Supplementary and Additional Materials for

"Mid-20th century land-use change greatly reduced flood intensity in the Southeastern US"

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Table S1 Radiocarbon (^{14}C) data measured for this study. SBL2_C1B is the only data included in the Bacon age-depth modeling.

Sample Name	**Depth in the core (cm)**	**Material dated**	**Lab Code**	**d13C (‰)**	**^{14}C age (yr BP)**
SBL2_C1A	194-195	tree barks	OS-140657	-24.75	20±15
SBL2_C1B	194-195	leaves	OS-140730	-28.32	125±15
SBL2_C2	191-192	leaves	OS-140658	-30.68	5±20
SBL2_C3	143-144	leaves	OS-140659	-28.66	>Modern
SBL2_C4	98-99	acorn	OS-140660	-27.69	>Modern

Table S2 Optically stimulated luminescence (OSL) data measured for this study.

Sample Name	**Depth in the core (cm)**	**Lab Code**	**Water (%)**	**^{238}U±1σ (ppm)**	**^{232}Th±1σ (ppm)**	**K_2O ±1σ (%)**	**Cosmic Rate±1σ (Gy/ka)**	**Total Dose Rate±1σ (Gy/ka)**	**De±1σ (Gy)**	**Age ±1σ (yr, 2018)**
SBL2_OSL1	180-185	COSL 68	40.2	5.363±0.107	13.884±1.499	1.499±0.055	0.156	2.687±0.209	0.39±0.05	145±22
SBL2_OSL2	120-125	COSL 69	38.8	5.220±0.101	13.942±1.681	1.681±0.060	0.166	2.852±0.242	0.39±0.04	137±18
SBL2_OSL3	80-85	COSL 70	40.7	5.281±0.099	13.458±0.345	1.612±0.057	0.172	2.708±0.211	0.32±0.05	118±21

Table S3 Activity of ^{210}Pb and ^{137}Cs of sediments from core SBL2.

Sample Name	**Depth in the core (cm)**	**^{210}Pb (Bq/kg)**	**err**	**^{137}Cs (Bq/kg)**	**err**
SBL2_L01	0-2	27.40	5.03	0.00	0.00
SBL2_L02	15-17	47.10	7.54	0.00	0.00
SBL2_L03	25-27	30.60	16.40	13.30	8.29
SBL2_L04	30-32	53.10	8.75	19.70	10.00
SBL2_L05	35-37	35.60	12.30	3.67	3.39
SBL2_L06	45-47	41.50	7.50	0.00	0.00
SBL2_L07	60-62	60.30	14.50	0.00	0.00
SBL2_L08	75-77	26.30	8.79	0.00	0.00
SBL2_L09	90-92	10.30	3.39	0.00	0.00
SBL2_L10	105-107	19.30	18.00	0.00	0.00
SBL2_L11	125-127	11.70	12.80	0.00	0.00
SBL2_L12	140-142	14.50	8.25	0.00	0.00
SBL2_L13	155-157	18.30	9.38	0.00	0.00
SBL2_L14	170-172	17.20	23.80	0.00	0.00

Table S4 Peak discharge of 100-year flood (Q_{100}) for major Southeastern US rivers (Fig. 1) during periods before and after 1950. The Q_{100} was calculated following the standardized methods by the US Geological Survey using PeakFQ v.7.4. Data used for the calculations are shown in Fig. 4.

River	**Period (CE)**	**Q_{100} (m^3/s)**	**5% confidence lower (m^3/s)**	**95% confidence upper (m^3/s)**
Cape Fear River	1925-1949	3514	2814	4970
	1950-2021	2220	1943	2680
Pee Dee River	1842-1948	9291	6705	15495
	1949-2021	3418	2885	4307
Savannah River	1796-1949	8767	7603	10520
	1950-2021	2152	1875	2595
Oconee River	1902-1949	1668	1287	2409
	1950-1978	834	679	1350

Table S5 Large reservoirs by river basin in the Southeastern US [1]. The flood storage capacity is defined as the difference between the maximum and the minimum normal operation capacity.

Basin	Reservoir	Year of completion	Drainage area above the reservoir (km^2)	Flood storage capacity (10^6 m^3)
Pee Dee River	W. Kerr Scott Reservoir	1963	906	138.1
	High Rock Lake	1927	10360	79.4
	Tuckertown Reservoir	1962	10671	0
	Badin Lake	1917	10826	93.5
	Lake Tillery	1928	11914	36.4
	Blewett Falls Lake	1912	17690	8.6
Congaree River	Lake Greenwood	1940	2978	181.3
	Lake Murray	1930	6268	154.2
	Lake Jocassee	1972	380	167.8
Savannah River	Lake Keowee	1970	1137	154.2
	Lake Hartwell	1961	5413	361.4
	Richard B. Russell Lake	1984	7511	172.7
	Strom Thurmond Lake	1953	15928	481.1
Cape Fear River	B. Everett Jordan Lake	1974	4374	669
	Shearon Harris Main Reservoir	1981	184	0
	Lake Cammack	1961	114	0
Oconee River	Lake Oconee	1979	4740	0
	Lake Sinclair	1952	7537	0

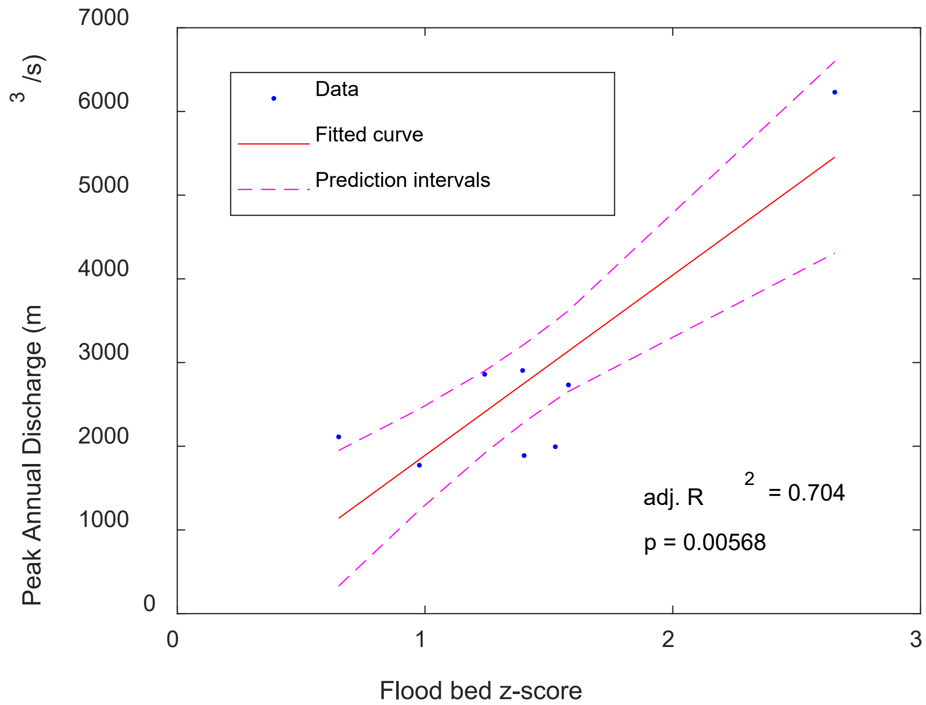

Figure S1 Scatterplot and linear regression with 1σ prediction intervals between flood-event layer z-score and peak annual discharge measurements of the Pee Dee River at PeeDee gage station (USGS 02131000).

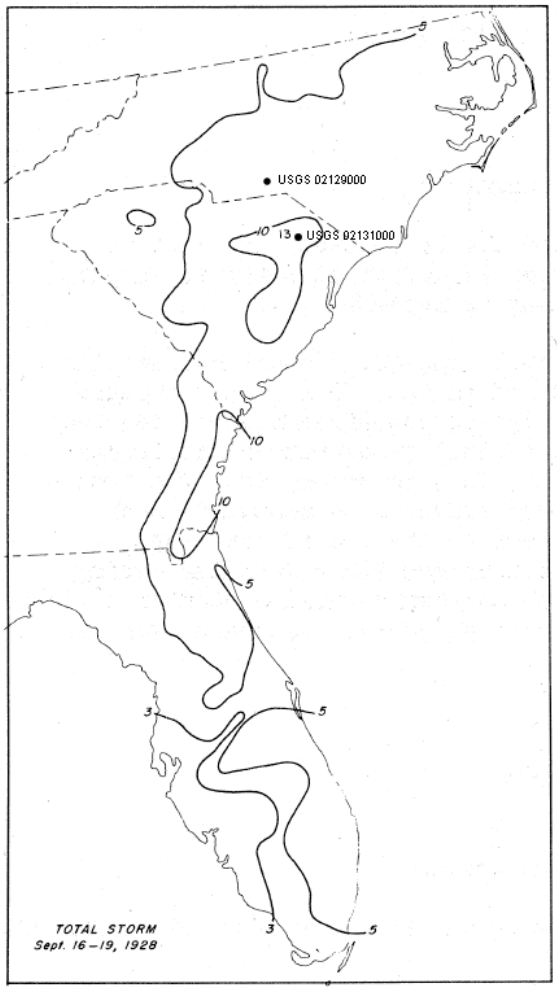

Fig S2 Total precipitation in inches (1 inch = 25.4 mm) during Sep 16-19, 1928, due to the Okeechobee Hurricane as compiled by the U.S. Army Corps of Engineers [2]. The location of two USGS gage stations, Pee Dee River near Rockingham (02129000) and Pee Dee River at PeeDee (02131000), are shown by filled circles. The PeeDee gage is located at the center of the heaviest Okeechobee Hurricane precipitation.

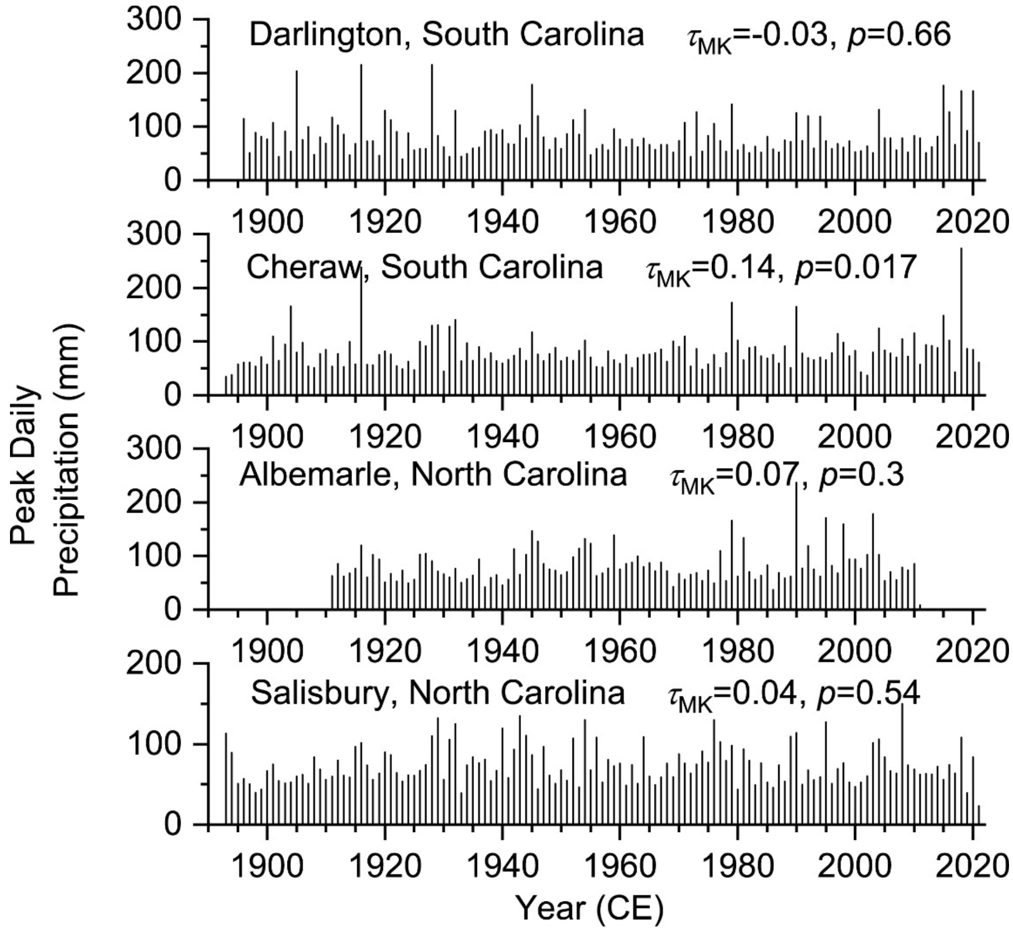

Fig. S3 Peak annual daily rainfall at various locations in the Pee Dee basin obtained from the National Centers for Environmental Science Information (https://www.ncei.noaa.gov/) weather stations (See Fig. 1 for station locations). The data at each station is analyzed using Mann-Kendall trend analysis for long-term trends and the significance of the trend.

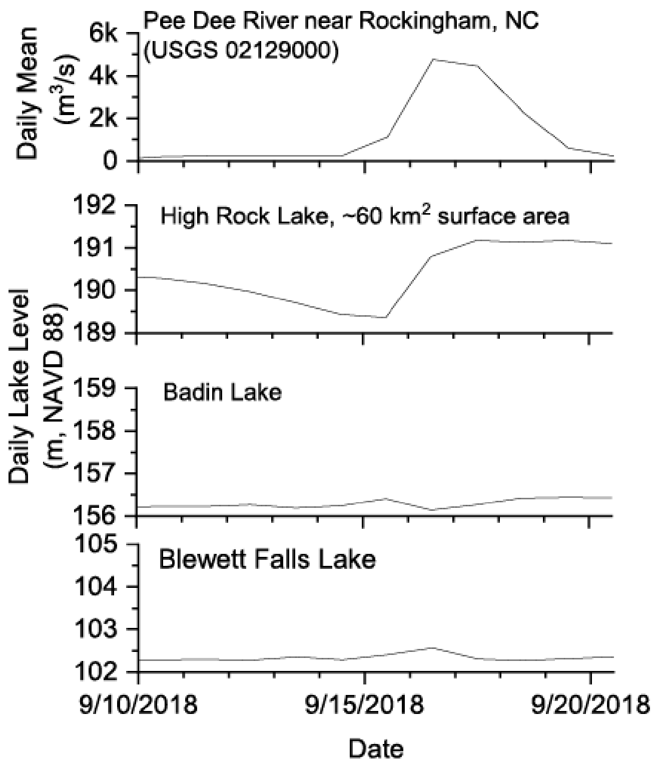

Fig. S4 Daily mean discharge of the Pee Dee River near Rockingham, North Carolina, and daily water levels of three large reservoirs, High Rock Lake, Badin Lake, and Blewett Falls Lake, in the Pee Dee basin during Hurricane Florence (2018).

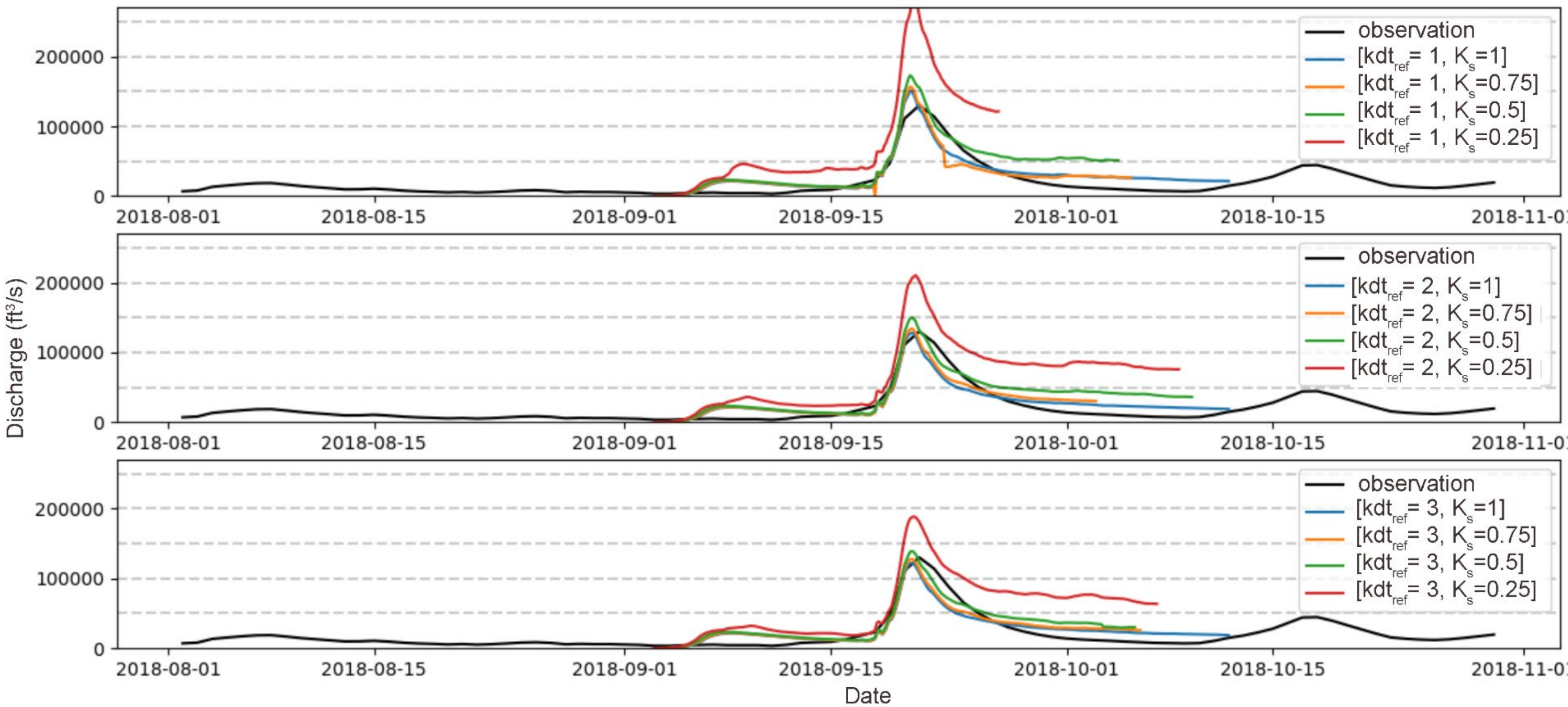

Fig. S5 Observed and simulated hydrographs at the Pee Dee River at PeeDee gage station (USGS 02131000) during Hurricane Florence (2018). The simulated data were obtained with the WRF-Hydro model using different combinations of saturated hydraulic conductivity (K_s) and infiltration parameter, kdt$_{ref}$.

1 Ruddy, B. C. & Hitt, K. J. Summary of selected characteristics of large reservoirs in the United States and Puerto Rico, 1988. Report No. 90-163, (1990).
2 Schoner, R. W. & Molansky, S. Rainfall Associated with Hurricanes (and Other Tropical Disturbances). Report No. 3, 305 (Washington, D.C., 1956).