POTAMOLOGY INVESTIGATIONS

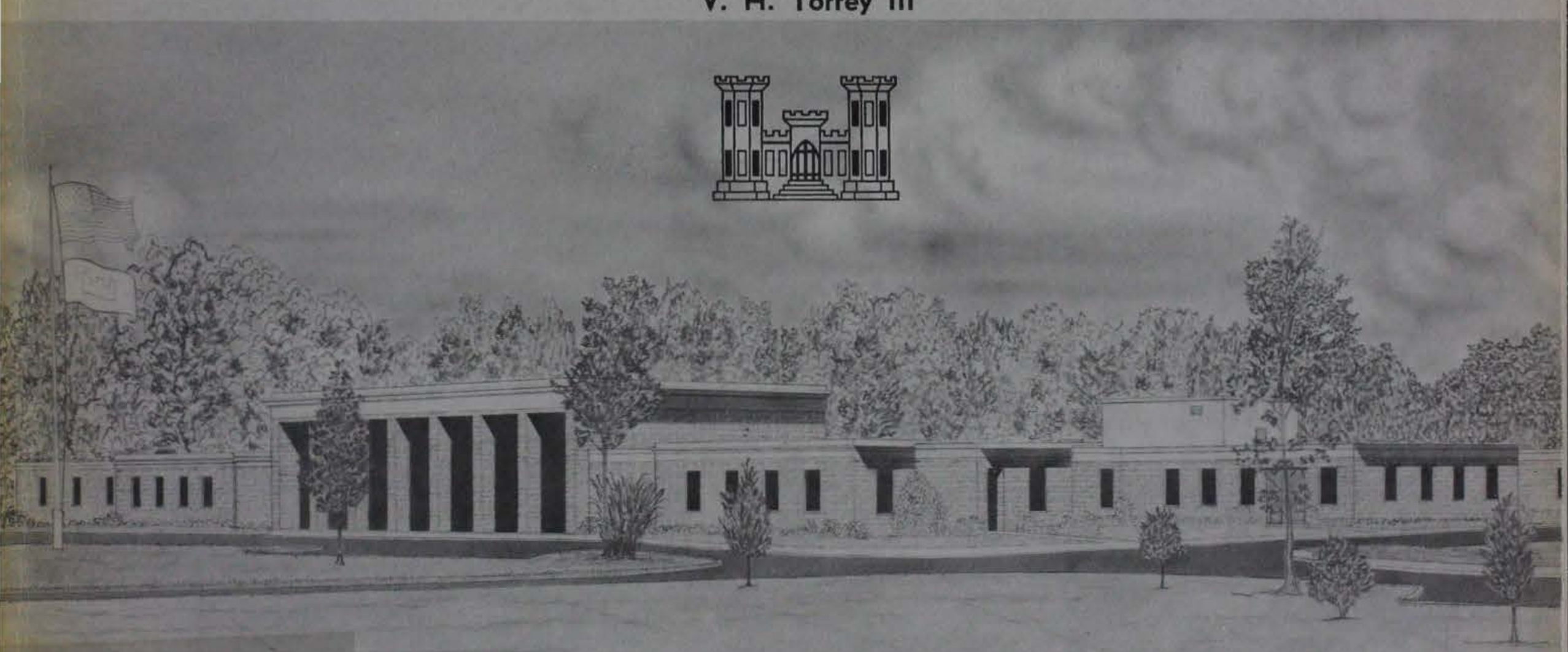
Report 12-21

VERIFICATION OF EMPIRICAL METHOD FOR DETERMINING RIVERBANK STABILITY

1968 AND 1969 DATA

by

V. H. Torrey III



October 1972

Sponsored by The President, Mississippi River Commission

Conducted by U. S. Army Engineer Waterways Experiment Station
Soils and Pavements Laboratory
Vicksburg, Mississippi

POTAMOLOGY INVESTIGATIONS REPORTS

Issued Prior to and Including This Report

Report No.	Title	Date
1-1	Instructions and Outline for Potamology Investigations	November 1947
1-2	Outline of Plans for the Potamology Investigations	December 1947
2-1	Preliminary Flume Tests of Mississippi River Revetment (1st Interim Report)	October 1947
2-2	Preliminary Tests of Mississippi River Dikes, Bank Stabilization Model	June 1950
2-3	Preliminary Tests of Experimental Baffles, Bank Stabilization Model	September 1951
2-4	Preliminary Flume Tests of Mississippi River Revetment (2d Interim Report)	November 1951
2-5	Investigation of Bank Stabilization, Miller Bend, Mississippi River	April 1953
2-6	Verification of Bank-stabilization Model	July 1953
3-1	Preliminary Laboratory Tests of Sand-asphalt Revetment	July 1948
5-1	Geological Investigation of Reid Bedford Bend Caving Banks, Mississippi River	July 1947
5-2	Field Investigation of Reid Bedford Bend Revetment, Mississippi River (3 volumes)	June 1948
5-3	Reid Bedford Bend, Mississippi River, Triaxial Tests on Sands	May 1950
5-4	Piezometer Observations at Reid Bedford Bend and Indicated Seepage Forces	May 1950
5-5	Standard Penetration Tests, Reid Bedford Bend, Mississippi River	May 1950
5-6	Undisturbed Sand Sampling and Cone Sounding Tests, Reid Bedford Bend Revetment, Mississippi River	May 1951
7-1	Soils Investigation, Bauxippi-Wynnoke Revetment	June 1951
8-1	Hardscrabble Bend, Mississippi River, Revetted Bank Failure, Soils Investigation	June 1950
9-1	Bank Caving Investigations, Kempe Bend Revetment, Mississippi River	November 1951
10-1*	Preliminary Development of Instruments for the Measurement of Hydraulic Forces Acting in a Turbulent Stream	June 1948
10-2	Turbulence in the Mississippi River	May 1950
10-3*	Evaluation of Instruments for Turbulence Measurements, 1948-1949	March 1951
10-4*	Evaluation of Instruments for Turbulence Measurements, 1949-1950	April 1951
11-0	Résumé of Conference Initiating Potamology Investigations, 11 February 1947	February 1947
11-1	Report of Conference on Potamology Investigations, 15 March 1948	March 1948
11-2	Report of First Potamology Conference with Hydraulics Consultants, 9-10 December 1948	December 1948
11-3	Minutes of Conference on Soil Studies, Potamology Investigation, 18 April 1949	April 1949
11-4	Report on Second Potamology Conference with Hydraulics Consultants, 23-24 May 1949	May 1949
11-5	Minutes of Conference with Soils Consultants, Stability of Mississippi River Banks, 5-8 October 1949	October 1949
11-6	Report of Conference on Potamology Investigations, 6-7 October 1949 (Volume 1, Volume 2*)	April 1951
11-7	Minutes of Conference on Soil Aspects of Potamology Program, 17-18 June 1950	October 1950
11-8	Minutes of Potamology Conference, 5 April 1951	April 1951
12-1	Density Changes of Sand Caused by Sampling and Testing	June 1952
12-2	Summary Report of Soils Studies	October 1952
12-3	Verification of Empirical Method of Determining Slope Stability	April 1954
12-4	Verification of Empirical Method of Determining Slope Stability - 1954 Data	June 1955
12-5	A Review of the Soils Studies	June 1956
12-6	Verification of Empirical Method of Determining Slope Stability - 1955 Data	July 1956
12-7	Verification of Empirical Method of Determining Slope Stability - 1956 Data	June 1957
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13-1	Bank Caving Investigations, Huntington Point Revetment, Mississippi River	June 1952
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16-1	Development of Operating Technique for and Verification of Channel-meander Model	September 1953
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18-1	Rotary Cone Penetrometer Investigations	June 1962
18-2	Verification of Cone Criteria for Determining Riverbank Stability	June 1965
19-1	Hydraulic Analysis of Mississippi River Channels, Miles 373 to 603, Fiscal Year 1964	September 1965
19-2	Resume of Research Studies of Hydraulic Characteristics of Mississippi River Channels, Interim Report FY 1967, Research Project 10	April 1967
19-3	Hydraulic Characteristics of Mississippi River Channels, Interim Report, FY 1970	June 1970
20-1	Effects of River Stages on Bank Stabilization; Analysis of Field Data	December 1965
21-1	Sand-Filled Bags as Dike Material; Potamology Research Project 9	March 1967
21-2	Review of Past Experience with Contraction Works; Potamology Research Project 9	March 1967
21-3	Investigation of Existing Dike Systems; Potamology Research Project 9	May 1969
21-4	Use of Plastic Filter Cloth in Revetment Construction; Potamology Research Project 11	June 1970

* Not of general informational value and hence not distributed.

Destroy this report when no longer needed. Do not return it to the originator.

The findings in this report are not to be construed as an official Department of the Army position unless so designated by other authorized documents.

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ARMY-MRC VICKSBURG, MISS.

Foreword

Estimates of bank stability from the standpoint of flow (liquefaction) failure at a number of sites along the Mississippi River were included in Summary Report of Soils Studies, Potamology Report 12-2, dated October 1952, and it was suggested that boring data acquired in future routine investigations be examined and used to estimate bank stability by a proposed empirical method. It was further suggested that these studies be conducted by a central office to permit refinement of criteria and to establish the validity of the proposed empirical method. In a letter dated 18 February 1953 to the Director, U. S. Army Engineer Waterways Experiment Station (WES), subject "Proposed Potamology Study - Soils," the President, Mississippi River Commission (MRC), indorsed the proposed program for verification of the empirical method and indicated that the U. S. Army Engineer Districts, Memphis, Vicksburg, and New Orleans, of the U. S. Army Engineer Division, Lower Mississippi Valley (LMVD), would be instructed to forward the necessary data to WES.

This report is the sixteenth in the series of verification studies. This study was authorized by letter from LMVD to WES dated 15 June 1970, subject "Status of Soils Division Projects for MRC and LMVD for FY 1970 and Request for Funds for Projects for FY 1971."

The studies and analyses reported herein were made by Messrs. V. H. Torrey III and Yu Shih Jeng and SP5 C. P. Flanagan under the direction of Messrs. J. R. Compton and W. E. Strohm, Jr. The studies were made under the general direction of Messrs. W. J. Turnbull (retired), J. P. Sale, and R. G. Ahlvin, Soils Division (now Soils and Pavements Laboratory), WES. This report was prepared by Mr. Torrey and was reviewed and approved by members of the Potamology Board in

accordance with LMVD Special Orders No. 20 dated 12 August 1964 and amended by Special Orders No. 29 dated 23 December 1964. Present members of the Potamology Board are:

Mr. A. J. Davis, MRC, Chairman
Mr. E. B. Lipscomb, MRC, Secretary
Mr. R. H. Haas, MRC
Mr. N. C. Long, St. Louis District
Mr. B. J. Littlejohn, Memphis District
Mr. J. E. Henley, Vicksburg District
Mr. D. E. Kranz, New Orleans District
Mr. J. J. Franco, WES

COL Levi A. Brown, CE, and COL Ernest D. Peixotto, CE, were Directors of the WES during preparation and publication of this report. Mr. F. R. Brown was Technical Director.

Contents

Summary

This report is the sixteenth of a series in which new data obtained from borings made for revetment construction are analyzed to determine the applicability of an empirical method for predicting riverbank stability with regard to flow (liquefaction) failure. Boring data obtained in 1968 and 1969 are analyzed, and stability predictions are made for 68 new areas. Failures that occurred during 1968 and 1969 at sites previously analyzed also are discussed.

Based on analyses made in 1958 of previous performance data, the classification criteria for zone A and zone B sands were modified in 1959. The failures at sites previously studied, new site predictions, and current year performance are analyzed using the modified criteria.

During 1968, 31 bank failures (24 flow type and 7 shear type) occurred along the Lower Mississippi River at 16 revetment sites within 500 ft of boring locations for which stability predictions with regard to flow failure had been made. Twenty-three flow failures occurred near 16 boring locations predicted to be unstable with regard to flow failure, and one flow failure occurred near a boring location predicted to be stable with regard to flow failure. Also, seven shear failures occurred near six boring locations predicted to be stable. Two flow failures (at two revetment sites) and nine shear failures (at five revetment sites) were reported in areas where no borings were located within 500 ft. Two flow failures occurred near boring locations for which no prediction was possible because the thickness of zone A sand had not been determined. Four revetment breaches were judged to be the direct result of severe local scour.

During 1969, 26 bank failures (21 flow type and 5 shear type) occurred at 12 revetment sites within 500 ft of boring locations for which stability predictions with regard to flow failure had been made. Among these were 17 flow failures near 13 boring locations predicted to be unstable, 4 flow failures near 4 boring locations predicted to be stable, 3 shear failures near 3 boring locations predicted to be stable, and 1 shear failure near a boring location predicted to be unstable with regard to flow failure. The one other shear failure was reported near a boring location for which no prediction was possible because a sufficient thickness of zone A sand had not been penetrated. Four flow failures and 12 shear failures occurred in areas that were more than 500 ft from any boring.

From 1954 (when riverbank stability predictions were initiated) through 1968, 1492 boring locations at 118 revetment sites on the Mississippi River were studied. Almost all of these borings were in the Memphis and Vicksburg District areas. Data on sites in the New Orleans District were included only in the first report of this series (Report 12-3). However, boring and failure data for 1968 and 1969 from the New Orleans District are included herein.

Flow failures reported through 1969 have occurred within 500 ft of 19 boring locations in the Memphis District and 84 boring locations in the Vicksburg District; of these, 83 occurred near locations that had been predicted to be unstable according to the modified criteria, 12 occurred at boring locations predicted to be stable, and 8 occurred at boring locations for which no prediction had been made because the thickness of zone A sand had not been determined.

The modified criteria have proven reliable in predicting stability with regard to flow failure. Of the total of 103 flow failures recorded since 1954 within 500 ft of analyzed borings, only 12 (12 percent) were near boring locations predicted to be stable. However, many locations predicted to be unstable have not experienced flow failure, and it is possible that either the density of the zone A sand may be such that flow failure will not occur or the severity of river attack has not been sufficient to initiate flow failure.

POTAMOLOGY INVESTIGATIONS

VERIFICATION OF EMPIRICAL METHOD FOR DETERMINING RIVERBANK STABILITY 1968 AND 1969 DATA

Purpose and Scope of Investigation

1. The study reported herein is part of a continuing investigation to determine the validity of an empirical method for predicting the susceptibility of banks of the Lower Mississippi River and banks of alluvial rivers in the Lower Mississippi River basin to flow slides (liquefaction-type failures). In this report, soils data obtained during 1968 and 1969 from routine borings along the banks of the Mississippi River are evaluated. Predictions are made of the susceptibility to flow slides of the banks at the boring locations. This report also includes a summary of failures that occurred in 1968 and 1969 at sites previously studied for which stability predictions were made in earlier reports of this series.

2. Boring data from 68 sites along the Lower Mississippi River between 942 and 12 MAHP* are evaluated in this report. The sites are listed below under the U. S. Army Engineer Districts in which they are located:

Memphis District	
Islands 2, 3, and 4, Ky.	Blaker Towhead, Tenn.
Hickman-Reelfoot, Ky.	Keyes Point, Tenn.
Kentucky Point, Ky.	Randolph Point, Tenn.
New Madrid Bend, Mo.	Ensley, Tenn.

Vicksburg District	
Cracraft, Ark.	Point Pleasant, Miss.
Mayersville, Miss.	Goldbottom, Miss.
Baleshed, La.	Bougere Bend, La.
False Point, La.	

* Miles above Head of Passes (1962 mileage).

New Orleans District

Palmetto Bend, Miss.	Luling, La.
Hog Point, La.	Avondale, La.
Springfield Bend, La.	Greenville Bend, La.
Allendale, La.	Cut-Off, La.
Port Allen, La.	Poydras, La. (2 sites)
Manchac Bend, La.	Scarsdale, La.
St. Gabriel, La.	Oak Point, La.
Philadelphia Point, La.	Linwood, La.
Marchand, La. (2 sites)	Belair, La.
Smoke Bend, La. (2 sites)	Alliance, La.
Aben, La.	Monsecour, La. (2 sites)
St. Elmo, La.	Myrtle Grove, La. (2 sites)
Burnside, La.	Harlem, La.
Romeville, La. (2 sites)	Junior, La. (2 sites)
Rich Bend, La.	Gravolet, La. (2 sites)
Belmont, La.	Diamond, La.
Vacherie, La.	Bohemia, La.
Angelina, La.	Point Michel, La.
Willow Bend, La.	Nestor, La.
Reserve, La.	Tropical Bend, La.
Lucy, La.	Fort Jackson, La.
Bonnet Carré, La.	Venice, La.
Waterford, La.	

3. This study is a test of empirical criteria for stability of banks with regard to flow failure rather than a complete bank stability analysis; consequently, factors other than those on which the criteria are based have purposely been excluded. Also, it is emphasized that the data used in compiling this report were obtained by the Memphis, Vicksburg, and New Orleans Districts in routine investigations of soil conditions at proposed revetment sites or at sites where revetments are being extended; no special explorations, such as deep undisturbed sample borings or cone penetration soundings, were made for this study.

4. Prior to 1960, the methods used by the Memphis and Vicksburg Districts to obtain samples from below the groundwater table were not the same. The Vicksburg District used a bailer sampler, and the Memphis District used a thin-walled, fixed-piston-type sampler. The samples obtained with the piston-type sampler are generally considered to be more representative and to provide a more accurate grain-size distribution than those obtained with the bailer sampler. Nevertheless, it was assumed in previous analyses that the bailer samplers obtained samples that were representative of the natural grain-size distribution, even though some loss of fines could be expected in this type of sampling. This may have affected the determination of the limits of various zones as described in reports concerned with data obtained prior to 1960. In 1960, the Vicksburg District began using the piston-type sampler, and stability predictions presented in this report for new sites in the Memphis, Vicksburg, and New Orleans Districts are based on data for samples obtained with the piston-type sampler.

Empirical Criteria for Determining Riverbank Stability

5. The following discussion, based on data accumulated as a part of the potamology investigations and related studies of caving banks, is concerned with the soil conditions involved in the criteria for determining riverbank stability.

Soil conditions associated with flow failures

6. Several basic soil conditions have been found to be associated with flow slides; they are described in Potamology Reports 9-1 and 12-2 and other reports, and are summarized in Potamology Report 12-3, the first of this series of verification reports (see list of Potamology Reports inside front cover). A brief description of these soil conditions is repeated here for the sake of convenience.

a. Flow failures occur in ancient point bar deposits.

b. Point bar deposits usually contain three basic soil types: a somewhat cohesive topstratum called "overburden soils";

underlying fine sands, called the "upper sand series"; and in turn, underlying coarse sands and gravels called the "lower sand series."

c. Flow failures have never been known to extend into the lower sand series.

d. The stability of a given slope is dependent upon the relative thicknesses of (1) the overburden, and (2) a zone of fine sand (designated zone A) in the upper sand series.

7. For data analyzed in this report, the upper sand series has been subdivided into two zones, A and B, on the basis of variations in grain size. Penetration resistance, as determined by the rotary cone penetrometer, or natural density from undisturbed samples may also be used to delineate zone A sand (see Potamology Report 18-1). Where failures have occurred, the boundary between zones A and B has been found to correspond approximately to the depth of failure (see Potamology Reports 12-2 and 12-5). Predictions of susceptibility to flow failure made through 1958 were based on gradation criteria developed in October 1952 as described in Report 12-2. However, a performance evaluation made during 1958 indicated that the gradation classification criteria for overburden soils, zone A sand, and zone B sand should be modified. This evaluation, described in detail in Potamology Report 12-8, showed that, based on the modified criteria, all flow failure locations studied would have been predicted to be unstable except three locations where the borings did not penetrate the full depth of zone A sand and which, therefore, did not meet the requirements for the verification study. The modified classification criteria for overburden soils, zone A sand, zone B sand, and lower sands are based on variations in grain size. These criteria have been adopted for making predictions at new revetment sites. A comparison of the original and modified criteria is presented in table 1.

8. In zoning soil conditions in the riverbank, it should be noted that zone B sands may contain occasional thin strata of sands as fine as zone A sands, but zone B contains predominantly coarser and denser material than zone A. Conversely, the occurrence of strata of medium or coarse material not exceeding about 5 ft in thickness in a

zone of fine sand greater than 20 ft in thickness is not considered sufficient reason to classify the zone as other than zone A. In determining the overburden thickness, the thicknesses of all strata overlying the zone A sand of governing thickness (i.e. thickness greater than 20 ft) are included. Thus the overburden zone may include not only cohesive topstratum material, but also relatively thin strata of sands (even zone A sands when separated from underlying zone A sands by more than 5 ft of other soils).

Thickness of zone A sand compared with thickness of overburden

9. It has been found that where flow failures have occurred, the zone A sands were at least 20 ft thick, and this is established as a minimum thickness for any location considered as potentially unstable. The ratio of the overburden thickness to the zone A sand thickness, called the R value, has also been found significant. An R value of 0.85 or less and a zone A sand thickness of 20 ft or more indicate an unstable condition. An R value greater than 0.85 or a zone A sand thickness less than 20 ft indicates a stable condition with regard to flow failure. The critical thickness ratio (R = 0.85) is based on application of the modified criteria developed from data for locations where flow failures have occurred.

Variability of soil conditions

10. Previous investigations have shown that the thickness of zone A sand may vary considerably in borings spaced as close as 250 ft from each other. Because of the wide spacing of borings at the sites studied, usually 1000 ft or more, it is reasonable to assume that appreciable changes in soil conditions may occur between borings. Therefore, predictions are made for individual boring locations rather than for an entire revetment reach.

Predictions at New Sites, Memphis and Vicksburg Districts

Method of analysis

11. The data furnished the U. S. Army Engineer Waterways

Experiment Station (WES) during 1968 and 1969 by the Memphis and Vicksburg Districts for use in this study consisted of boring logs, results of mechanical analyses of soil samples, and hydrographic survey maps of sites showing boring locations. Table 2 is a summary of the site and map identification data.

12. The percentages of material passing the Nos. 40, 60, and 200 sieves were obtained directly from sieve analysis data sheets furnished by the two Districts. Using the modified criteria (table 1) each soil sample was classified as overburden, upper sand (zone A or B), or lower sand series material.

13. The various series and zones were then delineated as a soil profile for each site. Thicknesses of overburden and zone A sand were determined for individual borings, and the corresponding R values were computed. In some cases, borings did not penetrate the full thickness of zone A sand. In these cases, a prediction of susceptibility to flow failure could be made only when a sufficient thickness of zone A sand was penetrated to indicate instability (i.e. when the R value obtained in the computation $R = \frac{\text{overburden thickness}}{\text{zone A thickness}}$ was 0.85 or less). No prediction could be made when the incompletely penetrated thickness of zone A sand was less than that required to produce an R value of 0.85 or less.

Predictions*

14. Table 3 summarizes soil conditions at sites in the Memphis and Vicksburg Districts for which data were supplied in 1968 and 1969, and evaluates individual boring locations with respect to susceptibility to flow failure. Zone A sand thicknesses are plotted versus R values in plates 1 through 4 for all sites in both the Vicksburg and Memphis Districts. As can be seen in table 3 and plates 1 through 4, the majority of the boring locations at revetment sites Nos. 215 and 235 for the Memphis District and 217, 240, and 242 for the Vicksburg District are classified as stable with respect to flow failure; the majority of

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* These evaluations were previously furnished the Memphis and Vicksburg Districts by letters dated 1 March 1971, subject "Analyses of 1970 Boring Data at New Revetment Sites."

the borings at sites 213, 214, 237, and 238 in the Memphis District and 216, 218, 219, and 241 in the Vicksburg District are classified as susceptible to flow failure.

Predictions at New Sites, New Orleans District

Method of analysis

15. The 1968 and 1969 data furnished WES by the New Orleans District consisted of boring logs, mechanical analyses of soil samples, and a set of small-scale hydrographic survey maps* showing the boring locations at 53 new revetment sites. Sounding ranges are plotted on the 1:20,000 scale hydrographic maps furnished by the New Orleans District. Revetment borings are generally made on the top of the bank at one of these sounding ranges and designated with the range number (followed by an "L" or "R" signifying left or right bank of the river). The hydrographic range numbers correspond to the approximate mileage above Head of Passes. Table 4 presents the boring locations and the soil conditions at the 53 sites for which data were furnished in 1968 and 1969.

16. With the inclusion of the boring data from the New Orleans District in this Potamology Report, a problem associated with the modified empirical criteria for predicting stability with regard to flow failure has become apparent. It is often the case that the borings made by the New Orleans District for revetment work extend to or slightly below thalweg elevations but still do not completely penetrate or extend far enough into the underlying zone A sand to permit a prediction in accordance with the current criteria. A criterion limiting the depth considered in making predictions is used herein for borings in the New Orleans District.

17. It is considered logical to assume that the mass of soil

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* U. S. Army Engineer District, New Orleans, "Mississippi River Hydrographic Survey 1961-63, Black Hawk, La., to Head of Passes, La.," Feb 1965, New Orleans, La., and U. S. Army Engineer District, Vicksburg, "Mississippi River Hydrographic Survey 1962-64, Mouth of White River, Ark., to Black Hawk, La.," Sep 1964, Vicksburg, Miss.

which might be involved in a flow-type failure would be that lying between the ground surface and the elevation of the thalweg opposite the boring location. Thus the concept of a limiting depth D_L arises. For the purpose of making predictions of susceptibility to flow failure in the New Orleans District, the limiting depth D_L is considered to be the difference between ground surface elevation of the boring and the 1962 thalweg elevation (1962 hydrographic survey) at the boring location, plus an additional 50 ft to allow for any deepening of the thalweg which may have occurred since 1962. The application of the limiting depth concept is described in fig. 1.

Predictions

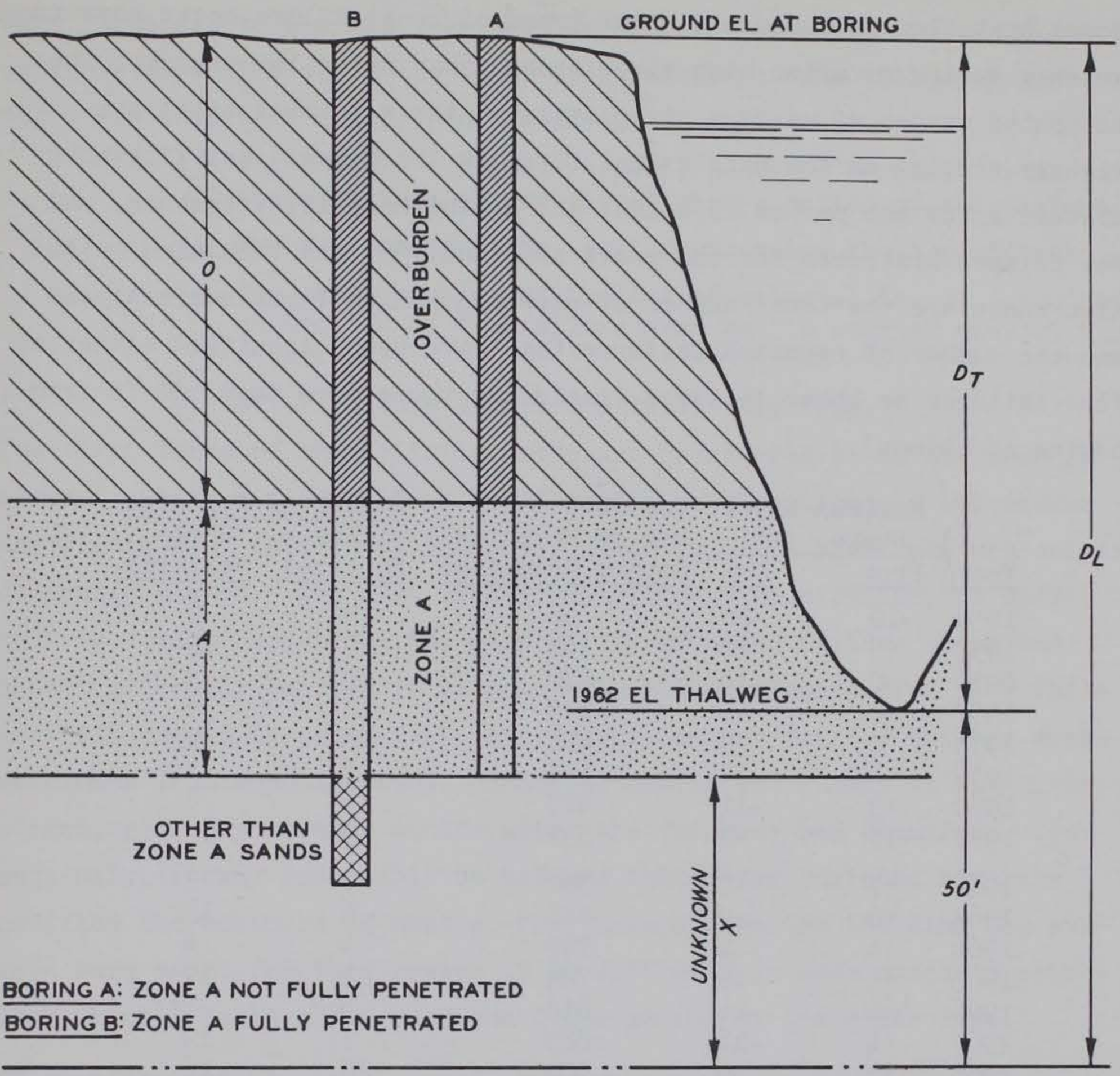
18. The use of the limiting depth concept primarily results in changing a "no prediction" condition to a "stable prediction" condition where the zone A sand has not been completely penetrated but the soil mass above the thalweg consists largely of overburden material. Most of the boring locations in the New Orleans District that would otherwise be classified as unpredictable are predicted to be stable when the limiting depth concept is used. This is in keeping with the past history of relative stability of the riverbank in the New Orleans District. Table 5 summarizes the predictions resulting from the limiting depth concept for the 1968 and 1969 revetment borings made in the New Orleans District (see table 4 for detailed data).

Failures at Sites Previously Analyzed

Method of analysis

19. The Memphis and Vicksburg Districts furnish WES yearly reports of any bank or revetment failures at sites that have been analyzed and for which performance predictions have been made in reports of this series beginning in 1954. The New Orleans District submitted reports on two failures in 1968 and 1969; these are included for record only since failures occurred at locations for which boring data have not been previously analyzed.

20. In the evaluation of revetment performance, it has been



BORING A: ZONE A NOT FULLY PENETRATED
BORING B: ZONE A FULLY PENETRATED

THE LIMITING DEPTH, D_L (= D_T + 50 FT), REPRESENTS THE MAXIMUM COMBINED THICKNESS OF OVERBURDEN AND ZONE A SANDS (O + A) THAT CAN BE USED IN THE EVALUATION OF STABILITY AGAINST FLOW SLIDES. THUS, THE THICKNESS OF ZONE A SANDS IS LIMITED TO A MAXIMUM VALUE OF (D_L - O).

	O/A	ZONE A THICKNESS	PREDICTION
D_L = O + A	≤0.85	≥20 FT	UNSTABLE
	>0.85		STABLE
D_L > O + A	≤0.85	≥20 FT	UNSTABLE
	≤0.85	<20 FT AND FULLY PENETRATED	STABLE
	≤0.85	<20 FT AND NOT PENETRATED	NO PREDICTION OR STABLE*
	>0.85	FULLY PENETRATED	STABLE
		NOT PENETRATED	NO PREDICTION OR STABLE*

* STABLE IF VALUE OF x IS SUCH THAT IT IS NOT POSSIBLE FOR A TO BE ≥20 FT AND FOR O/A TO BE ≤0.85.

Fig. 1. Prediction criteria using the limiting depth concept

found that flow failures and other types of bank failure occur more frequently during or after high river stages than after low stages. The estimated ranges of maximum river stage at the revetment sites previously studied on the Mississippi River in the Memphis and Vicksburg Districts for the period 1954-1967 and in the Memphis, Vicksburg, and New Orleans Districts for the years 1968 and 1969 are tabulated below. Also shown are the total number of revetted boring locations analyzed and the number of reported failures that have been classified either as flow failures or shear failures (including those more than 500 ft from boring locations).

Year	Maximum River Stage, ft* From	To	Cumulative Number of Revetted Boring Locations	Number of Failures Flow Failures	Shear Failures
1954	-10	-20	56	0	0
1955	+5	-10	158	9	3
1956	0	-14	270	10	3
1957	+2	-5	375	12	35
1958	0	-9	408	13	32
1959	-4	-14	447	5	11
1960	+3	-11	477	6	8
1961	+10	-2	532	10	11
1962	+7	-7	591	9	33
1963	+8	-9	648	6	12
1964	+4	-11	749	4	4
1965	+3	-10	783	11	12
1966	+7	-14	816	5**	5**
1967	+4	-14	885	7	19
1968	+3	-9	902	28	16
1969	+4	-6	939	25	17

* Referenced to bank-full conditions (Lower Mississippi Valley river reach).

** Failures could not be classified at two sites and are not included in this total. See paragraphs 43 and 48 of Report 12-19.

21. Based on the 1968 and 1969 river inspection and performance surveys, data on 87 failures that could be classified as either shear or flow failures (60 within 500 ft of boring locations) at 40 revetment sites were reported.

22. Survey maps and cross sections of the failure areas that

were forwarded to the WES have been studied to determine whether the failures were flow slides or shear-type failures. The following criteria are used to identify flow failures.

a. The failure surface, in plan, tends to be bowl- or neck-shaped with a narrow throat at the outlet of the failure.

b. The failure surfaces usually encompass the top of bank.

c. The major portion of the failed material is not deposited at the toe of the failure area but is carried away by the river.

d. After-failure slopes are relatively flat.

The first three of the criteria above are considered to be the most important; where a flow failure is stated to have occurred in subsequent descriptions of individual failures, these criteria have been met unless otherwise stated. The last criterion, although significant, is difficult to verify because of the possibility of after-failure scour and cannot generally be used in establishing the occurrence of a flow failure. It should be noted that, in general, survey maps of failure areas were made from annual surveys conducted during the summer at low river stages, probably several months after the failures had occurred. Consequently, it may reasonably be assumed that river currents may have modified the contours of most of the failure areas by the time the surveys were made; for this reason it is difficult in some cases to establish whether failures were of the liquefaction or the shear type.

Predictions and
observed performance

23. Flow-failure predictions and observed performance through 1969 for all sites for which predictions were made in the previous 15 reports and in this report for the 1968 data are summarized in table 6. The estimated maximum river stages with reference to bank-full condition at each of the sites studied from 1954 through 1969 are also shown in table 6. Failures reported in the years 1955 through 1967 were discussed in Reports 12-4, 12-6 through 12-14, and 12-17 through 12-20. Presentation of failures observed in 1968 and 1969 is made below. Where shear failures occur at locations predicted to be either stable or unstable with respect to flow slides, the criteria are considered to have

been neither verified nor contradicted.*

24. Failures observed in 1968 and 1969 which occurred within 500 ft of borings for which predictions have previously been made are presented in tables 7 and 8, respectively. The key to the dimensions of the shear and flow failures (given in columns 14-17 of tables 7 and 8) is shown in fig. 2. Those failures observed in 1968 and 1969 which could not be classified as either a flow or shear failure, or which occurred more than 500 ft from boring locations, are described in Appendix A for record purposes only.

Summary of New Site Predictions and 1968-1969 Performance at Sites Previously Studied

New site predictions

25. Predictions with regard to flow failure were made using the modified criteria for 103 new boring locations at 15 sites in the Memphis and Vicksburg Districts. Based on the modified criteria, 58 locations are predicted to be unstable and 40 are predicted to be stable with regard to flow failure. No prediction was possible for five locations because thicknesses of zone A sand were not determined.

26. Predictions as to stability with regard to flow failure were made using an alternate method of applying the modified criteria for 248 new boring locations at 53 sites in the New Orleans District. Based on the limiting depth concept, 47 locations are predicted to be

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* The original classification criteria were modified in 1959 as indicated in table 1. Previously reported data were reevaluated and tabulated in Report 12-10 to show predictions based on the modified criteria. The summary tabulation was expanded in Report 12-11 to indicate those locations for which no prediction could be made because the full thickness of zone A sand was not penetrated in the boring, and the thickness that was penetrated was insufficient for prediction purposes. Report 12-11 and later reports list only those failures that occurred within 500 ft of a boring location. Table 4 was revised in Report 12-19 to group all information on a particular site together under the heading of the site name. The site locations are listed in order of MAHP from upstream to downstream. The maximum river stage shown in the table is the maximum stage preceding the observed performance of the riverbank.

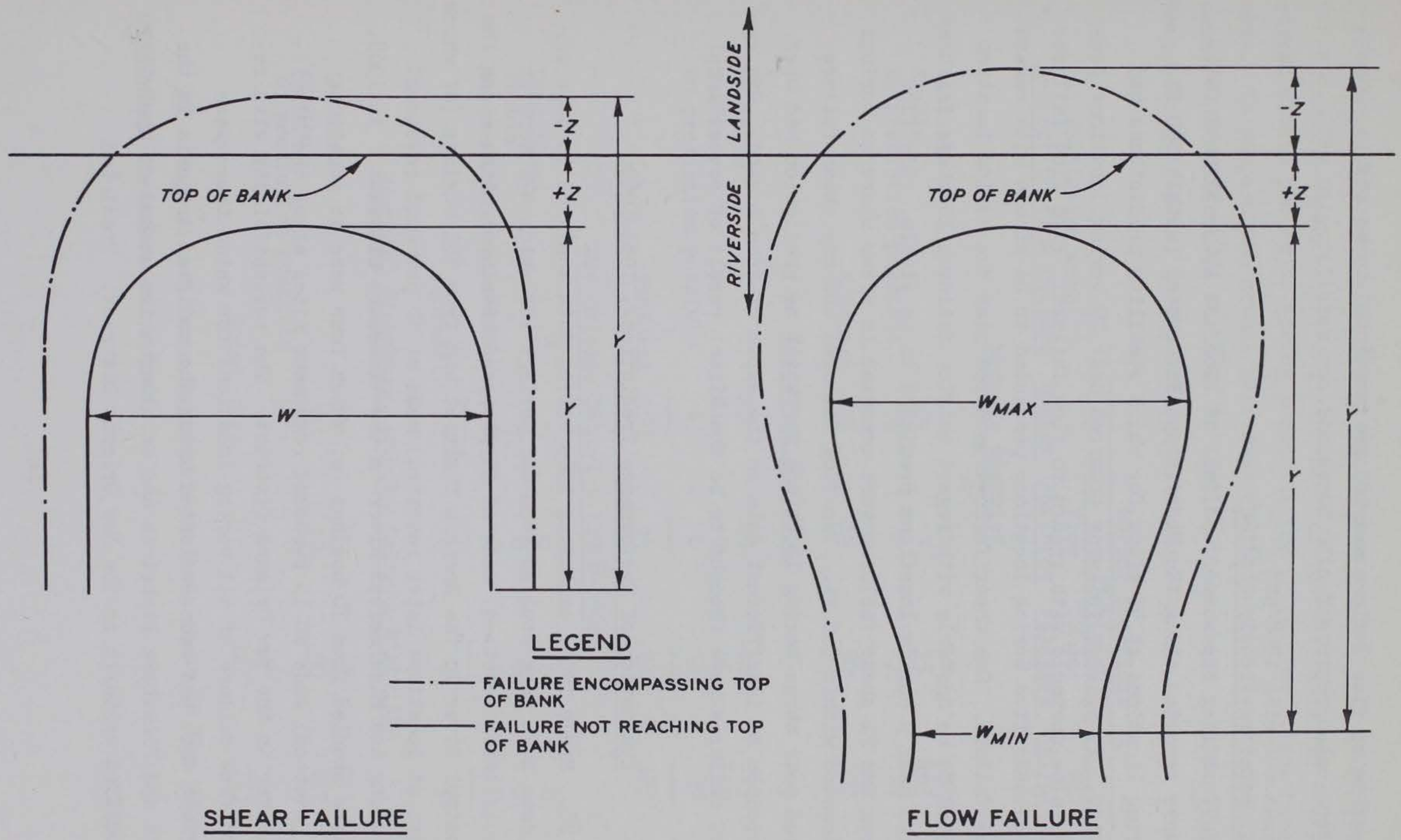


Fig. 2. Failure dimensions reported in tables 7 and 8

susceptible to flow failure and 185 are predicted to be stable. No prediction was possible for 16 locations.

Performance during 1968 and 1969 at sites previously studied

27. During the summer and fall of 1968 and 1969, 57 bank failures were reported along the Mississippi River near (within 500 ft) 43 boring locations at 41 sites for which stability predictions had been made. Forty flow failures occurred near 29 boring locations predicted to be unstable with regard to flow failure. Five flow failures occurred near five boring locations predicted to be stable with regard to flow failure. One shear failure occurred near one boring location predicted to be unstable with regard to flow failure; 10 shear failures occurred near 9 boring locations predicted to be stable. Six flow failures and 21 shear failures were reported in areas where no borings were located within 500 ft. Two flow failures and one shear failure occurred near three boring locations for which no prediction had been made because of insufficient data on the depth of zone A sand. Six revetment failures were thought to be the direct result of severe local scour.

Evaluation of Performance Predictions, 1954-1969

28. Since 1954, excluding 1969 boring data analyzed in this report, data have been studied from 641 borings (of which 476 were at locations later revetted) made at 59 proposed revetment sites along the Mississippi River in the Memphis District and from 781 borings (of which 456 were at locations later revetted) made at 62 proposed revetment sites along the Mississippi River in the Vicksburg District. In 1968, data were studied from 70 borings (of which four were at locations later revetted) made at 15 proposed revetment sites along the Mississippi River in the New Orleans District. The susceptibility with regard to flow failure of all boring locations for which there were sufficient data has been evaluated using the modified criteria in the Memphis and Vicksburg Districts and an alternative method of applying the modified criteria in the New Orleans District. Predicted

performance, together with actual performance records, is given in table 6. The only failures considered in this table are those that occurred within 500 ft of boring locations for which predictions have been made. To compare the actual performance with predicted performance, a summary of performance at those boring locations where revetment has been placed is given in the following tabulation:

Prediction with Respect to Flow Failure	Boring Locations Number	Performance Flow Failures	Shear Failures	No Failures
Memphis District				
Unstable	116	14	10	92
Stable	301	3	35	263
No prediction possible	59	2	5	52
Subtotal	476	19	50	407
Vicksburg District				
Unstable	200	69	12	119
Stable	213	9	55	149
No prediction possible	45	6	4	35
Subtotal	458	84	71	303
New Orleans District (1968-1969)				
Unstable	0	0	0	0
Stable	5	0	0	5
No prediction possible	0	0	0	0
Subtotal	5	0	0	5
Memphis, Vicksburg, and New Orleans Districts				
Unstable	316	83	22	211
Stable	519	12	90	417
No prediction possible	104	8	9	87
Total	939	103	121	715

29. Significant facts apparent from data shown in the preceding tabulation are discussed below:

a. In the Memphis District, only 14 percent of the revetted boring locations have experienced failures of either the flow or shear types, while in the Vicksburg District, 34 percent of the revetted boring locations have experienced failures.

b. Eighty-two percent of the flow failures have occurred in the Vicksburg District.

c. Approximately 44 percent of the revetted locations in the Vicksburg District are predicted to be potentially unstable, while in the Memphis District about 24 percent of the revetted locations are predicted to be unstable.

30. Table 9 summarizes soil conditions at the 12 locations where flow failures occurred in violation of the empirical criteria. It is considered significant that with only 12 exceptions, all flow failures have occurred either near locations predicted to be potentially unstable or where the full depth of zone A sand was not determined. However, since only 15 percent of the locations in the Vicksburg and Memphis Districts predicted to be susceptible to flow failures have actually experienced such failures over the 15-year period of study, it is apparent that the modified criteria define only a part (i.e. thicknesses of overburden and zone A sand) of the conditions indicative of the probability of flow failure. This empirical method does not include consideration of the effect of density of the zone A sand or of geological and groundwater conditions in predicting susceptibility to flow failure. In addition, the empirical method ignores the effect of river attack. It is entirely possible that many of the unstable locations have not yet experienced flow failures simply because they have not been subjected to the degree of river assault required to trigger flow failure.

Conclusions

31. Since flow failures have occurred at those locations that have been predicted to be unstable, the modified classification criteria are considered reliable in predicting susceptibility to flow failure. However, many locations predicted to be potentially unstable have not yet experienced flow failure; this may be because the density of the

zone A sand is such as to prevent flow failure, the severity of river attack has not been sufficient to initiate a flow failure, or the influence of other possible factors that could prevent such failures has not been taken into account.

Table 1

Comparison of Original and Modified Classification Criteria

Material	Original Criteria*	Modified Criteria**
Overburden soils	More than 10% passing No. 200 sieve	More than 20% passing No. 200 sieve
Upper sands	50% or more passing No. 40 sieve	50% or more passing No. 40 sieve
Zone A	50% or more passing No. 60 sieve	25% or more passing No. 60 sieve
Zone B	Less than 50% passing No. 60 sieve	Less than 25% passing No. 60 sieve
Lower sands	Less than 50% passing No. 40 sieve	Less than 50% passing No. 40 sieve

* These classification criteria were used prior to 1959.

** These criteria are presently used in the classification of individual soil samples. However, in establishing thicknesses of overburden and zone A materials, strata of other soils may be included in these zones, as described in the text.

Table 2

Summary of Site and Map Identification Data, Memphis and Vicksburg Districts

Revetment Site Data			Map Data			
Location	Boring No.	Miles Above Head of Passes*	Title	Date	Sheet No.	District File No.
			Memphis District (1968)			
New Madrid Bend, Mo.	13 through 21	882.8 to 880.9	General Map, New Madrid Bend, Mo.	March 1952	1	60/218
Blaker Towhead, Tenn.	A through H 7AU through 11AU 12U through 14U	843.8 to 842.6	General Map, Blaker Towhead, Tenn.	December 1964	1	60/271
Ensley, Tenn.	29 through 31	720.4 to 720.1	General Map, Island No. 48, Tenn.	April 1950	1	60/128
			Vicksburg District (1968)			
Cracraft, Ark.	C-7-68U, C-9-68U through C-12-68U	508.55 to 507.95	Cracraft, Ark.	1967	2	M-3.1-38
Mayersville, Miss.	M-1-67U through M-10-67U	500.85 to 499.30	Cracraft-Mayersville, Miss.	1967	3	M-3-97
Baleshed, La.	B-1-67 through B-7-67	485.30 to 484.20	Hagaman, La., Revetment	1965	30	M-4-1
Goldbottom, Miss.	GB-16-67 through GB-33-67U	390.20 to 386.80	Goldbottom, Miss.	1966	--	--
			Memphis District (1969)			
Islands 2, 3, and 4, Ky.	17 to 21	941.9 to 942.7	General Map, Campbell Point, Ky.	December 1953	1	60/229
Hickman-Reelfoot, Ky.	17 and 18	915.3 to 915.5	General Map, Hickman-Reelfoot, Ky.	March 1968	1	60/320
Kentucky Point, Ky.	1 to 6, 6A, 7 to 9	886.2 to 887.9	General Map, New Madrid Bend, Mo.	February 1969	1	60/361
Keyes Point, Tenn.	26 to 29	788.3 to 789.0	General Map, Golddust - Keyes Point, Tenn.	March 1952	--	60/219
Randolph Point, Tenn.	1 to 4	748.6 to 749.2	General Map, Brandywine	June 1955	1	60/235
			Vicksburg District (1969)			
False Point, La.	F-1-69U through F-4-69U	441.5 to 442.1	Mississippi River - Potamology Studies Detailed Study Reaches - Milliken Bend - Vicksburg	July 1969**	3	--
Point Pleasant, Miss.-La.	D-1-69U and D-2-69U	415.3 to 415.4	Point Pleasant, Miss.-La., Revetment	1965†	44	--
Bougere Bend, La.	B-1-69U through B-4-69U	330.5 to 331.0	Bougere Bend Revetment	1968†	8	--

* 1962 mileage.
** Survey date.
† Basic map date.

Table 3

Summary of Soil Conditions at 1968 and 1969 Sites, Memphis and Vicksburg Districts

Revetment Site Location	No.	Miles Above Head of Passes	Date	Boring No.	Boring MAHP*	Boring Depth ft	Overburden Thickness ft	Zone A Thickness** ft	R Value	Predictions†
Memphis District, 1968 Borings										
New Madrid Bend, Mo.	213	882.8 to 880.9	Mar 1968	13	882.8	54	0	30	0.00	U
				14	882.5	56	2	32	0.06	U
				15	882.2	56	5	23	0.22	U
				16	882.0	60	0	31	0.00	U
				17	881.7	76	0	21	0.00	U
				18	881.4	61	0	11	0.00	S
				19	881.2	51	1	6	0.17	S
				20	881.0	51	0	7	0.00	S
				21	880.9	53	0	43	0.00	U
Blaker Towhead, Tenn.	214	843.8 to 842.6	Apr 1968	7AU	843.8	79	15	29	0.52	U
				8AU	843.6	79	61	0	--	S
				G	843.6	62	51	11+	--	NP
				F	843.5	66	34	32+	--	NP
				9AU	843.4	70	30	40+	0.75	U
				H	843.4	66	39	27+	--	NP
				A	843.3	67	29	38+	0.76	U
				10AU	843.2	75	20	52+	0.38	U
				B	843.1	64	22	42+	0.52	U
				11AU	843.1	60	8	28	0.29	U
				C	842.9	64	15	28	0.54	U
				12U	842.8	58	5	38	0.13	U
				D	842.8	61	3	34	0.09	U
				13U	842.7	58	2	43	0.05	U
				E	842.6	62	12	28	0.43	U
				14U	842.6	68	24	26	0.92	S
Ensley, Tenn.	215	720.4 to 720.1	Apr 1968	29	720.4	75	35	38	0.92	S
				30	720.2	67	34	24	1.42	S
				31	720.1	71	49	18	2.72	S
Vicksburg District, 1968 Borings										
Cracraft, Ark.	216	508.55 to 507.95	May 1967 Jan 1968	C-12-68	508.55	62	13	27	0.48	U
				C-7-68U	508.45	61	12	38	0.32	U
				C-9-68U	508.20	62	14	29	0.48	U
				C-11-68U	508.10	61	19	23	0.83	U
				C-10-68U	507.95	62	22	44+	0.50	U
Mayersville, Miss.	217	500.85 to 499.30	Sep and Oct 1967	M-1-67U	500.85	112	34	21	1.62	S
				M-2-67U	500.70	101	24	15	1.60	S
				M-3-67U	500.55	101	25	8	3.13	S
				M-4-67U	500.35	101	59	20	2.95	S
				M-5-67U	500.20	202	58	57	1.02	S
				M-6-67U	499.95	101	19	55	0.35	U
				M-7-67U	499.80	101	35	13	2.69	S
				M-8-67U	499.65	101	8	22	0.36	U
				M-9-67U	499.50	101	45	39	1.15	S
				M-10-67U	499.30	131	16	18	0.89	S
Baleshed, La.	218	485.30 to 484.20	Sep and Oct 1967	B-1-67	485.30	136	3	78	0.04	U
				B-2-67	485.10	91	2	67	0.03	U
				B-3-67	484.90	91	9	54	0.17	U
				B-4-67U	484.75	91	8	21	0.38	U
				B-5-67	484.55	91	0	38	0.00	U
				B-6-67	484.40	141	0	24	0.00	U
				B-7-67	484.20	91	3	60	0.05	U
Goldbottom, Miss.	219	390.20 to 386.80	Aug to Dec 1967	GB-16-67	390.20	91	2	72	0.03	U
				GB-17-67	390.00	146	4	71	0.06	U
				GB-18-67	389.80	91	10	44	0.23	U
				GB-19-67	389.60	91	14	60	0.23	U
				GB-20-67	389.40	91	0	74	0.00	U
				GB-21-67	389.20	91	0	74	0.00	U
				GB-22-67	389.00	91	0	91+	0.00	U
				GB-23-67	388.80	91	0	84	0.00	U
				GB-24-67	388.60	131	0	94	0.00	U
				GB-25-67	388.40	91	9	35	0.26	U

(Continued)

* Miles above Head of Passes (1962 mileage).

** Plus symbol indicates boring did not completely penetrate the zone A sand stratum.

† U = unstable; S = stable; NP = no prediction possible.

Table 3 (Concluded)

Revetment Site Location	No.	Miles Above Head of Passes	Date	Boring No.	Boring MAHP	Boring Depth ft	Overburden Thickness ft	Zone A Thickness ft	R Value	Predictions
Vicksburg District, 1968 Borings (Continued)										
Goldbottom, Miss. (Continued)	219	390.20 to 386.80	Aug to Dec 1967	GB-26-67U	388.20	96	14	19	0.74	S
				GB-27-67U	388.00	96	23	40	0.58	U
				GB-28-67U	387.80	96	27	6	4.50	S
				GB-29-67U	387.60	96	56	32	1.75	S
				GB-30-67U	387.40	101	63	10	6.30	S
				GB-31-67U	387.20	151	65	19	3.42	S
				GB-32-67U	387.00	96	43	35	1.23	S
				GB-33-67U	386.80	91	33	10	3.30	S
Memphis District, 1969 Borings										
Islands 2, 3, and 4, Ky.	235	941.9 to 942.7	Mar 1969	17	941.9	64	8	27	0.30	U
				18	942.1	54	8	9	0.89	S
				19	942.3	70	18	4	4.50	S
				20	942.5	55	12	6	2.00	S
				21	942.7	54	18	0	--	S
Hickman-Reelfoot, Ky.	236	915.3 to 915.5	Feb 1969	17	915.5	60	4	29	0.14	U
				18	915.3	54	3	7	0.43	S
Kentucky Point, Ky.	237	886.2 to 887.9	Dec 1968	1	886.2	75	43	33+	--	NP
				2	886.4	60	6	41	0.15	U
				3	886.6	62	3	34	0.09	U
				4	886.8	70	0	60	0.00	U
				5	887.1	63	0	54	0.00	U
				6	887.3	54	0	8	0.00	S
				6A	887.4	51	0	20	0.00	U
				7	887.5	73	0	68	0.00	U
				8	887.7	52	0	28	0.00	U
				9	887.9	55	20	3	6.67	S
Keyes Point, Tenn.	238	788.3 to 789.0		26	789.0	61	27	34+	0.79	U
				27	788.7	70	32	38+	0.84	U
				28	788.5	64	27	23	1.17	S
				29	788.3	71	18	43	0.42	U
Randolph Point, Tenn.	239	748.6 to 749.2	Feb 1968	1	748.6	59	18	26	0.69	U
				2	748.8	67	35	23	1.52	S
				3	749.0	67	36	31+	1.16	NP
				4	749.2	70	35	10	3.50	S
Vicksburg District, 1969 Borings										
False Point, La.	240	441.5 to 442.1	Aug and Sep 1969	F-1-69U	442.1	138	89	0	--	S
				F-2-69U	441.9	137	94	0	--	S
				F-3-69U	441.7	142	89	0	--	S
				F-4-69U	441.5	137	83	0	--	S
Point Pleasant, Miss.-La.	241	415.3 to 415.4	Aug 1969	D-1-69U	415.3	122	38	48	0.79	U
				D-2-69U	415.4	122	28	92	0.30	U
Bougere Bend, La.	242	330.5 to 331.0	Jul and Aug 1969	B-1-69U	331.0	128	106	22	4.82	S
				B-2-69U	330.8	127	100	27+	--	NP
				B-3-69U	330.6	162	77	13	5.92	S
				B-4-69U	330.5	122	77	11	7.00	S

Table 4

Summary of Soil Conditions at 1968 and 1969 Sites, New Orleans District

Revetment Site Location	No.	Miles Above Head of Passes	Boring Date	Boring No.	MAHP	Ground Surface El ft msl ①	Thalweg El ft msl ②	Limiting Depth D_L (① - ② + 50 ft) ft ③	Boring Depth ft ④	X (③ - ④) ft ⑤	Over-burden Thickness ft ⑥	Zone A Thickness ft ⑦	R Value ⑧	Pre-diction ⑨
						1968 Sites								
St. Gabriel, La.	220	203.4 to 201.6	Mar 68	R-203.0-UL	203.4	26	-87	163	152	11	116	36+	>0.85*	S
				R-202.35-L	202.8	27	-111	188	170	18	108	62+	>0.85*	S
				R-201.67-L	202.1	27	-71	148	131	17	116	15+	>0.85*	S
				R-201.16-L	201.6	27	-62	139	122	17	119	3+	>0.85*	S
Marchand, La.	221	180.7 to 179.6	Sep 68	R-180.6-L	180.7	25	-135	210	150	60	127	23+	>0.85*	S
				R-180.0-L	180.1	31	-99	180	123	57	32	91+	0.35+	U
				R-179.6-L	179.6	22	-89	161	122	39	50	72+	0.69+	U
Smoke Bend, La.	222	178.0	Dec 68	R-177.9-RU	178.0	18	-145	213	141	72	131	10+	>0.85*	S
Burnside, La.	223	171.4 to 168.0	Apr 68	R-171.4-UL	171.4	22	-72	144	148	--	60	49	>0.85	S
				R-170.2-L	170.2	24	-126	200	161	39	161	?	>0.85*	S
				R-169.7-L	169.7	24	-104	178	149	29	149	?	>0.85*	S
				R-169.3-L	169.3	28	-125	203	161	42	140	21+	>0.85*	S
				R-168.9-L	168.9	27	-115	192	160	32	160	?	>0.85*	S
				R-168.4-L	168.4	27	-82	159	154	5	154	?	>0.85*	S
				R-168.0-L	168.0	28	-70	148	151	--	60	61	>0.85	S
Romeville, La.	224	162.4	Dec 68	R-162.4-UL	162.4	24	-116	190	140	50	140	?	>0.85*	S
Rich Bend, La.	225	159.9 to 154.2	Feb 68	R-160.0-UR	159.9	26	-71	147	100	47	100	?	>0.85*	S
				R-159.3-R	159.4	23	-70	143	130	13	130	?	>0.85*	S
				R-158.8-R	158.9	24	-67	141	100	41	42	58+	0.72+	U
				R-158.3-R	158.3	22	-69	141	100	41	84	16+	>0.85*	S
				R-157.9-R	157.9	22	-58	130	104	26	98	6+	>0.85*	S
				R-157.4-R	157.3	27	-61	138	100	--	32	10	>0.85	S
				R-156.9-R	156.9	18	-116	184	144	40	112	32+	>0.85*	S
				R-156.4-UR	156.4	22	-121	193	171	22	89	78	>0.85	S
				R-155.9-R	155.9	20	-130	200	161	39	98	63+	>0.85*	S
				R-155.4-R	155.4	23	-115	188	147	41	85	62+	?	NP
				R-154.8-UR	154.8	28	-56	134	89	45	53	36+	?	NP
				R-154.2-R	154.2	20	-54	124	70	54	40	10	>0.85	S
Lucy, La.	226	136.6 to 134.2	Mar 68	R-136.6-R	136.6	19	-96	165	123	43	123	?	>0.85*	S
				R-135.7-UR	135.7	22	-85	157	168	--	168	0	>0.85	S
				R-135.2-R	135.2	19	-82	151	123	28	123	?	>0.85*	S
				R-134.6-R	134.6	19	-103	172	131	--	33	82	0.40	U
				R-134.2-R	134.2	26	-69	145	131	--	49	63	0.78	U

(Continued)

Note: Col	Notation	Explanation
5	--	Not applicable if zone A was fully penetrated or if total depth of boring exceeded D_L.
7	+	Zone A not fully penetrated.
	++	(③ - ⑥) used in computing R value; number in parentheses to left of col ⑦ indicates total depth of zone A in the boring.
8	*	Even if zone A were (⑤ + ⑦) thick.
9	U	Unstable with regard to flow failure.
	S	Stable with regard to flow failure.
	NP	No prediction possible.

Table 4 (Continued)

Revetment Site Location	No.	Miles Above Head of Passes	Boring Date	Boring No.	MAHP	Ground Surface El ft msl ①	Thalweg El ft msl ②	Limiting Depth D_L (① - ② + 50 ft) ft ③	Boring Depth ft ④	X (③ - ④) ft ⑤	Overburden Thickness ft ⑥	Zone A Thickness ft ⑦	R Value ⑧	Prediction ⑨
1968 Sites (Continued)														
Cutoff, La.	227	90.8 to 86.1	Feb 68	R-90.8-UR	90.8	13	-67	130	99	31	99	?	>0.85*	S
				R-90.1-R	90.1	11	-63	124	103	21	103	?	>0.85*	S
				R-89.4-R	89.4	10	-73	133	102	31	102	?	>0.85*	S
				R-88.9-R	88.9	12	-76	138	102	36	102	?	>0.85*	S
				R-88.5-R	88.5	11	-89	150	122	28	122	?	>0.85*	S
				R-87.9-R	87.9	5	-104	159	102	57	102	?	>0.85*	S
				R-87.4-R	87.4	9	-101	160	99	61	99	?	>0.85*	S
				R-86.8-R	86.8	10	-91	151	130	--	72	13	>0.85	S
				R-86.1-R	86.1	10	-101	161	102	59	22	80+	0.28+	U
Poydras, La.	228	86.5 to 78.8	Nov and Dec 68	R-86.5-L	86.5	6	-84	140	150	--	86	35	>0.85	S
				R-86.1-L	86.1	5	-101	156	151	5	151	?	>0.85*	S
				R-84.4-L	84.4	5	-78	133	152	--	60	(92)73++	0.82	U
				R-83.8-L	83.8	6	-74	130	140	--	140	0	>0.85	S
				R-83.3-LU	83.3	5	-67	122	139	--	139	0	>0.85	S
				R-82.8-L	82.8	7	-68	125	150	--	30	75	0.40	U
				R-82.5-L	82.5	11	-85	146	140	--	30	76	0.40	U
				R-82.2-L	82.2	6	-98	154	140	--	93	27	>0.85	S
				R-81.9-L	81.9	8	-119	177	140	--	83	25	>0.85	S
				R-81.4-L	81.4	7	-112	169	140	--	80	26	>0.85	S
				R-80.4-LU	80.4	6	-126	182	139	--	80	22	>0.85	S
				R-79.9-L	79.9	4	-88	142	140	2	33	10	>0.85	S
				R-79.4-L	79.4	5	-66	121	140	--	78	15	>0.85	S
				R-78.8-L	78.8	6	-82	138	150	--	78	10	>0.85	S
Linwood, La.	229	71.5 to 69.7	Nov 68	R-71.5-L	71.5	6	-72	128	99	29	99	?	>0.85*	S
				R-71.0-LU	71.0	7	-81	138	103	35	103	?	>0.85*	S
				R-70.4-L	70.4	5	-98	153	99	54	99	?	>0.85*	S
				R-69.7-L	69.7	4	-72	126	100	26	41	59+	0.69	U
Monsecour, La.	230	62.0 to 60.7	Nov 68	R-62.0-L	62.0	1	-80	131	109	22	109	?	>0.85*	S
				R-60.7-L	60.7	5	-115	170	139	31	138	1+	>0.85*	S
Myrtle Grove, La.	231	58.8	Dec 68	R-58.8-RU	58.8	6	-107	163	151	12	151	?	>0.85*	S
Junior, La.	232	54.5	Dec 68	R-54.5-RU	54.5	3	-112	165	130	25	130	?	>0.85*	S
Gravolet, La.	233	51.7	Dec 68	R-51.7-LU	51.7	3	-87	140	130	10	130	?	>0.85*	S
Tropical Bend, La.	234	32.4 to 28.5	Oct 68	R-32.4-UR	32.4	3	-147	200	180	--	87	53	>0.85	S
				R-32.0-R	32.0	3	-101	154	132	22	70	62+	?	NP
				R-30.9-UR	30.9	4	-132	186	161	--	74	39	>0.85	S
				R-30.3-R	30.3	5	-142	197	173	24	173	?	>0.85*	S
				R-28.55-R	28.5	4	-82	136	120	16	120	?	>0.85*	S
1969 Sites														
Palmetto Bend, Miss.	243	326.8 to 325.4	Sep 69	R-324.15-L	326.8	39	-35	124	99	25	58	41+	>0.85*	S
				R-323.5-L	326.1	49	-30	129	99	--	60	31	>0.85	S
				R-322.8-L	325.4	48	-45	143	99	44	65	34+	?	NP

(Continued)

Table 4 (Continued)

Revetment Site Location	No.	Miles Above Head of Passes	Boring Date	Boring No.	MAHP	Ground Surface El ft msl ①	Thalweg El ft msl ②	Limiting Depth D_L (① - ② + 50 ft) ft ③	Boring Depth ft ④	X (③ - ④) ft ⑤	Over-burden Thickness ft ⑥	Zone A Thickness ft ⑦	R Value ⑧	Pre-diction ⑨
1969 Sites (Continued)														
Hog Point, La.	244	298.0 to 293.7	Aug 69	R-296.3-RU	298.0	49	-60	159	151	8	52	99+	0.52	U
				R-293.7-R	295.4	51	-30	131	109	22	30	79+	0.38	U
				R-292.9-R	294.6	52	-30	132	111	21	55	56+	?	NP
				R-291.9-R	293.7	54	-20	124	111	13	40	71+	0.56	U
Springfield Bend, La.	245	240.9 to 240.0	Aug 69	R-240.1-L	240.9	40	-60	150	149	1	38	111+	0.34	U
				R-239.1-L	240.0	41	-110	201	154	47	20	134+	0.15	U
Allendale, La.	246	237.3 to 235.6	Jul 69	R-236.5-R	237.3	30	-50	130	121	9	90	31+	>0.85*	S
				R-236.1-RU	236.9	25	-40	115	131	--	87	44+	>0.85	S
				R-235.4-R	236.2	30	-50	130	139	--	90	49+	>0.85	S
				R-234.9-R	235.6	30	-50	130	149	--	90	59+	>0.85	S
Port Allen, La.	247	233.7 to 227.7	Apr to Jun 69	R-232.9-R	233.7	34	-80	164	137	27	100	37+	>0.85*	S
				R-232.3-R	233.2	37	-60	147	149	--	118	19	>0.85	S
				R-231.7-R	232.6	32	-50	132	139	--	111	28+	>0.85	S
				R-231.0-R	231.8	33	-50	133	139	--	102	37+	>0.85	S
				R-230.3-R	231.2	36	-50	136	139	--	102	37+	>0.85	S
				R-229.1-R	229.9	36	-70	156	139	17	139	?	>0.85*	S
				R-228.0-R	228.9	30	-60	140	139	--	115	13	>0.85	S
				R-227.3-R	228.2	40	-50	140	141	--	46	94	0.49	U
				R-226.8-R	227.7	34	-60	144	142	--	32	108	0.30	U
Manchac Bend, La.	248	219.9 to 211.8	Apr and Jul 69	R-219.2-L	219.9	22	-90	162	139	23	75	64+	>0.85*	S
				R-218.8-L	219.5	28	-60	138	140	--	59	(81+)79++	0.75	U
				R-218.2-L	218.9	29	-90	169	140	29	45	95+	0.47	U
				R-217.6-L	218.3	32	-100	182	141	41	75	66+	?	NP
				R-217.1-L	217.8	29	-100	179	150	29	150	?	>0.85*	S
				R-216.4-LU	217.1	27	-80	157	152	--	110	36	>0.85	S
				R-215.8-L	216.5	27	-60	137	148	--	107	41+	>0.85	S
				R-215.2-L	215.9	39	-80	169	149	20	118	31+	>0.85*	S
				R-214.8-LU	215.5	28	-90	168	162	6	111	51+	>0.85*	S
				R-214.3-L	214.9	43	-120	213	174	--	127	29	>0.85	S
				R-213.7-L	214.3	27	-100	177	159	--	103	37	>0.85	S
				R-213.2-L	213.8	29	-90	169	149	20	114	35+	>0.85*	S
				R-212.6-LU	213.2	32	-70	152	152	--	120	32+	>0.85	S
				R-211.9-L	212.5	24	-60	134	149	--	110	39+	>0.85	S
				R-211.2-L	211.8	21	-60	131	139	--	47	(92+)84++	0.56	U
Philadelphia Point, La.	249	183.9 to 183.5	Apr 69	R-183.8-R	183.9	29	-70	149	119	30	38	81+	0.47	U
				R-183.3-R	183.5	24	-50	124	120	4	40	80+	0.50	U
Marchand, La.	250	181.5	Sep 69	R-181.3-UL	181.5	29	-90	169	125	44	125	?	>0.85*	S
Smoke Bend, La.	251	179.1 to 175.4	Mar 69	R-179.0-R	179.1	23	-80	153	179	--	88	91+	>0.85	S
				R-178.5-R	178.6	26	-140	216	146	70	131	15+	>0.85*	S
				R-177.2-R	177.2	30	-90	170	130	40	130	?	>0.85*	S
				R-176.6-R	176.6	28	-80	158	130	28	130	?	>0.85*	S
				R-176.1-R	176.2	28	-70	148	133	15	60	73+	0.82	U
				R-175.4-R	175.4	23	-50	123	131	--	45	(86+)78++	0.58	U

(Continued)

Table 4 (Continued)

Revetment Site Location	No.	Miles Above Head of Passes	Boring Date	Boring No.	MAHP	Ground Surface El ft msl ①	Thalweg El ft msl ②	Limiting Depth D_L (① - ② + 50 ft) ft ③	Boring Depth ft ④	X (③ - ④) ft ⑤	Over-burden Thickness ft ⑥	Zone A Thickness ft ⑦	R Value ⑧	Pre-diction ⑨
1969 Sites (Continued)														
Aben, La.	252	174.5 to 170.9	Nov 69	R-174.5-R	174.5	18	-70	138	150	--	67	20	>0.85	S
			Dec 69	R-173.8-R	173.8	24	-70	144	160	--	60	49	>0.85	S
				R-173.3-R	173.3	26	-70	146	170	--	123	42	>0.85	S
				R-172.9-R	172.9	21	-140	211	191	20	191	?	>0.85*	S
				R-171.9-R	171.9	28	-90	168	181	--	137	44+	>0.85	S
				R-170.9-R	170.9	22	-120	192	181	--	118	28	>0.85	S
St. Elmo, La.	253	175.8 to 173.3	Feb 69	R-175.8-L	175.8	30	-60	140	109	31	50	59+	0.85	U
				R-175.2-L	175.2	29	-60	139	110	19	100	10+	>0.85*	S
				R-174.6-L	174.6	34	-70	154	109	45	69	40+	?	NP
				R-173.3-L	173.3	23	-70	143	109	34	109	?	>0.85*	S
Romeville, La.	254	163.0 to 159.2	Jan 69	R-163.0-L	163.0	18	-90	158	139	19	115	24+	>0.85*	S
				R-160.9-L	160.9	28	-105	183	160	23	98	62+	>0.85*	S
				R-160.4-L	160.4	18	-85	153	140	13	140	?	>0.85*	S
				R-159.8-LU	159.8	26	-60	136	139	--	139	0	>0.85	S
				R-159.2-L	159.2	23	-70	143	139	4	139	?	>0.85*	S
Belmont, La.	255	155.1 to 149.2	Nov 69	R-155.1-L	155.1	26	-80	156	129	27	43	86+	0.50	U
				R-154.6-L	154.6	24	-50	124	129	--	58	(71+)66++	0.88	S
				R-154.0-L	154.0	25	-45	120	129	--	40	(89+)80++	0.50	U
				R-153.5-L	153.5	24	-50	124	129	--	68	61+	>0.85	S
				R-153.1-L	153.1	24	-85	159	139	20	95	44+	>0.85*	S
				R-151.85-LU	151.8	25	-115	190	162	28	130	32+	>0.85*	S
				R-151.3-L	151.3	27	-90	167	149	18	63	86+	0.73	U
				R-150.8-L	150.8	25	-80	155	149	6	34	115+	0.30	U
				R-149.2-L	149.2	15	-155	220	200	--	80	95	0.84	U
Vacherie, La.	256	150.3 to 146.6	Mar 69	R-150.3-R	150.3	20	-80	150	180	--	180	?	>0.85	S
				R-149.4-RU	149.4	23	-160	233	180	53	180	?	>0.85*	S
				R-148.6-R	148.6	21	-90	161	181	--	144	26	>0.85	S
				R-147.8-R	147.8	24	-80	154	100	54	100	?	>0.85*	S
				R-147.3-RU	147.3	21	-75	146	102	44	102	?	>0.85*	S
				R-146.6-R	146.6	22	-70	142	100	42	100	?	>0.85*	S
Angelina, La.	257	147.6 to 142.5	Oct 69	R-147.6-L	147.6	20	-75	145	124	21	51	73+	0.70	U
				R-147.1-L	147.1	9	-70	129	119	10	45	74+	0.61	U
				R-146.6-L	146.6	12	-70	132	129	3	70	59+	>0.85*	S
				R-145.9-L	145.9	15	-75	140	129	11	115	14+	>0.85*	S
				R-145.3-L	145.3	19	-90	159	139	20	90	49+	>0.85*	S
				R-144.2-LU	144.2	24	-80	154	150	4	139	11+	>0.85*	S
				R-143.2-L	143.2	17	-160	227	200	27	158	38	>0.85	S
				R-142.5-L	142.5	15	-120	185	200	--	62	100	0.62	U
Willow Bend, La.	258	143.2 to 139.2	Apr 69	R-143.2-R	143.2	18	-160	228	199	--	100	75	>0.85	S
				R-142.6-R	142.6	18	-120	188	199	--	90	70	>0.85	S
				R-142.0-RU	142.0	24	-130	204	200	4	143	36	>0.85	S
				R-141.4-R	141.4	21	-85	156	160	--	150	10+	>0.85	S
				R-140.8-R	140.8	16	-90	156	169	--	110	59+	>0.85	S
				R-140.1-R	140.1	23	-75	148	159	--	75	84+	>0.85	S
				R-139.2-R	139.2	20	-115	185	160	--	60	79	0.76	U

(Continued)

Table 4 (Continued)

Revetment Site Location	No.	Miles Above Head of Passes	Boring Date	Boring No.	MAHP	Ground Surface El ft msl ①	Thalweg El ft msl ②	Limiting Depth D_L (① - ② + 50 ft) ft ③	Boring Depth ft ④	X (③ - ④) ft ⑤	Over-burden Thickness ft ⑥	Zone A Thickness ft ⑦	R Value ⑧	Pre-diction ⑨
1969 Sites (Continued)														
Reserve, La.	259	140.1 to 136.8	Feb 69	R-140.1-L	140.1	24	-75	149	139	10	88	51+	>0.85*	S
				R-139.2-LU	139.2	25	-115	190	141	49	107	34+	>0.85*	S
				R-137.4-LU	137.4	18	-90	158	118	40	117	1+	>0.85*	S
				R-137.4-L	137.4	20	-90	160	110	50	110	?	>0.85*	S
				R-136.8-L	136.8	23	-75	148	110	38	110	?	>0.85*	S
Bonnet Carrè, La.	260	134.4 to 129.8	Oct to Nov 69	R-134.4-L	134.4	8	-75	133	121	12	58	35	>0.85	S
				R-133.8-L	133.8	9	-80	139	120	19	120	?	>0.85*	S
				R-133.2-L	133.2	14	-80	144	119	25	119	?	>0.85*	S
				R-132.75-LU	132.8	18	-70	138	123	15	123	?	>0.85*	S
				R-132.37-L	132.4	20	-60	130	120	10	120	?	>0.85*	S
				R-131.8-L	131.8	19	-60	129	120	9	120	?	>0.85*	S
				R-131.2-L	131.2	19	-60	129	130	--	130	0	>0.85	S
				R-130.7-L	130.7	20	-120	190	159	31	110	12	>0.85	S
				R-129.8-L	129.8	20	-110	180	159	--	60	84	0.71	U
Waterford, La.	261	130.7 to 125.2	Nov to Dec 69	R-130.7-R	130.7	12	-120	182	159	23	142	17+	>0.85*	S
				R-130.2-R	130.2	13	-120	183	189	--	60	37	>0.85	S
				R-129.2-R	129.2	21	-105	176	150	26	135	15+	>0.85*	S
				R-128.5-RU	128.5	15	-100	165	26	139	26	?	?	NP
				R-127.85-R	127.8	15	-90	155	139	16	139	?	>0.85*	S
				R-127.3-R	127.3	22	-105	177	139	38	139	?	>0.85*	S
				R-126.7-R	126.7	22	-75	147	142	5	95	47+	>0.85*	S
				R-126.0-R	126.0	21	-95	166	139	--	77	35	>0.85	S
				R-125.2-R	125.2	14	-90	154	139	--	25	67	0.37	U
Luling, La.	262	123.4 to 115.6	Feb to Apr 69	R-123.4-R	123.4	17	-125	192	148	44	141	7+	>0.85*	S
				R-122.7-RU	122.7	21	-130	201	151	50	151	?	>0.85*	S
				R-122.05-R	122.0	20	-100	170	151	19	151	?	>0.85*	S
				R-121.3-R	121.3	20	-90	160	152	--	30	15	>0.85	S
				R-116.3-R	116.3	15	-80	145	100	45	100	?	>0.85*	S
				R-115.6-R	115.6	18	-75	143	100	--	43	27	>0.85	S
Avondale, La.	263	109.8 to 105.0	Apr 69	R-109.8-R	109.8	10	-100	160	132	28	132	?	>0.85*	S
				R-109.4-RU	109.4	10	-135	195	137	58	137	?	>0.85*	S
				R-105.5-R	105.5	11	-95	156	130	26	68	62+	?	NP
				R-105.0-R	105.0	18	-100	168	120	--	80	32	>0.85	S
Greenville Bend, La.	264	102.0 to 98.4	Sep to Oct 69	R-102.0-RU	102.0	16	-90	156	130	26	115	15+	>0.85*	S
				R-98.4-UR	98.4	9	-110	169	130	39	130	?	>0.85*	S
Poydras, La.	265	85.5	Jan 69	R-85.5-LU	85.5	3	-140	193	127	--	72	12	>0.85	S
Scarsdale, La.	266	77.3 to 72.9	Aug 69	R-77.3-L	77.3	12	-125	187	159	--	50	20	>0.85	S
				R-76.6-L	76.6	6	-90	146	139	--	48	23	>0.85	S
				R-76.2-L	76.2	8	-90	148	139	--	80	40	>0.85	S
				R-75.6-L	75.6	6	-110	166	139	--	26	21	>0.85	S
				R-75.3-L	75.3	5	-95	150	139	--	78	20	>0.85	S
				R-75.0-L	75.0	7	-90	147	139	8	139	?	>0.85*	S
				R-74.3-L	74.3	6	-100	156	139	17	83	16	>0.85	S
				R-73.5-L	73.5	6	-75	131	140	--	45	60	0.75	U
				R-72.9-L	72.9	7	-115	172	149	--	45	61	0.74	U

(Continued)

Table 4 (Concluded)

Revetment Site Location	No.	Miles Above Head of Passes	Boring Date	Boring No.	MAHP	Ground Surface El ft msl ①	Thalweg El ft msl ②	Limiting Depth D_L (① - ② + 50 ft) ft ③	Boring Depth ft ④	X (③ - ④) ft ⑤	Overburden Thickness ft ⑥	Zone A Thickness ft ⑦	R Value ⑧	Prediction ⑨
1969 Sites (Continued)														
Oak Point, La.	267	73.5 to 71.3	Jan 69	R-73.5-R	73.5	5	-75	130	139	--	139	0	>0.85	S
				R-73.0-R	73.0	9	-120	179	142	37	142	?	>0.85*	S
				R-72.5-R	72.5	7	-110	167	139	--	85	18	>0.85	S
				R-72.0-R	72.0	8	-100	158	139	19	139	?	>0.85*	S
				R-71.3-R	71.3	6	-75	131	139	--	47	63	0.75	U
Belair, La.	268	66.7 to 62.6	Sep 69	R-66.7-L	66.7	6	-90	146	141	5	110	31+	>0.85*	S
				R-66.2-L	66.2	8	-75	133	130	3	113	17+	>0.85*	S
				R-65.6-L	65.6	6	-110	166	141	--	113	16	>0.85	S
				R-62.6-L	62.6	6	-110	166	121	--	89	13	>0.85	S
Alliance, La.	269	65.6 to 60.9	Sep 69	R-65.6-R	65.6	4	-110	164	139	--	69	36	>0.85	S
				R-64.5-R	64.5	4	-85	139	129	--	50	46	>0.85	S
				R-63.5-R	63.5	3	-75	128	129	--	80	30	>0.85	S
				R-62.9-R	62.9	4	-115	169	139	30	133	6+	>0.85*	S
				R-61.6-R	61.6	3	-90	143	129	14	129	?	>0.85*	S
				R-60.9-R	60.9	4	-115	169	141	28	67	74+	?	NP
Monsecour, La.	270	60.3	Jul 69	R-60.3-LU	60.3	6	-115	171	152	19	143	9+	>0.85*	S
Myrtle Grove, La.	271	60.4 to 57.7	Jan 69	R-60.4-R	60.4	4	-115	169	150	19	128	22+	>0.85*	S
				R-59.7-R	59.7	4	-195	249	221	28	159	62+	>0.85*	S
				R-57.7-R	57.7	6	-75	131	132	--	132	0	>0.85	S
Harlem, La.	272	58.0	Oct 69	R-58.0-LU	58.0	4	-85	139	150	--	150	0	>0.85	S
Junior, La.	273	55.9 to 53.3	Jan 69	R-55.9-R	55.9	5	-80	135	130	5	130	?	>0.85*	S
				R-53.3-R	53.3	5	-110	165	129	36	129	?	>0.85*	S
Gravolet, La.	274	52.6 to 49.7	Jul 69	R-52.6-L	52.6	4	-85	139	130	9	107	20	>0.85	S
				R-50.5-L	50.5	6	-110	166	130	36	130	?	>0.85*	S
				R-49.7-L	49.7	5	-80	135	131	4	131	?	>0.85*	S
Diamond, La.	275	50.9 to 46.7	Oct 69	R-50.9-R	50.9	6	-105	161	129	32	25	104+	0.24	U
				R-50.2-R	50.2	2	-95	147	119	28	72	47+	>0.85*	S
				R-49.7-R	49.7	3	-80	133	118	15	118	?	>0.85*	S
				R-49.2-R	49.2	2	-75	127	119	8	117	2+	>0.85*	S
				R-48.6-R	48.6	2	-90	142	119	--	65	46	>0.85	S
				R-48.0-R	48.0	4	-90	144	119	25	35	62	0.56	U
				R-46.7-R	46.7	2	-90	142	119	23	30	89+	0.34	U
Bohemia, La.	276	47.0	Oct 69	R-46.95-LU	47.0	4	-80	134	126	8	126	?	>0.85*	S
Point Michel, La.	277	43.9	Oct 69	R-43.9-RU	43.9	3	-160	213	187	26	180	7+	>0.85*	S
Nestor, La.	278	44.2 to 41.8	Dec 69	R-44.2-L	44.2	5	-140	195	150	--	86	35	>0.85	S
				R-43.7-L	43.7	5	-145	200	190	--	69	56	>0.85	S
				R-43.2-L	43.2	4	-100	154	150	4	150	?	>0.85*	S
				R-42.5-L	42.5	6	-105	161	130	31	130	?	>0.85*	S
				R-41.8-LU	41.8	6	-100	156	127	29	127	?	>0.85*	S
Fort Jackson, La.	279	23.0	Nov 69	R-23.05-RU	23.0	-6	-100	144	114	30	50	66	0.76	U
Venice, La.	280	16.9 to 11.5	Nov 69	R-16.9-RU	16.9	-4	-85	131	115	16	115	?	>0.85*	S
				R-11.5-RU	11.5	-3	-65	112	119	--	119	0	>0.85	S

Table 5

Summary of Predictions, 1968 and 1969 Borings in New Orleans District

Revetment Site Location	No.	Miles Above Head of Passes (1962 mileage)	No. of Borings	Predictions* Stable (A)	Stable (B)	Stable (C)	Unstable	No Prediction Possible (D)
			1968 Borings					
St. Gabriel, La.	220	203.4 to 201.6	4	--	--	4	--	--
Marchand, La.	221	180.7 to 179.6	3	--	--	1	2	--
Smoke Bend, La.	222	178.0	1	--	--	1	--	--
Burnside, La.	223	171.4 to 168.0	7	4	2	1	--	--
Romeville, La.	224	162.4	1	--	--	1	--	--
Rich Bend, La.	225	159.9 to 154.2	12	2	3	4	1	2
Lucy, La.	226	136.6 to 134.2	5	3	--	--	2	--
Cutoff, La.	227	90.8 to 86.1	9	7	1	--	1	--
Poydras, La.	228	86.5 to 78.8	14	3	8	--	3	--
Linwood, La.	229	71.5 to 69.7	4	3	--	--	1	--
Monsecour, La.	230	62.0 to 60.7	2	1	1	--	--	--
Myrtle Grove, La.	231	58.8	1	1	--	--	--	--
Junior, La.	232	54.5	1	1	--	--	--	--
Gravolet, La.	233	51.7	1	1	--	--	--	--
Tropical Bend, La.	234	32.4 to 28.5	5	2	2	--	--	1
		Total	70	28	17	12	10	3
			1969 Borings					
Palmetto Bend, La.	243	326.8 to 325.4	3	--	1	--	--	2
Hog Point, La.	244	298.0 to 293.7	4	--	--	--	3	1
Springfield Bend, La.	245	240.9 to 240.0	2	--	--	--	2	--
Allendale, La.	246	237.3 to 235.6	4	--	--	4	--	--
Port Allen, La.	247	233.7 to 227.7	9	1	2	4	2	--
Manchac Bend, La.	248	219.9 to 211.8	15	1	3	7	3	1
Philadelphia Point, La.	249	183.9 to 183.5	2	--	--	--	2	--
Marchand, La.	250	181.5	1	1	--	--	--	--
Smoke Bend, La.	251	179.1 to 175.4	6	2	--	2	2	--
Aben, La.	252	174.5 to 170.9	6	1	4	1	--	--
St. Elmo, La.	253	175.8 to 173.3	4	1	--	1	1	1
Romeville, La.	254	163.0 to 159.2	5	3	--	2	--	--
Belmont, La.	255	155.1 to 149.2	9	--	--	3	6	--
Vacherie, La.	256	150.3 to 146.6	6	5	1	--	--	--
Angelina, La.	257	147.6 to 142.5	8	--	1	4	3	--
Willow Bend, La.	258	143.2 to 139.2	7	--	3	3	1	--
Reserve, La.	259	140.1 to 136.8	5	2	--	3	--	--
Bonnet Carrè, La.	260	134.4 to 129.8	9	6	2	--	1	--
Waterford, La.	261	130.7 to 125.2	9	2	2	3	1	1
Luling, La.	262	123.4 to 115.6	6	3	2	1	--	--
Avondale, La.	263	109.8 to 105.0	4	2	1	--	--	1
Greenville Bend, La.	264	102.0 to 98.4	2	1	--	1	--	--
Poydras, La.	265	85.5	1	--	1	--	--	--
Scarsdale, La.	266	77.3 to 72.9	9	1	6	--	2	--
Oak Point, La.	267	73.5 to 71.3	5	3	1	--	1	--
Belair, La.	268	66.7 to 62.6	4	--	2	--	2	--
Alliance, La.	269	65.6 to 60.9	6	1	3	1	--	1
Monsecour, La.	270	60.3	1	--	--	1	--	--
Myrtle Grove, La.	271	60.4 to 57.7	3	1	--	2	--	--
Harlem, La.	272	58.0	1	1	--	--	--	--
Junior, La.	273	55.9 to 53.3	2	2	--	--	--	--
Gravolet, La.	274	52.6 to 49.7	3	2	1	--	--	--
Diamond, La.	275	50.9 to 46.7	7	1	1	2	3	--
Bohemia, La.	276	47.0	1	1	--	--	--	--
Point Michel, La.	277	43.9	1	--	--	1	--	--
Nestor, La.	278	44.2 to 41.8	5	3	2	--	--	--
Fort Jackson, La.	279	23.0	1	--	--	--	1	--
Venice, La.	280	16.9 to 11.5	2	2	--	--	--	--
		Total	178	49	39	46	36	8

* (A) No sand A encountered in boring.
(B) Sand A fully penetrated, R value >0.85.
(C) Sand A not fully penetrated, but R value >0.85 based on D_L concept.
(D) Sand A not fully penetrated and boring not carried to D_L; R value could be either greater than or less than 0.85.

Table 6

Summary of Performance Data at Sites Previously Studied

No.	Revetment Site Location	Potamology Report in Which Borings Are Evaluated	Predicted Performance with Regard to Flow Failure	Estimated Maximum River Stage Referenced to Bank-Full Conditions (ft) Observed Performance (Letter Symbols) 54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72
				MEMPHIS DISTRICT																		
	Pritchard, Mo., 947 MAHP			+7	+1	+2	0	-4	-3	+10	+6	+8	+4	+3	+3	+1	-1	+3			
14	Sta 264+00 to 284+00	12-4	Stable	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N			
	Campbell Point, Ky., 943 MAHP			+5	-1	0	-1	-4	+3	+10	+6	+8	+2	+2	+3	+1	-1	+2			
111	Sta 127+00 to 137+00	12-11	Stable							-	-	-	-	-	-	-	-	-			
15	Sta 147+00 to 196+00	12-4	Stable	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N			
15	Sta 205+00	12-4	No prediction	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N			
111	Sta 215+00 to 225+00	12-11	Stable							-	-	-	-	-	-	-	-	-			
	Islands 2, 3, and 4, Ky., 940 MAHP					+2	0	-4	+3	+10	+6	+8	+4	+3	+3	+1	-1	+2			
47	Sta 64+00	12-7	Unstable			N	N	N	N	N	N	N	N	N	N	N	N	N			
47	Sta 74+00 to 93+75		Stable			N	N	N	N	N	N	N	N	N	N	N	N	N			
47	Sta 104+25		No prediction			N	N	N	N	N	N	N	N	N	N	N	N	N			
47	Sta 114+00 to 173+50		Stable			N	N	N	N	N	N	N	N	N	N	N	N	N			
47	Sta 183+00 to 193+50		Unstable			N	O	N	N	N	N	N	N	N	N	N	N	N			
47	Sta 203+25 to 214+00		No prediction			N	N	N	N	N	N	N	N	N	N	N	N	N			
	Wolf Island, Ky., 934 MAHP							-4	+3	+10	+6	+7	+4	+3	+3	+1	-1	+2			
81	Sta 120+00	12-9	Stable					-	-	-	-	-	-	-	-	-	-	-			
81	Sta 130+00		Unstable					-	-	-	-	-	-	-	-	-	-	-			
81	Sta 140+00 to 160+00		Unstable					R	N	N	N	N	N	N	N	N	N	N			
81	Sta 172+00		Stable					R	N	N	N	N	N	N	N	N	N	N			
81	Sta 182+00 and 192+50		Unstable					R	N	N	N	N	N	N	N	N	N	N			
81	Sta 203+50 to 224+00		Stable					-	-	-	-	-	-	-	-	R	N	N			
81	Sta 234+00		Unstable					-	-	-	-	-	-	-	-	R	N	N			
81	Sta 244+00		No prediction					-	-	-	-	-	-	-	-	R	N	N			
81	Sta 254+00		Unstable					-	-	-	-	-	-	-	-	-	R	N			
81	Sta 264+00 and 273+50		Stable					-	-	-	-	-	-	-	-	-	R	N			
81	Sta 284+00 and 294+00		Unstable					-	-	-	-	-	-	-	-	-	-	-			
	Williams, Ky., 927 MAHP									+10	+6	+8	+4	+3	+3	+1	-1	+2			
112	Sta 100+00 to 110+00	12-11	Stable							-	-	-	-	-	-	-	-	-			
112	Sta 120+50 to 130+50		Stable							R	N	N	N	N	N	N	N	N			
	Hickman-Reelfoot, Ky., 919 MAHP									+10	+6	+7	+4	+2	+3	+1	-2	+2			
113	Sta 285+00		Stable							-	-	-	-	-	-	-	-	R			
113	Sta 295+00		No prediction							-	-	-	-	-	-	-	-	R			
113	Sta 305+00 and 315+00		Stable							-	-	-	-	-	-	-	-	R			

(Continued)

Note: Site locations are listed in order of miles above Head of Passes (MAHP) from upstream to downstream. Predictions for all sites based on modified classification criteria.

N = No failure reported.
- = No revetment built.
R = Revetment built.
F = Flow failure occurred as predicted.
(F) = Flow failure occurred at location predicted to be stable.
F = Flow failure occurred; prediction not possible since zone A sand was not sufficiently penetrated.
O = Failure other than flow type occurred.
RO = Revetment built and failure other than flow type occurred in the same year.

Table 6 (Continued)

Revetment Site No.	Location	Potamology Report in Which Borings Are Evaluated	Predicted Performance with Regard to Flow Failure	Estimated Maximum River Stage Referenced to Bank-Full Conditions (ft) Observed Performance (Letter Symbols) 54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72
				MEMPHIS DISTRICT (Continued)																		
	Island No. 8, Ky., 914 MAHP						+1	-1	-4	+3	+10	+6	+7	+4	+3	+3	+1	-2	+2			
48	Sta 25+75 and 36+00	12-7	Unstable				N	N	N	N	N	N	N	N	N	N	N	N	N			
48	Sta 46+00		No prediction				N	N	N	N	N	N	N	N	N	N	N	N	N			
48	Sta 56+00		Stable				N	N	N	N	N	N	N	N	N	N	N	N	N			
48	Sta 66+00 to 86+00		Unstable				N	N	N	N	N	N	O	N	N	N	N	N	N			
189	Sta 100+00	12-19	Stable														-	-	-			
189	Sta 110+00 to 120+00		Unstable														-	-	-			
	Slough Landing Neck, Tenn., 895 MAHP							-1	-4	+3	+10	+6	+7	+3	+2	+4	+2	-2	+1			
64	Sta 312+00 to 332+00	12-8	Stable					N	N	N	N	N	N	N	N	N	N	N	N			
64	Sta 340+75 to 351+75		Unstable					N	N	N	N	N	N	N	N	N	N	N	N			
64	Sta 362+50		Stable					N	N	N	N	N	N	N	N	N	N	N	N			
64	Sta 372+00		Unstable					N	N	N	N	N	N	N	N	N	N	N	N			
64	Sta 381+25 to 392+00		Stable					N	N	N	N	N	N	N	N	N	N	N	N			
64	Sta 402+00		Unstable					-	R	N	N	N	N	N	N	N	N	N	N			
64	Sta 412+75		Stable					-	R	N	N	N	N	N	N	N	N	N	N			
64	Sta 422+50		Stable					-	-	-	-	-	-	-	-	-	-	-	-			
98	Sta 432+50	12-10	Unstable					-	-	-	-	-	-	-	-	-	-	-	-			
98	Sta 442+50		Stable					-	-	-	-	-	-	-	-	-	-	-	-			
	La Forge, Mo., 891 MAHP					-6	+1	-1	-4	+3	+10	+5	+7	+3	+2	+4	+2	-2	+1			
99	Sta 105+00 to 125+00	12-10	Stable							-	-	-	-	-	R	N	N	N	N			
29	Sta 146+00	12-6	Unstable			N	N	N	N	N	N	N	N	N	N	N	N	N	N			
29	Sta 156+00 to 176+00		Stable			N	N	N	N	N	N	N	N	N	N	N	N	N	N			
29	Sta 186+00		Unstable			N	N	N	N	N	N	N	N	N	N	N	N	N	N			
29	Sta 195+00 to 217+50		Stable			N	N	N	N	N	N	N	N	N	N	N	N	N	N			
29	Sta 227+50		Unstable			N	N	N	N	N	N	N	N	N	N	N	N	N	N			
29	Sta 238+00 to 257+50		Stable			N	N	N	N	N	N	N	N	N	N	N	N	N	N			
	New Madrid Bend, Mo., 882 MAHP																	-2	+1			
213	Sta 435+00 to 475+00	12-21	Unstable															-	-			
213	Sta 485+00 to 505+00		Stable															-	-			
213	Sta 512+00		Unstable															-	-			
	Toney's Towhead, Tenn., 880 MAHP			0	-6	+1	-1	-4	+2	+9	+5	+6	+3	+2	+4	+2	-2	+1				
1	Sta 236+00	12-3	Unstable	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N				
1	Sta 245+00		Stable	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N				
1	Sta 255+00		No prediction	N	N	N	N	N	F	N	N	N	N	N	N	N	N	N				
1	Sta 265+00 to 274+25		Unstable	N	N	N	N	N	N	F	N	N	N	N	N	N	N	N				
	Merriwether-Cherokee Bend, Tenn., 870 MAHP			0	-6	0	-1	-4	+2	+9	+5	+6	+3	+2	+4	+2	-3	+1				
175	Sta 78+00	12-18	Unstable												N	N	N	N				
175	Sta 88+00 and 98+50		Stable												N	N	N	N				
2	Sta 326+00	12-3	Stable	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-				
2	Sta 336+00		Stable	-	-	-	-	R	N	N	N	N	N	N	N	N	N	N				
49	Sta 344+00	12-7	Unstable			-	-	R	N	N	N	N	N	N	N	N	N	N				
49	Sta 353+75 to 363+75		Stable			-	-	R	N	N	N	N	N	N	N	N	N	N				
49	Sta 374+75		No prediction			-	-	-	R	N	N	N	N	N	N	N	N	N				

(Continued)

Table 6 (Continued)

No.	Revetment Site Location	Potamology Report in Which Borings Are Evaluated	Predicted Performance with Regard to Flow Failure	Estimated Maximum River Stage Referenced to Bank-Full Conditions (ft) Observed Performance (Letter Symbols) 54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72
			MEMPHIS DISTRICT (Continued)																			
	Little Cypress Bend, Mo., 863 MAHP			0	-6	0	-1	-4	+2	+9	+5	+6	+3	+2	+4	+2	-3	+1				
3	Sta 104+50	12-3	No prediction	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-				
3	Sta 115+00		Stable	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-				
3	Sta 124+25 to 145+75		Stable	-	-	-	-	-	-	-	-	-	R	N	N	N	N	N				
3	Sta 160+50		Unstable	R	N	N	N	N	N	N	N	N	N	N	N	N	N	N				
3	Sta 170+00 and 180+25		Stable	R	N	N	N	N	N	N	N	N	N	N	N	N	N	N				
3	Sta 191+00		Unstable	R	N	N	N	N	N	N	N	N	N	N	N	N	N	N				
3	Sta 203+00		No prediction	R	N	N	N	O	N	N	N	N	N	N	N	O	N	N				
3	Sta 213+00		Stable	R	N	N	N	N	N	N	N	N	N	N	N	O	N	N				
3	Sta 223+75		No prediction	R	N	O	N	N	N	N	N	N	N	N	N	N	N	N				
3	Sta 232+75 to 303+75		Stable	R	N	N	N	N	O	N	N	N	N	N	N	N	N	N				
50	Sta 318+00 to 339+00	12-7	Stable	-	R	N	N	N	O	N	N	N	N	N	N	N	N	N				
82	Sta 390+00 and 400+00	12-9	Stable	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-				
82	Sta 410+00		Unstable	-	-	-	-	-	-	R	N	N	N	N	N	N	N	N				
82	Sta 420+00		Stable	-	-	-	-	-	-	R	N	N	N	N	N	N	N	N				
82	Sta 430+00		Unstable					-	-	-	-	-	R	N	N	N	N	N				
168	Sta 430+00 to 441+00	12-17	Stable										R	N	N	N	N	N				
168	Sta 451+00		Stable										-	-	-	-						
	Lee Towhead, Mo., 858 MAHP							-1	-4	+2	+9	+5	+6	+2	+2	+4	+2	-3	+1			
65	Sta 100+00	12-8	Stable					-	-	-	-	-	R	N	N	N	N	N	N			
65	Sta 110+00		Unstable					-	-	-	-	-	-	-	-	-	-	-	-			
65	Sta 120+00 to 150+00		Stable					-	-	-	-	-	-	-	-	-	-	-	-			
65	Sta 160+00		Unstable					-	-	-	-	-	-	-	-	-	-	-	-			
65	Sta 170+00 and 178+00		Stable					-	-	-	-	-	-	-	-	-	-	-	-			
	Fritz Landing, Tenn., 856 MAHP											+5	+6	+2	+2	+4	+2	-3	0			
133	Sta 70+00	12-13	Unstable										-	R	N	N	N	N	N			
133	Sta 80+00		No prediction										-	R	N	N	N	N	N			
133	Sta 90+00 and 100+00		Stable										-	R	N	N	N	N	N			
122	Sta 110+00	12-12	Unstable									-	-	R	N	N	N	N	N			
122	Sta 120+00 and 130+00		Stable									N	N	N	N	N	N	N	N			
122	Sta 140+00		No prediction									N	N	N	N	N	N	N	N			
122	Sta 150+00 to 170+00		Stable									N	N	N	N	N	N	N	N			
122	Sta 180+00		No prediction									N	N	N	N	N	N	N	N			
122	Sta 190+00		Stable									N	N	N	N	N	N	N	N			
122	Sta 200+00		No prediction									R	N	N	N	N	N	N	N			
	Hathaway Landing, Tenn., 852 MAHP			0	-6	0	-1	-4	+2	+9	+5	+6	+2	+2	+4	+2	-3	0				
4	Sta 210+00 to 230+00	12-3	No prediction	-	-	-	-	-	-	R	N	N	N	N	N	N	N	N				
4	Sta 240+00 to 250+00		Stable	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-				
4	Sta 260+00		Unstable	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-				
4	Sta 270+00 to 290+00		Stable	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-				
4	Sta 303+00		Unstable	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-				
4	Sta 312+00 and 322+00		Stable	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-				

(Continued)

Table 6 (Continued)

No.	Revetment Site Location	Potamology Report in Which Borings Are Evaluated	Predicted Performance with Regard to Flow Failure	Estimated Maximum River Stage Referenced to Bank-Full Conditions (ft) Observed Performance (Letter Symbols) 54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72
				MEMPHIS DISTRICT (Continued)																		
	Blaker Towhead, Tenn., 845 MAHP															+5	+2	-3	0			
176	Sta 107+00 to 136+00	12-18	Unstable													N	N	N	N			
176	Sta 151+00		No prediction													N	N	N	N			
176	Sta 167+00		Unstable													N	N	N	N			
214	Sta 188+00	12-21	Unstable															-	-			
214	Sta 198+00		Stable															-	-			
214	Sta 200+00 to 203+50		No prediction															-	-			
214	Sta 208+00		Unstable															-	-			
214	Sta 208+50		No prediction															-	-			
214	Sta 212+00 to 254+00		Unstable															-	-			
214	Sta 258+00		Stable															-	-			
	Linwood Bend, Tenn., 840 MAHP			0	-5	0	-2	-5	+2	+9	+5	+6	+2	+2	+5	+2	-3	0				
16	Sta 280+00 to 292+00	12-4	Stable	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N				
	Heloise, Tenn., 830 MAHP			0	-6	0	-2	-4	+2	+9	+4	+6	+2	+2	+5	+3	-4	0				
5	Sta 98+40 to 128+00	12-3	Stable	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N				
5	Sta 138+00 to 158+00		Unstable	N	N	N	N	0	N	N	N	N	N	N	N	N	N	N				
5	Sta 168+00 to 178+20		No prediction	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N				
5	Sta 188+00 to 208+10		Stable	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N				
5	Sta 218+00		Unstable	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N				
	Obion Bar, Tenn., 821 MAHP											+5	+2	+1	+5	+3	-4	0				
134	Sta 102+00	12-13	Stable									-	-	-	-	-	-	-				
134	Sta 112+00		Unstable									-	-	-	-	-	-	-				
134	Sta 122+00		Stable									-	-	-	-	-	-	-				
134	Sta 132+00 and 142+00		Stable									N	N	N	N	N	N	N				
134	Sta 152+00		Unstable									N	N	N	N	N	N	N				
134	Sta 159+00		No prediction									N	N	N	N	N	N	N				
	Tamm Bend, Tenn., 817 MAHP			-6	0	-2	-5	+2	+9	+4	+5	+2	+1	+5	+3	-4	0					
51	Sta 83+00	12-7	Unstable		N	N	N	N	N	N	N	N	N	N	N	N	N					
51	Sta 93+00 to 113+00		Stable		N	N	N	N	N	N	N	N	N	N	N	N	N					
30	Sta 123+00 to 164+00	12-6	Stable	N	N	N	N	N	N	N	N	N	N	N	N	N	N					
30	Sta 174+50		Unstable	N	N	N	N	N	N	N	N	N	N	N	N	N	N					
30	Sta 184+50		No prediction	N	N	N	N	N	N	N	N	N	N	N	N	N	N					
30	Sta 195+50		Stable	N	N	N	N	N	N	N	N	N	N	N	N	N	N					
30	Sta 205+00 to 214+50		No prediction	N	N	N	N	N	N	N	N	N	N	N	N	N	N					
30	Sta 225+00 to 236+00		Stable	N	N	N	N	N	N	N	N	N	N	N	N	N	N					
30	Sta 246+50		Unstable	N	N	N	N	N	N	N	N	N	N	N	N	N	N					
30	Sta 259+00 to 269+50		Stable	N	N	N	N	N	N	N	N	N	N	N	N	N	N					
100	Sta 280+00	12-10	Unstable					-	-	-	R	N	N	N	N	N	N					
51	Sta 290+00 to 310+00	12-7	Stable		-	-	-	-	-	-	R	N	N	N	N	N	N					
100	Sta 321+00	12-10	Stable					-	-	-	R	N	N	N	N	N	N					
100	Sta 331+00		Unstable					-	-	-	R	N	N	N	N	N	N					
100	Sta 341+00 to 361+00		Stable					-	-	-	R	N	N	N	N	N	N					

(Continued)

Table 6 (Continued)

No.	Revetment Site Location	Potamology Report in Which Borings Are Evaluated	Predicted Performance with Regard to Flow Failure	Estimated Maximum River Stage Referenced to Bank-Full Conditions (ft) Observed Performance (Letter Symbols) 54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72
				MEMPHIS DISTRICT (Continued)																		
	Barfield, Ark., 809 MAHP			0		-6	-1	-2	-4	+1	+8	+4	+5	+2	+1	+5	+3	-4	-1			
6	Sta 269+00 to 307+00	12-3	Stable	N		N	N	N	N	N	N	N	N	N	N	N	N	N	N			
6	Sta 320+00 to 352+00		No prediction	N		N	N	N	N	N	N	N	N	N	N	N	N	N	N			
6	Sta 362+00		Stable	N		N	N	N	N	N	N	N	N	N	N	N	N	N	N			
6	Sta 372+00		No prediction	N		N	N	N	N	N	N	N	N	N	N	N	N	N	N			
6	Sta 380+00 to 392+00		Stable	N		N	N	N	N	N	N	N	N	N	N	N	N	N	N			
6	Sta 403+00		No prediction	N		N	O	N	N	N	N	N	N	N	N	N	N	N	N			
6	Sta 412+75 to 471+00		Stable	N		N	O	O	N	N	N	N	N	N	N	N	N	N	N			
6	Sta 483+00		No prediction	F		N	O	N	N	N	N	N	N	N	N	N	N	N	N			
	Bend of Island 25, Tenn., 803 MAHP					-6	-1	-2	-5	+1	+8	+4	+5	+2	+1	+5	+3	-4	-1			
31	Sta 265+50 to 286+00	12-6	Stable			N	N	O	N	O	N	N	N	N	N	N	N	N	N			
31	Sta 295+00		Unstable			N	N	N	N	N	N	O	N	N	N	N	N	N	N			
31	Sta 306+00		Stable			N	N	N	N	N	N	O	N	N	N	N	N	N	N			
31	Sta 316+00		Unstable			N	N	N	N	N	O	O	O	N	N	N	N	N	N			
31	Sta 326+00		Unstable			N	N	O	N	N	N	O	O	N	N	N	N	F	N			
31	Sta 335+00		Stable			N	N	N	N	N	N	N	N	N	N	N	N	N	N			
	Island 26, Tenn., 799 MAHP					-6	-1	-2	-5	+1	+8	+4	+5	+1	+1	+6	+3	-4	-1			
32	Sta 61+50	12-6	Stable			-	-	-	-	-	-	-	-	-	-	-	-	-	-			
32	Sta 72+00		Unstable			-	-	-	-	-	R	N	N	N	N	N	N	N	N			
32	Sta 80+50 and 90+50		Stable			-	-	-	-	-	R	N	N	N	N	N	N	N	N			
32	Sta 101+00		Stable			-	-	-	-	R	N	N	N	N	N	N	N	N	N			
32	Sta 111+50 and 121+50		Unstable			-	-	-	-	R	N	N	F	N	N	N	N	N	N			
32	Sta 132+00		Stable			-	-	-	-	R	N	N	N	N	N	N	O	N	N			
32	Sta 142+00		Unstable			-	-	-	-	R	N	N	N	N	N	N	N	N	N			
32	Sta 152+00		Stable			-	R	N	N	N	N	N	N	N	N	N	N	N	N			
32	Sta 161+50		Unstable			-	R	N	N	N	N	N	N	N	N	N	N	N	N			
32	Sta 172+00 to 212+00		Stable			-	R	N	N	N	N	N	N	N	N	N	N	N	N			
32	Sta 222+00		Unstable			-	R	N	N	N	N	N	N	N	N	N	N	N	N			
	Keyes Point, Tenn., 792 MAHP					-6	-1	-2	-5	+1	+8	+4	+5	+1	+1	+6	+3	-4	-1			
145	Sta 20+50	12-14	Stable										-	-	-	-	-	-	-			
145	Sta 30+57 and 40+40		Stable										R	N	N	N	N	N	N			
83	Sta 50+00 to 60+00	12-9	Stable						-	-	-	-	R	N	N	O	N	N	N			
83	Sta 70+00		No prediction						-	-	-	-	R	N	N	N	N	N	N			
83	Sta 80+00 to 90+00		Stable						-	-	-	-	-	-	-	-	-	-	-			
33	Sta 110+00 to 119+50	12-6	Unstable	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-			
33	Sta 130+50		Stable	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-			
33	Sta 140+00 to 159+00		Stable	N		N	N	N	N	N	N	N	N	N	N	N	N	N	N			
33	Sta 168+00		No prediction	N		N	N	N	N	N	N	N	N	N	N	N	N	N	N			
33	Sta 177+50		Stable	N		N	N	N	N	N	N	N	N	N	N	N	N	N	N			
33	Sta 188+00		No prediction	N		N	N	N	N	N	N	N	N	N	N	N	N	N	N			
33	Sta 200+00		Stable	N		N	N	N	N	N	N	N	N	N	N	N	N	N	N			
177	Sta 491+00 to 1+00-U	12-18	Unstable													N	N	N	N			
177	Sta 11+00-U		Stable													N	N	N	N			

(Continued)

Table 6 (Continued)

No.	Revetment Site Location	Potamology Report in Which Borings Are Evaluated	Predicted Performance with Regard to Flow Failure	Estimated Maximum River Stage Referenced to Bank-Full Conditions (ft) Observed Performance (Letter Symbols) 54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72
				MEMPHIS DISTRICT (Continued)																		
	Island 30, Tenn., 786 MAHP									+1	+8	+4	+5	+1	+1	+6	+3	-5	-1			
101	Sta 108+00	12-10	Stable							N	N	N	N	N	N	N	N	N	N			
101	Sta 118+00		Unstable							N	N	N	N	N	N	N	N	N	N			
101	Sta 128+00		Stable							N	N	N	N	N	N	N	N	N	N			
101	Sta 138+00		Unstable							N	N	N	N	N	N	N	N	N	N			
101	Sta 148+00 to 178+00		Stable							N	N	N	N	N	N	O	N	N	N			
101	Sta 196+00		Unstable							N	N	N	N	N	N	N	N	N	N			
101	Sta 208+00 to 218+00		Unstable							R	N	N	N	N	N	N	O	N	N			
	Lower Bullerton, Ark., 782 MAHP							-2	-5	+1	+8	+4	+5	+1	+1	+6	+3	-5	-1			
66	Sta 368+00 to 388+00	12-8	Stable					R	N	N	N	N	N	N	N	N	N	N	N			
66	Sta 398+00		Stable					-	-	-	-	-	-	-	-	-	-	-	-			
66	Sta 408+00 and 418+00		Stable					N	N	N	N	N	N	N	N	N	N	N	N			
66	Sta 427+75		Unstable					N	N	N	N	N	N	N	N	N	N	N	N			
66	Sta 438+75		Stable					N	N	N	N	N	N	N	N	N	N	N	N			
66	Sta 449+00 and 457+50		Unstable					-	-	-	-	-	-	-	-	-	-	-	-			
	Lookout, Tenn., 773 MAHP							-2	-5	-1	+8	+4	+5	+1	+1	+6	+4	-5	-1			
67	Sta 226+00 and 236+00	12-8	Unstable					N	N	N	N	N	N	N	N	N	N	N	N			
67	Sta 246+25 to 266+00		Stable					N	N	N	N	N	N	N	N	N	N	N	N			
67	Sta 276+00		Stable					-	-	-	-	-	-	-	-	-	-	-	-			
	Chute of Island 35, Tenn., 765 MAHP								-5	+1	+8	+3	+4	+1	+1	+6	+4	-5	-2			
102	Sta 40+00U	12-10	Stable							-	-	-	-	-	-	-	-	-	-			
102	Sta 30+00U to 10+50U		Stable							N	N	N	N	N	N	N	N	N	N			
84	Sta 0+00	12-9	Unstable						-	-	-	-	-	-	-	-	-	-	-			
84	Sta 10+00L to 40+00L		Stable						-	-	-	-	-	-	-	-	-	-	-			
	Cedar Point, Tenn., 759 MAHP			-5	-1	-2	-5	+1	+8	+3	+4	+1	+1	+6	+4	-5	-2					
34	Sta 112+00 and 122+00	12-6	Stable	N	N	N	N	N	N	N	N	N	N	N	N	N	N					
34	Sta 131+50		Unstable	N	N	N	N	N	N	N	N	N	N	N	N	N	N					
34	Sta 142+00		Stable	N	N	N	N	N	N	N	N	N	N	N	N	N	N					
34	Sta 152+00		Unstable	N	N	N	N	N	N	N	N	N	N	N	N	N	N					
34	Sta 162+00 and 172+00		Stable	N	N	N	N	N	N	N	N	N	N	N	N	N	N					
34	Sta 182+00		Unstable	N	N	N	F	N	N	N	N	N	N	N	N	N	N					
	Dean Island, Ark., 756 MAHP			-5	-1	-2	-5	+1	+8	+3	+4	+1	+1	+6	+4	-5	-2					
135	Sta 76+00	12-13	Stable								-	-	-	-	-	-	-					
135	Sta 86+00		Unstable								-	-	-	-	-	-	-					
135	Sta 97+00		Stable								-	-	-	R	N	N	N					
35	Sta 105+00	12-6	Unstable	-	-	-	-	-	-	-	-	-	-	R	N	N	N					
35	Sta 115+00		Stable	-	-	-	-	-	-	-	-	-	-	R	N	N	N					
35	Sta 125+00		Unstable	-	-	-	-	-	-	-	-	-	-	R	N	N	N					
35	Sta 135+00		No prediction	-	-	-	-	-	-	-	-	-	-	R	N	N	N					
35	Sta 144+00 to 164+00		Unstable	-	-	-	-	-	-	-	-	-	-	-	R	F	N					
35	Sta 174+00		Unstable	-	-	-	-	-	-	-	-	-	-	-	-	-	-					
35	Sta 184+00		Stable	-	-	-	-	-	-	-	-	-	-	-	-	-	-					

(Continued)

Table 6 (Continued)

No.	Revetment Site Location	Potamology Report in Which Borings Are Evaluated	Predicted Performance with Regard to Flow Failure	Estimated Maximum River Stage Referenced to Bank-Full Conditions (ft) Observed Performance (Letter Symbols) 54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72
				MEMPHIS DISTRICT (Continued)																		
	Brandywine, Ark., 751 MAHP						-1	-3	-5	+1	+8	+3	+4	0	0	+6	+4	-5	-2			
52	Sta 63+00	12-7	Stable				N	N	N	N	N	N	N	N	N	N	N	N	N			
52	Sta 84+00		Unstable				N	N	N	N	N	N	N	N	N	N	N	N	N			
52	Sta 104+00 to 186+00		Stable				N	N	N	N	N	N	N	N	N	N	N	N	N			
	Island 40, Tenn., 742 MAHP									+1	+8	+3	+4	0	0	+7	+4	-6	-2			
123	Sta 96+00	12-12	Unstable									-	-	-	-	-	-	-	-			
123	Sta 106+50 to 126+25		Stable									-	-	-	-	-	-	R	N			
123	Sta 136+00		Unstable									-	-	-	-	-	-	R	N			
123	Sta 146+00 and 156+00		Unstable									R	N	N	N	N	N	N	N			
123	Sta 166+00 to 186+00		Unstable								R	N	N	N	N	N	N	N	N			
103	Sta 215+00	12-10	No prediction							R	N	N	N	N	N	N	N	N	N			
103	Sta 224+00 to 234+00		Stable							R	N	N	N	N	N	N	N	N	N			
	Loosahatchie, Tenn., 738 MAHP										+7	+3	+4	0	0	+7	+4	-6	-2			
114	Sta 97+00	12-11	Unstable								-	-	-	-	-	-	R	N	N			
114	Sta 107+70		Unstable								-	R	N	N	N	N	N	N	N			
114	Sta 118		Stable								R	N	N	N	N	N	N	N	N			
114	Sta 128+00 to 148+00		Unstable								N	N	N	N	N	N	N	N	N			
114	Sta 158+00 and 168+00		Stable								N	N	N	N	N	N	N	N	N			
124	Sta 177+00 and 187+00	12-12	Stable									-	-	-	R	N	N	N	N			
124	Sta 196+00		Unstable									-	-	-	R	N	N	N	N			
124	Sta 207+00		Stable									-	-	-	R	N	N	N	N			
178	Sta 218+00 to 253+00	12-18	Stable													R	N	N	N			
178	Sta 253+00 and 258+00		No prediction													R	N	N	N			
178	Sta 265+00		Stable													R	N	N	N			
178	Sta 271+00 and 279+00		No prediction													R	N	N	N			
178	Sta 284+00		Stable													R	N	N	N			
178	Sta 289+00 and 299+00		No prediction													R	N	N	N			
178	Sta 307+00		Stable													R	N	N	N			
178	Sta 310+00 and 320+00		No prediction													R	N	N	N			
178	Sta 332+00		Stable													R	N	N	N			
	Hopefield Point, Ark., 737 MAHP									0	+7	+3	+4	0	0	+7	+4	-6	-2			
104	Sta 129+00	12-10	No prediction							-	-	-	-	-	-	-	-	-	-			
104	Sta 134+00		No prediction							N	N	N	N	N	N	N	N	N	N			
136	Sta 160+00	12-13	Stable									R	N	N	N	N	N	N	N			
136	Sta 170+00		Unstable									R	N	N	N	N	N	N	N			
136	Sta 180+00		Stable									R	N	N	N	N	N	N	N			
136	Sta 190+00		Stable									-	-	-	-	-	-	-	-			
	Bauxippi-Wyanoke, Ark., 729 MAHP			+3	-4	-2	-3	-5	0	+7	+3	+4	0	0	+7	+4	-6	-2				
17	Sta 80+00 to 84+00	12-4	Stable	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N				
17	Sta 217+00 to 234+50		Stable	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N				

(Continued)

Table 6 (Continued)

No.	Revetment Site Location	Potamology Report in Which Borings Are Evaluated	Predicted Performance with Regard to Flow Failure	Estimated Maximum River Stage Referenced to Bank-Full Conditions (ft) Observed Performance (Letter Symbols) 54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72
				MEMPHIS DISTRICT (Continued)																		
	Ensley, Tenn., 723 MAHP			+3	-4	-2	-3	-5	0	+7	+3	+4	0	0	+6	+4	-6	-2			
18	Sta 248+00 to 269+00	12-4	Unstable	N	F	F	F	N	N	N	N	N	N	N	N	N	N	N			
18	Sta 278+00		Stable	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N			
85	Sta 288+00 and 298+00	12-9	Unstable					-	R	N	N	N	N	N	N	N	N	N			
85	Sta 308+00 and 318+00		Unstable					-	-	-	-	R	N	N	N	N	N	N			
146	Sta 327+00	12-14	Stable									R	N	N	N	N	N	N			
146	Sta 337+00		Stable									-	-	R	N	N	N	N			
146	Sta 348+00 and 359+50		Unstable									-	-	R	R	N	N	N			
146	Sta 369+50		No prediction									-	-	-	-	-	R	N			
146	Sta 378+00		Unstable									-	-	-	-	-	R	N			
215	Sta 377+00 to 397+00	12-21	Stable														-	-			
	Coahoma, Tenn., 717 MAHP			+2	-4	-2	-3	-5	0	+7	+3	+3	0	0	+6	+4	-6	-2			
19	Sta 122+00 to 193+00	12-4	Stable	N	0	0	0	0	N	0	N	N	N	N	N	N	N	N			
	Norfolk Star, Miss., 708 MAHP											+3	0	0	+6	+4	-5	-2			
137	Sta 168+00	12-13	Stable									N	N	N	N	N	N	N			
137	Sta 178+00		Stable									-	-	R	N	N	N	N			
137	Sta 188+00 and 198+00		Unstable									-	-	R	N	N	N	N			
	Pickett, Miss., 702 MAHP						-2	-3	-5	0	+6	+3	+3	-1	0	+6	+4	-5	-2			
53	Sta 117+50	12-7	Unstable				-	-	-	-	-	-	-	-	-	-	-	-	-			
53	Sta 127+00		Stable				-	-	-	-	-	-	-	-	-	-	-	-	-			
53	Sta 139+50 to 175+75		Stable				N	N	N	N	N	N	N	N	N	N	N	N	N			
53	Sta 185+00 to 194+50		Unstable				F	N	N	N	N	N	N	N	N	N	N	N	N			
190	Sta 225+00	12-19	Unstable														R	N	N			
190	Sta 235+00		Unstable														R	N	N			
190	Sta 245+00		No prediction														R	N	N			
190	Sta 255+00		Unstable														-	-	-			
	Porter Lake, Ark., 701 MAHP			+1	-5	-2	-2	-5	0	+6	+3	+3	-1	0	+6	+4	-5	-2				
20	Sta 281+50	12-4	Unstable	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N				
20	Sta 291+50		Stable	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N				
20	Sta 302+00 and 311+50		Unstable	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N				
	Commerce Landing, Miss., 695 MAHP				-5	-2	-2	-5	0	+6	+3	+3	-1	0	+6	+4	-5	-2				
36	Sta 122+00 to 172+50	12-6	Stable		N	N	N	N	N	N	N	N	N	N	N	N	N	N				
36	Sta 182+00		No prediction		N	N	N	N	N	N	N	N	N	N	N	N	N	N				
36	Sta 192+00		Stable		N	N	N	N	N	N	N	0	N	N	N	N	N	N				

(Continued)

Table 6 (Continued)

Revetment Site No.	Location	Potamology Report in Which Borings Are Evaluated	Predicted Performance with Regard to Flow Failure	Estimated Maximum River Stage Referenced to Bank-Full Conditions (ft) Observed Performance (Letter Symbols) 54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72
			MEMPHIS DISTRICT (Continued)																			
	Peters, Ark., 691 MAHP			+1	-5	-2	-2	-5	0	+5	+3	+3	-1	0	+6	+4	-5	-2				
169	Sta 30+00	12-17	Unstable											N	N	N	N	N				
169	Sta 41+00		No prediction											N	N	N	N	N				
7	Sta 187+00	12-3	No prediction	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N				
7	Sta 198+00 to 210+00		Stable	N	N	N	N	N	N	O	N	N	N	N	N	N	N	N				
7	Sta 220+00		No prediction	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N				
7	Sta 230+00		Stable	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N				
7	Sta 240+00 to 250+00		No prediction	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N				
7	Sta 260+00		Stable	N	N	N	N	N	N	N	N	O	N	N	N	N	N	N				
7	Sta 270+00		No prediction	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N				
	Harbert Point, Miss., 675 MAHP			+2	-4	-2	-2	-5	0	+5	+4	+2	-1	0	+6	+4	-5	-2				
21	Sta 101+75	12-4	No prediction	-	-	-	-	-	-	-	-	R	N	N	N	N	N	N				
21	Sta 112+00 to 121+75		Stable	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N				
21	Sta 133+25 and 143+00		Unstable	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N				
21	Sta 153+00 to 174+50		Stable	N	N	O	N	O	N	N	N	O	N	N	N	N	N	N				
21	Sta 184+00		No prediction	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N				
	St. Francis, Ark., 671 MAHP				-4	-2	-2	-5	0	+4	+4	+2	-1	0	+6	+4	-5	-2				
125	Sta 311+00 and 323+00	12-12	Unstable								-	-	-	-	-	-	-	-				
125	Sta 330+00 to 350+00		Stable								-	-	-	-	-	-	-	-				
179	Sta 359+00	12-18	No prediction												N	N	N	N				
179	Sta 370+00 and 380+00		Stable												N	N	N	N				
179	Sta 400+00		No prediction												N	N	N	N				
179	Sta 410+00		Stable												N	N	N	N				
179	Sta 420+00		Unstable												N	N	N	N				
54	Sta 430+00	12-7	Stable			N	N	N	N	N	N	N	N	N	R	N	N	N				
54	Sta 440+00		Unstable			N	N	N	N	N	N	N	R	N	N	N	N	N				
54	Sta 450+00 and 460+00		Stable			N	N	N	N	N	N	N	R	N	N	N	N	N				
37	Sta 470+50 to 490+00	12-6	Stable		N	N	N	N	N	N	N	N	N	N	N	N	N	N				
37	Sta 494+50 to 508+50		No prediction		N	N	N	N	N	N	N	N	N	N	N	N	N	N				
37	Sta 520+00 to 529+00		Stable		N	N	N	N	N	N	N	N	N	N	N	N	N	N				
68	Sta 539+00	12-8	Stable				N	N	N	N	N	N	N	N	N	N	N	N				
68	Sta 549+00		Unstable				N	N	N	N	N	N	N	N	N	N	N	N				
68	Sta 559+00		Stable				-	-	-	-	-	-	-	-	-	-	-	-				
86	Sta 570+00 and 580+00	12-9	No prediction					-	-	-	-	-	-	-	-	-	-	-				
	Helena Delta, Ark., 660 MAHP			+2	-3	-2	-2	-5	0	+4	+3	+1	-2	0	+5	+3	-5	-2				
22	Sta 350+00 and 360+00	12-4	No prediction	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N				
22	Sta 369+50		Unstable	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N				
22	Sta 380+00		No prediction	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N				
87	Sta 390+00	12-9	Stable					-	-	-	-	-	-	-	-	-	-	-				
87	Sta 400+00		No prediction					-	-	-	-	-	-	-	-	-	-	-				
87	Sta 410+00		Stable					-	R	N	N	N	N	N	N	N	N	N				
115	Sta 420+00 to 440+00	12-11	Stable							N	N	N	N	N	N	N	N	N				
115	Sta 450+00		Stable							-	-	-	-	-	-	-	-	-				

(Continued)

Table 6 (Continued)

No.	Revetment Site Location	Potamology Report in Which Borings Are Evaluated	Predicted Performance with Regard to Flow Failure	Estimated Maximum River Stage Referenced to Bank-Full Conditions (ft) Observed Performance (Letter Symbols) 54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72
	MEMPHIS DISTRICT (Concluded)																					
	Old Town Bend, Ark., 643 MAHP							-2	-6	-2	+3	+2	0	-3	-1	+1	0	-6	-3			
69	Sta 272+25 to 293+75	12-8	Stable					-	R	N	N	N	N	O	N	N	N	N	O			
88	Sta 304+50 and 314+50	12-9	Stable						-	R	N	N	N	N	O	N	N	N	N			
88	Sta 324+50		Stable						-	-	-	R	N	N	O	N	N	N	N			
	Island 63 Bar, Miss., 639 MAHP													-3	-1	0	-1	-6	-3			
170	Sta 134+00 to 154+00	12-17	Unstable											R	N	N	N	F	N			
170	Sta 164+00		Stable											R	N	N	N	N	N			
170	Sta 174+00 to 184+00		Unstable											R	N	N	N	N	N			
	Island 62, Ark., 639 MAHP						-2	-2	-7	-2	+3	+2	-1	-3	-2	0	-1	-6	-3			
55	Sta 73+75	12-7	Unstable				N	N	N	N	N	N	N	N	N	N	N	N	N			
55	Sta 83+00 to 93+50		Stable				N	N	N	N	N	N	N	N	N	N	N	N	N			
55	Sta 104+00		No prediction				N	N	N	N	N	N	N	N	N	N	N	N	N			
55	Sta 114+50 to 134+25		Stable				N	N	N	N	N	N	N	N	N	N	N	N	N			
116	Sta 160+00	12-11	Stable								N	N	N	N	N	N	N	N	N			
116	Sta 170+00		Unstable								-	-	-	-	-	-	-	-	-			
116	Sta 180+00 and 190+00		Stable								-	-	-	-	-	-	-	-	-			
	Fair Landing, Ark., 633 MAHP							-2	-7	-3	+2	+1	-1	-3	-1	-1	-2	-7	-4			
70	Sta 264+00	12-8	Stable					N	N	N	N	N	N	N	(F)	N	N	N	N			
70	Sta 274+50		Unstable					N	N	N	N	N	N	N	F	N	N	N	N			
70	Sta 283+50		Stable					N	N	N	N	N	N	N	O	N	N	N	N			
70	Sta 294+00		Stable					N	N	N	N	N	N	N	N	N	N	N	N			
	Rescue Landing, Miss., 628 MAHP			-5	-10	-2	-2	-8	-3	+2	+1	-1	-4	-3	-2	-3	-7	-4				
8	Sta 70+50 to 180+00	12-3	Stable	N	N	N	O	N	N	N	N	N	N	N	N	N	N	N				
8	Sta 202+00 to 215+00		Unstable	F	N	N	N	N	N	N	N	N	O	N	N	N	N	N				
	Ludlow, Ark., 625 MAHP				-10	-2	-3	-8	-4	+3	0	-2	-4	-3	-3	-4	-7	-4				
38	Sta 27+00	12-6	Stable		N	N	N	N	N	N	N	N	N	N	N	N	N	N				
38	Sta 39+00		Stable		N	N	N	N	N	N	N	N	N	(F)	N	N	N	N				
38	Sta 47+00		Stable		N	N	N	N	N	N	N	N	N	N	N	N	N	N				
38	Sta 58+00		Stable		N	N	N	N	N	N	N	N	N	O	N	N	(F)	N				
38	Sta 68+00		Stable		N	N	N	N	N	N	N	N	N	N	N	N	N	N				
38	Sta 76+00		Stable		N	O	N	N	N	N	N	N	N	N	N	N	N	N				
38	Sta 86+00 and 96+00		Stable		N	N	N	N	N	N	N	N	N	N	N	N	N	N				
	Henrico, Ark., 606 MAHP												-3	-6	-4	-7	-8	-8	-5			
138	Sta 66+00	12-13	Unstable										N	N	N	N	N	F	O			
138	Sta 76+00		Stable										R	N	N	N	N	N	N			
138	Sta 86+00		No prediction										-	-	-	-	R	N	N			
138	Sta 96+00		Stable										-	-	-	-	-	R	N			
138	Sta 106+00 and 116+00		No prediction										-	-	-	-	-	-	-			

(Continued)

Table 6 (Continued)

No.	Revetment Site Location	Potamology Report in Which Borings Are Evaluated	Predicted Performance with Regard to Flow Failure	Estimated Maximum River Stage Referenced to Bank-Full Conditions (ft) Observed Performance (Letter Symbols) 54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72
				VICKSBURG DISTRICT																		
	Dennis, Miss., 612 MAHP													-5	-3	-6	-6	-8	-5			
147	613.20 to 612.80 MAHP	12-14	Stable											-	-	-	-	-	-			
147	612.60 MAHP		Unstable											-	-	-	-	-	-			
147	612.45 MAHP		Stable											-	-	-	-	-	-			
191	610.10 MAHP	12-19	Unstable														R	N	N			
191	609.90 MAHP		Stable														-	-	-			
191	609.70 MAHP		Unstable														-	-	-			
	Smith Point, Miss., 602 MAHP							-3	-11	-6	+1	-2	-4	-6	-5	-9	-8	-8	-5			
71	603.1 MAHP	12-8	Stable					-	-	-	-	-	-	-	-	-	-	-	-			
71	Range 0+50D		Stable					O	N	N	N	N	N	N	N	N	N	N	N			
71	Range 23+50D		Unstable					O	N	N	F	N	N	N	N	N	N	N	N			
	Big Island, Ark., 598 MAHP					-10	-2	-3	-11	-6	0	-2	-5	-7	-6	-9	-9	-9	-6			
72	600.1 and 599.9 MAHP	12-8	Unstable					-	-	-	-	-	-	-	-	-	-	-	-			
72	Range 51U		No prediction					N	N	N	N	N	N	N	N	N	N	N	N			
40	Range 22U	12-6	No prediction			N	F	N	N	N	N	N	N	N	N	N	N	N	N			
40	Range 7U		Stable			O	O	O	N	N	N	O	O	N	N	N	N	N	N			
40	Range 9D		Unstable			N	N	N	N	N	N	O	N	N	N	N	N	N	N			
139	Ranges 43D to 58D	12-13	Stable									R	N	N	N	N	N	N	N			
139	Range 66D		Unstable									R	N	N	N	N	N	N	N			
139	Range 73D		Stable									-	R	N	N	N	N	N	N			
171	596.00 MAHP	12-17	Stable												-	-	-	-	-			
171	595.8 and 595.60 MAHP		Unstable												-	-	-	-	-			
171	595.30 MAHP		No prediction												-	-	-	-	-			
	Victoria Bend, Miss., 595 MAHP				-9	-2	-4	-12	-7	0	-3	-5	-7	-6	-10	-10	-9	-6				
89	596.2 MAHP	12-9	Unstable					-	-	-	-	-	-	-	-	-	-	-	-			
89	595.7 to 595.5 MAHP		Stable					-	-	-	-	-	-	-	-	-	-	-	-			
89	Range 31U		Unstable					N	N	N	N	N	N	N	R	N	N	N	N			
41	Range 30U to 21D	12-6	Unstable		F	F	O	N	F	F	O	N	N	N	N	N	N	N	N			
	Terrene, Miss., 591 MAHP						-4	-12	-7	0	-3	-5	-7	-5	-11	-11	-9	-6				
126	Range 33D	12-12	Stable							-	R	N	N	N	N	N	N	N	N			
148	Range 39D	12-14	Unstable										R	N	N	N	N	N	N			
126	593.8 MAHP	12-12	Stable								-	-	R	N	N	N	N	N	N			
148	Range 45D	12-14	Stable										R	N	N	N	N	N	N			
148	Range 53D	12-14	Unstable										R	N	N	N	N	N	N			
73	593.5 MAHP	12-8	Stable				-	-	-	-	-	-	R	N	N	N	N	N	N			
148	Range 59D	12-14	Stable										R	N	N	N	N	N	N			
126	593.20 MAHP	12-12	Stable							-	-	-	R	N	N	N	N	N	N			
148	Range 66D	12-14	Unstable										R	N	N	N	N	N	N			
148	593.00 MAHP	12-14	Stable										R	N	N	N	N	N	N			
73	592.90 MAHP	12-8	Stable				-	-	-	-	-	-	R	N	N	N	N	N	N			
148	592.8 MAHP	12-14	No prediction									R	N	N	N	N	N	N	N			
73	Range 11D	12-8	Stable				-	-	R	N	N	N	N	N	N	N	N	N	N			
73	Range 23D	12-8	No prediction				-	-	R	N	N	N	N	N	N	N	N	N	N			
73	Range 49D	12-8	Unstable				-	-	R	N	N	N	N	N	N	N	N	N	N			
126	Range 61D	12-12	Stable							R	N	N	N	N	N	N	N	N	N			

(Continued)

Table 6 (Continued)

No.	Revetment Site Location	Potamology Report in Which Borings Are Evaluated	Predicted Performance with Regard to Flow Failure	Estimated Maximum River Stage Referenced to Bank-Full Conditions (ft) Observed Performance (Letter Symbols) 54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72
			VICKSBURG DISTRICT (Continued)																			
	Klondike, Ark., 588 MAHP						-3	-5	-12	-7	0	-3	-6	-7	-6	-11	-11	-9	-6			
56	590.7 MAHP	12-7	Stable				-	-	-	-	-	-	-	-	-	-	-					
56	Range 62U to 29D		Stable				N	O	O	O	N	N	N	N	N	O	O	N	N			
56	Range 49D		Unstable				-	-	R	N	N	F	N	N	N	N	N	N	N			
90	Range 70D	12-9	Unstable						-	R	N	F	N	N	F	N	N	N	N			
90	Range 85D		Unstable						-	R	N	O	N	N	F	N	N	N	N			
149	586.15 MAHP	12-14	No prediction										N	N	O	N	N	N	N			
90	585.90 MAHP	12-9	Stable						-	-	-	-	-	-	-	-	-					
149	585.65 MAHP	12-14	Unstable											-	-	-	-					
	Prentiss, Miss., 583 MAHP							-5	-13	-7	-1	-4	-6	-8	-6	-11	-11	-9	-6			
150	584.50 to 584.20 MAHP	12-14	Unstable										-	-	R	N	N	N	N			
150	584.05 MAHP		Unstable										R	N	N	N	N	N	N			
74	Range 45U to 12U	12-8	Stable					-	-	R	N	N	O	N	N	N	O	N	N			
74	Range 1D		Unstable					N	N	N	N	N	N	N	N	N	N	N	N			
74	Ranges 12D and 19D		Stable					N	N	N	N	N	O	N	N	N	N	N	N			
	Ozark, Ark., 578 MAHP								-14	-8	-1	-4	-7	-9	-8	-12	-12	-9	-5			
91	580.6 MAHP	12-9	Unstable						-	-	-	-	-	-	-	-	-					
91	579.8 MAHP		Unstable						-	R	N	N	N	N	N	N	N	N	N			
91	Ranges 16U and 3U		Stable						-	R	N	N	N	N	N	N	N	N	N			
91	Range 10D to 51D		Stable						N	N	O	N	N	N	N	N	N	N	N			
91	Range 64D		No prediction						N	N	N	N	N	N	N	N	O	N	N			
91	Range 78D		Stable						N	N	N	N	N	N	N	N	O	N	N			
91	Range 92D		Unstable						R	N	N	N	N	N	N	N	N	F	N			
151	Range 99D	12-14	Stable										R	N	N	N	N	N	N			
151	Range 106D		No prediction						-	-	-	-	R	N	N	N	N	N	N			
151	575.75 MAHP		Stable										R	N	N	N	N	N	N			
151	575.50 MAHP		Unstable										-	-	-	-	-					
	Catfish Point, Miss., 574 MAHP			-7	-13	-4	-6	-14	-9	-1	-5	-7	-9	-8	-12	-12	-9	-5			
152	575.85 to 575.20 MAHP	12-14	Stable										-	R	N	N	N	N				
152	574.95 and 574.75 MAHP		Unstable										-	R	N	N	N	N				
152	574.55 and 574.30 MAHP		Stable										-	R	N	N	N	N				
24	Ranges 26U and 21U	12-4	Stable	N	N	N	N	N	N	O	N	N	N	N	N	(F)	N	O				
24	Range 13U		Unstable	N	N	N	N	N	N	N	N	N	N	N	N	N	F	N				
24	Range 5U		Stable	N	N	N	N	N	N	N	O	N	N	N	N	N	N	N				
24	Range 2D		Unstable	N	O	O	F	N	N	N	N	N	N	N	N	N	N	N				
24	Range 38D		Stable	N	N	N	O	N	N	N	O	N	N	O	N	N	N	N				

(Continued)

Table 6 (Continued)

No.	Revetment Site Location	Potamology Report in Which Borings Are Evaluated	Predicted Performance with Regard to Flow Failure	Estimated Maximum River Stage Referenced to Bank-Full Conditions (ft) Observed Performance (Letter Symbols) 54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72
			VICKSBURG DISTRICT (Continued)																			
	Cypress Bend, Ark., 568 MAHP						-5	-7	-15	-10	-1	-5	-8	-10	-8	-13	-13	-9	-5			
192	570.80 MAHP	12-19	Unstable														-	-	-			
192	570.70 MAHP		Unstable														R	N	N			
192	570.50 MAHP		Stable														R	N	N			
192	570.40 MAHP		Unstable														R	N	N			
192	570.30 MAHP		Stable														R	N	N			
192	570.10 MAHP		Stable														R	N	N			
57	Range 49U	12-7	Stable				-	-	-	-	-	-	-	-	-	-	R	N	N			
57	Range 35U		Unstable				N	N	N	N	N	N	N	N	N	N	N	F	N			
57	Range 20U		Stable				N	N	N	N	N	N	N	N	N	N	N	N	O			
57	Range 6U		Unstable				N	N	N	N	N	N	N	N	N	N	N	F	N			
57	Ranges 8D and 23D		Stable				O	N	N	N	N	N	N	N	N	N	N	O	N			
57	Range 35D		Unstable				N	N	N	N	N	O	N	N	N	N	N	F	N			
57	Range 51D		Stable				N	O	N	N	N	N	N	N	N	N	N	O	N			
140	Range 57D	12-13	Stable									R	N	N	N	N	N	O	N			
140	Ranges 58D to 86D	12-13	Stable									R	N	N	N	N	N	O	N			
172	566.50 to 566.00 MAHP	12-17	Stable											R	N	'N	N	N	N			
	Eutaw, Miss., 564 MAHP						-5	-8	-16	-10	-1	-6	-8	-10	-9	-13	-13	-9	-5			
58	566.5 and 566.2 MAHP	12-7	Stable				-	-	-	-	-	-	-	-	-	-	-	-	-			
58	Range 33D		Unstable				-	-	R	N	N	N	N	N	N	N	N	N	N			
58	Range 44D to 68D		Stable				-	-	-	-	-	-	-	-	-	R	N	N	N			
58	Range 79D		Stable				-	-	-	-	-	-	-	-	-	-	-	-	-			
	Mounds, Miss., 562 MAHP													-10	-8	-13	-13	-9	-5			
153	593.90 to 563.50 MAHP	12-14	Unstable											R	N	N	N	N	N			
153	563.35 to 562.95 MAHP		Stable											R	N	N	N	N	N			
153	562.70 to 562.10 MAHP		Stable											N	N	N	O	N	N			
153	561.40 to 561.00 MAHP		Unstable											N	N	R	N	N	F			
153	560.90 MAHP		Unstable											-	-	R	N	N	N			
193	560.80 MAHP	12-19	Unstable														-	-	R			
193	560.60 MAHP		Unstable														-	-	-			
193	560.50 MAHP		Unstable														-	-	-			
	Pair-O-Dice, Ark., 561 MAHP						-6	-9	-16	-11	-2	-6	-9	-10	-9	-13	-13	-9	-5			
59	562.6 MAHP	12-7	No prediction				-	-	-	-	-	-	-	-	-	-	-	-	-			
59	Range 26U to 1U		Stable				N	N	N	N	N	O	N	N	N	N	N	N	N			
59	Range 13D		Unstable				N	N	N	N	N	N	N	N	N	N	N	N	N			
59	Range 25+50D		Stable				N	N	N	N	N	N	N	N	N	N	N	N	N			
59	559.40 MAHP		Unstable				-	-	-	-	-	-	-	-	-	-	-	-	-			
	Huntington Point, Miss., 557 MAHP									-11	-2	-6	-9	-11	-9	-14	-14	-8	-5			
105	557.5 to 557.0 MAHP	12-10	Stable							-	-	-	-	-	-	-	-	-	-			

(Continued)

Table 6 (Continued)

No.	Revetment Site Location	Potamology Report in Which Borings Are Evaluated	Predicted Performance with Regard to Flow Failure	Estimated Maximum River Stage Referenced to Bank-Full Conditions (ft) Observed Performance (Letter Symbols) 54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72
			VICKSBURG DISTRICT (Continued)																			
	Yellow Bend, Ark., 552 MAHP										-1	-6	-9	-10	-9	-14	-13	-8	-4			
117	Range 163D	12-11	Stable								R	N	N	N	N	N	N	N	N			
117	Range 170D		Unstable								R	N	N	N	N	N	N	N	N			
117	Range 176D		Stable								R	N	N	N	N	N	N	N	N			
154	551.20 MAHP	12-14	Stable										R	N	N	N	N	(F)	N			
154	551.05 MAHP		Unstable										R	N	N	N	N	N	N			
154	550.75 MAHP		Stable										R	N	N	N	N	N	N			
154	550.55 MAHP		Unstable										R	N	N	N	N	N	N			
154	550.35 to 550.15 MAHP		No prediction										R	N	N	N	N	N	N			
154	549.95 MAHP		Stable										R	N	N	N	N	N	N			
154	549.80 MAHP		Unstable										R	N	N	N	N	N	N			
154	549.55 to 549.40 MAHP		Stable										-	-	-	-	-	-	-			
154	549.25 MAHP		Unstable										-	-	-	-	-	-	-			
	Georgetown, Ark., 550 MAHP								-12	-11	-1	-6	-7	-9	-7	-13	-13	-8	-4			
92	Range 188D to 240D	12-9	Stable						-	-	-	-	R	N	N	N	N	N	N			
	Island 82, Ark., 546 MAHP														-9	-12	-12	-8	-4			
180	546.35 to 545.55 MAHP	12-18	Stable												R	N	N	N	N			
	Miller Bend, Miss., 544 MAHP												-6	-7	-7	-11	-11	-8	-4			
127	Range 204D	12-12	Unstable									N	N	F	N	N	N	N	N			
127	Range 213D		Unstable									N	N	N	N	N	N	N	N			
155	541.50 to 541.30 MAHP	12-14	Unstable										-	-	-	-	-	-	-			
127	Range 223D	12-12	Stable									N	N	N	N	N	N	N	N			
127	Range 233D		Stable									-	-	-	-	-	-	-	-			
155	541.15 to 540.80 MAHP	12-14	Unstable										-	-	-	-	-	-	-			
155	540.65 to 540.25 MAHP		Stable										-	-	-	-	-	-	-			
155	540.10 to 539.65 MAHP		Unstable										-	-	-	-	-	-	-			
	La Grange, Miss., 538 MAHP													-7	-7	-9	-9	-8	-4			
156	539.35 to 539.20 MAHP	12-14	Unstable											-	-	-	-	-	-			
156	539.00 to 538.85 MAHP		Stable											-	-	-	-	-	-			
156	538.35 MAHP		Unstable										R	N	N	N	N	N	N			
156	538.10 to 537.80 MAHP		Stable										R	N	O	N	N	N	N			
156	537.60 to 537.45 MAHP		Stable											R	N	N	N	N	N			

(Continued)

Table 6 (Continued)

Revetment Site No.	Location	Potamology Report in Which Borings Are Evaluated	Predicted Performance with Regard to Flow Failure	Estimated Maximum River Stage Referenced to Bank-Full Conditions (ft) Observed Performance (Letter Symbols) 54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72
				VICKSBURG DISTRICT (Continued)																		
	Lakeport, Ark., 528 MAHP								-10	-11	+4	0	-3	-4	-3	-7	-8	-7	-4			
157	530.50 MAHP	12-14	Stable											-	-	-	-	-	-			
157	530.30 MAHP		No prediction											-	-	-	-	-	-			
157	530.10 MAHP		Stable											-	-	-	-	-	-			
157	529.90 MAHP		No prediction											-	-	-	-	-	-			
157	529.70 and 529.50 MAHP		Stable											-	-	-	-	-	-			
157	529.35 MAHP		Unstable											-	-	-	-	-	-			
157	529.15 MAHP		Stable											-	-	-	-	-	-			
93	Range 14D to 33D	12-9	Stable						N	N	O	O	N	N	N	N	N	N	N			
93	Range 56D		Unstable						N	N	N	F	N	N	N	N	N	N	N			
93	Range 70D		No prediction						-	-	-	-	-	-	-	-	-	-	-			
106	Range 112D	12-10	Stable							-	-	-	-	-	-	-	-	-	-			
106	Range 121D		Unstable							N	N	N	N	N	N	N	N	N	N			
106	Range 131D		Stable							N	N	N	N	N	N	N	N	N	N			
106	Range 140D		Unstable							N	N	N	N	N	N	N	N	N	N			
106	Range 151D	12-10	Stable							R	N	N	N	N	N	N	N	N	N			
	Walnut Point, Miss., 522 MAHP						-1	-4	-10	-5	+4	0	-3	-4	-3	-7	-8	-7	-3			
60	523.90 MAHP	12-7	Stable				-	-	-	-	-	-	-	-	-	-	R	N	N			
60	523.70 MAHP		Unstable				-	-	-	-	-	-	-	-	-	-	R	N	N			
60	Range 26U		Stable				N	N	N	N	N	N	N	N	N	N	N	O	N			
60	Range 12U		Unstable				N	N	N	N	N	N	N	N	N	N	N	N	N			
60	Ranges 2D and 16D		Stable				N	N	N	N	N	O	N	N	N	N	N	N	N			
60	Range 30D		Unstable				N	N	N	N	N	N	N	N	N	N	N	N	N			
60	Ranges 39D and 53D		Stable				N	N	N	N	N	N	N	N	N	N	N	N	N			
158	Ranges 58D and 65D	12-14	Stable										R	N	N	N	N	N	N			
60	Range 67D	12-7	Stable				-	-	-	-	-	-	R	N	N	N	N	N	N			
158	Range 71D	12-14	Stable										R	N	N	N	N	N	N			
158	520.3 MAHP		No prediction											R	N	N	N	N	N			
60	520.2 MAHP	12-7	Stable				-	-	-	-	-	-	-	R	N	N	N	N	N			
158	520.1 MAHP	12-14	Unstable											R	N	N	N	N	N			
158	519.7 MAHP		Stable											R	N	N	N	N	N			
158	519.5 MAHP	12-14	Unstable											R	N	N	N	N	N			
	Kentucky Bend, Miss., 519 MAHP												-3	-4	-3	-7	-8	-7	-3			
141	520.1 to 519.7 MAHP	12-13	Stable									-	-	R	N	N	N	N	N			
141	Range 54D		Stable									N	N	N	N	N	N	N	(F)			
141	Range 61D		Unstable									N	N	N	N	N	N	N	N			
141	Ranges 65D and 72D		Stable									N	N	N	O	(F)	N	N	N			
141	Range 79D		Unstable									N	N	N	F	N	N	N	N			
141	Range 87D		Stable									N	N	N	O	N	N	N	N			
141	Range 93D		Unstable									N	N	N	N	N	N	N	N			

(Continued)

Table 6 (Continued)

No.	Revetment Site Location	Potamology Report in Which Borings Are Evaluated	Predicted Performance with Regard to Flow Failure	Estimated Maximum River Stage Referenced to Bank-Full Conditions (ft) Observed Performance (Letter Symbols) 54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72
				VICKSBURG DISTRICT (Continued)																		
	Island No. 88, Miss., 514 MAHP																-8	-7	-3			
194	514.6 MAHP	12-19	Unstable														-	-	-			
194	514.5 MAHP		Stable														-	-	-			
194	514.3 MAHP		Unstable														R	N	N			
194	514.2 MAHP		Stable														R	N	N			
194	514.1 MAHP		Stable														R	O	N			
194	513.9 MAHP		Stable														RO	O	N			
194	513.7 MAHP		Stable														RO	N	N			
194	513.6 MAHP		Stable														R	N	(F)			
194	513.5 MAHP		Stable														R	N	N			
194	513.3 MAHP		Unstable														N	N	F			
194	513.2 MAHP		No prediction														N	N	N			
	Cracraft, Ark., 513 MAHP			-4	-9	-1	-4	-10	-6	+4	+1	-3	-4	-3	-7	-8	-7	-3				
142	513.3 MAHP	12-13	Stable								-	-	-	-	-	-	-	-				
142	513.1 and 512.9 MAHP		No prediction								-	-	-	-	-	-	-	-				
142	512.7 MAHP		Stable								-	-	-	R	N	N	O	(F)				
159	512.7 MAHP	12-14	No prediction										-	R	N	N	N	N				
216	508.6 to 508.0 MAHP	12-21	Unstable															-				
142	Range 80U	12-13	No prediction								-	-	-	R	N	N	O	O				
142	Range 74U		Stable								O	N	N	O	N	N	N	N				
9	Range 61U to 44U	12-3	Stable	N	N	N	O	N	N	N	N	N	N	N	N	N	N	N				
9	Range 33U		Unstable	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N				
9	Ranges 26U and 18U		Stable	N	N	N	N	N	N	N	N	O	N	N	N	N	N	N				
9	Range 6U		Unstable	F	N	N	N	N	N	N	N	N	N	N	N	N	N	N				
25	Range 30D	12-4	Unstable	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N				
	Carolina, Miss., 507 MAHP			-4	-9	-1	-4	-10	-6	+4	+1	-3	-4	-3	-8	-7	-7	-3				
118	Range 60U to 44U	12-11	Stable							R	O	N	N	N	N	N	N	N				
118	Range 37U		Unstable							R	O	O	F	N	N	N	N	N				
26	Range 3D	12-4	Stable	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N				
	Sarah Island, Miss., 504 MAHP													-3	-8	-7	-7	-3				
181	505.0 MAHP	12-18	Stable											-	-	-	-	-				
181	504.85 to 503.85 MAHP		Unstable											R	N	N	N	N				
181	503.70 MAHP		Stable											R	N	N	N	N				
181	503.45 and 503.3 MAHP		Unstable											R	N	N	N	N				
181	503.10 MAHP		Stable											-	-	R	N	N				
181	502.95 MAHP		No prediction											-	-	R	N	N				
	Mayersville, Miss., 496 MAHP							-11	-6	+4	+1	-3	-4	-3	-8	-7	-7	-3				
217	500.85 to 500.20 MAHP	12-21	Stable														-	-				
217	499.95 MAHP		Unstable														-	-				
119	499.9 MAHP	12-11	Stable							-	-	-	-	-	-	-	-	-				
217	499.8 MAHP	12-21	Stable														-	-				
217	499.65 MAHP		Unstable														-	-				
217	499.5 MAHP		Stable														-	-				
119	499.4 MAHP	12-11	Unstable							-	-	-	-	-	-	-	-	-				
217	499.3 MAHP	12-21	Stable														-	-				

(Continued)

Table 6 (Continued)

Revetment Site No.	Location	Potamology Report in Which Borings Are Evaluated	Predicted Performance with Regard to Flow Failure	Estimated Maximum River Stage Referenced to Bank-Full Conditions (ft) Observed Performance (Letter Symbols) 54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72
				VICKSBURG DISTRICT (Continued)																		
	Mayersville, Miss., 496 MAHP (Continued)																					
94	Range 80U	12-9	Unstable						N	N	N	N	N	N	N	N	N	N	N			
94	Range 56U		Stable						O	N	N	N	N	N	N	N	N	N	N			
94	Range 48U		Unstable						N	N	N	N	N	N	N	N	N	N	N			
94	Range 40U		Stable						N	O	N	O	O	N	N	N	N	N	N			
	Louisiana Bar, La., 490 MAHP							-4	-11	-6	+4	+1	-3	-4	-3	-8	-7	-6	-2			
78	491.4 to 490.3 MAHP	12-8	Stable					-	-	-	-	-	-	-	-	-	-	-	-			
78	489.7 MAHP		Unstable					-	-	-	-	-	-	-	-	-	-	-	-			
	Baleshed-Stack Island, La., 489 MAHP													-4	-3	-8	-7	-6	-2			
173	492.90 MAHP	12-17	Unstable											-	-	-	-	-	-			
173	492.70 MAHP		Stable											-	-	-	-	-	-			
173	492.50 MAHP		Unstable											-	-	-	-	-	-			
173	492.30 MAHP		No prediction											-	-	-	-	-	-			
173	492.10 MAHP		Unstable											-	-	-	-	-	-			
173	491.90 to 491.75 MAHP		Stable											-	-	-	-	-	-			
173	491.55 MAHP		No prediction											-	-	-	-	-	-			
173	491.40 MAHP		Unstable											-	-	-	-	-	-			
173	491.15 and 491.00 MAHP		Stable											-	-	-	-	-	-			
173	490.80 to 490.4 MAHP		Unstable											R	N	N	N	N	N			
160	490.15 MAHP	12-14	Unstable											R	N	N	N	N	N			
160	490.00 MAHP		Stable											R	N	N	N	N	N			
160	489.80 to 489.70 MAHP		Unstable											R	N	N	N	N	N			
160	489.50 and 489.35 MAHP		Unstable											-	R	N	N	N	N			
160	489.15 MAHP		Unstable											-	-	R	N	N	N			
160	489.00 to 488.60 MAHP		Unstable											N	N	N	N	N	N			
160	488.45 MAHP		Stable											N	N	N	N	N	N			
160	488.25 to 487.70 MAHP		Unstable											N	N	N	N	N	N			
160	487.50 MAHP		Stable											N	N	N	N	N	N			
160	487.35 MAHP		Unstable											N	N	N	N	N	N			
160	487.15 MAHP		Unstable											R	N	N	N	N	F			
160	486.95 to 486.75 MAHP		Unstable											-	R	N	N	N	N			
182	486.60 MAHP	12-18	Unstable											-	R	N	N	N	N			
182	486.40 and 486.20 MAHP		Unstable												-	R	N	N	N			
195	486.00 MAHP	12-19	Unstable														R	N	N			
195	485.80 to 485.40 MAHP		Unstable														-	-	R			
218	485.3 to 484.2 MAHP	12-21	Unstable															-	-			
	Ben Lomond, Miss., 487 MAHP				-9	-1	-4	-11	-7	+3	-3	-3	-4	-2	-8	-7	-6	-2				
42	Ranges 33U and 19U	12-6	Stable		-	-	-	-	-	-	-	-	-	-	-	-	-	-				
42	Ranges 5U to 21D		Stable		N	N	O	N	N	N	N	N	N	N	N	N	N	N				
42	Ranges 34D and 49D		Unstable		N	N	F	N	N	F	F	N	N	N	N	N	N	N				
	Hagaman, La., 483 MAHP			-4	-9	-1	-4	-11	-7	+3	+1	-3	-4	-3	-8	-7	-6	-2				
95	Ranges 146 and 166	12-9	No prediction				-	-	-	-	-	-	-	-	-	-	-	-				
95	Range 176		Stable				-	R	N	N	N	N	N	N	N	N	N	N				

(Continued)

Table 6 (Continued)

Revetment Site No.	Revetment Site Location	Potamology Report in Which Borings Are Evaluated	Predicted Performance with Regard to Flow Failure	Estimated Maximum River Stage Referenced to Bank-Full Conditions (ft) Observed Performance (Letter Symbols) 54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72
	VICKSBURG DISTRICT (Continued)																					
	Hagaman, La., 483 MAHP (Continued)																					
27	Range 186 to 241	12-4	Stable	O	N	O	O	O	N	N	O	N	N	N	N	N	N	N	N			
27	Range 265		Unstable	N	N	O	O	N	N	N	N	N	N	N	N	N	N	N	N			
143	Range 288 to 309	12-13	Stable								R	N	N	N	N	N	N	N	N			
143	Range 316		Unstable								R	N	N	N	N	N	N	N	N			
143	Range 321		Stable								R	N	N	N	N	N	N	N	N			
143	Range 335		No prediction								R	N	N	N	N	N	N	N	N			
143	Range 342		Unstable								-	-	-	-	-	-	-	-	-			
	Cottonwood, Miss., 472 MAHP					-10	-1	-4	-12	-7	+3	0	-3	-5	-3	-8	-8	-6	-2			
128	Range 26U	12-12	Unstable								R	N	N	N	N	N	N	N	N			
43	Range 11U	12-6	Unstable			-	R	N	N	F	F	N	N	N	N	N	N	N	N			
43	Range 3D		Stable			-	R	N	N	N	O	N	N	N	N	N	N	N	N			
43	Range 16D to 52D		Unstable			N	F	N	N	N	N	N	F	N	N	N	N	N	N			
43	Range 72D		Stable			N	N	N	N	N	N	N	N	N	N	N	N	N	N			
161	472.05 to 471.25 MAHP	12-14	Unstable											-	-	-	-	-	-			
161	471.05 MAHP		Stable											-	-	-	-	-	-			
161	470.85 and 470.60 MAHP		Unstable											-	-	-	-	-	-			
	Goodrich, La., 470 MAHP							-4	-12	-8	+4	0	-4	-5	-3	-8	-8	-6	-2			
96	470.2 MAHP	12-9	Stable						-	-	-	-	-	-	-	-	-	-	-			
96	470.0 MAHP		Unstable						-	-	-	-	-	-	-	-	-	-	-			
174	Range 120U	12-17	No prediction						-	-	-	-	-	-	-	-	-	-	-			
174	Range 112U		No prediction						-	-	-	-	-	-	-	R	N	N	N			
174	Range 105U		Unstable											R	N	N	N	F	N			
174	Range 99U		No prediction											R	N	N	N	N	N			
79	Range 88U to 64U	12-8	Unstable					O	F	N	N	F	F	F	N	N	N	N	N			
	Belle Island, La. and Miss., 460 MAHP					-10	-2	-4	-13	-7	+3	0	-4	-6	-4	-8	-8	-6	-2			
44	Range 39D	12-6	Stable			N	N	N	O	O	N	O	N	N	N	N	N	N	N			
61	Range 54D	12-7	Unstable				N	N	N	N	N	O	N	N	N	N	N	N	N			
61	Ranges 67D and 74D		No prediction				O	N	N	N	O	N	N	N	N	N	N	N	N			
61	Range 87D		Stable				-	-	-	R	N	N	N	N	N	N	N	N	N			
61	Range 212D		Unstable				-	-	-	-	-	-	-	-	-	-	-	-	-			
	Milliken Bend, Ark., 455 MAHP			-21	-5	-10	-2	-5	-13	-8	+2	0	-4	-6	-4	-8	-8	-6	-2			
10	Ranges 112D and 124D	12-3	Stable	-	-	-	-	R	N	N	N	N	N	N	N	N	N	N	N			
10	Range 134D		Unstable	-	-	-	-	R	N	N	N	N	N	N	N	N	N	N	N			
97	Ranges 178D to 212D	12-9	Unstable						N	N	F	N	N	N	N	N	N	N	N			
	Marshall Browns Point, Miss. and La., 447 MAHP				-5	-10	-2	-5	-13	-8	+2	-1	-4	-6	-4	-9	-9	-6	-2			
11	Ranges 16U and 8U	12-3	Unstable		F	N	N	F	N	N	N	N	N	N	N	N	N	N	N			
11	Range 2U*		Stable		(F)	(F)	N	(F)	N	N	N	N	N	N	N	N	N	N	N			
11	Range 5D		Unstable		N	N	O	O	N	N	N	N	N	N	N	N	N	N	N			
11	Ranges 11D and 18D		No prediction		F	N	O	O	N	N	N	O	N	N	N	N	N	N	N			
11	Ranges 24D and 31D		Unstable		F	F	F	N	N	N	N	N	N	N	N	N	N	N	N			

(Continued)

* Boring location previously predicted to be unstable. See Appendix A, Report 12-13, for discussion.

Table 6 (Continued)

No.	Revetment Site Location	Potamology Report in Which Borings Are Evaluated	Predicted Performance with Regard to Flow Failure	Estimated Maximum River Stage Referenced to Bank-Full Conditions (ft) Observed Performance (Letter Symbols) 54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72
			VICKSBURG DISTRICT (Continued)																			
	Kings Point, Miss., 439 MAHP										+2	-1	-5	-6	-4	-9	-9	-5	-2			
129	Range 6D	12-12	Stable								R	N	N	N	N	N	N	N	N			
129	Ranges 19D and 29D		Unstable								R	N	N	N	N	N	N	N	N			
162	439.80 to 439.40 MAHP	12-14	Unstable								-	-	-	R	N	N	N	N	N			
129	439.25 MAHP	12-12	Unstable								-	-	-	R	N	N	N	N	N			
162	439.15 to 438.10 MAHP	12-14	Unstable										-	R	N	N	N	N	N			
	Delta Point, La., 437 MAHP					-11	-3	-5	-13	-8	+2	-1	-5	-7	-4	-9	-9	-5	-2			
45	Ranges 24D and 47D	12-6	Unstable			-	-	-	-	-	R	N	N	N	N	N	N	N	N			
45	Range 70D		Stable			-	-	-	-	-	R	N	N	N	N	N	N	N	N			
	Racetrack, Miss., 433 MAHP					-10	-3	-5	-14	-8	+2	-1	-5	-6	-4	-9	-9	-5	-2			
196	435.4 to 434.7 MAHP	12-19	Stable														-					
46	Range 25U to 9D	12-6	Stable			-	-	-	-	-	R	N	N	N	N	N	N	N	N			
46	Range 33D		Unstable			N	N	N	N	N	N	N	N	N	N	N	N	N	N			
46	Range 50D		Stable			N	N	N	N	N	N	N	N	N-	N	N	N	N	N			
	Oak Bend, Miss., 425 MAHP															-8	-8	-5	-2			
183	426.45 to 425.85 MAHP	12-18	Stable													-	-	-	-			
	Reid-Bedford, La., 428 MAHP				-5	-10	-3	-5	-13	-8	+2	-1	-5	-6	-4	-8	-8	-5	-2			
28	429.15 MAHP	12-4	Stable		0	N	N	N	N	0	N	N	N	N	N	N	N	N	N			
28	428.75 to 427.65 MAHP		Unstable		N	F	F	F	F	N	N	N	N	N	F	N	N	N	N			
28	427.25 MAHP		Stable		N	N	0	N	N	N	N	N	N	N	N	N	N	N	N			
	Diamond, La. and Miss., 423 MAHP						-2	-4	-13	-8	+2	0	-4	-6	-4	-8	-8	-5	-2			
62	424.90 to 425.15 MAHP	12-7	Stable				-	-	-	-	-	-	-	-	-	-	-	-	-			
62	Range 14U		Unstable				N	N	N	N	N	N	N	N	N	N	N	N	N			
62	Range 1D		No prediction				N	N	N	N	N	N	N	N	N	N	N	N	N			
62	Range 7D to 40D		Unstable				-	R	N	F	N	0	N	N	F	N	N	N	N			
	Lake Karnac, La. and Miss., 419 MAHP							-4	-13	-8	+2	+1	-4	-6	-4	-8	-8	-5	-2			
120	421.00 and 420.75 MAHP	12-11	Stable								-	-	-	-	-	-	-	-	-			
120	420.5 MAHP		Stable								-	-	-	R	N	N	N	N	N			
80.	Range 18D to 36D	12-8	Stable					R	N	0	N	0	N	N	N	N	N	N	N			
80	Range 46D		Unstable					-	R	0	0	N	N	N	N	N	N	N	N			
80	Range 54D		Unstable					-	R	N	F	N	N	N	N	N	N	N	N			
80	Range 65D		No prediction					-	R	F	N	0	N	N	N	N	N	N	0			
144	Range 97D	12-13	Unstable									R	N	N	N	N	N	N	F			
144	Ranges 106D and 112D		Stable									R	N	N	N	N	N	N	(F)			
144	Range 119D		Unstable									R	N	N	N	N	N	N	N			
144	Range 126D		Stable									R	N	N	N	N	N	N	N			

(Continued)

Table 6 (Continued)

No.	Revetment Site Location	Potamology Report in Which Borings Are Evaluated	Predicted Performance with Regard to Flow Failure	Estimated Maximum River Stage Referenced to Bank-Full Conditions (ft) Observed Performance (Letter Symbols) 54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72
			VICKSBURG DISTRICT (Continued)																			
	Point Pleasant, La., 413 MAHP													-5	-3	-8	-8	-5	-2			
241**	415.4 to 415.3 MAHP	12-21	Unstable																F			
197	415.3 to 415.1 MAHP	12-19	Unstable														N	N	N			
163	414.20 MAHP	12-14	Stable											-	-	-	R	N	N			
163	414.00 MAHP		Unstable											-	-	-	R	N	F			
163	413.85 MAHP		Stable											-	-	-	R	O	N			
163	413.65 MAHP		No prediction											-	-	R	N	N	N			
163	413.45 MAHP		Unstable											-	-	R	N	N	N			
163	413.25 MAHP		No prediction											-	-	R	N	N	N			
163	413.05 to 412.90 MAHP		Stable											-	-	R	N	N	N			
163	412.75 MAHP		Unstable											-	-	R	N	N	N			
163	412.55 to 412.40 MAHP		Stable											-	-	R	N	N	N			
163	412.20 MAHP		No prediction											-	-	R	N	N	N			
184	412.00 MAHP	12-18	No prediction													R	N	N	N			
184	411.80 to 411.4 MAHP		Stable													R	N	N	N			
184	411.20 MAHP		Unstable													-	-	-	-			
184	411.00 MAHP		Stable													-	-	-	-			
	Grand Gulf, Miss., 405 MAHP										+2	+1	-3	-5	-3	-7	-7	-5	-2			
185	410.3 and 410.1 MAHP	12-18	Unstable												R	N	N	N	N			
185	409.95 MAHP		No prediction												R	N	N	N	N			
185	409.80 MAHP		Stable												R	N	N	N	N			
185	409.65 to 408.95 MAHP		Unstable												R	N	N	F	N			
185	408.75 and 408.60 MAHP		No prediction												R	N	N	N	N			
198	406.2 MAHP	12-19	No prediction														-	-	-			
198	406.0 to 405.8 MAHP		Unstable														-	-	-			
198	405.6 to 405.2 MAHP		No prediction														-	-	-			
121	Range 0 to 11D	12-11	No prediction								-	-	-	-	-	-	-	-	-			
121	Ranges 18D and 25D		No prediction								N	N	N	N	N	N	N	N	N			
121	Range 31D		Stable								N	N	N	N	N	N	N	N	N			
121	Range 38D		Unstable								N	N	N	N	N	N	N	N	N			
121	Range 44D		No prediction								N	N	N	N	N	N	N	N	N			
121	Range 52D to 83D		Stable								N	N	N	N	N	N	N	N	N			
121	Range 90D		No prediction								N	N	N	N	N	N	N	N	N			
121	Range 98D		Unstable								N	N	N	N	N	N	N	F	N			
121	Range 104D		No prediction								N	N	N	N	N	N	N	N	N			
121	Range 111D to 123D		Unstable								N	N	N	N	N	N	N	F	N			
121	Range 130D		Stable								N	N	N	N	F	N	N	N	N			
130	Range 135D	12-12	Stable								N	N	N	N	N	N	N	N	N			
130	Ranges 141D and 146D		Unstable								N	N	N	N	N	N	N	N	N			
130	Range 151D		Stable								N	N	N	N	N	N	N	N	N			
130	Range 156D		Unstable								N	N	N	N	N	N	O	N	N			
130	Ranges 162D to 179D		Unstable								N	N	N	N	N	N	F	N	N			
130	Range 186D		Unstable								R	N	N	N	N	N	N	F	F			
											-	-	-	-	-	-	-	-	-			

(Continued)

** This is not a site previously studied since it was bored in 1969. However, the occurrence of a flow failure at this location warrants its inclusion herein.

Table 6 (Continued)

No.	Revetment Site Location	Potamology Report in Which Borings Are Evaluated	Predicted Performance with Regard to Flow Failure	Estimated Maximum River Stage Referenced to Bank-Full Conditions (ft) Observed Performance (Letter Symbols) 54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72
			VICKSBURG DISTRICT (Continued)																			
	Goldbottom, Miss., 389 MAHP									-8	+2	+1	-3	-4	-3	-7	-7	-5	-2			
107	Range 22D	12-10	No prediction							-	-	-	-	R	N	N	N	N	N			
107	Range 35D		No prediction							N	N	N	N	N	N	N	N	N	N			
107	Ranges 50D and 65D		Stable							N	N	N	N	N	N	N	N	N	N			
107	Range 78D		Unstable							N	N	F	N	N	O	N	F	N	N			
107	Range 91D		Stable							N	O	O	N	N	N	N	N	N	N			
107	Ranges 104D to 142D		Unstable							N	O	F	N	N	F	N	N	F	F			
131 164	Range 149D	12-12 12-14	Unstable							R	N	N	N	N	N	N	N	F	F			
131 164	Range 154D to 168D		Unstable							-	-	-	R	N	N	N	N	N	N			
131 164	Range 175D		Unstable							-	-	-	-	-	-	-	-	-	-			
164 219	390.2 to 388.4 MAHP	12-14 12-21	Unstable											-	-	-	-	-	-			
219	388.2 MAHP	12-21	Stable															-	-			
219	388.0 MAHP		Unstable															-	-			
219	387.8 to 386.8 MAHP		Stable															-	-			
	Kempe Bend, La., 384 MAHP													-4	-3	-6	-7	-5	-2			
165	384.95 to 384.25 MAHP	12-14	Unstable											-	-	-	-	-	-			
	Ashland, Miss., 377 MAHP													-4	-3	-6	-7	-5	-2			
166	378.95 and 378.75 MAHP	12-14	Unstable											-	-	-	-	-	-			
166	378.55 MAHP		Stable											-	-	-	-	-	-			
166	378.35 and 378.20 MAHP		Unstable											-	-	-	-	-	-			
166	378.00 MAHP		Stable											-	-	-	-	-	-			
166	377.80 MAHP		No prediction											-	-	-	-	-	-			
166	377.55 and 377.30 MAHP		Unstable											-	-	-	-	-	-			
166	377.10 MAHP		No prediction											-	-	-	-	-	-			
166	376.95 to 376.40 MAHP		Stable											-	-	-	-	-	-			
	Gibson, La., 370 MAHP									-8	+2	0	-5	-4	-4	-6	-8	-5	-2			
186	370.70 MAHP	12-18	Stable													N	N	N	N			
186	370.55 MAHP		Unstable													N	N	N	N			
108	370.40 MAHP	12-10	Unstable							-	-	-	-	-	-	-	-	-	-			
186	370.35 and 370.15 MAHP	12-18	Unstable													N	N	N	N			
108	370.10 MAHP	12-10	Unstable							-	-	-	-	-	-	-	-	-	-			
186	369.95 MAHP	12-18	Unstable													N	N	N	N			
186	369.75 MAHP		No prediction													N	N	N	N			
199	369.6 to 369.4 MAHP	12-19	Unstable														N	N	N			
199	369.2 MAHP		No prediction														N	N	N			

(Continued)

Table 6 (Continued)

No.	Revetment Site Location	Potamology Report in Which Borings Are Evaluated	Predicted Performance with Regard to Flow Failure	Estimated Maximum River Stage Referenced to Bank-Full Conditions (ft) Observed Performance (Letter Symbols) 54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72
			VICKSBURG DISTRICT (Continued)																			
	Natchez Harbor, Miss., 362 MAHP						-2	-3	-12	-8	+2	0	-5	-4	-4	-6	-8	-5	-2			
63	362.3 MAHP	12-7	Stable				-	-	-	-	-	-	-	-	-	-	-	-	-			
63	362.1 MAHP		No prediction				-	-	-	-	-	-	-	-	-	-	-	-	-			
63	361.9 MAHP		Stable				-	-	-	-	-	-	-	-	-	-	-	-	-			
63	361.7 and 361.5 MAHP		No prediction				-	-	-	-	-	-	-	-	-	-	-	-	-			
63	361.3 MAHP		Stable				-	-	-	-	-	-	-	-	-	-	-	-	-			
	Carthage, Miss., 361 MAHP													-4	-4	-6	-8	-5	-2			
167	362.30 MAHP	12-14	Stable											-	-	-	-	-	-			
167	361.95 MAHP		Stable											N	N	N	N	N	N			
167	361.20 and 361.00 MAHP		No prediction											N	N	N	N	N	N			
167	360.90 and 360.70 MAHP		Stable											-	-	-	-	-	-			
167	360.55 MAHP		No prediction											-	-	-	-	-	-			
167	359.95 MAHP		Stable											-	-	-	-	-	-			
167	359.55 and 359.35 MAHP		No prediction											-	-	-	-	-	-			
	Morville, La., 354 MAHP															-5	-7	-5	-2			
187	355.7 to 355.3 MAHP	12-18	No prediction													-	-	-	-			
187	355.15 to 354.75 MAHP		Stable													-	-	-	-			
187	354.60 and 354.40 MAHP		No prediction													-	-	-	-			
187	354.25 and 354.05 MAHP		Stable													-	-	-	-			
187	353.85 MAHP		No prediction													-	-	-	-			
187	353.65 MAHP		Stable													-	-	-	-			
200	353.5 MAHP	12-19	No prediction														-	-	-			
200	353.3 to 353.1 MAHP		Stable														-	-	-			
200	352.9 to 352.4 MAHP		No prediction														-	-	-			
200	352.2 MAHP		Stable														-	-	-			
200	351.9 MAHP		Stable														-	-	-			
	St. Catherine, La., 350 MAHP															-5	-6	-5	-2			
188	351.30 and 351.0 MAHP	12-18	Unstable													N	N	N	N			
188	350.65 to 349.15 MAHP		No prediction													N	N	N	N			
	Bougere Bend, La., 328 MAHP															-4	-3	-5	-2			
132	Ranges 51U and 44U	12-12	No prediction	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	R			
132	Range 38U		Stable	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	R			
†																						
			NEW ORLEANS DISTRICT																			
	St. Gabriel, La., 202 MAHP																	-1	+2			
220	Range 203.0 to 201.16	12-21	Stable															-	-			

(Continued)

† See Table 4 of Potamology Report 12-20 and earlier reports of this series for failure history of sites 23, 39, 75, 76, 77, 109, and 110 along the Arkansas River in the Vicksburg District and sites 12 and 13 along the Mississippi River in the New Orleans District.

Table 6 (Continued)

No.	Revetment Site Location	Potamology Report in Which Borings Are Evaluated	Predicted Performance with Regard to Flow Failure	Estimated Maximum River Stage Referenced to Bank-Full Conditions (ft) Observed Performance (Letter Symbols) 54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72
			NEW ORLEANS DISTRICT (Continued)																			
	Marchand, La., 180 MAHP																	-1	+1			
221	Range 180.6	12-21	Stable															-	-			
221	Range 180.0 to 179.6		Unstable															-	-			
	Smoke Bend, La., 178 MAHP																	-1	+1			
222	Range 177.9	12-21	Stable															-	-			
	Burnside, La., 170 MAHP																	0	+2			
223	Range 171.4 to 168.0	12-21	Stable															-	-			
	Romeville, La., 162 MAHP																	+1	+3			
224	Range 162.4	12-21	Stable															-	-			
	Rich Bend, La., 157 MAHP																	+2	+4			
225	Range 160.0 and 159.3	12-21	Stable															-	-			
225	Range 158.8		Unstable															-	-			
225	Range 158.3 to 155.9		Stable															-	-			
225	Range 155.4 and 154.8		No prediction															-	-			
225	Range 154.2		Stable															-	-			
	Lucy, La., 135 MAHP																	+2	+4			
226	Range 136.6 to 135.2	12-20	Stable															-	-			
226	Range 134.6 and 134.2		Unstable															-	-			
	Cut-Off, La., 88 MAHP																	+3	+4			
227	Range 90.8 to 86.8	12-21	Stable															-	-			
227	Range 86.1		Unstable															-	-			
	Poydras, La., 82 MAHP																	+3	+4			
228	Range 86.5 and 86.1	12-21	Stable															-	-			
228	Range 84.4		Unstable															-	-			
228	Range 83.8 and 83.3		Stable															-	-			
228	Range 82.8 and 82.5		Unstable															-	-			
228	Range 82.2 to 78.8		Stable															-	-			
	Linwood, La., 71 MAHP																	+3	+4			
229	Range 71.5 to 70.4	12-21	Stable															-	-			
229	Range 69.7		Unstable															-	-			
	Monsecour, La., 61 MAHP																	+3	+4			
230	Range 62.0 and 60.7	12-21	Stable															-	-			
	Myrtle Grove, La., 58 MAHP																	+3	+4			
231	Range 58.8	12-21	Stable															-	-			

(Continued)

Table 6 (Concluded)

No.	Revetment Site Location	Potamology Report in Which Borings Are Evaluated	Predicted Performance with Regard to Flow Failure	Estimated Maximum River Stage Referenced to Bank-Full Conditions (ft) Observed Performance (Letter Symbols) 54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72
			NEW ORLEANS DISTRICT (Continued)																			
	Junior, La., 54 MAHP																	+3	+4			
232	Range 54.5	12-21	Stable															-	-			
	Gravolet, La., 52 MAHP																	+3	+4			
233	Range 51.7		Stable															-	-			
	Tropical Bend, La., 30 MAHP																	+3	+4			
234	Range 32.4		Stable															-	-			
234	Range 32.0		No prediction															-	-			
234	Range 30.9 to 28.55		Stable															-	-			

Table 7

1968 Failures at Sites Previously Analyzed, Memphis and Vicksburg Districts

No.	Revetment Site Failure Location	Year Site Revetted	1968 Date Failure First Noted	1968 Date Failure Surveyed	Boring Data*						Location of Boring with Respect to Failure ft	Failure Type	Failure Dimensions and Position with Respect to Top of Bank**				Additional Information Concerning the Failure Location	Site Failure History Since 1954
					No.	Report in Which Analyzed	O ft	A ft	R Value	Prediction			W_{max} or W ft	W_{min} ft	Y ft	Z ft		
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)
									MEMPHIS DISTRICT									
31	Bend of Island 25, Tenn., 803 MAHP	1958 1962 1964																Ten shear failures have occurred between sta 268+00 and 284+00, sta 326+00 and 328+00, sta 278+00 and 290+00; at sta 714+00, between sta 292+00 and 330+00, and between sta 318+00 and 322+00 as described in Reports 12-9, -11, -12, -13, and -14.
	Sta 330+00		Jan	Jun	7	12-6	23	46	0.50	Unstable	400 US	Flow	440	280	400	-20		
35	Dean Island, Ark., 756 MAHP	1967																None
	Sta 159+00		Mar	Aug	2	12-6	2	22	0.09	Unstable	500 DS	Flow	220	70	220	20		
170	Island 63 Bar, Miss., 639 MAHP	1964																None
	Sta 146+00		Jul	Jul	2	12-17	0	47	0.00	Unstable	200 US	Flow	140	80	170	20		
138	Henrico, Ark., 606 MAHP	1962 1963																None
	Sta 69+00U		Jan	Jul	18	12-13	30	40	0.75	Unstable	300 DS	Flow	220	130	300	0	Scour hole occurred at toe of concrete mattress and between sta 78+00U and 66+00U. It had a width transverse to river current of 100 ft and a maximum depth of 10 ft at necks of the two adjacent failures	
	Sta 71+40U		Jan	Jul	18	12-13	30	40	0.75	Unstable	450 DS	Flow	200	100	250	40		
									VICKSBURG DISTRICT									
91	Ozark, Miss.-Ark., 578 MAHP	1958 1961																Three shear failures have occurred at ranges R-35-D, R-67-D+8S, and between R-81-D and R-82-D as described in Reports 12-12, -13, and -20
	Range 89D and 90D		Jul	Jul	D-11-58	12-9	37	49	0.78	Unstable	350 DS	Flow	200	100	250	40	20 ft of material has been scoured from beneath toe of revetment mattress since revetment was placed in 1961	
24	Catfish Point, Miss., 574 MAHP	1954																Seven shear failures have occurred between R-10-D and R-16-D, R-8-D and R-12-D, R-13-D and R-24-D, R-5-D and R-29-D, R-24-D and R-44-D, and at R-28-U and R-7-U as described in Reports 12-7, -8, -9, -12, -13, -18, and -20. Three flow failures have occurred at R-1-U, R-32-D, and R-42-D as described in Reports 12-9, -12, and -20
	Range 13U to 9U			Jul	C-3-54	12-4	14	31	0.45	Unstable	0	Flow	470	100	250	-60	30-ft depth of scour along toe of concrete mattress since 1954	
57	Cypress Bend, Ark., 569 MAHP	1956 1962 1965																Four shear failures have occurred at R-51-D, R-41-D, R-31-D, and between R-20-D and R-23-D as described in Reports 12-8, -9, and -13
	Range 33U+70		Feb	Jul	C-9-56	12-7	24	32	0.75	Unstable	200 US	Flow	110	50	150	60	10-ft depth of scour at toe of mattress since site last revetted in 1965	
	Range 7U to 6U		Feb	Jul	C-7-56	12-7	17	45	0.38	Unstable	100 DS	Flow	150	70	140	30	18-ft depth of scour along mattress toe since 1956	
	Range 3U		Feb	Jul	C-7-56	12-7	17	45	0.38	Unstable	450 US	Flow	170	130	160	70	10-ft depth of scour along toe of mattress since 1956	
	Range 18D to 19D		Feb	Jul	C-5-56	12-7	27	16	1.69	Stable	0	Shear	130	-	200	60	20-ft depth of scour at toe of mattress since 1956	
	Range 22D to 24D		Feb	Jul	C-5-56	12-7	27	16	1.69	Stable	0	Shear	300	-	110	-20	20-ft depth of scour along toe of mattress since 1956. Scour hole, 200 ft long, 100 ft wide, transverse to current, and 10 ft deep, was located at riverward limit of failure	

(Continued)

* O = overburden thickness, ft; A = zone A sand thickness, ft; R = ratio of overburden thickness to zone A sand thickness (O/A).

** See fig. 2 wherein

W = width of shear failure

W_{max} = maximum width of flow failure

W_{min} = width of flow failure at neck

Y = distance from top of failure to W_{min} (flow failure) or to toe of shear slide

Z = distance from top of slide to top of bank (+ if riverside, - if landside).

Table 7 (Concluded)

No. (1)	Revetment Site / Failure Location (2)	Year Site Revetted (3)	1968 Date Failure First Noted (4)	1968 Date Failure Surveyed (5)	Boring Data: No. (6)	Report in Which Analyzed (7)	O ft (8)	A ft (9)	R Value (10)	Prediction (11)	Location of Boring with Respect to Failure ft (12)	Failure Type (13)	Failure Dimensions and Position with Respect to Top of Bank: W or W_{max} ft (14)	W_{min} ft (15)	Y ft (16)	Z ft (17)	Additional Information Concerning the Failure Location (18)	Site Failure History Since 1954 (19)
												VICKSBURG DISTRICT (Continued)						
57	Cypress Bend, Ark., 569 MAHP (Continued)																	
	Range 33D		Feb	Jul	C-4-56	12-7	25	30	0.83	Unstable	300 DS	Flow	170	90	200	100	10-ft depth of scour along toe of mattress since 1956	
	Range 57D		Feb	Jul	CB-1-62	12-13	88	4	22.0	Stable	0	Shear	60	-	150	350	20-ft depth of scour along toe of mattress since revetment in 1962	
154	Ark. City-Yellow Bend, Ark., 551 MAHP	1963																None
	Range 193D to 195D		Mar	Jul	YB-1-63	12-14	49	35	1.40	Stable	250 DS	Flow	450	50	300	-60	30-ft depth of scour along toe of mattress since 1963. Large scour hole was located just downstream of failure and between R-194-D and R-200-D (900 ft). Hole was at toe of revetment and had a width transverse to current of 200 ft and a maximum depth of 15 ft	
60	Walnut Point, Miss., 523 MAHP	1956																One shear failure has occurred at R-1-D as reported in Report 12-13
	Range 24U to 22U		Jul	Jul	W-3-56	12-7	26	29	0.89	Stable	450 US	Shear	200	-	200	80	Scour hole 10 ft deep, 200 ft long (parallel to riverbank), and 50 ft wide was located just within failure at its riverward extent	
194	Island 88 (Worthington), Miss., 514 MAHP	1966																One flow failure has occurred at R-37-D and three overlapping shear failures occurred between R-38-D and R-41-D, as reported in Report 12-20
	Range 28D to 30D		Mar	Jul	W-7-66U	12-19	44	40	1.10	Stable	200 DS	Shear	250	-	300	-30	20-ft depth of scour along toe of mattress since 1966	
	Range 34D to 36D		Mar	Jul	W-6-66U	12-19	9	5	1.80	Stable	0	Shear	250	-	250	0	30-ft depth of scour along toe of mattress since 1966	
174	Goodrich, La., 470 MAHP	1964																Three shear failures have occurred between R-86-U and R-91-U, R-92-U and R-94-U, and R-92-U and R-99-U as described in Reports 12-9, -10, and -17. One flow failure has occurred between R-88-U and R-98-U as described in Report 12-13
	Range 103U		Mar	Aug	G-3-64U	12-17	23	73	0.32	Unstable	300 US	Flow	170	30	170	80		
163	Point Pleasant, Miss., 411 MAHP	1966 1967																None
	Range 109D to 112D		Mar	Aug	D-10-63 U		47	30	1.57	Stable	100 DS	Shear	200	-	250	100	40-ft depth of scour at toe of revetment since 1967. Scour hole was located at failure along toe of mattress. It was 150 ft long parallel to the bank, 10 ft deep, and 50 ft wide	
185	Grand Gulf, Miss., 409 MAHP	1965																None
	Range 138U to 134 U		Mar	Aug	G-9-65U	12-18	29	63	0.46	Unstable	300 US	Flow	580	100	250	60	30-ft depth of scour along toe of revetment since 1965	
130	Grand Gulf, Miss., 399 MAHP	1960 1961																One shear failure has occurred at R-151-D and one flow failure has occurred at R-156-D as reported in Report 12-20
	Range 91D		Mar	Aug	GG-15-60	12-11	-	No penetration	-	No prediction	-	Flow	240	50	300	100	Scour hole about 10 ft deep was located at outlet neck of failure. It lay between ranges 89D and 93D and had a width of 150 ft transverse to river flow	
	Range 103D to 104D		Mar	Aug	GG-17-60	12-11	-	No penetration	-	No prediction	-	Flow	270	50	330	60	Scour hole about 10 ft deep was located at outlet neck of failure. It lay between ranges 100D and 105D and had a width of 100 ft transverse to river flow	
	Range 174D		Mar	Aug	GG-29-61	12-12	43	58	0.74	Unstable	150 US	Flow	190	60	250	120	20-ft depth of scour along toe of concrete mattress at ranges 174D and 176D since 1961	
	Range 176D		Mar	Aug	GG-29-61						450 US	Flow	270	60	300	0		
107	Goldbottom, Miss., 393 MAHP	1959 1962																Five shear failures have occurred at R-73-D, R-84-D, R-86-D, R-97-D, and R-101-D as reported in Reports 12-12, -13, and -18. Four flow failures have occurred at R-77-D, R-79-D, R-100-D, and R-138-D as reported in Reports 12-13, -18, and -20
	Range 134D		Jan	Aug	GB-2-59	12-10	24	64	0.38	Unstable	350 US	Flow	350	150	500	-100	Scour hole was located at toe of mattress and just upstream of failure. It lay between ranges 131D and 133D, had a maximum depth of 20 ft, and a width transverse to river flow of 200 ft. Outlet neck of failure joined scour hole	
	Range 142D		Jan	Aug	GB-1-59	12-10	10	87	0.12	Unstable	0	Flow	200	40	450	-100	30-ft depth of scour along mattress toe between ranges 142D and 152D since 1962	
	Range 143D to 145D		Jan	Aug	GB-1-59						300 US	Flow	400	160	450	-120		
	Range 146D to 147D		Jan	Aug	GB-11-61	12-12	13	30	0.43	Unstable	350 DS	Flow	350	50	450	-120		
	Range 149D to 152D		Jan	Aug	GB-11-61						50 US	Flow	350	100	400	240		

Table 8

1969 Failures at Sites Previously Analyzed, Memphis and Vicksburg Districts

Revetment Site No. (1)	Failure Location (2)	Year Site Revetted (3)	1968 Date Failure First Noted (4)	1968 Date Failure Surveyed (5)	Boring Data* No. (6)	Report in Which Analyzed (7)	O ft (8)	A ft (9)	R Value (10)	Prediction (11)	Location of Boring with Respect to Failure ft (12)	Failure Type (13)	Failure Dimensions and Position with Respect to Top of Bank**: W or W_{max} ft (14)	W_{min} ft (15)	Y ft (16)	Z ft (17)	Additional Information Concerning the Failure Location (18)	Site Failure History Since 1954 (19)
												MEMPHIS DISTRICT						
69	Oldtown Bend, Ark., 643 MAHP	1958 1959 1961																Three shear failures have occurred between sta 288+00 and 301+00 and at sta 313+50 and sta 315+50 as described in Reports 12-17 and -18
	Sta 283+25		Aug	Sep	18	12-8	66	0	--	Stable	25 DS	Shear	250	--	200	0		
138	Henrico, Ark., 606 MAHP	1962 1967																None
	Sta 60+00 to 67+00		Nov (1968)	Jun	18		30	40	0.75	Unstable	0	Shear	670	--	200	0		
												VICKSBURG DISTRICT						
24	Catfish Point, Miss., 574 MAHP	1956 1961																Seven shear failures have occurred between R-10-D and R-16-D, R-8-D and R-12-D, R-14-D and R-24-D, R-5-D and R-29-D, at R-23-U and at R-7-U; and between R-24-D and R-44-D as described in Reports 12-7, -8, -9, -12, -13, -18, and -20. Four flow failures have occurred at R-1-U, R-32-D, R-42-D, and R-18-U as described in Reports 12-9, -12, and -20.
	Range 24U to 22U		Jul	Jul	C-1-54	12-4	49	36	1.36	Stable	250 US	Shear	300	--	250	150	20-ft depth of scour along toe of concrete mattress since 1961	
153	Mounds, Miss., 562 MAHP	1962 1963																None
	Range 60D		Jul	Sep	M-13-63	12-14	19	73	0.26	Unstable	300 DS	Flow	220	120	300	0	Large scour hole located at toe of concrete mattress between ranges 54D and 62D. Hole was 300 ft wide transverse to river current, and a maximum of 20 ft deep just upstream of failure neck	
	Range 67D		Jul	Sep	M-13-63	12-14	19	73	0.26	Unstable	180 DS	Flow	220	50	300	0	40-ft depth of scour along toe of mattress at range 67D since 1963	
141	Kentucky Bend, Miss., 519 MAHP	1952 1962																Two shear failures have occurred between R-68-D and R-71-D and between R-71-D and R-81-D and two flow failures have occurred at R-78-D and R-67-D as described in Reports 12-13 and -19
	Ranges 54D to 56D		Jul	Jul	KB-4-62	12-13	45	33	1.36	Stable	0	Flow	260	110	260	0	Large scour hole located at toe of mattress between ranges 52D and 56D. Hole had a maximum width transverse to river flow of 250 ft and a maximum depth of 30 ft at point about 200 ft upstream of failure neck	
194	Island 88 (Worthington), Miss., 514 MAHP	1966 1967 1968																Three shear failures have occurred between R-38-D and R-41-D and one flow failure has occurred at R-37-D as reported in Report 12-20
	Range 49D		Mar	Aug	W-4-66	12-19	9	0	--	Stable	200 US	Flow	180	40	300	-30	20-ft depth of scour at toe of mattress along reach from ranges 49D to 62D since 1967	
	Range 57D to 58D		Mar	Aug	W-2-66	12-19	10	23	0.44	Unstable	100 DS	Flow	280	80	350	-50		
	Range 60D to 62D		Mar	Aug	W-2-66	12-19	10	23	0.44	Unstable	50 US	Flow	440	50	300	-60		
	Range 63D		Mar	Aug	W-2-66	12-19	10	23	0.44	Unstable	150 US	Flow	180	90	270	-20	No appreciable scour at range 63D since last revetted in 1968	

(Continued)

* O = overburden thickness, ft; A = zone A sand thickness, ft; R = ratio of overburden thickness to zone A sand thickness (O/A).

** See fig. 2 wherein

W = width of shear failure

W_{max} = maximum width of flow failure

W_{min} = width of flow failure at neck

Y = distance from top of failure to W_{min} (flow failure) or to toe of shear slide

Z = distance from top of slide to top of bank (+ if riverside, - if landside).

Table 8 (Concluded)

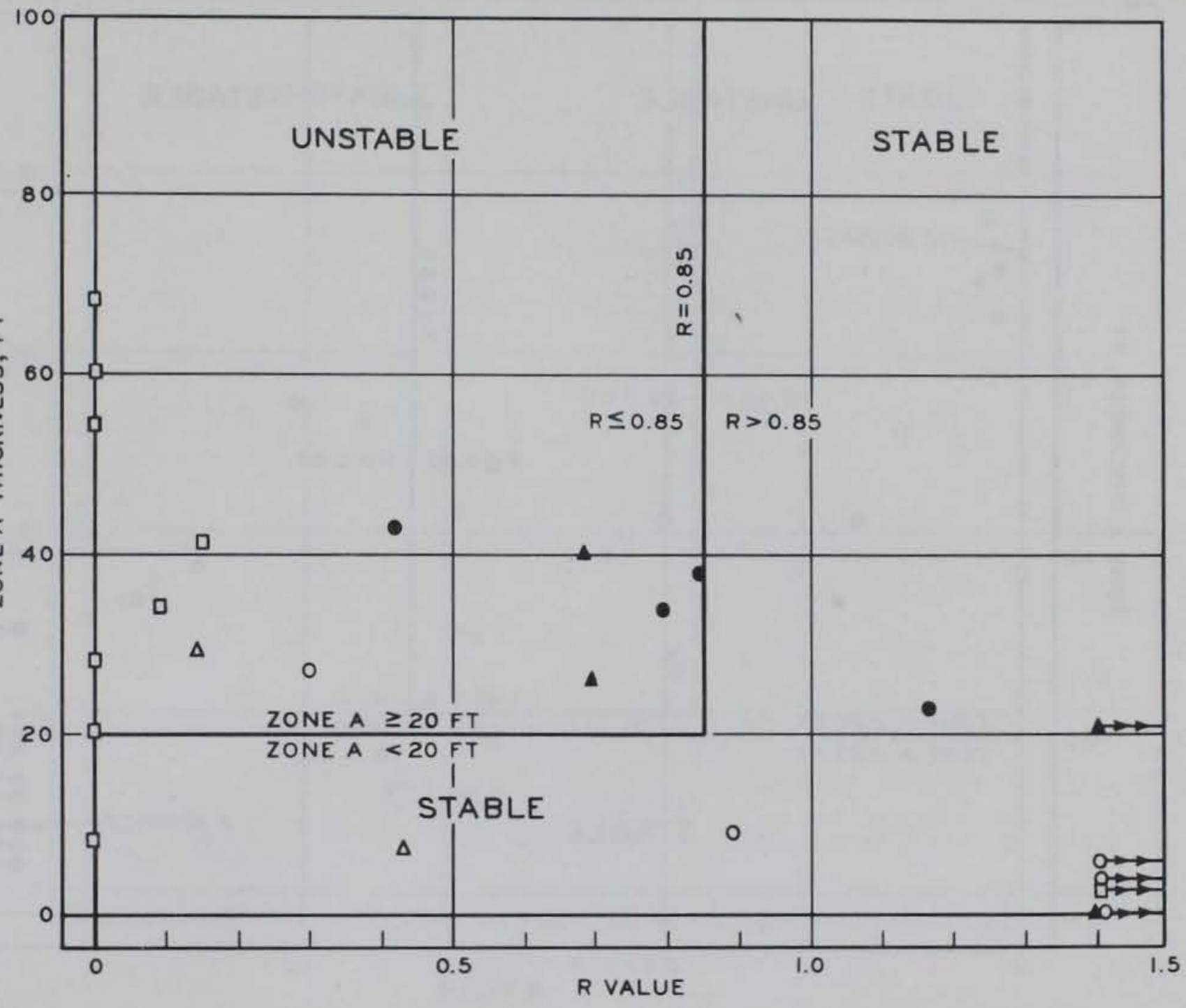
No.	Revetment Site Failure Location	Year Site Revetted	1968 Date Failure First Noted	1968 Date Failure Surveyed	Boring Data: No.	Boring Data: Report in Which Analyzed	Boring Data: O ft	Boring Data: A ft	Boring Data: R Value	Boring Data: Prediction	Location of Boring with Respect to Failure ft	Failure Type	Failure Dimensions and Position with Respect to Top of Bank: W or W max ft	Failure Dimensions and Position with Respect to Top of Bank: W min ft	Failure Dimensions and Position with Respect to Top of Bank: Y ft	Failure Dimensions and Position with Respect to Top of Bank: Z ft	Additional Information Concerning the Failure Location	Site Failure History Since 1954
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)
										VICKSBURG DISTRICT (Continued)								
142	Cracraft, Ark., 513 MAHP	1962 1965 1968																Two shear failures have occurred between R-74-U and R-68-U and at R-72-U as described in Reports 12-13 and -18
	Range 85U to 84U		Jul	Jul	CR-4-62	12-13	73	29	2.50	Stable	300 US	Flow	250	60	160	140	20-ft depth of scour along toe of mattress at both failure locations at this site since last revetted in 1968 and 1962, respectively	
	Range 79U to 77U		Jul	Jul	CR-5-62	12-13	(No penetration in zone A)			No prediction	--	Shear	200	--	350	0		
160	Baleshed-Stack Island, La., 489 MAHP	1963 1966																None
	Range 4D to 7D		Jun	Aug	L-13-63	12-14	3	64	0.05	Unstable	400 (landside of failure)	Flow	320	100	400	0	Small scour hole located just downstream of failure neck and at toe of revetment mattress. Hole lay between ranges 5D and 7D, had a width transverse to streamflow of 75 ft, and had a maximum depth of about 8 ft	
144	Lake Karnac, Miss., 419 MAHP	1959 1960 1962																Seven shear failures have occurred at R-22-D, R-27-D, R-46-D, and between R-31-D and R-51-D, R-47-D and R-50-D, R-64-D and R-66-D, R-88-D and R-95-D as described in Reports 12-11, -12, and -13. One flow failure occurred between R-55-D and R-58-D as described in Report 12-11
	Range 94D to 96D		Mar	Jun-Jul	LKR-13-62	12-13	28	40	0.70	Unstable	200 DS	Flow	250	60	500	0	Scour hole occurred at neck of failure and at toe of mattress between ranges 94D and 98D. Hole was 400 ft across, measured transverse to the streamflow, and 40 ft deep. Failure was a double flow failure, one above the other	
	Range 107D		Mar	Jun-Jul	LKR-14-62	12-13	13	15	--	Stable (< 20 ft zone A)	0	Shear	200	--	450	-100	20-ft depth of scour along toe of mattress between ranges 107D and 116D since 1962	
	Range 111D to 16D		Mar	Jun-Jul	LKR-15-62	12-13	13	5	--	Stable (< 20 ft zone A)	0	Flow	800	150	550	-250		
163 197	Point Pleasant, La., 413 MAHP	1965 1967																None
	Range 11D to 13D		Mar	Jun-Aug	D-1-69U	12-21	38	48	0.79	Unstable	0	Flow	450	110	350	-180	Scour hole at neck of failure and toe of mattress between ranges 10D and 11D. Hole had a width transverse to the streamflow of 200 ft and a maximum depth of 10 ft	
	Range 102D to 104D		Mar	Jun-Aug	D-11-63	12-14	31	69	0.45	Unstable	200 DS	Flow	300	50	300	50	Large scour hole at toe of mattress and centered just upstream of failure neck at range 98D. Its upstream and downstream limits were ranges 96D and 104D, respectively. Hole had a maximum depth of 25 ft and a width of 300 ft transverse to streamflow	
130	Grand Gulf, Miss., 401 MAHP	1961																One shear failure has occurred between R-151-D and R-152-D and two flow failures have occurred at R-118-D and between R-152-D and R-153-D as described in Reports 12-18 and -19
	Range 172D to 175D		Jun	Jun	GG-29-61	12-11	43	58	0.74	Unstable	0	Flow	350	130	400	-300	Scour hole at toe of mattress and just downstream of neck of failure. Its limits were ranges 174D and 176D, and it was 50 ft wide and 10 ft deep	
107 131 164	Goldbottom, Miss., 393 MAHP	1959 1960 1961 1963																Five shear failures have occurred at R-73-D, R-84-D, R-86-D, R-97-D, and R-101-D as described in Reports 12-12, -13, and -18. Five flow failures have occurred at R-77-D (two failures), R-79-D, R-100-D, and R-132-D, as described in Reports 12-13, -18, and -20
	Range 103D to 105D		May	Jun	GB-4-59	12-10	19	65	0.29	Unstable	0	Flow	500	70	450	30	Scour hole at neck of failure and toe of mattress between ranges 104D and 107D. It had a width transverse to streamflow of 200 ft and a maximum depth of 25 ft	
	Range 132D to 133D		May	Jun	GB-2-59	12-10	24	64	0.38	Unstable	150 DS	Flow	340	100	550	-40	Scour hole at neck of failure and toe of mattress between ranges 131D and 134D. It had a maximum depth of 20 ft and a width transverse to streamflow of 200 ft	
	Range 139D		May	Jun	GB-1-59	12-10	10	87	0.12	Unstable	300 DS	Flow	500	50	400	-60	35-ft depth of scour along toe of mattress since 1961	
	Range 145D		May	Jun	GB-11-61	12-12	13	30	0.43	Unstable	500 DS	Flow	200	80	450	-120		
	Range 146D to 147D		May	Jun	GB-11-61	12-12	13	30	0.43	Unstable	300 DS	Flow	270	70	450	-120	30-ft depth of scour along toe of mattress between ranges 145D and 152D since 1963	
	Range 150D		May	Jun	GB-11-61	12-12	13	30	0.43	Unstable	0	Flow	270	70	240	130		
	Range 152D		May	Jun	GB-12-61	12-12	13	60	0.22	Unstable	0	Flow	470	120	400	0		

Table 9

Summary of Soil Conditions at
Locations Where Flow Failures Occurred in Areas Predicted to be Stable

Failure Location*	Date of Failure	Distance to Nearest Boring ft	Soil Conditions: Overburden Thickness ft	Soil Conditions: Zone A Sand Thickness ft	R Value
Fair Landing, Ark., 633 MAHP					
Range 259+00 to 262+00	1965	250	26	28	0.93
Ludlow, Ark., 625 MAHP					
Sta 38+50 to 40+00	1965	0	40	37	1.08
Sta 60+00 to 62+00	1967	200	48	8	6.00
Arkansas City-Yellow Bend, Ark., 551 MAHP					
R-193-D to R-195-D	1968	250	49	39	1.40
Island 88 (Worthington), Miss.					
514 MAHP, R-37-D	1967	50	9	5	1.80
R-49-D	1969	200	9	0	--
Cracraft, Ark., 513 MAHP					
R-85-U to R-84-U	1969	300	73	29	2.50
Kentucky Bend, Miss., 519 MAHP					
R-67-D	1966	300	38	30	1.27
R-68-D to R-69-D	1966	450	43	25	1.72
R-54-D to R-56-D	1969	0	45	33	1.36
Marshall Browns Point, Miss. and La., 447 MAHP					
R-4-U to R-2-U)	1955	0			
R-2-U to R-0) one boring location	1956	0	40	39	1.02
R-3-U)	1958	150			
Lake Karnac, Miss., 419 MAHP					
R-111-D to R-116-D	1969	0	13	5	2.60

* MAHP listed corresponds to mileage given in table 6 and is not necessarily the exact location of the failure; the exact location of the failure is indicated by the range or station listed.



LEGEND

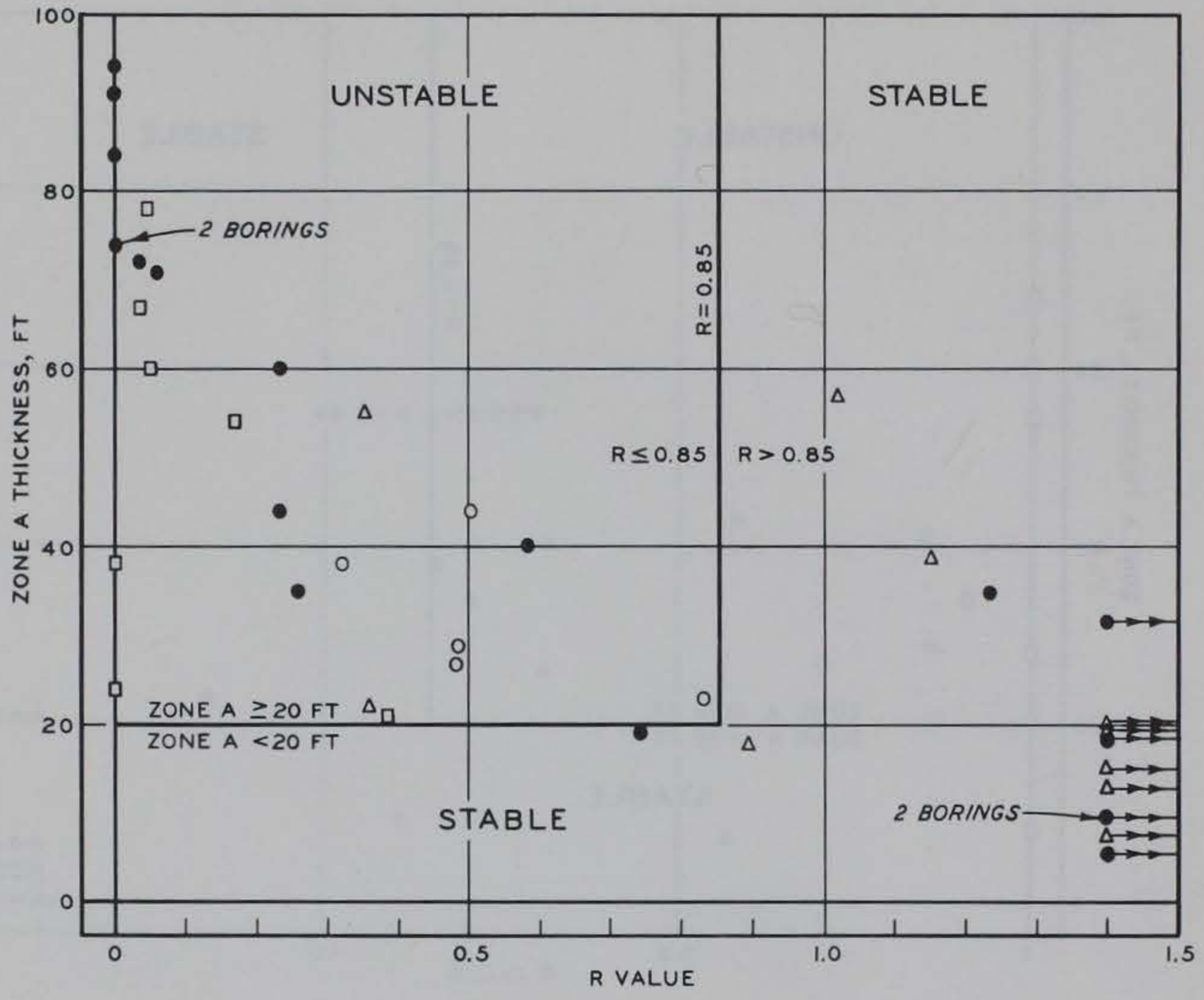
	LOCATION	SITE NO.	NO. BORINGS	NO PREDICTION POSSIBLE
○	ISLANDS 2,3,AND 4, KY.	235	5	–
△	HICKMAN-REELFOOT, KY.	236	2	–
□	KENTUCKY POINT, KY.	237	10	1 BORING
●	KEYES POINT, TENN.	238	4	–
▲	RANDOLPH POINT, TENN.	239	4	–

NOTE: →→ R VALUE GREATER THAN 1.5.

ZONE A THICKNESS VS R VALUE

MEMPHIS DISTRICT
1969 BORINGS

PLATE 1



LEGEND

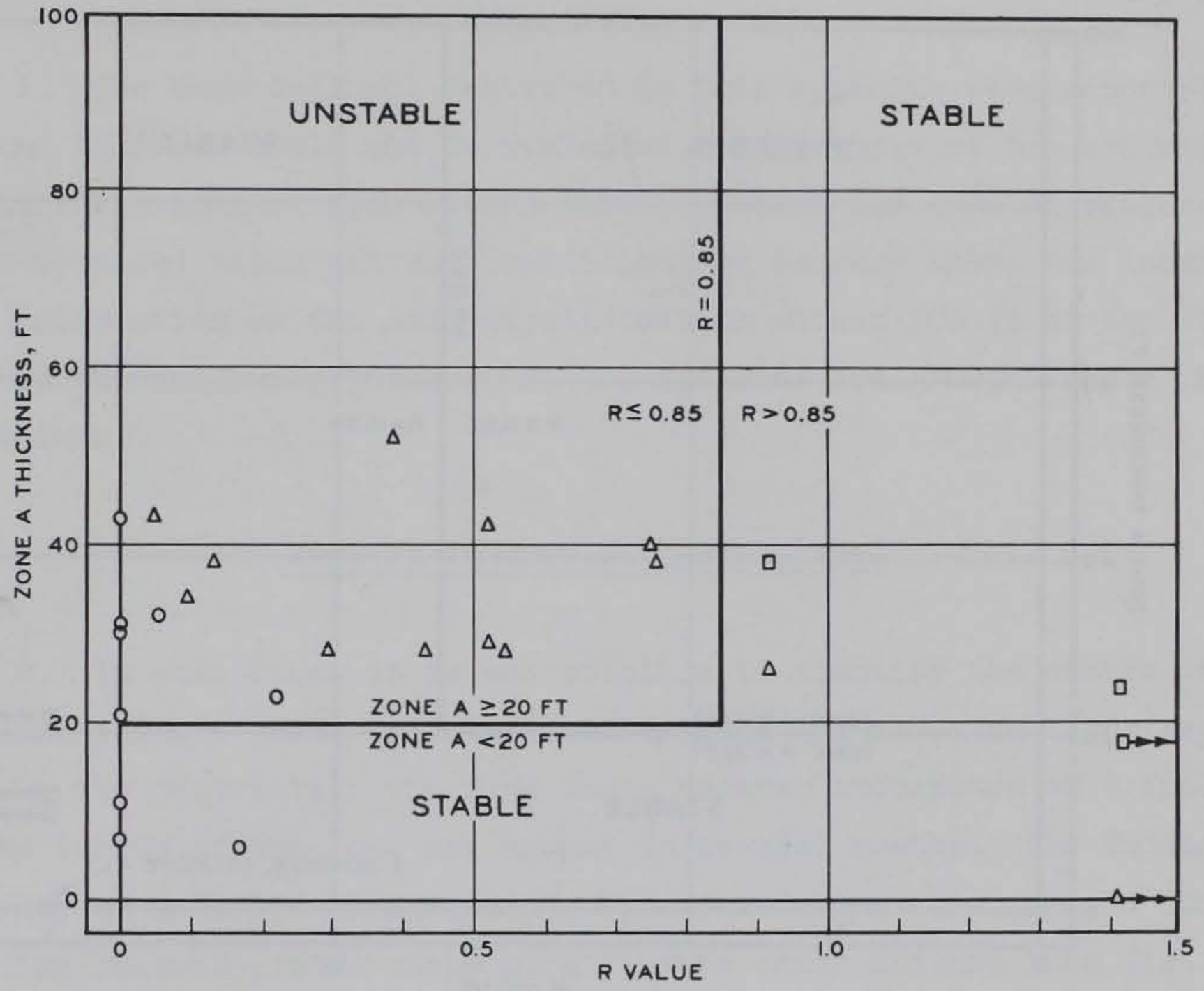
	LOCATION	SITE NO.	NO. BORINGS
○	CRACRAFT, ARK.	216	5
△	MAYERSVILLE, MISS.	217	10
□	BALESHED, LA.	218	7
●	GOLDBOTTOM, MISS.	219	18

NOTE: →→ R VALUE GREATER THAN 1.5.

ZONE A THICKNESS VS R VALUE

VICKSBURG DISTRICT
1968 BORINGS

PLATE 2



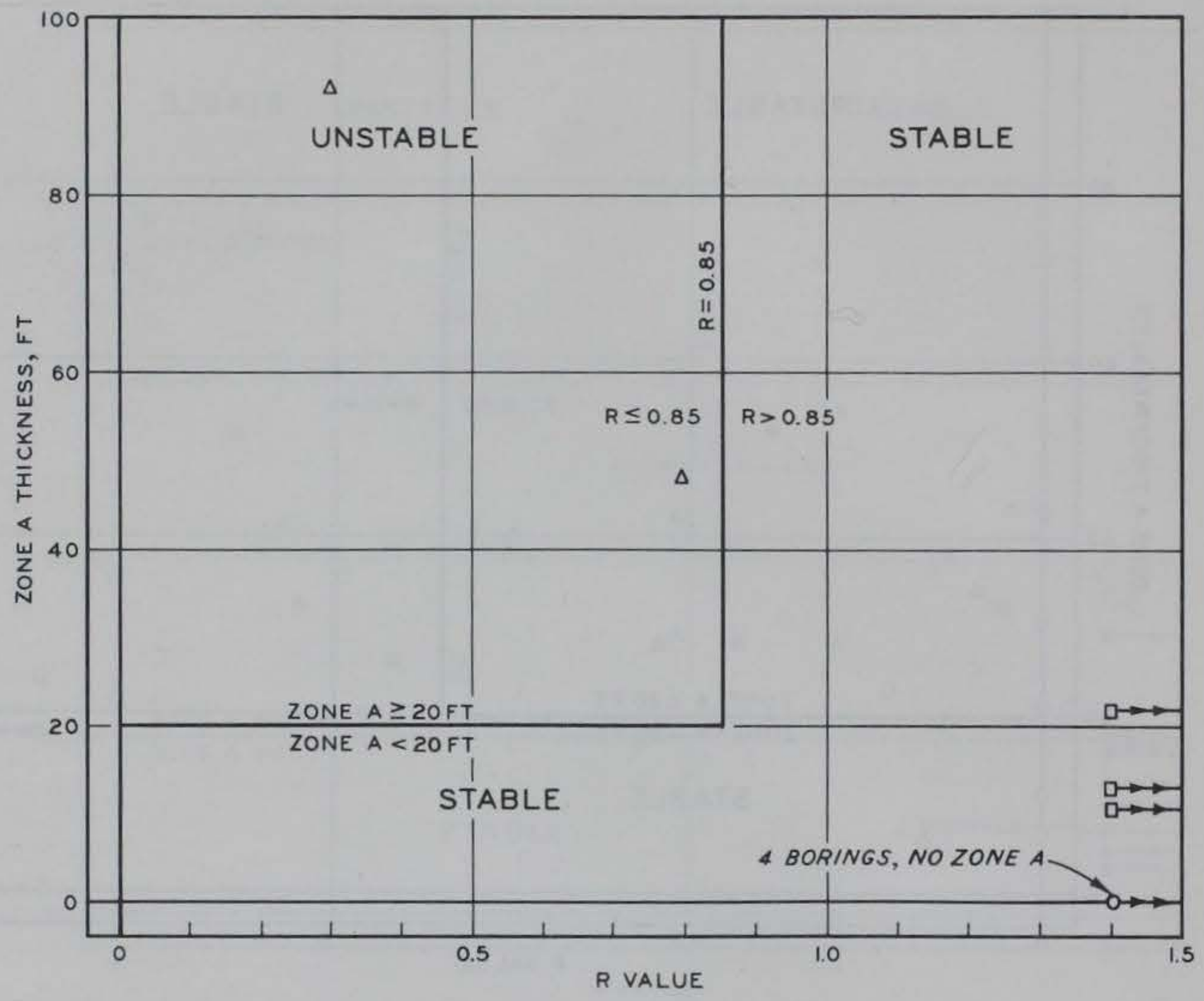
	LOCATION	SITE NO.	NO. BORINGS	NO PREDICTION POSSIBLE
O	NEW MADRID BEND, MO.	213	9	-
Δ	BLAKER TOWHEAD, TENN.	214	16	3 BORINGS
□	ENSLEY, TENN.	215	3	-

NOTE: →→ R VALUE GREATER THAN 1.5.

ZONE A THICKNESS VS R VALUE

MEMPHIS DISTRICT 1968 BORINGS

PLATE 3



LEGEND

	LOCATION	SITE NO.	NO. BORINGS	NO PREDICTION POSSIBLE
O	FALSE POINT, LA.	240	4	–
Δ	POINT PLEASANT, LA.-MISS.	241	2	–
□	BOUGERE BEND, LA.	242	4	1 BORING

NOTE: →→ R VALUE GREATER THAN 1.5.

ZONE A THICKNESS
VS R VALUE

VICKSBURG DISTRICT
1969 BORINGS

PLATE 4

Appendix A: 1968 and 1969 Bank Failures Not Analyzed in Main Report

1. The bank failures described in this appendix were reported in 1968 and 1969 but could not be evaluated as the basis of the criteria for stability against flow slides either because the type of failure (shear or flow) could not be established, or because there was inadequate information on the soil stratification within 500 ft of the failure. In the following paragraphs, the failures are grouped under these two reasons.

Type of Failure Not Established

2. In some cases it is not possible to identify the nature of a revetment failure using only the contour maps and cross sections provided by the Districts. The time lapse between occurrence of a failure and the survey of the scar may amount to several months. The failure shape may be modified significantly by scour during this period. Therefore, the characteristic shape of a flow or shear failure (see fig. 2, main text) may not be discernible. Furthermore, it may be that the revetment break was actually caused by severe localized scour, i.e., an erosional case not involving a sliding or flowing of the soil. The failures described below are attributed to the latter conditions, but it cannot be said that they are not actually flow or shear failures obliterated by the apparent scour.

1968 failures

3. Cypress Bend, Ark. (site 57, 569 MAHP). Two failures between R-46-D and R-49-D and between R-59-D and R-60-D were reported in February 1968 and surveyed in July 1968. The revetment failure between R-46-D and R-49-D progressed to within 100 ft of the top of the bank. It was about 200 ft in width and appeared to have been caused by general scour. The thalweg at the failure location had been deepened about 20 ft since the area was last revetted in 1956. Boring C-3-56, located 300 ft downstream, indicates a stable condition (Report 12-7),

with 39 ft of overburden, 19 ft of zone A sand, and an R value of 2.04.

4. The failure between R-59-D and R-60-D was within 130 ft of the top of the bank and extended 300 ft riverward. This failure appeared to be of a flow nature since it had a maximum width of 270 ft and a small outlet neck of only 80 ft. However, examination of the cross sections did not indicate particularly flat final slopes. In addition, the shape of the break was quite elliptical and the transition was not smooth into the neck. On the basis of these observations, this is judged to be a large scour hole. Boring C-2-56, located 300 ft downstream, indicated a stable stratification (Report 12-7), showing 62 ft of overburden underlain by 12 ft of zone B and lower sands. The thalweg of the river had been deepened about 20 ft since the failure site had last been revetted in 1962.

5. Cracraft, Ark. (site 142, 512 MAHP). A failure at site 142 between R-87-U and R-79-U was reported and surveyed in July 1968. Revetment had been placed along this reach in 1965. Previous shear failures were reported in Reports 12-13 and 12-18 between R-68-U and R-74-U and at R-72-U. The failure between R-87-U and R-79-U was caused by scour. The major scour hole extended from R-85-U to R-79-U (900 ft) and reached a maximum depth of 40 ft between R-84-U and R-83-U. A smaller scour hole, about 20 ft in depth, was situated between R-87-U and R-86-U. Both scour trenches were centered some 400 ft from the top of the bank. The shear failure occurred all along the bank between R-87-U and R-79-U and generally commenced at a distance of 200 ft from the top of the bank. The soil conditions along this reach were analyzed in Report 12-13. Boring CR-4-62, located near R-87-U, indicated a stable location, with 73 ft of overburden and 25 ft of zone A sand (R = 2.50).

6. Point Pleasant, Miss.-La. (site 163, 411 MAHP). One failure between R-81-D and R-88-D was reported and surveyed in August 1968 at site 163 where revetment had been placed in 1966 and 1967. No previous failures have been reported for this reach. The failure appeared to be the result of scour as evidenced by several scour holes averaging 5 to 10 ft in depth. All scour holes lay within 200 ft of the top of

the bank. There were no borings within 500 ft of this failure.

1969 failures

7. Cypress Bend, Ark. (site 57, 568 MAHP). One failure which could not be definitely classified was reported in March 1969 and surveyed in August 1969 at this site. The failure occurred between R-20-U and R-16-U where revetment had been placed in 1956. The scar commenced about 70 ft riverward of the top of the bank and proceeded some 300 ft at a generally constant width of 450 ft. The configuration suggested that general scour had moved the material along this reach. However, since cross sections of the area showed that a 30-ft depth of material had been removed from the toe of the revetted slope since 1956, the failure may actually have been a shear-type one that was obscured by the subsequent scour. Boring C-8-56 (Report 12-7), located at R-20-U, showed stable conditions, with 28 ft of overburden and 32 ft of zone A sand (R = 0.87).

8. Lake Karnac, Miss. (site 80, 419 MAHP). Four failures were reported along this reach in March 1969 and these failures were surveyed in June-July 1969. One of the failures, located between R-61-D and R-63-D where revetment had been placed in 1959 and 1960, cannot be classified as either a shear or flow failure. It began at the top of the bank and extended riverward some 300 ft at a constant width of 250 ft. It appeared that the soil was removed from the bank at this location by severe local scour.

Inadequate Boring Data

1968 failures

9. Mounds, Miss. (site 153, 562 MAHP). Five failures were reported along this reach where revetment had been placed in 1946, 1954, 1962, 1963, and 1964. The failures, reported in January, March, and July 1968 as occurring at R-16-D, between R-18-D and R-20-D, at R-28-D, R-30-D, and R-35-D, were surveyed in July 1968. One previous failure, designated a shear type, was reported in Report 12-20 at R-12-D.

10. All five failures were similar in appearance, being U-shaped,

70 to 130 ft in width, 200 to 250 ft in length riverward, and generally extending from the top of the bank to the toe of the revetment. These are all classed as shear-type failures, and were probably caused by scour (20 ft since 1964) which is evident at the toe of the revetment all along this reach. None of the borings in the vicinity (reported in Report 12-14) was within 500 ft of any of the five failures.

11. Kentucky Bend, Miss. (site 141, 519 MAHP). One failure, between R-8-U and R-11-U, was reported in August 1968 and surveyed in September 1968 along a reach where revetment had been placed in 1943 and again in 1958. Previous failures were reported in Report 12-13 to be shear failures between R-68-D and R-71-D and between R-81-D and R-90-D, and a flow failure at R-79-D. Two flow failures were reported in Report 12-19 at R-67-D and between R-67-D and between R-68-D and R-69-D.

12. The recent failure commenced about 100 ft riverward of the top of the bank and extended at an average width of 350 ft toward the thalweg for a distance of 400 ft. The characteristic U-shape identifies the break as a shear type, which was probably caused by severe scour at the toe of the revetment. Approximately 50 ft of material had been removed from the toe by scour since 1958. No borings were located within 500 ft of this failure.

13. Island No. 88 (Worthington), Miss. (site 194, 514 MAHP). Three failures were reported in March 1968 and surveyed in July 1968 along this reach where revetment had been placed in 1966 and 1967. A failure between R-64-D+90 and R-66-D did not occur within 500 ft of a boring. This failure was a shear type, probably induced by scour which had removed 18 ft of material from the toe of the slope since the area was last revetted in 1967. The material involved in the failure lay within an area 250 ft wide and 200 ft long from the top of the bank to its riverward limit.

14. Cracraft, Ark. (site 9, 512 MAHP). One failure at R-68-U of site 9 was reported in March 1968 and surveyed in July 1968. Revetment had been placed in the vicinity in 1957 and repairs made in 1962. Previous shear failures along this reach occurred between R-26-U and R-28-U and between R-53-U and R-55-U, as reported in Reports 12-14 and

12-9, respectively. The failure at R-68-U commenced at the top of the bank and extended 300 ft riverward. Since it had a top width of 250 ft and a neck width of 50 ft, the failure is classified as a flow type. No boring was within 500 ft of this failure.

15. Mayersville, Miss. (495 MAHP). Three failures were reported and surveyed in September 1968 along this reach where revetment had been placed in 1950 and 1966. These were located at R-57-D, R-59-D, and R-63-D. The failure at R-57-D was situated 200 ft from the top of the bank and extended 200 ft riverward. It is classified as a flow failure since it had a top width of 210 ft and a neck width of only 50 ft. The scar at R-59-D is also thought to be a flow failure as it had a maximum width of 250 ft and a neck width of 100 ft. This break lay 140 ft from the top of the bank and had a length of 250 ft riverward. The break at R-63-D commenced about 150 ft from the top of the bank and continued riverward for 200 ft. The typical fan shape of a flow failure was evident from the top width of 230 ft as opposed to the neck width of 60 ft. No judgment can be made about the stability of these failure locations since no borings fell within 500 ft of any one of them.

16. Fitler-Cottonwood, Miss. (475 MAHP). One failure at R-143+40 of Fitler revetment was reported and surveyed in September 1968. Revetment had been placed in this area in 1947 and some repairs had been made in 1962. No previous failures have been reported for this site. The failure at R-143+40 was within 120 ft of the top of the bank and progressed riverward some 300 ft. Since the failure exhibited a U-shape with a fairly constant width of 230 ft, it is classified as a shear failure. There were insufficient boring data to make predictions as to flow failure stability at this location.

17. Goodrich, La. (465 MAHP). One failure was reported in March 1968 between R-79-D and R-80-D and was surveyed in August 1968. Revetment had been constructed in 1951. No previous failures are on record for this reach. The uppermost edge of the failure between R-79-D and R-80-D was very near the top of the bank. The width of the failure was 200 ft for the entire 350-ft riverward length. This was apparently a shear failure induced by scour. The center of a large scour hole (20 ft

in depth and 200 ft in length parallel to the riverbank) was located 300 ft from the top of the bank. No borings were located within 500 ft of the failure.

18. Point Pleasant, Miss.-La. (site 197, 413 MAHP). One failure (between R-30-D and R-32-D) was reported in August 1968 and surveyed in September 1968 at this site where revetment had been placed in 1965. No previous failures have ever been reported for this area. The failure extended from the top of the bank to a point 300 ft riverward. The top width of the failure measured 400 ft, while the neck width reached only 60 ft. The distinct fan shape indicated the failure to be of the flow type. There was no boring within 500 ft of the failure.

19. Palmetto, Miss. (321.5 MAHP). Three progressive failures along this reach in the New Orleans District, first observed in July 1964, were checked annually until July 1968 when they were surveyed for repairs. These were located between ranges U-10 and U-8, D-5 and D-9, and at range D-12A where revetment had been placed in 1954.

20. The failure between ranges U-10 and U-8 was one of general shear. It began within about 150 ft of the top of the bank and had progressed 300 ft riverward with a width of 400 ft by the time repairs were made. No adequate data were available on borings within 500 ft of this slide.

21. The failure located between ranges D-5 and D-9 had the fan shape typical of a flow-type failure. It commenced some 80 ft landward of the top of the bank and continued riverward for 500 ft. It had a maximum width at the top of the bank of about 450 ft and a neck width at its riverward limit of only 130 ft. No adequate data were available on borings within 500 ft of the failure.

22. The failure at range D-12A extended 400 ft riverward from a point about 60 ft landward of the top of the bank at a constant width of 230 ft. The distinct U-shape indicates a shear failure. No adequate boring data were available within 500 ft of this failure.

23. Bayou Sara, La. (265.0 MAHP). One failure between ranges U-19 and U-18, where revetment had been placed in 1964, was reported and surveyed in October 1968. The failure commenced at the top of the

bank and continued 300 ft riverward at a width of 200 ft. It was U-shaped and is classified as a shear failure. No adequate data are available on borings within 500 ft of this failure.

24. Allendale, La. (238.0 MAHP). One failure along this reach where revetment had been placed in 1961 and 1964 was first reported in October 1967 and surveyed in January 1968. The slide was located between ranges U-53 and U-58. It was U-shaped with a 300-ft length beginning 150 ft riverward of the top of the bank and a 130-ft width. No adequate data are available on borings within 500 ft of this failure.

1969 failures

25. Henrico, Ark. (site 138, 606 MAHP). Failures occurring at this site between sta 51+00 and 53+50 and between sta 54+00 and 59+00 were reported in November 1968 and surveyed in June 1969. Revetment had been placed along this reach in 1962, 1967, and 1968. No previous failures were noted at this site. These failures were 200 ft and 500 ft in width, respectively. Both commenced at the top of the bank and extended about 200 ft riverward at a constant width. They are classified as shear failures. No borings were near either of the two locations.

26. Sunrise T. H., Tenn. (776 MAHP). One failure was reported at this site (never analyzed previously) in March 1969 and surveyed in August 1969 between sta 71+00 and 75+00 where revetment had been placed in 1963. The failure extended from a point 200 ft landward of the top of the bank some 450 ft riverward. The fan shape of a flow failure was evident from the maximum width of 450 ft as opposed to a minimum riverward width of only 140 ft. No borings were within 500 ft of this failure.

27. Klondike, Ark. (site 56, 589 MAHP). A failure at this site between R-53-D and R-54-D was reported in May 1969 and surveyed in August 1969. Revetment had been placed along this bank in 1958. The failure had a maximum width of 200 ft and a minimum riverward width of 70 ft. The failure extended from the top of the bank to 200 ft riverward. It is thought to be a flow-type failure. No borings were within 500 ft of this failure.

28. Cypress Bend, Ark. (sites 57 and 140, 568 MAHP). Five

failures that could not be documented with boring data were reported in March 1969 and surveyed in August-September 1969 at these two sites. Four of these breaks were in site 57 where revetment had been placed in 1956 and were situated between R-0 and R-42-D, R-6-D and R-9-D, R-27-D and R-30-D, and R-42-D and R-44-D. The remaining failure was located in site 140 between R-67-D and R-70-D where revetment was constructed in 1962. These five failures were all classified as shear failures. Widths varied from 300 to 500 ft and lengths were consistently about 250 ft, beginning at the top of the concrete mattress and extending to its toe. There were no borings within 500 ft of any of these failures.

29. Mounds, Miss. (site 153, 562 MAHP). One failure between R-46-D and R-50-D where revetment had been placed in 1962 was reported in July 1969 and surveyed in September 1969. The upstream and downstream ends of the failure lay within 50 ft of the top of the bank. Approximately 400 ft of riverbank was involved, generally from the top of the concrete mattress to its toe. This failure appeared to be of the shear type, probably caused by the 30 ft of scour that has occurred at the toe of the revetted slope since 1962. There were no borings within 500 ft of this failure.

30. Huntington Point, Miss. (557 MAHP). One failure at R-28-D was reported in July 1969 and surveyed in August 1969. Revetment had been placed at this location in 1949 and 1952. The failure was about 500 ft in length, extending for 40 ft landside of the top of the bank to the toe of the concrete mattress. The width varied from 400 ft near the top to 120 ft at the riverward limit. On the basis of the fan shape, this failure was classified as a flow type. The thalweg of the river has been deepened about 30 ft since 1952. There were no borings in the vicinity of this failure.

31. Kentucky Bend, Miss. (site 141, 519 MAHP). Of a total of two failures at this site, one could not be documented with boring data. The other failure is described in table 8, main text, along with the failure history of this site. The failure described here lay between R-34-D and R-51-D and was reported and surveyed in July 1969. It was apparently one of general shear, probably caused by a 40-ft deepening

of the scour trench along the toe of the revetted slope which has occurred since the site was revetted in 1952. One localized break, at R-38-D, within this range took the fan shape of a flow failure. It lay between the top of the bank and the toe of the concrete mattress, had a length of 230 ft, a maximum width of 300 ft, and a minimum throat width of only 70 ft. There were no recent borings near any part of these failures.

32. Mayersville, Miss. (496 MAHP). One failure between R-89-D and R-91-D where revetment was placed in 1950 and 1957 was reported in June 1969 and surveyed in September 1969. This revetment failure was in an area where no borings have been made since the inception of this series of reports. The failure extended from 83 ft riverside of the top of the bank toward the thalweg for a distance of 200 ft at a uniform width of about 320 ft. It was evidently a shear failure due to scour at the toe of the revetted slope.

33. Baleshed-Stack Island, La. (site 160, 489 MAHP). One failure at this site (between R-22-D and R-31-D) could not be associated with boring data. It was first noted in June 1969 and surveyed in August 1969. Revetment had been placed in this area in 1963. The failure between R-22-D and R-31-D appeared to be one of general shear caused by the 40 ft of scour at the toe of the slope since the last revetting. Sloughing of the bank occurred from the top of the concrete mattress (100 ft riverward of the top of the bank) to its toe, a distance of 250 ft.

34. Goodrich, La. (site 96, 470 MAHP). A failure was reported in June 1969 and surveyed in July 1969 between R-73-D and R-75-D where revetment had been placed in 1951. Previous failures occurring along this reach were a shear failure between R-91-U and R-86-U, a shear failure between R-94-U and R-92-U, flow failures between R-98-U and R-88-U, and a shear failure between R-99-U and R-92-U; these failures were described in Reports 12-9, 12-10, 12-13, and 12-17, respectively. The new failure had the arcuate shape of a flow failure, commencing at the top of the bank and continuing 330 ft riverward. The maximum width was 420 ft, and the minimum width was only 50 ft. The thalweg of the

river had been deepened about 30 ft at the failure location since 1951. No boring was near this failure.

35. Point Pleasant, La. (site 163, 413 MAHP). One failure occurring at this site between R-68-D and R-70-D could not be correlated to boring data. It was first noted along this reach (where revetment had been placed in 1967) in March 1969, and the failure was surveyed in August 1969. The failure commenced at the top of the bank and extended 300 ft riverward with a uniform width of 300 ft. It is classed as a shear failure.

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* Unless otherwise noted, all reports listed are publications of the Waterways Experiment Station.