Great Smoky Mountain Rain Gauge Network Field Report 18 May 2012

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Status

Table 1: Gauge visits during the spring 2012. Comments: DD=gauge data download, MN=general gauge maintenance (cleaning, bounce sheet, re-level), CA = calibration with two nozzles, and CV= clear vegetation.

Date	Gauges Visited	Technicians	Comments
30 Mar 2012	2, 5, 8	Greg, Thomas	CA, DD, MN, CV
31 Mar 2012	306	Doug, Robert, Chris	Install, MN, CV
1 Apr 2012	1, 3	Greg, Ashley	CA, DD, MN, CV
7 Apr 2012	4, 10, 104	Greg, Thomas	CA, DD, MN, CV
8 Apr 2012	-EASTER-	-EASTER-	-EASTER-
9 Apr 2012	100, 105, 109	Greg, Michael	CA, DD, MN, CV
14 Apr 2012	111, 112, 107	Greg, Thomas	CA, DD, MN, CV
15 Apr 2012	305, 309, 310	Greg, Robert, Jeremy	CA, DD, MN, CV
23 Apr 2012	108, 110	Greg, Jeremy	CA, DD, MN, CV
22 Apr 2012	101, 102, 103	Greg, Megan, Ashley	CA, DD, MN, CV
28 Apr 2012	303, 311	Greg, Robert, Jeremy	CA, DD, MN, CV
29 Apr 2012	300, 308	Greg, Daniel, Megan	CA, DD, MN, CV
15 May 2012	301, 302	Greg, Daniel, Kurt	CA, DD, MN, CV
16 May 2012	304, 307	Greg, Doug, Robert	CA, DD, MN, CV
18 May 2012	106, 110	Greg, Robert	CA, DD, MN, CV

Gauge visitation in support of the Great Smoky Mountain Rain Gauge Network (GSMRGN) during the spring 2012 occurred over 14 days spanning a period of over eight weeks in the March – May 2012 period. The primary purpose of the visits was [1] to perform calibrations on each gauge (using 100 and 300 mm nozzles, two trials each) [2] to complete maintenance tasks, [3] to download gauge observations that were made since the previous gauge visits in the fall 2011, and [4] clear vegetation. Twelve technicians and volunteers (listed on the front page) made the visits and performed the required work. It is important to note that the volunteers were NOT directly involved in any of the gauge visit tasks, but were volunteering to assist with personal safety should someone get injured during a particular series of gauge visits.

The general tasks completed at **every** gauge visit consisted of (1) field calibrations of each gauge [CA in Table 1], (2) gauge data download from the data loggers [DD in Table 1], (3) general gauge maintenance [MN in Table 1], and (4) clearing of vegetation from the gauge site [CV in Table 1]. Specialized tasks were to download data from the new T/RH sensors for those remaining in the Great Smoky Mountain National park. Task (1) involved completing (ideally) four calibration trials at each gauge using a 100 and 300 mm nozzle, two trials per nozzle. This task required carrying extra water and extended each gauge visit by about 55 minutes, which presented a logistical challenge during certain trips. Task (2) merely required a serial port link between the field study laptop and the gauge data logger and consisted of pulling the data (often in files having two different formats) onto a desktop folder on the laptop, checking for completeness of the data, and comparing the data logger time to the actual time, making corrections to the data logger clock if necessary. The standard that has been chosen for this study is to maintain the clocks on Eastern Daylight Time, since most of the "warm" precipitation will be occurring during the season when EDT is in effect. Because of concerns regarding accuracy of the time on the ML1 data loggers, a new standard was followed whereby the time from the Garmin GPS locators was used as guidance for accurate time since the GPS time (and each GPS satellite) is synched with the atomic clock of the U.S. Naval Observatory. Most ML1 data logger times were adjusted during the spring 2012 gauge visits to coincide with the EDT given by the GPS locators and a test of the logger time accuracy can be

assessed during the summer 2012 gauge visits. Time corrections during the spring 2012 gauge visits were generally done with the "TA" command since it had been noted that data logger times had been drifting since the previous visits in the fall 2011. Task (3) required the cleaning of debris from the funnel filter, cleaning the tipping buckets of debris (if necessary), cleaning the gauge drain ports, replacement of the old "Bounce" fabric softener sheet inside the case of the gauge, and re-leveling the gauge if it has come unleveled. Task (4) is required to insure that none of the surrounding vegetation overgrows the funnel top during the growing season, thereby reducing the catchment of the gauge.

The challenges encountered during some of the gauge visits in the spring 2012 were related primarily to the large variance in weather conditions. Several trips had to be broken down to multiple daytime visits due to the remoteness of the gauges and the need to carry extra water for the calibrations, which made the hiking times to each gauge longer (e.g. g#300, 306, 308, 301, 302, 303, 311). One of the repeat visits (g# 110) was due to questionable calibration results on the original visit day (100 mm nozzle) likely due to the cold and snow that was experienced during the visit on April 23, 2012. The Sunup Knob gauge (g#306) was re-installed after it was discovered in December 2011 to have been knocked over by a bear. The Sunup Knob gauge was calibrated in the laboratory on March 23, 2012 during a calibration training session led by Anna Wilson and Greg Cutrell. No gauges were discovered to have been tipped over during the visits in the spring 2012.

Details of every gauge visit along with each gauge precipitation and calibration data record can be found in folder "GAUGE-DATA-PMM" which contains sub-folders for each gauge that consists of the individual data files (often having at least two different formats) and a "history" MS Word document that mirrors exactly the notes made in the field journal during each gauge visit. A MS Word document will be created that contains the notes made in the field journal during the gauge visits in the spring 2012.

Plans for the summer months of 2012

Table 2: Planned gauge visits during the summer 2012. Comments: DD=gauge data download, MN=general gauge maintenance (cleaning, bounce sheet, re-level), and CV= clear vegetation.

Date	Gauges Visited	Technicians	Comments
28Jun 2012	1, 3	TBD	DD, MN, CV
29 Jun 2012	2, 5, 8, 106	TBD	DD, MN, CV
30 Jun 2012	4, 10, 104	TBD	DD, MN, CV
1 Jul 2012	111, 112	TBD	DD, MN, CV
5 Jul 2012	101, 102, 103, 108, 110	TBD	DD, MN, CV
6 Jul 2012	100, 105, 107, 109	TBD	DD, MN, CV
7 Jul 2012	305, 309, 310	TBD	DD, MN, CV
8 Jul 2012	303, 306, 311	TBD	DD, MN, CV
12 Jul 2012	304, 307	TBD	DD, MN, CV
13 Jul 2012	300, 301, 302, 308	TBD	DD, MN, CV

Gauge visitation in support of the GSMRGN during the summer 2012 will occur over at least 10 days spanning a period of nearly six weeks in June/July 2012. The primary purpose of the visits will be to perform maintenance, download precipitation observations that were made since the previous gauge visits in March - May 2012, and check if the time adjustment ("TA") command has fixed the tendency of many data logger time stamps to gradually drift between visits. A primary maintenance issue will be to clear each gauge funnel of typical growing season debris (leaves, insects, bird poop), to keep the "field-of-view" of the gauges clear of vegetation overgrowth, and to place fresh "Bounce" fabric softener sheets inside the gauges to discourage insect or spider habitation. The higher elevation gauges during the June/July period will be visited last as they were most recently visited in the spring 2012.

The general tasks completed at every gauge visit will consist of (1) gauge data download from the data loggers [DD in Table 2], (2) general gauge maintenance [MN in Table 2], and (3) clearing of vegetation from the gauge site [CV in Table 2].

Details of every gauge visit along with each gauge precipitation data record will be updated in folder "GAUGE-DATA-PMM" which contains sub-folders for each gauge that consists of the individual data files (often having at least two different formats) and a "history" MS Word document that mirrors exactly the notes made in the field journal during each gauge visit.

An earlier visit to the Sunup Knob gauge (g#306) will be made in late-May or early-June 2012 to verify that a bear has not again pushed over the gauge. A working theory is that, perhaps, the scent from the bounce fabric softener sheet was attracting the attention of the offending bear. It was re-installed without a bounce fabric softener sheet.

Kurt Hibbert is a new undergraduate research student at UNC Asheville who has been added to the technician team during the spring 2012 gauge visits to help replace students who graduated in May 2012. We have lost Jeremy Michael from the technician team to a new job after his May 2012 graduation and will be losing Michael Goldsbury, Daniel Martin, and Christopher Zarzar as they pursue graduate studies after the summer 2012 gauge visit season.