

MISSOURI RIVER AND MISSISSIPPI RIVER FLOOD-PEAK ELEVATIONS—WEST ALTON AND VICINITY

The 1993 flood-peak elevations of the Missouri and the Mississippi Rivers near West Alton and vicinity were determined from USGS and U.S. Army Corps of Engineers (St. Louis District) stage-gaging station data and by surveying high-water flood marks after the water had receded (fig. 13). All USGS flood-elevation data on the Missouri and the Mississippi Rivers were compiled with other flood-mark data collected by the U.S. Army Corps of Engineers (St. Louis and Kansas City Districts) and St. Louis County (Department of Highways and Traffic).

The Missouri River flood-peak elevations and discharge in West Alton and vicinity would have been even higher had the Federal reservoir system not been in place and operational. For example, Missouri River peak discharges near St. Louis were estimated to have been reduced by more than 100,000 ft³/s as a result of storage of flood flows in reservoirs upstream (Perry, 1994, p. 11).

The water-surface elevations of the 1993 flooding of the Mississippi River near West Alton and vicinity are shown in figure 14. The figure shows the June through August elevations for the Mississippi River at the U.S. Army Corps of Engineers, St. Louis District, tailwater-gaging station at Melvin Price Locks & Dam.

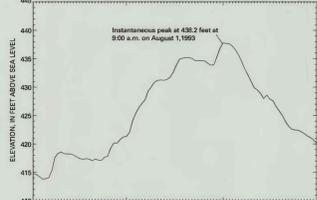


Figure 14. Water-surface elevations of the Mississippi River at Melvin Price Locks & Dam near Alton, Illinois, June through August 1993 (U.S. Army Corps of Engineers tailwater-gaging station).

FLOOD PROFILES

The flood-peak elevations determined from the U.S. Army Corps of Engineers gaging station data and by surveying flood-mark data along the Missouri and the Mississippi River flood plains were used to interpret the 1993 flood profiles and to assist in delineating the area inundated by the August 1 flood peak in West Alton and vicinity. These flood marks are subject to errors in maximum-height interpretation, localized increases and decreases in water-surface levels because of water-velocity differences, and accuracy of reference elevations used in the surveying process. The best-fit Missouri and Mississippi River flood-peak profiles (figs. 15, 16, respectively) and water-surface contour lines (fig. 13) 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. Flood-peak elevation locations are plotted and referenced by distance, in river miles, upstream from the mouth of the Missouri and the Ohio Rivers.

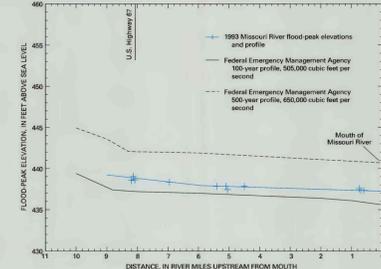


Figure 15. The 1993 flood-peak elevations and profile and the Federal Emergency Management Agency 100- and 500-year flood profiles (U.S. Department of Housing and Urban Development, 1993c, panels 127, 138) along the Missouri River near West Alton and vicinity, Missouri.

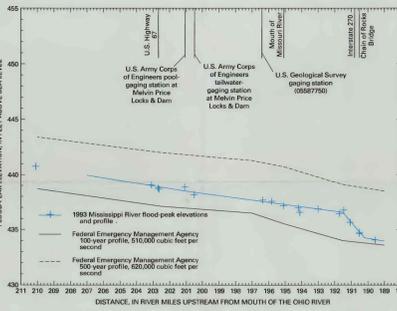


Figure 16. The 1993 flood-peak elevations and profile and the Federal Emergency Management Agency 100- and 500-year flood profiles (U.S. Department of Housing and Urban Development, 1992, 1993c, panel 2) along the Mississippi River near West Alton and vicinity, Missouri.

INUNDATED AREA

The extent of the Missouri and the Mississippi Rivers flooding from August 1 through 3, 1993, in West Alton and vicinity was determined by using surface-water contours shown in figure 13. These elevation data were used to hand-draw the outlines of the 1993 inundation boundaries for each river on 1:24,000-scale (contour interval, 10 ft) topographic maps of West Alton and vicinity. By using the GIS software package ARC/INFO, the hand-drawn outline of the 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 Missouri and the Mississippi Rivers was scanned from a set of 1:24,000-scale aerial photographs taken on August 2, 1993 (Walker and Associates, Fenton, Missouri). These scanned inundation boundaries were manually digitized into a second ARC/INFO coverage.

A limited amount of onsite inspection was done in areas where the two outlines for each river did not agree as to the limits of flood inundation. For example, some small areas of land within the Missouri/Mississippi River inundation boundary (Portage des Sioux and Columbia Bottom) 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-floodwater/land-surface contact (particularly in local areas of dense vegetation) from the aerial photographs. The August 1 through 3, 1993, Missouri River and Mississippi River extent of flooding shown in figure 13 is considered to be the best interpretation on the basis of both inundation outlines.

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

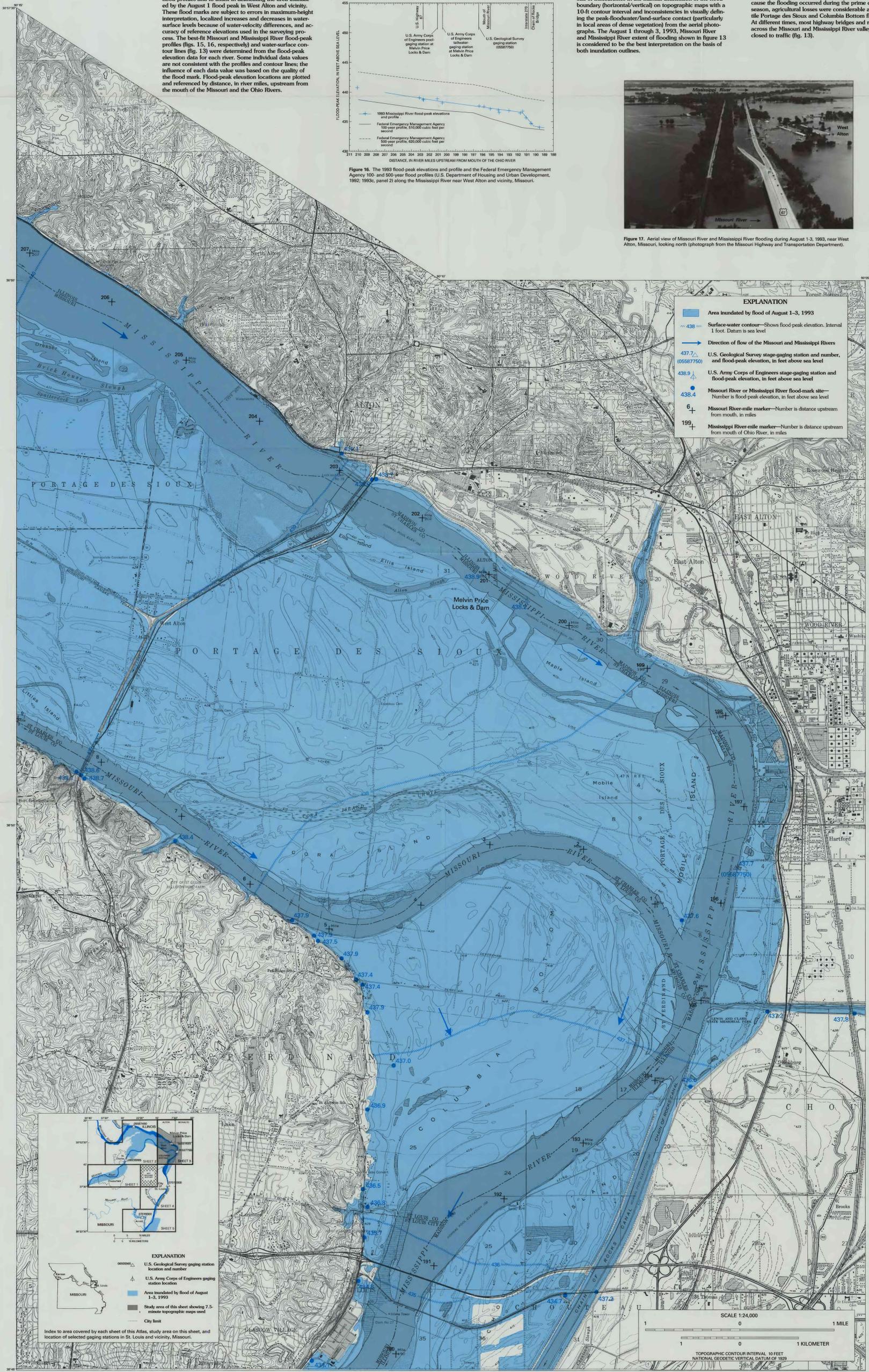
The National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973 were established to encourage State and local governments to adopt wise flood-plain-management practices. The FEMA has adopted the 100-year flood as the base flood for purposes of defining the flood boundaries of the 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 Missouri and the Mississippi Rivers flooding from August 1 through 3, 1993, in West Alton and vicinity, the FEMA 100- and 500-year flood profiles for the Missouri (U.S. Department of Housing and Urban Development, 1993b, panels 137 and 138) and the Mississippi (U.S. Department of Housing and Urban Development, 1992, 1993c, panel 2) Rivers are shown in figures 15 and 16, respectively.

FLOOD DAMAGES

In West Alton and vicinity, a substantial part of the 1993 flood damages was related to the floodwater breaching the Missouri River and the Mississippi River levee systems. For example, the breaching of these levees resulted in the inundation of the Alton, Illinois, water-treatment facilities, the closing of U.S. Highway 67, and the damage to many businesses in West Alton, Missouri (fig. 17). Because the flooding occurred during the prime crop-growing season, agricultural losses were considerable along the fertile Portage des Sioux and Columbia Bottom flood plains. At different times, most highway bridges and railroad lines across the Missouri and Mississippi River valleys were closed to traffic (fig. 13).



Figure 17. Aerial view of Missouri River and Mississippi River flooding during August 1-3, 1993, near West Alton, Missouri, looking north (photograph from the Missouri Highway and Transportation Department).



- EXPLANATION**
- Area inundated by flood of August 1-3, 1993
 - Surface-water contour—Shows flood-peak elevation. Interval 1 foot. Datum is sea level
 - Direction of flow of the Missouri and Mississippi Rivers
 - U.S. Geological Survey stage-gaging station and number, and flood-peak elevation, in feet above sea level
 - U.S. Army Corps of Engineers stage-gaging station and flood-peak elevation, in feet above sea level
 - Missouri River or Mississippi River flood-mark site—Number is flood-peak elevation, in feet above sea level
 - Missouri River-mile marker—Number is distance upstream from mouth, in miles
 - Mississippi River-mile marker—Number is distance upstream from mouth of Ohio River, in miles

- EXPLANATION**
- U.S. Geological Survey gaging station location and number
 - U.S. Army Corps of Engineers gaging station location
 - Area inundated by flood of August 1-3, 1993
 - Study area of this sheet showing 7.5-minute topographic map used
 - City limit
- Index to areas covered by each sheet of this Atlas, study area on this sheet, and location of selected gaging stations in St. Louis and vicinity, Missouri.

Base from U.S. Geological Survey, Columbia Bottom, 1:24,000, 1961; Wood River, 1:24,000, 1956; Alton, 1:24,000, 1954 (Photorevised 1963 and 1974); and Embudo, 1:24,000, 1954 (Photorevised 1963)

Figure 13. The Missouri River and Mississippi River flood-peak elevations and extent of flooding during August 1-3, 1993, in West Alton and vicinity, Missouri.