**GPS data history 2000~2012**

*Lixi Kong updated 10/31/2015*

# *1. Data collected:*

GPS data were collected in 2000, 2001, 2002, 2008, 2010, 2011 and 2012. Some re-measurements were done. *All GPS data come with a* ***Date*** *when it was collected. Before 2010, GPS were all collected by Garmin; in 2012,* LE and part of ME data are from Trimble; and overall Trimble is more accurate than Garmin

## *1.1GPS Data collected in 2000, 2001, 2002, and 2003*

*R:\MOOSHUBB\longterm\lixi kong\GPS\_ELEV\MM GPS.xls*

*This is the old GPS main data file we had been having before we looked into more details on GPS data in 2012. This was not included in any of the master files we had before 2012.*

## *1.2GPS data collected in 2000, 2001, 2002, 2003, 2008, 2010, 2011*

*R:\MOOSHUBB\longterm\lixi kong\GPS\_ELEV\ MoosilaukeGPSpoints4\_17\_12.xls*

*I got this from PAP on 04/17/2012 which includes data from MM GPS.xls and some other data. When there is a GPS data, there is NOT always an elevation*

* 1. ***GPS data collected by Garmin in******2000, 2001, 2002, 2003, 2008, 2010, 2011***

*R:\MOOSHUBB\longterm\lixi kong\GPS\_ELEV\PAPgarmin12032012*

*This part of data was downloaded from Garmin on 12/03/2012, and there is only GPS location data, NO elevation data. There are some duplicates data with “MoosilaukeGPSpoints4\_17\_12.xls”, but also some new data*

* 1. ***GPS data collected in 2012 by Trimble for LE and part of ME segments***

*R:\MOOSHUBB\longterm\Rawdata2012 \Moosilauke\_Low\_MidE\_contour2012.txt*

*We lost part of the ME data. There is always an elevation recorded with GPS location data. However, Trimble doesn’t directly read elevation in the field and elevation is calculated by certain model, PAP will look into details on this.01/23/2013*

## *1.5 SAS program*

*R:\MOOSHUBB\longterm\lixi kong\GPS\_ELEV\GPSELEV041712.sas*

*R:\MOOSHUBB\longterm\lixi kong\GPS\_ELEV\PAPgarmin12032012.sas*

*R:\MOOSHUBB\longterm\lixi kong\GPS\_ELEV\GPSMAS12.sas*

*R:\MOOSHUBB\longterm\lixi kong\GPS\_ELEV\GPSMAS12 inter.sas*

## *1.6 SAS/Excel data set:*

* *Data set with all GPS measurements:*

*R:\MOOSHUBB\longterm\lixi kong\GPS\_ELEV\gpsmas12.ssd*

*R:\MOOSHUBB\longterm\lixi kong\GPS\_ELEV\GPSMAS12.xls*

* *Data set corrected for errors and re-measurements:*

*R:\MOOSHUBB\longterm\lixi kong\GPS\_ELEV\gpsmas12c.ssd*

*R:\MOOSHUBB\longterm\lixi kong\GPS\_ELEV\GPSMAS12C.xls*

* *Interpolated Transect plots:*

*R:\MOOSHUBB\longterm\lixi kong\GPS\_ELEV\TRANinter.xls*

* *Interpolated Segment plots:*

*R:\MOOSHUBB\longterm\lixi kong\GPS\_ELEV\SEGMENTinter.xls*

* ***Data set with all measured and interpolated points:***

*R:\MOOSHUBB\longterm\lixi kong\GPS\_ELEV\gpsmas12inter.ssd*

**PPLOT**

**TRAN**

**TPLOT**

**CONTNAM**

**STPACE**

**DATE:** Dates GPS data were collected. Some are missing.

**LABEL:** Point labels. A few plot labels were not correct.Some points were not plot locations (such as random point on a hiking trail)

**LONG:** measured longitude

**LAT:** measured latitude

**POINT\_X:** measured or interpolated longitude

**POINT\_Y:** measured or interpolated 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.

## *1.7 Main Shapefiles:*

*Interpolated transect plots: R:\MOOSHUBB\longterm\lixi kong\GPS\_ELEV\shapefiles\TRANinter.shp*

*All transect plots (measured and interpolated): R:\MOOSHUBB\longterm\lixi kong\GPS\_ELEV\shapefiles\TRAN\_ALL.shp*

*Measured segments: R:\MOOSHUBB\longterm\lixi kong\GPS\_ELEV\shapefiles\SEG.shp*

*All interpolated segments: R:\MOOSHUBB\longterm\lixi kong\GPS\_ELEV\shapefiles\SEGMENTinter.shp*

*All permanent plots(all measured, no need to interpolate): R:\MOOSHUBB\longterm\lixi kong\GPS\_ELEV\shapefiles\PP*

# *2. Permanent plots*

All plots were collected for GPS data; plot 5 and 6 had re-measurements in 2011

|  |  |  |
| --- | --- | --- |
| Plot | Lat | Long |
| PP05 | 43.99505 | -71.8277 |
| PP05R | 43.99544 | -71.828 |
| PP06 | 43.99516 | -71.8288 |
| PP06R | 43.99506 | -71.8292 |

Re-measurements look OK on the map. An average was taken for plot5 and plot6.

# *3. Transect plots*

NOT all transect plots were collected for GPS data. Some extra plots where we didn’t collect tree/sapling data were also measured for GPS.

* 1. ***Re-measurements***

|  |  |  |  |
| --- | --- | --- | --- |
| TRAN | TPLOT | Lixi’s Notes referring to ARCGIS map |  |
| E320 | 18~20 | Re-measurement looks Ok | Average taken 01/08/2013 |
| E330 | -1,-2 | Measurement for plot -1 should be a remeasurements for plot -2. | corrected 01/21/2013 |
| E334 | -2~-1 | Re-measurement looks Ok | Average taken 01/08/2013 |
| E334 | 2 | This is a duplicate of a measurement for -2 | Corrected 01/08/2013 |
| E335 | -4~-1 | Re-measurement looks Ok | Average taken 01/08/2013 |
| E335 | 2 | It should be remeasurement for plot1 | Corrected 01/08/2013 |
| E335 | 3 | It should be remeasurement for plot 2 | Corrected 01/08/2013 |
| E335 | 4~8 | Re-measurement looks Ok | Average taken 01/08/2013 |
| E335 | 15 | Three marked as plot 15 but look like at different locations. Could be plot 13, 14, 15 | *Corrected.* 01/08/2013*In June 2011 , field crew sampled plot 15 and 16 but thought they were plot 17 and 18. Then in August, they sampled actual plot 17 and 18.*  *One of the plot 15 was sampled in Oct.2011.The other two were sampled in 2008.* |
| E335 | 17 | One of the p17 could be re-measurement of plot 15 | This was sampled in 2008. Corrected 01/08/2013 |
| E335 | 18 | Re-measurement looks Ok | Average taken 01/08/2013 |
| S344 | 14 | Re-measurement looks Ok. | Average taken 01/08/2013 |
| S344 | 14 | One of the re-measurement look like should be for E320 | Deleted this observation to be conservative |
| S344 | 15 | One of the p15 should be a duplicate of plot16 | Corrected 01/08/2013 |
| S344 | 21~23 | Re-measurement looks Ok | Average taken 01/08/2013 |
| W32 | -6~-2 | One of the p6 ~2is a duplicate of plot -6~-2 | Corrected 01/08/2013 |
| W32 | 1 | Re-measurement looks Ok | Average taken 01/08/2013 |
| W32 | 19 | Re-measurement looks Ok | Average taken 01/08/2013 |
| W46 | -4, -3 | One of the p3/p4 is a duplicate of p-3/p-4 | Corrected 01/08/2013 |
| W46 | -1/1 | Duplicates. ELEV is 780, so it’s probably p1 | Corrected 01/08/2013 |
| W46 | 16, 18, 19 | Re-measurement looks Ok | Average taken 01/08/2013 |
| W46 | 20 | Three measurements did in 2011 are very close, but they are a little bit far from first GPS point measured in 2000. Which is correct? | Trust the three in 2011 for now. 01/08/2013 |
| W60 | 16~20 | Re-measurement looks Ok | Average taken 01/08/2013 |
| W70 | -5~-2 | Some duplicates were marked as the positive plots | Corrected 01/08/2013 |
| W70 | 12, 16, 18 | Re-measurement looks Ok | Average taken 01/08/2013 |
| W70 | 20 | One of measurement for p20 should be remeasurement for W60 plot 20 | Corrected 01/08/2013 |

* 1. ***Extra plots collected for GPS data(plots were didn’t tag plants):***

S26 P 21-24.

E330 P-2

E334 P-4

* 1. ***Plots we NEVER collected GPS data (also include soil probe data information):***

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | *GPS* | | *Soil* | |
|  | *Plots* | *# of Plots* | *Plots* | *#of Plots* |
| Tran W32 | P2~P10; P13~P15 | 12 |  |  |
| Tran W46 | P-1; P2; P5~P13; P15 | 12 |  |  |
| Tran W60 | P-3~P-1;P1-P15; | 18 |  |  |
| Tran W70 | P6 | 1 |  |  |
| Tran E320 | P1~P7; P11~P15 | 12 |  |  |
| Tran E330 | P1~P15 | 15 |  |  |
| Tran E335\* | P9~P14 (might be P9~P12, see “Uncertain/unknown plots”) | 6 | P-4~P-1 | 4 |
| Tran S26 | P15; P20(we didn’t sample for trees in this plot | 2 | P14, P15 | 2 |
| Tran S344 | P8 | 1 | P3~P15 | 13 |

* 1. ***Transect interpolation:***

In ArcMap, for each transect line, connect all the measured points, and then draw the average direction line. If we need to fill in a gap, such as interpolate plot 3~7 between plot 2 and plot 8, elevation for plot 3~7 were calculated basing on elevation of plot 2 and plot 8 assuming plot 2~8 have equal elevation difference, then on the average direction line, points were hand drew referring to 5ft contour line.

|  |  |  |
| --- | --- | --- |
| TRAN | Average direction | notes |
| W32 | 40.9 |  |
| W46 | 54.9 | Plot 4 overlaps plot 5 |
| W60 | 67.1 |  |
| W70 | 73.9 | There is two sections |
| E320 | 310 |  |
| E330 | 321 |  |
| E334 | 325 | All plots collected for GPS |
| E335 | 327 |  |
| S344 | 339 |  |
| S26 | 34 |  |

# *4. Segments*

## *4.1 segment plots collected for GPS data:*

|  |  |
| --- | --- |
| *Contour* | *# of segments* |
| LE1860 begins on the Carriage Road at its south end with pace 0 | *69* |
| ME2020 begins on the Carriage Road at its south end with pace 0 | *50* |
| HE460 runs north from the Carriage Road(pace 0) to the Slide Trail(pace 460) | *5* |
| HE140 runs SW from **Old** Gorge Brook Trail (0) for 140 paces | *0* |
| HE1080 runs NE from **Old** Gorge Brook Trail and heads NE for 1080 | *12* |
| LW1900 starting at Hurricane trail at its south end and runs N | *17* |
| MW1580 begins at its south end and run N | *18* |
| HW620 starting with Glencliff and going S | *18* |
| HW400 starting with glencliff and going N | *17* |

* 1. ***Re-measurements***

| **CONTNAM** | **STPACE** | **Lixi’s note referring to ArcGIS map** | **correction** |
| --- | --- | --- | --- |
| HE1080 | 700 | Re-measurement looks Ok | Average taken 01/08/2013 |
| HW400 | 100 | Re-measurement looks Ok | Average taken 01/08/2013 |
|  | 220 | Re-measurement looks Ok | Average taken 01/08/2013 |
|  | 280 | Re-measurement looks Ok | Average taken 01/08/2013 |
|  | 340 | Re-measurement looks Ok | Average taken 01/08/2013 |
| HW620 | 540 | Re-measurement looks Ok | Average taken 01/08/2013 |
| LE1860 | 180 | Re-measurement looks Ok | Average taken 01/08/2013 |
|  | 480 | Re-measurement looks Ok | Average taken 01/08/2013 |
|  | 600 | Re-measurement looks Ok | Average taken 01/08/2013 |
|  | 940 | Re-measurement looks Ok | Average taken 01/08/2013 |
|  | 1060 | Re-measurement looks Ok | Average taken 01/08/2013 |
|  | 1340 | Re-measurement looks Ok | Average taken 01/08/2013 |
|  | 1440 | Re-measurement looks Ok | Average taken 01/08/2013 |
|  | 1620 | Re-measurement looks Ok | Average taken 01/08/2013 |
| ME2020 | 0 | Re-measurement looks Ok. Mesurements for seg20 looks like re-measurement for seg0 too. | Corrected 01/09/2013 |
|  | 100 | Re-measurement looks Ok | Average taken 01/08/2013 |
|  | 160 | The measurement done in 2011 looks like re-measurement for seg 180 | Corrected 01/09/2013 |
|  | 340 | Re-measurement looks Ok | Average taken 01/08/2013 |
|  | 700 | Measurement done in 2001 looks far away from the other two | Deleted the one far away 01/09/2013 |
|  | 800 | Re-measurement looks Ok | Average taken 01/08/2013 |
|  | 920 | Re-measurement looks Ok | Average taken 01/08/2013 |
|  | 980 | Re-measurement looks Ok | Average taken 01/08/2013 |
|  | 1580 | Re-measurement looks Ok | Average taken 01/08/2013 |
|  | 1620 | Re-measurement looks Ok | Average taken 01/08/2013 |
| MW1580 | 60 | Re-measurement looks Ok | Average taken 01/08/2013 |

* 1. ***Segments interpolation:***

In ArcMap, for each segment, select the contour line best fits all the measured points first referring to 12.5ft contour lines. If protocol says the contour starts with certain trail, take the intersection of the contour and trail as the start point, the last measured segment location as end point, and construct evenly distributed segments on the line (every 20 pace). An average length of 20 paces was calculated basing on this, and then if we need to add more points starting with the last measured segment, use the average length to construct more points on the same contour line.

*Segment target elevation:*

* L: 2750ft
* M: 3250ft
* H: 3750ft

|  |  |  |  |
| --- | --- | --- | --- |
|  | Contour selected | Average interval | Notes |
| LW1900 | 2750ft | 103ft |  |
| MW1580 | 3225ft | 101ft |  |
| HW400 | 3825ft | 89ft |  |
| HW620 | 3800ft | 96ft |  |
| LE1860 | 2687.5FT | 97ft |  |
| ME2020 | 3350ft | 110ft |  |
| HE460 | 3912.5ft | 89ft |  |
| HE1080 | 3900ft | 85ft | Old Gorge Brook Trail were added referring to an old Moosilauke map to locate the start point of this contour. This might not be precise; we should probably collect GPS points on this contour in the future. |
| HE140 | 3875ft | 85ft | No GPS was collected. Use the average interval of HE1080 to construct points. |

1. ***Other GPS points collected.***

|  |  |
| --- | --- |
| Abbreviation | **Place** **name** |
| HENGB | (new) Gorge Brook Trail |
| HEOGB | Old Gorge Brook Trail |
| NSN | Snapper Trail |
| OSN | Old Snapper Trail |
| HUR | Hurricane Trail |
| RDG | Ridge Trail |
| CAR | Carriage Road |
| GLN | Glencliff |
| MLG## | Matt Landis Gap Plot ## |
| MLB## | Matt Landis Building Plot ## |
| MLM## | Matt Landis Mature Plot ## |
|  | Matt Landis Contour ### |
| ML91G? |  |
| ML1065? |  |
| MLMO2? |  |
| SSUM | South Summit |
| AN##S# |  |
| B## |  |
| BBFIELD |  |
| BICENT |  |
| BLOWD |  |
| BOFFIC |  |
| …..more to be listed |  |

# *6. Master file:*

**SAS program:**

**R:\MOOSHUBB\longterm\lixi kong\GPS\_ELEV\GPSMAS12.sas**

**R:\MOOSHUBB\longterm\lixi kong\GPS\_ELEV\gpsmas12inter.sas**

**SAS data set:**

**R:\MOOSHUBB\longterm\lixi kong\GPS\_ELEV\gpsmas12inter.ssd**

**PPLOT**

**TRAN**

**TPLOT**

**CONTNAM**

**STPACE**

**LABEL**: besides permanent, transect, segment plots, some other points were also measured for GPS locations, and LABEL variable tells where those points are.

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

**DATE**: date the longitude and latitude was measured.

**POINT\_X/POINT\_Y**: if there is a set of actual measured longitude and latitude, this is equal to the set of measured value, if not, this is the interpolated longitude and latitude

**INTERP**: Variable to indicate whether it’s interpolated or not. 1=interpolated longitude and latitude.

# *7. GPS and ELEV data (this part needs to be updated. 01/24/2013)*

***Transect:*** For the total of **236** plots (230 plots where we collected demographic data and 6 plots we didn’t do demographic data but GPS (6) or/and ELEV(4) were collected) which have at least one ELEV or GPS data, **72** have only ELEV; **2** have only GPS location, and the rest of **162** have at least one set of both ELEV and GPS collected at the same time.

For a compete table of which plots were collected for at least one GPS or/and ELEV, see [SMRY\_GPSELEV](SMRY_GPSELEV.xls)

After correcting for obvious errors:

|  |  |  |  |
| --- | --- | --- | --- |
| # of plot | PP | TRAN | SEG |
| # of plots sampled | 24 | 236 | 178 |
| # of plots sampled for GPS | 24 | 141 | 178 |
| # of plots sampled for ELEV | 24 | 234 | 73 |
| # of plots sampled for both at the same time | 2 | 162 | 73 |
| # of plots had GPS remeasurements | 2 | 45 | 25 |
| # of plots had ELEV remeasurements | 2 | 107 | 0 |

***\* Except for permanent plot and 2011 elevation data, when there is both an ELEV and GPS data, they were always collected together***

***\* Except for the 2 transect plots, when there is GPS data, there is always elevation data.***

***\* Sometimes a plot would have more than one re-measurement.***

***\*An average was taken for plots with GPS re-measurement***

Email with Peter:

* I have an old GPS file, which has data collected in 2000/2001/2002. So for the new file "MoosilaukeGPSpoints4\_17\_12", I assume everything to the right of "ELEV\_M11" which have a date in 2008, 2010, or 2011 (or sometimes without a date, but have data logger) are the new data you found on data loggers?   YES, that is correct, although you may see that the plot data is from older records - look at the longitutude latitude values to see if they are the same or not.
* Dose"Date" only represent the data GPS data were collected or when both GPS/elev were collected? When elevation is recorded as 0, that just means elevation were not recorded?   the date is downloaded with the lat and long and elevation values.
* "Dup\_location" and data to the right represent re-measurements we did in the same year or a different year? For example, permanent plot 4 were measured in 2000, then in 2011; and transect 46 plot20 had two measurements in 2011?   yes, and could have come from the same or different data logger.
* Sometimes plots was recorded as something like "70p16B", "46p20real", do they just mean trans70 plot 16, and trans 46 plot 20? does "B" or "real" have other meanings?   There was not real convention on how locations were labeled, adding a b or real were done to make sure a name was not repeated when I or David Janos thought we had already taken a reading for a giving location or when we retook a location because the old one we were using to find the location took us astray.  so B or real would be a better value to have.
* And at the end of the file, row 286 to row 290, no "NAME" information were recorded. Do we not know what those data are for?   Correct, but I was hoping you could map those and see if they come up in places that we could guess which plots they would be.  Sometime a position was recorded with out naming them.

I'm planning on create a new updated file with all GPS data, and for those re-measurements, I will plot them on the map in ArcGIS to see how much they overlap with each other to check for errors. For elevation data, I'll also create a new file with all the data we have so far. Please let me know if you have any suggestions about editing/checking the data.

thanks for making this effort, it will greatly help us relocate and conduct analysis.  Clearly a standard protocol for collecting points and naming them is needed.  Hopefully, we are not missing too many, but I know we do not have very many segments recorded.   thanks,  Peter