

MISSISSIPPI RIVER AND RIVER DES PERES FLOOD-PEAK ELEVATIONS AND MISSISSIPPI RIVER DISCHARGES—CITY OF ST. LOUIS AND VICINITY

The 1993 flood-peak elevations on the Mississippi River and River des Peres in the city of St. Louis and vicinity were determined from USGS streamflow-gaging station data and by surveying high-water flood marks after the water had receded (fig. 18). All USGS flood-elevation data on the Mississippi River and River des Peres were compiled with other flood-mark data collected by the U.S. Army Corps of Engineers (St. Louis District) and St. Louis County (Department of Highways and Traffic).

The water-surface elevations and discharges of the 1993 flooding in the city of St. Louis and vicinity are shown in figure 19. The figure shows the June through August elevations and discharges for the Mississippi River at the USGS streamflow-gaging station (07010000) on the downstream side of Eads Bridge in the city of St. Louis (fig. 18). At this station, the Mississippi River flood-peak elevation of 429.52 ft above sea level on August 1, 1993, was greater than the previous maximum flood-peak elevation of April 1973 by more than 6 ft.

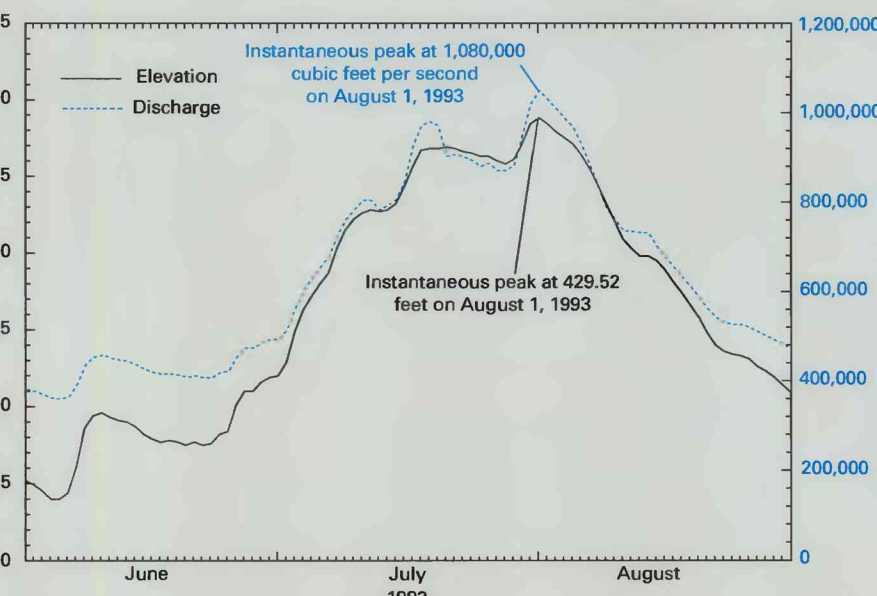


Figure 19. Water-surface elevations and discharges of the Mississippi River at St. Louis, Missouri, June through August 1993 (USGS streamflow-gaging station 07010000).

FLOOD PROFILES

The flood-peak elevations determined from USGS gaging-station data and by surveying flood-mark data along the Mississippi River and the River des Peres flood plains (fig. 18) were used to interpret the 1993 flood profiles and to assist in delineating the area inundated by the August 1 flood peak in the city of St. Louis and vicinity. These flood marks are subject to errors in maximum-height interpretation, localized increases or decreases in water-surface levels because of water-velocity differences, and accuracy of reference elevations used in the surveying process. The best fit Mississippi River and River des Peres flood-peak profiles (figs. 20, 21, respectively) and surface-water contour lines (fig. 18) were determined from the flood-peak elevation data for each river. Some individual data values are not consistent with the profiles and contour lines; the influence of each data value was based on the quality of the flood mark. The Mississippi River flood-peak elevation locations are plotted and referenced by distance, in river miles, upstream from the mouth of the Ohio River, and the River des Peres flood-peak elevation locations are plotted and referenced by distance, in feet, upstream from its mouth.

INUNDATED AREA

The extent of the Mississippi River flooding and the River des Peres backwater flooding from August 1 through 3, 1993, in the city of St. Louis and vicinity were determined by using surface-water contours shown in figure 18. These elevation data were used to hand-draw the outline of the 1993 inundation boundary for each river on 1:24,000-scale (contour interval, 10 ft) topographic maps of the city of St. Louis and vicinity. By using the GIS software package ARC/INFO, the hand-drawn inundation boundaries were manually digitized from the 1:24,000-scale maps and stored. Topographic maps that have contour intervals of more than 5 ft usually are not used alone to establish flood boundaries. Therefore, a second outline of the 1993 flood inundation boundaries of the Mississippi River and River des Peres was scanned from aerial photographs taken within a few days after the flood peak. The Mississippi River inundation boundary was scanned from a set of 1:24,000-scale aerial photographs taken on August 2, 1993 (Walker and Associates, Fenton, Missouri), and the River des Peres inundation boundary was scanned from a set of 1:16,000-scale aerial photographs taken on August 4, 1993 (Walker and Associates, Fenton, Missouri). These scanned inundation boundaries were manually digitized into a second ARC/INFO coverage.

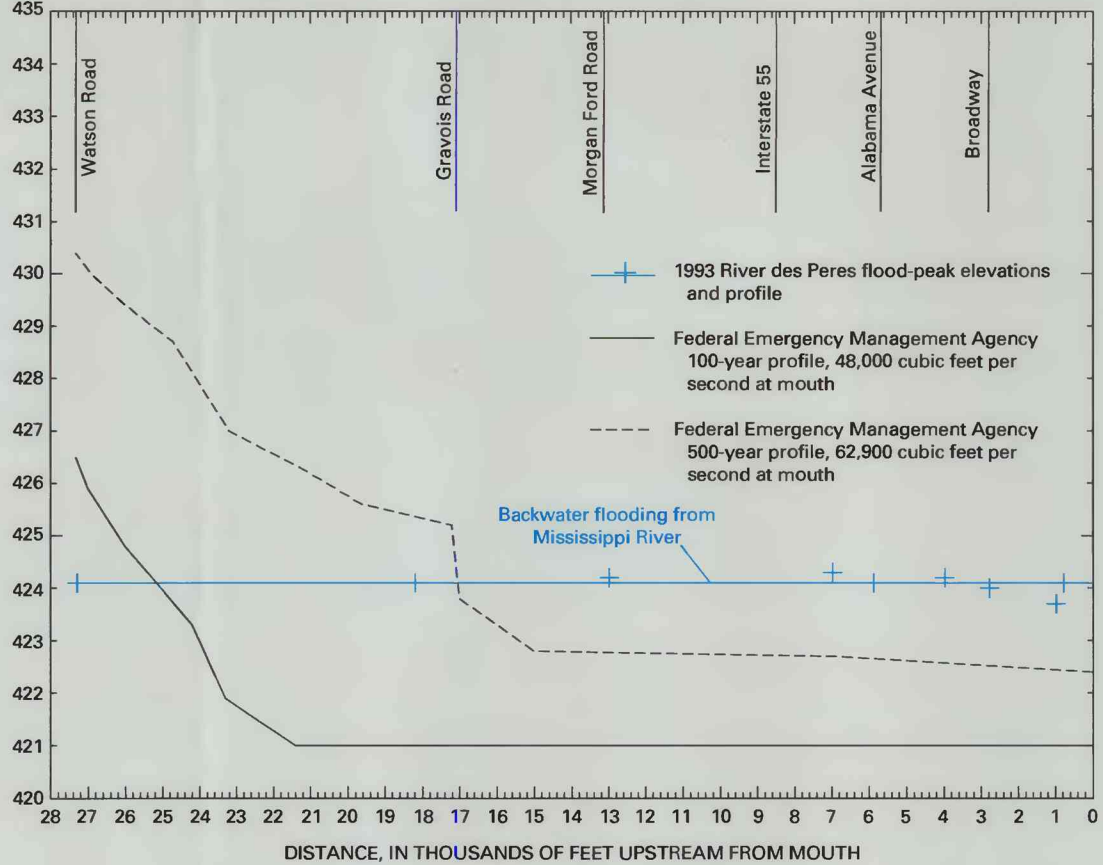


Figure 21. The 1993 flood-peak elevations and profile and the Federal Emergency Management Agency 100- and 500-year flood profile (U.S. Department of Housing and Urban Development, 1993c, panels 3, 4) along the River des Peres in the city of St. Louis and vicinity, Missouri.

A limited amount of onsite inspection was done in areas where the two outlines did not agree as to the limits of flood inundation. For example, some small areas of land within the inundation boundaries may be at or slightly above the August 1 through 3 peak elevations; however, some of these small areas may not be delineated. Other discrepancies in the outlines were the result of inaccuracies in the manual delineation of the flood boundary (horizontal/vertical) on topographic maps with a 10-ft contour interval and inconsistencies in visually defining the peak-flood-water/and-surface contact from the aerial photographs. The August 1 through 3, 1993, Mississippi River and River des Peres extent of flooding shown in figure 18 is considered to be the best interpretation on the basis of both inundation outlines.

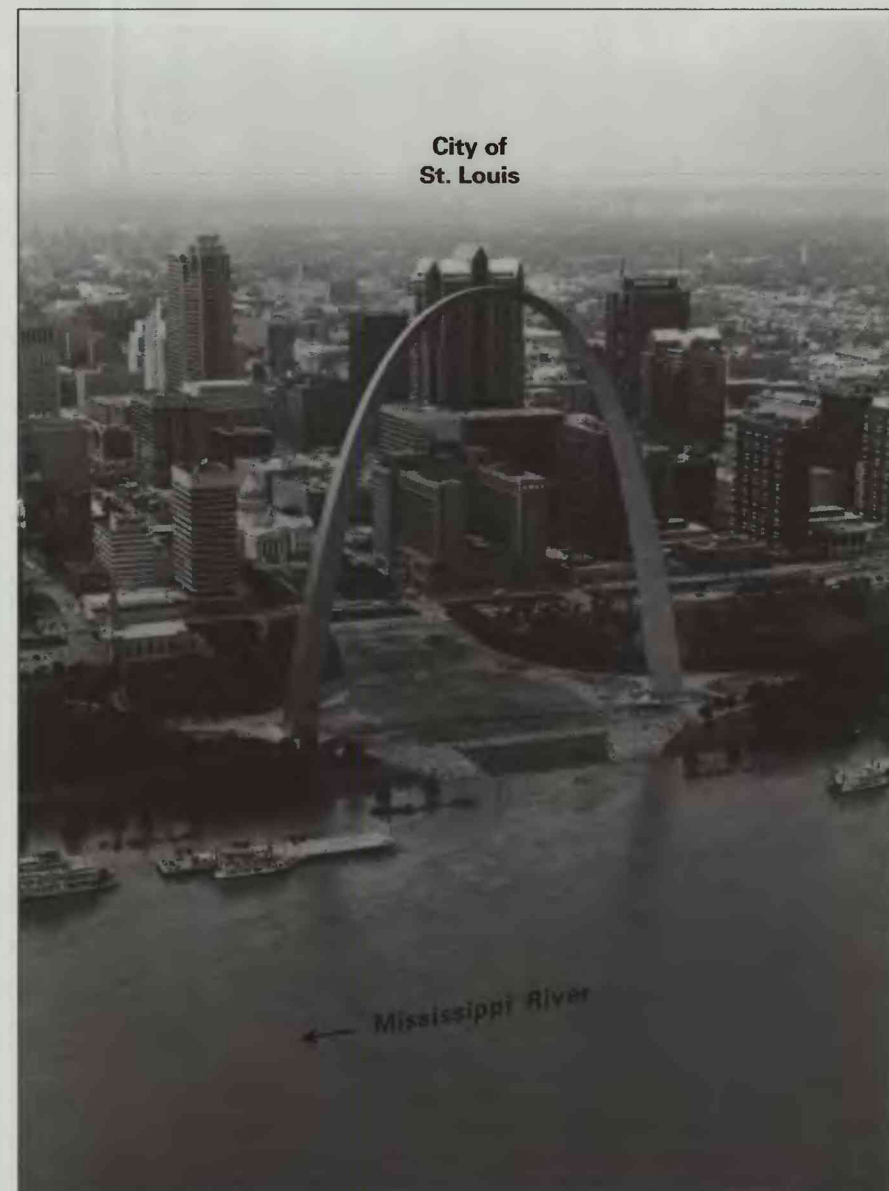


Figure 22. Aerial view of Mississippi River flooding on August 1, 1993, at the Jefferson National Expansion Memorial (Arch) in the city of St. Louis, Missouri, looking west (photograph from the Missouri Highway and Transportation Department).

FEDERAL EMERGENCY MANAGEMENT AGENCY 100- AND 500-YEAR FLOOD PROFILES

The National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973 were established to encourage State and local governments to adopt wise flood-plain-management practices. The FEMA has adopted the 100-year flood as the base flood for purposes of defining the flood boundaries of flood-insurance-rate maps. The 500-year flood can be used to identify additional areas of flood risk in a community (U.S. Department of Housing and Urban Development, 1993a, p. 34). To assist in the evaluation of the Mississippi River and the River des Peres flooding from August 1 through 3, 1993, in the city of St. Louis and vicinity, the FEMA 100- and 500-year profiles for the Mississippi River (U.S. Department of Housing and Urban Development, 1993b, panel 136; 1993c, panels 1, 2) and River des Peres (U.S. Department of Housing and Urban Development, 1993c, panels 3, 4) are provided in figures 20 and 21, respectively.

FLOOD DAMAGES

A substantial part of the 1993 flood damage in the city of St. Louis and vicinity was related to the flood-water breaching makeshift levees along the River des Peres. At the Jefferson National Expansion Memorial (Arch), the flooding Mississippi River approached the base of the Arch on August 1, 1993 (fig. 22).

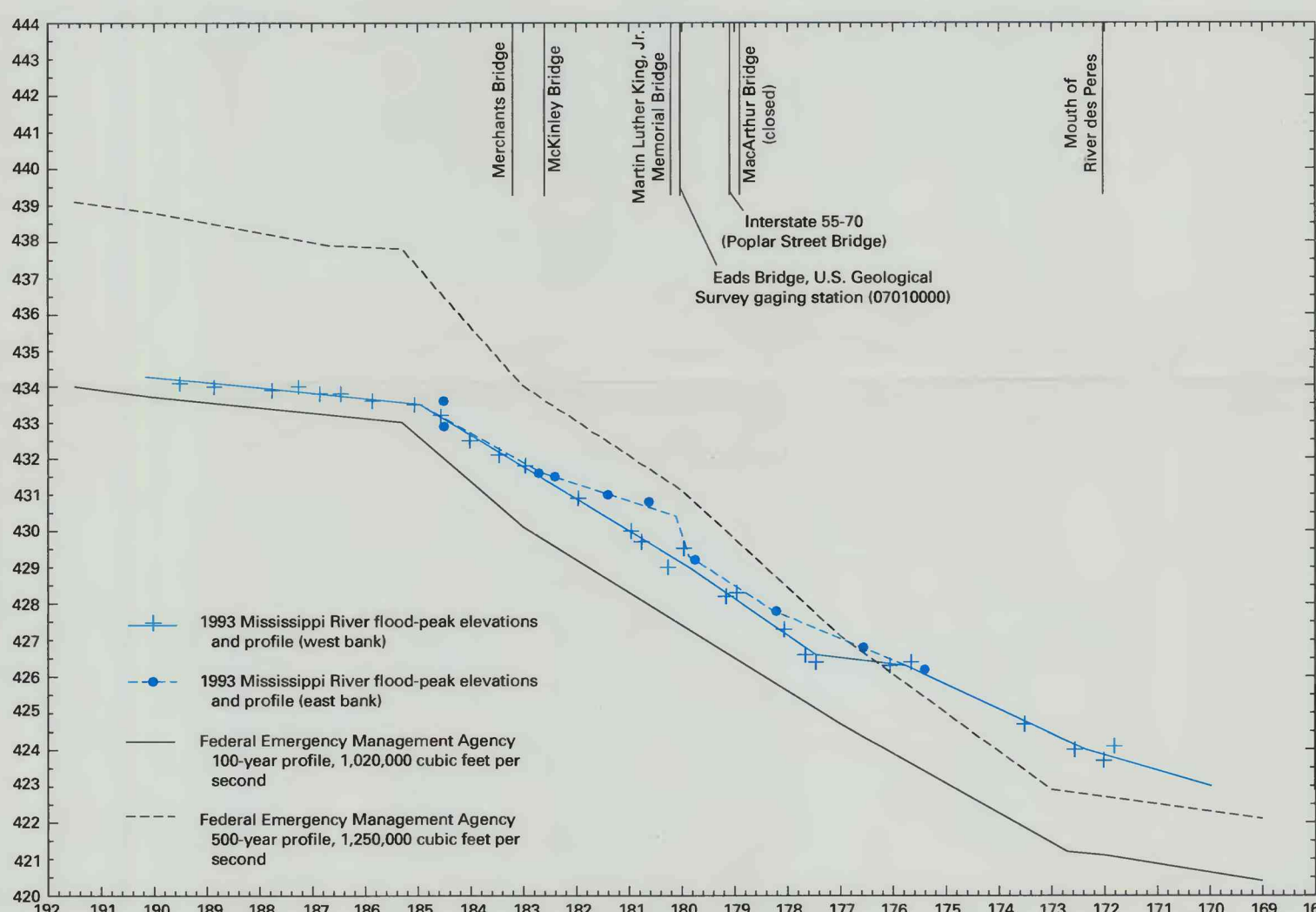


Figure 20. The 1993 flood-peak elevations and profiles and the Federal Emergency Management Agency 100- and 500-year flood profiles (U.S. Department of Housing and Urban Development, 1993b, panel 136; 1993c, panels 1, 2) along the Mississippi River in the city of St. Louis and vicinity, Missouri.

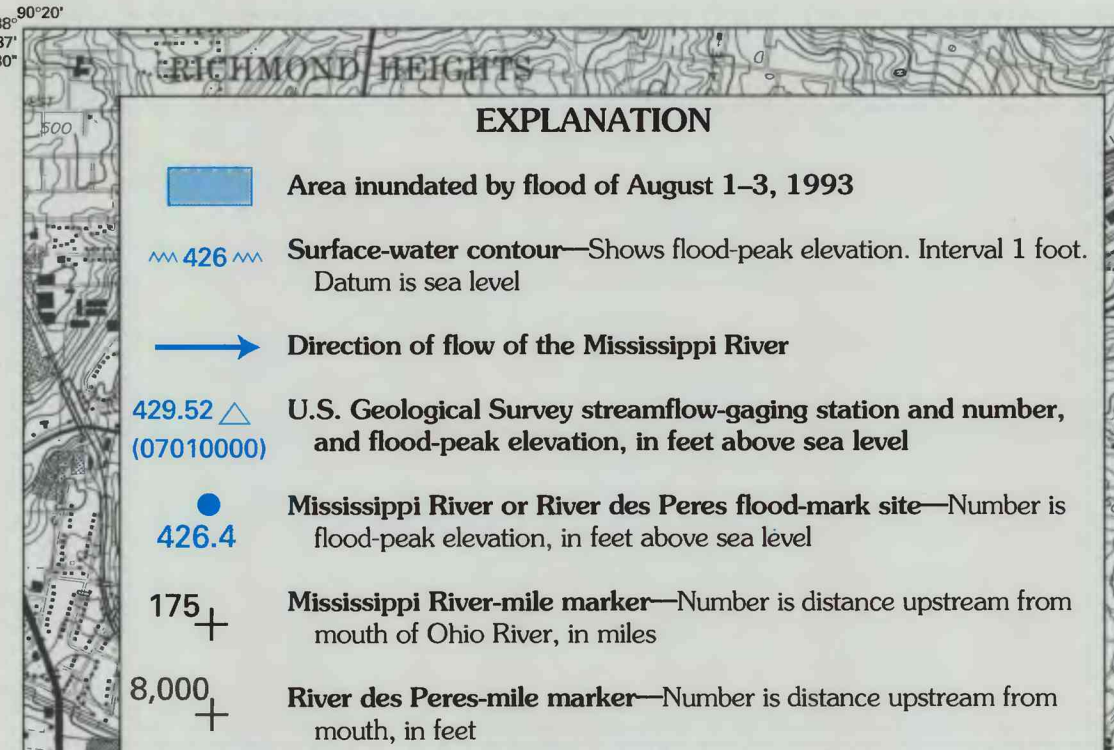


Figure 18. The Mississippi River and River des Peres flood-peak elevations and extent of flooding during August 1-3, 1993, in the city of St. Louis and vicinity, Missouri.

DELINEATION OF FLOODING WITHIN THE UPPER MISSISSPPI RIVER BASIN—FLOOD OF AUGUST 1-3, 1993, IN ST. LOUIS AND VICINITY, MISSOURI—CITY OF ST. LOUIS AND VICINITY

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