860 | 1720 | 1998 | PIRU | . | 1 | LAFMSK wrote sp 2 has a totden of 1 on sapling print-out data sheet, which refers to PIRU. | Correct CNT as 1 |
|  | | | | | | | |
| LE1860 | 600 | 1999 | ACSA | . | 1 | ACSA sapling has a count of 1 on hand written hard copy. | Correct CNT as 1 |
| LE1860 | 1340 | 1999 | BEPA | . | 1 | On hand written hard copy, one BEPA sapling is tagged. | Correct CNT as 1 |
| LW1900 | 640 | 1999 | BEAL | . | 2 | No sapling count data found on hard copy. In segtree.ssd, 2 BEAL saplings were tagged in 1998, and still alive in 1999. | Correct CNT as 2 |
|  | | | | | | | |
| HE1080 | 580 | 1998 | BECO | 0 | 2 | No sapling count data found on the hard copy, on sapling print-out hard copy, there are 2 BECO, which is consistent with what’s in SAS file. | Correct CNT as CNTTAG |
| LE1860 | 1440 | 1998 | BECO | 0 | 5 | No sapling hard copies found, but there are 5 tagged BECO saplings. | Correct CNT as CNTTAG |
| LW1900 | 1140 | 1998 | PIRU | 32 | 31 | 98319 which as a PIRU on pirnt-out hard copy was corrected as BEAL in SAS file from Kevin. | Correct CNT as CNTTAG |
| LW1900 | 1480 | 1998 | PIRU | 8 | 9 | 98484 miss a HT98, it has HT99 of 142, tagyear of 1998, no substrate collected, so it was treated as saplings in 1998. | Correct CNT as CNTTAG |
| ME2020 | 920 | 1998 | PIRU | 0 | 21 | PIRU sapling have a count of 21 recorded on hard copies, SOAM and BECO are recorded on top and below PIRU all had count of 0. There data are checked to be correctly recorded in data set. | Correct CNT as CNTTAG |
| ME2020 | 1080 | 1998 | PIRU | 14 | 15 | No relevant hard copies found | Correct CNT as CNTTAG |
| ME2020 | 1620 | 1998 | PIRU | 11 | 12 | No useful information found on hard copy. In SAS file from Kevin, 98870 and 98873 have same location, 98870 has all data except STAT99 and TERM99; 98873 has only data for STAT99 and TERM99. 98870 was NF in 2000, 98873 was ALIVE in 2000. Are they the same plant or two stems? | They are the same plant, and 98873 is the correct tag number. CNT should be 11. |
| ME2020 | 1740 | 1998 | PIRU | 21 | 22 | No hand written sapling count hard copy found. But on pirnt-out hard copies, there are 22 PIRU saplings, which correspond to SAS file. | Correct CNT as CNTTAG |
| MW1580 | 1000 | 1998 | PIRU | 1 | 2 | No sapling count found on hard copy, but found 2 tagged PIRU saplings on hand written hard copy. | Correct CNT as CNTTAG |
|  | | | | | | | |
| HE1080 | 900 | 1999 | BECO | 3 | 2 | ***1999 data sheet usually don’t record sapling count other than ABBA(Some data sheets do though)***. Confirmed with segtree.ssd, there is only 2 BECO saplings in 1999 in this segment. | Correct CNT as CNTTAG |
| HE460 | 120 | 1999 | BECO | 6 | 7 | 98944 is missed on hand written hard copy. It was a sapling in 1998, it’s still ALIVE in 2000, so it should be alive in 1999 as well. | Correct CNT as CNTTAG |
| HE460 | 420 | 1999 | BECO | 20 | 19 | No useful information found on hard copies. Confirmed with segtree.ssd has 1 live BECO sapling tagged in 1999, and 18 BECO saplings tagged in 1998, still alive in 1999 | Correct CNT as CNTTAG |
| LE1860 | 240 | 1999 | FAGR | 24 | 23 | No useful information found on hard copies. One FAGR was retagged in 2011, thus had a tagyear of 2011 in new tagged individual master file, so it was not counted. There should be 24 FAGR saplings in 1999. This is the only plant retagged in 2011 but was originally measured in 1999. | No correction needed for CNT. |
| HW620 | 300 | 1999 | BECO | 4 | 5 | BECO Sapling has a count of 5 on hand written hard copy | Correct CNT as CNTTAG |
| HW620 | 360 | 1999 | BECO | 6 | 4 | BECO sapling has a count of 7 on hand written hard copy. Referring to SAS file from Kevin, there are 4 BECO saplings tagged in 1998 still alive in 1999, another BECO sapling tagged in 1998, not sampled in 1999, and dead in 2000, so It was not counted. | Correct CNT as CNTTAG |
| LW1900 | 580 | 1999 | ACSA | 29 | 28 | Confirmed with segtree.ssd, there are 28 tagged ACSA live saplings in 1999 in this segment. | Correct CNT as CNTTAG |
| LW1900 | 1060 | 1999 | PIRU | 4 | 7 | No PIRU sapling count on hard copy. Confirmed with segtree.ssd, there are only 7 live PIRU saplings in this segment in 1999 | Correct CNT as CNTTAG |
| LW1900 | 1840 | 1999 | PIRU | 8 | 7 | Note: “8 PIRU saplings”, but confirmed with segtree.ssd, there are only 7 live PIRU saplings in this segment in 1999. | Correct CNT as CNTTAG |
| MW1580 | 1060 | 1999 | PIRU | 4 | 3 | Confirmed with segtree.ssd, there are only 3 live PIRU saplings in this segment in 1999. | Correct CNT as CNTTAG |
| ME2020 | 1480 | 1999 | PIRU | 4 | 3 | No PIRU sapling count on hard copy. confirmed with segtree.ssd there are 3 LIVE PIRU saplings in 1999, and all of them were tagged in 1998, identified as a sapling in 1998. | Correct CNT as CNTTAG |

* Did we have a record for all species in all segments where we sampled for sapling density?

In 1989, there is always a record for ABBA and PIRU in each segment

In 1998 and 1999: ACPE and ACSA are only found at L elevation, so we don’t need to add M/H elevation count=0, and ACPE is totally not found in 1999; BEAL only found at L and M; BEPA, FAGR, and PRPE only found at L, we’ll make the species consistent between 1998 and 1999.

* ***Since we didn’t remeausre HT99, we could miss some individuals that were seedlings in 1998 and grow into saplings in 1999. This doesn’t influence ABBA saplings. Using whether a plant have SUB99 to judge whether it’s a sapling or seedling is not reliable because if they are resampling a 1998 seedlings, they might collect substrate even if it’s a saplings in 1999.***

1998 tagged seedlings that are still alive in 1999, had no HT99 measured, excluding ABBA, which could be 1998 seedling that grow into sapling class in 1999: (**or we can avoid using 1999 data for segments which we sampled in1998**)

# *3 Herbaceous cover Data*

## *3.1 Herbaceous cover data collected in 1988*

*A randomly chosen 1m\*1m quadrat (or 1\*1\*1 cubes? Protocol didn’t say clearly) was selected in the 2m-wide band to collect percentage cover of trees, herbs, and shrubs. The positions of the quadrats were NOT recorded, and all the flags were pulled out after data collection. These data were merged with 1989 data as SAS data set contour.ssd.*

Raw data: R:\MOOSHUBB\longterm\Contour89\herb88.dat

## *3.2 Herbaceous cover Data collected in 1989*

*In each segment a 1\*1m herbaceous quadrat was randomly chosen in the seedling band. Percentage of cover of all species<=1m (protocol says all species>1m but it actually mean <=1m?) (in the 1\*1\*1 cube) in the quadrat were estimated.*

## *3.3 Herbaceous cover data collected in 1998*

*One of the three 1\*1 fir quadrats(fir quadrats permanently marked?) was randomly selected as the herbaceous plot, where herb cover (in 1\*1\*1 cubes) (protocol says all species>1m but it actually mean <=1m?) and substrate data were collected. The positions of the quadrats were NOT recorded.*

## *3.4 Herbaceous cover data collected in 1999*

*Besides the herbaceous quadrat, randomly sample one out of the remaining two 1\*1 quadrats as the second herbaceous quadrat to collect herb cover(. Starting 7/21/99, we only collected species cover data in one quadrat for each segment.*

## *3.5 1998 and 1999 combined herbaceous cover data set*

*R:\MOOSHUBB\longterm\Moos1999\Datasets\herbcov.ssd*

*In 1998, In each segment, one 1\*1m quadrat was randomly chosen among the three 1\*1 quadrats where herbaceous (for all species <=1m high) data , In 1999, besides the herbaceous quadrat, randomly sampled one out of the remaining two 1\*1 quadrats as the second herbaceous quadrat to collect herb cover and substrate data. Starting 7/21/99, only two quadrats were established as the fir quadrats, in one of them fir seedlings by age and height class were counted, species cover data, substrate data, were collected. And in the other only fir seedlings older than one year were counted. Positions of quadrats were all recorded. No herb cover data collected in skeleton segments in 1998.*

**SEGID:** Segment ID

**SPECIES:** Species codes. Don’t know what 52, 53, 54, 55, 56, 57, 58 are yet.

Referring to hardcopies:

52=Cornus alte. (1999) COAL? We have Cornus Canadensis in our list

52=POGR (1998) (populous grandidentata**?**)

53=jecod weed (?)

54=SORU (Rough stemmed goldenrod) .Solidago rugosa

55=CAIN we have Carex spp.

56=CALA

57=SCSPP (skull cap). Scutellaria Species?

58=VISPP viburnum species? We have Viburnum alnifolium in our list.

Lixi 5/16/2012  
**POSITION:** Positions of the quadrat, only recorded in1999.

**PCTCOVER:** Percentage of cover

**CENSUS:** 1998 or 1999.

## *3.6 Herbaceous cover data collected in 2003*

6 segment (some are missing, Mellissa is looking for them Lixi 4/02/2013) on each of East and West side at 838m (2750’) elevation were randomly selected from the segments were sampled before, species %cover and woody plants count in 3 1\*1m quadrats(everything, including shrubs were sampled in 1\*1\*1cubes) in each segment were estimated, following the same method for 2003 permanent herb\shrub\seeding data collection.

*Raw data from Mellisa/Peter: R:\MOOSHUBB\longterm\RawData 2003*

SAS file: R:\MOOSHUBB\longterm\lixi kong\2003data\segherb2003.ssd

**SEASON:** Spring, or summer

**DATE:** Date when data were collected

**ASPECT:** East or west.

**PACENO:** Pace number

**SEGID:** Segment ID

**ELEVATION:** Elevation, all equal to 2750’.

**1\*1LOC:** 1\*1m quadrat location. Distance from the beginning pace?

**SPECIES:** Species identification. Full names.

* There are “Abies balsamea” with a note “not a seedling”. “Abies balsamea” and “Abies balsamea seedling”: Those without “seedling”as notes were not seedlings
* Circea alpine: this is small enchanter's-nightshade (*Circaea* *alpina*)
* Claytonia virginica: This should be Carolina spring-beauty (*Claytonia* *caroliniana*). You would not have seen it in previous surveys because it is a true spring ephemeral and would have been completely decomposed by summer.
* 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.
* Pyrola: this was elliptic-leaved shinleaf (*Pyrola* *elliptica*)
* Sambucus racemosa: We have Sambucus Canadensis on our list. “They are different species. S. canadensis is typically found in wetter soils and floodplains. I only recall seeing S. racemosa on the mountain in general. Note the S. racemosa and S. pubens are synonyms for the same species.” Mellissa 4/02/2013
* Tiarella cordifolia: this species is foam-flower (*Tiarella* *cordifolia*), I observed in several locations (not in plots) as well. It’s a common species.
* no plants: for W220 1\*1 6m quadrat there is

**COVER:** Percentage of cover for collected for plants in all species in the 1\*1 quadrat.

**COUNT:** Counts were collected for woody plants. Some are missing.

**NOTES:**

* Not a seedling: those don’t have seedling as a note were not seedlings.

*We might have some time series data from 1998/1999 to 2003. But limited, we are not sure at this time if we’ll use them.*

## *3.7 Herbaceous cover data collected in 2010*

*Segments sampled: Seg13, Seg21, and Seg48. In each segment, two quadrats were chosen, where herb %cover, and ABBA & PIRU seedling counts and %cover were estimated.*

Raw data: R:\MOOSHUBB\longterm\lixi kong\Segment2010\segherb10.xls

***3.8 Master File for Herb Cover (data from 1988 to 1999)***

SAS program: R:\MOOSHUBB\longterm\lixi kong\Segment2011\herbmas99.sas

R:\MOOSHUBB\longterm\lixi kong\Segment2011\herbmas99.ssd

Merging finished. Cross check with original data!

**CONTNAM**

**STPACE**

**SPEC:** Species abbreviations.

**FORM:** TREE, HERB, or SHRUB

**PCVR:** Percentage of cover. For each quadrat, all species are included, those weren’t found have PCTCOVER of 0.

**AREA:** area within which the cover was estimated

**ELEVCL**

**ASPCL**

**DATE:** Date when herb cover data were collected, recorded in1988 and 1989.

**CENS:** 1988, 1989, 1998 or 1999.

**PCVQ:** Position of species cover quadart, only recorded in1999.

# *4 Prism Data*

## *4.1 Data collected in 1988*

*Number of live and dead PIRU at the beginning and the end of each segment were counted. Slope correction was NOT made. Displacements were also collected. BAF (basal area factor) of prisms we used were 1.*

Raw data 1: R:\MOOSHUBB\longterm\Contour89\prism88.dat

Raw data 2: R:\MOOSHUBB\longterm\Seedling\prism88.dat

SAS data set: [R:\MOOSHUBB\longterm\Seedling\prism88.ssd](../../Seedling/prism88.sas7bdat) (This was simply created by reading “*Raw data 2”* into SAS)

*Raw data 2 has POINT(displacement data) which raw data 1 doesn’t have, data from raw data 1 were merged with 1989 data as “contour.ssd”, but there are some problems, so will use raw data2 in 2011 segment prism master file.*

CONTOUR

SEGMENT: segment pace name.

SEGLNGTH: Segment length

PACE: Pace at where prism data were collected. if SEGMENT=PACE, then it’s the prism point at the beginning of the segment; if SEGMENT<PACE (difference would be 20 paces), then it’s the prism point at the end of the segment.

POINT: Displacement of the segment..

PRISMLVE: number of live PIRU.

PRISMDED: number of dead PIRU.

DUMMY: “a dummy column used to enter extra data if needed. See handwritten notes of the appropriate data if and entry was made in this column”. Only LE1860, seg1760, beginning point, has a DUMMY of 999. Others all have DUMMY equal to 0.

On printed hard copy, LE1860, starting pace 1820 was corrected as 1800; ME2020, starting pace 140 was corrected as 120 in 1989, so after correction, both of the segments have two prism point measured. Corrected this in new master file. Lixi 5/16/2012

Also on the hard copy, LE1860, starting point, number of live piru was corrected from 5 to 6, with a note “borderline tree 5/25/89 pap”. Corrected this. Lixi 5/16/2012

Where at both points, no live or dead PIRU were in (all have 0s), we still keep the segment so we don’t overestimate the average?

ME2020, seg920, at prism point1, DISP=U1, and the prism point 2, DISP=U2. The same on printed hardcopy. Corrected U2 to U1 for now.

He1080, seg1080, segment length=0. And only has data entry at prism point 1. No PIRU found. The same on printed hardcopy.

## *4.2 Data collected in 1989*

*Number of live, dead, and snag (a tree that is broken off above dbh and has less than 50% of its crown structure still present) PIRU were counted at the beginning (prism point 1), midpoint (prism point 2), and end (prism point3) were counted. The definition of prism point 2 and 3 got switched in 1998. Slope correction was done in the field by turning the prism angle parallel to the slope at each point.*

*LW1900, segment 340, 520, 640, and 840 don’t have data for snag trees, assume we looked for them, but didn’t find any?*

Raw data: R:\MOOSHUBB\longterm\Contour89\prism89.dat

## *4.3 Data collected in 1998*

*Number of live, dead, and snag trees in all species were counted at each of 3 prism points for each segment. Slope correction was done in field by turning the prism angle parallel to the slope of each point.*

## *4.4 Data collected in 1999*

*Number of live, dead, and snag trees in all species were counted at each of 3 prism points for each segment.*

## *4.5 1998 and 1999 prism data set*

R:\MOOSHUBB\longterm\Moos1999\Datasets\pirsm.ssd

*This data set has data for 126 segments, some of which were sampled in 1998, some in 1999.* *No prism data collected in skeleton segments in 1998.*

*SAS program produces pirsm.*ssd was rerun by Lixi in 2011 to add in CENSUS variable, and the new SAS data set is:

R:\MOOSHUBB\longterm\Moos1999\Datasets\pirsmcopy.ssd

ME2020, seg1880 only has data for point 1 and 3. Checking hardcopy, there is actually data for point 2. Added data. Lixi 5/16/2012

Contour 1900, seg1420 (sampled in 1999) has a prism point 0. The other two prism points are 1, 3, so I assumed 2 was misentered as 0. Confirmed this with hardcopy. Corrected. Lixi 5/16/2012

The same problem for contour 1580, seg720 (sampled in 1999). Can’t find hardcopy for this.

**CONID:** Contour ID

**SEGID:** Segment ID

**COUNT:** Number of trees at prism point

**POINT:** Prism point. 1, 2, or 3. 1=starting point of the segment; 2=end of the segment; 3=midpoint of the segment. The definition of point 2 and 3 got switched comparing to 1989 protocol.

**TYPE:** 1=LIVE; 2=DEAD; 3=SNAGGED

**SPECIES:** Species codes. Don’t know what 52 is.

Referring to hard copy, 52 is POTR (populous tremmioides). POTR was coded as “52” in1998, and “100” in 1999 for prism data. Corrected. Lixi 5/16/2012

**CENSUS:** In which year the segment was sampled for prism data.

## *4.6 Data collected in 2010*

*Segment sampled: Seg13, Seg21, and Seg48.*

*At three prism points for each segment, numbers of alive, dead, or snagged trees by species were recorded.*

R:\MOOSHUBB\longterm\lixi kong\Segment2010\segprism10.xls

***4.7 Master File for Prism data from 1988 to 1999***

R:\MOOSHUBB\longterm\lixi kong\Segment2011\prismmas99.ssd

**CENS**

**CONTNAM**

**STPACE**

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

**ASPCL:** E or W.

**SGLEN**

**SPEC:** Species abbreviations

**SGDSP88**

**SGDSP9899**

**TYPE:** ALIVE, DEAD, or SNAG.

**CTP1**: counts at beginning of the segment

**CTP2**: counts at end of the segment

**CTP3**: counts at the mid-point of the segment

## *4.8 Prism, Slope, and Shape Data collected in 2012*

A 1 m2 per ha prism was used LE0, and every other pace tree from LE 20 to LE 1860; every other pace tree from ME20 to ME2020 pace tree to determine the number of live trees of each species (spruce, fir, heart-leafed paper birch and yellow birch).  Dead heart-leafed paper birch and yellow birch were also counted using the prism. Displacement is about 1-2M) In addition, slope angle up and down slope were measured in degrees and the micro topography of the area was assessed as flat, concave or convex at each pace tree.  ME2020, segment1040 was skipped for all the above data.  Two sets of slope and shape data for LE, seg0. Should leave the row with prism data out.

*Raw Data: R:\MOOSHUBB\longterm\Rawdata2012\ SEGGPS6-28-12-T1.xlsx*

*R:\MOOSHUBB\longterm\Rawdata2012\* *SegGPS7-10-12.xlsx*

*SAS prism data set: R:\MOOSHUBB\longterm\lixi kong\Segment2012\prism12.ssd*

CONTNAM

PACE: point where we collected prism data. Depending on which segments sampled before, this could be the beginning or end point of a segment sampled before. And it’s different depending on the census year This also means in previous year, a beginning/end point of a segment in one year could be the end/beginning point of an adjacent segment in another year even though they don’t totally overlap because of replacement. (This happens when the difference in STPACE is 20 in different census year). .For now, 2012 data has been matched with previous prism data to decide which segment’s data the prism is. When duplicated pace number happened between different census year, the smaller pace number was matched. How we eventually want to deal with the data depends on how we want to use prism data.

SPEC: need to add complete species list to each segment. So we don’t over estimate mean

CTP: count of certain species at the pace. Again depending on how pace is match with segments sampled before, this could be at prism point 1 or prism point2

CENS: 2012

ASPCL

ELEVCL

*SAS plot level data set: R:\MOOSHUBB\longterm\lixi kong\Segment2012\segplot12.ssd*

CONTNAM

STPACE

SLOPE86: Slope collected in 1986 in degrees.

SLOPE86OLD: original slope data collected in 1986 in degrees. Some corrections/editions were made to create variable SLOPE86. Details see Segsoil data history.

SLUP12: slope angel up in degrees collected in 2012.

SLDOWN12: slope angel down in degrees collected in 2012

SLOPE12: average of SLUP12 and SLDOWN12 in degrees. In future analysis, when there is data from both 2012 and 1986 for certain segment, we should always trust 2012 data.

SHAPE: 1=CONCAVE 2=plain 3=CONVEX. Roughly, When SLUP> SLDOWN, it should be concave; when SLUP<SLDOWN, it should be convex. Data checking indicates LE, seg880 and LE seg640 might have the wrong SHAPE. Notes from Noah on 12/07/2012

“We talked about that issue with slope when we were out in the field.  It is a matter of scale.  Since all those points are on a mountainside, as the scale gets larger every point will be convex.  I doubt those are errors.  If anything I would say the numbers are more accurate representations of the area than the slopes.  Its confusing to have two measures, I think you should just pick one method and use that.”

MICR: Derived from SHAPE

## *4.9 Master file for prism data from 1988 to 2012*

*SAS data set: R:\MOOSHUBB\longterm\lixi kong\Segment2012\prismmas12.ssd*

# *5. Substrate data*

## *5.1 Data collected in 1989*

*In one herbaceous quadrat for each segment, percentage covers of available substrate were estimated. Data are included in data set contour.ssd. Protocol: “Available substrate was based on 100%, but overlap of moss on dead wood may push the total percent above 100%. This total may reach 110% maximum.”*

*Substrate types are:*

*Live bole>5cm*

*Dead bole (standing dead)>5cm*

*Bare soil*

*Rock*

*Water*

*Dead wood on the ground>5cm, including moss on dead wood*

*Moss: moss on the ground, excluding LYLU. Including moss on dead wood.*

*Litter*

*HW600 should be HW620 MW1600 should be MW1580?*

## *5.2 Data collected in 1998*

*One of the three 1\*1 fir quadrats was randomly selected as the herbaceous plot, where (in 1\*1\*1 cubes) substrate data were collected. The positions of the quadrats were NOT recorded.*

*HE460, STPACE20, and LE STPACE 980 don’t have DISPLACEMENT data.*

## *5.3 Data collected in 1999*

*Besides the herbaceous quadrat, randomly sample one out of the remaining two 1\*1 quadrats as the second herbaceous quadrat to collect substrate data. Starting 7/21/99, we only collected substrate data in one quadrat for each segment.*

***5.4 1998 and 1999Substrate data set***

R:\MOOSHUBB\longterm\Moos1999\Datasets\substrat.ssd

*This data set has data for 130 segments, some of which were sampled in 1998, and some in 1999. No Substrate data collected in skeleton segments in 1998.*

*SAS program produced this data set was rerun by Lixi in 2011 to add in CENSUS variable, and the new data set is:*

R:\MOOSHUBB\longterm\Moos1999\Datasets\substratcopy.ssd

**SEGID**

**POSITN:** Position of the quadrat, only collected in1999.

**ROCK**

**BSOIL**

**H2O**

**GWOOD:** dead wood on the ground >1cm. 1998 segment protocol says it’s “dead wood**>**5cm in 1998 according to segment 1998 protocol”, and 1998 permanent protocol says it’s “>1cm”. Permanent was usually sampled before segments, so this could be an error in segment protocol, that it didn’t get updated. It’s >5cm according to 1999 amendments.

**AWOOD:** aerial wood>1cm in 1998 and >5cm according to 1999 amendments (Including moss growing on it)

**AMOSS:** % ofMoss on aerial wood>1cm in 1998 and >5cm in 1999. This is included in AWOOD. This is always less or equal to AWOOD.

**BOLEA**

**BOLED**

**TIPUP**

**STMP**

**MOSS:** % of moss on the ground

**LITTER:** In 1998, we didn’t distinguish specific litter type; in 1999 we categorized litter into mixed litter, conifer litter, and deciduous litter if any of them applies. So for 1999 data: LITTER total=MIXEDLIT+CONLIT+DECLIT. There are a few cases when LITTER=0, but MIXEDLIT, CONLIT, or DECLIT not equal to 0, will correct LITTER as the sum of MIXEDLIT, CONLIT, and DECLIT in new master file.

**MIXEDLIT:** %cover of mixed coniferous and deciduous (one doesn’t dominant).This was only used in 1999.

**CONLIT:** %cover of conifer litter. This was only used in 1999

**DECLIT:** %cover of deciduous litter.This was only used in 1999

**CENSUS:** In which year the segment was sampled for Substrate data.

## *5.5 Data collected in 2003*

According to Melisa’s thesis, 6 segment on each of East and West side at 838m (2750’) elevation were randomly selected and revisited in 2003. Substrate data were collected for these quadrats in each segment. I only have 3 east segments and 5 west segment. Mellissa looked and couldn’t find the missing data. 07/30/2013

*Raw data from Mellisa/Peter: R:\MOOSHUBB\longterm\RawData 2003\* *MCoppola data 2003 segments*

**SEASON**

**DATE**

**ASPECT**

**PACENO**

**ELEVATION**

**1\*1LOC**

**SUBCODE:**

* 1: moss
* 2: mixed litter
* 3: dead wood on the ground >=5cm
* 4: bare soil
* 5: conifer litter
* 6: deciduous litter
* 13: moss on dead wood on the ground>=5cm
* 15: moss on rock
* 16: moss on standing live bole>=5cm
* 25: mixed litter on rock

**PCOVER:** Percentage of cover

**NOTE:**

* live tree: standing live bole >=5cm
* tree roots: standing live bole>=5cm
* snag: standing dead bole >=5cm
* W pace 220, SUBCODE=5, which represents conifer litter, and there is also a note of “rock”: this mean "conifer litter on rock”

*SAS file: R:\MOOSHUBB\longterm\lixi kong\2003data\segsub2003.ssd*

*SAS file: R:\MOOSHUBB\longterm\lixi kong\2003data\segsub2003c.ssd*

SEASON

DATE

CONTNAM

STPACE

LOC

BSOIL

BLD5

BLA5

LITT: Derived variable. LITT=LITM+LITD+LITC

LITM

LITD

LITC

LITCRCK

LITMRCK

WDG5

MSSG

MSRCK

MSBLA5

MSWDG5

SUMG: sum of all substrates (only substrate on the ground was recorded). All equal to 100 except LE, seg800, 15m has SUMG equal to 77. Data for this quadart was deleted from the corrected data set *segsub2003c.ssd*

## *5.6 Data collected in 2010*

*Segment sampled: Seg 13, and Seg48.*

*In each segment, two quadrats were chosen, where substrate data were collected.*

R:\MOOSHUBB\longterm\lixi kong\Segment2010\segsubstrate10.xls

***5.7 Master File for Substrate data 1989~2003***

SAS program: *R:\MOOSHUBB\longterm\lixi kong\Segment2011\submas99.sas*

SAS data: *R:\MOOSHUBB\longterm\lixi kong\Segment2011\submas99.ssd*

**SAS data: *R:\MOOSHUBB\longterm\lixi kong\Segment2011\submas99c.ssd (corrected for SUMG)***

**CENS**

**CONTNAM**

**STPACE**

**SGDSP:** segment displacement

**QPOS:** quadrat position

**BLA5:** aerial live bole with DBH>5cm collected in 1989, 1998, 1999 and 2003.

**BLD5:** dead bole on the ground with DBH>5cm collected in 1989, 1998, 1999 and 2003.

**BSOIL:** bare soil collected in 1989, 1998, 1999 and 2003.

**RCK:** rock collected in 1989, 1998, and 1999.

**WATER:** water collected in 1989, 1998, and 1999.

**WDG5:** dead wood on the ground >5cm collected in 1989, 1999, and 2003. In 1989, this includes moss growing on it, which could make sum of everything on the ground larger than 100.

**WDG1:** dead wood on the ground<1cm collected in 1998. 1998 segment protocol says it’s “dead wood**>**5cm in 1998 according to segment 1998 protocol”, and 1998 permanent protocol says it’s “>1cm”. Permanent was usually sampled before segments, so this could be an error in segment protocol, that it didn’t get updated. It’s >5cm according to 1999 amendments.

**WDA5:** aerial wood>5cm collected in 1989 and 1999. In 1999, this including moss growing on this . WDA5 is always >=MSWDA5.

**MSWDA5:** Moss on aerial wood >5cm collected in 1999

**WDA1:** aerial wood >1cm collected in 1998, including moss growing on it. WDA1 is always >= MSWDA1.

**MSWDA1:** Moss on aerial wood>1cm collected in 1998

**MSSG:** ground moss collected in 1989, 1998, 1999 and 2003.

**MSRCK:** moss on rock collected in 2003 only.

**MSBLA5:** moss on standing bole live>5cm collected in2003 only.

**MSWDG5:** moss on dead wood on the ground>5cm collected in 2003 only.

**TIPA:** tipups collected in 1998 and 1999.

**STPA:** stumps collected in 1998 and 1999.

**LITT:** Total litter on the ground collected in 1989 and 1998. For 1999, this is the sum of LITM, LITC, and LITD; in 2003 this is the sum of LITM, LITC, LITD, LITCRCK, and LITMRCK.

**LITM:** mixed litter on the ground collected in 1999 and 2003

**LITC:** conifer litter on the ground collected in 1999 and 2003

**LITD:** deciduous litter on the ground collected in 1999 and 2003

**LITCRCK:** conifer litter on rock collected in 2003 only.

**LITMRCK:** mixed litter on rock collected in 2003 only.

**ASPCL**

**ELEVCL**

**SUMG:** sum of everything on the ground.

* In 1989, SUMG=BLA5+BLD5+BSOIL+RCK+WATER+WDG5+MSSG+LITT. This varies between 82 and 106. Data for LW, seg1120 was deleted in the corrected data set, and when SUMG is <95 or >105; LITT was adjusted to make SUMG equal to 100.
* In 1998, SUMG=BLA5+BLD5+BSOIL+RCK+WATER+TIPA+STPA+MSSG+LITT+WDG1. This varies between 98 and 105, no correction needed.
* In 1999, SUMG=BLA5+BLD5+BSOIL+RCK+WATER+TIPA+STPA+MSSG+LITT+WDG5. This varies between 99 and 100.5, no correction needed.
* In 2003, only substrate on the ground were recorded, so SUMG is sum of everything which is BSOIL+BLD5+BLA5+LITM +LITD+LITC+LITCRCK+LITMRCK+WDG5+MSSG+MSRCK+MSBLA5+MSWDG5

**SUMA:** sum of everything including aerial.

* 1998: SUMA=SUMG+WDA1
* 1999: SUMA=SUMG+WDA5

**CORRECT**: if a correction was made to adjust SUMG, CORRECT=1.

# *6. GLI data collected in 2000*

10 segments were selected randomly on each of the East contour (30 segments in total) ,although proximity to trails was taken into account in interest of time, and Hemispherical Photographs were taken at each of the three previously established prism points at each segment. The camera was positioned within 3 meters of the prism point, at a height of 75 cm. Three segments on ME were omitted due to time constraints. These were SEGID 149, 154 and 155.

The camera was leveled and the top of the camera was aligned with North using a compass. The camera was focused to infinity and the f-stop was set to 8 (unless high light levels forced us to make a change). Light levels were determined using a light meter, and the shutter speed of each picture was set accordingly. Two pictures were taken at each photo location. On the first, the exposure time was set one setting faster than that which the light meter determined was accurate. The shutter speed for the second photograph was two settings faster than that of the first picture (or three settings above what the meter actually suggested).

* *All Original GLI photo (including transects):* Wainberg GLI work 13Feb2002\wainberg GLI-image (Segment: Roll 3, 4, 17, 18, 19, 20, and 21)
* *GLA processed bitmaps and calculation reports(on sky regain basis) and copies of original GLI photos (Not all GLI were analyzed):*

Roll 3, 9~14: GLI image data2 27Oct2001

Roll 15~21: GLI image data3 27Oct2001

* *Plot information:* GLI image data1 27Oct2001\calibration\_databases\_spreadsheets\seg\_gli\_data
* Frame number from field data should be perceived frame numbers, assuming frame number from “Imagename” in gla worksheet is perceived frame number too, after merging, 60 out of the 81 points matched; 21 points didn’t have GLA results to be matched.;
* If assuming frames from gla were actual frame numbers, after merging, 68 out of the 81 matched.

Check frame number from “IMANGENAME”, such as “r#f000gla”.

# *7. Seed Trap Data collected in 2000*

Traps were placed in the same general locations as the GLI on East side segments, with extra traps placed above and below 6 ME segments for increased sampling. At each segment chosen, three traps were placed – one near each prism point. The exact placement of the traps was based on the cover directly over the trap. The trap was placed in the most open area near the prism point. The level of openness varies tremendously Two diameters were recorded for each trap when placed. Due to the weight of water and such, the shape of the trap does change significantly – to where these dimensions are altered. We should consider taking these dimensions once again during collection. Upon collection time, take the following data:

Trapid (tagno attached to underside of trap – can be difficult to find)

Segid (where is the trap)

Point (prism point that the trap in near)

Diam1 (diameter of trap along contour)

Diam2 (diameter of trap perpindicular to contour)

Minht (The minimum height the trap is from the ground)

Data not entered?

Permanent were collected for trap data too? Found data on hard

# *8. Litter Depth Data collected in 2003 only*

6 segment on each of East and West side at 838m (2750’) elevation were randomly selected and revisited in 2003. Litter depth data were collected at three locations in each segment. Mellisa only found data for 3 east segments and 5 West segment and sent to Lixi in 2013.

*Raw data from Mellisa/Peter: R:\MOOSHUBB\longterm\RawData 2003*

SAS file: R:\MOOSHUBB\longterm\lixi kong\2003data\seglitdep2003.ssd

**SEASON:** Summer

**DATE:** between 7/10/2013 and 7/31/2013.

**CONTNAM**

**STPACE:**

**ASPCL:** E or W.

**ELEVCL:** L

**QPOS:** distance from the beginning of the segment where litter depth was measured.

**LITDEP:** litter depth

**NOTES: “**moss on rock”, and “rock”.

# *9. Canopy Density Data collected in 2003 only*

6 segment on each of East and West side at 838m (2750’) elevation were randomly selected and revisited in 2003 in both spring and summer. Melissa only gave Lixi data for 6 LE segments and 5 LW segments, and some of them only have data in one season. An average of 4 was recorded for 3 locations for each segment. Canopy density data were collected for these quadrats in each segment

*Raw data from Mellisa/Peter: R:\MOOSHUBB\longterm\RawData 2003*

SAS file: R:\MOOSHUBB\longterm\lixi kong\2003data\segcano2003.ssd

**SEASON**

**DATE**

**CONTNAM**

**STPACE**

**QPOS:** distance from the beginning of the segment in m where they collected OPEN.

**OPEN:** %of openness. This is an average of 4 readings from 4 directions at the same location.

# *10. GPS and ELEV Data collected in 2012*

A Trimble Nomad (unit 3) was used to collect location data at **every other** pace tree from pace 20 to pace1860 on Low East and pace 20 to pace780 on Mid East.  A Garmin GPSmap 76CSx was used on the other Mid East pace trees (800-2020).

For details about GPS and ELEV data, see “GPS data history” and “ELEV data history”.

# APPENDIX 1

**Segments where new seedlings/saplings were tagged in 1988, 1989, 1998 or 1999**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| ASPECT | ELEV | CONTLEN | PACE | census1 | census2 | census3 |
| E | H | 140 | 0 | 1988 |  |  |
| E | H | 140 | 20 |  | 1998 | 1999 |
| E | H | 140 | 40 | 1988 |  |  |
| E | H | 140 | 80 | 1988 |  |  |
| E | H | 140 | 120 |  | 1998 | 1999 |
| E | H | 460 | 40 |  | 1998 | 1999 |
| E | H | 460 | 120 |  | 1998 | 1999 |
| E | H | 460 | 200 |  | 1998 | 1999 |
| E | H | 460 | 280 |  | 1998 | 1999 |
| E | H | 460 | 320 |  | 1998 | 1999 |
| E | H | 460 | 420 |  | 1998 | 1999 |
| E | H | 1080 | 20 |  | 1998 | 1999 |
| E | H | 1080 | 80 | 1988 |  |  |
| E | H | 1080 | 120 |  | 1998 | 1999 |
| E | H | 1080 | 160 | 1988 |  |  |
| E | H | 1080 | 180 |  | 1998 | 1999 |
| E | H | 1080 | 240 |  | 1998 | 1999 |
| E | H | 1080 | 380 |  | 1998 | 1999 |
| E | H | 1080 | 420 |  | 1998 | 1999 |
| E | H | 1080 | 540 |  | 1998 | 1999 |
| E | H | 1080 | 580 |  | 1998 | 1999 |
| E | H | 1080 | 700 |  | 1998 | 1999 |
| E | H | 1080 | 740 |  |  | 1999 |
| E | H | 1080 | 860 |  | 1998 | 1999 |
| E | H | 1080 | 900 |  | 1998 | 1999 |
| E | H | 1080 | 980 |  | 1998 | 1999 |
| E | H | 1080 | 1040 |  | 1998 | 1999 |
| E | L | 1860 | 40 |  |  | 1999 |
| E | L | 1860 | 80 |  | 1998 | 1999 |
| E | L | 1860 | 180 |  | 1998 | 1999 |
| E | L | 1860 | 240 | 1988 | 1998 | 1999 |
| E | L | 1860 | 260 | 1988 |  |  |
| E | L | 1860 | 320 | 1988 | 1998 | 1999 |
| E | L | 1860 | 360 | 1988 |  |  |
| E | L | 1860 | 400 |  | 1998 | 1999 |
| E | L | 1860 | 480 | 1988 | 1998 | 1999 |
| E | L | 1860 | 560 | 1988 |  |  |
| E | L | 1860 | 600 |  | 1998 | 1999 |
| E | L | 1860 | 680 |  | 1998 | 1999 |
| E | L | 1860 | 720 | 1988 | 1998 | 1999 |
| E | L | 1860 | 760 | 1988 |  |  |
| E | L | 1860 | 800 | 1988 | 1998 | 1999 |
| E | L | 1860 | 840 | 1988 |  |  |
| E | L | 1860 | 880 | 1988 |  |  |
| E | L | 1860 | 940 | 1988 | 1998 | 1999 |
| E | L | 1860 | 960 |  | 1998 | 1999 |
| E | L | 1860 | 1060 |  | 1998 | 1999 |
| E | L | 1860 | 1140 | 1988 |  |  |
| E | L | 1860 | 1160 |  | 1998 | 1999 |
| E | L | 1860 | 1180 | 1988 |  |  |
| E | L | 1860 | 1220 | 1988 | 1998 | 1999 |
| E | L | 1860 | 1300 | 1988 |  |  |
| E | L | 1860 | 1340 | 1988 | 1998 | 1999 |
| E | L | 1860 | 1380 | 1988 | 1998 | 1999 |
| E | L | 1860 | 1420 | 1988 |  |  |
| E | L | 1860 | 1440 |  | 1998 | 1999 |
| E | L | 1860 | 1560 | 1988 | 1998 | 1999 |
| E | L | 1860 | 1620 |  | 1998 | 1999 |
| E | L | 1860 | 1720 | 1988 | 1998 | 1999 |
| E | L | 1860 | 1780 |  | 1998 | 1999 |
| E | L | 1860 | 1800 | 1988 |  |  |
| E | L | 1860 | 1820 | 1988 |  |  |
| E | L | 1860 | 1840 | 1988 | 1998 | 1999 |
| E | M | 2020 | 0 |  | 1998 | 1999 |
| E | M | 2020 | 100 |  |  | 1999 |
| E | M | 2020 | 160 |  | 1998 | 1999 |
| E | M | 2020 | 240 |  |  | 1999 |
| E | M | 2020 | 340 |  | 1998 | 1999 |
| E | M | 2020 | 400 |  |  | 1999 |
| E | M | 2020 | 440 | 1988 |  |  |
| E | M | 2020 | 480 |  | 1998 | 1999 |
| E | M | 2020 | 600 | 1988 | 1998 | 1999 |
| E | M | 2020 | 700 |  | 1998 | 1999 |
| E | M | 2020 | 720 | 1988 |  |  |
| E | M | 2020 | 740 |  | 1998 | 1999 |
| E | M | 2020 | 800 | 1988 | 1998 | 1999 |
| E | M | 2020 | 880 | 1988 |  |  |
| E | M | 2020 | 900 | 1988 |  |  |
| E | M | 2020 | 920 | 1988 | 1998 | 1999 |
| E | M | 2020 | 960 | 1988 |  |  |
| E | M | 2020 | 980 |  | 1998 | 1999 |
| E | M | 2020 | 1000 | 1988 |  |  |
| E | M | 2020 | 1080 | 1988 | 1998 | 1999 |
| E | M | 2020 | 1160 | 1988 |  |  |
| E | M | 2020 | 1180 |  | 1998 | 1999 |
| E | M | 2020 | 1200 | 1988 | 1998 | 1999 |
| E | M | 2020 | 1240 | 1988 |  |  |
| E | M | 2020 | 1280 | 1988 |  |  |
| E | M | 2020 | 1320 |  | 1998 | 1999 |
| E | M | 2020 | 1360 | 1988 |  |  |
| E | M | 2020 | 1400 | 1988 | 1998 | 1999 |
| E | M | 2020 | 1440 | 1988 |  |  |
| E | M | 2020 | 1480 | 1988 | 1998 | 1999 |
| E | M | 2020 | 1580 |  | 1998 | 1999 |
| E | M | 2020 | 1620 |  | 1998 | 1999 |
| E | M | 2020 | 1740 |  | 1998 | 1999 |
| E | M | 2020 | 1820 |  | 1998 | 1999 |
| E | M | 2020 | 1880 | 1988 | 1998 | 1999 |
| E | M | 2020 | 1920 | 1988 | 1998 | 1999 |
| E | M | 2020 | 1960 | 1988 |  |  |
| E | M | 2020 | 2000 | 1988 | 1998 | 1999 |
| W | H | 400 | 60 | 1989 | 1998 | 1999 |
| W | H | 400 | 100 |  |  | 1999 |
| W | H | 400 | 220 | 1989 | 1998 | 1999 |
| W | H | 400 | 280 |  |  | 1999 |
| W | H | 400 | 340 | 1989 | 1998 | 1999 |
| W | H | 600 | 40 | 1989 |  |  |
| W | H | 600 | 180 | 1989 |  |  |
| W | H | 600 | 360 | 1989 |  |  |
| W | H | 600 | 480 | 1989 |  |  |
| W | H | 620 | 40 |  | 1998 | 1999 |
| W | H | 620 | 120 |  |  | 1999 |
| W | H | 620 | 180 |  | 1998 | 1999 |
| W | H | 620 | 300 |  |  | 1999 |
| W | H | 620 | 360 |  | 1998 | 1999 |
| W | H | 620 | 440 |  |  | 1999 |
| W | H | 620 | 480 |  | 1998 | 1999 |
| W | H | 620 | 540 |  |  | 1999 |
| W | L | 1900 | 60 | 1989 | 1998 | 1999 |
| W | L | 1900 | 100 |  |  | 1999 |
| W | L | 1900 | 220 | 1989 | 1998 | 1999 |
| W | L | 1900 | 340 | 1989 | 1998 | 1999 |
| W | L | 1900 | 440 |  |  | 1999 |
| W | L | 1900 | 520 | 1989 | 1998 | 1999 |
| W | L | 1900 | 580 |  |  | 1999 |
| W | L | 1900 | 640 | 1989 | 1998 | 1999 |
| W | L | 1900 | 780 |  |  | 1999 |
| W | L | 1900 | 840 | 1989 | 1998 | 1999 |
| W | L | 1900 | 920 |  |  | 1999 |
| W | L | 1900 | 1000 | 1989 | 1998 | 1999 |
| W | L | 1900 | 1060 |  |  | 1999 |
| W | L | 1900 | 1120 | 1989 |  |  |
| W | L | 1900 | 1140 |  | 1998 | 1999 |
| W | L | 1900 | 1220 |  |  | 1999 |
| W | L | 1900 | 1280 | 1989 | 1998 | 1999 |
| W | L | 1900 | 1420 |  |  | 1999 |
| W | L | 1900 | 1480 | 1989 | 1998 | 1999 |
| W | L | 1900 | 1580 |  |  | 1999 |
| W | L | 1900 | 1620 | 1989 | 1998 | 1999 |
| W | L | 1900 | 1740 |  |  | 1999 |
| W | L | 1900 | 1800 | 1989 | 1998 | 1999 |
| W | L | 1900 | 1840 |  |  | 1999 |
| W | M | 1580 | 60 |  | 1998 | 1999 |
| W | M | 1580 | 100 |  |  | 1999 |
| W | M | 1580 | 180 |  | 1998 | 1999 |
| W | M | 1580 | 280 |  |  | 1999 |
| W | M | 1580 | 340 |  | 1998 | 1999 |
| W | M | 1580 | 400 |  |  | 1999 |
| W | M | 1580 | 520 |  | 1998 | 1999 |
| W | M | 1580 | 580 |  |  | 1999 |
| W | M | 1580 | 700 |  | 1998 | 1999 |
| W | M | 1580 | 720 |  |  | 1999 |
| W | M | 1580 | 760 |  |  | 1999 |
| W | M | 1580 | 840 |  | 1998 | 1999 |
| W | M | 1580 | 900 |  |  | 1999 |
| W | M | 1580 | 1000 |  | 1998 | 1999 |
| W | M | 1580 | 1060 |  |  | 1999 |
| W | M | 1580 | 1120 |  | 1998 | 1999 |
| W | M | 1580 | 1220 |  |  | 1999 |
| W | M | 1580 | 1280 |  | 1998 | 1999 |
| W | M | 1580 | 1420 |  |  | 1999 |
| W | M | 1580 | 1480 |  | 1998 | 1999 |
| W | M | 1600 | 60 | 1989 |  |  |
| W | M | 1600 | 180 | 1989 |  |  |
| W | M | 1600 | 340 | 1989 |  |  |
| W | M | 1600 | 520 | 1989 |  |  |
| W | M | 1600 | 700 | 1989 |  |  |
| W | M | 1600 | 840 | 1989 |  |  |

# APPENDIX 2

**Num of segments sampled for different data each year by aspect and elevation**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| ASPECT | ELEV | CENSUS | TAGGING\_SEED\_SAP | SEED\_SAP\_CNT | SPECIES\_COVER | SUBSTRATE | PRISM |
| E | H | 1988 | 5 | 22 | 22 |  | 42 |
| E | L | 1988 | 24 | 42 | 47 |  | 46 |
| E | M | 1988 | 22 | 37 | 38 |  | 45 |
|  | | | | | | | |
| W | H | 1989 | 7 | 7 | 7 | 7 | 7 |
| W | L | 1989 | 12 | 12 | 12 | 12 | 12 |
| W | M | 1989 | 6 | 6 | 6 | 6 | 6 |
|  | | | | | | | |
| E | H | 1998 | 21 | 22 | 11 | 11 | 11 |
| E | L | 1998 | 23 | 24 | 13 | 13 | 11 |
| E | M | 1998 | 23 | 26 | 12 | 12 | 12 |
| W | H | 1998 | 7 | 7 | 7 | 7 | 7 |
| W | L | 1998 | 12 | 12 | 1 | 8 | 12 |
| W | M | 1998 | 10 | 10 | 5 | 10 | 10 |
|  | | | | | | | |
| E | H | 1999 | 22 | 22 | 22 | 22 | 11 |
| E | L | 1999 | 24 | 24 | 13 | 24 | 12 |
| E | M | 1999 | 26 | 26 | 19 | 26 | 13 |
| W | H | 1999 | 13 | 14 | 13 | 13 | 6 |
| W | L | 1999 | 23 | 24 | 9 | 24 | 12 |
| W | M | 1999 | 20 | 20 | 13 | 19 | 9 |