NWS FORM E-5 U. S. DEPARTMENT OF COMMERCE |HSA OFFICE: RNK
NOAA, NATIONAL WEATHER SERVICE BLACKSBURG, VA

MONTHLY REPORT OF RIVER/FLOOD CONDITIONS

TO: NATIONAL WEATHER SERVICE
HYDROMETEOROLOGICAL INFO CENTER
1325 EAST-WEST HIGHWAY
SILVER SPRING, MD 20910

| **REPORT FOR:**
| **December 2010**

| **Date: 1/11/11**

|**Signature:** Peter Corrigan

Summary: Minor river flooding and some flash flooding occurred on the 1st due to widespread moderate to heavy rains on November 30-December 1, but this was the extent of significant hydrologic activity during the month. The rest of the month in the Blacksburg Hydrologic Service Area (HSA) saw sporadic light to moderate snowfall events and very cold temperatures. Monthly precipitation ranged from a low of 1.66" at Concord (CONV2) in Campbell County, VA to a high of 6.48" at Boone 1SE (BOON7) in Watauga County, NC. The mean monthly precipitation was 3.47" versus the December long-term mean of 3.12" (1971-2000 data) or 111 percent of average. The salient weather feature for the month was consistent, if not extreme, cold temperatures. Monthly means ranged from a low of 25.5°F at Bluefield (-11.1°) to a high of 33.0°F at Danville (-7.1°). At all five official climate sites it was among the 5 coldest Decembers on record. For Bluefield it was the 3rd coldest December on record (since 1959) and even at Lynchburg with records back to 1893 it ranked as the 5th coldest at 30.4°F (-7.8°).

A major storm affected the eastern U.S. during the period from November 30-December 1 a powerful upper low and surface system moved into the Great Lakes providing an extended period of deep southerly flow across the region. Precipitable water values were extremely high for very early December, running from 1.3 to 1.6 inches or nearly 200 percent of normal. A Flash Flood Watch was issued early on November 29th for the western portions of the forecast area as low pressure was forecast to bring widespread 2 to 3 inch rains across the area. Precipitation developed late on the 29th and produced moderate rains (0.25 to 0.50") across the western HSA for the 24 hours ending 12Z on the 30th. Heavier and more widespread precipitation developed on the evening of the 30th into the early morning hours of the 1st. As the rainfall intensity increased to 0.25" to 0.50" per hour during the evening of the 30th, the first of several Flash Flood Warnings (FFW) was issued at 832 PM for Ashe and Watauga counties, followed by another FFW for areas to the east including parts of Ashe, Watauga, Alleghany, Surry and Wilkes counties. The heavy rains spread across far southwest Virginia and prompted FFWs for parts of Smyth, Grayson, Tazewell, Bland, Patrick, Carroll and Floyd counties. There were several reports of flash flooding within these areas including a water rescue in Galax where a woman drove her vehicle into flood waters. As shown in Figure 1 total precipitation ranged from around 1 inch in the far southeast piedmont to over 5 inches in parts of the Blue Ridge. Due to the generally dry antecedent conditions across much of the area (November precipitation <50% of normal in the most of the western mountains) the riverine hydrologic response to this heavy rainfall was fairly tame. Numerous rivers had significant rises exceeding Action Stage and a few non-forecast points actually exceeded flood stage, including the Calfpasture River near Clifton Forge (COWV2) and Buffalo Creek at Murat (MURV2). Impacts appear to have been minimal with mainly some agricultural

land flooding. No River Flood Warnings were issued although numerous River Statements discussed the sharp within-bank rises forecast on rivers across the area.

Table 1 – Top ten 36-hour precipitation amounts: RNK HSA – valid 12Z, December 1, 2010

SHEF ID	Station	County	Type	Precipitation
SPAN7	Little R/Sparta	Alleghany	IFLOWS	6.16
LRLN7	Laurel Springs	Ashe	RAWS	6.13
FOSN7	Watauga R./Foscoe	Watauga	IFLOWS	5.88
FYGV2	Fancy Gap	Carroll	IFLOWS	5.43
BLCV2	Devils Knob	Nelson	IFLOWS	5.35
PPGV2	Pipers Gap	Carroll	IFLOWS	5.31
WLBN7	Wilbar	Wilkes	DCP	5.21
MONV2	Montebello FH	Nelson	IFLOWS	5.20
RAVN7	Raven Knob	Surry	RAWS	4.61
TPTN7	Triplett	Watauga	DCP	4.52

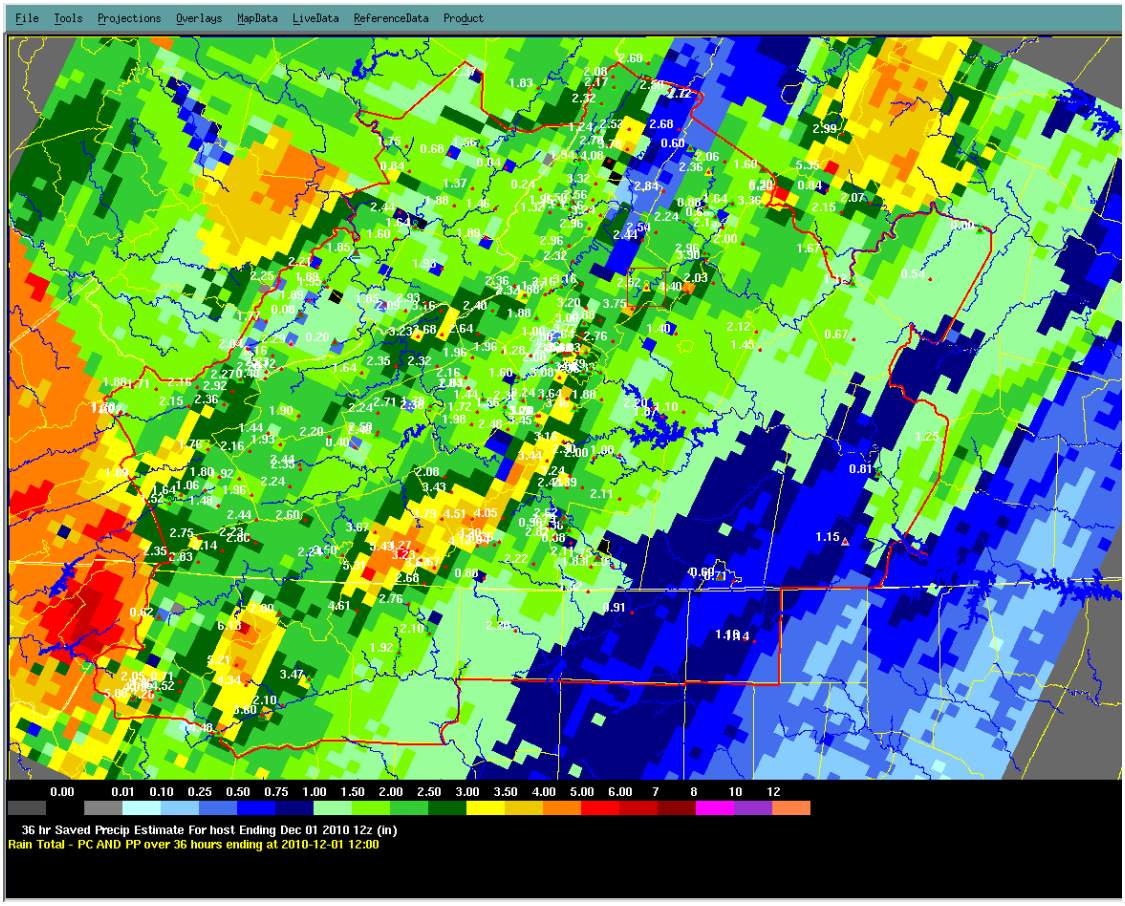

Figure 1. 36-hour MPE Rainfall (with rain gages) RNK HSA – 12Z, December 1, 2010

Much of the remainder of December was characterized by very cold temperature with along with several light to moderate precipitation events that fell primarily as snow or mixed precipitation. The most significant events were December 4-5, 15-16 and December 25-26. The initial event occurring primarily on December 4th was an 'Alberta clipper' type storm that dropped 3 to 6 inches of snow in the west and 1 to 3 in the eastern HSA. Liquid equivalents were modest, generally 0.50" or less. In the December 15-16 event snow, sleet and freezing rain fell across the area as low pressure tracked out of the southern Plains across the Tennessee Valley. Snowfall ranged from less than 1 inch in the far south to over 6 inches in the northwest, with varying amounts of ice and some rain. Liquid equivalents from the storm were generally 0.25 to 0.75 inches. Very cold temperatures and northwest flow snow showers continued for several days following this storm adding significant snow to favored mountain locations. The December 25-26 event brought snowfall on Christmas Day with storm total snow amounts ranging from less than 2 inches in the north to over 6 inches in the far south (Yadkin, Wilkes counties). Additional upslope snows in the arctic air that plunged in behind the storm affected the far western HSA with up to 8 inches of new snow (Tazewell, Greenbrier counties).

2010 Annual Hydrologic Summary

For the 65 NWS Cooperative stations in the Blacksburg Hydrologic Service Area (HSA) with complete monthly records in 2010, the average annual precipitation was 43.05 inches. This was just slightly below the 1971-2000 mean of 44.55 inches or 97 percent of the mean. The median value was 43.38". Annual totals ranged from a low of 30.14" at Alderson (ALDW2) in Greenbrier County, WV to a maximum of 59.16" at Meadows of Dan (MODV2) in Patrick County, VA. The driest month was November (1.98") and the wettest August (5.20").

The first two weeks of 2010 began with persistently very cold temperatures, followed by a rain event of 1 to 2.5" January 14-16 with extensive snowmelt and some minor river flooding. A significant ice jam flood developed on the New River near Galax, VA, an infrequent occurrence in recent years in the Blacksburg HSA. Another storm with heavy rains of 2 to 5 inches impacted most of the area January 24-25 causing some of the most widespread river flooding seen since September 2004. River crests were mainly in the minor to moderate flood category, but a number of water rescues were needed and several mudslides were reported. February was another cold month with temperatures well below normal but only one notable hydrologic event, on February 5-6. Mainly snow (6 to 12 inches) fell in the mountains but rainfall further east cause enough runoff to produce minor flooding on the Dan River.

March started out cold with the long term snow cover persisting into the first 10 days. Warming temperatures and melting snow then combined with moderate to heavy rainfall (up to 3 inches) across the western HSA March 12-13 to produce record flooding and flash flooding across parts of the New River basin in southwest Virginia and southeast West Virginia. Numerous evacuations were required and damage was extensive, probably exceeding $6 million. A new record flood stage was established on the Bluestone River at Pipestemin Mercer County, WV. In Giles County, VA both Wolf Creek at Narrows (WOLV2) and Walker Creek near Bane (BANV2) reached their 3rd highest stage on record. March ended with some flash flooding from training thunderstorms over portions of the Dan River basin, which led to some river flooding on the Dan as well. The end of winter saw some fairly impressive seasonal snowfall totals entered into the record books for winter 2009-2010. These included a new seasonal record at Bluefield, WV of 81.1 inches (old record 77.8 inches in 1995-1996).

A rapid transition to spring weather occurred in April with a very warm, but dry month with nil hydrologic activity. Rainfall was only a little more than 50 percent of average (2.01"). May was more typical of spring with sporadic bouts of heavy rain with some flash flooding, although not enough to bring rivers into flood.

Flash flooding was most widespread May 16-18 as a frontal boundary became stalled out over the southern mountains and produced 2 to 4 inch rains. Western Greenbrier county reported several evacuations as streams rose from up to 5 inches of rainfall.

June, the first month of meteorological summer, was very warm (with several monthly warmth records broken) and generally drier than normal with only isolated flash flooding. The most notable event was June 12-14 with 1 to 2.5" across parts of the far western HSA. July was also extremely warm with records being set and more scattered convection and pockets of flash flooding. The most significant rains were July 12-14 with 1 to 3 inch rains across the upper James and Yadkin river basins. August went into the record books with yet more heat records, thus completing the warmest summer on record across most of the region. It was also fairly wet with the typical precipitation variability of summer. The most significant event was August 18-20 as a stationary boundary over the southern third of the HSA acted as a trigger for 3 to 5 inch rainfall and isolated pockets of flash flooding.

Fall began with a very dry September causing drought concerns in the far western HSA to increase through the month. This issue was terminated by very timely rainfall arriving September 26-28, as low pressure tracked northeast out of Gulf of Mexico along a stationary boundary. Portions of the central HSA received 3 to 5 inches of rain, with 1 to 2 inches elsewhere. This event was followed was the remains of Tropical Storm Nicole on the 29-30th that brought very heavy rains from the Blue Ridge eastward. Parts of Henry County had 5 to 7 inches of rain in 24 hours which produced significant flash flooding in parts of the county. Like the previous month, October 2010 was mostly dry until the last week of the month when an active cold front moving east from record low pressure over the upper Midwest affected the area October 26-27. The front spawned several tornados and flash flood producing rainfall across portions of the Virginia/North Carolina piedmont. The 2 to 4-inch rains fell mainly in the Dan River basin and produced some minor mainstem river flooding. November saw no flooding or flash flooding as rainfall was well below normal at 1.98" or only 60 percent of average. November was the driest month of 2010, but a significant rainfall event began affecting the area November 30th. The continuing event on December 1st saw 2 to 4 inch rains (see above) which produced pockets of flash flooding. December was also very cold, ranking in the top 5 coldest Decembers on record at all the climate observing sites.

Non-Routine Hydrologic Product Summary (Dec):
Flood/Flash Flood Watches (FFARNK): 0
Flood Advisories (Urban/Small Stream - FLSRNK): 0
Flash Flood Warnings (FFWRNK): 6
Areal Flood Warnings (FLWRNK): 0
River Flood Warnings (FLWRNK - forecast points): 0

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