**Soil Data History 1986/87~2011**

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# 1. Probe data collected in 1987 for regular transect plots

## 1.1 Plots samples

Plot 1 ~Plot 15 on W32, W46, W60, W70, E320, E330, E334, E335, and N326.

## 1.2 Method

Basing on protocol “TRANPR87.doc” and “proposed change to soil sampling 1987.pdf” 20 probe samples were taken for each transect plots and soil types were recorded as H(Histosol), M(mineral with/without E or/and B horizon), or R(rock). Distance before probe hits a rock (or we should rather say an obstruction) for as long as 10cm was also recorded. (Distance before hit a rock for surface rock/obstructions was not recorded) Dominant soil type out of the 20 samples, excluding Rock was identified as soil class for a transect plots.

In 2012, soil class was modified by dividing M into Spodosol and Inceptisol basing on “E” or ”Bh”/”B” notes. Soil class for a plot was identified by the dominant soil type out of the 20 samples. When S/I have the same percentage as H, regarding H needs a higher percentage to be classified, it would be an S/I; when S has the same percentage as I, it would be a S.

Probe data were entered/edited by Lixi and Noah in 2012. A few plots miss one or a couple probe sample.

About soil class for a plot: We decided on 12/03/2012 (PAP, DRP, Lixi) to divide it into Mineral and Histosol by a 50% criterion; then within Mineral, we use a 50% criterion to distinguish Inceptisol and Spodosol. This avoids situation like: if before M=8, F=6; new category I=5; S=3; F=6, then it would change soil type for a plot from M to F. When S+I has the same percentage as H, regarding H needs a higher percentage to be classified, it would be a S/I; when S has the same percentage as I, it would be a S.

## 1.3 Data sets

Excel raw file: *R:\MOOSHUBB\longterm\lixi kong\SegTrSoil\regtrsoil.xls*

Transect file: *R:\MOOSHUBB\longterm\lixi kong\SegTrSoil\rtrsoil.ssd*

# 2. Probe data collected in 2011 for negative and high-high transect plots

## 2.1 Plots samples

All transect plots established in 1999 except P-4~-1 on E335 (David Janas couldn’t find these plots), P14 and P15 on S26, and P3~15 on S344, were collected for probe databy David Janas. We didn’t tag plants on S26, P20~P24, but soil data were still collected. All plots collected for probe data in 2011 are listed as follows:

W32: P-1~P-6; P16~P19

W46: P-1~P-4; P 16~P20

W60: P-1~P-3; P16~P20

W70: P-1~P-5; P16~P21

E320: P16~20

E330: P-1; P16~P19

E334: P-1~P-3; P16~P20

E335: P14~P18 (so plot 14, plot 15 has two sets of soil probing data from 1987 and 2011. Soil type are both Histosol in both census years for both plots).

S26: P1~P4, P16~P24

S344: P16~24

## 2.2 Method

*R:\MOOSHUBB\longterm\lixi kong\SegTrSoil\janas\_moosilauk\_methods.doc*

Soil samples were collected at 20 - 1m intervals arranged in a perpendicular cross pattern centered on the PVC pipe plot marker following protocol previous established in 1987 (TRANPRO87.doc). Samples were taken with a soil corer and were examined in the field. Soil composition was recorded as H (Histosol), M (Mineral with/without E horizon), or R (Rock) and distance before probe hits a rock (as long as 80 cm) was recorded. Soils with 2/3 or more of the core as organic matter are considered Histosol, soils with an E horizon are Spodosol, and all other mineral soils are classified as Inceptisol.

## 2.3 Data set:

Raw data: R:\MOOSHUBB\longterm\lixi kong\SegTrSoil\janas\_moosilauke2011.xls

SAS file: R:\MOOSHUBB\longterm\lixi kong\SegTrSoil\nhhtrsoil.ssd

# 3. Probe data collected in 1986/87 for segments

## 3.1 Plots sampled

Tab. 1 Number of segments sampled for probe data by contour

|  |  |
| --- | --- |
| CONTNAM | # of segments |
| LE1860 | 34 |
| ME2020 | 58 |
| HE140 | 7 |
| HE460 | 22 |
| HE1080 | 15 |
| LW1900 | 48 |
| MW1580 | 40 |
| HW400 | 10 |
| HW620 | 15 |

## 3.2 Method

Also referring to “TRANPR87.doc”and “Proposed changes to soil sampling protocol 1987.pdf”, *a*ll data collected in 1986/87 for segments were collected on the actual contour line rather than displaced segments.

Each probing was recorded as R (Rock), M (Mineral soil) or F (Folist)/H (Histosol) based on an evaluation of the core obtained. Rock was recorded if rock(or other obstructions) was encountered within 0-3 cm of the soil surface. If the probing encountered rock or other obstruction within 10cm, the depth to the obstruction was recorded following the soil type, such as “H 8”. A note of “E” or/and “Bh” was recorded if in a mineral soil, one horizon is particularly strong, ie. BH or E. If 2/3 or more of the core (note organic material was assumed to be compressed by 50%) is comprised of organic material the soil is called a Histosol. If less than 2/3 of the core is organic, the soil is recorded as a Mineral soil.

The plot was declared a Histosol if 70% or more of the non-Rock probing >10cm to obstruction were recorded as Histosol. The plot was declared a mineral soil (Spodosol if well drained) if 50% or more of the non-rock >10cm to obstruction were recorded as mineral soil. This criterion doesn’t cover all the possible percentages, so Lixi compared soil class defined in 1986/87 with count of M and H and figured that dominate soil type out of the 20 probe samples (the one with more than 50%) was used as the soil type for a plot.

In 2012, Probe data were entered and edited by Lixi in 2012 from hard copies. Besides correcting some probes which should be rock (rock encountered within 0-3cm) but was defined as something else, soil class was also modified by dividing Mineral soil into Inceptisol and Spodosol depending on whether E and/or Bh horizon was found. Dominant soil type was used as soil classification for a plot. We decided on 12/03/2012 (PAP, DRP, Lixi) to divide it into Mineral and Histosol by a 50% criterion; then within Mineral, we use a 50% criterion to distinguish Inceptisol and Spodosol. This avoids situation like: if before M=8, F=6; new category I=5; S=3; F=6, then it would change soil type for a plot from M to F. New category hasn’t been added to soil master file yet. When S+I has the same percentage as H, regarding H needs a higher percentage to be classified, it would be a S/I; when S has the same percentage as I, it would be a S.

## 3.3 Data sets:

Excel raw data: *R:\MOOSHUBB\longterm\lixi kong\SegTrSoil\segsoil.xls*

Segment file: *R:\MOOSHUBB\longterm\lixi kong\SegTrSoil\segsoil.ssd*

**Data other than soil probe data:**

**STPACE:** Some extra segments were sampled because we were looking for segment which has %spruce larger than 5, such as LE670(%spruce/con), ME570(has probe data), HE410(%spruce/con), and HW420(%spruce/con).

**SLOPE**: Original slope measurements of the segment in degrees collected in 1986. Some corrections/editions were made (referring to available slope collected in 2012) and a new variable **SLOPE86** was created:

* LW1900 stpace 20, slope=-24. Changed it to 24. Lixi 01/31/2013
* Two measurements for the same segment, for example 10/16, or 10-20, an average of the two numeric numbers were taken. Lixi 01/31/2013
* Slope recrded as smaller or bigger than certain values such as <0; >30; >31. These are consistent with 2012 data, so set these as missing. Lixi 01/31/2013
* One slope was recorded as percentage: 42%. Converted it to degrees. Lixi 01/31/2013

**PSPRUCE:** visual estimates of percentage of spruce. Do we want to keep one numeric value?

Recorded as a range: <1; 10-15; <1-4 midpoint?

Recorded as “80% conifer” 80% of the conifer are spruce. 80%

**PCON**: visual estimates of percentage of conifers

**SOILS**: Soil types for each segment basing on proportion of F/F+M and M/F+M

For some segments we didn’t do probes in 1986/1987, but have a soil type from 1986?

Leave as missing PAP

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| CONTNAM | STPACE | PSPRUCE | PCON | SOILS | SLOPE |
| LE1860 | 0 | 0 | 0 | m |  |
| LE1860 | 20 | 0 | 0 | m |  |
| LE1860 | 60 | 0 | 0 | m |  |
| LE1860 | 80 | 0 | 0 | m |  |
| LE1860 | 120 | 0 | 0 | m |  |
| LE1860 | 140 | 0 | 0 | m |  |
| LE1860 | 180 | 0 | 0 | m |  |
| LE1860 | 220 | 2.5 | 0 | m |  |
| LE1860 | 240 | 2.5 | 0 | m |  |
| LE1860 | 340 | 8-15 | 40 | h |  |
| ME2020 | 900 | 40 | 70 | s | 23-30 |
| ME2020 | 940 | 55 | 85 | i | 37 |
| ME2020 | 980 | 10-15 | 60 | s/i | >30 |
| ME2020 | 1100 | 35 | 60 | h/s |  |
| ME2020 | 1120 | 0 | 30 | s |  |
| ME2020 | 1160 | <3 | 60 | h/s |  |
| ME2020 | 1280 | 0-5 | 60 | h/s |  |
| ME2020 | 1300 | <1 | 45 | h |  |
| HE460 | 410 | 5-20 | 75 | h |  |
| HE1080 | 360 | 0 | 70 | h |  |
| HE1080 | 400 | <1 | 95 | h | 22 |
| HE1080 | 460 | 0 | 98 | h | 19 |
| HE1080 | 780 | <1 | 80 | s | 8 |
| HE1080 | 860 | 0 | 75 | s |  |
| HE1080 | 1080 | 0 | 65 | s | 30 |

# 4. Master data set for Permanent, Transect and Segment

SAS program:

*R:\MOOSHUBB\longterm\lixi kong\SegTrPPSoil\soilmas11.sas*

SAS data set:

*R:\MOOSHUBB\longterm\lixi kong\SegTrPPSoil\soilmas11.ssd*

**PPLOT**

**TRAN:** Transect names

**TPLOT:**  Transect plot numbers.

**CONTNAM**

**STPACE**

**SOILCL**:NewSoil class. For permanent, since we don’t have probe data, it’s simple M (mineral) or H(histosol); for segments and transects: We first divide SOILCL into Mineral and Histosol by a 50% criterion; then within Mineral, we use a 50% criterion to distinguish Inceptisol and Spodosol.When S has the same percentage as H, regarding H needs a higher percentage to be classified, it would be a S:

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| CONTNAM | STPACE | PSPRUCE | PCON | SOILS | ***SOILCL*** | HISTO | ROCK | INCEP | SPODO |
| LE1860 | 1360 | 2-4 | 25 | m | ***S*** | **5** | 4 | **5** | **5** |
| ME2020 | 60 | 3 | 75 | m | ***S*** | **8** | 0 | 4 | **8** |
| ME2020 | 100 | 3 | 40 | m | ***S*** | **7** | 2 | 4 | **7** |
| MW2020 | 120 | <1 | 45 | m | ***S*** | 3 | 3 | **7** | **7** |
| ME2020 | 180 | <1 | 75 | m | ***S*** | 4 | 2 | **7** | **7** |
| ME2020 | 1320 | <1 | 55 | m | ***S*** | **7** | 0 | 6 | **7** |
| ME2020 | 1440 |  |  | m | ***S*** | 5 | 3 | **6** | **6** |
| LW1900 | 1440 | <1 | 10 | m | ***I*** | **5** | 6 | **5** | 4 |
| LW1900 | 1800 | 2 | 35 | m | ***S*** | **9** | 2 | 0 | **9** |
| MW1580 | 480 | 5-10 | 90 | m | ***S*** | **8** | 1 | 3 | **8** |

**Additionally,** ME2020, SEG 680 only had 7 sampled all of which were rock, so no SOILCL was given to this segment.

**HISTO**:Number of Histosol out of 20 probe samples. A few plots have less than 20 samples.

**INCEP**: Number of Inceptisol out of 20 probe samples

**SPODO**:Number of Spodosol out of 20 probe samples

**ROCK**:Number of Surface Rock(or other obstructions) out of 20 probe samples

**MINER:** Total number of INCEP+SPODO.

**PHISTO:** Percentage of histosol out of the total of (HISTO+INCEP+SPODO)

**ELEVCL**

**ASPCL**

**POINT\_X/POINT\_Y:** measured or interpolated longitude\latitude

**INTERP:** if it’s equal to 1 then POINT\_X/POINT\_Y are interpolated values; if it’s missing, then POINT\_X/POINT\_Y are actual measured values.

**LONG/LAT:** measured longitude/latitude

**Date:** Date soil probe data were collected, only for 2011 soil data.

**S1-S20:** Probe data. Recorded as

* R: Surface Rock(or other obstructions)
* H#: Histosol, “#” represents distance before probe hits a rock
* H0log/H0stump/H0root: Log, stump, or root at the sample point so no probe could be taken. These should be dropped out of the tally for classification.
* H1/H2/H3: should be surface rock (if rock was encountered with 0~3cm of the soil surface)
* M#: Mineral without E horizon, should be classified as Inceptisol. Number represents distance before hit a rock.
* M#E: Mineral with E horizon, should be classified as Spodosol. Number represents distance before hit a rock.

**SOILCL1-SOILCL20**:New soil class for each of the 20 probe samples. R=surface rock; I=Inceptisol; S=Spodosol; H=Histosol.

**DISROCK1-DISROCK20**: Distance before probe hits a rock (or other obstruction such as log, rood, and stump as recorded in 2011 data). For some of the “surface rock/obstruction” which distance was not recorded for, Lixi set them as 3s.

**NOTES**: notes from 2011.

**SLOPE86:** slope data from soil probe data sheets, some corrections were made. Details see 3.3 Data sets

**PSPRUCE:** visual estimates of percentage of spruce, from soil probe data sheets.

**PCON**: visual estimates of percentage of conifers, from soil probe data sheets

**SOILS:** some soil class estimations for each plot from soil probe data sheets. They were not based on probe data, we probably won’t use them.