Prepared by:
Douglas K. Miller

Undergraduate research students (UNC Asheville):
Marlee Burgess

Volunteer assistants (other):
Brady Dodd, Jeremiah Dodd, Cody and Don Elliott (Waynesville Watershed Field Manager), Christopher Godfrey, Elizabeth Miller, Jonathan Miller, Lisa Miller, Tom Remaley

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Status

Table 1: Gauge visits during the spring 2020 campaign. Comments: DD=gauge data download, MN=general gauge maintenance (cleaning, re-level), CA= rain gauge calibration, CV= vegetation clearing, ECC=electric contact cleaning treatment, and BR = data logger battery replacement.

Date	Gauges Visited	Technicians	Comments	Vehicle
3/21/2020	104, 110, 4	Doug	DD, MN, CV, CA	any vehicle
3/23/2020	106, 10**[A]	Doug, Jared (10:30 am)??	DD, MN, CV, CA	4wd needed
3/28/2020	111, 112	Doug, Elizabeth	DD, MN, CV, CA	any vehicle
3/30/2020	106, 10	Doug, Lisa	DD, MN, CV, CA	4wd needed
4/4/2020	11; 3	Doug	DD, MN, CV, CA	4wd needed
4/6/2020	101, 102, 103	Doug, Marlee	DD, MN, CV, CA	any vehicle
4/13/2020	**Make up day**	Doug, ????	DD, MN, CV, CA	**???**
4/18/2020	100T, 108, 109	Doug, Lisa	DD, MN, CV, CA	any vehicle
4/20/2020	107, 11	Doug	DD, MN, CV, CA	any vehicle
4/25/2020	301, 302**[B]	Doug, [Lyn??], Marlee	DD, MN, CV, CA	any vehicle
5/2/2020	303s, 306	Doug, Jonathan	DD, MN, CV, CA	any vehicle
5/4/2020	305, 309, 310	Doug, Brady, Jeremiah	DD, MN, CV, CA	4wd needed
5/12/2020	300, 308	Doug, Tom	DD, MN, CV, CA	any vehicle
5/14/2020	2; 5; 8**[C]	Doug, [Sam P ??]	DD, MN, CV, CA	any vehicle
5/16/2020	301, 302	Doug, Brady, Jeremiah, Chris G	DD, MN, CV, CA	any vehicle
5/27/2020	304, 307	Doug	DD, MN, CV, CA, ECC	4wd needed
6/8/2020	105, 311	Doug, Lisa	DD, MN, CV, CA, ECC	any vehicle
6/9/2020	2; 5; 8	Doug, Don, Cody	DD, MN, CV, CA, ECC	any vehicle

**[A] => postponed due to rain - visit later, **[B] => GSMNP closed - visit later, **[C] => postponed due to restrictive COVID-19 procedures at Waynesville Watershed Operations Plants – visit later

Gauge visitation in support of the Duke Great Smoky Mountain Rain Gauge Network (GSMRGN) during the spring 2020 campaign occurred over fourteen days spanning a period of twelve weeks in March - June 2020. The primary purpose of the visits in the spring 2020 was [1] to perform downloads of gauge tip observations since the previous gauge visits in the autumn 2019, [2] to complete rain gauge and data logger maintenance tasks, [3] to clear vegetation and tree limbs and, [4] to calibrate ALL rain gauges since field calibrations were last completed in the spring 2019. Ten 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 critical gauge visit tasks, but were volunteering primarily to assist with personal safety should someone get injured during a particular series of gauge visits. Student field technicians from UNC Asheville were not allowed to assist in fieldwork after 6 April 2020 due to strict distancing measures imposed by UNCA due to the COVID-19 pandemic.

The general tasks completed at **every** gauge visit consist of (1) gauge data download from the data loggers [DD in Table 1], (2) general gauge maintenance and ML1 logger condition monitoring [MN in Table 1], (3) clear vegetation within a five foot radius of the rain gauge [CV in Table 1], and, (4) calibration of rain gauges using a

single trial of the 50, 100, and 300 mm nozzles [CA in Table 1]. As the gauge visit campaign progressed, it became obvious that systematic failure due to poor electronic contact between the logger cable leads and the gauge switch metal plates, caused by contamination build-up (e.g., dust, dirt) over the years, required electronic contact cleaner to be sprayed on the logger wires and switch metal plates (ECC in Table 1; refered to as "electronic contact cleaning [ECC] treatment" in the field notes). This procedure was only followed in the final three day (seven gauge) visits of the spring 2020 visit campaign. The primary specialized task was the necessary data logger lithium battery replacement at five rain gauge locations (as indicated using a multimeter to test logger battery voltage after a long winter), at JR Rich (g #103, 3.54V), Utah Mountain (g #108, 3.52V), Camel Hump Knob (g #300, very low voltage), Snake Den Ridge (g #302, preventative measure), and Big Creek (g #311, 0.00V). We have had significant problems with ML1-420 loggers draining the lithium batteries down in a very short period of time. Task (1) 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 raw [*.txt] and CSV formats) onto a desktop folder on the laptop, checking for completeness of the data, and comparing the data logger time and date to the actual GPS time and date (making a screenshot of the time comparison). 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. Most ML1-FL data logger times have been adjusted (using "TA" command) during previous gauge visits to coincide with the EDT given by the GPS locator. As noted above, several ML1 and ML1-420 loggers (g #102 [Hemphill Bald], #109 [Eaglesnest Ridge], #301 [Mt. Guyot], #008 [Double Spring Gap]) showed a lack of response to tips, even though the battery voltage was good. Please read the MS Word document containing the field notes to find a more thorough description of these problems. ECC treatment will be made at all gauge visits during the summer 2020 campaign. Task (2) required the cleaning of debris from the funnel filter, cleaning the tipping buckets of debris (if necessary), cleaning the gauge drain ports and siphon, re-leveling the gauge if it has come unleveled, and fixing or replacing the gauge mesh if it had been damaged. Liquid wrench is needed at g #101, g #103, and g #108 in the summer 2020 visit as the nut in one of the bolt ports had become rusty and was replaced with a stainless steel one. Task (3) consisted of cutting briars and other emerging vegetation during the spring season within a five foot radius of the gauge using clippers or weeding by hand. Several locations had tree limbs cleared with the extension saw (g #301 [Mt. Guyot], #105 [Hultquist property], #008 [Double Spring Gap], #005 [Deep Gap #2]) and two locations will need tree limbs cleared using the GSMNP arborist (g #308 and g #311) during the summer 2020 visit. Task (4) was completed successfully in every data logger at each of the rain gauge locations. It should be noted that the ML1-420 logger temperature files at several gauges (g #103 [JR Rich property], #300 [Camel Hump Knob], #302 [Snake Den Ridge Trail], and #301 [Mt. Guyot]) were downloaded to help differentiate tips due to liquid precipitation from tips due to melting snow.

Challenges encountered during some of the gauge visits in the spring 2020 were; (i) muddy and rainy conditions early in the campaign [resulting in gauge visit postponements and scheduling challenges, see description below], (ii) complications arising due to the emergence of COVID-19 just as the gauge visit campaign was getting underway; GSMNP closure, lack of access to UNCA field technicians, and restrictions at the Waynesville Watershed Operations Plant, and (iii) closure of the Cove Creek Gap Rd [near g #105; Hultquist property] to repair the wash-out from a rockslide in 2013. I'm thankful for the trusty volunteers that helped keep me safe and allowed the visit campaign to be completed on 8 June 2020!

Details of every gauge visit along with raw precipitation text and CSV format files are found via Google Drive
https://drive.google.com/open?id=10a3fR0Yv5J7rlBI6uubaFDMEhWxC2vv9
which contains sub-folders for each gauge that consist of the individual data files (often having at least two different formats), pictures taken at the gauge site during the visit, screenshots of the GPS (laptop) and ML1 logger time comparison, and a MS Word document that mirrors the notes made in the field journal during each visit.

Noteworthy precipitation events of October 2019 – February 2020 as observed at KAVL are highlighted in yellow in **Appendix A**. The bookend months of the five month period (October 2019 and February 2020) saw a significant amount of above normal rainfall. An event on 6 February 2020, in particular, caused a significant washout of a road in the GSMNP, located near Cataloochee Creek, along with at least one landslide (Wooten, personal communication).

Plans for the summer months of 2020

Table 2: Planned gauge visits during the summer 2020 campaign. DD=gauge data download, MN=general gauge maintenance (cleaning, re-level), CA= rain gauge calibration, CV= vegetation clearing, ECC=electric contact cleaning treatment, and BR = data logger battery replacement.

Date	Gauges Visited	Technicians	Comments
7/??/2020	3; 11; 107; 109	Doug + 1 field technician	DD, MN, CV, ECC
7/??/2020	2; 5; 8; 106; 10	Doug + 1 field technician	DD, MN, CV, ECC
7/??/2020	4; 104, 110, 105	Doug + 1 field technician	DD, MN, CV, ECC
7/??/2020	111, 112, 311	Doug + 1 field technician	DD, MN, CV, ECC
7/??/2020	101, 102, 103, 100T, 108	Doug + 1 field technician	DD, MN, CV, ECC
7/??/2020	303s, 306, 308	Doug + 2 field technicians	DD, MN, CV, ECC
8/??/2020	304, 307, 305, 309, 310	Doug + 2 field technicians	DD, MN, CV, ECC
8/??/2020	301, 302, 300	Doug + 2 field technicians	DD, MN, CV, ECC

Gauge visitation in support of the Duke GSMRGN during the summer 2020 will occur over at least eight days spanning July and August 2020. The primary purpose of the visits will be to download precipitation observations that were made since the previous gauge visits in March - June 2020 [DD in Table 2], perform maintenance and check if the ML1 logger times have drifted between visits and make the corresponding needed adjustments [MN in Table 2], and clear vegetation (and tree branches) from overhanging gauges [CV in Table 2], and electronic contact cleaning [ECC in Table 2]. Gauge parts and loggers may have to be replaced during some of the visits if less-than-acceptable conditions show no signs of improvement, as noted in the previous section description.

Details of every gauge visit along with each gauge precipitation record will be posted online and shall contain sub-folders for each gauge that consist of the individual data files (often having at least two different formats), pictures taken at the gauge site during the visit, screenshots of the GPS (laptop) and ML1 logger time comparison, and a MS Word document that mirrors the notes made in the field journal during the visit.

The technician roster during the 2019-2020 academic year consisted of Meredith Avison, Marlee Burgess, Lyn Comer, Andrew Hill, Alice Monroe, Samuel Peterson, and Samantha Wood. New undergraduate research students at UNC Asheville will be recruited as field technicians for the Duke GSMRGN project in the fall 2020.

Table 3: The Duke Great Smoky Mountain Rain Gauge Network is currently (valid as of 20 May 2020) composed of 32 tipping bucket rain gauges.

Gauge #	Location	Latitude	Longitude	Altitude
RG002	Lickstone Bald	35°25.5’ N	82°58.2’ W	5680 ft.
RG003	High Top	35°23.0’ N	82°54.9’ W	5280 ft.
RG004	Lickstone Ridge S	35°22.0’ N	82°59.4’ W	6305 ft.
RG005	Deep Gap	35°24.5’ N	82°57.8’ W	4986 ft.
RG008	Double Summer Gap	35°22.9’ N	82°58.4’ W	5700 ft.
RG010	Beaty Summer Gap	35°27.3’ N	82°56.8’ W	4849 ft.
RG011	near Deep Gap	35º23.7’ N	82º54.9’ W	4081 ft.
RG100T	Purchase Knob	35°35.1’ N	83°04.3’ W	4905 ft.
RG101	The Swag	35°34.5’ N	83°05.2’ W	4986 ft.
RG102	Hemphill Bald	35°33.8’ N	83°06.2’ W	5365 ft.
RG103	JR Property	35°33.2’ N	83°07.0’ W	5539 ft.
RG104	Cat. Ski Area	35˚33.2’ N	83˚05.2’ W	5208 ft.
RG105	KH Property	35°38.0’ N	83°02.4’ W	4412 ft
RG106	Pinnacle Ridge	35°25.9’ N	83°01.7’ W	3969 ft
RG107	Lookout Point	35°34.0’ N	82°54.4’ W	4459 ft
RG108	Utah Mountain	35°33.2’ N	82°59.3’ W	4188 ft
RG109	Eaglesnest Ridge	35°29.7’ N	83°02.4’ W	4922 ft
RG110	JH Property	35°32.8’ N	83°08.8’ W	5128 ft
RG111	Hurricane Ridge	35°43.7’ N	82°56.8’ W	4573 ft
RG112	Ore Knob	35°45.0’ N	82°57.8’ W	3884 ft
RG300	Camel Hump Knob	35°43.5’ N	83°13.0’W	5110 ft
RG301	Mt Guyot	35°42.3’N	83°15.3’W	6570 ft
RG302	Snake Den Ridge	35°43.2’N	83°14.8’W	6104 ft
RG303s	Mt Cammerer	35°45.7’N	83°09.7’W	4887 ft
RG304	Big Cataloochee	35°40.2’N	83°10.9’W	5971 ft

RG305	Mt Sterling 1	35°41.4’N	83°07.9’W	5349 ft
RG306	Sunup Knob	35°44.7’N	83°10.2’W	5039 ft
RG307	Balsam Mountain	35°39.0’N	83°11.9’W	5327 ft
RG308	Cosby Knob	35°43.8’ N	83°10.9’W	4826 ft
RG309	Mt Sterling 2	35°40.9’N	83°09.0’W	5262 ft
RG310	Mt Sterling 3	35°42.1’N	83°07.3’W	5761 ft
RG311	Big Creek	35°45.9’N	83°08.4’W	3398 ft

Appendix A

These data are preliminary and have not undergone final quality control by the National Climatic Data Center (NCDC). Therefore, these data are subject to revision. Final and certified climate data can be accessed at the NCDC - http://www.ncdc.noaa.gov.

WFO Monthly/Daily Climate Data

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CXUS52 KGSP 011659
CF6AVL

PRELIMINARY LOCAL CLIMATOLOGICAL DATA (WS FORM: F-6)

                                          STATION:   ASHEVILLE NC
                                          MONTH:     OCTOBER
                                          YEAR:      2019
                                          LATITUDE:   35 25 N
                                          LONGITUDE:  82 33 W

  TEMPERATURE IN F:        :PCPN:    SNOW:  WIND       :SUNSHINE: SKY      :PK WND
==============================================================================
1   2   3   4   5  6A  6B    7    8   9   10  11  12  13   14  15   16   17  18
                                     12Z  AVG MX 2MIN
DY MAX MIN AVG DEP HDD CDD  WTR  SNW DPTH SPD SPD DIR MIN PSBL S-S WX    SPD DR
==============================================================================

 1  89  67  78  17   0  13 0.00  0.0    0  2.4 10  80   M    M   6 128    15 320
 2  91  65  78  17   0  13 0.00  0.0    0  3.7 15  10   M    M   3 128    19 340
 3  91  61  76  16   0  11 0.00  0.0    0  2.3 14 340   M    M   0 1      17 320
 4  89  59  74  14   0   9 0.00  0.0    0  6.1 16 340   M    M   0        20 340
 5  69  56  63   3   2   0    T  0.0    0  5.0 10 160   M    M   9 18     17 110
 6  69  56  63   4   2   0 0.00  0.0    0  4.7 10 170   M    M  10 18     12 170
 7  74  62  68   9   0   3    T  0.0    0  5.8 16 360   M    M   9        21 360
 8  69  60  65   6   0   0 0.67  0.0    0  3.8 13 340   M    M  10 1      15 340
 9  69  55  62   4   3   0 0.00  0.0    0  2.4 10 190   M    M   6 1      14 190
10  77  56  67   9   0   2 0.00  0.0    0  1.6 10 170   M    M   6 12     13 160
11  75  52  64   6   1   0 0.00  0.0    0  2.2 10 180   M    M   4 12     14 170
12  79  56  68  10   0   3 0.00  0.0    0  4.9 18 340   M    M   6        22 340
13  69  54  62   5   3   0 0.10  0.0    0  3.6 13 190   M    M   6 18     17 210
14  74  49  62   5   3   0 0.00  0.0    0  5.5 17 340   M    M   0        23 360
15  71  43  57   0   8   0 0.00  0.0    0  3.7 13 150   M    M   3        17 150
16  68  47  58   2   7   0 0.07  0.0    0 11.0 24 340   M    M   6 1      32 340
17  60  41  51  -5  14   0 0.00  0.0    0 13.8 25 340   M    M   0        33 340
18  68  39  54  -2  11   0 0.00  0.0    0  5.5 17 340   M    M   0        20 340
19  55  42  49  -6  16   0 1.42  0.0    0  2.4 10 160   M    M   6 1      12 170
20  72  52  62   7   3   0 0.02  0.0    0  9.5 26 340   M    M   5 1      32 330
21  66  55  61   6   4   0 0.00  0.0    0  4.4 13 140   M    M  10 1      19 150
22  69  45  57   3   8   0 1.36  0.0    0  8.7 25 350   M    M   5 18     35 340
23  64  40  52  -2  13   0 0.00  0.0    0  6.4 18 330   M    M   0        24 340
24  65  33  49  -5  16   0 0.00  0.0    0  1.6 10 160   M    M   1 12     15 160
25  61  45  53  -1  12   0 0.40  0.0    0  1.5  7 330   M    M   9 1       8 310
26  69  57  63  10   2   0 0.49  0.0    0  7.6 18 150   M    M  10 1      31 130
27  72  52  62   9   3   0 0.73  0.0    0 10.1 22 340   M    M   4 1      27 170
28  73  47  60   7   5   0 0.00  0.0    0  3.4 13 160   M    M   4 12     18 150
29  70  50  60   8   5   0 0.00  0.0    0  3.7 12 160   M    M   8 128    15 160
30  63  60  62  10   3   0 1.76  0.0    0  4.8 14 300   M    M  10 1      20 270
31  72  34  53   1  12   0 0.76  0.0    0 12.8 35 340   M    M   8 18     44 340
==============================================================================
SM 2222 1590       156  54  7.78     0.0 164.9          M      164
==============================================================================
AV 71.7 51.3                                5.3 FASTST   M    M   5    MAX(MPH)
                                 MISC ----->  # 35 340               # 44  340
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NOTES:
# LAST OF SEVERAL OCCURRENCES

COLUMN 17 PEAK WIND IN M.P.H.

PRELIMINARY LOCAL CLIMATOLOGICAL DATA (WS FORM: F-6) , PAGE 2

                                        STATION:  ASHEVILLE NC
                                        MONTH:    OCTOBER
                                        YEAR:     2019
                                        LATITUDE:   35 25 N
                                        LONGITUDE:  82 33 W

[TEMPERATURE DATA]      [PRECIPITATION DATA]       SYMBOLS USED IN COLUMN 16

AVERAGE MONTHLY: 61.5   TOTAL FOR MONTH:   7.78    1 = FOG OR MIST
DPTR FM NORMAL:   5.1   DPTR FM NORMAL:    4.87    2 = FOG REDUCING VISIBILITY
HIGHEST:    91 ON  3, 2 GRTST 24HR  2.24 ON 30-31      TO 1/4 MILE OR LESS
LOWEST:     33 ON 24                               3 = THUNDER
                        SNOW, ICE PELLETS, HAIL    4 = ICE PELLETS
                        TOTAL MONTH:   0.0 INCH    5 = HAIL
                        GRTST 24HR     0.0         6 = FREEZING RAIN OR DRIZZLE
                        GRTST DEPTH:   0           7 = DUSTSTORM OR SANDSTORM:
                                                       VSBY 1/2 MILE OR LESS
                                                   8 = SMOKE OR HAZE
[NO. OF DAYS WITH]      [WEATHER - DAYS WITH]      9 = BLOWING SNOW
                                                   X = TORNADO
MAX 32 OR BELOW:   0    0.01 INCH OR MORE:  11
MAX 90 OR ABOVE:   2    0.10 INCH OR MORE:   9
MIN 32 OR BELOW:   0    0.50 INCH OR MORE:   6
MIN  0 OR BELOW:   0    1.00 INCH OR MORE:   3

[HDD (BASE 65) ]
TOTAL THIS MO.   156    CLEAR  (SCALE 0-3)   9
DPTR FM NORMAL  -122    PTCLDY (SCALE 4-7)  14
TOTAL FM JUL 1   158    CLOUDY (SCALE 8-10)  8
DPTR FM NORMAL  -177

[CDD (BASE 65) ]
TOTAL THIS MO.    54
DPTR FM NORMAL    44    [PRESSURE DATA]
TOTAL FM JAN 1  1327    HIGHEST SLP 30.35 ON 24
DPTR FM NORMAL   465    LOWEST  SLP 29.69 ON 31

[REMARKS]
#FINAL-10-19#


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CXUS52 KGSP 011232
CF6AVL
PRELIMINARY LOCAL CLIMATOLOGICAL DATA (WS FORM: F-6)

                                        STATION:   ASHEVILLE NC
                                        MONTH:     NOVEMBER
                                        YEAR:      2019
                                        LATITUDE:   35 25 N
                                        LONGITUDE:  82 33 W

  TEMPERATURE IN F:       :PCPN:    SNOW:  WIND      :SUNSHINE: SKY     :PK WND
================================================================================
1   2   3   4   5  6A  6B    7    8   9   10  11  12  13   14  15   16   17  18
                                    12Z  AVG MX 2MIN
```

DY	MAX	MIN	AVG	DEP	HDD	CDD	WTR	SNW	DPTH	SPD	SPD	DIR	MIN	PSBL	S-S	WX	SPD	DR
1	55	32	44	-8	21	0	0.00	0.0	0	11.2	25	350	M	M	0		37	340
2	57	32	45	-6	20	0	0.00	0.0	0	6.2	20	360	M	M	3	12	27	10
3	57	34	46	-5	19	0	0.00	0.0	0	4.5	16	340	M	M	0		21	340
4	54	30	42	-9	23	0	0.00	0.0	0	3.2	13	160	M	M	1	1	17	150
5	67	39	53	3	12	0	0.00	0.0	0	6.0	17	340	M	M	3		22	340
6	65	38	52	2	13	0	0.00	0.0	0	5.0	17	340	M	M	0		19	140
7	65	38	52	2	13	0	0.12	0.0	0	6.2	18	350	M	M	5	1	25	360
8	50	29	40	-10	25	0	0.00	0.0	0	13.2	26	350	M	M	1		40	340
9	51	25	38	-11	27	0	0.00	0.0	0	2.8	10	160	M	M	0		14	130
10	66	29	48	-1	17	0	0.00	0.0	0	2.8	15	340	M	M	0		18	340
11	67	35	51	2	14	0	0.00	0.0	0	5.1	16	200	M	M	1	1	22	200
12	55	21	38	-10	27	0	0.23	T	0	23.0	36	340	M	M	8	146	47	350
13	42	18	30	-18	35	0	0.00	0.0	0	7.1	24	330	M	M	0		31	330
14	44	24	34	-14	31	0	T	0.0	0	3.5	9	360	M	M	5		13	360
15	56	37	47	-1	18	0	0.02	0.0	0	8.7	17	350	M	M	2		23	340
16	62	37	50	3	15	0	0.00	0.0	0	7.2	20	340	M	M	2		23	360
17	61	36	49	2	16	0	0.00	0.0	0	3.4	13	160	M	M	4		20	160
18	55	40	48	2	17	0	0.00	0.0	0	3.6	13	160	M	M	6	1	17	160
19	56	40	48	2	17	0	T	0.0	0	7.3	16	340	M	M	4		21	330
20	53	37	45	-1	20	0	0.00	0.0	0	9.3	26	340	M	M	4		34	340
21	64	32	48	2	17	0	0.00	0.0	0	3.6	13	170	M	M	1		19	160
22	66	42	54	9	11	0	T	0.0	0	4.4	20	340	M	M	7	1	23	330
23	54	45	50	5	15	0	1.36	0.0	0	5.6	23	340	M	M	10	13	28	340
24	46	35	41	-4	24	0	0.00	0.0	0	13.1	24	340	M	M	4		31	340
25	60	31	46	2	19	0	0.00	0.0	0	3.2	10	340	M	M	1	1	15	330
26	61	31	46	2	19	0	0.00	0.0	0	3.7	12	180	M	M	0	2	16	130
27	76	48	62	18	3	0	0.22	0.0	0	9.0	23	320	M	M	5	18	30	320
28	58	39	49	5	16	0	0.00	0.0	0	15.2	26	350	M	M	1		36	360
29	61	44	53	10	12	0	T	0.0	0	6.5	14	340	M	M	9		18	340
30	60	45	53	10	12	0	0.62	0.0	0	4.3	13	160	M	M	8	13	17	180
SM	1744	1043			548	0	2.57	T		207.9			M		95			
AV	58.1	34.8								6.9	FASTST		M	M	3		MAX(MPH)	
								MISC ---->		# 36	340						# 47	350

NOTES:
LAST OF SEVERAL OCCURRENCES

COLUMN 17 PEAK WIND IN M.P.H.

PRELIMINARY LOCAL CLIMATOLOGICAL DATA (WS FORM: F-6) , PAGE 2

STATION: ASHEVILLE NC
MONTH: NOVEMBER
YEAR: 2019
LATITUDE: 35 25 N
LONGITUDE: 82 33 W

[TEMPERATURE DATA]

AVERAGE MONTHLY: 46.5
DPTR FM NORMAL: -0.8
HIGHEST: 76 ON 27
LOWEST: 18 ON 13

[PRECIPITATION DATA]

TOTAL FOR MONTH: 2.57
DPTR FM NORMAL: -1.08
GRTST 24HR 1.36 ON 23-23

SNOW, ICE PELLETS, HAIL
TOTAL MONTH: T
GRTST 24HR T ON 12-12
GRTST DEPTH: 0

SYMBOLS USED IN COLUMN 16

1 = FOG OR MIST
2 = FOG REDUCING VISIBILITY TO 1/4 MILE OR LESS
3 = THUNDER
4 = ICE PELLETS
5 = HAIL
6 = FREEZING RAIN OR DRIZZLE
7 = DUSTSTORM OR SANDSTORM: VSBY 1/2 MILE OR LESS
8 = SMOKE OR HAZE
9 = BLOWING SNOW
X = TORNADO

[NO. OF DAYS WITH]

MAX 32 OR BELOW: 0

[WEATHER - DAYS WITH]

0.01 INCH OR MORE: 6

MAX 90 OR ABOVE: 0 0.10 INCH OR MORE: 5
MIN 32 OR BELOW: 12 0.50 INCH OR MORE: 2
MIN 0 OR BELOW: 0 1.00 INCH OR MORE: 1

[HDD (BASE 65)]
TOTAL THIS MO. 548 CLEAR (SCALE 0-3) 17
DPTR FM NORMAL 16 PTCLDY (SCALE 4-7) 10
TOTAL FM JUL 1 706 CLOUDY (SCALE 8-10) 3
DPTR FM NORMAL -161

[CDD (BASE 65)]
TOTAL THIS MO. 0
DPTR FM NORMAL -1 [PRESSURE DATA]
TOTAL FM JAN 1 1327 HIGHEST SLP 30.42 ON 6
DPTR FM NORMAL 464 LOWEST SLP 29.62 ON 23

[REMARKS]
#FINAL-11-19#

000
CXUS52 KGSP 011547
CF6AVL
PRELIMINARY LOCAL CLIMATOLOGICAL DATA (WS FORM: F-6)

STATION: ASHEVILLE NC
MONTH: DECEMBER
YEAR: 2019
LATITUDE: 35 25 N
LONGITUDE: 82 33 W

TEMPERATURE IN F:							:PCPN:		SNOW:	WIND			:SUNSHINE:		SKY		:PK WND	
1	2	3	4	5	6A	6B	7	8	9	10	11	12	13	14	15	16	17	18
									12Z	AVG MX 2MIN								
DY	MAX	MIN	AVG	DEP	HDD	CDD	WTR	SNW	DPTH	SPD	SPD	DIR	MIN	PSBL	S-S	WX	SPD	DR
1	66	44	55	12	10	0	0.58	0.0	0	9.1	26	240	M	M	6	13	40	240
2	44	33	39	-3	26	0	T	T	0	17.8	33	330	M	M	8		44	340
3	43	31	37	-5	28	0	0.00	0.0	0	14.4	24	330	M	M	4		32	340
4	57	31	44	2	21	0	0.00	0.0	0	14.5	29	330	M	M	0		38	330
5	58	32	45	3	20	0	0.00	0.0	0	7.9	29	330	M	M	0		39	330
6	56	32	44	3	21	0	T	0.0	0	1.5	9	340	M	M	8		12	360
7	57	32	45	4	20	0	0.00	0.0	0	3.2	10	160	M	M	4		14	160
8	49	39	44	3	21	0	0.00	0.0	0	7.9	14	170	M	M	7		18	150
9	56	37	47	6	18	0	0.23	0.0	0	9.2	21	190	M	M	8	1	29	210
10	57	34	46	6	19	0	0.43	0.0	0	11.9	29	340	M	M	9	18	35	340
11	42	28	35	-5	30	0	0.03	T	0	13.3	29	330	M	M	2	146	37	330
12	43	22	33	-7	32	0	0.04	0.0	0	5.5	14	170	M	M	2		18	170
13	43	32	38	-2	27	0	0.54	0.0	0	2.2	9	110	M	M	10	1	13	130
14	51	34	43	3	22	0	0.36	0.0	0	7.9	24	330	M	M	7	1	34	330
15	57	30	44	5	21	0	0.00	0.0	0	4.2	16	340	M	M	0	1	20	340
16	65	35	50	11	15	0	0.01	0.0	0	6.4	21	170	M	M	5	1	26	180
17	61	32	47	8	18	0	0.62	0.0	0	15.6	40	340	M	M	8	13	48	340
18	42	26	34	-5	31	0	0.00	0.0	0	15.1	35	330	M	M	0		47	340
19	51	25	38	-1	27	0	0.00	0.0	0	6.1	20	340	M	M	0		25	350
20	54	23	39	1	26	0	0.00	0.0	0	1.5	8	130	M	M	0		11	140
21	52	32	42	4	23	0	0.00	0.0	0	2.4	10	160	M	M	4		13	160
22	45	33	39	1	26	0	0.53	0.0	0	2.4	10	350	M	M	7	1	13	360
23	53	45	49	11	16	0	0.52	0.0	0	5.1	13	10	M	M	10	1	19	30
24	67	38	53	15	12	0	T	0.0	0	4.9	13	340	M	M	5	1	16	340
25	61	30	46	8	19	0	0.00	0.0	0	1.2	9	150	M	M	1	1	13	160
26	65	31	48	10	17	0	0.00	0.0	0	1.8	9	170	M	M	0	1	13	170
27	63	31	47	9	18	0	0.00	0.0	0	0.7	6	180	M	M	1	1	8	170
28	66	35	51	14	14	0	T	0.0	0	2.9	12	130	M	M	4	1	17	180

```
29  65  54  60  23   5   0 0.34  0.0    0  7.6 29 180   M    M   9 1      42 180
30  65  43  54  17  11   0 0.06  0.0    0 10.7 24 190   M    M   2 1      33 190
31  50  37  44   7  21   0 0.00  0.0    0 11.2 17 350   M    M   0        22 330
================================================================================
SM 1704 1041       635   0  4.29    T    226.1          M      131
================================================================================
AV 55.0 33.6                                 7.3 FASTST   M    M   4    MAX(MPH)
                                  MISC ---->  # 40 340               # 48  340
================================================================================
```

NOTES:
LAST OF SEVERAL OCCURRENCES

COLUMN 17 PEAK WIND IN M.P.H.

PRELIMINARY LOCAL CLIMATOLOGICAL DATA (WS FORM: F-6) , PAGE 2

STATION: ASHEVILLE NC
MONTH: DECEMBER
YEAR: 2019
LATITUDE: 35 25 N
LONGITUDE: 82 33 W

[TEMPERATURE DATA]

AVERAGE MONTHLY: 44.3
DPTR FM NORMAL: 4.9
HIGHEST: 67 ON 24
LOWEST: 22 ON 12

[PRECIPITATION DATA]

TOTAL FOR MONTH: 4.29
DPTR FM NORMAL: 0.70
GRTST 24HR 0.62 ON 30- 1

SNOW, ICE PELLETS, HAIL
TOTAL MONTH: T
GRTST 24HR T ON 11-11
GRTST DEPTH: 0

SYMBOLS USED IN COLUMN 16

1 = FOG OR MIST
2 = FOG REDUCING VISIBILITY TO 1/4 MILE OR LESS
3 = THUNDER
4 = ICE PELLETS
5 = HAIL
6 = FREEZING RAIN OR DRIZZLE
7 = DUSTSTORM OR SANDSTORM: VSBY 1/2 MILE OR LESS
8 = SMOKE OR HAZE
9 = BLOWING SNOW
X = TORNADO

[NO. OF DAYS WITH]

MAX 32 OR BELOW: 0
MAX 90 OR ABOVE: 0
MIN 32 OR BELOW: 17
MIN 0 OR BELOW: 0

[WEATHER - DAYS WITH]

0.01 INCH OR MORE: 13
0.10 INCH OR MORE: 9
0.50 INCH OR MORE: 5
1.00 INCH OR MORE: 0

[HDD (BASE 65)]
TOTAL THIS MO. 635
DPTR FM NORMAL -159
TOTAL FM JUL 1 1341
DPTR FM NORMAL -320

[CDD (BASE 65)]
TOTAL THIS MO. 0
DPTR FM NORMAL 0
TOTAL FM JAN 1 1327
DPTR FM NORMAL 464

CLEAR (SCALE 0-3) 13
PTCLDY (SCALE 4-7) 14
CLOUDY (SCALE 8-10) 4

[PRESSURE DATA]
HIGHEST SLP 30.62 ON 12
LOWEST SLP 29.45 ON 1

[REMARKS]
#FINAL-12-19#

290
CXUS52 KGSP 011922
CF6AVL

PRELIMINARY LOCAL CLIMATOLOGICAL DATA (WS FORM: F-6)

STATION: ASHEVILLE NC
MONTH: JANUARY
YEAR: 2020

LATITUDE: 35 25 N
LONGITUDE: 82 33 W

TEMPERATURE IN F:							:PCPN:		SNOW:	WIND			:SUNSHINE:			SKY		:PK WND	
1	2	3	4	5	6A	6B	7	8	9	10	11	12	13	14	15	16	17	18	
									12Z	AVG	MX	2MIN							
DY	MAX	MIN	AVG	DEP	HDD	CDD	WTR	SNW	DPTH	SPD	SPD	DIR	MIN	PSBL	S-S	WX	SPD	DR	
1	51	32	42	5	23	0	0.00	0.0	0	7.8	18	320	M	M	0		24	340	
2	46	32	39	2	26	0	0.56	0.0	0	3.6	13	140	M	M	6	1	17	140	
3	59	45	52	15	13	0	0.27	0.0	0	4.7	18	170	M	M	8	1	23	190	
4	55	34	45	8	20	0	0.07	T	0	10.6	29	340	M	M	9	1	40	320	
5	47	30	39	2	26	0	T	T	0	9.3	26	330	M	M	2		35	320	
6	55	33	44	7	21	0	0.00	0.0	0	7.2	17	340	M	M	1		23	310	
7	50	36	43	6	22	0	0.09	0.0	0	8.0	29	330	M	M	6	13	40	340	
8	56	31	44	7	21	0	0.00	0.0	0	6.9	29	340	M	M	0		38	340	
9	54	26	40	3	25	0	0.00	0.0	0	6.0	15	140	M	M	2		21	160	
10	60	45	53	16	12	0	0.09	0.0	0	7.0	14	180	M	M	9	1	18	130	
11	66	54	60	23	5	0	1.54	0.0	0	12.9	36	170	M	M	10	13	44	200	
12	68	47	58	21	7	0	0.00	0.0	0	7.1	20	200	M	M	1		24	180	
13	60	47	54	17	11	0	0.13	0.0	0	2.4	14	140	M	M	7	1	21	140	
14	61	52	57	20	8	0	0.41	0.0	0	2.7	17	310	M	M	6	13	21	310	
15	67	50	59	22	6	0	T	0.0	0	2.9	12	190	M	M	8	12	15	200	
16	57	40	49	12	16	0	0.00	0.0	0	12.3	25	350	M	M	2	12	37	360	
17	46	34	40	3	25	0	0.00	0.0	0	10.4	25	350	M	M	3		35	340	
18	48	33	41	4	24	0	0.14	0.0	0	9.0	23	180	M	M	8	18	29	180	
19	46	24	35	-2	30	0	0.00	0.0	0	17.9	32	330	M	M	1	1	39	340	
20	29	21	25	-12	40	0	T	T	0	17.1	29	330	M	M	3		34	330	
21	31	20	26	-11	39	0	T	T	0	14.7	24	340	M	M	5		31	330	
22	46	17	32	-5	33	0	0.00	0.0	0	3.5	14	350	M	M	0		19	350	
23	51	27	39	2	26	0	0.02	0.0	0	4.8	13	170	M	M	5		16	120	
24	44	35	40	3	25	0	1.32	0.0	0	5.9	12	210	M	M	9	1	14	340	
25	43	32	38	1	27	0	0.00	0.0	0	9.8	21	340	M	M	5	12	25	350	
26	48	29	39	2	26	0	0.00	0.0	0	9.1	20	340	M	M	3		25	330	
27	47	32	40	2	25	0	0.07	0.0	0	5.6	26	320	M	M	8	1	34	330	
28	52	35	44	6	21	0	0.00	0.0	0	10.1	18	340	M	M	0		24	340	
29	48	29	39	1	26	0	0.00	0.0	0	2.6	10	150	M	M	6		13	160	
30	51	37	44	6	21	0	0.00	0.0	0	4.1	12	160	M	M	8		15	170	
31	41	33	37	-1	28	0	0.20	0.6	0	2.6	10	170	M	M	10	12	13	170	
SM	1583	1072			678	0	4.91		0.6	238.6			M		151				
AV	51.1	34.6								7.7	FASTST		M	M	5		MAX(MPH)		
								MISC ---->		# 36	170					# 44	200		

NOTES:
LAST OF SEVERAL OCCURRENCES

COLUMN 17 PEAK WIND IN M.P.H.

PRELIMINARY LOCAL CLIMATOLOGICAL DATA (WS FORM: F-6) , PAGE 2

STATION: ASHEVILLE NC
MONTH: JANUARY
YEAR: 2020
LATITUDE: 35 25 N
LONGITUDE: 82 33 W

[TEMPERATURE DATA]
AVERAGE MONTHLY: 42.8
DPTR FM NORMAL: 5.7
HIGHEST: 68 ON 12
LOWEST: 17 ON 22

[PRECIPITATION DATA]
TOTAL FOR MONTH: 4.91
DPTR FM NORMAL: 1.24
GRTST 24HR 1.58 ON 10-11

SNOW, ICE PELLETS, HAIL

SYMBOLS USED IN COLUMN 16
1 = FOG OR MIST
2 = FOG REDUCING VISIBILITY TO 1/4 MILE OR LESS
3 = THUNDER
4 = ICE PELLETS

TOTAL MONTH: 0.6 INCH
GRTST 24HR 0.6 ON 31-31
GRTST DEPTH: 0

5 = HAIL
6 = FREEZING RAIN OR DRIZZLE
7 = DUSTSTORM OR SANDSTORM: VSBY 1/2 MILE OR LESS
8 = SMOKE OR HAZE
9 = BLOWING SNOW
X = TORNADO

[NO. OF DAYS WITH]

MAX 32 OR BELOW: 2
MAX 90 OR ABOVE: 0
MIN 32 OR BELOW: 14
MIN 0 OR BELOW: 0

[WEATHER - DAYS WITH]

0.01 INCH OR MORE: 13
0.10 INCH OR MORE: 8
0.50 INCH OR MORE: 3
1.00 INCH OR MORE: 2

[HDD (BASE 65)]
TOTAL THIS MO. 678
DPTR FM NORMAL -188
TOTAL FM JUL 1 2019
DPTR FM NORMAL -508

CLEAR (SCALE 0-3) 12
PTCLDY (SCALE 4-7) 12
CLOUDY (SCALE 8-10) 7

[CDD (BASE 65)]
TOTAL THIS MO. 0
DPTR FM NORMAL 0
TOTAL FM JAN 1 0
DPTR FM NORMAL 0

[PRESSURE DATA]
HIGHEST SLP 30.64 ON 9
LOWEST SLP 29.74 ON 4

[REMARKS]
#FINAL-01-20#

000
CXUS52 KGSP 011650
CF6AVL

PRELIMINARY LOCAL CLIMATOLOGICAL DATA (WS FORM: F-6)

STATION: ASHEVILLE NC
MONTH: FEBRUARY
YEAR: 2020
LATITUDE: 35 25 N
LONGITUDE: 82 33 W

TEMPERATURE IN F:							:PCPN:		SNOW:	WIND			:SUNSHINE:		SKY		:PK WND	
1	2	3	4	5	6A	6B	7	8	9	10	11	12	13	14	15	16	17	18
									12Z	AVG	MX	2MIN						
DY	MAX	MIN	AVG	DEP	HDD	CDD	WTR	SNW	DPTH	SPD	SPD	DIR	MIN	PSBL	S-S	WX	SPD	DR
1	50	34	42	4	23	0	0.03	0.0	0	6.6	20	340	M	M	9	12	24	330
2	66	33	50	12	15	0	0.00	0.0	0	6.0	17	330	M	M	0		23	320
3	71	33	52	14	13	0	0.00	0.0	0	2.5	12	170	M	M	0		15	210
4	63	51	57	19	8	0	T	0.0	0	4.2	13	190	M	M	7		18	200
5	61	55	58	19	7	0	0.52	0.0	0	6.5	20	180	M	M	10	1	29	190
6	59	55	57	18	8	0	3.35	0.0	0	5.1	13	170	M	M	10	13	16	170
7	56	28	42	3	23	0	0.35	T	0	12.3	22	290	M	M	7	1	30	300
8	36	25	31	-8	34	0	0.07	0.5	0	6.6	18	350	M	M	5	1	26	340
9	50	27	39	0	26	0	0.00	0.0	0	5.3	13	160	M	M	5	12	21	150
10	55	37	46	7	19	0	0.32	0.0	0	9.2	17	190	M	M	7	1	24	180
11	66	50	58	18	7	0	0.28	0.0	0	10.9	22	340	M	M	6	1	31	340
12	56	46	51	11	14	0	0.14	0.0	0	6.7	23	340	M	M	10	18	30	350
13	65	36	51	11	14	0	1.17	0.0	0	10.7	26	340	M	M	6	13	36	340
14	43	29	36	-4	29	0	0.00	0.0	0	14.3	29	340	M	M	0		35	340
15	47	23	35	-5	30	0	0.00	0.0	0	5.7	14	140	M	M	0	8	19	120
16	46	31	39	-1	26	0	0.00	0.0	0	1.1	7	330	M	M	7		9	140
17	59	30	45	4	20	0	0.00	0.0	0	4.6	15	120	M	M	1	1	24	140
18	58	47	53	12	12	0	0.25	0.0	0	5.7	14	160	M	M	10	18	18	170

19	53	43	48	7	17	0	0.03	0.0	0	9.4	24	340	M	M	9	1	29	330
20	43	32	38	-3	27	0	0.27	0.8	0	6.8	25	330	M	M	10	1	31	330
21	41	26	34	-8	31	0	0.00	0.0	0	13.0	25	340	M	M	2		31	320
22	56	23	40	-2	25	0	0.00	0.0	0	3.2	13	330	M	M	0		16	330
23	59	26	43	1	22	0	0.00	0.0	0	2.6	15	200	M	M	3		21	210
24	47	43	45	3	20	0	0.31	0.0	0	5.0	14	210	M	M	10	1	19	150
25	63	44	54	12	11	0	0.11	0.0	0	5.1	16	210	M	M	5	1	19	210
26	60	34	47	4	18	0	T	0.0	0	6.5	26	310	M	M	6	12	33	310
27	45	28	37	-6	28	0	T	T	T	13.9	29	330	M	M	4		41	330
28	46	26	36	-7	29	0	0.00	0.0	0	4.0	18	340	M	M	4		25	260
29	43	30	37	-6	28	0	0.05	1.1	1	10.7	25	340	M	M	3	1	35	320
SM	1563	1025		584		0	7.25		2.4	204.2			M		156			
AV	53.9	35.3								7.0	FASTST		M	M	5		MAX(MPH)	
								MISC ---->		# 29	340					# 41	330	

NOTES:
LAST OF SEVERAL OCCURRENCES

COLUMN 17 PEAK WIND IN M.P.H.

PRELIMINARY LOCAL CLIMATOLOGICAL DATA (WS FORM: F-6) , PAGE 2

STATION: ASHEVILLE NC
MONTH: FEBRUARY
YEAR: 2020
LATITUDE: 35 25 N
LONGITUDE: 82 33 W

[TEMPERATURE DATA]
AVERAGE MONTHLY: 44.6
DPTR FM NORMAL: 4.3
HIGHEST: 71 ON 3
LOWEST: 23 ON 22,15

[PRECIPITATION DATA]
TOTAL FOR MONTH: 7.25
DPTR FM NORMAL: 3.49
GRTST 24HR 3.40 ON 6- 7

SNOW, ICE PELLETS, HAIL
TOTAL MONTH: 2.4 INCHES
GRTST 24HR 1.1 ON 29-29
GRTST DEPTH: 1 ON 29

SYMBOLS USED IN COLUMN 16
1 = FOG OR MIST
2 = FOG REDUCING VISIBILITY TO 1/4 MILE OR LESS
3 = THUNDER
4 = ICE PELLETS
5 = HAIL
6 = FREEZING RAIN OR DRIZZLE
7 = DUSTSTORM OR SANDSTORM: VSBY 1/2 MILE OR LESS
8 = SMOKE OR HAZE
9 = BLOWING SNOW
X = TORNADO

[NO. OF DAYS WITH]
MAX 32 OR BELOW: 0
MAX 90 OR ABOVE: 0
MIN 32 OR BELOW: 14
MIN 0 OR BELOW: 0

[WEATHER - DAYS WITH]
0.01 INCH OR MORE: 15
0.10 INCH OR MORE: 11
0.50 INCH OR MORE: 3
1.00 INCH OR MORE: 2

[HDD (BASE 65)]
TOTAL THIS MO. 584
DPTR FM NORMAL -106
TOTAL FM JUL 1 2603
DPTR FM NORMAL -636

CLEAR (SCALE 0-3) 7
PTCLDY (SCALE 4-7) 14
CLOUDY (SCALE 8-10) 8

[CDD (BASE 65)]
TOTAL THIS MO. 0
DPTR FM NORMAL 0
TOTAL FM JAN 1 0
DPTR FM NORMAL 0

[PRESSURE DATA]
HIGHEST SLP 30.54 ON 15
LOWEST SLP 29.16 ON 7

[REMARKS]
#FINAL-02-20#