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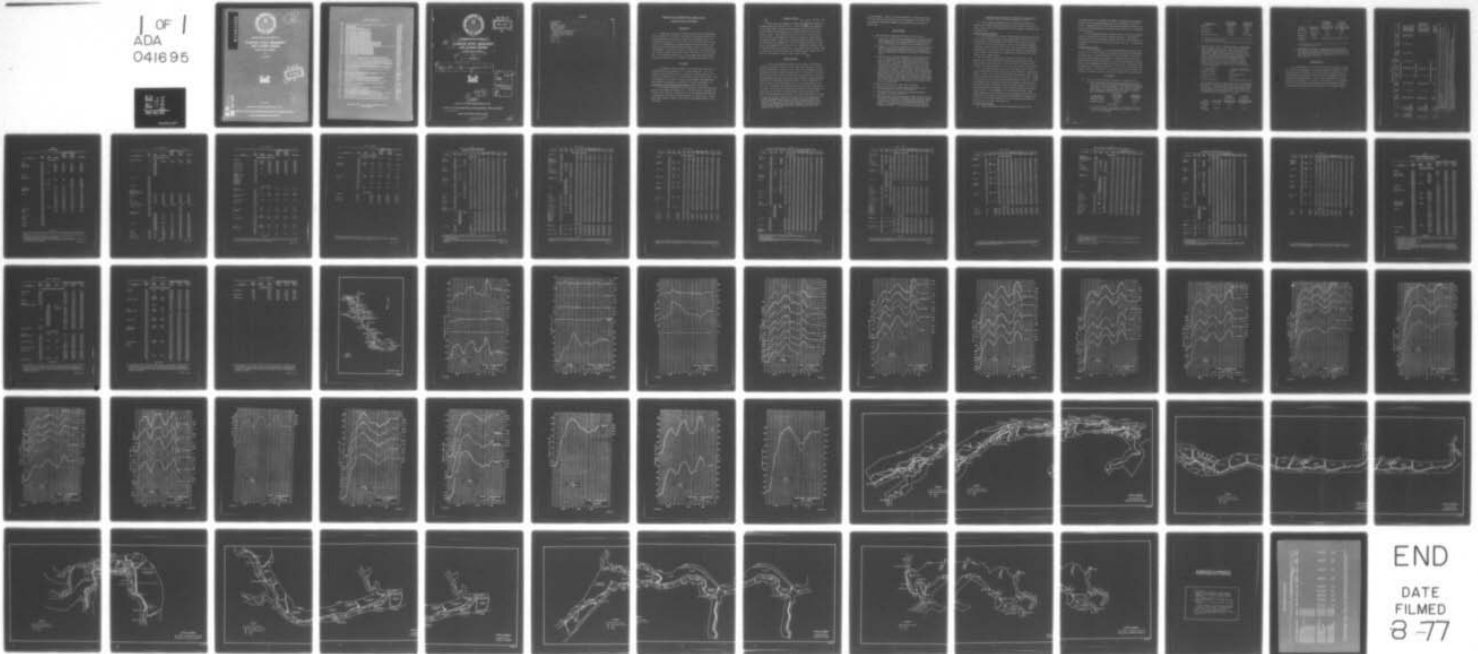
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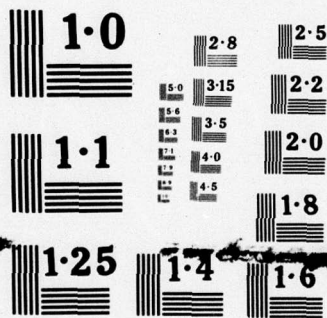
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MISSISSIPPI BASIN MODEL REPORT 31-5

FLOWLINE STUDY, MISSISSIPPI AND ILLINOIS RIVERS

Hydraulic Model Investigation

by

J. E. Foster



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June 1977

Sponsored by U. S. Army Engineer District, St. Louis

Conducted by U. S. Army Engineer Waterways Experiment Station, Vicksburg, Mississippi

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MISSISSIPPI BASIN MODEL REPORTS

Issued Prior to and Including This Report

Report No.	Title	Date
1-1	Preliminary Report on Proposed Reservoir Operation Model, Mississippi River and Tributaries	October 1942
1-2	Report on Proposed Site	October 1942
1-3	Definite Project Report	April 1943
1-4	Description of the Mississippi Basin Model	July 1951
1-5	Automatic Instrumentation of the Mississippi Basin Model	November 1955
1-6	History and Description of the Mississippi Basin Model	August 1971
2-1	Report of First Meeting of Mississippi Basin Model Board	October 1945
2-2	Report of Second Meeting of Mississippi Basin Model Board	March 1947
2-3	Report of Third Meeting of Mississippi Basin Model Board	May 1948
2-4	Report of Fourth Meeting of Mississippi Basin Model Board	August 1948
2-5	Report of Fifth Meeting of Mississippi Basin Model Board	June 1949
2-6	Report of Sixth Meeting of Mississippi Basin Model Board	March 1950
2-7	Report of Seventh Meeting of Mississippi Basin Model Board	March 1951
2-8	Report of Eighth Meeting of Mississippi Basin Model Board	August 1952
2-9	Report of Ninth Meeting of Mississippi Basin Model Board	September 1953
2-10	Report of Tenth Meeting of Mississippi Basin Model Board	October 1954
2-11	Report of Eleventh Meeting of Mississippi Basin Model Board	October 1955
2-12	Report of Twelfth Meeting of Mississippi Basin Model Board	May 1956
2-13	Report of Thirteenth (Fiscal Year 1957) Meeting of Mississippi Basin Model Board	May 1957
2-14	Report of Fourteenth (Fiscal Year 1958) Meeting of Mississippi Basin Model Board	May 1958
2-15	Report of Fifteenth (Fiscal Year 1959) Meeting of Mississippi Basin Model Board	May 1959
2-16	Report of Sixteenth Meeting of Mississippi Basin Model Board, Fiscal Year 1960	June 1960
2-17	Special Report of the Mississippi Basin Model on Curtailment of Model Limits (Seventeenth Meeting of the Board)	September 1960
2-18	Report of Eighteenth Meeting of Mississippi Basin Model Board, Fiscal Year 1961	July 1961
2-19	Report of Nineteenth Meeting of Mississippi Basin Model Board	July 1962
2-20	Report of Twentieth Meeting of Mississippi Basin Model Board	August 1963
2-21	Report of Twenty-First Meeting of Mississippi Basin Model Board	April 1964
2-22	Report of Twenty-Second Meeting of Mississippi Basin Model Board	April 1965
2-23	Report of Twenty-Third Meeting of Mississippi Basin Model Board	May 1966
2-24	Report of Twenty-Fourth Meeting of Mississippi Basin Model Board	June 1967
2-25	Report of Twenty-Fifth Meeting of Mississippi Basin Model Board	June 1968
2-26	Report of Twenty-Sixth Meeting of Mississippi Basin Model Board	June 1969
2-27	Report of Twenty-Seventh Meeting of Mississippi Basin Model Board	June 1970
3-1	The Mississippi Basin Model	Rev April 1950
12-1	Verification of Sioux City-to-Bertram Reach, Missouri River and Tributaries, 1950 and 1947 Floods	April 1952
12-2	Verification of Sioux City-to-Mouth Reach, Missouri River and Tributaries, 1952 and 1951 Floods	June 1962
13-1	Verification of the Pickwick Dam-Kentucky Dam Reach, Tennessee River and Tributaries, 1950 and 1948 Floods	December 1960
14-1	Verification of Tulsa-to-Van Buren Reach, Arkansas River and Tributaries, Spring 1941 and 1943 Floods	July 1951
14-2	Verification of Van Buren-to-Pine Bluff Reach, Arkansas River and Tributaries, Spring 1941 and 1943 Floods	November 1952
15-1	Verification of Hannibal-to-St. Louis Reach, Mississippi River and Tributaries, 1947, 1944, and 1943 Floods	August 1951
15-2	Verification of Hannibal-to-Thebes Reach, Mississippi River and Tributaries, 1947, 1944, and 1943 Floods	May 1952
23-1	Effects of Reservoirs and Results of Steady-Flow Tests, Cumberland River	June 1965
23-2	Kentucky Reservoir Steady Flow Profiles and Effects of Pickwick Discharge Duration on Downstream Stages	July 1965
23-3	Effects of Cheatham and Barkley Reservoirs and Coordinated Operation of Barkley and Kentucky Reservoirs, Cumberland and Tennessee Rivers	May 1969
24-1	Flood-Routing and Reservoir-Operation Study, Tulsa-to-Van Buren Reach, Arkansas River and Tributaries	April 1961
29-1	Comprehensive Testing Program	November 1971
31-1	Operation of the Birds Point-New Madrid Floodway	July 1957
31-2	Adequacy of Project Levee Grades in Hannibal-to-Thebes Reach, Mississippi River and Tributaries	April 1957
31-3	Proposed Alignments for Columbia Bottoms Levee, St. Louis Industrial Park	January 1960
31-4	Mississippi River Hypothetical Flood 524	September 1962
31-5	Floodrise Study, Mississippi and Illinois Rivers	June 1977
32-1	Effects of Agricultural Levees on Design Flood Profiles for Kansas City Local Protection	May 1955
32-2	Tests for Re-evaluation of Missouri River Agricultural Levees in the Kansas City District	December 1959
32-3	Tests for Re-evaluation of Missouri River Agricultural Levees in the Omaha District	May 1960
34-1	Effects of Project Levees Along Point Remove Creek, Tributary of Arkansas River	June 1956
34-2	Adequacy of Project Levee Grades Without and with Reservoir Modification, Van Buren to Pine Bluff, Arkansas River	April 1957
38-1	Effects of Height and Alignment of Levees at Confluence of Missouri and Mississippi Rivers	October 1971
42-1	Hypothetical Storms over the Iowa Tributaries	October 1956
43-1	The Ohio River Hypothetical Flood 08-1	February 1962
44-1	Determination of Discharge Hydrographs for Arkansas River and Tributaries, April 1927 Flood	June 1956
52-1	Tests of Channel Realignment near St. Joseph, Missouri	October 1954
81-1	Effects of Proposed Highway Fill Across Chouteau Island	January 1959
81-2	Effects of Proposed Chain of Rocks Dam, Mississippi River, Mile 190.1	September 1959
81-3	Effects of Roadway Construction on Mississippi River Flow, Laha County, Tennessee	December 1967
81-4	Report of Model Study, Effects of Modifying Operation of Old River Control Structure on 1945, 1961, 1967, and 1968 Flood Flows; Appendix A, Additional Hydrographs	March 1972
81-5	Report of Model Study Effects of Ultimate Channel Development in the Atchafalaya Basin	December 1973
86-1	Effects of Roadway Embankment and Waterway Openings of Proposed Interstate Highway 155 on Mississippi River Floods	July 1966
86-2	Effects of Southwind Maritime Centre on Ohio River Flow Conditions at Mount Vernon, Indiana	April 1972
92-1	Effects of Flood Heights of Levee, Railroad, and Highway Fills in the Flood Plains of the Missouri River	October 1955

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MISSISSIPPI BASIN MODEL REPORT 31-5

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FLOWLINE STUDY, MISSISSIPPI AND ILLINOIS RIVERS

Hydraulic Model Investigation

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by

James A. E. Foster

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WES-Miss-Basin Model-31-5



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Contents

	<u>Page</u>
Introduction	2
The Model	2
Purpose of Study	3
Model Adjustment	3
Test Procedure	4
Mississippi River flowline	5
Illinois River flowline	5
Missouri River flowline	6
Conclusions	6
Tables 1-7	
Plates 1-25	

FLOWLINE STUDY, MISSISSIPPI AND ILLINOIS RIVERS

Hydraulic Model Investigation

Introduction

1. Model tests to develop frequency profiles for the Mississippi River from mile 0 to 300 above the mouth of the Ohio River and for the Illinois River from its mouth to mile 80 were requested by the U. S. Army Engineer District, St. Louis (SLD), in letter dated 18 April 1974 to the U. S. Army Engineer Waterways Experiment Station (WES). Additional tests were requested during subsequent visits to the model by SLD personnel. Funds for the study were authorized in Intra-Army Order No. ED 98-74, dated 17 April 1974, and No. ED 98-74 R-1, dated 22 April 1974. The study was conducted on the Mississippi Basin Model (MBM) at the Jackson Installation of the WES from November 1974 to April 1975.

The Model

2. The MBM is a fixed-bed model of the Mississippi River and its tributary system from Hannibal, Mo., to Baton Rouge, La. It is constructed to a horizontal scale of 1:2000 and a vertical scale of 1:100 and has a discharge scale of 1:1,500,000 and a time scale of 1:267. General features of this model, including appurtenances, instrumentation, and operating procedures, are described in detail in MBM Report 1-4, Description of the Mississippi Basin Model, dated 18 July 1951.

3. The study reported herein was conducted on the Mississippi River portion of the MBM from Hannibal, Mo., to Wickliffe, Ky., including the Illinois River upstream to Meredosia, Ill.; the Missouri River upstream to Hermann, Mo.; and the Ohio River upstream to Golconda, Ill. Plate 1 shows model limits, streams, inflow points, and gaging stations in the test reach.

Purpose of Study

St. Louis District

4. These tests were conducted to develop water surface profiles on the Mississippi and Illinois Rivers to assist the SLD in (a) updating rating curves, (b) reestablishing design grades for authorized levee projects,* and (c) developing data for economic benefit and flood insurance studies. These profiles will also be used to ascertain which river flowline, the Mississippi, Illinois, or Missouri, would produce the highest stages at points along the Mississippi and Illinois Rivers for particular flow frequencies. Stages on the Mississippi and Illinois Rivers just upstream of St. Louis, Mo., are affected by backwater from the Missouri River and by each other to the extent that the maximum stage at a given point for a particular flow frequency may be produced by the flows of this frequency on any of these three rivers.

Model Adjustment

5. Prior to conducting the study, the test reach of the MBM was adjusted to reproduce the 1973 flood to insure that the model reflected existing conditions. Levees were installed to the alignment and grade furnished by the SLD as those existing in 1973. Flows that occurred during the period from 1 March to 5 May 1973 were introduced on the model, and adjustments were made to make the model reproduce stage hydrographs recorded in the prototype during this period. Since the MBM does not have a separate inflow instrument for all of the small streams, flows from minor tributaries were combined with those of larger tributaries in the reach. As a result of this method of operation, it was necessary to adjust some of the flows to better simulate actual prototype flows. Water surface elevations at Wickliffe, Ky., were held to those recorded

* Authorized projects include 5 SLD levee units on the Mississippi River (Kaskaskia Island, Columbia Bottoms, and agricultural levee units 8, 10, and 12) and 13 SLD levee units on the Illinois River (Nutwood, Elred Spankey, Elred, Keach, Hartwell, Hillview, Big Swan, Scott County, McGee Creek, Meredosia, Meredosia Lake, and 2 upstream of model limits).

in the prototype. Plates 2-4 show the measured or computed prototype flow with modifications made during model adjustment. Resulting stage and discharge hydrographs compared with prototype data are shown in plates 5-19.

Test Procedure

6. These tests were conducted with three series of flows:
 - a. Flows of 5- to 500-year frequencies and the agricultural and urban design floods on the Mississippi River with the Illinois and Missouri River flows required to maintain the correct flow frequency relationship on the Mississippi River.
 - b. Flows of 5- to 500-year frequencies and the agricultural and modified agricultural design floods on the Illinois River with the Mississippi and Missouri River flows required to give the appropriate elevation at the mouth of the Illinois River.
 - c. Flows of 10- to 100-year frequencies on the Missouri River with the Mississippi and Illinois River flows required to give the appropriate flow frequency relationship on the Missouri River. The Mississippi River urban design flood, with a crest discharge of 1,300,000 cfs at St. Louis, Mo. (equivalent to the flood of record that occurred in 1844) is the flood for which the existing St. Louis levee and floodwall are designed. This extreme flood is considerably rarer than the 100-year frequency event. The Illinois River agricultural design flood is a flood equal to the May 1943 Illinois River flood coincident with a 50-year flood on the Mississippi River. The frequency of this flood varies somewhat through the 80-mile reach of the Illinois River in the SLD, but is approximately equivalent to the 100-year event on the Illinois River.
7. Flowlines were tested with three levee conditions:
 - a. Existing levees on the Mississippi and Missouri Rivers and authorized levees on the Illinois River.
 - b. SLD-authorized levees except for a combined Kaskaskia Island-Ste. Genevieve area levee.
 - c. SLD-authorized levees with Kaskaskia Island levee to existing authorized alignment with grades equal to Federal levees in the area. The flows for the Illinois and Missouri River flowlines were tested with only SLD-authorized levees installed. The combination of flows used for each test is presented in Table 1. The locations of both existing and

authorized levees are shown in Plates 20-25 and grades of levees for both conditions are presented in Table 2.

8. Water surface elevations for all tests were recorded in the channel at all model gaging stations and at other points necessary to give a detailed profile at approximately 1-mile intervals along the various levee units.

Mississippi River flowline

9. Eight combinations of flows representing Mississippi River flowlines from the 5-year frequency to the Urban Design Flood were tested in the Hannibal to Wickliffe Reach with existing levee conditions (tests 1-8) and then with authorized levees except for the combined Kaskaskia Island-Ste. Genevieve levee (tests 9-16). The water surface elevations at Wickliffe, Ky., were held to a rating curve furnished by the Memphis District (MED). Levees were not crevassed even though some were overtopped with the higher flows.

10. The flows for the 500-year frequency were tested in the Hannibal-to-St. Louis Reach with authorized levees installed (test 17). Water surface elevation at Chain of Rocks was held to a rating curve developed from data recorded for tests 1-16. No levees were crevassed.

11. Six flows, the same as in tests 3-8, were tested in the St. Louis-to-Wickliffe Reach with authorized levees installed, including the Kaskasia Island levee at the existing authorized alignment, and at grades equal to those of other Federal levees in the area (tests 18-23). Stages at Wickliffe were held to the same elevations used in tests 3-8. Levees were crevassed for a distance of 2000 ft (prototype) at both the upper and lower ends and in some cases along the center portion of the levee units when they were overtopped. Levee crevasse locations are shown in Plates 23 and 24. The crevassing of the levees was tested to more closely approximate what would occur in the prototype during floods exceeding the levee design. Water surface elevations were recorded only in the St. Louis-to-Thebes reach since test conditions from Thebes to Wickliffe were the same as for tests 3-8.

Illinois River flowline

12. Eight combinations of flows representing Illinois River

flowlines from the 5- to 500-year frequency were tested in the Hannibal-to-St. Louis reach with SLD-authorized levees installed (tests 24-30 and 32). Stages at Chain of Rocks were held to elevations obtained with flows for the Mississippi River flowline (tests 9-15 and 17). No levees were crevassed.

13. The modified agriculture design flow was tested on the Illinois River with the authorized levees installed (test 31). The stage at Grafton was held to the elevation obtained for test of the 50-year Mississippi River flowline with authorized levees (test 12). No levees were crevassed.

Missouri River flowline

14. Three combinations of flows representing Missouri River flowlines of 10-, 25-, and 100-year frequencies were tested in the Hannibal-to-Thebes reach with the SLD-authorized levees installed (tests 33-35). These tests were conducted to determine if Missouri River floods would produce higher backwater elevations on the upper Mississippi and Illinois Rivers than corresponding frequencies on these rivers. Stages were held at Grays Point to elevations recorded for tests of the Mississippi River flowline (tests 10, 11, and 13). No levees were crevassed. Stages were recorded at the same locations used for Mississippi River flowline tests.

Conclusions

15. The test results, presented in Tables 3-7 indicate that:
- a. Existing Federally constructed Mississippi River levees (tests 1-8) will protect against Mississippi River floods of at least a 50-year frequency. The additional authorized levee units (5 on the Mississippi and 13 on the Illinois River) that were examined in this test series presently give the degree of protection shown below:

<u>Levee Unit</u>	<u>Mississippi River Mile</u>	<u>Degree of Protection*</u>
Kaskaskia Island	111-116	10-year
Columbia Bottoms	193-195	None

(Continued)

* Degree of protection determined by elevation of levee less 2 ft of freeboard.

<u>Levee Unit</u>	<u>Mississippi River Mile</u>	<u>Degree of Protection</u>
Ag area 8	249-261	20-year
Ag area 10	265-272.5	5-year
Ag area 12	288-293	25-year
Illinois River units	15-80*	20 to 50**

* Illinois River mileage.

** Degree of protection based on existing grade of levees.

- b. Increasing the height of existing levees to authorized grades (compare Tables 4 and 5 with Table 3) would provide increased protection for these levee units but would raise stages slightly on unprotected areas when floodwaters exceeded the height of the existing levees. Since all potential levee construction examined in this series involves raising and strengthening existing units (except Columbia Bottoms), changes to flood heights would occur only in the vertical increment between the top of the existing and the raised levee. The degree of protection for the additional authorized units is as follows:

<u>Levee Unit</u>	<u>Degree of Protection</u>
Kaskaskia Island	50-year
Columbia Bottoms	Urban design flood
Ag areas 8, 10, 12	50-year
Illinois River units	Agricultural design flood

The increased stages that would result from the additional authorized levee units on both rivers will vary according to location. In general, Mississippi River stages would increase less than 1 ft along the raised levee with the effect gradually decreasing upstream. Test data indicated the magnitude of the increase is as follows:

<u>Unit</u>	<u>River Mile</u>	<u>Increase at Upstream End, ft, for Design Flood</u>	<u>Increase ±10 Miles Upstream, ft, for Design Flood</u>
Kaskaskia Island	111-116	+0.6	+0.3
Columbia Bottoms	193-195	+0.4	+0.5

<u>Unit</u>	<u>River Mile</u>	<u>Increase at Upstream End, ft, for Design Flood</u>	<u>Increase ±10 Miles Upstream, ft, for Design Flood</u>
Ag area 8	249-261	+0.9	+0.8*
Ag area 10	265-272.5	+0.9	+0.3
Ag area 12	288-293	+0.9	0
Illinois R. Levees	15-80	Varies, but is less than 1.0 ft	

* Affected by Ag area 10.

- c. Crevassing all levees as overtopping occurs would reduce the stages of the higher flows more than construction of the authorized levees would raise them; thus, the net effect would be a reduction of stages from 0 to 4.0 ft (compare tests 19-23 with 4-8).

Recommendation

16. Interpretation of the results of these tests should be made by, or with the assistance of, experienced hydraulic personnel to avoid possible erroneous comparisons and conclusions. The results can best be understood by graphically comparing the water-surface profiles for the various levee conditions. Since possible combinations of conditions are too numerous for inclusion in this report, it is recommended that the St. Louis District be consulted to determine valid combinations before proceeding with further analysis of the data presented.

Table 1

Test Conditions, Steady Flow in 1000 cfs

Test No.	Flow	Miss. River Hannibal	Cuivre River Troy	Illinois River Meredosia	Macoupin Creek Kane	Missouri River Hermann	Meramec River Eureka	Kaskaskia River New Athens	Big Muddy River Murphysboro	Ohio River Golconda	Control Gage
<u>Mississippi River Flowlines</u>											
1,9	5 yr	252	4	50	--	284	40	20	15	600	Wickliffe
2,10	10 yr	290	5	60	--	335	45	25	15	660	Wickliffe
3,11,18	25 yr	340	5	75	--	400	55	30	15	720	Wickliffe
4,12,19	50 yr	375	5	80	--	465	55	30	15	785	Wickliffe
5,13,20	100 yr	410	10	90	--	510	65	35	20	820	Wickliffe
6,14,21	200 yr	450	10	95	--	570	65	30	30	850	Wickliffe
7,15,22	Ag Design	372	8	135	--	575	55	30	25	1210	Wickliffe
8,16,23	Urb Design	450	25	175	--	650	80	40	40	950	Wickliffe
17	500 yr	500	20	100	--	630	--	40	--	--	Chain of Rocks
<u>Illinois River Flowlines</u>											
24	5 yr	228	--	73	5	284	--	--	--	--	Chain of Rocks
25	10 yr	264	--	86	5	335	--	--	--	--	Chain of Rocks
26	25 yr	312	--	102	6	400	--	--	--	--	Chain of Rocks
27	50 yr	339	--	114	7	465	--	--	--	--	Chain of Rocks
28	100 yr	375	--	127	8	510	--	--	--	--	Chain of Rocks
29	200 yr	407	--	139	9	570	--	--	--	--	Chain of Rocks
30	Ag Design	365	--	123	27	575	--	--	--	--	Chain of Rocks
31	Mod Ag Design	--	--	123	27	--	--	--	--	--	Grafton
32	500 yr	455	--	155	10	630	--	--	--	--	Chain of Rocks
<u>Missouri River Backwater Flowlines</u>											
33	10 yr	245	5	50	--	390	--	--	--	--	Grays Point
34	25 yr	280	5	60	--	475	--	--	--	--	Grays Point
35	100 yr	325	5	70	--	620	--	--	--	--	Grays Point

Note: 1. Test reach

- a. Tests 1-16 conducted in Hannibal to Wickliffe Reach. Water surface at Wickliffe controlled to rating curve furnished by Memphis District. recorded for tests 1-16.
 - b. Test 17 conducted in Hannibal to St. Louis Reach. Water surface at Chain of Rocks controlled to rating curve developed from data
 - c. Tests 18-23 conducted in St. Louis to Wickliffe Reach. Water surface at Wickliffe controlled to rating curve furnished by Memphis District.
 - d. Tests 24-30 and 32 conducted in Hannibal to St. Louis Reach. Water surface at Chain of Rocks held to elevations recorded for tests 1-17.
 - e. Test 31 conducted on Illinois River. Water surface at Grafton controlled to elevation obtained in test 12.
 - f. Tests 33-35 conducted in Hannibal to Thebes Reach. Water surface at Grays Point controlled to elevations recorded in tests 1-17.
2. Levee conditions: Levee locations shown in plates 20-25. Levee Grades presented in Table 2.
- a. Tests 1-8, existing levees installed on Mississippi and Missouri Rivers and authorized levees on Illinois River.
 - b. Tests 9-17 and 24-35, authorized levees installed except for the combined Kaskaskia Island-Ste. Genevieve area levee.
 - c. Tests 18-23, authorized levees with Kaskaskia Island Levee installed to existing authorized alignment with same degree of protection as other Federal levees in the area.

Table 2
Levee Conditions

Station	River Mile*	Levee Station	Existing	Levee El. ft msl		Authorized††
				Existing Except Illinois River**	Authorized Except Kaskaskia Island†	
<u>Mississippi River</u>						
L&D 22L	301.1					
	296.0					
Mundy's Ldg.	293.0	52+00	466.0	466.0	468.0	468.0
Area 12 Levee	292.3		466.0	466.0	468.0	468.0
	291.6		465.9	465.9	467.5	467.5
	291.0		465.9	465.9	467.2	467.2
	290.2		465.0	465.0	466.8	466.8
	289.1		465.0	465.0	466.6	466.6
	288.3	307+00	465.0	465.0	466.5	466.5
	285.5					
Louisiana	282.1					
	278.0					
L&D 24U	273.5					
Area 10 Levee	273.0					
	272.0		451.0	451.0	459.0	459.0
	271.0	100+00	451.0	451.0	458.3	458.3
	270.0				458.0	458.0
	269.0				457.6	457.6
	268.0	282+00			457.2	457.2
	266.9		450.0	450.0	456.8	456.8
	265.8				456.4	456.4
Rip Rap Ldg.	265.0		449.0	449.0	449.0	449.0
Area 8 Levee	260.7	298+00	451.0	451.0	454.4	454.4
Mosier Ldg.	260.3					
	260.1		450.0	450.0	454.0	454.0
	259.2		450.0	450.0	453.6	453.6
Hamburg	258.5					
	258.2		449.0	449.0	453.2	453.2
	257.6		449.0	449.0	453.0	453.0
	256.3		448.5	448.5	452.6	452.6
	255.6		449.0	449.0	452.4	452.4
	255.0		448.5	448.5	452.3	452.3
	254.4		448.0	448.0	452.0	452.0
	253.5		448.0	448.0	451.7	451.7
	253.0		448.0	448.0	451.3	451.3
	252.4		447.5	447.5	451.0	451.0
	251.8		447.0	447.0	450.9	450.9
	251.3	822+00	447.0	447.0	450.8	450.8
	250.8		449.0	449.0	449.0	449.0
Sterling Ldg.	247.8					
	245.0		443.0	443.0	443.0	443.0
Foley	241.5		442.0	442.0	442.0	442.0
L&D 25U	237.9					
	234.0					
Dixon's Ldg.	228.3					
	224.3					
Grafton	218.0					
Elsah	214.0					
	210.0					
	207.0					
L&D 26U	203.0					
	199.2					
Hartford	196.8					

(Continued)

- * Mississippi River, distance above mouth of Ohio River; Illinois and Missouri Rivers, distance above mouth.
- ** Tests with existing levees on Mississippi and Missouri Rivers and authorized levees on Illinois River. Existing grades of Illinois River levees given for comparison.
- † Authorized levees except for combined Kaskaskia Island-Ste. Genevieve area levee.
- †† Authorized with Kaskaskia Island levee to existing authorized alignment with same degree of protection as other Federal levees in the area.

Table 2 (Continued)

Station	River Mile	Levee Station	Levee El., ft msl			
			Existing	Existing Except Illinois River	Authorized Except Kaskaskia Island	Authorized
<u>Mississippi River (Continued)</u>						
Columbia Bottoms Levee	4.8	6+00	No	No	Levee	Levee
		26+00	levee	levee	in to	in to
	4.2	46+00	existing	existing	confining	confining
		66+00			grade	grade
		66+00				
		106+00				
		126+00				
		146+00				
		166+00				
		186+00				
	195.0	206+00				
		226+00				
		246+00				
		266+00				
		286+00				
Chain of Rocks	194.0					
	190.4					
	187.2					
	186.2					
	185.2					
	184.5					
	184.0					
	183.5					
Bissell Point	183.3					
	183.0					
	182.1					
	181.3					
St. Louis Engineer Depot	179.6					
Missouri Pacific Elevator	176.8					
Jefferson Barracks	172.6					
	169.3					
	162.9	305+71	417.5	417.5	417.5	417.5
Waters Point	158.5	543+57	415.4	415.4	415.4	415.4
	156.0	330+00	414.2	414.2	414.2	414.2
	151.4		412.2	412.2	412.2	412.2
Selma	145.7	863+30	409.5	409.5	409.5	409.5
	141.0		407.5	407.5	407.5	407.5
Brickeys Ldg.	136.0	219+26	405.2	405.2	405.2	405.2
	130.3		402.6	402.6	402.6	402.6
Little Rock Ldg.	125.5	364+14	399.5	399.5	399.5	399.5
City of St. Genevieve Levee	123.0		Not installed	Not installed	Confining	Not installed
St. Genevieve Levee	122.8				397.0	
	121.8				396.8	
	120.9				396.3	
	120.1				395.5	
	119.1				395.0	
East Kaskaskia	116.2					
Kaskaskia Is. Levee	115.3	10+00	386.2	386.2	393.5	393.5
	114.3	54+00			393.2	393.2
	113.3	105+00			392.7	392.7
	112.1	176+00	386.0	386.0	391.8	391.8
		216+00			391.5	391.5
		239+00	378.8	378.8	391.2	391.2
		295+00			391.0	391.0
		339+70			391.0	391.0
		385+50	376.7	376.7	391.2	391.2
St. Mary		436+50	385.0	385.0	391.5	391.5
		485+00			392.0	392.0
		542+20			393.0	393.0
		589+00	386.6	386.6	393.4	393.4
		644+00			393.5	393.5
		706+00	386.0	386.0	393.5	393.5
		755+20			393.5	393.5
Chester	109.5	251+78	390.0	390.0	390.0	390.0
	105.1		387.6	387.6	387.6	387.6
Bishop Ldg.	100.8	730+52	385.4	385.4	385.4	385.4
	97.4		383.6	383.6	383.6	383.6
Red Rock Ldg.	94.1	300+00	381.7	381.7	381.7	381.7
	90.6		379.5	379.5	379.5	379.5
Cumberland Rocks	87.0	656+34	377.2	377.2	377.2	377.2
	86.0		376.6	376.6	376.6	376.6

(Continued)

(Sheet 2 of 4)

Table 2 (Continued)

Station	River Mile	Levee Station	Existing	Levee El. ft msl		
				Existing Except Illinois River	Authorized Except Kaskaskia Island	Authorized
<u>Mississippi River (Continued)</u>						
Grand Tower	81.9					
	79.3	136+22	371.6	371.6	371.6	371.6
	75.0	291+31	369.5	369.5	369.5	369.5
Crawford Ldg.	72.9	393+00	368.3	368.3	368.3	368.3
	69.2		366.2	366.2	366.2	366.2
Moccasin Springs	66.3		364.6	364.6	364.6	364.6
	61.3		362.4	362.4	362.4	362.4
Devils Island	57.3	537+77	360.3	360.3	360.3	360.3
	54.8		358.3	358.3	358.3	358.3
Cape Girardeau	52.1		356.4	356.4	356.4	356.4
	49.6		353.8	353.8	353.8	353.8
Grays Point	46.3	482+91	350.4	350.4	350.4	350.4
Thebes	43.7					
Counterfeit Rock	42.3					
Commerce	39.3					
Powers Island	35.2					
Price Ldg.	30.0					
Thompson Ldg.	20.2					
Beechridge	13.2					
Birds Point	2.0					
Wickliffe	-2.0					
<u>Illinois River**</u>						
Meredosia	71.1	290+00	445.5	451.2	451.2	451.2
Magee Cr. Levee	70.0					
	69.0					
	68.0					
	67.3	500+00	448.5	451.0	451.0	451.0
Valley City Levee	66.0		448.1	450.6	450.6	450.6
Naples	65.4					
	65.0					
	64.0					
Scott County Levee	63.0	252+00	448.0	450.4	450.4	450.4
	62.0					
Valley City	61.6					
	61.0					
	60.0					
	59.0					
	58.0					
	57.0	565+00	445.0	449.2	449.2	449.2
Big Swan Levee	56.0					
Florence	56.0	301+00	444.9	449.1	449.1	449.1
	55.0					
	54.0					
	53.0					
	52.0	500+00				
	51.0	553+00	444.0	448.0	448.0	448.0
Hillview Levee	50.0	155+00	443.9	447.8	447.8	447.8
	49.0					
	48.0					
	47.0					
	46.0					
	45.0					
	44.0	497+30	443.5	446.7	446.7	446.7
Pearl	43.2	525+00				
Hartwell Levee	43.0	180+00	443.0	446.6	446.6	446.6
	42.0					
	41.0					
	40.0					
	39.0					
	38.1	437+00	442.0	446.0	446.0	446.0

(Continued)

** Tests with existing levees on Mississippi and Missouri Rivers and authorized levees on Illinois River. Existing grades of Illinois River levees given for comparison.

(Sheet 3 of 4)

Table 2 (Concluded)

Station	River Mile	Levee Station	Existing	Levee El. ft. msl		Authorized
				Existing Except Illinois River	Authorized Except Kaskaskia Island	
<u>Illinois River** (Continued)</u>						
Keach Levee	37.0	336+00	444.0	445.8	445.8	445.8
	36.0					
	35.0					
	34.0					
Eldred Levee Kampsville	33.0	562+00	441.0	445.3	445.3	445.3
	32.0	268+00	442.0	445.2	445.2	445.2
	31.5					
	31.0		441.9	444.9	444.9	444.9
	30.0					
	29.0					
	28.0					
	27.0		441.7	444.4	444.4	444.4
	26.0					
	25.0					
Nutwood Levee	24.0	700+00	441.5	444.1	444.1	444.1
	23.0	175+00	440.5	444.0	444.0	444.0
	22.0					
Hardin	21.6					
	21.0					
	20.0					
	19.0		440.3	443.7	443.7	443.7
	18.0					
	17.0					
	16.0					
	15.3	574+00	440.0	443.5	443.5	443.5
10.0						
3.3						
<u>Missouri River</u>						
St. Charles	28.4		446.8	446.8	446.8	446.8
	25.0		448.6	448.6	448.6	448.6
	19.0		443.8	443.8	443.8	443.8
Halls Ferry	17.1		440.0	440.0	440.0	440.0
	12.3		438.0	438.0	438.0	438.0
Bellefontaine	8.2		431.0	431.0	431.0	431.0
	5.0		423.9	423.9	423.9	423.9

** Tests with existing levees on Mississippi and Missouri Rivers and authorized levees on Illinois River. Existing grades of Illinois River levees given for comparison.

(Sheet 4 of 4)

Table 3
Water Surface Elevations, Mississippi River Flowline,
Existing Levees Except On Illinois River*

Station	River Mile**	Levee Station	Levee Elevation	Water Surface El., ft. msl††							
				Test 1 5 yr	Test 2 10 yr	Test 3 25 yr	Test 4 50 yr	Test 5 100 yr	Test 6 200 yr	Test 7 Ag Design	Test 8 Urb Design
Mississippi River*											
L&D 22L	301.1			466.5	468.4	470.5	472.1	473.6	475.3	471.8	475.3
	296.0			462.6	464.5	466.6	468.2	470.1	471.5	468.1	471.5
Mundy's Ldg.	293.0	52+00	466.0	460.2	462.0	464.1	465.7	467.2	468.5	465.7	468.5
Area 12 Levee	292.3		466.0	--	462.3	464.0	465.7	467.2	468.9	465.9	468.9
	291.6		465.9	--	462.0	463.8	465.3	466.8	468.2	465.4	468.2
	291.0		465.9	--	460.9	463.0	464.7	466.4	467.7	464.8	467.7
	290.2		465.0	458.4	460.0	462.3	464.2	465.8	467.2	464.1	467.2
	289.1		465.0	458.4	460.0	462.0	463.9	465.4	466.8	463.9	466.8
	288.3	307+00	465.0	--	461.5	463.5	465.0	466.4	466.4	463.6	466.4
	285.5			457.1	458.9	461.1	462.7	464.3	465.7	462.7	465.7
Louisiana	282.1			455.5	457.4	459.1	460.6	462.1	463.5	460.6	463.5
	278.0			453.1	454.7	456.3	458.1	459.7	461.0	458.1	461.0
L&D 24U	273.5			451.0	452.5	454.5	455.9	457.3	458.4	456.2	458.4
Area 10 Levee	273.0			449.3	451.3	453.1	455.0	456.3	457.4	455.6	458.0
	272.0		451.0	448.9	450.6	452.6	454.4	455.9	456.9	455.0	457.4
	271.0	100+00	451.0	448.9	450.5	452.5	454.0	455.5	456.4	454.7	456.8
	270.0			448.4	450.2	452.1	453.6	455.1	455.9	454.2	456.1
	269.0			448.0	449.8	451.8	453.4	454.8	455.7	453.9	455.8
	268.0	282+00		447.7	449.5	451.6	453.1	454.5	455.2	453.7	455.6
	266.9		450.0	446.8	448.9	451.0	452.8	454.3	455.0	453.4	455.5
	265.8			446.5	448.9	450.7	452.5	454.1	454.9	453.1	455.4
Rip Rap Ldg.	265.0			446.7	448.4	450.6	452.4	453.9	454.8	453.0	455.2
Area 8 Levee	260.7	298+00	451.0	444.8	446.8	448.8	450.6	452.0	452.8	451.7	453.3
Mosier Ldg.	260.3			444.8	446.7	448.7	450.6	452.0	452.8	451.7	453.3
	260.1		450.0	444.6	446.3	448.4	450.1	451.6	452.5	450.9	453.3
	259.2		450.0	443.9	445.7	447.8	449.5	450.8	451.9	450.5	452.5
Hamburg	258.5			443.5	445.7	447.3	449.3	450.7	451.6	450.3	452.4
	258.2			443.4	445.3	447.1	449.3	450.7	451.3	450.3	452.1
	257.6		449.0	443.4	445.1	446.8	449.0	450.6	451.2	449.9	452.0
	256.3		448.5	443.4	444.9	446.6	448.9	450.3	451.0	449.8	451.9
	255.0		449.0	--	446.4	448.4	450.4	451.9	450.8	449.6	451.6
	254.4		448.5	442.1	444.9	446.2	448.4	449.9	450.6	449.3	451.5
	255.0		448.0	441.8	444.7	445.9	447.7	449.2	450.3	449.2	451.4
	254.4		448.0	441.3	443.3	445.5	447.4	449.1	450.0	448.9	451.2
	253.5		448.0	440.9	442.9	445.0	447.2	448.8	449.6	448.4	451.0
	252.4		447.5	440.6	442.5	444.5	446.6	448.1	449.4	448.0	450.8
	251.8		447.0	440.2	442.1	444.2	446.0	448.0	449.2	447.9	450.8
	251.3	822+00	447.0	440.0	441.8	443.9	445.9	447.7	449.0	447.8	450.7
Sterling Ldg.	250.8		449.0	439.7	441.7	443.9	445.7	447.6	448.8	447.4	450.2
	247.8			439.2	441.2	443.0	445.0	446.9	448.2	446.6	450.0
Foley	245.0		443.0	437.7	439.8	442.1	444.4	446.2	447.6	446.1	449.5
L&D 25U	241.5		442.0	435.7	438.1	440.8	443.0	445.2	447.0	445.3	449.2
	237.9			434.2	436.5	439.4	442.0	444.4	446.3	444.9	448.8
	234.0			433.1	435.8	438.9	441.4	443.7	446.0	444.5	448.6
Dixon's Ldg.	228.3			430.7	433.6	436.7	439.4	442.5	444.9	443.5	447.9
	224.3			429.7	432.7	435.7	438.7	441.7	444.1	442.9	447.2
Grafton	218.0			427.3	430.4	433.5	436.6	439.8	442.3	441.4	445.5
Elsah	214.0			426.3	429.2	432.5	435.5	438.7	441.3	440.3	445.1
	210.0			425.2	428.4	431.7	434.8	437.9	440.4	439.6	444.3
	207.0			424.6	427.8	431.2	434.3	437.3	439.9	439.0	443.7
L&D 26U	203.0			424.0	427.4	430.6	433.7	436.7	439.2	438.4	442.7
	199.2			423.0	426.5	430.0	433.2	436.1	438.5	437.9	442.5
Hartford	196.8			422.3	426.0	429.8	432.9	435.9	438.4	437.6	442.2
Columbia Bottom Levee	4.8	6+00	No Levee	--	--	--	432.1	436.0	437.6	437.0	441.7
	26+00	Levee		--	--	--	428.6	432.2	435.7	437.7	436.8
	4.2	46+00	Existing	--	425.8	428.8	432.4	435.4	437.9	436.6	441.7
		66+00		--	425.8	429.0	432.5	435.4	438.0	436.9	441.6
		86+00		--	425.8	429.0	432.6	435.4	438.0	437.0	441.5
		106+00		--	425.6	429.0	432.4	435.3	438.0	437.0	441.4
		126+00		--	425.2	428.7	432.1	435.2	437.9	437.0	441.3
		146+00		--	424.8	428.4	431.8	435.1	437.7	436.9	441.2
		166+00		--	--	427.6	431.5	434.9	437.7	436.8	441.1
		186+00		--	422.8	427.6	431.2	434.8	437.7	436.7	441.0
	195.0	206+00		--	422.8	427.6	431.2	434.7	437.7	436.6	441.0
		226+00		--	422.8	427.6	431.2	434.5	437.7	436.4	440.9
		246+00		--	422.8	427.6	431.2	434.0	437.5	436.2	440.8
		266+00		--	422.8	427.6	431.3	434.2	437.2	436.1	440.7
		286+00		--	--	427.6	431.4	434.4	437.1	436.1	440.7
	194.0			419.7	423.7	428.2	431.7	435.1	437.6	436.7	441.1
Chain of Rocks	190.4			418.5	422.3	426.6	430.4	433.3	435.7	435.0	439.5
	187.2			418.3	422.1	426.7	430.5	433.4	435.9	434.9	439.5
	186.2			418.2	421.9	426.5	429.9	433.0	435.5	434.5	439.0
	185.2			417.8	421.6	426.1	429.5	432.9	435.1	434.2	438.9
	184.5			417.2	421.2	425.9	429.3	432.6	435.1	434.1	438.2
	184.0			416.7	420.6	425.1	428.5	431.9	433.9	433.4	437.2
	183.5			416.1	420.0	424.3	427.6	430.7	433.0	432.3	436.3

(Continued)

* Existing levees on Mississippi and Missouri Rivers and authorized levees on Illinois River.
 ** Mississippi River, distance above mouth of Ohio River; Illinois and Missouri Rivers, distance above mouth.
 † Elevation in feet mean sea level.
 †† No levees were crevassed.
 * Only Mississippi River elevations represent appropriate frequency. Illinois and Missouri River flows are those required to maintain correct flow frequency relationship on Mississippi River; hence, elevations on Illinois and Missouri Rivers are backwater elevations.

Table 3 (Continued)

Station	River Mile	Levee Station	Levee El.	Water Surface El., ft msl						Test 7 Ag Design	Test 8 Urb Design
				Test 1 5 yr	Test 2 10 yr	Test 3 25 yr	Test 4 50 yr	Test 5 100 yr	Test 6 200 yr		
Mississippi River* (Continued)											
Bissell Point	183.3			415.1	419.0	423.2	426.8	429.7	431.7	431.1	434.8
	183.0			415.7	419.5	423.8	427.1	430.1	432.4	431.6	435.5
	182.1			415.1	419.0	423.3	426.5	429.5	431.3	430.8	434.4
	181.3			414.9	418.7	423.0	426.2	429.2	430.9	430.3	432.7
St. Louis Engineer Depot	179.6			413.4	416.9	421.0	424.3	427.0	428.9	428.2	431.6
Missouri Pacific Elevator	176.8			411.6	415.0	418.9	422.3	424.8	426.5	426.1	428.8
	172.6			409.4	412.3	416.0	418.9	421.3	422.5	422.3	424.1
Jefferson Barracks	169.3			408.3	411.4	415.2	418.3	420.7	421.8	421.6	423.4
	162.9	305+71	417.5	406.5	409.7	413.6	416.9	419.3	420.6	420.3	422.3
Waters Point	158.5	543+57	415.4	403.1	406.3	410.4	413.3	415.9	417.3	417.0	418.3
	156.0	330+00	414.2	401.6	404.8	408.8	411.5	414.4	415.6	415.4	416.4
	151.4			399.8	402.7	406.9	409.8	412.3	413.2	412.9	414.2
Selma	145.7	863+30	409.5	396.7	400.0	403.8	406.8	409.4	410.7	410.3	412.0
	141.0			394.0	397.1	400.7	403.5	405.9	407.1	407.1	409.3
Brickeys Ldg.	136.0	219+26	405.2	391.4	394.4	398.0	400.6	403.1	404.4	403.9	406.7
	130.3			388.3	390.9	394.5	397.4	399.6	401.0	400.6	403.7
Little Rock Ldg.	125.5	364+14	399.5	385.5	387.8	390.8	393.3	395.3	396.1	395.7	397.3
Ste. Genevieve	123.0			398.0	394.7	397.3	399.7	393.1	394.6	395.8	397.0
Ste. Genevieve Levee	122.8			397.8	394.2	396.9	399.2	394.8	395.8	395.4	397.0
	121.8			397.2	384.2	386.6	389.9	392.2	394.7	395.7	396.8
	120.9			396.5	383.8	386.3	389.6	392.1	394.6	395.5	396.5
	120.1			396.2	383.5	386.0	389.2	391.7	394.2	395.2	396.5
	119.1			395.5	382.4	385.4	388.2	391.4	393.9	394.9	395.5
East Kaskaskia	116.2			380.1	383.5	387.8	391.0	393.3	394.1	393.8	395.3
Kaskaskia Is. Levee	115.3	10+00	386.2	379.5	382.9	387.4	390.8	393.0	393.9	393.5	394.9
	114.3	54+00		379.2	382.3	387.1	390.7	393.0	393.8	393.4	394.8
	113.3	105+00		378.9	382.1	386.9	390.6	392.8	393.7	393.3	394.8
	112.1	176+00	386.0	378.1	381.8	386.6	390.3	392.6	393.5	393.1	394.7
		216+00		377.3	381.7	386.5	390.2	391.9	393.1	392.1	394.3
		239+00		377.1	382.0	386.9	390.6	392.3	393.5	392.7	394.6
		295+00		377.2	382.2	387.3	390.7	392.8	393.7	393.3	394.7
		339+70		377.3	382.3	387.5	390.7	393.0	393.8	393.6	394.6
		385+50	376.7	377.3	382.4	387.6	390.7	393.1	393.9	393.7	395.0
St. Mary		436+50	385.0	377.3	382.5	387.7	390.8	393.2	394.0	393.7	395.1
		485+00		377.4	382.7	387.7	390.9	393.3	394.2	393.7	395.2
		542+20		Dry	382.9	387.8	391.1	393.4	394.3	393.8	395.4
		587+00	386.6	Dry	383.0	387.9	391.2	393.5	394.4	393.9	395.6
		644+00		Dry	383.3	388.0	391.3	393.6	394.6	394.2	395.8
		706+00	386.0	380.5	383.7	387.5	391.0	393.4	394.2	393.9	394.4
		755+20		379.8	383.1	387.2	390.8	393.2	394.0	393.8	395.0
Chester	109.5	251+78	390.0	376.1	379.4	383.5	386.7	389.3	390.2	389.9	391.2
	105.1			374.1	377.6	381.5	384.5	387.3	388.5	387.9	389.3
Bishop Ldg.	100.8	730+52	385.4	371.5	375.0	379.3	382.3	385.6	386.6	386.1	387.7
	97.4			369.9	374.0	378.2	381.5	384.7	385.6	385.2	386.9
Red Rock Ldg.	94.1	300+00	381.7	368.5	372.5	376.8	379.9	383.0	384.1	383.6	385.1
	90.6			379.5	366.7	370.8	374.8	378.1	381.2	381.6	383.2
Cumberland Rocks	87.0	656+34	377.2	364.1	367.9	372.1	374.9	378.0	379.0	378.7	380.1
	86.0			363.6	367.2	371.3	374.1	377.3	378.2	377.8	379.2
Grand Tower	81.9			361.4	364.7	369.3	372.3	375.3	376.5	376.0	377.3
	79.3	136+22	371.6	359.1	362.8	366.0	368.5	371.9	372.8	372.4	373.4
	75.0	291+31	369.5	356.7	360.1	363.9	366.5	369.9	370.6	370.2	371.2
Crawford Ldg.	72.9	393+00	368.3	355.7	359.3	363.0	365.7	368.3	369.6	369.2	370.3
	69.2			355.1	358.0	361.7	364.5	367.2	368.2	367.7	369.0
Moccasin Springs	66.3			352.0	355.1	358.7	361.4	363.9	365.0	364.7	366.0
	61.3			350.3	353.5	357.0	359.9	362.5	363.5	363.1	364.3
Devils Island	57.3	537+77	360.3	348.7	352.0	355.6	358.1	360.7	362.0	361.6	363.1
	54.8			346.5	349.6	353.9	355.7	358.7	360.4	360.4	361.9
Cape Girardeau	52.1			344.2	347.2	350.8	353.2	355.6	357.6	356.8	360.1
	49.6			342.5	345.9	349.9	352.3	354.7	356.6	355.4	359.7
Grays Point	46.3	482+91	350.4	339.8	342.7	346.0	347.8	350.1	352.4	351.6	356.9
Thebes	43.7			338.3	340.8	343.7	345.2	346.7	348.4	348.0	351.3
Counterfeit Rock	42.3			337.6	340.1	342.7	344.1	345.5	346.8	346.4	349.1
Commerce	39.3			336.1	338.3	340.9	342.0	343.1	343.9	343.9	345.8
Powers Island	35.2			333.1	335.5	338.6	339.9	340.7	341.5	341.6	343.6
Price Ldg.	30.0			330.6	332.6	335.4	337.0	338.2	339.4	340.0	341.8
Thompson Ldg.	20.2			326.5	329.3	333.2	335.2	336.7	338.1	338.7	340.7
Beechridge	13.2			325.3	328.7	332.7	335.0	336.4	337.9	338.5	340.6
Birds Point	2.0			321.7	325.3	329.7	331.5	332.4	333.4	334.3	335.1
Wickliffe	-2.0			319.5	323.2	327.2	328.6	329.1	329.5	330.0	330.0
Illinois River†											
Meredosia	71.1	290+00	451.2	435.7	437.7	439.8	441.4	443.5	444.7	449.7	452.4
McGee Cr. Levee	70.0			--	437.9	439.7	441.2	443.6	444.5	449.5	452.4
	69.0			434.6	436.9	439.5	440.9	442.9	444.0	448.8	452.3
	68.0			434.9	436.9	439.4	440.8	442.7	443.9	448.6	452.1
	67.3	500+00	451.0	435.1	437.0	439.2	440.7	442.9	444.0	448.7	452.0
Valley City Levee	66.0		450.6	--	437.0	439.2	440.6	442.8	444.1	448.8	451.3
	65.4			434.7	436.7	438.9	440.5	442.8	444.1	448.8	451.2
	65.0			434.7	436.5	438.8	440.5	442.8	444.1	448.7	451.1
	64.0			434.7	436.6	439.0	440.4	442.7	444.0	448.7	451.0
Scott County Levee	63.0	252+00	450.4	--	--	--	440.3	442.7	444.1	448.4	450.3
	62.0			--	436.1	438.7	440.1	442.6	443.9	448.3	450.2

(Continued)

* Only Mississippi River elevations represent appropriate frequency. Illinois and Missouri River flows are those required to maintain correct flow frequency relationship on Mississippi River; hence, elevations on Illinois and Missouri Rivers are backwater elevations.

Table 3 (Concluded)

Station	River Mile	Levee Station	Levee El	Water Surface El., ft. msl							
				Test 1 5 yr	Test 2 10 yr	Test 3 25 yr	Test 4 50 yr	Test 5 100 yr	Test 6 200 yr	Test 7 Ag Design	Test 8 Urb Design
<u>Illinois River* (Continued)</u>											
Valley City	61.6			434.4	436.1	438.6	440.3	442.5	443.8	448.2	450.2
	61.0			---	436.1	438.7	440.0	442.4	443.7	448.1	449.9
	60.0			433.8	436.0	438.4	439.9	442.4	443.7	447.9	449.9
	59.0			433.6	435.8	438.2	439.9	442.4	443.7	447.8	449.7
	58.0			---	435.5	438.1	439.8	442.4	443.6	447.7	449.6
	57.0	565+00	449.2	433.1	435.4	437.9	439.7	442.4	443.6	447.6	449.5
	56.0			---	---	---	---	---	---	---	---
Big Swan Levee	56.0										
Florence	56.0	301+00	449.1	433.3	435.5	438.0	440.0	442.4	443.9	447.5	449.4
	55.0			432.8	435.4	438.0	439.7	442.3	443.8	447.0	449.1
	54.0			432.5	435.2	437.9	439.6	442.2	443.8	447.0	449.0
	53.0			432.4	435.0	437.8	439.5	442.2	443.8	447.0	449.0
	52.0	500+00		432.2	434.8	437.7	439.5	442.1	443.8	447.0	449.0
	51.0	553+00	448.0	432.1	434.6	437.6	439.4	442.1	443.8	446.9	448.9
Hillview Levee	50.0	155+00	447.8	432.2	434.6	437.5	439.5	442.1	443.9	446.6	448.8
	49.0			431.7	434.2	437.0	439.0	442.0	443.6	445.8	448.0
	48.0			431.5	434.1	436.9	439.0	442.0	443.6	445.7	448.0
	47.0			431.3	434.0	436.8	438.9	441.9	443.5	445.7	448.0
	46.0	380+00		431.1	434.0	436.8	438.9	441.8	443.5	445.6	448.0
	45.0			431.0	433.9	436.7	438.8	441.7	443.5	445.6	448.0
	44.0		446.7	430.8	433.9	436.6	438.8	441.6	443.5	445.6	448.0
Pearl	43.2	525+00		431.3	433.9	436.6	439.1	441.7	443.6	445.6	448.1
Hartwell Levee	43.0	180+00	446.6	430.5	433.6	436.5	438.7	441.7	443.6	445.4	448.0
	42.0			430.8	433.6	436.2	438.6	441.6	443.5	445.1	447.9
	41.0			430.7	433.5	436.1	438.5	441.5	443.4	445.0	447.9
	40.0			430.3	433.4	436.0	438.5	441.4	443.4	445.0	447.9
	39.0			430.2	433.2	436.0	438.5	441.3	443.3	445.0	447.9
	38.1	437+00	446.0	430.4	433.2	436.0	438.5	441.2	443.2	445.0	447.8
Keach Levee	37.0	336+00	445.8	430.0	433.0	436.0	438.5	441.3	443.3	445.0	447.8
	36.0			429.9	432.9	435.9	438.4	441.2	443.2	445.0	447.7
	35.0			429.9	432.8	435.8	438.2	441.1	443.2	445.0	447.7
	34.0			429.8	432.7	435.7	438.1	441.1	443.1	445.0	447.4
	33.0	562+00	445.3	429.8	432.6	435.6	438.0	441.0	443.0	445.1	447.4
Eldred Levee	32.0	268+00	445.2	429.7	432.6	435.4	437.9	440.8	443.0	445.1	447.4
Kampsville	31.5			429.8	432.7	435.5	438.1	441.0	443.1	445.1	447.4
	31.0			429.7	432.5	435.4	437.9	440.8	443.0	445.1	447.4
	30.0			429.5	432.4	435.3	437.8	440.7	442.9	445.0	447.4
	29.0			---	---	---	---	---	---	---	---
	28.0			429.2	432.2	435.1	437.7	440.6	442.7	444.8	447.5
	27.0			429.1	432.1	435.0	437.7	440.5	442.7	444.8	447.5
	26.0			429.0	432.1	434.9	437.6	440.5	442.6	444.8	447.5
	25.0			428.9	432.0	434.8	437.6	440.5	442.6	444.8	447.5
	24.0	700+00	444.1	428.8	432.0	434.7	437.6	440.4	442.5	444.8	447.5
Nutwood Levee	23.0	175+00	444.0	428.4	431.2	434.6	437.1	440.2	442.4	444.8	447.5
	22.0			428.5	431.6	434.7	437.3	440.2	442.4	444.8	447.5
Hardin	21.6			428.8	431.7	434.7	437.3	440.3	442.4	444.8	447.5
	21.0			428.6	431.7	434.5	437.3	440.2	442.4	444.8	447.5
	20.0			428.4	431.5	434.3	437.1	440.1	442.3	444.8	447.5
	19.0			428.2	431.4	434.2	437.0	440.1	442.3	444.8	447.5
	18.0			428.1	431.3	434.2	437.0	440.1	442.3	444.8	447.5
	17.0			428.0	431.2	434.2	437.0	440.1	442.3	444.8	447.5
	16.0			428.0	431.1	434.1	437.0	440.1	442.2	444.8	447.5
	15.3	574+00	443.5	428.0	431.1	434.1	437.0	440.1	442.2	444.8	447.5
	10.1			427.8	431.0	433.8	436.9	439.9	442.2	444.6	447.5
	3.3			427.5	430.7	433.6	436.8	439.8	442.2	444.5	447.5
	0			427.3	430.4	433.5	436.6	439.8	442.3	444.4	447.5
<u>Missouri River†</u>											
St. Charles	28.4		446.8	444.1	446.7	449.1	450.4	451.3	452.4	452.4	453.6
	25.0		448.6	449.9	442.5	445.1	447.1	448.3	449.2	449.5	450.3
	19.0		443.8	443.8	437.8	440.4	441.9	442.8	444.0	443.7	446.1
Halls Ferry	17.1		440.0	443.7	436.5	439.5	441.0	442.0	443.3	442.7	445.5
	12.3		438.0	440.9	434.1	436.9	438.5	439.5	441.2	440.2	443.9
Bellefontaine	8.2		431.0	428.2	431.0	433.7	435.1	436.8	438.9	438.2	442.7
	5.0		423.9	425.5	428.6	431.9	433.9	436.5	438.8	438.1	442.4

* Only Mississippi River elevations represent appropriate frequency. Illinois and Missouri River flows are those required to maintain correct flow frequency relationship on Mississippi River; hence, elevations on Illinois and Missouri Rivers are backwater elevations.

Table 4
 Water Surface Elevations, Mississippi River Flowline - Authorized Levees Except for Kaskaskia Island Levee*

Station	River Mile**	Levee Station	Levee El†	Water Surface El. ft. msl††									
				Test 9 5 yr	Test 10 10 yr	Test 11 25 yr	Test 12 50 yr	Test 13 100 yr	Test 14 200 yr	Test 15 Ag. Design	Test 16 Urb. Design	Test 17 500 yr	
Mississippi River‡													
LAD 22L	301.1			466.5	468.4	470.5	472.1	473.6	475.3	471.8	475.3	476.9	
296.0				462.6	464.5	466.6	468.2	470.6	471.9	468.2	471.9	473.1	
Mundy's Ldg.	293.0	52+00	468.0	460.2	462.0	464.1	465.7	467.6	469.3	466.0	469.3	470.4	
Area 12 Levee	292.3			--	462.3	464.0	465.7	468.1	469.8	465.9	469.8	470.4	
	291.6			--	467.5	463.8	465.3	467.4	469.0	465.4	469.0	469.9	
	291.0			--	467.2	463.0	464.7	467.0	468.4	464.8	468.4	469.5	
	290.2			458.4	460.0	462.3	464.2	466.4	468.0	464.1	468.0	468.9	
	289.1			458.4	460.0	462.0	463.9	466.0	467.6	463.9	467.6	468.8	
	288.3	307+00	466.5	--	--	461.5	463.5	465.6	467.3	463.6	467.3	468.5	
	285.5			457.1	458.9	461.1	462.7	464.9	466.4	462.7	466.4	467.4	
Louisiana	282.1			455.5	457.4	459.1	460.6	462.4	464.0	460.8	464.0	465.0	
	278.0			453.1	454.7	456.3	458.1	459.9	461.5	458.4	461.5	462.3	
LAD 24U	273.5			451.0	452.5	454.5	455.9	457.7	459.2	456.2	459.4	460.2	
Area 10 Levee	273.0			449.3	451.3	453.1	455.0	457.2	458.6	455.6	458.9	459.7	
	272.0			448.9	450.6	452.6	454.4	456.7	457.9	455.0	458.3	459.2	
	271.0	100+00	458.3	448.9	450.6	452.5	454.0	456.3	457.4	454.7	458.0	458.8	
	270.0			448.4	450.2	452.1	453.6	455.8	457.0	454.2	457.6	458.4	
	269.0			457.6	448.0	449.8	451.8	453.4	455.4	453.9	457.2	458.0	
	268.0	282+00	457.2	447.7	449.5	451.6	453.1	455.1	456.4	453.7	456.9	457.7	
	266.9			456.8	446.8	448.9	451.0	452.8	454.8	456.1	453.4	456.7	
	265.8			456.4	446.5	448.5	450.7	452.5	454.4	455.9	453.1	456.4	
Rip Rap Ldg.	265.0			446.7	448.4	450.6	452.4	454.1	455.5	453.0	456.2	456.9	
Area 8 Levee	260.7	298+00	454.4	444.8	446.8	448.8	450.6	452.9	454.4	451.7	455.1	455.5	
Mosier Ldg.	260.3			444.8	446.7	448.7	450.5	452.4	453.7	451.4	454.5	455.0	
	260.1			444.6	446.3	448.4	450.1	452.1	453.5	450.9	454.2	455.0	
	259.2		454.0	443.9	445.7	447.8	449.5	451.5	452.9	450.5	453.8	454.3	
Hamburg	258.5			443.5	445.7	447.3	449.3	451.5	452.6	450.3	453.5	454.1	
	258.2			443.2	445.3	447.1	449.1	451.3	452.4	450.3	453.3	454.0	
	257.6			443.0	445.1	446.8	449.0	451.2	452.2	449.9	453.2	453.7	
	256.3			442.6	444.9	446.6	448.9	451.0	452.0	449.8	453.1	453.4	
	255.6			442.4	--	446.4	448.4	450.6	451.8	449.6	452.9	453.1	
	255.0			442.1	443.9	446.2	448.1	450.3	451.5	449.3	452.6	452.9	
	254.4			441.8	443.7	445.9	447.7	450.1	451.2	449.2	452.4	452.6	
	253.5			441.3	443.3	445.5	447.4	450.0	451.0	448.9	452.1	452.2	
	253.0			440.9	442.9	445.0	447.2	449.5	450.7	448.4	451.8	452.0	
	252.4			440.6	442.5	444.5	446.6	448.9	450.3	448.0	451.6	451.7	
	251.8			440.2	442.1	444.2	446.0	448.7	450.0	447.9	451.4	451.4	
	251.3	822+00	450.8	440.0	441.8	443.9	445.9	448.3	449.8	447.8	451.3	450.9	
Sterling Ldg.	250.8			439.7	441.7	443.9	446.0	448.0	449.2	447.4	450.7	450.9	
	247.8			439.2	441.2	443.0	445.3	447.3	448.6	446.9	450.3	450.4	
	245.0			437.7	439.8	442.1	444.6	446.6	448.1	446.3	449.9	449.9	
LAD 25U	241.5		442.0	435.7	438.1	440.8	443.3	445.7	447.3	445.6	449.4	449.3	
	237.9			434.2	436.5	439.4	442.4	444.9	446.7	445.3	449.1	449.0	
	234.0			433.1	435.8	438.9	441.8	444.3	446.1	444.8	449.0	448.7	
Dixon's Ldg.	228.3			430.7	433.6	437.0	440.0	442.9	445.1	443.9	448.2	447.5	
	224.3			429.7	432.7	435.9	439.3	442.1	444.4	443.2	447.5	446.8	
Grafton	218.0			427.3	430.4	434.1	437.4	440.4	442.9	441.8	446.1	445.1	
	214.0			426.3	429.2	432.9	436.2	439.3	441.9	440.7	445.4	444.3	
	210.0			425.2	428.4	432.1	435.5	438.6	441.2	440.0	444.7	443.5	
	207.0			424.6	427.8	431.5	435.0	438.1	440.6	439.5	444.2	443.0	
LAD 26U	203.0			424.0	427.4	431.0	434.6	437.4	439.7	438.9	443.6	442.2	
	199.2			423.0	426.5	430.6	434.2	436.9	439.4	438.5	443.1	441.8	
Hartford	196.8			422.3	426.0	430.4	433.9	436.7	439.9	438.2	442.6	441.5	
Columbia Bottom Levee	4.8	6+00	Levee	--	--	432.5	434.7	437.6	439.7	438.7	443.4	442.2	
		26+00	In to	--	--	432.4	434.7	437.7	439.7	438.7	443.4	442.1	
		46+00	confining	--	425.8	431.8	434.5	437.5	439.4	438.6	443.3	441.9	
		66+00	grade	--	425.8	430.9	433.9	436.7	439.0	438.0	442.8	441.4	
		86+00		--	425.8	430.5	433.5	436.5	438.8	437.7	442.4	441.4	
		106+00		--	425.6	430.2	433.2	436.3	438.6	437.5	442.1	441.0	
		126+00		--	425.2	429.9	432.2	435.7	438.1	437.0	441.8	440.6	
		146+00		--	424.8	429.2	431.2	435.0	437.1	436.0	441.0	439.5	
		166+00		--	--	427.8	430.4	433.8	436.1	435.0	440.0	438.7	
		186+00		--	422.8	427.6	431.0	434.0	436.1	435.0	439.6	438.4	
		206+00		--	422.8	427.6	431.2	434.0	436.2	435.5	439.8	438.7	
		226+00		--	422.8	427.6	431.2	434.0	436.6	436.0	440.1	439.4	
		246+00		--	422.8	427.6	431.2	434.0	437.0	436.1	440.7	439.4	
		266+00		--	422.8	427.6	431.3	434.2	437.1	436.1	440.7	439.8	
		286+00		--	--	427.6	431.4	434.4	437.2	436.7	441.1	440.1	
Chain of Rocks	194.0			419.7	423.7	428.7	431.9	435.1	437.6	436.7	441.1	440.1	
	190.4			418.5	422.3	426.6	430.4	433.3	435.7	435.0	439.5	438.4	
	187.2			418.3	422.1	426.7	430.5	433.4	435.9	434.9	439.5	438.4	
	186.2			418.2	421.9	426.5	429.9	433.0	435.5	434.5	439.0	438.0	
	185.2			417.8	421.6	426.1	429.5	432.9	435.1	434.2	438.9	438.9	
	184.5			417.2	421.2	425.9	429.3	432.6	435.1	434.1	438.2	437.2	
	184.0			416.7	420.6	425.1	428.5	431.9	433.9	433.4	437.2	436.2	
	183.5			416.1	420.0	424.3	427.6	430.7	433.0	432.3	436.3	435.3	
Bissell Point	183.3			415.1	419.0	423.2	426.8	429.7	431.7	431.1	434.8	433.8	
	183.0			415.7	419.5	423.8	427.1	430.1	432.4	431.6	435.5	434.4	
	182.1			415.1	419.0	423.3	426.5	429.5	431.3	430.8	434.4	433.7	
	181.3			414.9	418.7	423.0	426.2	429.2	430.9	430.3	432.7	432.7	
St. Louis	179.6			413.4	416.9	421.0	424.3	427.0	428.9	428.2	431.6	431.6	
Engineer Depot	176.8			411.6	415.0	418.9	422.2	424.8	426.5	426.1	428.8	428.8	
Missouri Pacific Elevator	172.6			409.4	412.3	416.0	418.9	421.3	422.5	422.3	424.1	424.1	

(Continued)

* Authorized levees installed except for the combined Kaskaskia Island-Ste. Genevieve area levee.
 ** Mississippi River; distance above mouth of Ohio River; Illinois and Missouri Rivers, distance above mouth.
 † Elevation in feet mean sea level.
 †† No levees were crevassed.
 ‡ Only Mississippi River elevations represent appropriate frequency with additional levees installed. Illinois and Missouri River flows are those required to maintain correct flow frequency relationship on the Mississippi River; hence, elevations on Illinois and Missouri River elevations are backwater elevations.

Table 4 (Continued)

Station	River Mile	Levee Station	Levee El	Water Surface El., ft msl									
				Test 9 5 yr	Test 10 10 yr	Test 11 25 yr	Test 12 50 yr	Test 13 100 yr	Test 14 200 yr	Test 15 Ag. Design	Test 16 Urb. Design	Test 17 500 yr	
Mississippi River* (Continued)													
Jefferson Barracks	169.3			408.3	411.4	415.2	418.3	420.7	421.8	421.6	423.4		
	162.9	305+71	417.5	406.5	409.7	413.6	416.9	419.3	420.6	420.3	422.3		
Waters Point	158.5	543+57	415.4	403.1	406.3	410.7	413.9	416.3	417.2	417.0	418.3		
	156.0	330+00	414.2	401.6	404.8	409.1	412.3	414.8	415.6	415.4	416.4		
	151.4		412.2	399.8	403.1	407.3	410.7	413.1	413.6	413.3	414.5		
Selma	145.7	863+30	409.5	396.7	400.1	404.4	407.8	410.3	411.3	411.0	412.3		
	141.0		407.5	394.0	397.5	401.7	404.9	407.5	408.4	408.0	410.1		
Brickeys Ldg.	136.0	219+26	405.2	391.4	394.8	399.1	402.3	405.0	406.2	405.7	408.1		
	130.3		402.6	388.3	391.8	396.1	399.5	402.4	403.5	403.1	405.4		
Little Rock Ldg.	125.5	364+14	399.5	385.5	388.5	392.7	395.8	398.5	399.0	398.6	399.6		
	123.0		---	---	---	---	---	---	---	---	---		
Ste. Genevieve Levee	122.8		397.0	384.2	387.9	392.1	395.4	398.2	398.7	398.4	399.4		
	121.8		396.8	383.9	387.6	392.0	395.2	398.1	398.7	398.4	399.4		
	120.9		396.3	383.8	387.4	391.8	395.1	398.0	398.7	398.3	399.2		
	120.1		395.5	383.5	387.3	391.7	395.0	397.8	398.5	398.1	399.1		
	119.1		395.0	382.4	386.0	390.3	393.8	396.7	397.3	397.1	398.3		
East Kaskaskia	116.2			380.1	383.5	387.8	391.2	394.1	394.8	394.4	395.8		
Kaskaskia Is. Levee	115.3	10+00	393.5	379.5	382.8	387.3	390.2	393.3	394.4	394.0	395.4		
	114.3	54+00	393.0	379.2	382.4	386.7	389.9	393.0	394.0	393.8	395.2		
	113.3	105+00	392.7	378.9	382.0	386.4	389.6	392.7	393.7	393.4	394.8		
	112.1	176+00	391.8	378.1	381.6	386.2	389.0	392.7	393.5	393.1	394.7		
		216+00	391.5	377.3	381.3	386.0	388.7	392.4	393.2	393.0	394.5		
		239+00	391.2	377.3	381.3	386.0	388.7	392.4	393.2	393.0	394.5		
		295+00	391.0	377.3	381.3	386.0	388.7	392.4	393.2	393.0	394.7		
		337+00	391.0	377.3	381.3	386.0	388.7	392.4	393.2	393.0	394.8		
		385+50	391.2	377.3	381.3	386.0	388.7	392.4	393.2	393.0	394.9		
St. Mary	125.5	436+50	391.5	377.3	381.3	386.0	388.7	392.4	393.2	393.0	394.9		
		485+00	392.0	378.0	381.3	386.0	388.7	392.4	393.2	393.0	394.9		
		542+20	393.0	379.0	381.3	386.0	388.7	392.4	393.2	393.0	394.9		
		587+00	393.4	380.0	381.3	386.0	388.7	392.4	393.2	393.0	394.9		
		644+00	392.5	379.0	381.3	386.0	388.7	392.4	393.2	393.0	394.9		
		706+00	393.5	380.0	381.3	386.0	388.7	392.4	393.2	393.0	394.9		
		755+20	393.5	380.0	381.3	386.0	388.7	392.4	393.2	393.0	394.9		
Chester	109.5	251+78	390.0	376.1	379.4	383.5	386.7	389.3	390.2	389.9	391.2		
	105.1		387.6	374.1	377.6	381.5	384.5	387.3	388.5	388.5	389.3		
Bishop Ldg.	100.8	730+52	385.4	371.5	375.0	379.3	382.3	385.6	386.6	386.1	387.7		
	97.4		383.6	369.9	374.0	378.2	381.5	384.7	385.6	385.2	386.9		
Red Rock Ldg.	94.1	300+00	381.7	368.5	372.5	376.8	379.9	383.0	384.1	383.6	385.1		
	90.6		379.5	366.7	370.8	374.8	378.1	381.2	382.1	381.6	383.2		
Cumberland Rocks	87.0	656+34	377.2	364.1	367.9	372.1	374.9	378.0	379.0	380.1	378.7		
	86.0		376.6	363.6	367.2	371.3	374.1	377.3	378.2	379.2	377.8		
Grand Tower	81.9			361.4	364.7	369.3	372.3	375.3	376.5	377.3	376.0		
	79.3	136+22	371.6	359.1	362.8	366.0	368.5	371.9	372.8	372.4	374.2		
	75.0	221+31	369.5	356.7	360.1	363.9	366.5	369.5	370.6	371.2	370.2		
Crawford Ldg.	72.9	393+00	368.3	355.7	359.3	363.0	365.7	368.3	369.6	370.3	369.2		
	69.2		366.2	355.1	358.0	361.7	364.5	367.2	368.2	369.0	367.7		
Moccasin Springs	66.3		364.6	352.0	355.1	358.7	361.4	363.9	365.0	366.0	364.7		
	61.3		362.4	350.3	353.5	357.0	359.9	362.5	363.5	364.3	363.1		
Devils Island	57.3	537+77	360.3	348.7	352.0	355.6	358.1	360.7	362.0	363.1	361.6		
	54.8		358.3	346.5	349.6	353.9	357.7	360.4	361.9	361.9	359.4		
Cape Girardeau	52.1		356.4	344.2	347.2	350.8	353.2	355.6	357.6	360.1	356.8		
	49.6		353.8	342.5	345.9	349.9	352.3	354.7	356.6	359.7	355.4		
Grays Point	46.3	482+91	350.4	339.8	342.7	346.0	347.8	350.1	352.4	356.9	351.6		
	43.7		348.3	340.8	343.7	345.2	346.7	348.4	349.1	348.0	346.4		
Counterfeit Rock	42.3		337.6	340.1	342.7	344.1	345.5	346.8	349.1	346.4	344.6		
Commerce	39.3		336.1	338.3	340.9	342.0	343.1	343.9	345.8	343.9	341.6		
Powers Island	35.2		333.1	335.5	338.6	339.9	340.7	341.5	343.6	341.6	339.9		
Price Ldg.	30.0		330.6	332.6	335.4	337.0	338.2	339.4	341.8	340.0	338.0		
Thompson Ldg.	20.2		326.5	329.3	333.2	335.2	336.7	338.1	340.7	338.7	336.5		
Beechridge	13.2		325.3	328.7	332.9	335.0	336.4	337.9	340.6	338.5	336.5		
Birds Point	2.0		321.7	325.3	329.7	331.5	332.4	333.4	335.1	333.3	331.3		
Wickliffe	-2.0		319.5	323.2	327.2	328.6	329.1	329.5	330.0	330.0	330.0		
Illinois River*													
Meredosia	71.1	290+00	451.2	435.7	437.7	440.2	441.9	443.8	445.2	450.1	452.5	446.6	
McGee Cr. Levee	70.0		---	437.9	440.0	441.6	443.9	445.1	450.0	452.6	446.3		
	69.0		434.6	436.9	439.8	441.4	443.5	444.5	449.5	452.5	446.1		
	68.0		434.9	436.9	439.7	441.3	443.1	444.2	449.1	452.4	446.0		
Valley City Levee	67.3	500+00	451.0	435.1	437.0	439.6	441.2	443.2	444.4	449.0	452.2	446.0	
	66.0		450.6	---	437.0	439.5	441.3	443.1	444.5	448.9	451.6	446.0	
	65.4		---	434.7	436.7	439.2	441.1	443.1	444.5	448.9	451.5	446.0	
	65.0		---	434.7	436.5	439.0	441.0	443.1	444.5	448.9	451.3	446.0	
	64.0		---	434.7	436.6	439.3	441.0	443.0	444.5	448.9	451.1	446.0	
Scott County Levee	63.0	252+00	450.4	---	---	---	441.0	443.0	444.5	448.6	450.8	446.0	
	62.0		---	436.1	439.1	440.7	443.0	444.4	448.5	450.7	446.0		
Valley City	61.6		434.4	436.1	439.0	441.0	443.0	444.3	448.4	450.7	446.0		
	61.0		---	436.1	438.9	440.7	442.9	444.3	448.3	450.5	446.0		
	60.0		433.8	436.0	438.7	440.5	442.8	444.2	448.2	450.3	446.0		
	59.0		433.6	435.8	438.5	440.5	442.8	444.2	448.1	450.1	446.0		
	58.0		---	435.5	438.3	440.4	442.8	444.2	448.0	450.0	446.0		
	57.0	565+00	449.2	433.1	435.4	438.2	440.3	442.8	444.2	447.8	449.8	445.9	

(Continued)

* Only Mississippi River elevations represent appropriate frequency with additional levees installed. Illinois and Missouri River flows are those required to maintain correct flow frequency relationship on the Mississippi River; hence, elevations on Illinois and Missouri River elevations are backwater elevations.

Table 4 (Concluded)

Station	River Mile	Levee Station	Levee El	Water Surface El., ft. msl.									
				Test 9 5 yr	Test 10 10 yr	Test 11 25 yr	Test 12 50 yr	Test 13 100 yr	Test 14 200 yr	Test 15 Ag Design	Test 16 Urb Design	Test 17 500 yr	
Illinois River* (Continued)													
Big Swan Levee	56.0			--	--	--	--	--	--	--	--	--	--
Florence	56.0	301+00	449.1	443.3	435.5	438.4	440.6	442.8	444.4	447.8	449.7	445.9	445.9
	55.0			432.8	435.4	438.4	440.3	442.7	444.3	447.4	449.6	445.9	445.9
	54.0			432.5	435.2	438.3	440.2	442.7	444.3	447.4	449.6	445.9	445.9
	53.0			432.4	435.0	438.2	440.1	442.6	444.3	447.3	449.5	445.9	445.9
	52.0	500+00		432.2	434.8	438.1	440.1	442.6	444.3	447.3	449.5	445.9	445.9
	51.0	553+00	448.0	432.1	434.6	438.0	440.0	442.5	444.3	447.2	449.4	445.9	445.9
Hillview Levee	50.0	155+00	447.8	432.2	434.6	437.9	440.2	442.5	444.5	447.0	449.3	445.8	445.8
	49.0			431.7	434.2	437.4	439.7	442.5	444.1	446.2	448.4	445.7	445.7
	48.0			431.5	434.1	437.3	439.6	442.4	444.0	446.2	448.4	445.7	445.7
	47.0			431.3	434.0	437.2	439.6	442.4	444.0	446.1	448.4	445.7	445.7
	46.0	380+00		431.1	434.0	437.1	439.5	442.3	444.0	446.0	448.4	445.6	445.6
	45.0			431.0	433.9	437.1	439.5	442.3	444.0	446.0	448.4	445.6	445.6
	44.0		446.7	430.8	433.9	437.0	439.4	442.3	444.0	445.9	448.4	445.6	445.6
Pearl	43.2	525+00		431.3	433.9	437.1	439.7	442.3	444.1	445.7	448.3	445.6	445.6
Hartwell Levee	43.0	180+00	446.6	430.5	433.6	436.8	439.5	442.2	443.9	445.6	448.2	--	--
	42.0			430.8	433.6	436.6	439.4	442.1	443.9	445.5	448.2	445.6	445.6
	41.0			430.7	432.5	436.5	439.4	442.0	443.8	445.4	448.2	445.6	445.6
	40.0			430.3	431.4	436.5	439.3	442.0	443.8	445.2	448.2	445.6	445.6
	39.0			430.2	431.2	436.4	439.3	441.9	443.7	445.1	448.2	445.6	445.6
	38.1	437+00	446.0	430.4	433.2	436.4	439.2	441.8	443.7	445.0	448.2	445.6	445.6
Keach Levee	37.0	336+00	445.8	430.0	433.0	436.5	439.1	441.8	443.7	444.6	448.1	445.6	445.6
	36.0			429.9	432.9	436.4	439.0	441.8	443.7	444.6	448.1	445.6	445.6
	35.0			429.9	432.8	436.3	438.9	441.7	443.6	444.6	448.0	445.6	445.6
	34.0			429.8	432.7	436.2	438.8	441.6	443.6	444.5	448.0	445.5	445.5
	33.0	562+00	445.3	429.8	432.6	436.1	438.7	441.5	443.6	444.5	447.9	445.5	445.5
Eldred Levee	32.0	268+00	445.2	429.7	432.6	436.0	438.5	441.3	443.4	444.0	447.2	445.4	445.4
Kampville	31.5			429.8	432.7	435.9	438.8	441.3	443.4	443.8	447.2	445.4	445.4
	31.0			429.7	432.5	435.9	438.5	441.2	443.3	443.8	447.2	445.4	445.4
	30.0			429.5	432.4	435.8	438.5	441.2	443.2	443.7	447.1	445.3	445.3
	29.0			--	--	--	--	--	--	--	--	--	--
	28.0			429.2	432.2	435.6	438.5	441.2	443.1	443.6	446.9	445.2	445.2
	27.0			429.1	432.1	435.6	438.4	441.2	443.1	443.5	446.8	445.2	445.2
	26.0			429.0	432.1	435.5	438.4	441.2	443.0	443.4	446.8	445.1	445.1
	25.0			428.9	432.0	435.4	438.3	441.2	443.0	443.3	446.7	445.1	445.1
	24.0	700+00	444.1	428.8	432.0	435.3	438.3	441.1	443.0	443.2	446.6	445.1	445.1
Nutwood Levee	23.0	175+00	444.0	428.4	431.2	435.2	438.0	440.9	443.0	442.6	446.5	445.1	445.1
	22.0			428.5	431.6	435.2	437.9	440.8	443.0	442.5	446.4	445.1	445.1
Hardin	21.6			428.8	431.7	435.2	437.8	440.7	442.9	442.4	446.5	445.1	445.1
	21.0			428.7	431.7	435.2	437.8	440.7	442.9	442.4	446.5	445.1	445.1
	20.0			428.4	431.5	434.9	437.7	440.7	442.9	442.4	446.5	445.1	445.1
	19.0			428.2	431.4	434.8	437.7	440.6	442.9	442.3	446.5	445.1	445.1
	18.0			428.1	431.3	434.8	437.7	440.6	442.9	442.3	446.5	445.1	445.1
	17.0			428.0	431.2	434.8	437.7	440.6	442.9	442.3	446.5	445.1	445.1
	16.0			428.0	431.1	434.8	437.7	440.6	442.9	442.2	446.5	445.1	445.1
	15.3	574+00	443.5	428.0	431.1	434.8	437.7	440.6	442.9	442.2	446.4	445.1	445.1
	14.0			427.8	431.0	434.6	437.6	440.5	442.9	442.1	446.2	445.1	445.1
	13.0			427.5	430.7	434.5	437.6	440.4	442.9	442.0	446.1	445.1	445.1
	3.3			427.3	430.4	434.1	437.4	440.4	442.9	441.8	446.1	445.1	445.1
	0												
Missouri River*													
St. Charles	28.4		446.8	444.1	446.7	449.1	450.4	451.3	452.4	452.4	453.6	453.4	453.4
	25.0		448.6	449.9	442.5	445.1	447.1	448.3	449.2	449.5	450.3	450.2	450.2
	19.0		443.8	434.8	437.8	440.4	441.9	443.0	444.4	444.0	446.3	445.4	445.4
Halls Ferry	17.1		440.0	433.7	436.5	439.5	441.0	442.3	443.7	443.2	445.9	444.9	444.9
	12.3		438.0	430.9	434.1	436.9	438.5	440.0	441.6	441.0	444.4	443.3	443.3
Bellefontaine	8.2		431.0	428.2	431.0	433.7	435.5	437.5	439.7	439.1	443.3	442.1	442.1
	5.0		423.9	425.5	428.6	431.9	434.4	437.3	439.7	439.1	443.0	441.9	441.9

* Only Mississippi River elevations represent appropriate frequency with additional levees installed. Illinois and Missouri River flows are those required to maintain correct flow frequency relationship on the Mississippi River; hence, elevations on Illinois and Missouri River elevations are backwater elevations.

Table 5
Water Surface Elevation, Mississippi River Flowline - Authorized Levees*

Station	River Mile**	Levee Station	Levee El†	Water Surface El, ft msl††					Test 23 Urb Design
				Test 18 25 yr	Test 19 50 yr	Test 20 100 yr	Test 21 200 yr	Test 22 Ag Design	
Mississippi River*									
St. Louis	179.6			421.0	424.3	427.0	427.7	427.1	431.0
Engineer Depot	176.8			418.9	422.3	424.8	425.4	424.6	428.1
Missouri Pacific Elevator	172.6			416.0	418.9	421.3	421.3	420.5	423.3
Jefferson Barracks	169.3			415.2	418.3	420.7	420.5	419.8	422.8
	162.9	305+71	417.5	413.6	416.9	419.3	418.8	418.1	421.1
Waters Point	158.5	543+57	415.4	410.4	413.3	415.9	415.6	414.4	417.7
	156.0	330+00	414.2	408.8	411.5	414.4	413.6	413.1	415.6
	151.4		412.2	406.9	409.8	412.3	411.3	410.6	413.4
Selma	145.7	863+30	409.5	403.8	406.8	409.4	408.9	407.8	411.3
	141.0		407.5	400.7	403.5	406.3	405.9	405.1	408.6
Brickeys Ldg.	136.0	219+26	405.2	398.0	400.7	403.4	403.0	402.4	406.0
	130.3		402.6	394.8	397.8	400.2	399.0	398.7	402.5
Little Rock Ldg.	125.5	364+14	399.5	391.1	393.6	396.2	394.4	393.3	396.6
Ste. Genevieve Levee	122.8		Levee	390.3	393.0	395.4	393.8	392.7	395.8
	121.8		not	390.1	392.8	395.1	393.6	392.5	395.7
	120.9		installed	389.7	392.7	394.8	393.2	392.2	395.5
	120.1			389.5	392.4	394.6	392.9	391.8	395.3
	119.1			389.1	392.0	394.3	392.7	391.4	395.0
East Kaskaskia	116.2			387.8	391.1	393.5	391.5	390.3	393.9
Kaskaskia Is. Levee	115.3	10+00	393.5	387.5	391.0	393.3	391.3	389.9	393.6
	114.3	54+00	393.2	387.2	390.7	393.2	391.0	389.6	393.5
	113.3	105+00	392.7	386.8	390.6	392.9	390.7	389.5	393.4
	112.1	176+00	391.8	386.6	390.3	392.6	390.4	389.4	393.2
		216+00	391.5	387.0	390.4	392.4	390.1	389.2	392.9
		239+00	391.2	387.4	390.9	392.8	390.7	389.4	393.1
		295+00	391.0	387.8	391.2	393.2	390.8	389.8	393.1
		339+70	391.0	388.1	391.2	393.2	390.9	389.9	393.1
		385+50	391.2	388.0	391.3	393.2	390.9	390.0	393.2
St. Mary		436+50	391.5	388.0	391.4	393.2	391.0	390.0	393.4
		485+00	392.0	388.1	391.4	393.3	391.2	390.1	393.8
		542+20	393.0	388.3	391.6	393.6	391.8	390.7	394.2
		589+00	393.4	388.5	392.0	393.8	392.0	390.9	394.5
		644+00	393.5	388.9	392.1	394.2	392.4	391.2	394.9
		706+00	393.5	389.0	392.2	394.1	392.5	391.1	394.7
		755+20	393.5	388.8	391.9	394.0	392.0	391.1	394.6
Chester	109.5	251+78	390.0	383.5	386.7	389.3	387.3	386.3	389.6
	105.1		387.6	381.5	384.5	387.3	385.5	384.6	387.8
Bishop Ldg.	100.8	730+52	385.4	379.3	382.3	385.6	383.2	382.4	385.5
	97.4		383.6	378.2	381.5	384.7	382.3	381.3	384.9
Red Rock Ldg.	94.1	300+00	381.7	376.8	379.9	383.0	381.0	380.0	383.5
	90.6		379.5	374.8	378.1	381.2	378.4	377.6	380.5
Cumberland Rocks	87.0	656+34	377.2	372.1	374.9	378.0	375.7	374.7	377.7
	86.0		376.6	371.3	374.1	377.3	375.1	374.3	376.8
Grand Tower	81.9			369.3	372.3	375.3	373.0	372.2	375.3
	79.3	136+22	371.6	366.0	368.5	371.9	370.0	369.4	372.3
	75.0	291+31	369.5	363.9	366.5	369.5	367.7	366.8	370.1
Crawford Ldg.	72.9	393+00	368.3	363.0	365.7	368.3	366.8	366.1	369.2
	69.2		366.2	361.7	364.5	367.2	365.9	365.1	368.0
Moccasin Springs	66.3		364.6	358.7	361.4	363.9	362.8	361.9	365.0
	61.3		362.4	357.0	359.9	362.5	361.7	360.8	363.8
Devils Island	57.3	537+77	360.3	355.6	358.1	360.7	360.1	359.4	362.5
	54.8		358.3	353.9	355.7	358.7	358.8	357.7	361.7
Cape Girardeau	52.1		356.4	350.8	353.2	355.6	352.2	356.4	360.2
	49.6		353.8	349.9	352.3	354.7	356.6	355.7	360.0
Grays Point	46.3	482+91	350.4	346.0	347.8	350.1	352.3	352.8	356.7
Thebes	43.7			343.7	345.2	346.7	348.4	351.3	348.0

* Authorized levees with Kaskaskia Island levee installed to existing authorized alignment with same degree of protection as other Federal levees in the area.
 ** Distance above mouth of Ohio River.
 † Elevation in feet mean sea level.
 †† Tests conducted in St. Louis-to-Wickliffe Reach but stages in Thebes-to-Wickliffe Reach were the same as for tests 11-16 (Table 4).
 • Levees were crevassed when overtapped.

Table 6
Water Surface Elevations, Illinois River Flowing, Authorized Levees

Station	River Mile*	Levee Station	Levee Elevation**	Water Surface El. ft. ms1†									
				Test 24 5 yr	Test 25 10 yr	Test 26 25 yr	Test 27 50 yr	Test 28 100 yr	Test 29 200 yr	Test 30 Ag Design	Test 31 Mod Ag Design	Test 32 500 yr	
Mississippi River**													
L&D 22L	301.1			465.1	467.0	469.0	470.4	472.0	473.4	471.6	--	--	475.4
	296.0			461.1	463.5	465.3	466.8	468.5	469.8	467.8	--	--	471.8
Mundy's Ldg.	293.0	52+00	468.0	459.4	460.9	462.8	464.2	465.9	467.4	465.7	--	--	469.3
Area 12 Levee	292.3			--	461.3	463.1	464.0	465.7	467.2	465.5	--	--	469.3
	291.6			--	460.7	462.6	463.6	465.2	466.7	465.0	--	--	468.8
	291.0			--	459.8	461.6	463.3	464.8	466.3	464.6	--	--	468.3
	290.2			--	459.0	461.2	462.8	464.5	465.8	464.2	--	--	467.7
	289.1			--	458.9	461.2	462.2	463.9	465.4	463.5	--	--	467.3
	288.3			--	458.9	461.2	462.2	463.9	465.4	463.5	--	--	466.2
	285.5	307+00	466.5	--	456.0	457.6	460.9	461.9	463.7	465.0	--	--	463.9
Louisiana	282.1			--	455.9	457.8	459.2	460.5	461.8	460.4	--	--	461.3
	278.0			--	452.0	453.5	455.7	456.9	458.3	459.9	--	--	461.3
L&D 24U	273.5			--	449.8	451.4	453.4	454.6	456.1	457.4	--	--	459.1
Area 10 Levee	273.0			--	448.7	450.4	452.3	453.6	455.5	456.8	--	--	458.2
	272.0			--	448.1	450.0	451.9	453.2	455.1	456.4	--	--	457.8
	271.0	100+00	458.3	--	447.9	449.6	451.6	452.6	454.7	456.0	--	--	457.8
	270.0			--	447.5	449.1	451.2	452.4	454.4	455.5	--	--	457.4
	269.0			--	447.0	448.8	450.8	452.0	454.0	455.2	--	--	457.0
	268.0	282+00	457.2	--	446.7	448.4	450.4	451.8	453.6	454.8	--	--	456.7
	266.9			--	445.8	447.9	449.9	451.4	453.3	454.6	--	--	456.3
	265.8			--	445.4	447.5	449.7	451.2	453.2	454.1	--	--	455.9
Rip Rap Ldg.	265.0			--	445.4	447.3	449.4	450.9	452.6	454.0	--	--	454.7
Area 8 Levee	260.7	298+00	454.4	--	443.9	445.6	447.8	449.4	451.3	452.5	--	--	454.7
Moster	260.3			--	443.6	445.4	447.7	449.0	450.8	452.3	--	--	454.2
	260.1			--	443.6	445.5	447.7	448.9	450.9	452.2	--	--	454.0
	259.2			--	443.0	444.7	447.0	448.4	450.3	451.7	--	--	453.6
Hamburg	258.5			--	442.2	444.2	446.7	448.1	449.6	451.4	--	--	453.3
	258.2			--	442.6	444.1	446.5	447.8	449.8	451.1	--	--	453.1
	257.6			--	442.5	443.9	446.2	447.7	449.6	451.0	--	--	452.9
	256.3			--	442.1	443.5	445.8	447.5	449.3	450.6	--	--	452.6
	255.6			--	442.4	443.9	446.2	447.7	449.6	451.0	--	--	452.3
	255.0			--	441.4	442.9	445.4	446.8	448.9	449.9	--	--	452.1
	254.4			--	440.9	442.6	445.2	446.8	448.7	449.6	--	--	451.8
	253.5			--	440.5	442.3	444.8	446.2	447.9	449.2	--	--	451.3
	253.0			--	440.1	441.9	444.5	446.2	448.2	449.0	--	--	451.1
	252.4			--	439.8	441.4	444.2	445.8	448.0	448.8	--	--	450.8
	251.8			--	439.4	441.2	444.0	445.6	447.6	448.6	--	--	450.7
	251.3	822+00	450.8	--	439.1	441.0	443.7	445.2	447.4	448.4	--	--	450.1
Sterling Ldg.	250.8			--	439.3	440.7	443.2	445.1	447.0	448.3	--	--	450.1
	247.8			--	438.5	439.9	442.7	444.6	446.5	447.5	--	--	449.8
	245.0			--	437.1	438.8	441.7	444.0	445.6	447.0	--	--	449.4
L&D 25U	241.5			--	434.7	437.0	440.0	442.6	444.7	446.2	--	--	448.7
	237.9			--	433.3	435.7	438.8	441.7	444.0	445.7	--	--	448.5
	234.0			--	432.4	435.3	438.1	441.3	443.4	445.1	--	--	448.1
Dixon's Ldg.	228.3			--	430.2	433.6	436.8	439.7	442.4	444.6	--	--	447.2
	224.3			--	429.7	432.6	435.9	439.0	442.0	444.0	--	--	446.7
Grafton	218.0			--	427.4	430.4	434.2	437.6	440.4	442.8	--	--	445.2
	214.0			--	426.4	429.3	432.9	436.0	439.2	441.8	--	--	444.3
	210.0			--	425.3	428.3	432.1	435.5	438.6	441.2	--	--	443.5
	207.0			--	424.7	427.8	431.5	435.0	438.0	440.7	--	--	443.0
L&D 26U	203.0			--	424.1	427.4	431.0	434.6	437.3	439.6	--	--	442.2
	199.2			--	423.0	426.5	430.7	434.2	436.9	439.4	--	--	441.8
Hartford	196.8			--	422.4	426.0	430.5	433.9	436.6	438.8	--	--	441.5
Columbia Bottom Levee	4.8	6+00	Levee	--	--	432.5	434.7	437.6	439.7	438.7	--	--	442.2
		26+00	in to	--	--	432.4	434.7	437.7	439.7	438.7	--	--	442.1
		46+00	confining	--	--	425.8	431.8	434.5	437.5	439.4	--	--	441.9
		66+00	grade	--	--	425.8	430.9	433.9	436.7	439.0	--	--	441.4
		86+00		--	--	425.8	430.5	433.5	436.5	438.8	--	--	441.4
		106+00		--	--	425.6	430.2	433.2	436.3	438.6	--	--	441.0
		126+00		--	--	425.2	429.9	432.2	435.7	438.1	--	--	440.6
		146+00		--	--	424.8	429.2	431.2	435.0	437.1	--	--	439.5
		166+00		--	--	427.8	430.4	433.8	436.1	435.0	--	--	438.7
		186+00		--	--	422.8	427.6	431.0	434.0	436.1	--	--	438.4
		206+00		--	--	422.8	427.6	431.2	434.0	436.2	--	--	436.7
		226+00		--	--	422.8	427.6	431.2	434.0	436.6	--	--	439.4
		246+00		--	--	422.8	427.6	431.2	434.0	437.0	--	--	439.4
		266+00		--	--	422.8	427.6	431.3	434.2	431.1	--	--	439.5
		286+00		--	--	427.6	431.4	434.4	437.2	436.1	--	--	439.8
	194.0			--	419.7	423.7	428.7	431.9	435.1	437.6	--	--	440.1
Chain of Rocks	190.4			--	418.5	422.3	426.6	430.4	433.3	435.7	--	--	438.4
Illinois River**													
Meredosia	71.1	290+00	451.2	439.5	441.6	444.2	446.6	448.6	450.6	448.7	448.0	--	451.8
McGee Cr. Levee	70.0			439.3	441.6	443.8	446.3	448.3	450.4	448.6	447.9	--	451.5
	69.0			439.0	441.2	443.7	446.0	448.0	450.2	448.3	447.6	--	451.3
	68.0			438.9	440.9	443.6	445.8	447.7	449.9	448.1	447.4	--	451.0
	67.3	500+00	451.0	438.8	440.8	443.5	445.7	447.5	449.8	448.0	447.2	--	450.8
Valley City Levee	66.0			438.5	440.6	443.3	445.5	447.4	449.4	447.8	447.1	--	450.6
	65.4			438.5	440.6	443.3	445.4	447.4	449.3	447.8	447.0	--	450.5
	65.0			438.4	440.6	443.2	445.4	447.4	449.2	447.8	447.0	--	450.4
	64.0			438.4	440.5	443.1	445.4	447.4	449.1	447.8	447.0	--	450.3
Scott County Levee	63.0	252+00	450.4	--	440.4	443.0	445.3	447.4	449.0	447.7	446.8	--	450.1
	62.0			--	438.2	440.3	443.0	445.2	447.3	445.9	447.6	--	449.9
	61.6			--	438.1	440.2	443.0	445.1	447.2	445.8	447.5	--	449.9
Valley City	61.0			--	438.0	439.9	442.8	444.9	447.0	445.7	447.4	--	449.8
	60.0			--	437.6	439.7	442.6	444.6	446.7	445.6	447.2	--	449.6

(Continued)

* Mississippi River, distance above mouth of Ohio River; Illinois and Missouri Rivers, distance above mouth.
 ** Elevation in feet mean sea level.
 † No levees were crevassed.
 †† Only Illinois River elevations represent appropriate frequency with authorized levees installed. Mississippi and Missouri River flows are those required to give correct elevations at mouth of Illinois River; hence, Mississippi upstream of mouth of Illinois River and Missouri River elevations are backwater elevations.

Table 6 (Concluded)

Station	River Mile	Levee Station	Levee El	Water Surface El. ft msl									
				Test 24 5 yr	Test 25 10 yr	Test 26 25 yr	Test 27 50 yr	Test 28 100 yr	Test 29 200 yr	Test 30 Ag Design	Test 31 Mod Ag Design	Test 32 500 yr	
<u>Illinois River†† (Continued)</u>													
Valley City (Continued)	59.0			437.4	439.5	442.4	444.5	446.5	448.4	447.1	446.1	449.4	
	58.0			437.2	439.3	442.3	444.4	446.4	448.3	447.0	446.0	449.3	
	57.0	565+00	449.2	437.0	439.2	442.2	444.3	446.4	448.2	447.0	446.0	449.2	
Big Swan Levee	56.0			---	---	---	---	---	---	---	---	---	
Florence	55.0	301+00	449.1	437.0	439.2	442.2	444.3	446.4	448.2	447.0	445.9	449.2	
	54.0			436.7	438.9	441.8	444.1	446.3	447.9	447.0	445.8	449.0	
	53.0			436.1	438.5	441.5	443.8	445.9	447.6	446.9	445.5	448.7	
	52.0	500+00		435.9	438.2	441.3	443.7	445.7	447.5	446.9	445.4	448.6	
	51.0	553+00	448.0	435.7	438.0	441.2	443.6	445.6	447.3	446.8	445.1	448.5	
Hillview Levee	50.0	155+00	447.8	435.3	437.7	440.9	443.2	445.6	447.2	446.6	444.8	448.3	
	49.0			434.9	437.4	440.4	443.0	445.3	446.8	446.2	444.5	448.0	
	48.0			434.7	436.9	440.0	442.6	444.9	446.6	446.0	444.3	447.8	
	47.0			434.5	436.7	439.8	442.3	444.6	446.4	445.9	444.2	447.6	
	46.0	380+00		434.3	436.6	439.8	442.2	444.5	446.3	445.8	444.1	447.6	
	45.0			434.2	436.6	439.8	442.2	444.4	446.2	445.8	444.0	447.5	
	44.0		446.7	434.2	436.6	439.8	442.2	444.4	446.1	445.7	443.8	447.5	
Pearl	43.2	525+00		434.3	436.7	439.8	442.1	444.4	446.1	445.6	443.7	447.5	
Hartwell Levee	43.0	180+00	446.6	434.2	436.6	439.7	442.0	444.3	446.1	445.4	443.7	447.4	
	42.0			433.8	436.3	439.3	441.7	444.2	446.0	445.2	443.6	447.4	
	41.0			433.6	436.0	439.0	441.4	444.0	445.9	445.1	443.4	447.3	
	40.0			433.3	435.7	438.7	441.3	443.9	445.9	445.0	443.3	447.2	
	39.0			433.0	435.6	438.4	441.2	443.7	445.8	444.8	443.2	447.2	
Keach Levee	38.1	437+00	446.0	433.0	435.5	438.3	441.1	443.6	445.8	444.6	443.0	447.2	
	37.0	336+00	445.8	432.8	435.4	438.2	441.0	443.5	445.7	444.6	442.7	447.1	
	36.0			432.5	435.2	438.1	440.9	443.4	445.4	444.5	442.5	447.0	
	35.0			432.4	435.1	438.0	440.8	443.1	445.2	444.4	442.4	446.8	
	34.0			432.3	434.9	437.9	440.7	442.9	445.0	444.3	442.2	446.7	
Eldred Levee	33.0	562+00	445.3	432.1	434.8	437.8	440.6	442.8	444.8	444.2	442.0	446.6	
Kampsville	32.0	268+00	445.2	432.0	434.7	437.8	440.4	442.7	444.7	444.2	441.8	446.5	
	31.5			432.0	434.6	437.7	440.3	442.7	444.6	444.2	441.8	446.5	
	31.0			432.0	434.3	437.6	440.2	442.6	444.6	444.1	441.7	446.4	
	30.0		444.9	431.8	434.1	437.3	440.1	442.5	444.5	444.0	441.6	446.2	
	29.0			---	---	---	---	---	---	---	---	---	
	28.0			431.5	434.0	437.0	439.9	442.2	444.3	443.9	441.4	446.2	
	27.0		444.4	431.4	433.9	436.9	439.8	442.1	444.1	443.8	441.3	446.2	
	26.0			431.2	433.7	436.8	439.7	442.0	444.0	443.7	441.2	446.1	
	25.0			431.0	433.6	436.7	439.5	441.8	443.9	443.6	441.0	446.0	
Nutwood Levee	24.0	700+00	444.1	430.7	433.4	436.5	439.2	441.6	443.8	443.4	440.8	445.8	
	23.0	175+00	444.0	430.4	433.1	436.2	439.0	441.4	443.6	443.2	440.5	445.6	
	22.0			430.3	433.0	436.1	438.9	441.4	443.5	443.0	440.2	445.5	
Hardin	21.6			430.3	432.9	436.1	438.8	441.3	443.4	443.0	440.1	445.5	
	21.0			430.2	432.8	435.9	438.6	441.2	443.3	442.8	439.9	445.5	
	20.0			429.8	432.5	435.6	438.4	441.0	443.1	442.5	439.6	445.4	
	19.0		443.7	429.6	432.2	435.4	438.3	440.8	443.0	442.3	439.3	445.4	
	18.0			429.3	431.9	435.2	438.2	440.7	443.0	442.2	439.0	445.4	
	17.0			429.2	431.8	435.1	438.1	440.7	442.0	442.2	438.8	445.4	
	16.0			429.1	431.7	435.0	438.0	440.6	442.9	442.2	438.7	445.4	
	15.3	574+00	443.5	429.0	431.6	434.9	438.0	440.6	442.9	442.1	438.7	445.4	
	10.0			428.5	431.5	434.6	437.9	440.5	442.9	442.1	438.6	445.3	
	3.3			427.7	430.8	434.5	437.7	440.4	442.9	442.0	438.2	445.2	
	0			427.4	430.4	434.1	437.4	440.4	442.9	441.9	437.7	445.2	
<u>Missouri River††</u>													
St. Charles	28.4		446.8	441.1	446.7	449.1	450.4	451.3	452.4	452.4		453.4	
	25.0		448.6	449.9	442.5	445.1	447.1	448.3	449.2	449.5		450.2	
	19.0		443.8	434.8	437.8	440.4	441.9	443.0	444.4	444.0		445.4	
Halls Ferry	17.1		440.0	433.7	436.5	439.5	441.0	442.3	443.7	443.2		444.9	
	12.3		438.0	430.9	434.1	436.9	438.5	440.0	441.6	441.0		443.3	
Bellefontaine	8.2		431.0	428.2	431.0	433.7	435.5	437.5	439.7	439.1		442.1	
	5.0		423.9	425.5	428.6	431.9	434.4	437.3	439.7	439.1		441.9	

†† Only Illinois River elevations represent appropriate frequency with authorized levees installed. Mississippi and Missouri River flows are those required to give correct elevations at mouth of Illinois River; hence, Mississippi upstream of mouth of Illinois River and Missouri River elevations are backwater elevations.

Table 7
Water Surface Elevations, Missouri River
Flowline, Authorized Levees

Station	River Mile*	Levee Station	Levee El**	Water Surface El, ft msl†		
				Test 33 10 yr	Test 34 25 yr	Test 35 100 yr
<u>Mississippi River††</u>						
L&D 22L	301.1			466.2	468.0	470.1
	296.0			462.1	464.0	466.3
Mundy's Ldg.	293.0	52+00	468.0	460.1	461.8	463.8
Area 12 Levee	292.3		468.0	--	461.8	463.8
	291.6		467.5	--	461.5	463.5
	291.0		467.2	--	461.0	463.0
	290.2		466.8	--	460.3	462.4
	289.1		466.6	--	459.8	462.0
	288.3	307+00	466.5	--	--	--
	285.5			457.1	458.8	460.8
Louisiana	282.1			455.3	457.0	459.0
	278.0			452.9	454.6	456.3
L&D 24U	273.5			450.8	452.2	454.4
Area 10 Levee	273.0			449.7	450.9	453.7
	272.0		459.0	448.9	450.3	453.2
	271.0	100+00	458.3	448.8	449.9	452.9
	270.0		458.0	448.4	449.6	452.5
	269.0		457.6	448.0	449.3	452.2
	268.0	282+00	457.2	447.8	449.0	451.8
	266.9		456.8	446.9	448.4	451.4
	265.8		456.4	446.5	448.3	450.9
Rip Rap Ldg.	265.0			446.5	448.2	450.9
Area 8 Levee	260.7	298+00	454.4	444.9	446.7	449.6
Mosier Ldg.	260.3			444.6	446.5	449.4
	260.1		454.0	444.7	446.5	449.3
	259.2		433.6	444.0	445.8	448.8
Hamburg	258.5			443.4	445.4	448.3
	258.2		453.2	443.5	445.5	448.4
	257.6		453.0	443.4	445.2	448.2
	256.3		452.6	442.8	444.7	447.9
	255.6		452.4	442.4	444.5	447.7
	255.0		452.3	442.1	444.2	447.5
	254.4		452.7	441.8	443.8	447.3
	253.5		451.7	441.3	443.3	446.9
	253.0		451.3	441.1	443.1	446.6
	252.4		451.0	440.6	442.6	446.2
	251.8		450.9	440.3	442.4	446.2
	251.3	822+00	450.8	439.9	442.1	445.8
Sterling Ldg.	250.8		449.0	439.8	442.0	445.6
	247.8			439.4	441.5	445.3
	245.0		443.0	438.0	440.6	444.5
L&D 25U	241.5		442.0	436.0	439.0	443.6
	237.9			434.7	437.8	442.8
	234.0			434.1	437.4	442.2

(Continued)

* Mississippi River, distance above mouth of Ohio River; Illinois and Missouri Rivers, distance above mouth.

** Elevation in feet mean sea level.

† No levees were crevassed.

†† Only Missouri River elevations represent appropriate frequency. Mississippi and Illinois River flows are those required to give appropriate flow frequency relationship on the Missouri River; hence Mississippi and Illinois River elevations are backwater elevations.

(Sheet 1 of 4)

Table 7 (Continued)

Station	River Mile	Levee Station	Levee El	Water Surface El, ft msl		
				Test 33 10 yr	Test 34 25 yr	Test 35 100 yr
<u>Mississippi River†† (Continued)</u>						
Dixon's Ldg.	228.3			432.0	435.6	441.4
	224.3			431.7	435.2	441.2
Grafton	218.0			429.5	433.2	439.8
	214.0			428.8	432.6	438.8
	210.0			428.4	432.1	438.6
	207.0			427.8	431.5	438.1
L&D 26U	203.0			427.4	431.0	437.4
	199.2			426.5	430.6	436.9
Hartford	196.8			426.0	430.4	436.6
Columbia Bottom Levee	4.8	6+00	Levee	--	432.5	437.6
		26+00	in to	--	432.4	437.7
	4.2	46+00	confining	425.8	431.8	437.5
		66+00	grade	425.8	430.9	436.7
		86+00		425.8	430.5	436.5
		106+00		425.6	430.2	436.3
		126+00		425.2	429.9	435.7
		146+00		424.8	429.2	435.0
		166+00		--	427.8	433.8
		186+00		422.8	427.6	434.0
	195.0	206+00		422.8	427.6	434.0
		226+00		422.8	427.6	434.0
		246+00		422.8	427.6	434.0
		266+00		422.8	427.6	434.2
		286+00		--	427.6	434.4
	194.0			423.7	428.7	435.1
Chain of Rocks	190.4			422.3	426.6	433.3
<u>Illinois River††</u>						
Meredosia	71.1	290+00	451.2	435.6	437.8	441.4
McGee Cr. Levee	70.0			--	437.5	441.2
	69.0			--	437.4	441.0
	68.0			--	437.2	441.0
	67.3	500+00	451.0	--	437.2	440.9
Valley City Levee	66.0		450.6	--	437.1	440.8
	65.4			434.8	437.0	440.8
	65.0			434.8	437.0	440.7
	64.0			434.7	436.9	440.7
Scott County Levee	63.0	252+00	450.4	434.6	436.8	440.7
	62.0			--	--	--
Valley City	61.6			434.5	436.7	440.8
	61.0			434.3	436.6	440.7
	60.0			434.1	436.5	440.6
	59.0			433.9	436.4	440.7
	58.0			433.8	436.2	440.7
	57.0	565+00	449.2	433.7	436.2	440.7
Big Swan Levee	56.0			--	--	--

(Continued)

†† Only Missouri River elevations represent appropriate frequency. Mississippi and Illinois River flows are those required to give appropriate flow frequency relationship on the Missouri River; hence Mississippi and Illinois River elevations are backwater elevations.

(Sheet 2 of 4)

Table 7 (Continued)

Station	River Mile	Levee Station	Levee El	Water Surface El, ft msl					
				Test 33 10 yr	Test 34 25 yr	Test 35 100 yr			
<u>Illinois River†† (Continued)</u>									
Florence	56.0	301+00	449.1	433.6	436.1	440.7			
	55.0			433.4	435.9	440.7			
	54.0			433.2	435.8	440.7			
	53.0			433.1	435.8	440.7			
Hillview Levee	52.0	500+00	448.0	432.9	435.7	440.7			
	51.0	553+00		432.8	435.7	440.7			
	50.0	155+00		432.7	435.6	440.6			
	49.0	380+00		432.6	435.4	440.5			
	48.0			432.4	435.3	440.5			
	47.0			432.3	435.2	440.5			
	46.0			432.2	435.2	440.5			
	45.0	525+00		446.7	432.1	435.2	440.6		
	44.0				432.1	435.1	440.6		
	Pearl				43.2	432.1	435.2	440.6	
Hartwell Levee	43.0		180+00		446.6	--	--		
	42.0					432.0	435.1	440.5	
	41.0					431.8	434.9	440.4	
	40.0			431.6	434.8	440.3			
	39.0			431.5	434.8	440.3			
	38.1	437+00	446.0	431.4	434.8	440.3			
	37.0	336+00	445.8	431.4	434.7	440.3			
Keach Levee	36.0	562+00	445.3	431.3	434.7	440.3			
	35.0			431.2	434.6	440.2			
	34.0			431.2	434.5	440.2			
	33.0			431.1	434.4	440.2			
	Elred Levee Kampsville			32.0	268+00	445.2	431.0	434.3	440.2
				31.5			431.0	434.3	440.2
				31.0			431.0	434.3	440.2
				30.0			430.8	434.2	440.1
				29.0			430.7	434.1	440.1
				28.0			430.7	434.1	440.1
27.0				430.6	434.0	440.0			
26.0				430.6	433.9	439.9			
25.0			430.5	433.9	439.9				
24.0	700+00	444.1	430.4	433.8	439.9				
Nutwood Levee	23.0	175+00	444.0	430.4	433.8	439.9			
	22.0			430.3	433.8	439.9			
Hardin	21.6			430.2	433.8	439.9			
	21.0			430.2	433.8	439.9			
	20.0			430.1	433.7	439.9			
	19.0			430.0	433.7	439.8			
	18.0			430.0	433.6	439.8			
	17.0			430.0	433.6	439.8			
	16.0			430.0	433.5	439.8			
	15.3	574+00	443.5	429.9	433.5	439.8			
	10.0			429.7	433.3	439.8			
	3.3			429.5	433.2	439.7			
	0			429.4	433.2	439.6			

(Continued)

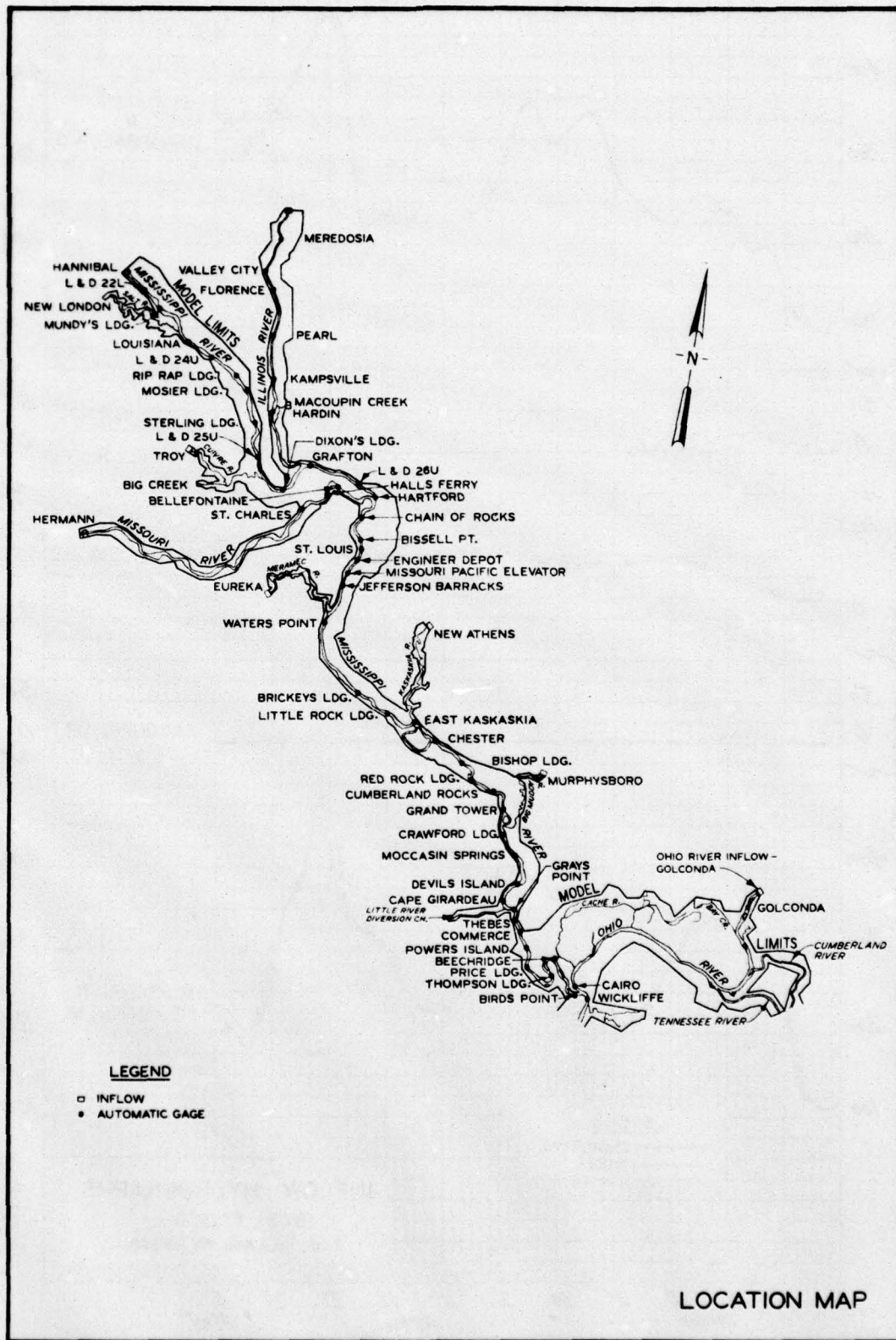
†† Only Missouri River elevations represent appropriate frequency. Mississippi and Illinois River flows are those required to give appropriate flow frequency relationship on the Missouri River; hence Mississippi and Illinois River elevations are backwater elevations.

(Sheet 3 of 4)

Table 7 (Concluded)

Station	River Mile	Levee Station	Levee El	Water Surface El, ft msl		
				Test 33 10 yr	Test 34 25 yr	Test 35 100 yr
<u>Missouri River</u> ††						
St. Charles	28.4		446.8	448.6	450.5	452.8
	25.0		448.6	444.6	447.0	449.6
	19.0		443.8	439.4	441.7	443.9
Halls Ferry	17.1		440.0	438.5	440.8	443.1
	12.3		438.0	435.6	437.5	440.2
Bellfontaine	8.2		431.0	432.2	434.4	437.8
	5.0		423.9	429.4	432.6	437.4

†† Only Missouri River elevations represent appropriate frequency. Mississippi and Illinois River flows are those required to give appropriate flow frequency relationship on the Missouri River; hence Mississippi and Illinois River elevations are backwater elevations.



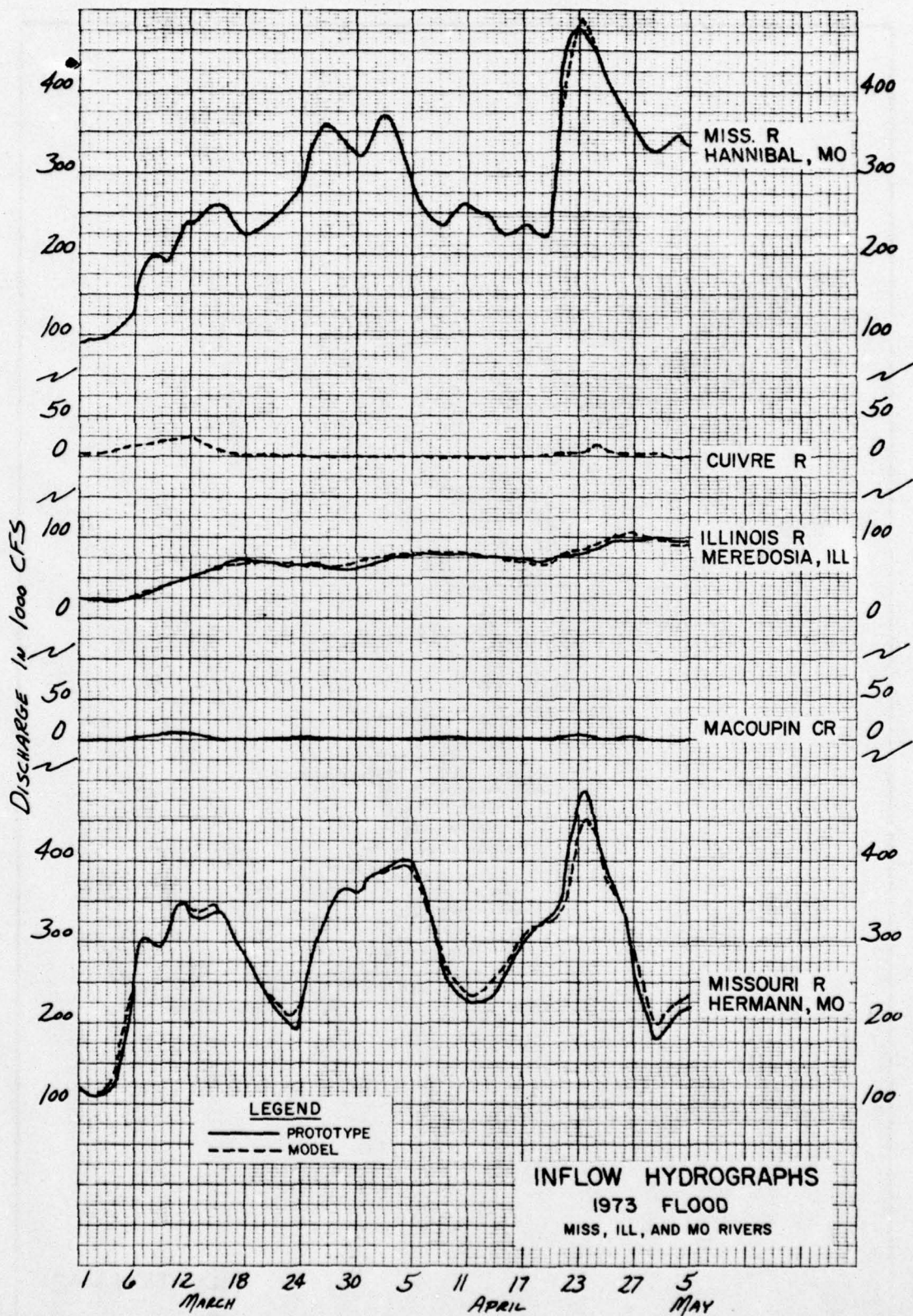
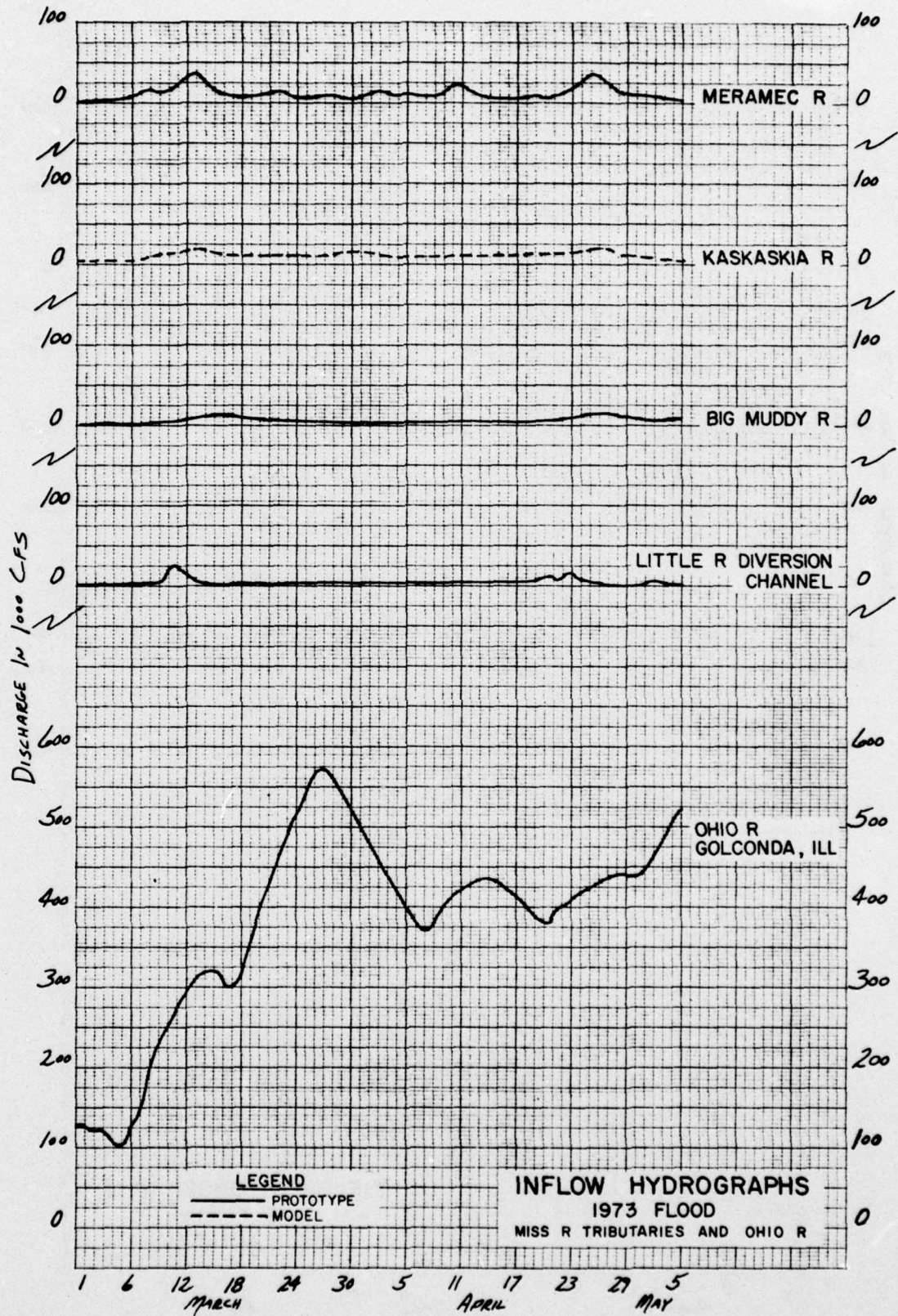
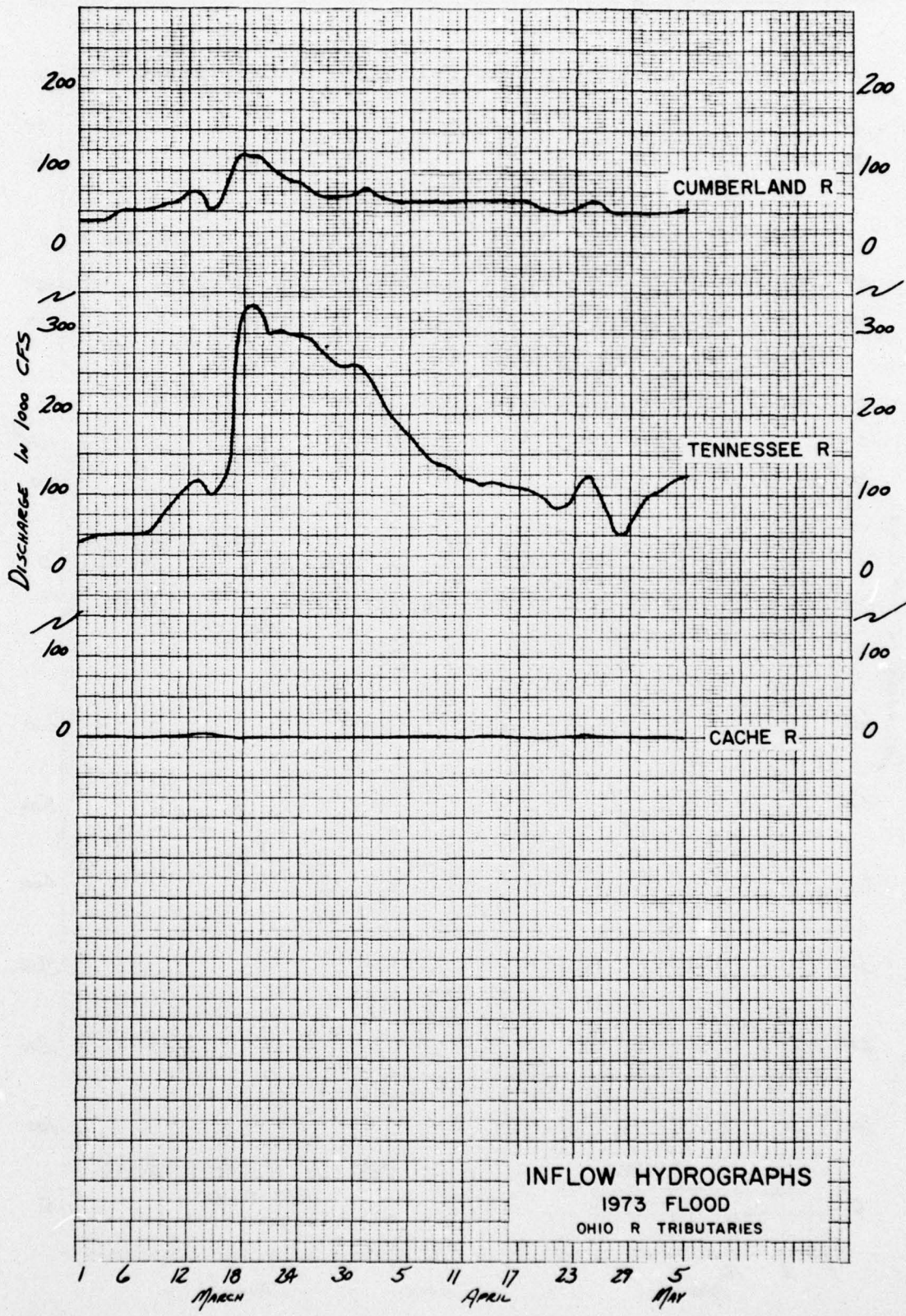
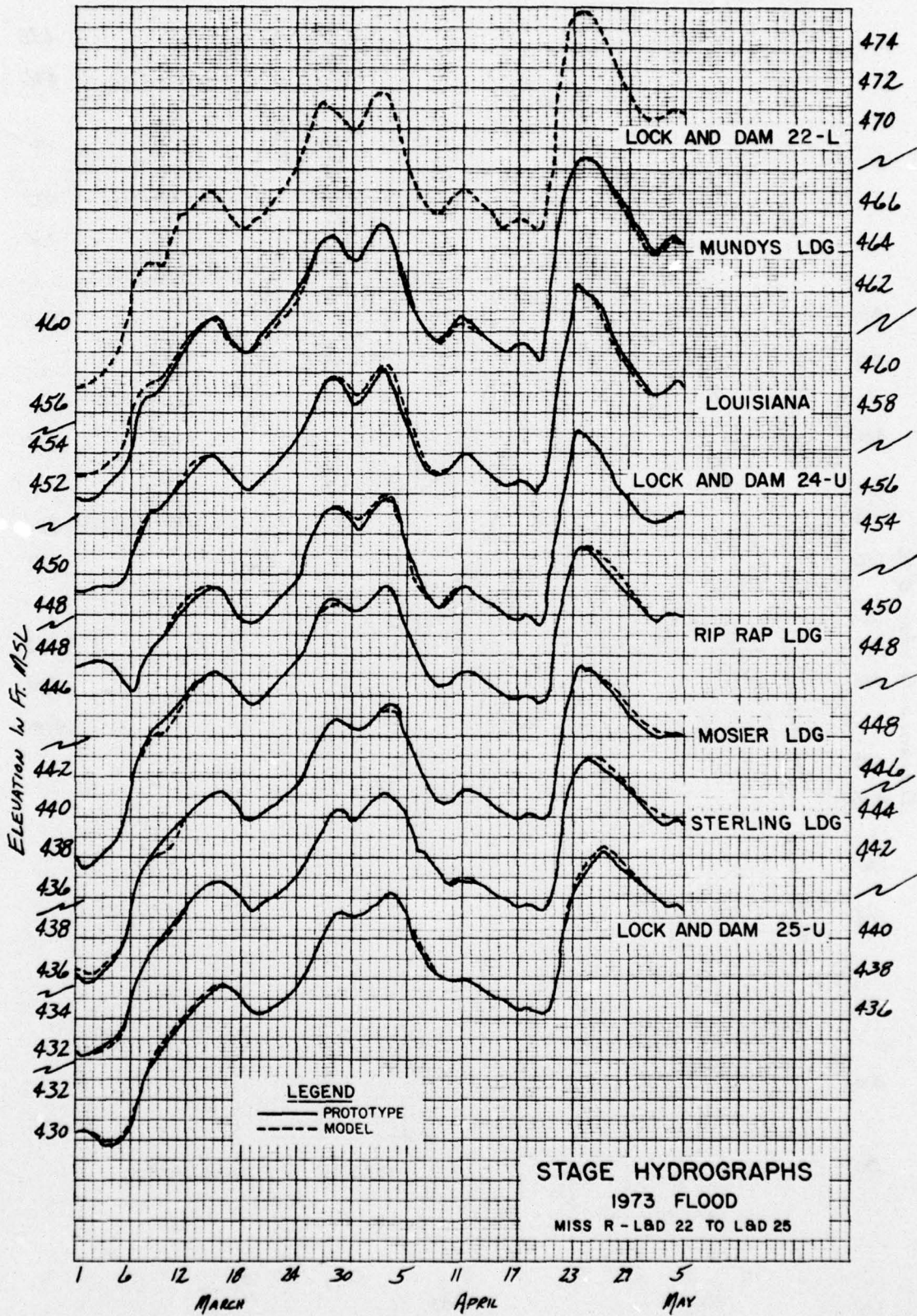


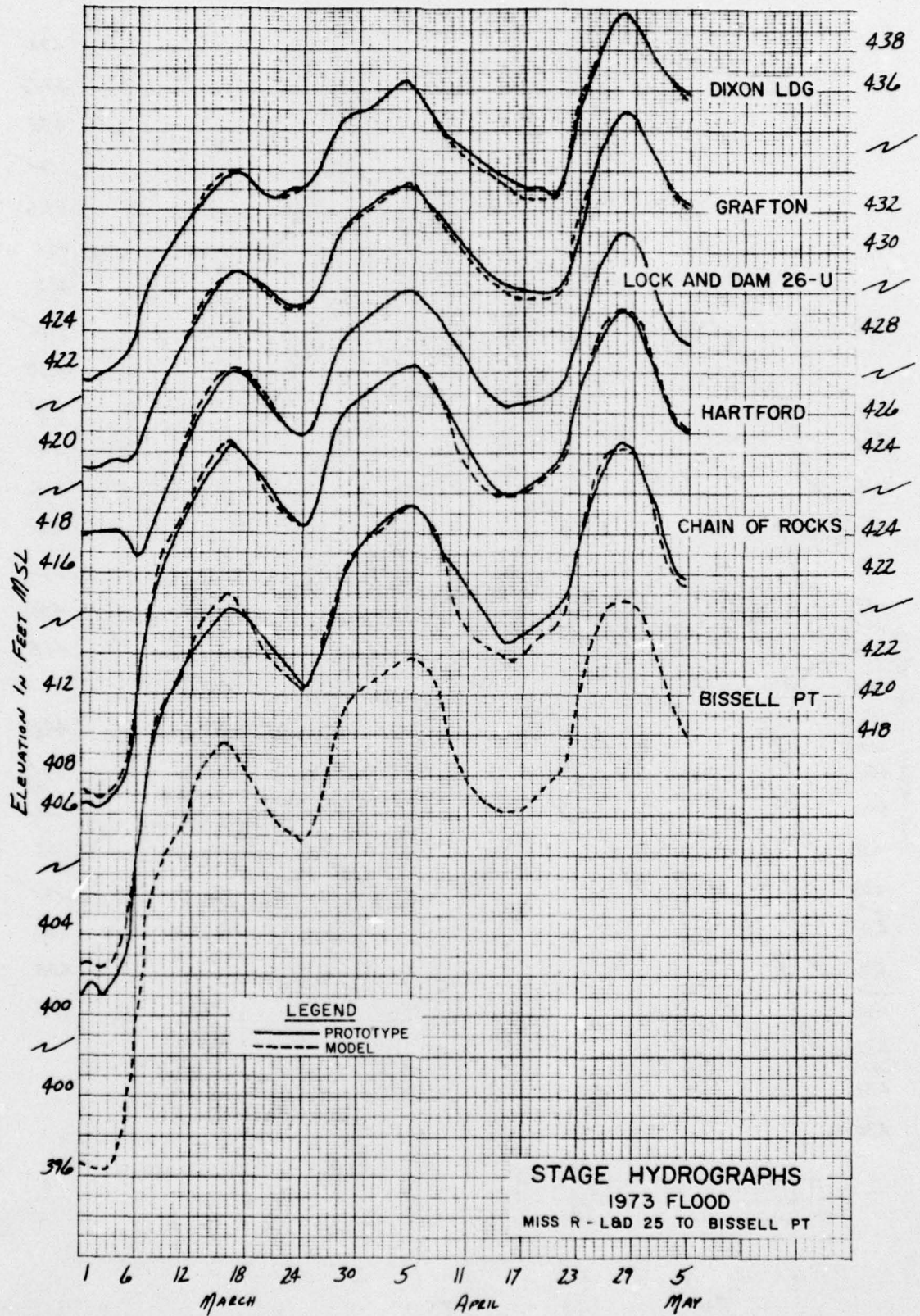
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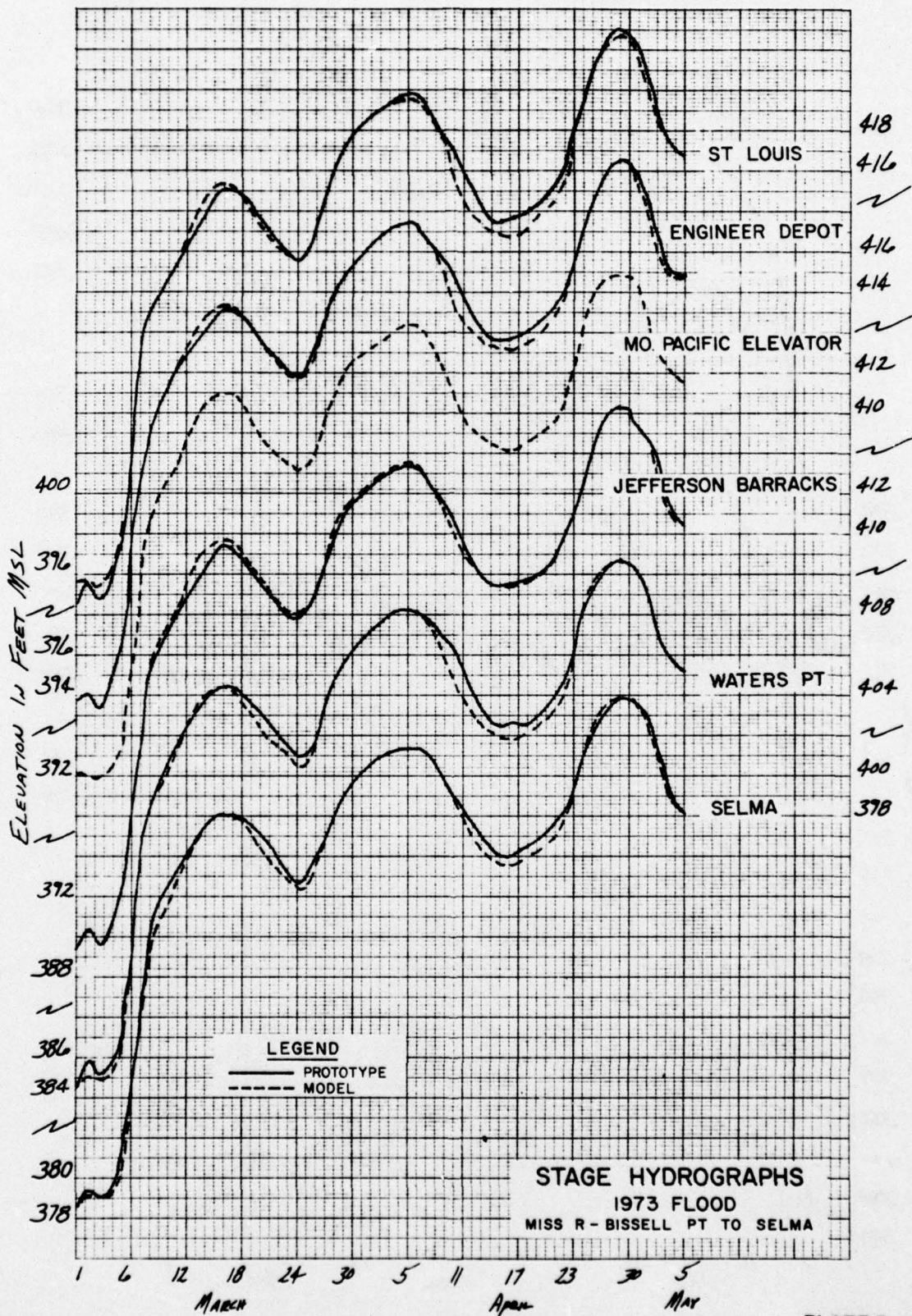


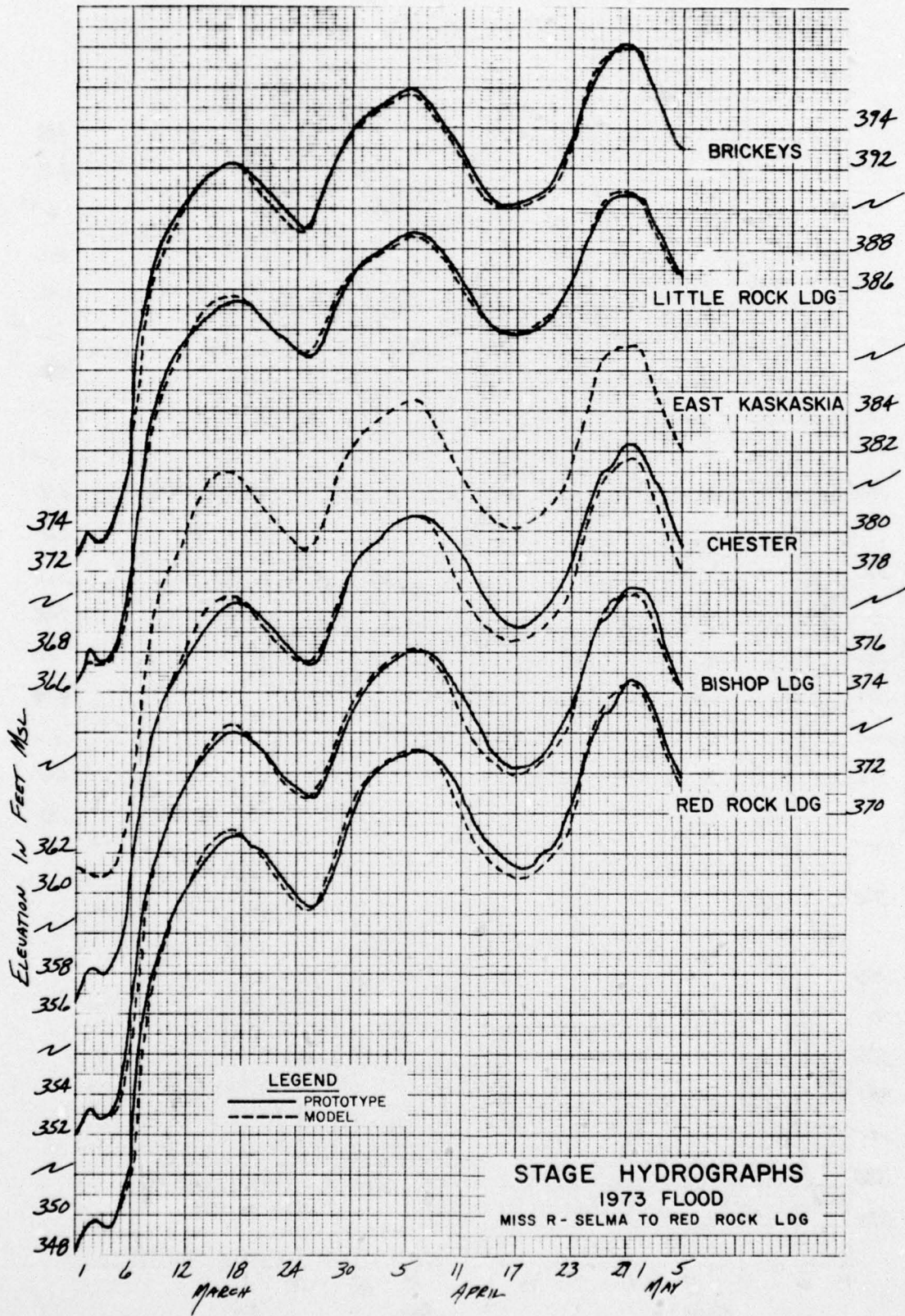


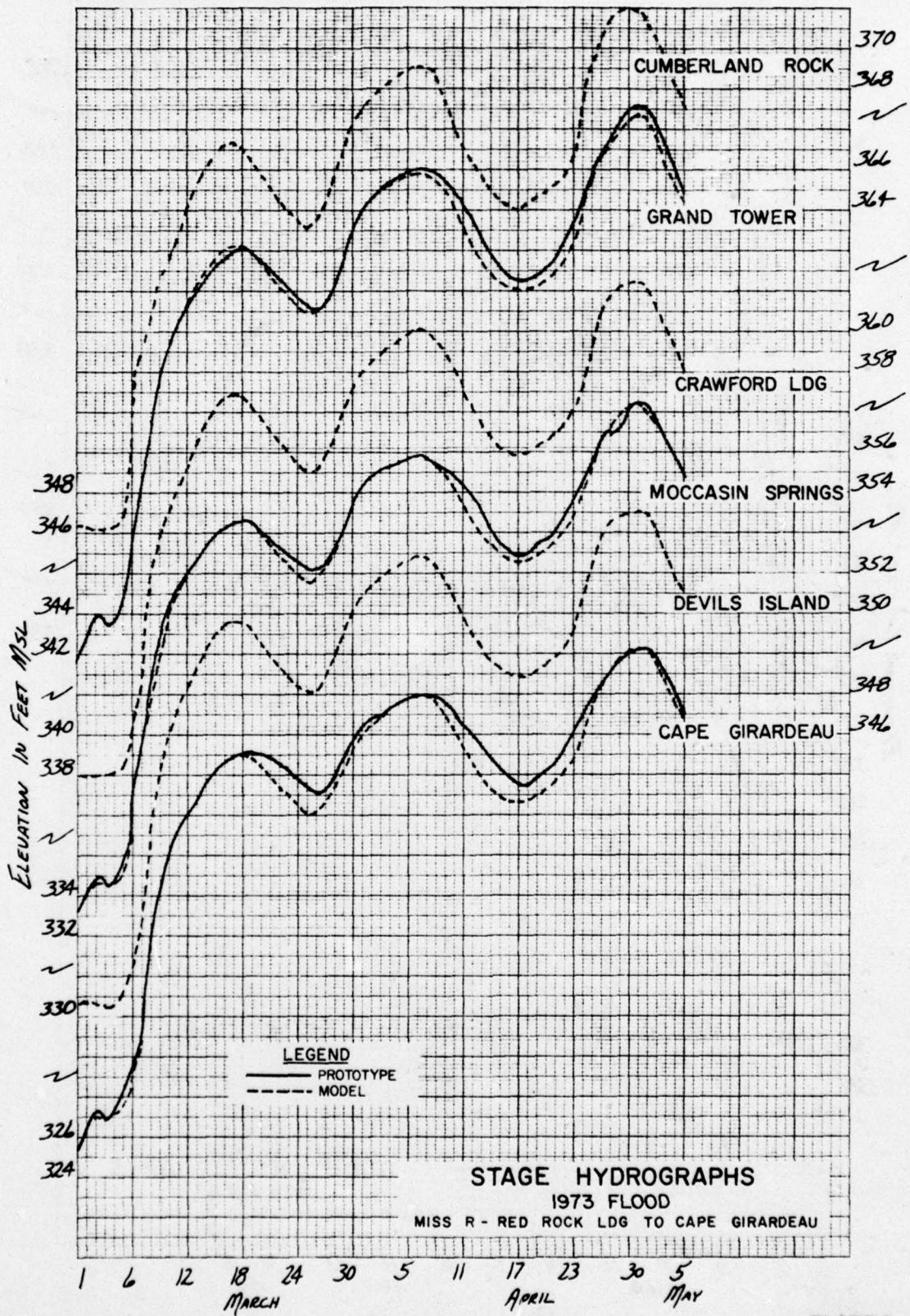
INFLOW HYDROGRAPHS
 1973 FLOOD
 OHIO R TRIBUTARIES











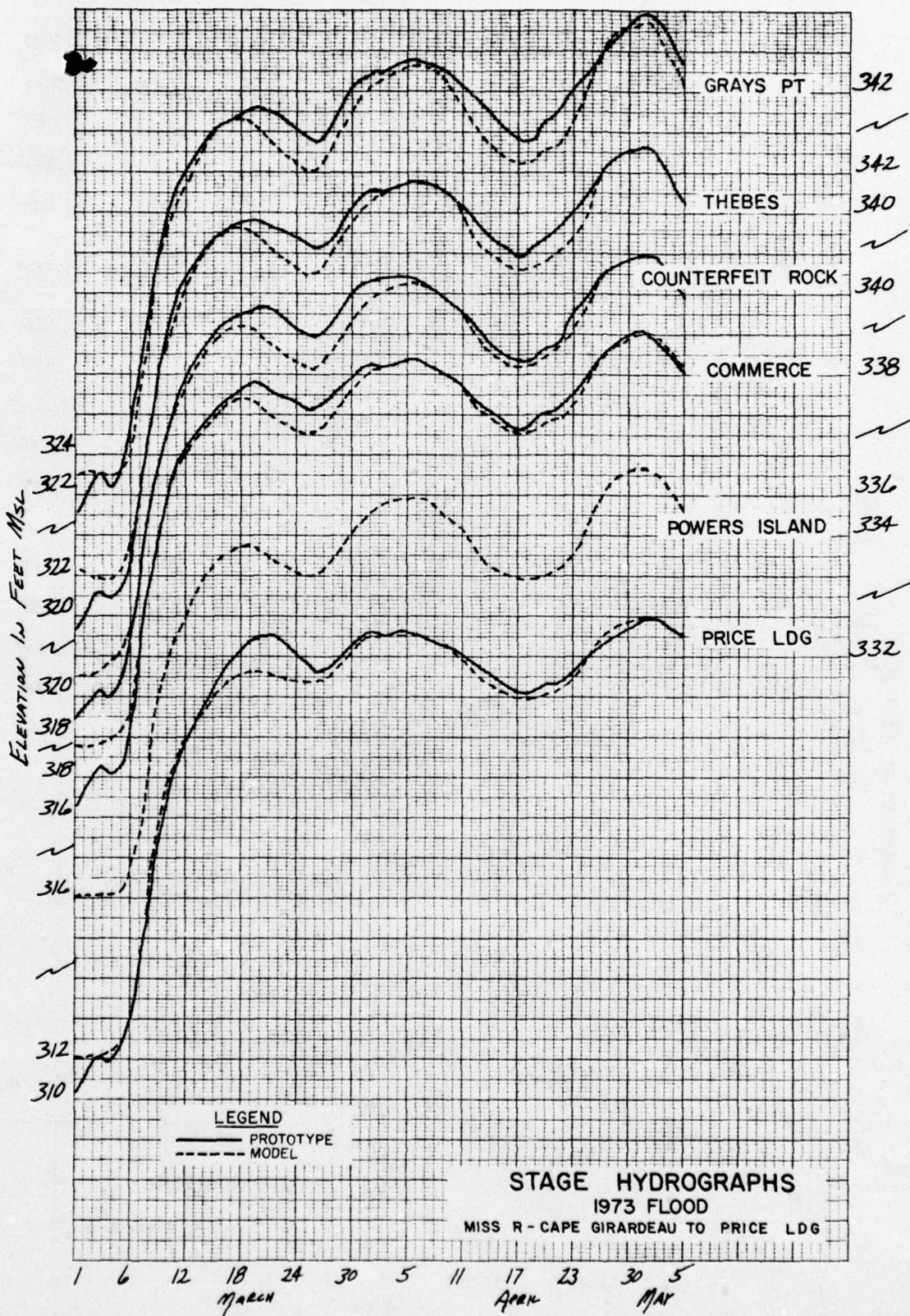
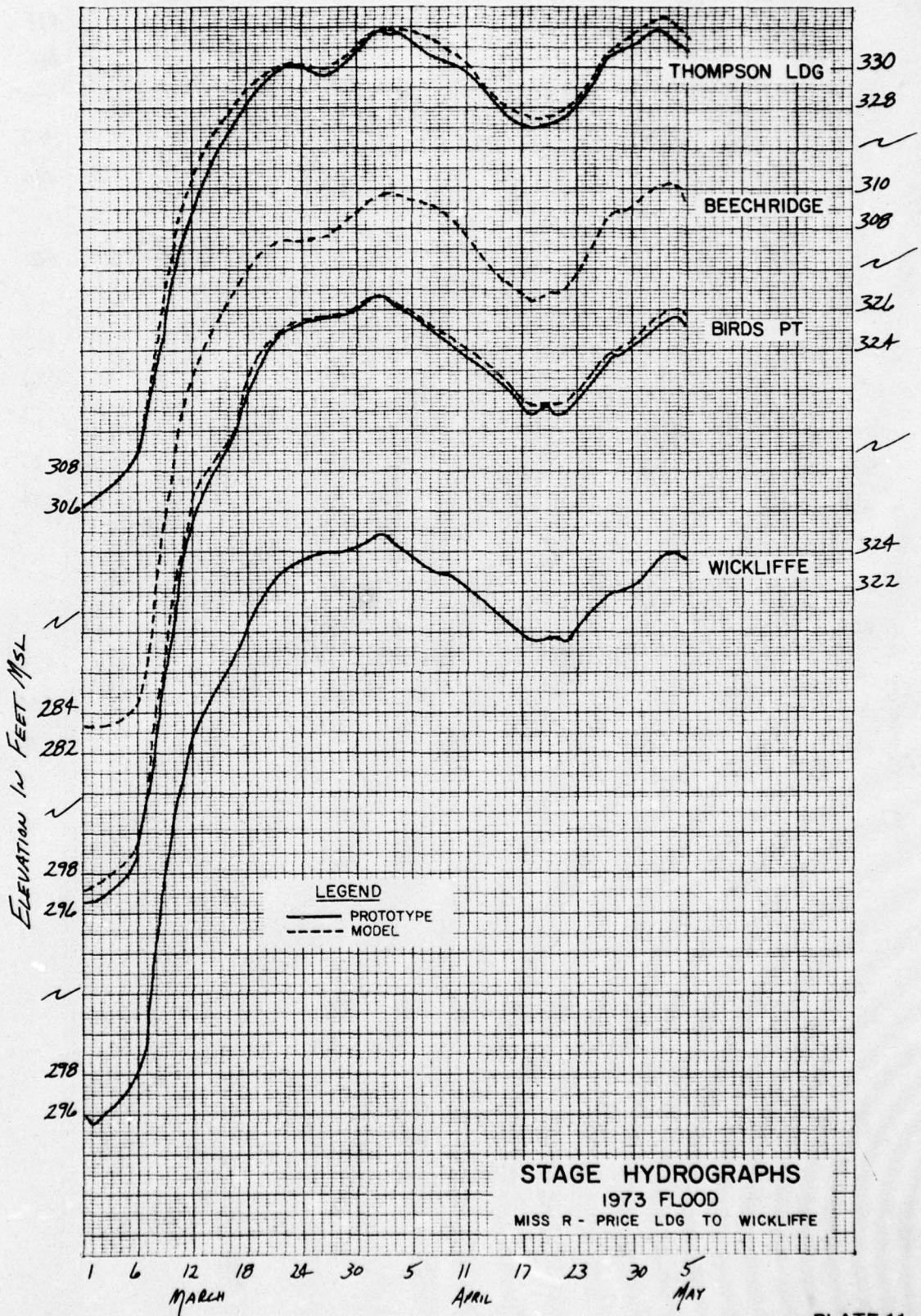


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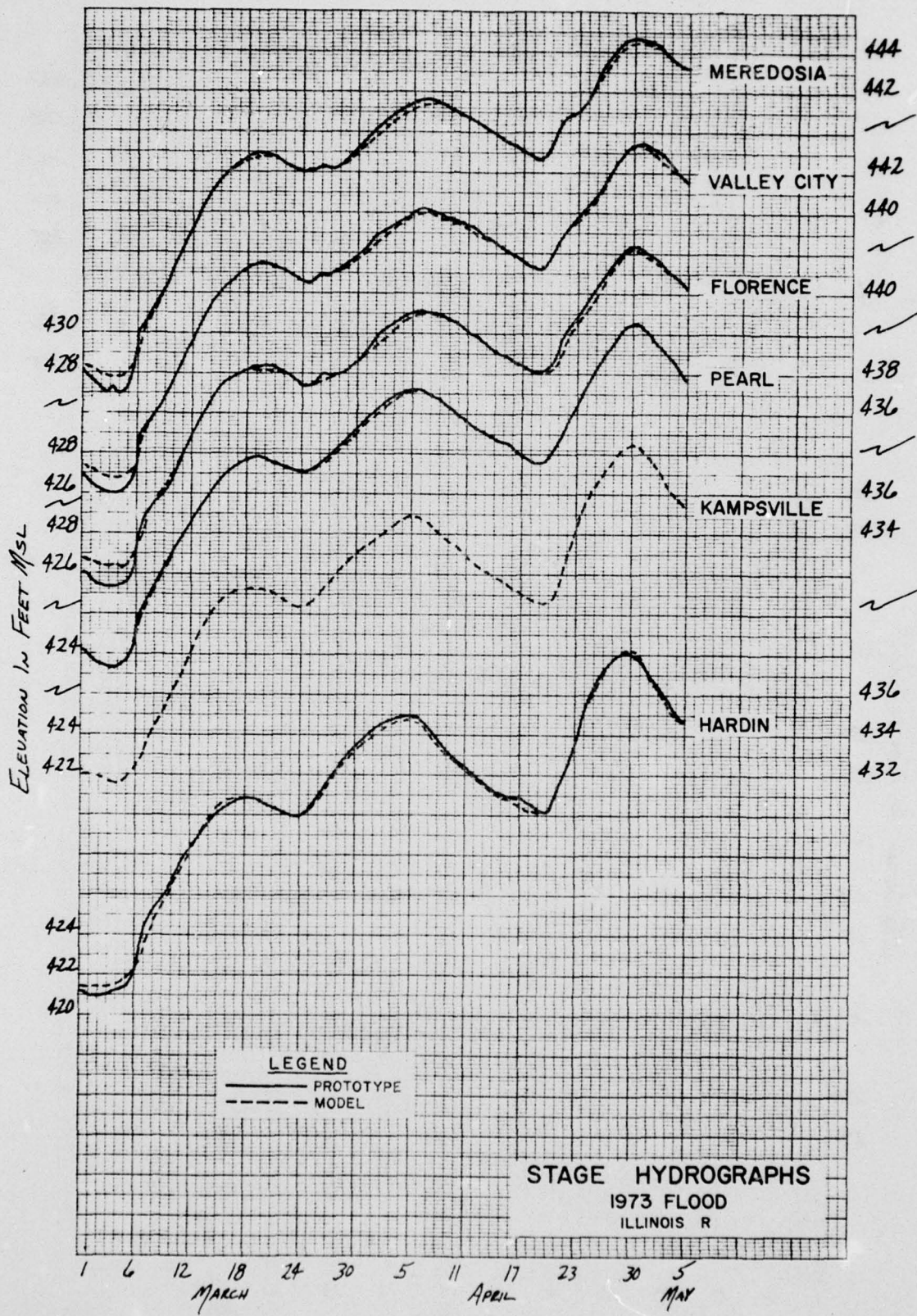
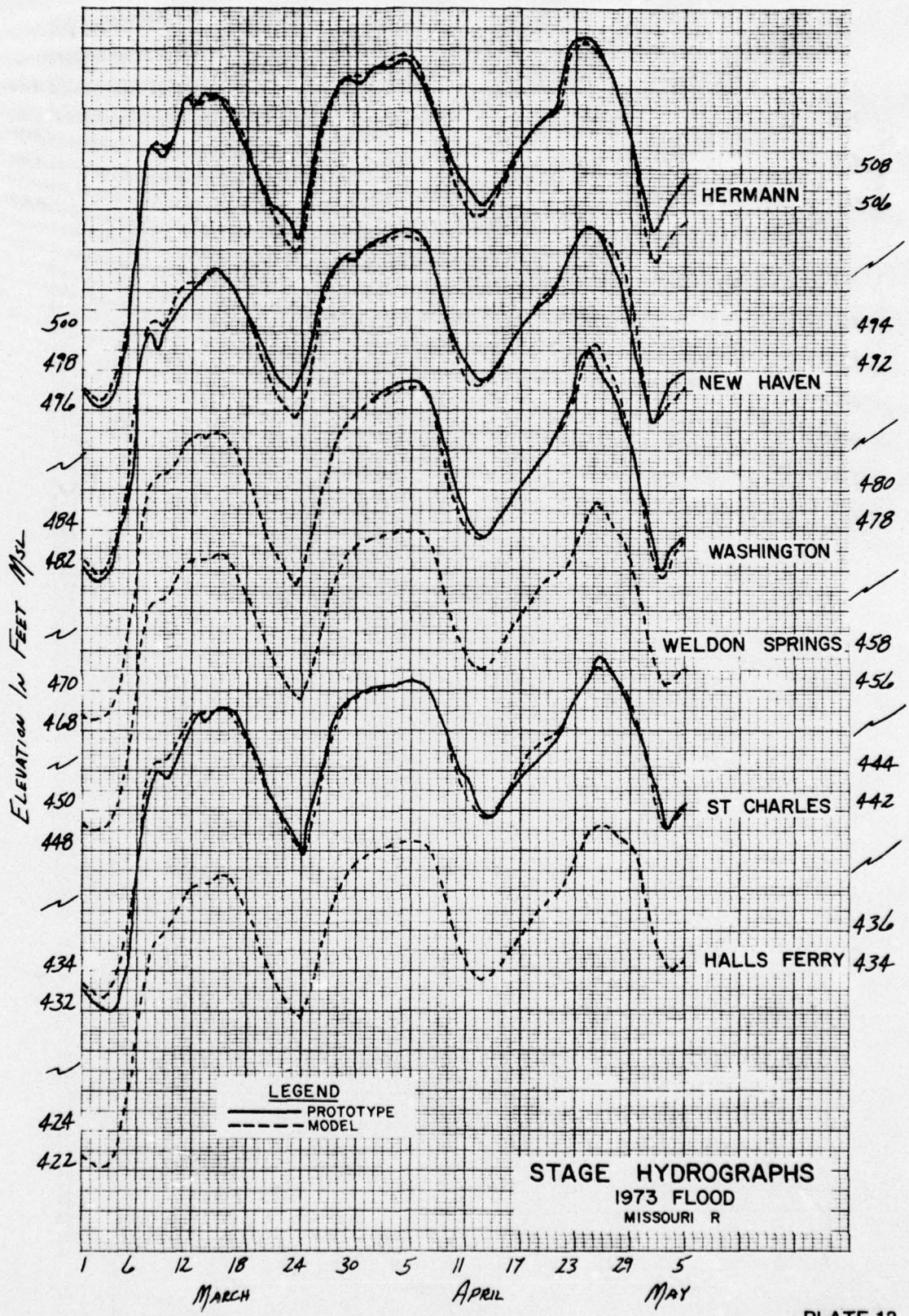
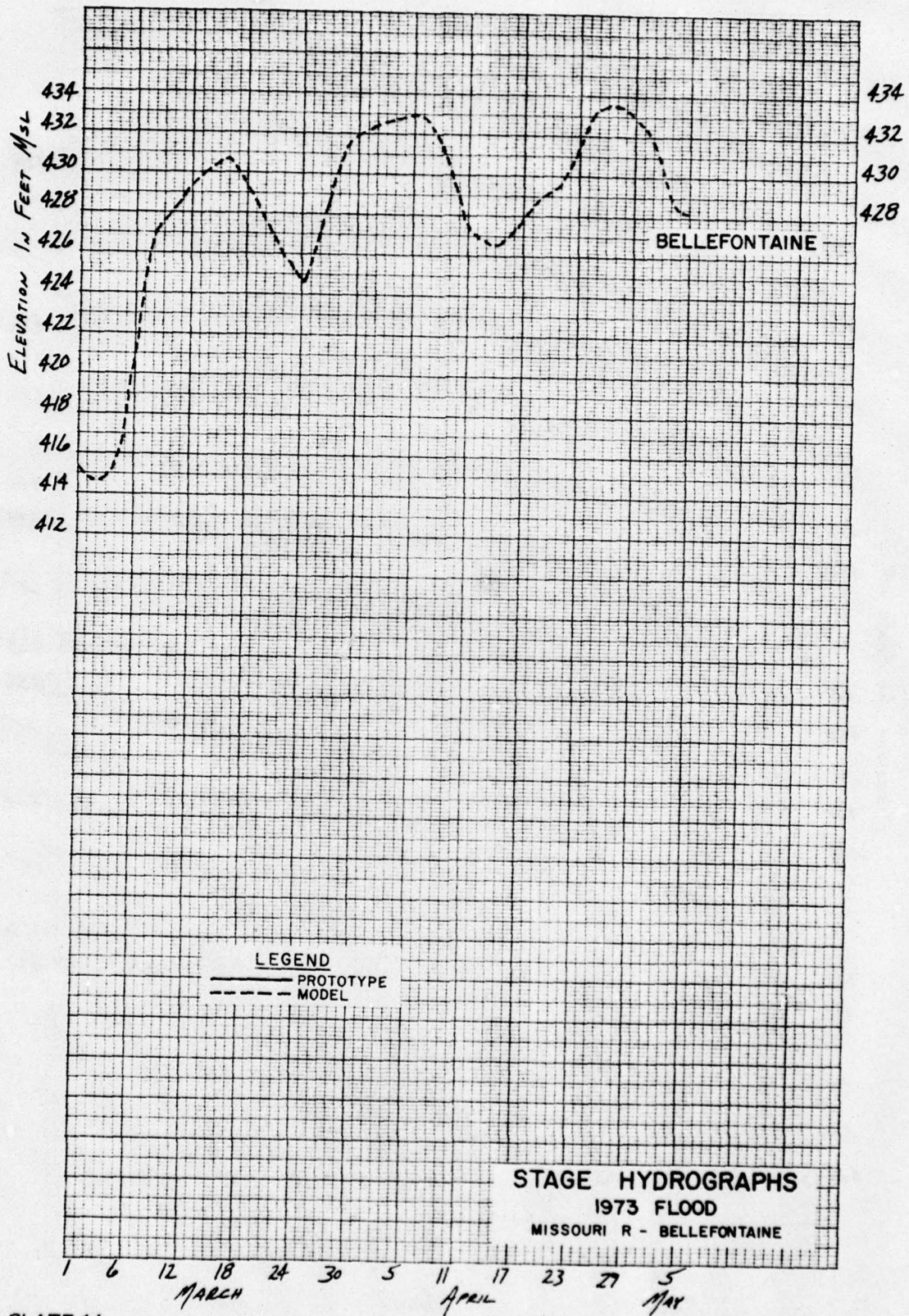
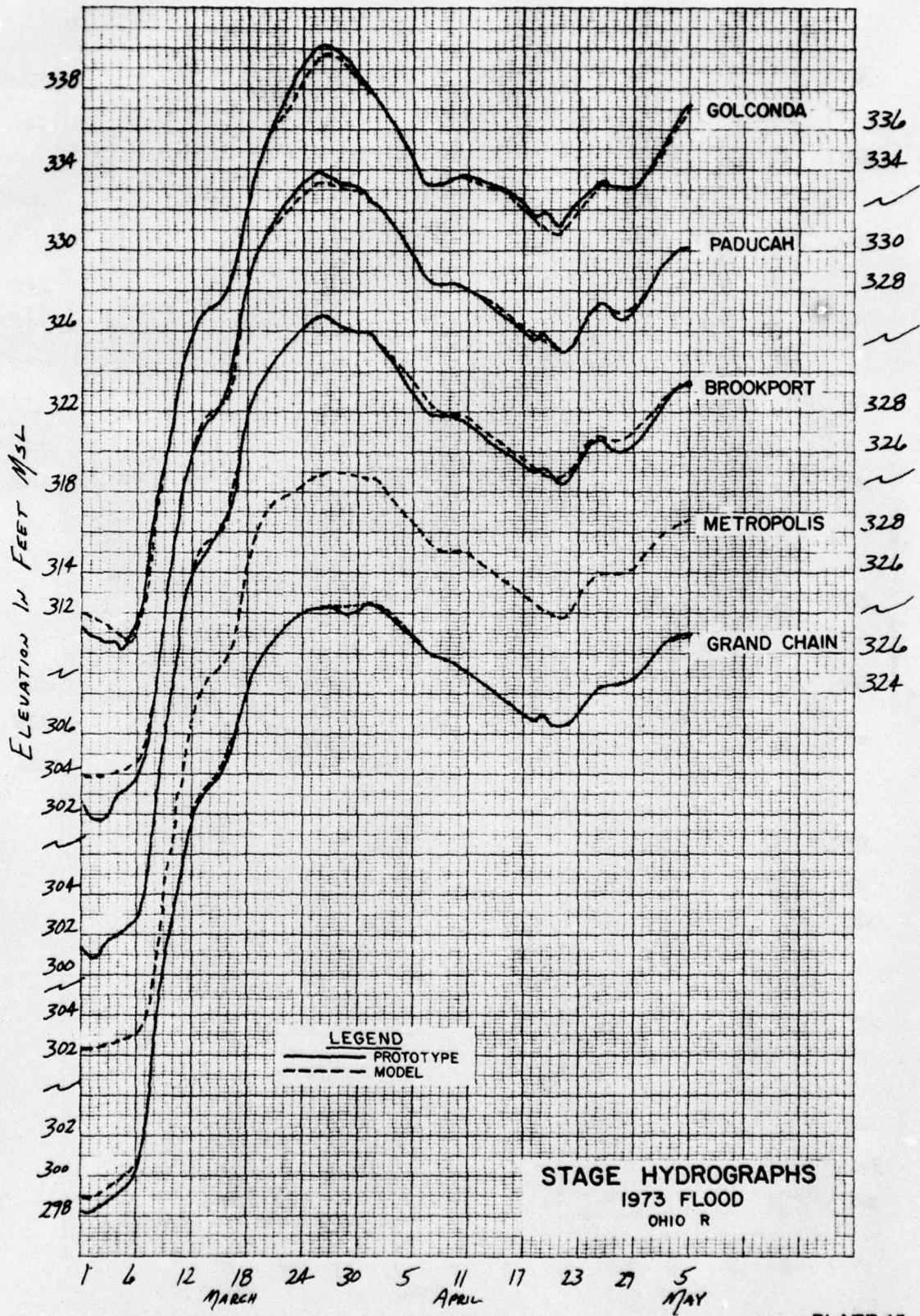


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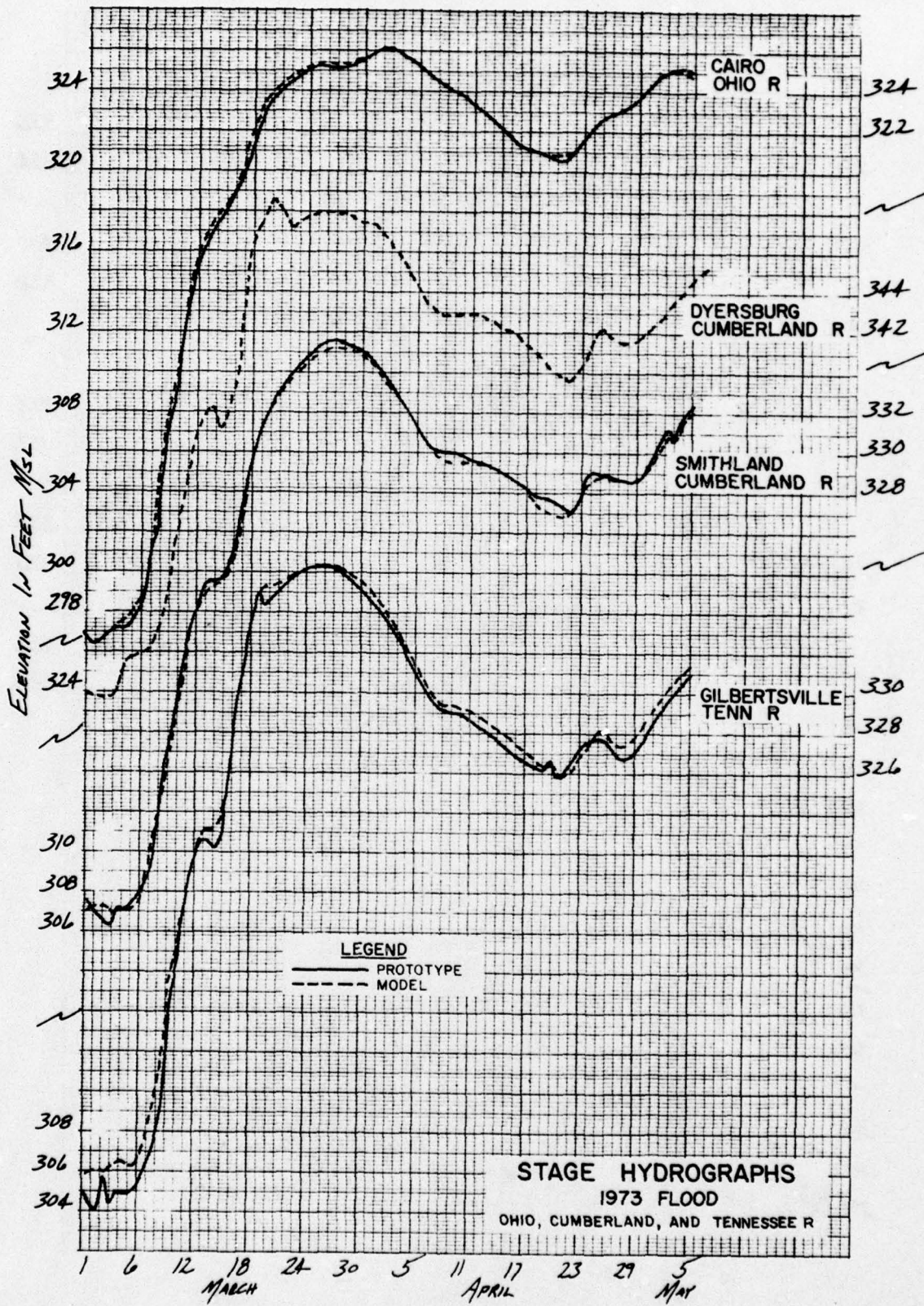
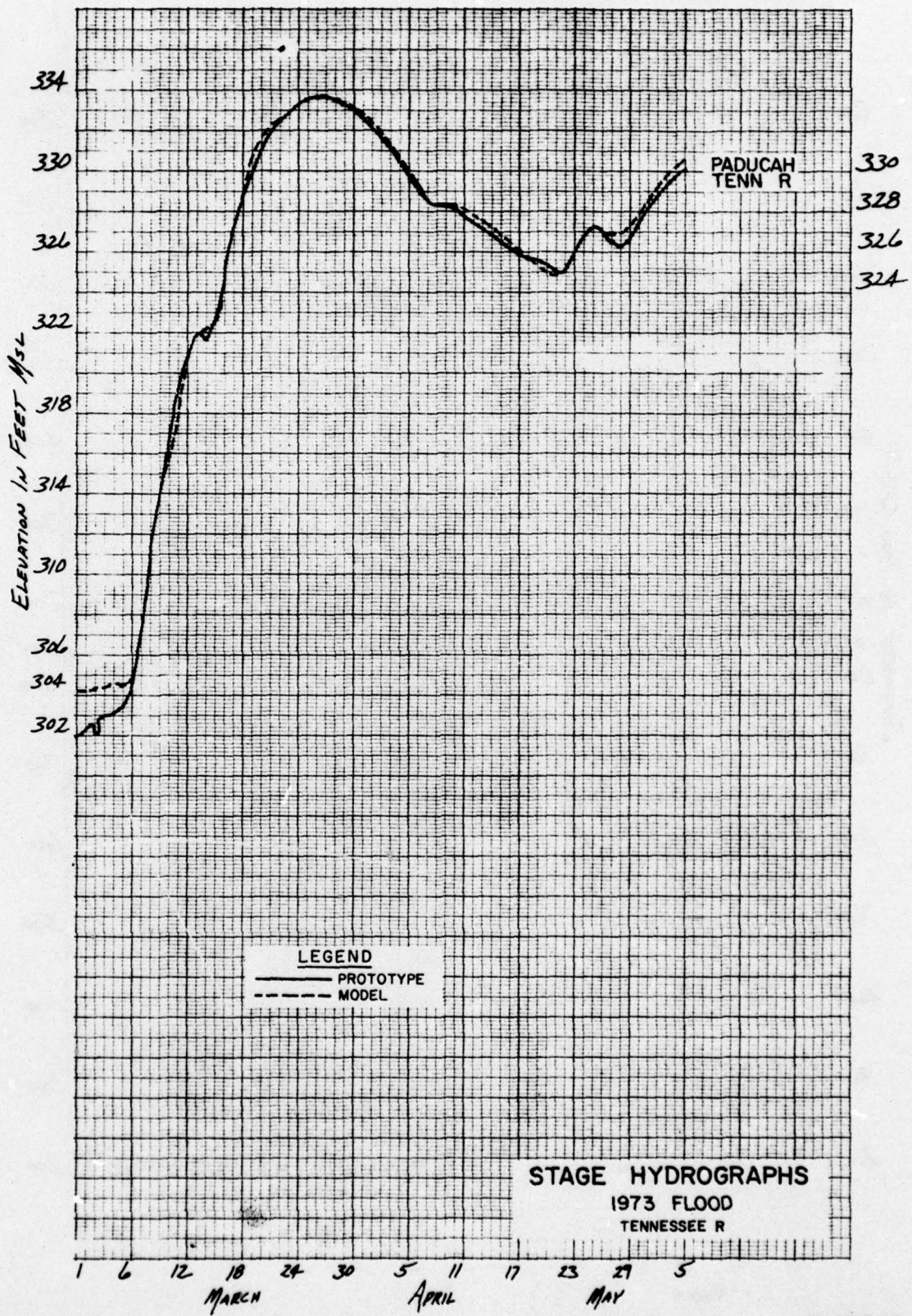


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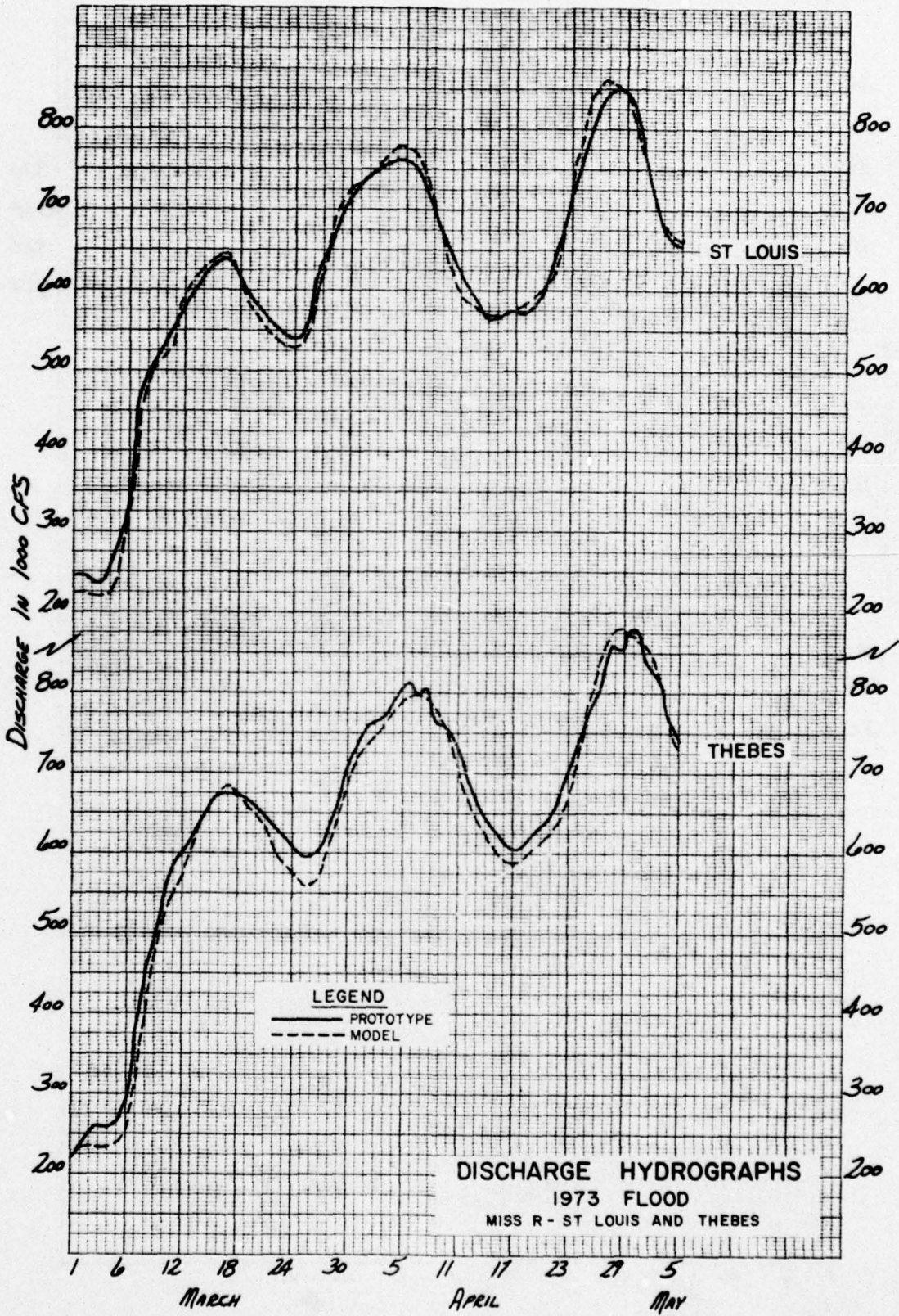
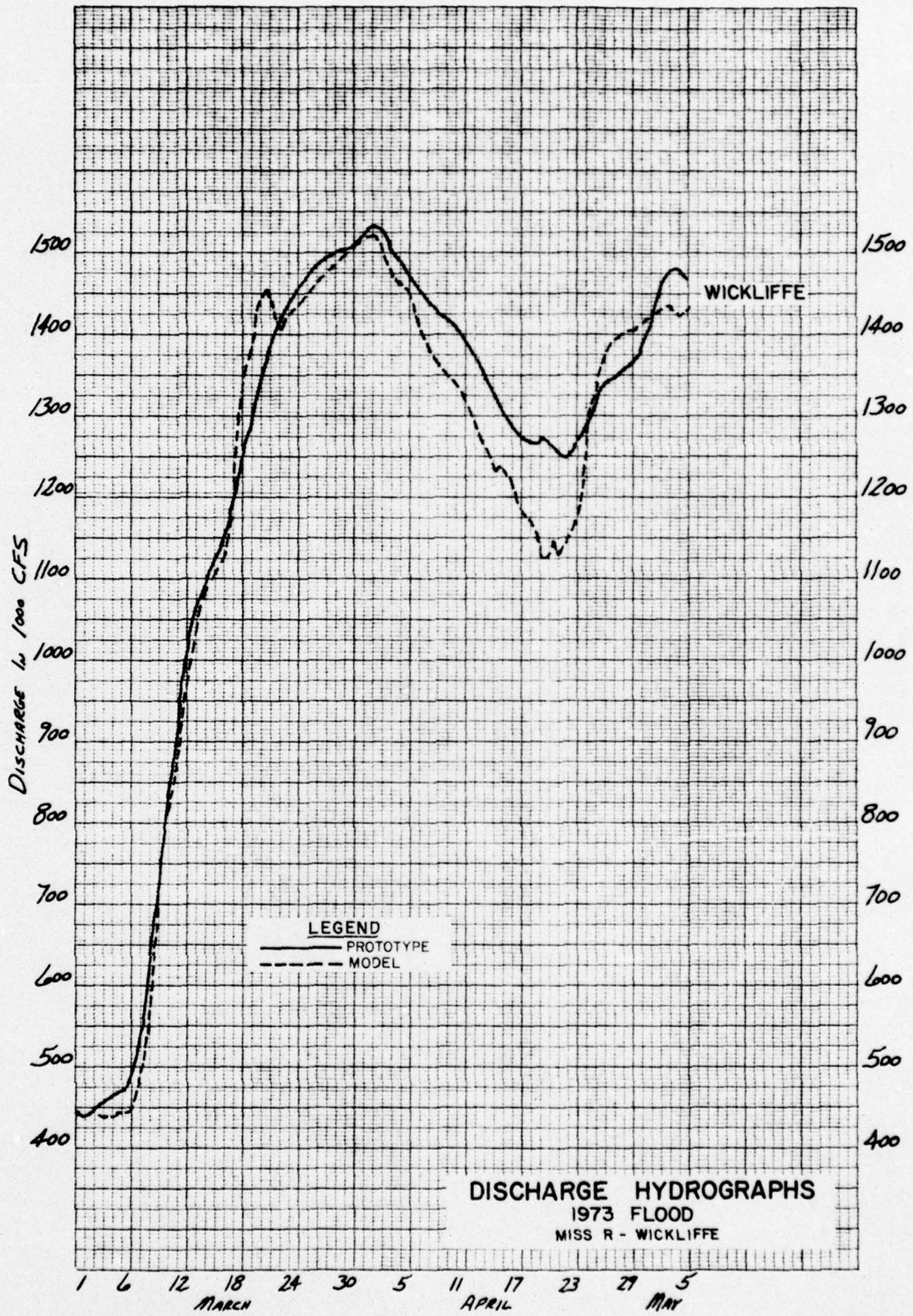
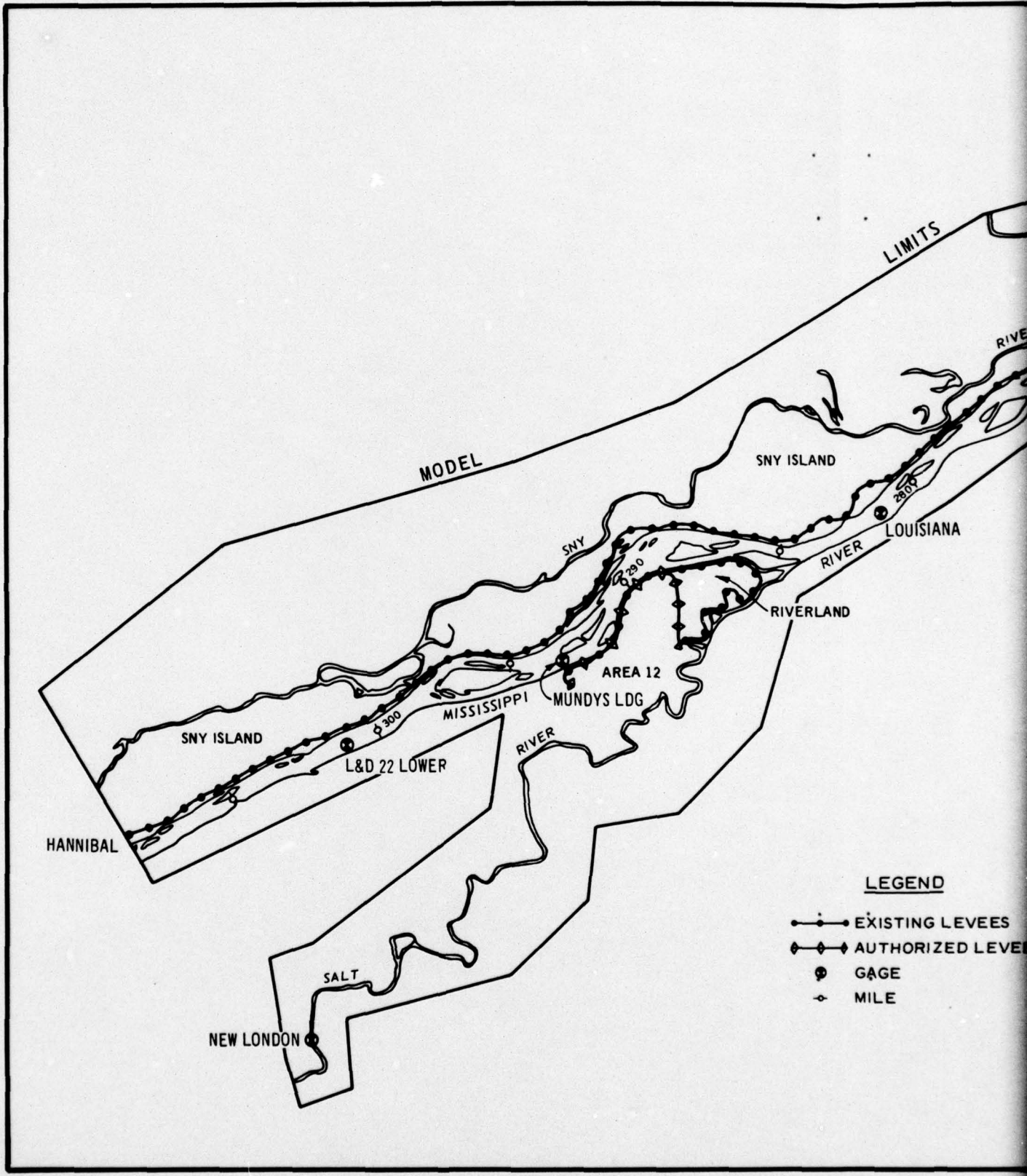


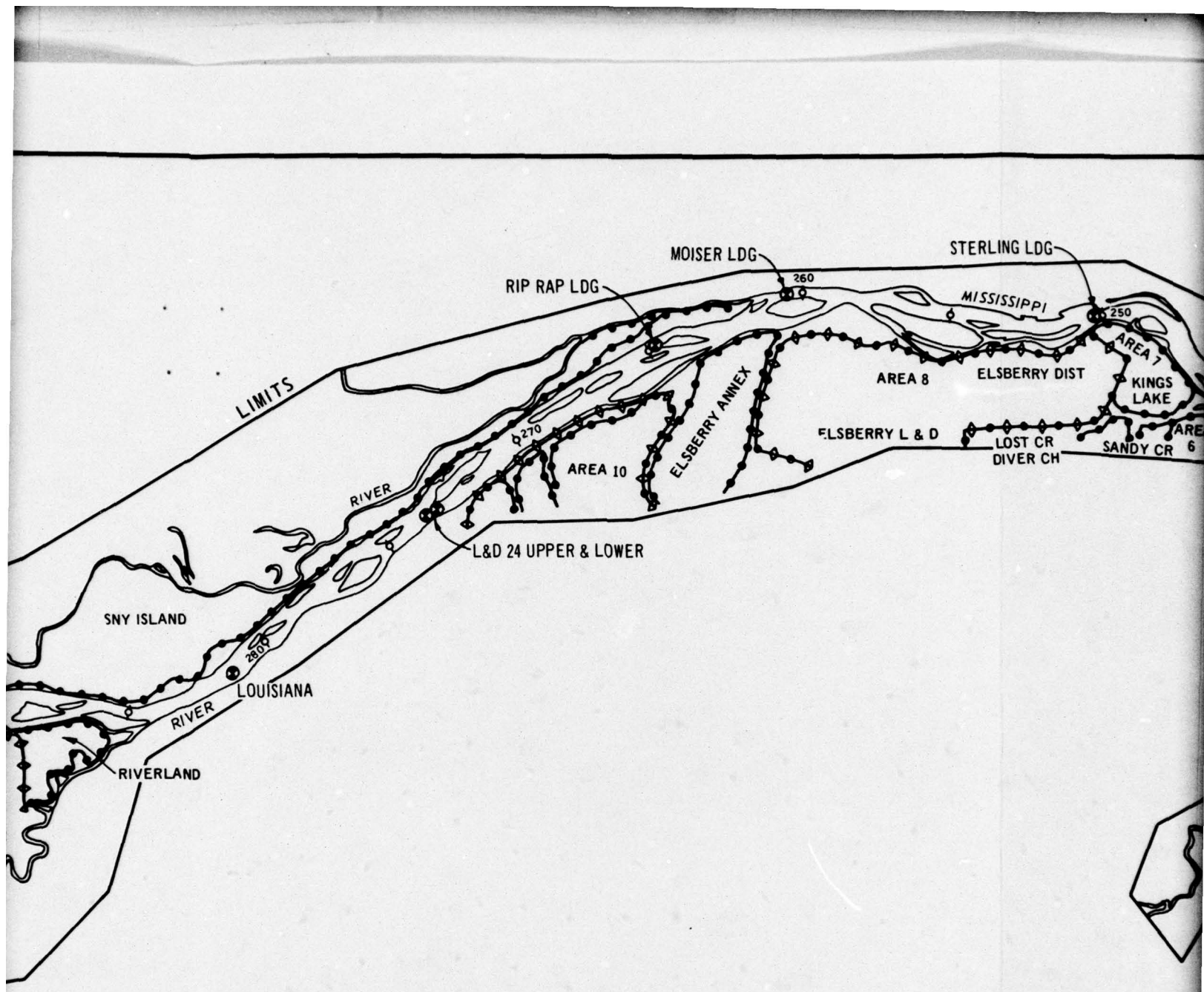
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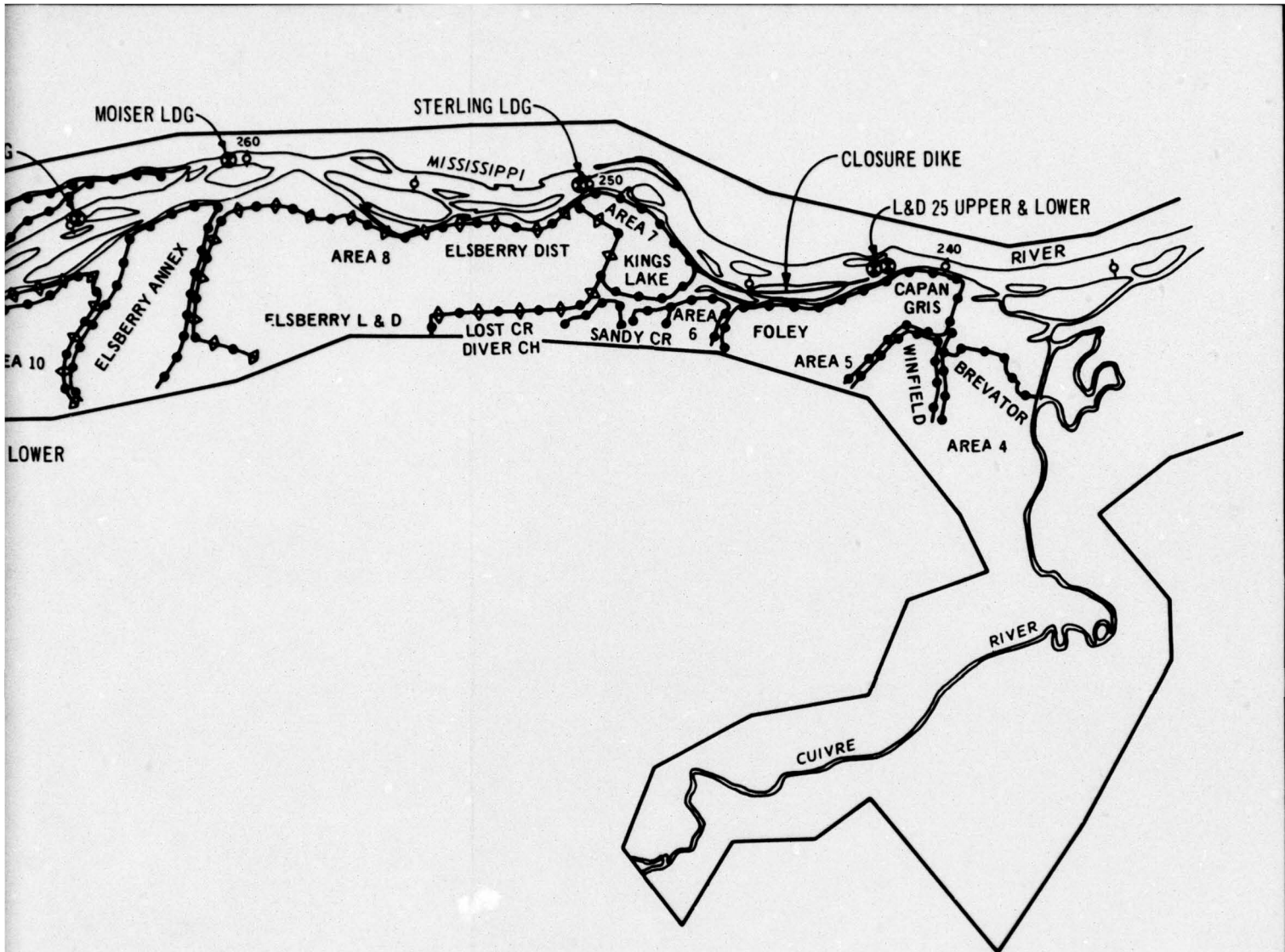
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- ⊙ GAGE
- ◆ MILE

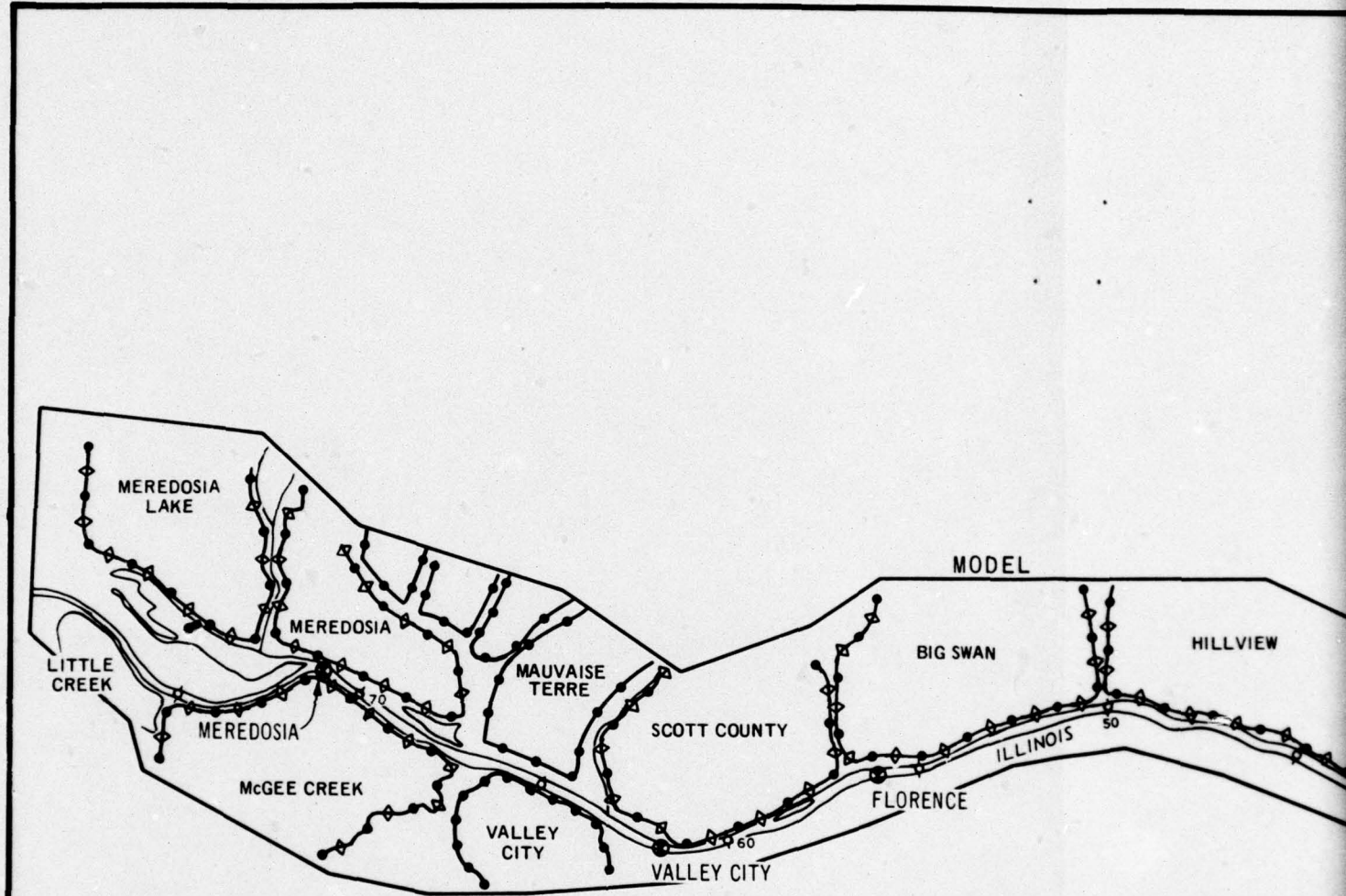


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- GAGE
- ◆ MILE

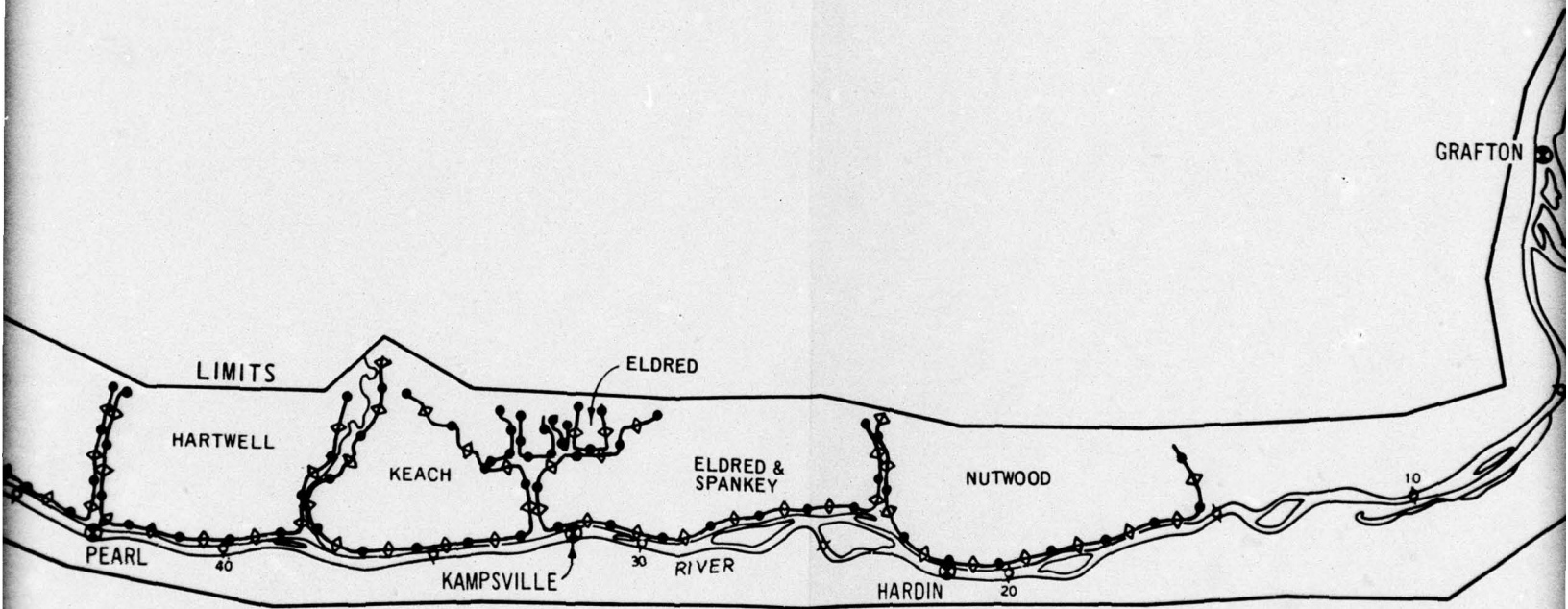


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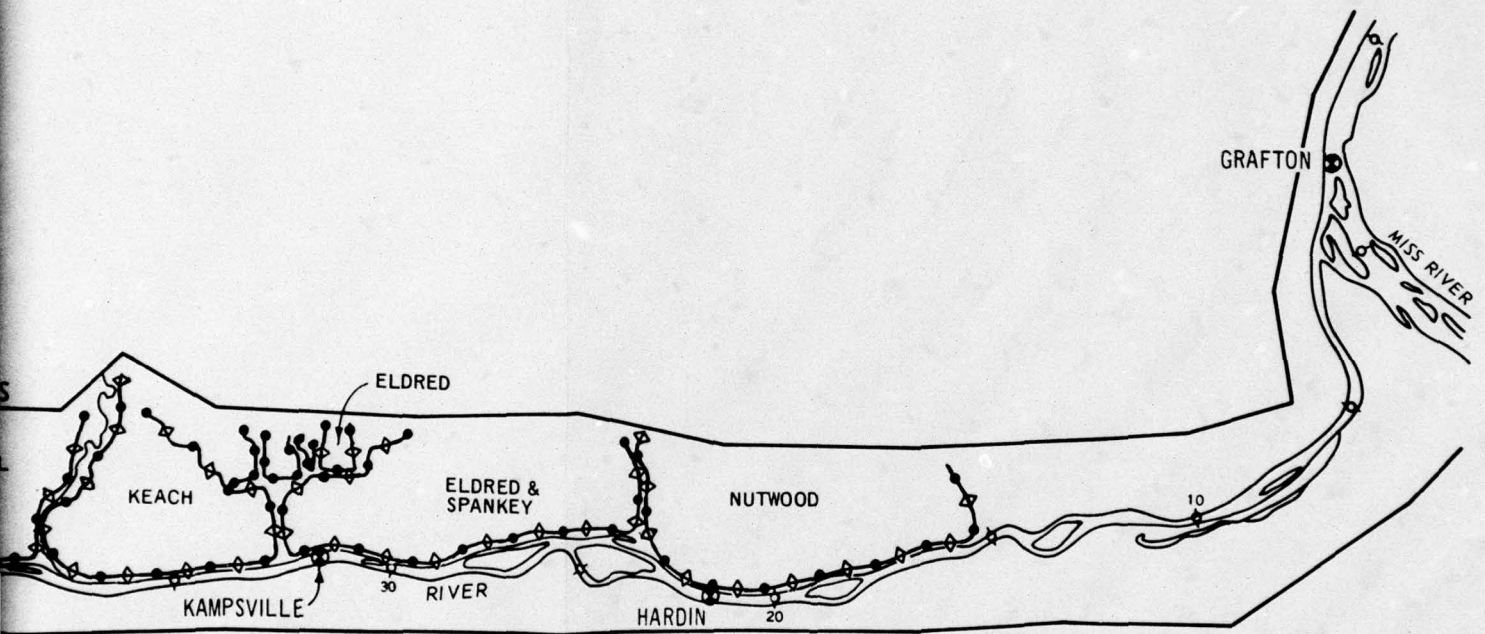
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- MILE



LEVEE ALIGNMENT
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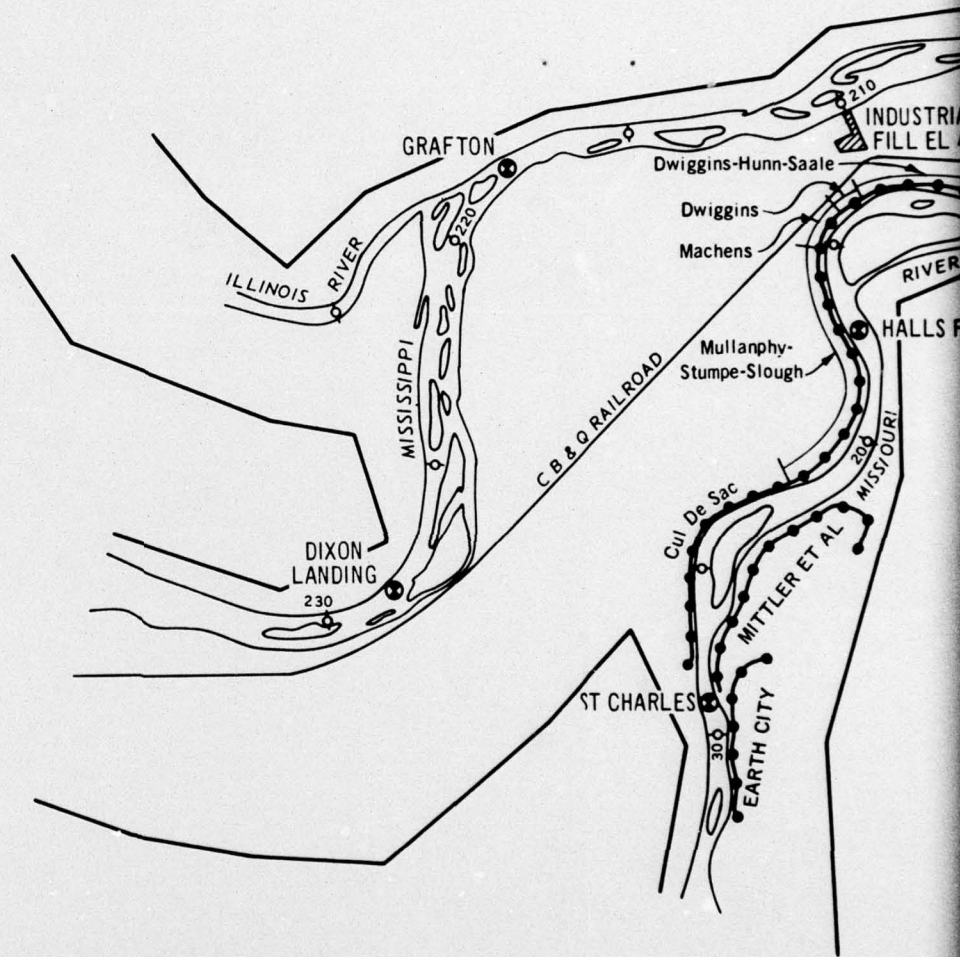
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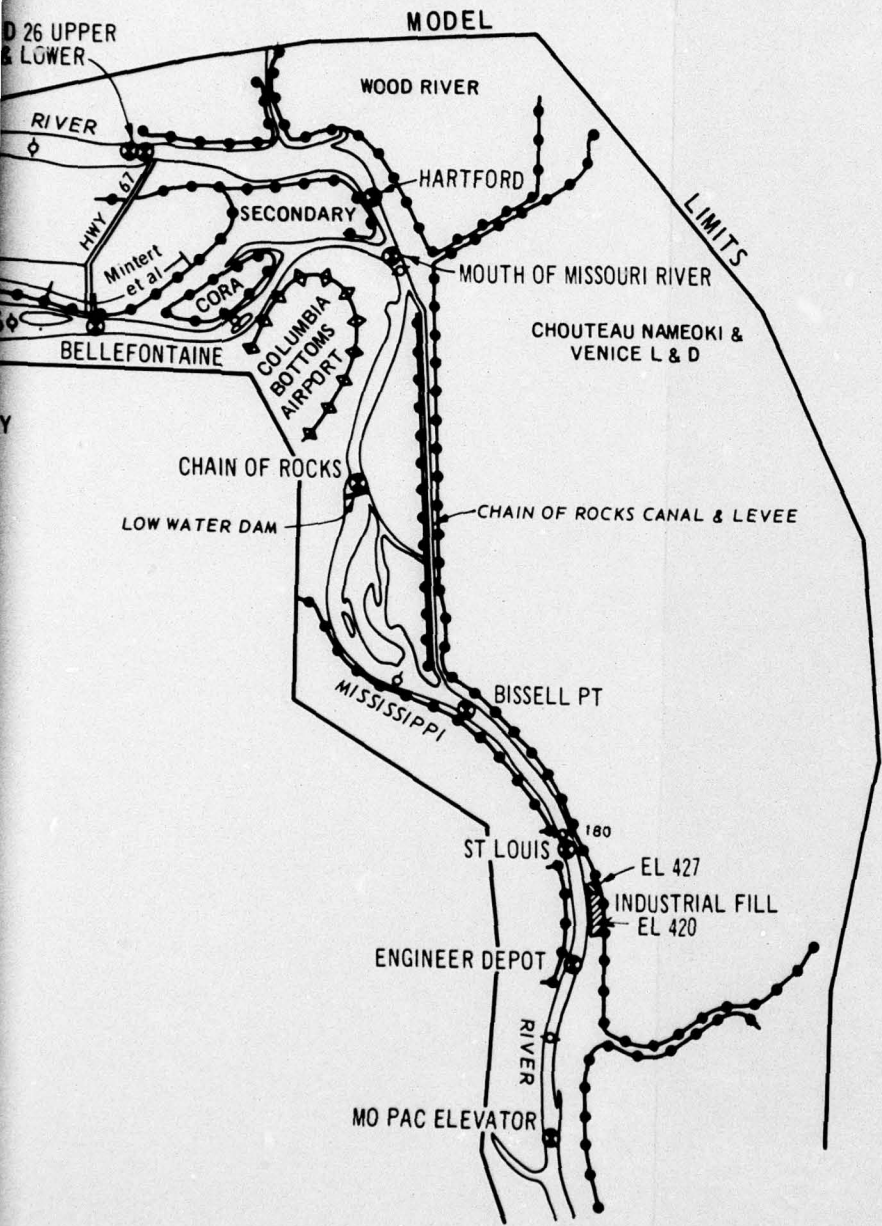
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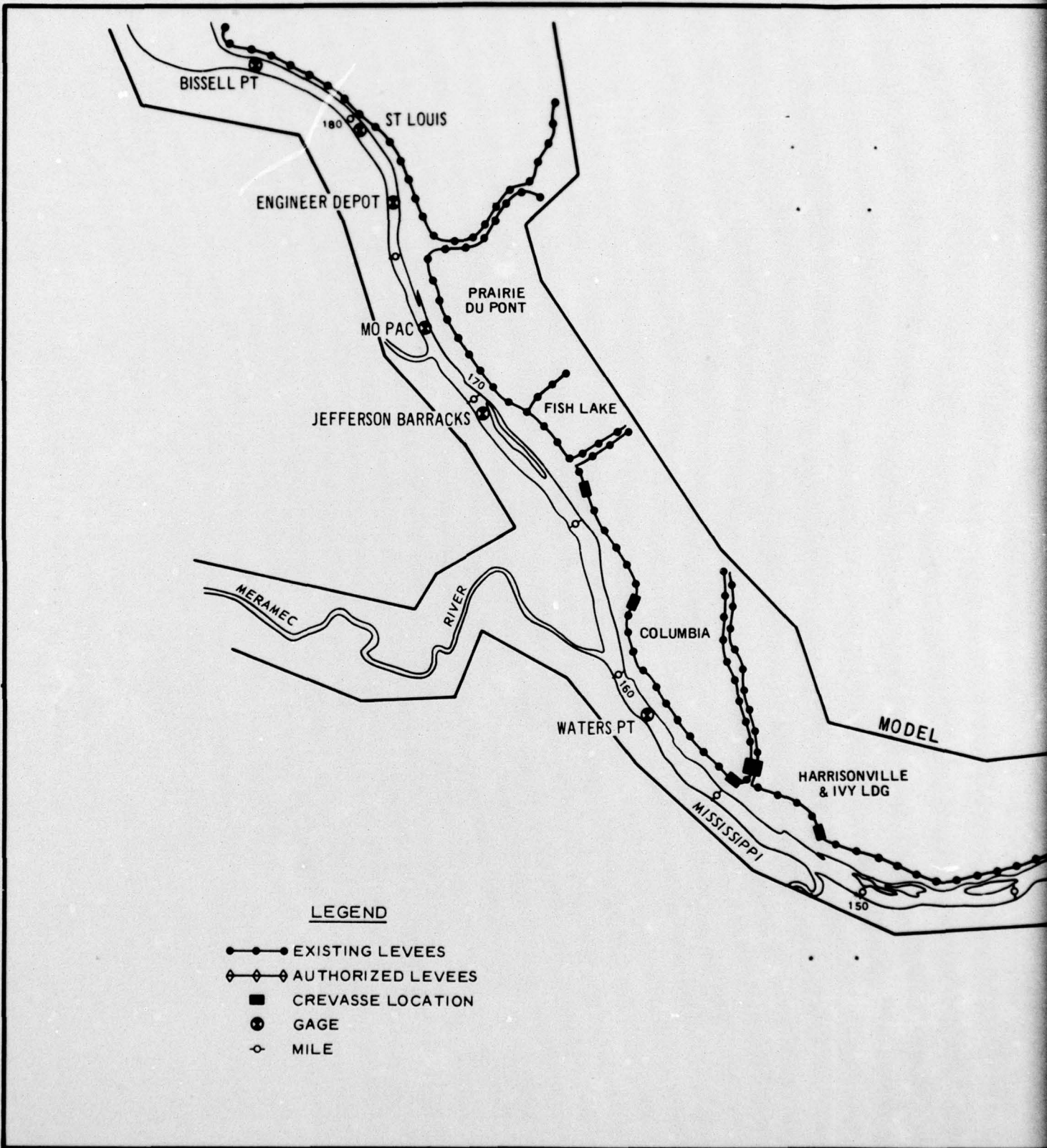
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- ◊ MILE

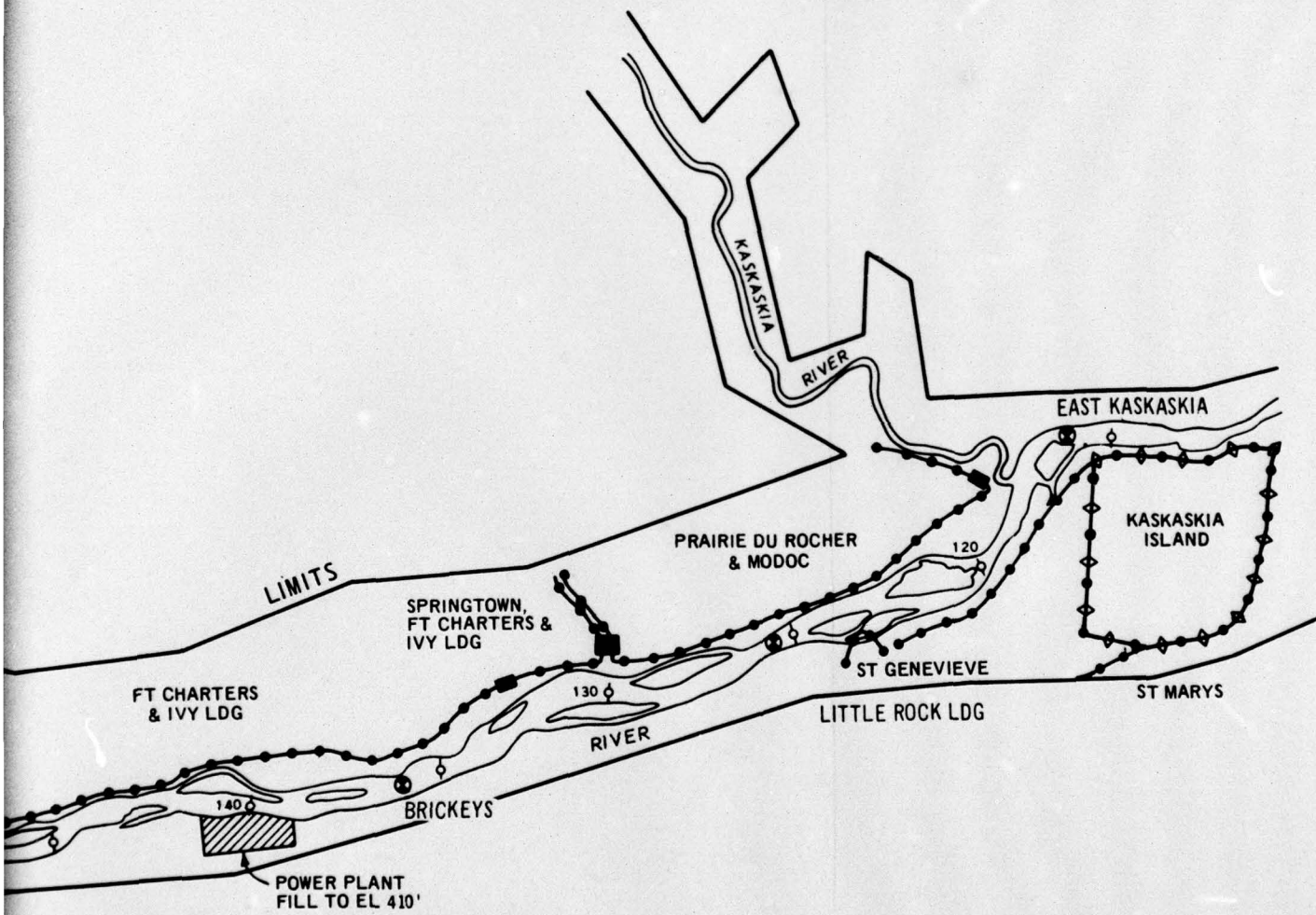


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 MO. RIVER - ST CHARLES TO MOUTH

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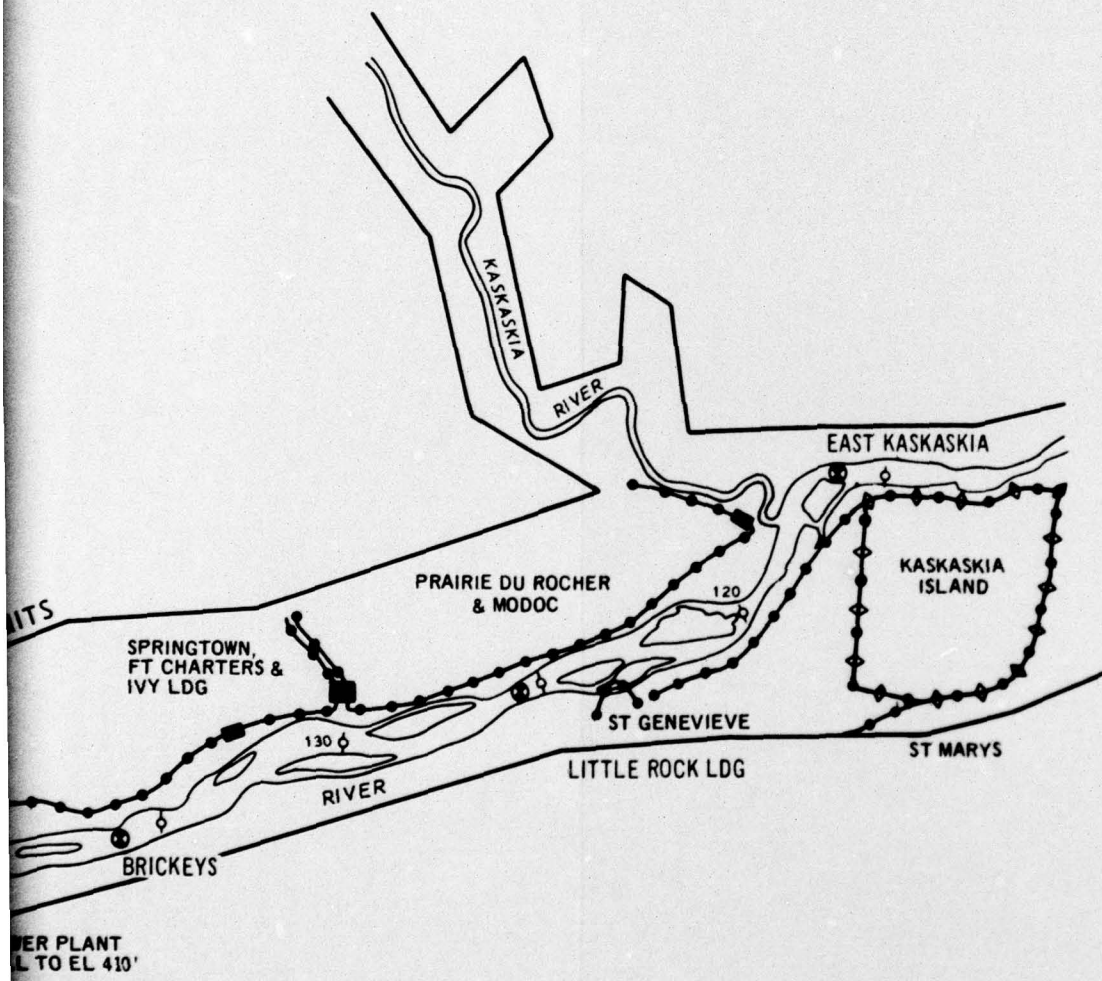




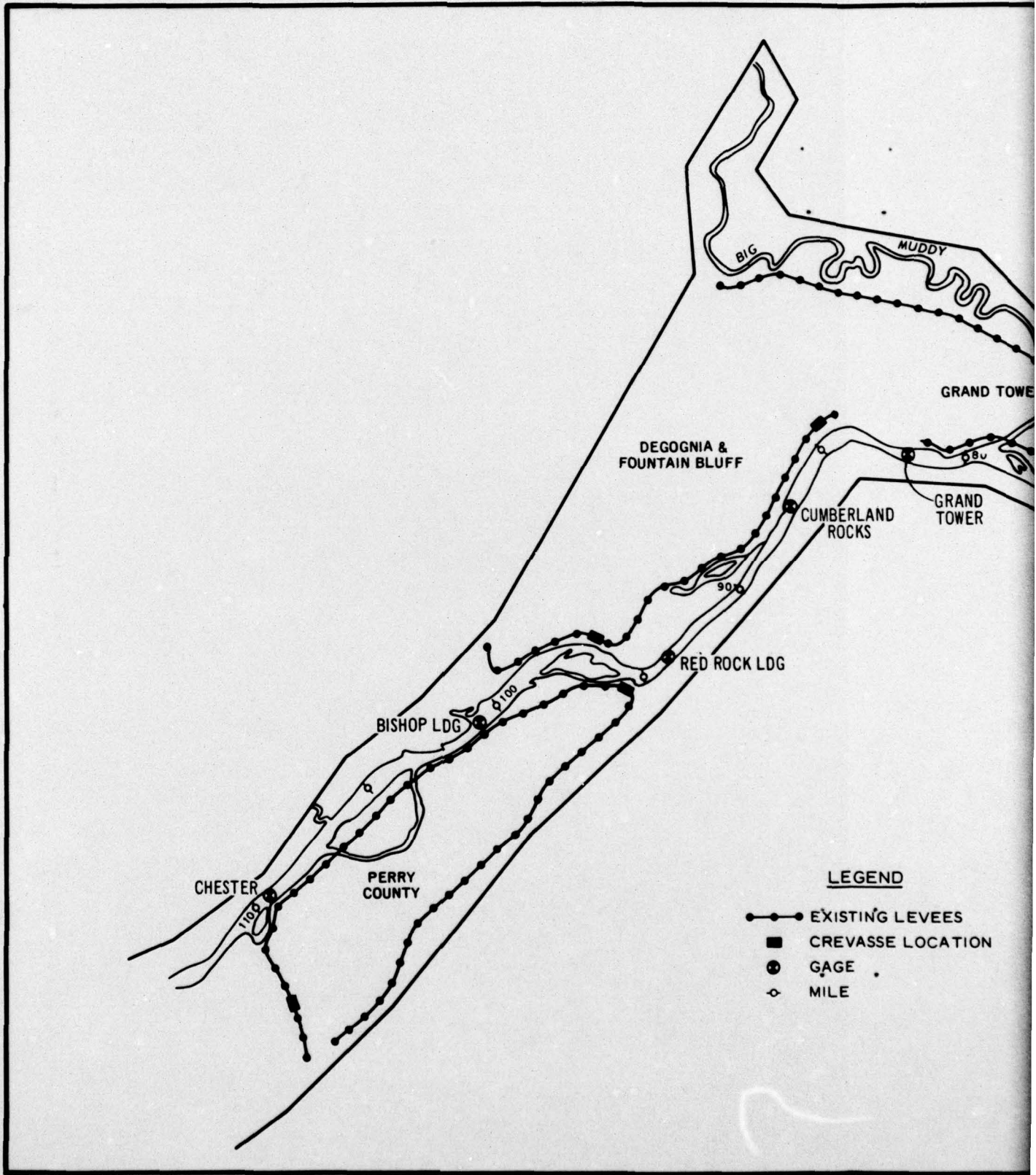
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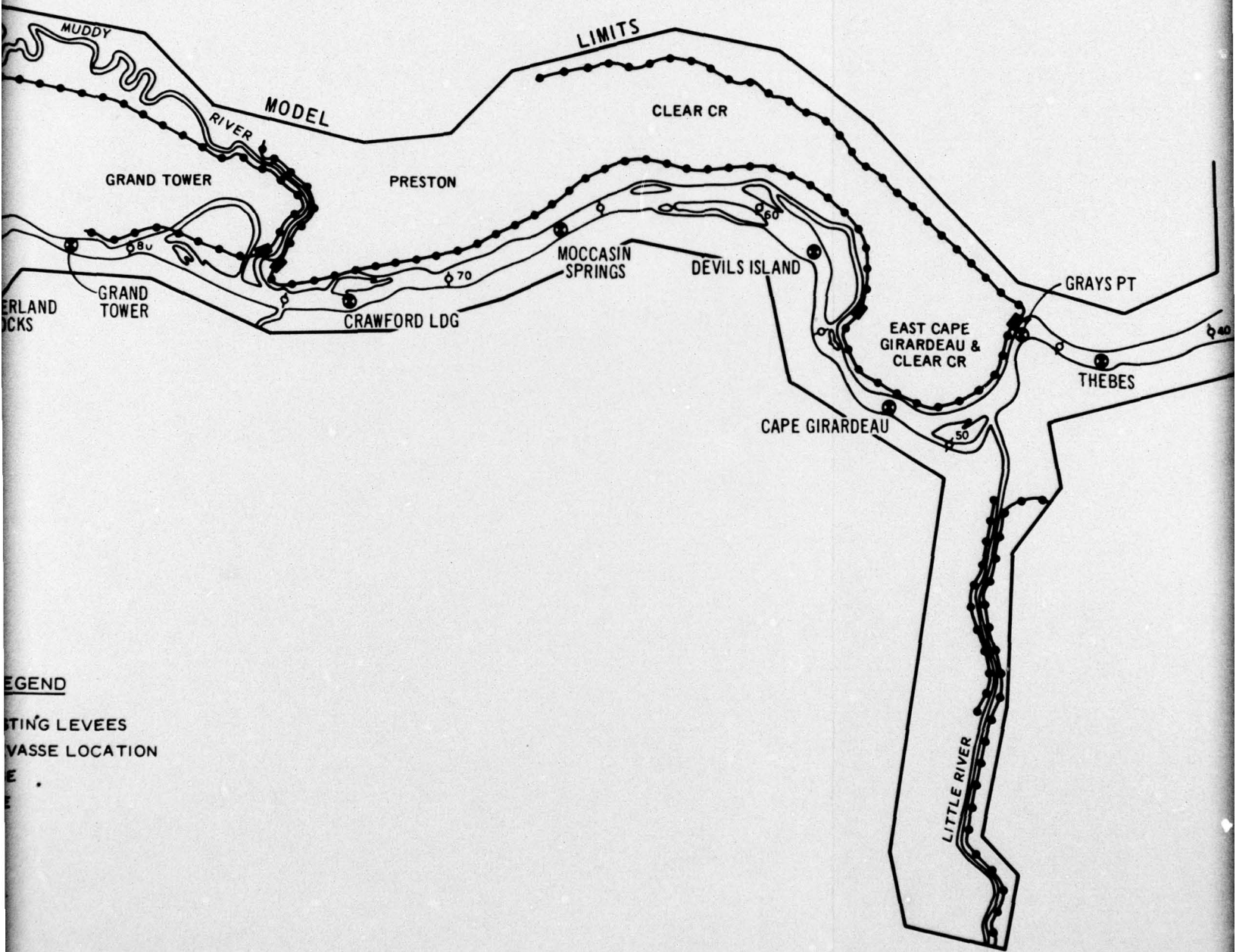


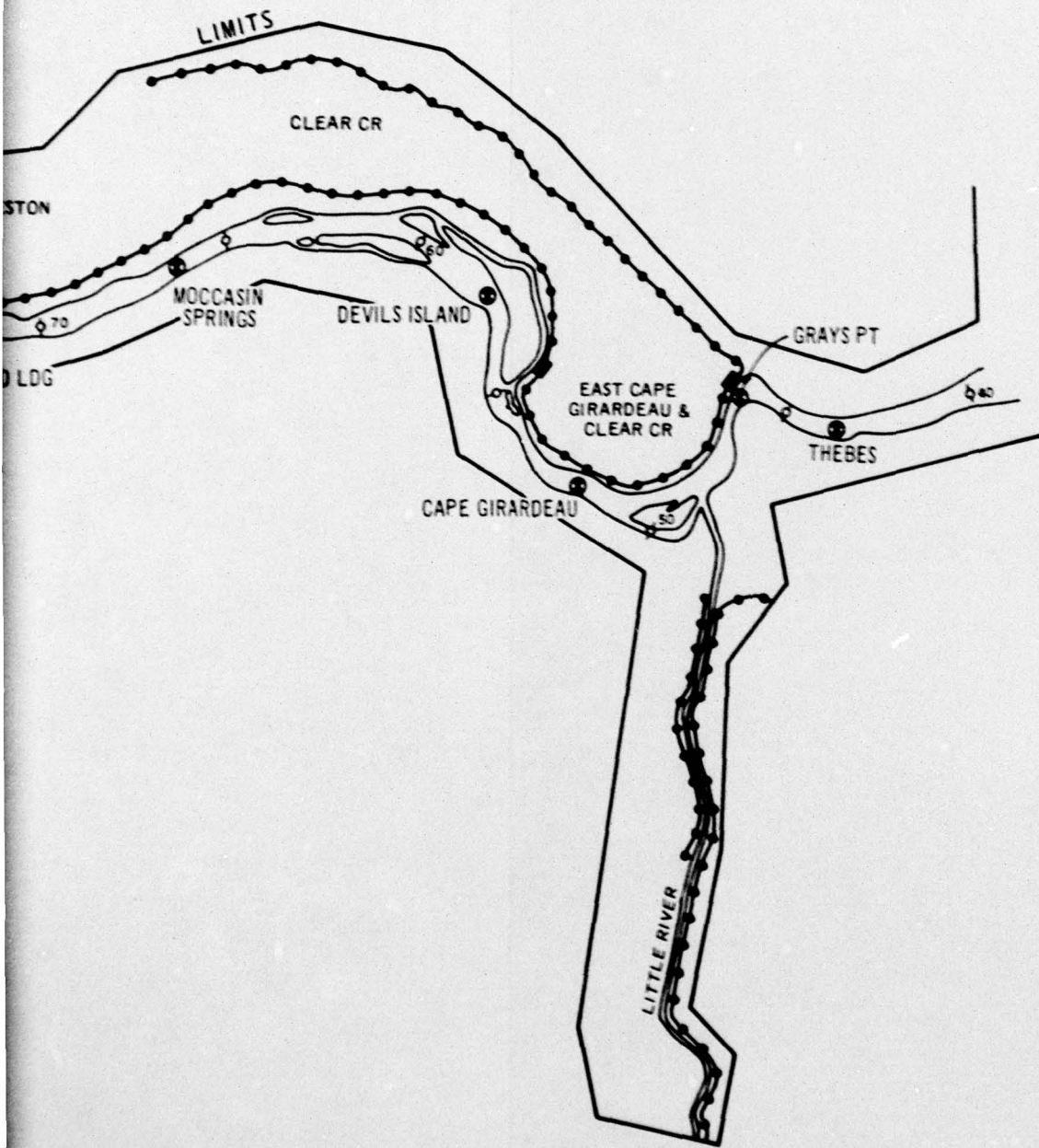
LEVEE ALIGNMENT
 MISSISSIPPI RIVER
 ST LOUIS TO CHESTER



LEGEND

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- CREVASSE LOCATION
- GAGE
- ◇ MILE

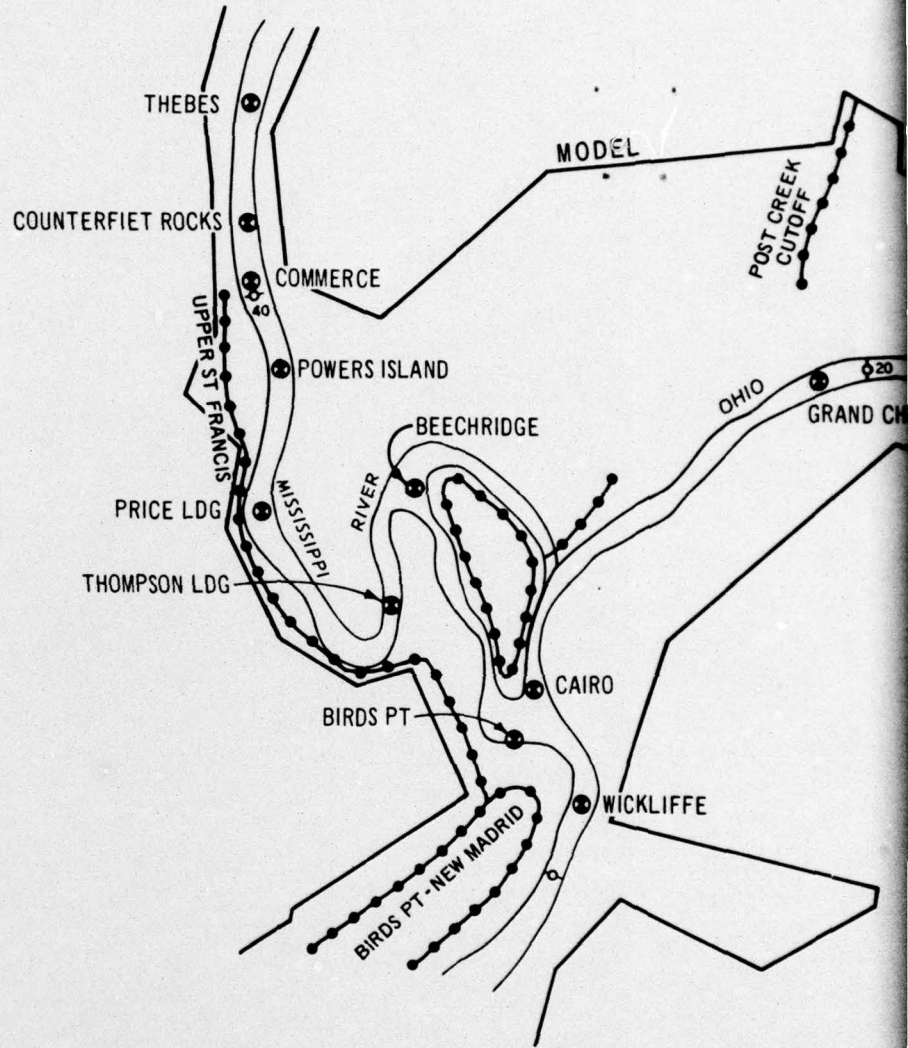




**LEVEE ALIGNMENT
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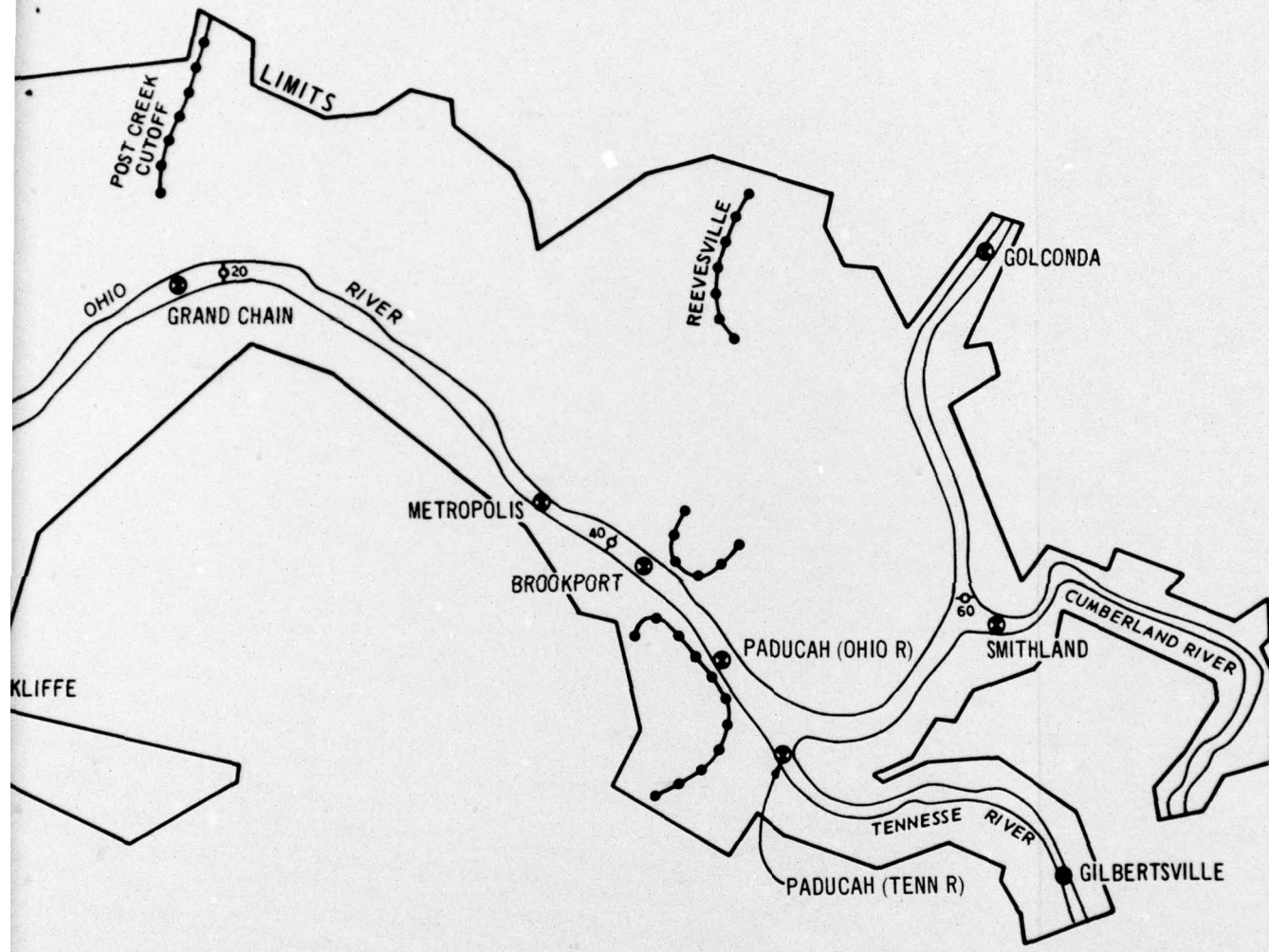
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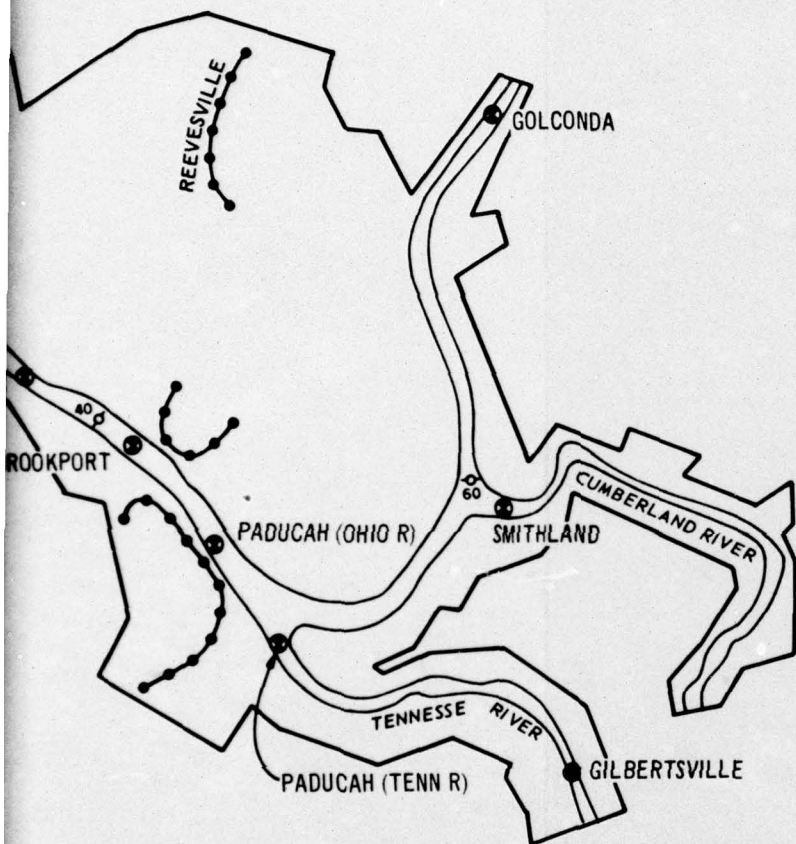


LEGEND

- EXISTING LEVEES
- GAGE
- ◇ MILE



MISS. RIV
OHIO RIV



LEVEE ALIGNMENT

MISS. RIVER - THEBES TO WICKLIFFE
 OHIO RIVER - GOLCONDA TO MOUTH

In accordance with ER 70-2-3, paragraph 6c(1)(b), dated 15 February 1973, a facsimile catalog card in Library of Congress format is reproduced below.

Foster, James E

Flowline study, Mississippi and Illinois Rivers; hydraulic model investigation, by James E. Foster. Vicksburg, U. S. Army Engineer Waterways Experiment Station, 1977.

1 v. (various pagings) illus. 27 cm. (U. S. Waterways Experiment Station. Mississippi basin model report 31-5)

Sponsored by U. S. Army Engineer District, St. Louis.

1. Flood frequencies. 2. Flow profiles. 3. Hydraulic models. 4. Illinois River. 5. Mississippi River. 6. Open channel flow. 7. Water surface profiles.

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(Series: U. S. Waterways Experiment Station, Vicksburg, Miss. Mississippi basin model report 31-5)

TA7.W34b no.31-5

Key to Numbering of MEM Reports*

Type of Report or Test	Office for which Conducted										Reserved for Future	Inter-Division	Basin-wide	
	General	LMVD	MRD	ORD	SWD	UMVD	Outside Agencies							
General Reports	1-series													
MEM Board Meetings	2-series													
Papers in Technical Journals	3-series													
Reserved for Future	4-series													
Reserved for Future	5-series													
Reserved for Future	6-series													
Reserved for Future	7-series													
Reserved for Future	8-series													
Reserved for Future	9-series													
Verification Studies	10-series	11-	12-	13-	14-	15-	16-	17-	18-	19-				
Reservoir-Operation Studies	20-series	21-	22-	23-	24-	25-	26-	27-	28-	29-				
Levee Studies	30-series	31-	32-	33-	34-	35-	36-	37-	38-	39-				
Flood-Routing Studies	40-series	41-	42-	43-	44-	45-	46-	47-	48-	49-				
Changes in Regiment	50-series	51-	52-	53-	54-	55-	56-	57-	58-	59-				
Reserved for Future	60-series													
Reserved for Future	70-series													
Miscellaneous Studies	80-series	81-	82-	83-	84-	85-	86-	87-	88-	89-				
Combined-Purpose Studies	90-series	91-	92-	93-	94-	95-	96-	97-	98-	99-				

* First digit indicates type of report or test; second digit (for 10-series and above) indicates office for which performed. Numbers following dashes indicate chronological order in respective series.