NWS-CR-TA-92-18

CRH SSD
SEPTEMBER 1992

CENTRAL REGION TECHNICAL ATTACHMENT 92-18

A NOTABLE RAINFALL EVENT IN SOUTHERN INDIANA: AUGUST 8, 1992

Albert P. Shipe, Jr.
National Weather Service Forecast Office
Indianapolis, Indiana

1. Introduction

Exceptionally heavy rain and flooding that had never been seen before in Scott, western Jefferson, and northern Clark Counties struck quickly on the morning of August 8, 1992. Approximately 300 homes suffered moderate to major damage. More than 20 businesses were extensively flooded. Sixty-five miles of Conrail railroad tracks were washed out along with numerous state and county roads and bridges. A small stream named Stucker Fork became a raging river and flooded Interstate 65 by four feet.

People in Henryville were rescued from roof tops by helicopters. Some people in the Henryville area clung to trees and had to wait until the water went down before being rescued. The Scottsburg water supply reservoir almost failed and suffered damage to its spillway. Several Soil Conservation Survey (SCS) watershed projects in Scott county were overtopped. An impressive landslide, with boulders the size of cars, closed a local road near Hanover. One person drowned attempting to cross a flooded road. This flood event will remain in the memory of people in southeast Indiana.

2. Antecedent Conditions

Rainfall in southeast and southcentral Indiana ranged from normal to rather abundant during July 1992. While much of central Indiana received near record to record July rainfall, this portion of Indiana had escaped much of this rain. Nevertheless, lesser flash flood events that caused local roads and a few bridges to be flooded or washed out were noted in portions of Clark and Jefferson Counties during July. This flooding was a harbinger of a much greater flood that would occur in August.

The rains of July seemed to end in August. Precipitation of one half inch or less fell in southcentral and southeast Indiana during the first seven days of August. The weather had been very pleasant for early August. Local streams and reservoirs had returned to low summertime levels. The weather pattern began to change on the 8th. Warm and very humid air was returning to southern Indiana.

3. Description of the Rainfall Event

Thunderstorms developed in very moist air during the early morning on the 8th. Thunderstorms remained in nearly the same area until mid-morning, dumping torrential amounts of rain. Storms dissipated and moved out of the affected area by 1:00 pm EST.

Heavy rain of 3 to 13 inches fell in a six-hour period during the morning of August 8, 1992 in portions of southcentral and southeast Indiana. Counties receiving this rain included Lawrence, Jackson, Jennings, Jefferson, Washington, Clark and Scott. The hardiest hit county was Scott, which received between 8 and 13 inches of rain.

Two NWS automated rain gages recorded this intense rain event in 15-minute increments. One rain gage was located at the Moses Fell Annex Farm near Oolitic in central Lawrence County. The second automated gage was located at Crothersville in extreme southeast Jackson County. This gage was located about 39 miles eastsoutheast of Oolitic. The rain gage near Oolitic recorded 4.7 inches, while the Crothersville gage recorded more than twice that amount with 9.7 inches!

In Figure 1, heavy rain began in the Oolitic area between 3:15 am and 3:30 am and continued until 4:30 am. About 1½ inches fell in one hour. Heavy rain quickly returned by 5:45 am and continued until 7:45 am. In this two-hour period, nearly three inches of rain fell. During this time span, rain of 1.0 inch fell in a half hour. The Oolitic area received another 0.10 inches of rain from 7:45 am until 9:30 am. Altogether, 4.70 inches of rain had fallen in about six hours.

The second automated rain gage located at Crothersville in extreme southeast Jackson County, Indiana, recorded an even more impressive intense rain event. Heavy rain began between 3:30 - 3:45 am, and continued until 5:15 am. Rain of 2½ inches fell in 1½ hours at Crothersville.

Torrential rain began at Crothersville between 6:00 - 6:15 am, and continued until 9:15 am. An incredible rain amount of nearly seven inches fell in this three-hour time span at Crothersville. During one 15-minute period, 0.9 inches of rain was recorded. Near the end of the rain, 1.6 inches fell in 30 minutes.

The Crothersville area received another 0.30 inches of rain from 9:30 am to 1:00 pm. This brought the storm total to 9.70

inches for this unbelievable rainfall event. Figure 2 indicates the rainfall mass curve at Crothersville, Indiana.

4. Description of the Flood Event

The intense and highly unusual rain event of August 8, 1992 caused widespread flash flooding in Scott, southwest Jefferson, extreme southern Jennings, central Lawrence, southern Jackson, northeast Washington and northern Clark counties of southcentral and southeast Indiana. Flash flooding occurred on every small stream in Scott County. Local stream rises of 30 to 35 feet occurred in northern Clark and southwest Jefferson Counties.

The only U.S. Geological Survey gaging station to record a portion of the flood event was on the headwaters of the Muscatatuck River near Deputy, Indiana. The stream rose slightly over 29 feet in just 11 hours (Figure 3)! The U.S. Geological Survey stated this was a 100-year flood event for the gaging station. Flooding in Scott and northern Clark Counties exceeded a 500-year flood.

The worst flash flooding occurred in and near Henryville in northern Clark County. The rainfall analysis (Figure 4) indicates rain of 5½ to 9 inches fell in northern Clark County. Part of the reason for such a disastrous flood was that the heavy rain moved downstream along the small watersheds in northern Clark County. Heavy rains moving downstream in a watershed accentuate the flood heights.

Flash flooding ended by mid-afternoon in the affected area. However, the major channels of the Muscatatuck River filled quickly and caused severe backwater flooding in Austin by evening.

Extensive river flooding occurred along the Muscatatuck River in southern Jackson county. The crest on the Muscatatuck river reached the mouth of the river in southern Jackson County about three to four days later. Flooding was significant for August, but not as great as the recent floods of May 1990 or January 1991.

5. Approximate Rainfall Depth Duration Analysis

Crothersville did not receive the heaviest rain from this event. Rainfall of over 10 inches was recorded at the NWS site near Deputy in eastern Jefferson County. Unofficial reports of 10 to 13 inches were reported in many areas of Scott County by the SCS office at Scottsburg.

Figure 4 is the storm isohyetal analysis. Rain of more than eight inches fell in Scott, northeast Washington, southeast Jackson, southwest Jefferson and extreme northern Clark counties. This figure and information from the Scottsburg SCS office indicate at least eight inches fell in Scott County with an average of between 10 and 11 inches county wide!

NOAA Technical Memorandum NWS Hydro-33 indicates this rain event would be the second greatest known for a six-hour, 200 square mile area in the summer season for the states of Ohio, Michigan, Illinois, Kentucky and Indiana. When the estimated six-hour, 200 square mile rainfall value of 10.2 inches is compared with the Probable Maximum Precipitation (PMP) for August of 19.5 inches, portions of southeast Indiana received at least 52 percent of PMP. This was a highly unusual rain event to strike Scott and southwestern Jefferson Counties!

As a comparison, the 100-year rainfall for a six-hour period in southcentral and southeast Indiana is approximately 5.3 inches. A 100-year 10-day rain for southeast Indiana is approximately 12.5 inches. According to SCS unofficial reports, locations in Scott county received this amount of rain in six hours!

6. Conclusion

Storms producing rainfall exceeding 50 percent of PMP are highly unusual and cause near record to record flooding. Documentation of such storms are important for designing future flood control structures and/or local water supply reservoirs. When such an event occurs from thunderstorms, time is only available to save lives. Research is needed to forecast these situations more accurately.

7. References

Hydrometeorological Report NO. 55A: Probable Maximum Precipitation Estimates-Unites States Between the Continental Divide and the 103rd Meridian, Hansen, Fenn NWS, Schreiner and Stodt Bur. of Reclam. and Miller.

Interagency Hazard Mitigation Team Report, August 28, 1992, Region V, FEMA, FEMA 953-DR-INDIANA.

Shipe, A.P. and Riedel, J.T., 1976: Greatest Known Areal Storm Rainfall Depth for the Contiguous United States, NOAA Technical Memorandum NWS HYDRO 33, Office of Hydrology, Silver Spring, MD December.

Unpublished report from Midwestern Climate Center, Illinois Water Survey, University of Illinois at Champaign, Ill.

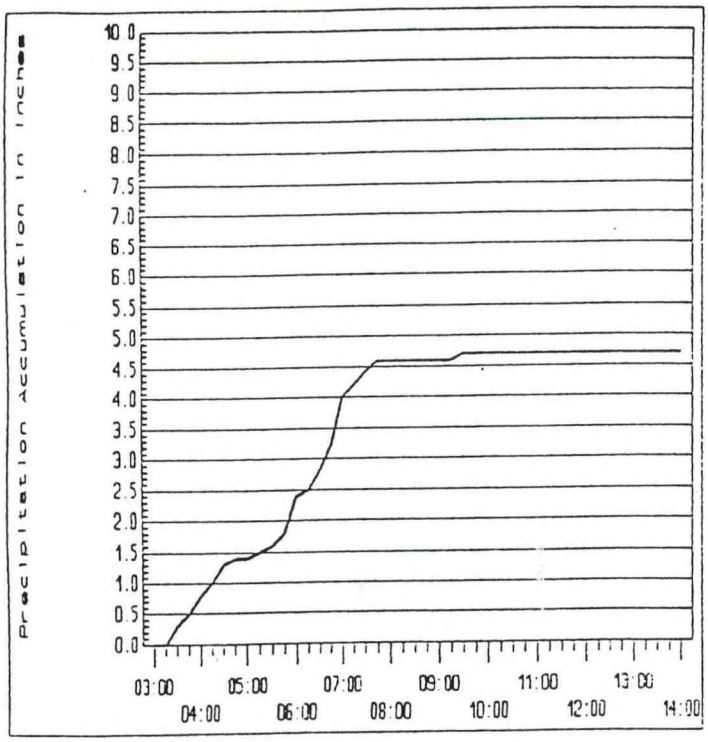

Figure 1. Rainfall Mass Curve at Moses Fell Annex Farm near Oolitic, Indiana, on August 8, 1992.

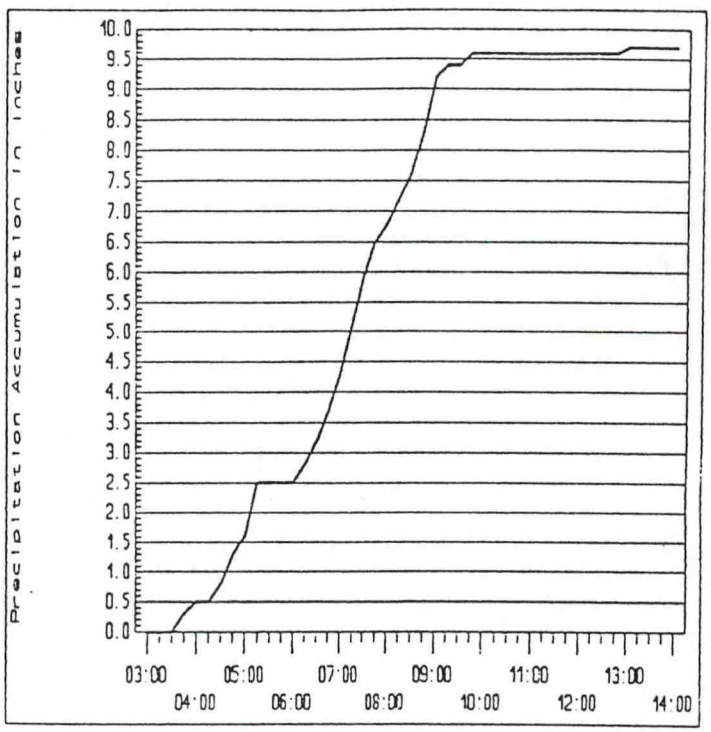

Figure 2. Rainfall Mass Curve at Crothersville, Indiana, on August 8, 1992.

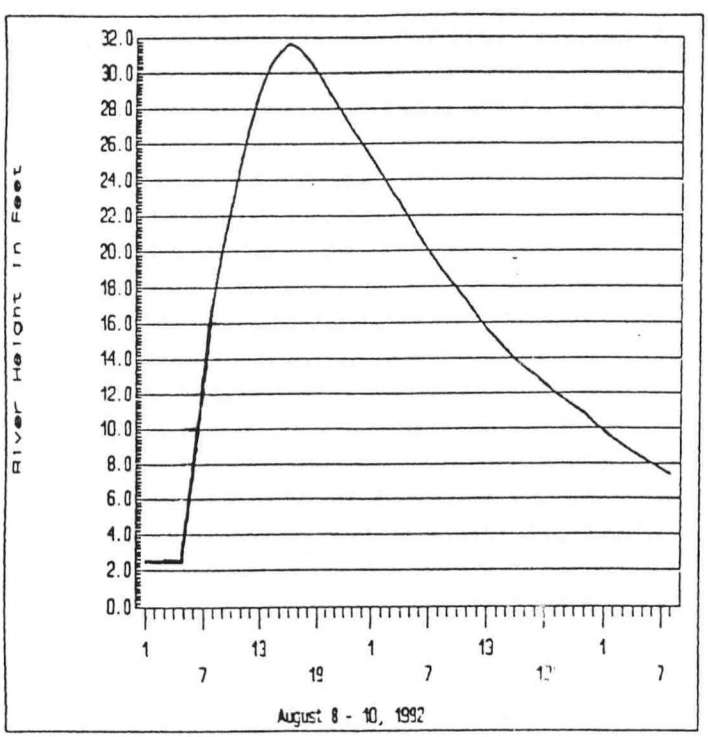

Figure 3. Hydrograph of Muscatatuck River near Deputy, Indiana on August 8-10, 1992.

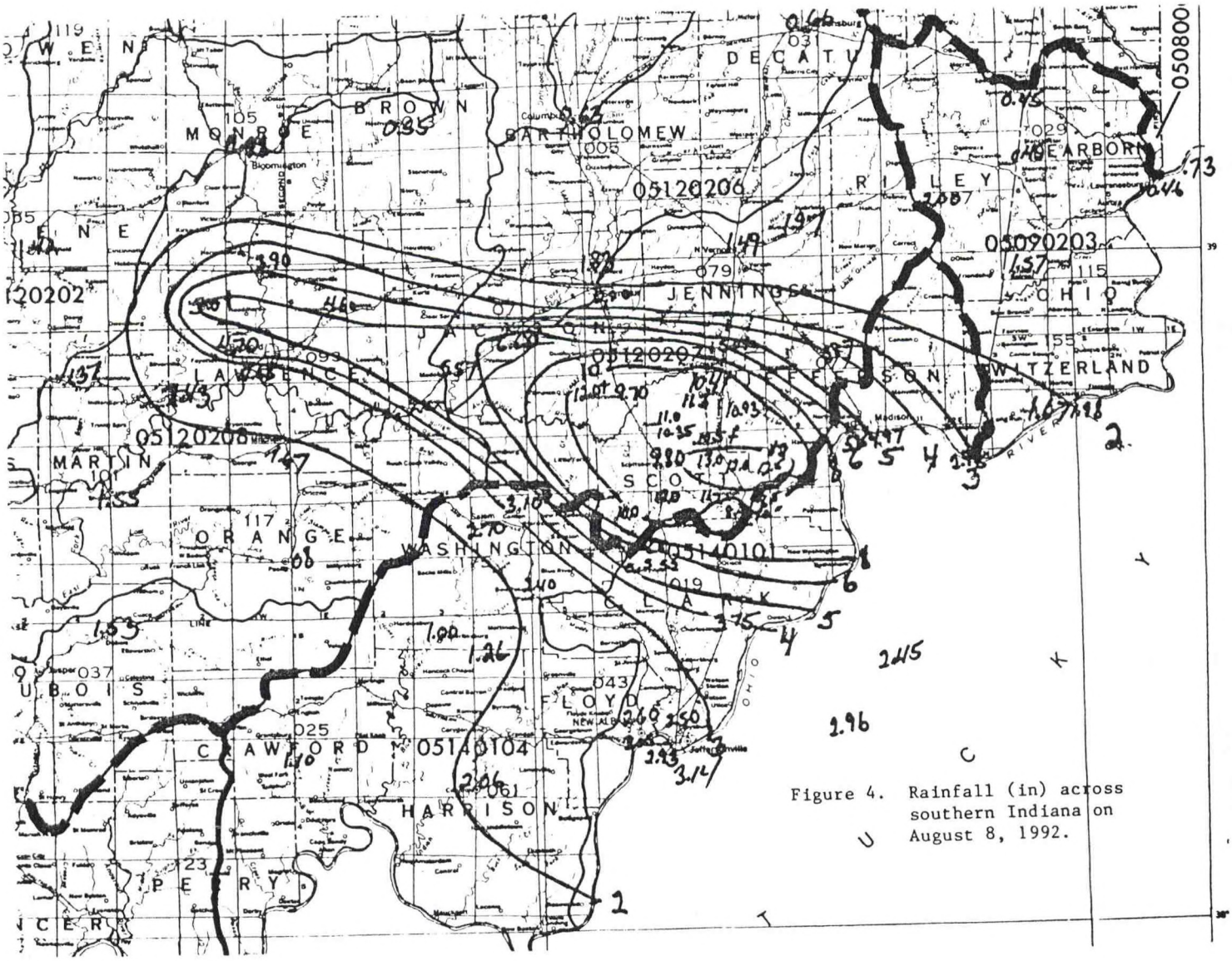

Figure 4. Rainfall (in) across southern Indiana on August 8, 1992.