

SEVERE LOCAL STORMS, SEPTEMBER, 1928

[The table herewith contains such data as have been received concerning severe local storms that occurred during the month. A more complete statement will appear in the Annual Report of the Chief of Bureau.]

Place	Date	Time	Width of path, yards	Loss of life	Value of property destroyed	Character of storm	Remarks	Authority
Floyd County, Tex. (western).	3					Hail and electrical.	Severe damage to crops over path 5 miles long.	Official, U. S. Weather Bureau.
Meade and Clark Counties, Kans.	4	5-5:30 p. m.	7 miles		\$100,000	Severe hail.	Damage chiefly to growing crops, roofs, and windows; poultry killed; path, 25 miles.	Do.
Harper County, Okla.	4	5:30 p. m.	5 miles		30,000	Heavy hail.	Damage chiefly to crops.	Do.
Montgomery, Page, and Wayne Counties, Iowa.	10	P. m.				Rain and wind.	Considerable crop damage; roads and bridges washed.	Do.
Sterling, Kans., and vicinity.	11	8:30 p. m.	1,760		5,000	Severe hail.	Greenhouses, automobiles, and roofs damaged over path 2 miles long.	Do.
Van Buren County, Iowa.	11	9 p. m.				Wind and rain.	Crops injured.	Do.
Maryville, Mo.	11	P. m.			500	Severe wind.	Telephone poles and shade trees damaged.	Do.
Fordyce, Nebr., to Davis, S. Dak.	13	3:15-4:40 p. m.	100	4	165,000	Tornado.	Farm buildings wrecked; livestock killed.	Do.
Pendar (near) to Dakota City, Nebr.	13	3:45 p. m.		4	750,800	do.	Livestock killed, many buildings demolished or badly damaged; 40 persons injured; path 33 miles.	Do.
Marshall County, Kans.	13	4-5 p. m.				Wind.	Buildings damaged; trees uprooted, haystacks blown over.	Do.
Clay County, Kans. (northeastern).	13	P. m.				do.	Barns, small buildings, telephone lines and crops damaged.	Do.
Denver, Colo., and vicinity.	13				15,000	do.	Injury chiefly to trees and parks; minor damage to buildings.	Do.
Lancaster, Pa., and vicinity.	13	P. m.			20,000	Electrical and wind.	Several buildings damaged; one building collapsed.	Do.
Rindge, N. H.	13	do.	300		50,000	Probably tornado.	Several homes wrecked; barns demolished; telephone lines and trees blown down; path 4 miles.	Boston Herald.
Calhoun, Pocahontas, Sioux, and Woodbury Counties, Iowa.	13	5-6 p. m.			67,000	4 tornadoes.	Many dwellings and farm buildings wrecked; crops destroyed; 1 person injured.	Official, U. S. Weather Bureau.
Bremer County, Iowa.	14	4 a. m.	440		20,000	Tornado.	Character of damage not reported. Path 1 mile.	Do.
Fayette County, Iowa.	14	do.	400		40,000	do.	Character of damage not reported. Path 16 miles long.	Do.
Rockford, Ill., and vicinity.	14	3:22 p. m.	200-500	14	1,200,000	do.	About 30 city blocks affected; many farm buildings damaged; path 26 miles long; 100 persons injured.	Do.
Scottville, Mich. (near).	14	6:30 p. m.	116		20,000	do.	Several barns completely wrecked; trees twisted; path 6 miles long.	Do.
Grand Rapids, Mich. (southeast part of).	14	7:15 p. m.	8		110,000	Wind and electrical.	A number of buildings wrecked; 1 building badly damaged by lightning; path about 3 miles.	Do.
Rock, Green, Dane, and Waupaca Counties, Wis.	14				181,500	Severe wind and probably 3 small tornadoes.	Heavy property damage of various kinds; 13 persons injured.	Do.
South and Middle Atlantic coast.	16-20			1,836	27,760,000	Tropical hurricane.	Heavy damage to buildings, crops, water-front property, and public utilities; greatest losses in Florida.	Do.

RIVERS AND FLOODS

By R. E. SPENCER

Aside from the important floods in the Carolina rivers the only rise of consequence during September occurred in the lower Wisconsin River. This flood, the result of a period of fairly steady rainfall from the 10th to the 15th, was of moderate character, was accurately forecast so that levees and embankments could be guarded and strengthened where necessary, and its resultant losses are reported not to have exceeded \$43,000, of which \$28,850 was in matured crops. The value of property saved directly by the flood warnings was \$1,000.

The rises in the Connecticut, the Altamaha, the French Broad, Big Pigeon, Hiwassee, the Grand of Missouri, the Canadian, and Rio Grande were all without damage, while along the James of Virginia only \$150 loss occurred and \$12,000 worth of property was saved through Weather Bureau flood warnings.

The first of the two floods in the Carolina rivers resulted from a period of rainfall in those States lasting generally from the 1st to the 5th, and the second from rains incident to the northward approach and passage of the tropical cyclone on the 17th, 18th, and 19th. In general, the floods of the later period were the more severe, not only because of heavier rains but also in large measure because overflow from the preceding rises had not yet drained from lowlands and swamps along the lower reaches of the streams at the time of approach of the second flood. August stages were exceeded in all

streams except the Roanoke of Virginia and North Carolina and the Santee system of South Carolina; and in the lower reaches of at least four of the gaged rivers high water records were broken. These are the Cape Fear, where the stage of 41.3 feet at Elizabethtown, N. C., exceeded the previous record of August 29, 1908, by 0.3 foot; the Waccamaw, where the stage of 13.4 feet at Conway, S. C., exceeded the previous record of October 9-10, 1924, by 2.3 feet; the Peedee, where the stage of 29.6 feet at Mars Bluff, S. C., exceeded the previous record by 0.6 foot; and the Black, where the stage of 18 feet at Kingstree, S. C., exceeded the previous record of July 17, 1916, by 2.5 feet.

Flood warnings, issued well in advance of the damaging stages, and distributed by every available means, effected a saving reported to have amounted to \$570,250, mainly, as usual, in the removal of household goods and livestock and in the gathering of matured or nearly matured crops. In addition, as reported by the official in charge of the Weather Bureau office at Raleigh, N. C.—

A number of railroad and other bridges were weighted down as a precaution with coal cars, and lumber, brick, cotton, and other manufacturing plants were protected as far as possible. Warnings were of much interest in protecting levees on the Roanoke in danger from repeated overflows, and to the State highway commission in giving advance notice of closing and opening of highways and in connection with bridges and approaches thereto.

But despite the generally effective distribution of warnings and the advantage taken of them, losses were nevertheless very heavy. The following statement, quoted

from the report of the official in charge of the Weather Bureau office at Columbia, S. C., is suggestive of conditions in other districts as well as his own:

It is generally accepted that the September floods were more damaging than the August floods, especially as to highways and crops, the latter being practically ruined in extensive areas, while the highway commission has made increased allotments over the August sums for road repairs. On account of much lighter rainfall in the Piedmont sections, the principal damage occurred in the central basins and the lower reaches.

This report also states that on account of damaged culverts two railroad trains were wrecked in South Carolina and five persons killed, the damage to the culverts having been due to undermining and seepage from the rains and floods. These were the only deaths reported. The total monetary loss, however, is reported to have reached a total of \$4,004,050. Of this amount at least \$2,000,000 was in crops, about evenly divided between the two States.

[All dates in September except as otherwise specified]

River and station	Flood stage	Above flood stages—dates		Crest	
		From—	To—	Stage	Date
ATLANTIC DRAINAGE					
	<i>Feet</i>			<i>Feet</i>	
Connecticut: Bellows Falls, Vt.....	12	{ 18 30	19 (1)	12.2 12.3	19 30
James:					
Columbia, Va.....	18	{ 7	7	24.0	7
Richmond, Va.....	10	{ 7	7	11.8	7
Roanoke:					
Randolph, Va.....	21	{ 7 20	24.8 26.1	8 21	
Weldon, N. C.....	30	{ 7 20	10 25	36.6 42.0	9 23
Dan:					
Danville, Va.....	8	{ 20	20	8.3	20
Clarksville, Va.....	12	{ 21	22	13.0	22
Tar:					
Rocky Mount, N. C.....	9	{ 5 19	8 24	9.9 13.6	7 20
Tarboro, N. C.....	18	{ 9 20	11 28	20.7 29.0	10 24
Greenville, N. C.....	14	{ 10 20	13 (1)	15.7 21.9	12 24-25
Fishing Creek: Enfield, N. C.....	15	{ 19	22	16.7	20
Neuse:					
Neuse, N. C.....	15	{ 6 19	9 25	16.3 20.0	9 22
Smithfield, N. C.....	14	{ 4 18	11 26	21.5 23.0	7 21
Cape Fear:					
Fayetteville, N. C.....	35	{ 4 19	10 25	55.5 64.7	8 22
Elizabethtown, N. C.....	22	{ 4 19	13 28	35.7 41.8	9 23
Haw: Moncure, N. C.....	22	{ 6 19	7 22	27.0 30.3	6 20
Waccamaw: Conway, S. C.....	7	{ 14	(1)	13.4	30
Peedee:					
Cheraw, S. C.....	27	{ 5 19	9 23	37.7 42.0	7 20
Mars Bluff, S. C.....	17	{ 5 5	(1) 14	29.6 19.0	23 11
Lynches: Effingham, S. C.....	14	{ 18 6	23 14	19.4 15.6	20 and 24 8
Black: Kingstree, S. C.....	12	{ 6 19	14 28	15.6 18.0	8 21
Santee:					
Rimini, S. C.....	12	{ (1)	(1)	30.4	Aug. 21
Ferguson, S. C.....	12	{ (1)	(1)	20.6	Aug. 22
Catawba: Catawba, S. C.....	12	{ 6 18	7 20	14.0 17.5	7 18
Wateree:					
Camden, S. C.....	24	{ 5 18	8 22	33.2 32.5	6 19
Malta, S. C.....	14	{ 8 21	8 22	14.0 14.5	8 22
Congaree: Columbia, S. C.....	15	{ 6 19	7 20	26.2 19.6	6 19
Broad: Blairs, S. C.....	15	{ 6 19	7 20	18.5 19.0	6 19
Saluda: Chappells, S. C.....	14	{ 6 19	6 19	16.4 14.4	6 19

¹ Continued at end of month.

² Continued from last month.

River and station	Flood stage	Above flood stages—dates		Crest	
		From—	To—	Stage	Date
ATLANTIC DRAINAGE—continued					
Altamaha:	<i>Feet</i>			<i>Feet</i>	
Charlotte, Ga.....	15	{ (1) 7	1	26.2	Aug. 22
Everett City, Ga.....	10	{ (1) 5	30	18.9	11
Oconee: Milledgeville, Ga.....	22	{ 5	6	15.0	Aug. 27-28
Ocmulgee:					
Macon, Ga.....	18	{ 6	6	26.5	6
Abbeville, Ga.....	11	{ 6	15	13.0	12
MISSISSIPPI DRAINAGE					
French Broad: Asheville, N. C.....	4	{ 3	3	5.0	3
Big Pigeon: Newport, Tenn.....	6	{ 6	8	5.0	6
Hiwassee: Charleston, Tenn.....	22	{ 6	6	6.0	3
Wisconsin:					
Knowlton, Wis.....	12	{ 15	17	6.5	6
Portage, Wis.....	17	{ 19	21	22.6	3
Grand:					
Gallatin, Mo.....	20	{ 12	16	16.9	16
Chillicothe, Mo.....	18	{ 12	18	18.1	20
Brunswick, Mo.....	12	{ 17	19	28.2	15
Canadian: Logan, N. Mex.....	4	{ 5	5	27.8	16
				12.2	18
				5.0	2
WEST GULF DRAINAGE					
Rio Grande: San Benito, Tex.....	23	{ 25	26	23.9	26

² Continued from last month.

MEAN LAKE LEVELS DURING SEPTEMBER

By UNITED STATES LAKE SURVEY

[Detroit, Mich., October 5, 1928]

The following data are reported in the Notice to Mariners of the above date:

Data	Lakes ¹			
	Superior	Michi- gan and Huron	Erie	Ontario
Mean level during September, 1928:	<i>Feet</i>	<i>Feet</i>	<i>Feet</i>	<i>Feet</i>
Above mean sea level at New York.....	603.40	580.44	572.12	246.17
Above or below—				
Mean stage of August, 1928.....	+0.38	-0.06	-0.47	-0.47
Mean stage of September, 1927.....	+0.74	+1.28	+0.48	+0.90
Average stage for September, last 10 years.....	+1.17	+0.57	+0.16	+0.63
Highest recorded September stage.....	-0.64	-2.99	-1.82	-1.44
Lowest recorded September stage.....	+2.07	+2.22	+1.19	+2.17
Average departure (since 1860) of the September level from the August level.....	+0.05	-0.20	-0.26	-0.41

¹ Lake St. Claire's level: In September, 1928, 575.16 feet.

EFFECT OF WEATHER ON CROPS AND FARMING OPERATIONS, SEPTEMBER, 1928

By J. B. KINCER

General summary.—A continuation of heavy rain during the first decade over an area from New Jersey and Pennsylvania southward was very detrimental to farming operations and crops, with much work delayed and crops damaged. Elsewhere it was mostly favorable for outdoor work, but fall plowing was hindered by hard, dry soil in many interior districts and a general rain was needed over most of the interior valley States.

During the second decade a tropical hurricane which struck the Florida peninsula on the 16th-17th, brought torrential rains and high winds to most sections from Florida northeastward to Pennsylvania. The weather