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U.S. River Discharge for 2008 in State of the Climate in 2008

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U.S. RIVER DISCHARGE FOR 2008—A. MACDONALD, L. BOWLING, B. FEKETE, R. LAMMERS, AND R. LAWFORD

For the 2008 water year (1 October 2007 through 30 September 2008), streamflow across the contiguous United States was slightly above the long-term annual median (1930–2008), with pronounced regional differences (Jian et al. 2009). Annual streamflow was much above normal throughout the upper Midwest and central Plains, due primarily to wet winter and early spring conditions. Wet winter and summer conditions led to above-normal annual streamflow in New England. Much-below-average annual flows existed in the Southeast, due to low flows in the fall and winter that slowly recovered in the spring and summer (Jian et al. 2009). Streamflow in Alaska was low in all seasons, with record-low values in the spring, summer, and annual totals.

Transporting nutrients, pollutants, heat, and low salinities, river discharge is important to the ocean on both regional and basin scales. Milliman et al. (1995) identified 61 rivers in the contiguous United States that discharge directly into ocean basins. Of these, 40 are active USGS stations with record lengths sufficient to compute 2008 streamflow as a percentile of normal flow (1964–2008). As illustrated (Table 7.1), total discharge into the Gulf of Mexico was higher than normal in 2008 (84th percentile) due to summer flooding in the U.S. Midwest, while discharge into the Pacific and Atlantic Oceans was lower than normal (32nd and 36th percentiles, respectively).

Table 7.1. Estimates of observed and extrapolated discharge volume.

Basin receiving water	U.S. land area (km^2)[a]	Gauged land area (km^2)	Observed 2008 discharge volume (km^3)	Percentile (1964–2008)	Extrapolated 2008 discharge volume (km^3)[b]
Atlantic Ocean[c]	795,256	277,847	102	36th	292
Pacific Ocean[d]	1,022,605	749,933	215	32nd	293
Gulf of Mexico[e]	4,053,225	3,251,813	588	84th	733

[a] Estimated using the published areas of the 21 USGS water resources regions (Seaber et al. 1987)

[b] Calculated from observed annual runoff (observed discharge/gauged land area) times the total land area draining to each water body.

[c] Excludes Great Lakes drainage through the St. Lawrence River.

[d] Includes the Canadian portion of the Columbia River basin.

[e] Excludes the Rio Grande.

ning of summer, anomalies from +1° to +4°C were observed in the northwestern, northern, northeastern, and the southern Pacific Coast regions. Monsoon conditions starting in the north and moving eastward brought heavy rain from July to September. This was accompanied by temperatures 2° to 4°C below normal in the northern, central, southern, and southeastern regions of Mexico. The northwestern and western regions of the country experienced temperatures 1° to 3°C above normal during the rainy season (June–September). During the fall, in the southeast and the Yucatán Peninsula, unusually low temperatures were reported (11°C and 13°C in Campeche and Yucatán, respectively), resulting in low mean temperatures for these regions during October and November.

(ii) Precipitation

The year started drier than normal during the winter and spring, but significant precipitation occurred during the rainy season. Normal precipitation started in July, particularly in the north and northeast of Mexico and the central part of the country. The rainy