Table 1. Manning's n-values used in model calibration
[ft, feet]

Land-use coverage	Lower depth		Upper depth	
	Manning's n	Depth (ft)	Manning's n	Depth (ft)
Channel and bank				
Mississippi River main channel	0.025	15	0.031	20
Spur dikes (on main channel banks)	.500	20	.050	25
Commercial and railroad embankment	.075	3	.050	8
Old River and Horse Island Chute	.040	2	.045	5
Floodplain				
Row crop	.100	3	.065	8
Timber and brush	.160	2	.220	5
Open timber and brush	.075	5	.120	10
Brush (small willows, scrub)	.170	5	.130	8
Pasture (native grass)	.055	1	.045	2
Road and embankment	.045	1	.040	2
Bois Brule Levee (crab grass, bluegrass)	.055	1	.045	3

Table 2. Final simulated results for three alternative discharges

[ft^3/s, cubic feet per second; ft, feet]

Discharge type	Discharge (ft^3/s)	Water-surface elevation at gage (ft)	Water-surface elevation at downstream boundary (ft)	Difference in water-surface elevations (ft)
Measured	944,000	390.18	388.35	1.83
Maximum	1,000,000	390.83	388.85	1.98
Impendent	894,000	387.09	385.15	1.94

Table 3. Simulated and calculated discharges through Horse Island Chute bridge

[ft^3/s, cubic feet per second]

Discharge	Total discharge (ft^3/s)	Simulated discharge through Horse Island Chute bridge[1] (ft^3/s)	Calculated discharge through Horse Island Chute bridge based on regression (ft^3/s)	Simulated minus calculated discharge (ft^3/s)	Percent difference from calculated discharge
Measured	944,000	54,700	51,600	3,100	6.0
Maximum	1,000,000	59,200	57,500	1,700	3.0
Impendent	894,000	47,800	46,400	1,400	3.0

[1] Flow over road embankment is not included.

Table 4. Contraction scour depths and parameters used to compute scour

[ft/s, feet per second; ft^3/s, cubic feet per second; ft, feet]

Parameter required to compute scour depth	Measured discharge	Maximum discharge	Impendent discharge
Critical velocity of incipient motion (ft/s)	2.69	2.70	2.65
Average velocity in approach channel (ft/s)	2.22	2.35	2.13
Type of scour	Clear water	Clear water	Clear water
Approach section (fig. 12)			
Discharge (ft^3/s)	23,130	24,952	20,270
Channel width (ft)	296.6	296.6	296.6
Average depth (ft)	35.1	35.8	32.0
Energy grade line elevation (ft)	391.0	391.8	388.0
Downstream bridge face (fig. 12)			
Discharge (ft^3/s)	54,830	59,297	47,797
Channel width (ft)	460.8	460.8	460.8
Average depth (ft)	33.4	34.1	30.2
Energy grade line elevation (ft)	390.5	391.2	387.4
Computed contraction scour depth (ft)	**8.1**	**10.3**	**6.7**

Table 5. Local pier scour depths and parameters used to compute scour

[MoDOT, Missouri Department of Transportation; ft, feet; ft/s, feet per second]

MoDOT bent number[1]	Stationing along centerline from left (north) end of bridge[2] (ft)	Maximum depth at upstream face[3] (ft)	Maximum velocity at upstream face[3] (ft/s)	Angle of attack computed by FESWMS-2DH (degrees)	Computed pier scour depth (ft)
Measured discharge					
14	34.0	40.14	4.12	0.2	3.8
13	67.0	40.14	4.12	1.9	4.2
12	100.0	40.14	4.12	3.2	4.5
11	133.0	40.14	4.12	4.5	4.7
10	166.0	40.14	4.12	5.6	4.9
9	199.0	40.14	4.12	6.1	5.0
8	232.0	40.14	4.12	6.4	5.1
7	265.0	40.14	4.12	6.6	5.1
6	298.0	40.14	4.12	6.7	5.1
5	331.0	40.14	4.12	6.8	5.1
4	364.0	40.14	4.12	7.0	5.2
3	397.0	40.14	4.12	7.4	5.2
2	430.0	40.14	4.12	7.0	5.2
Maximum discharge					
14	34.0	40.99	4.34	0.9	4.1
13	67.0	40.99	4.34	1.4	4.2
12	100.0	40.99	4.34	2.9	4.5
11	133.0	40.99	4.34	4.2	4.8
10	166.0	40.99	4.34	5.4	5.0
9	199.0	40.99	4.34	6.1	5.1
8	232.0	40.99	4.34	6.4	5.2
7	265.0	40.99	4.34	6.7	5.2
6	298.0	40.99	4.34	6.8	5.3
5	331.0	40.99	4.34	7.1	5.3
4	364.0	40.99	4.34	7.3	5.3
3	397.0	40.99	4.34	7.9	5.5
2	430.0	40.99	4.34	7.6	5.4
Impendent discharge					
14	34.0	37.23	4.08	0.5	3.9
13	67.0	37.23	4.08	2.0	4.2
12	100.0	37.23	4.08	3.2	4.4
11	133.0	37.23	4.08	4.3	4.6
10	166.0	37.23	4.08	5.3	4.8
9	199.0	37.23	4.08	5.7	4.9
8	232.0	37.23	4.08	5.8	4.9
7	265.0	37.23	4.08	5.8	4.9
6	298.0	37.23	4.08	5.6	4.8
5	331.0	37.23	4.08	5.4	4.8
4	364.0	37.23	4.08	5.1	4.8
3	397.0	37.23	4.08	4.9	4.7
2	430.0	37.23	4.08	2.7	4.3

[1] Pier/bent number corresponds to Missouri Department of Transportation bridge plans.

[2] Stationing is the distance from the left abutment (as viewed facing downstream).

[3] Maximum depth and velocity are used for all bents to account for possible changes in the thalweg during a flood event.

Table 6. Local abutment scour depths and parameters used to compute scour

[ft^3/s, cubic feet per second; ft, feet; ft^2, square feet; ft/s, feet per second]

Parameter required for computation of scour depth	Measured discharge	Maximum discharge	Impendent discharge
Left (north) abutment/embankment (from left abutment toe to flow separation line)			
Discharge blocked by embankment[1] (ft^3/s)	1,246	1,428	715
Embankment length (ft)	143	143	143
Area of blocked flow (ft^2)	2,520	2,539	2,447
Velocity at upstream toe (ft/s)	2.41	2.63	2.13
Computed abutment scour depth (ft)	**25.4**	**26.1**	**20.6**
Right (south) abutment/embankment (from right abutment toe to levee)			
Discharge blocked by embankment[1] (ft^3/s)	2,928	3,337	1,160
Embankment length (ft)	278.1	278.1	278.1
Area of blocked flow (ft^2)	3,140	3,178	2,998
Velocity at upstream toe (ft/s)	2.96	3.16	2.56
Computed abutment scour depth (ft)	**34.4**	**35.3**	**28.7**

[1]Discharge blocked by embankment is the difference in total approach discharge blocked and amount of flow over the road embankment.