

## Procedures when visiting GSMRGN rain gauge – Summer 2011

[1] For ALL gauges, we'll do the usual gauge maintenance. See document on UNCA-PMM web page found here

[http://facstaff.unca.edu/dmiller/gaugevisit\\_proc.pdf](http://facstaff.unca.edu/dmiller/gaugevisit_proc.pdf)

Don't forget to examine carefully that both the "Raw" and "CSV-1" data files have data in them. Some files were empty that were created during the Spring 2011 gauge visits. Don't forget to re-launch the Hobo data loggers after downloading the data. We will NOT be replacing the Hobo batteries during this round of summer visits. Also, please clear all water out of the tipping bucket for Step [3] below.

[2] For twenty rain gauges (gauges# Hurr. Ridge, Miller; 111, 112, Pinnacle Ridge; 106, Cat Divide, The Swag; 101, 102, 103, 108, 110, Mt Sterling; 305, 309, 310, Big Cat; 304, 307, AT West; 300, 301, 302, Cosby Knob; 308, AT East; 303, 306, 311) we will be installing a new lithium battery and a new battery filter capacitor. The instructions will be provided separately in a document sent to us by Hydrological Services. This is meant to fix the ML1 (blue) data logger voltage drop problem we had observed one year ago. Make sure to do the data logger fix *after* you are confident that you have successfully downloaded the data logger files in the "Raw" and "CSV-1" format files. You'll need to make sure that a Phillips screwdriver and sharp knife (e.g. exacto blade) or wire cutters are with you so that the standard 2 wire cable can be trimmed to make room for the capacitor. Doug will be serving as the "guinea pig" with the gauge visits on Monday, July 25 to gauges 111 & 112 to make sure that the capacitor replacement procedure functions properly and will send out an update on the installation procedure, if necessary. Note that the gauges requiring capacitor installation are highlighted by red font in the "gsmrgn\_visits\_summer2011d3.xlsx" file accompanying this document in the email dated Monday, July 18, 2011. Please be sure to **document** in the field log notebook that you replaced the lithium battery and installed the capacitor for each gauge that had a successful installation.

[3] It is also important to check the "Raw" and "CSV-1" data files downloaded to the laptop during Step [1] because we'll be checking the calibration of ALL the gauges (assuming it is NOT raining when you are visiting the gauge) and we'll be **zeroing out** the data loggers just before the calibration step so that the calibration tips appear at the *beginning* of the new data logger record. Make sure that the tipping buckets are empty before following the calibration procedure.

Calibration steps (after having finished the maintenance steps of Step [1]):

{a} Fill clear plastic tube (labeled "Duke 1") with water, making sure that the white valve at the closed end of the tube is turned to the "off" (horizontal) position. You'll know if it's not off as water will begin to drip through the tube connected to the white valve.

{b} Attach the 100 MM nozzle to the threaded end of the "Duke 1" calibration tube and slip the nozzle end of the tube into the tripod that should be resting on the funnel of the rain gauge cover. Make sure that the nozzle is securely fastened to the tube, if not, little drips will begin to form on the outside of the nozzle, dripping into the gauge, and contaminating your results.

{c} Turn the white valve to the "on" (vertical) position and water should begin to drip into the rain gauge cover. You should hear tips once enough water has fallen into the gauge and been funneled into the tipping bucket. After the "Duke 1" tube has emptied, manually tip the tipping bucket several times to empty the buckets and to "mark" on the data logger the completion of a particular trial. Also turn the white valve back to the "off" position.

{d} Repeat steps [a]-[c] two times, for a total of three gauge calibrations.

{e} Upon completion of the three calibration trials, download the “new” data logger (NOT the Hobo data logger) file in “Raw” and “CSV-1” format so we can have copies of the calibration data immediately available for comparison to the calibration data that was taken before each gauge was deployed in the field.

{f} Do not try calibrating a gauge if rain is falling during the gauge visit. We must have at least two uncorrupted gauge calibration trials for the data to be meaningful.

{g} Please be sure to **document** in the field log notebook each time that you successfully re-calibrated a rain gauge so that we can know which (if any) gauges have NOT been re-calibrated and will need to have the procedure addressed during our next round of visits.

Make sure you **bring plenty of water** so that you’ll be able to successfully complete **three** calibration trials. The volume of water needed to fill the clear “Duke 1” calibration tube three times amounts to about one liter of water, so you’ll need **1 liter of water for each gauge** requiring calibration. Each trial will require about 12.5 minutes for the water to empty from the clear “Duke 1” tube, so almost 40 minutes must be devoted to re-calibration. Please don’t rush the calibration procedure. If you run out of time and can’t visit all the gauges scheduled for a particular day, don’t worry [be happy], we’ll visit those “missed” gauges on a different day this summer.

[4] For ten rain gauges (gauges# Mt Sterling; 305, 309, 310, Big Cat; 304, 307, AT West; 300, 301, 302, Cosby Knob; 308, AT East; 306) we’ll be

{a} putting existing met sensor cables *inside* the plastic sensor support tubes, to protect them from the elements, and

{b} downloading data from met sensors recently installed by Anna Wilson (and Kevin) using the “Hobo” software that’s been installed on the laptop and can be found on the desktop near the top of the laptop screen. Please verify that the downloaded files have data inside them by creating a plot (using the Hobo software) from the retrieved file. We **don’t** want to zero out or re-launch the Hobo data logger associated with the met sensors. Check the status of the met sensor via the Hobo software to make certain that moving the cables didn’t cause a disconnection to occur between the sensor and the logger. Doug and Thomas will be serving as the “guinea pigs” with the gauge visits on Monday, Aug 1 to gauges 305, 309, 310 to make sure that the met sensor procedures work and will send out an update on them, if necessary.

You’ll need to bring cutters for cutting the zip ties so that you can move the met sensor cables and you’ll need to bring new zip ties in case you need to support the sensor cables in their new position. As usual, please document any challenges and/or issues that you encountered in the field log notebook when trying to complete Step [4]. You can be working on Step [4] during the calibration procedure (Step [3]) to be more efficient with your time.

### Summary

Step [1]; ALL gauges,

Step [2]; gauges# 111, 112, 106, 101, 102, 103, 108, 110, 305, 309, 310, 304, 307, 300, 301, 302, 308, 303, 306, and 311,

Step [3]; ALL gauges,

Step [4]; gauges# 305, 309, 310, 304, 307, 300, 301, 302, 308, and 306.