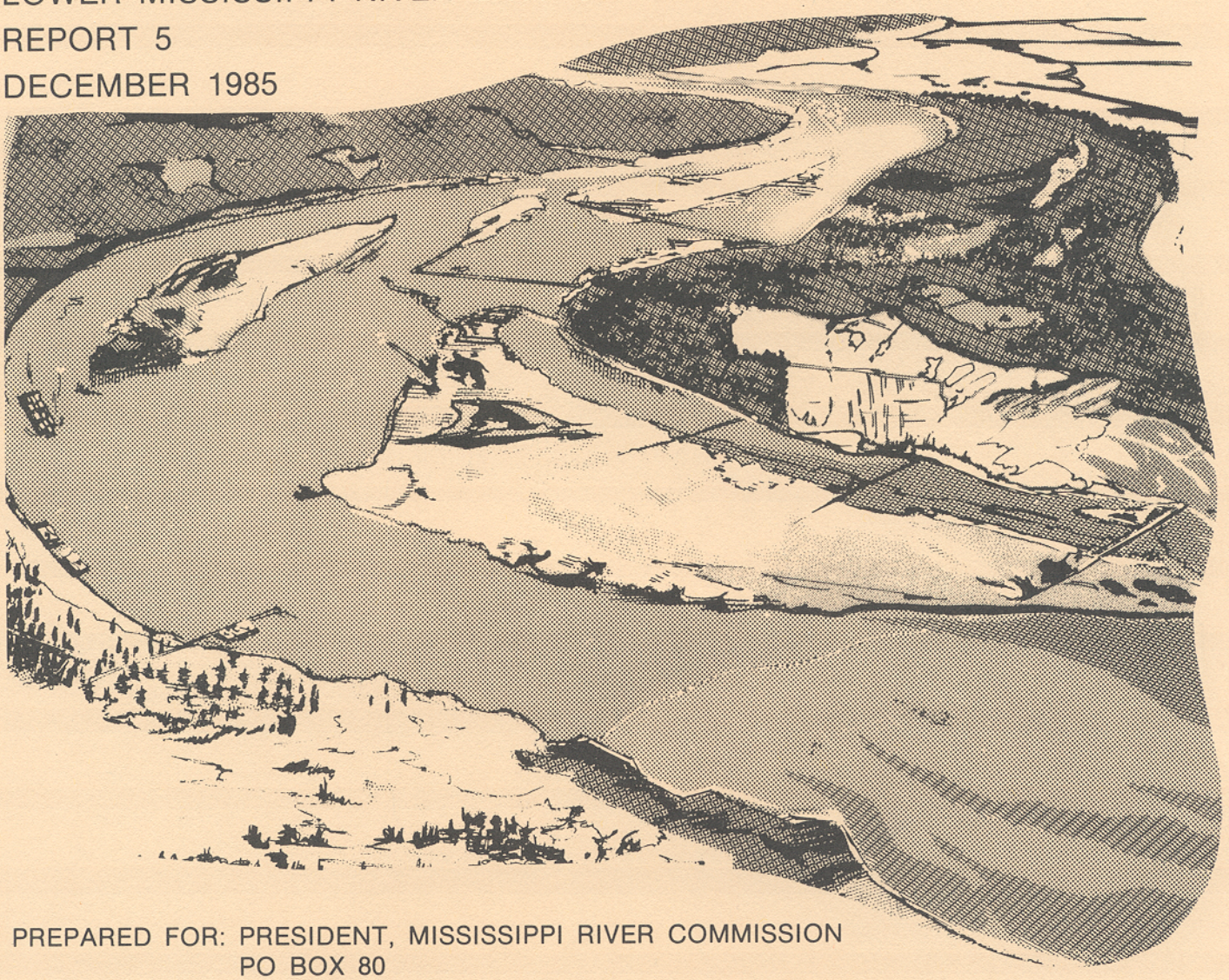
US Army Corps
of Engineers
Mississippi River
Commission

PHYSICAL AND HYDROLOGIC CHARACTERISTICS OF AQUATIC HABITAT ASSOCIATED WITH DIKE SYSTEMS IN THE LOWER MISSISSIPPI RIVER, RIVER MILE 320 TO 610, AHP

LOWER MISSISSIPPI RIVER ENVIRONMENTAL PROGRAM

REPORT 5

DECEMBER 1985



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20. ABSTRACT *(Continue on reverse side if necessary and identify by block number)*:

Physical and hydrologic investigations were made of 46 dike systems in the Lower Mississippi River (river mile 320 to 610, AHP) as part of the Mississippi River Commission's Lower Mississippi River Environmental Program. Data on the water surface area, water volume, and water depth in each dike system were simulated for four river stages corresponding to the 0-, +5-, +10-, and +15-foot Lower Water Reference Plane (LWRP) elevations computed for the river. In addition, data on the engineering features of the 156 dikes located in the study reach were compiled. (Continued)

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20. ABSTRACT (Continued).

Results of the investigation indicated that there is a significant amount of aquatic habitat found within dike systems (pool habitat) and associated sandbars. Total aquatic habitat surface area ranged from 10,971 acres at a 0-foot LWRP river stage to 25,778 acres at a stage of +15 feet LWRP for pool areas, and from 14,404 acres to 23,599 acres at these river stages in sandbars associated with dike systems. These data were based on hydrographic surveys taken in dike systems between 1978 and 1982.

Four main types of dike structures were present in the river: transverse, L-head, vane, and stone-filled pile. A total of 156 individual dike structures had been constructed through 1982, with a total length of 60.1 miles. Transverse dikes constitute 77 percent of the dikes that have been built.

Hydrologic analyses based on a 29-year period of record indicated that dike system pool habitat is relatively unstable during the river's low-flow period in the summer and fall (July through December); average number of days per event or occurrence of pool habitat in three 5-foot river stage intervals ranged from 7 to 11 days with 3.88 to 5.15 events per year. An estimated 54.5 to 100 percent of the total quantity of dike structure is inundated an average of 79 percent of the time during the river's high-flow period (January through June).

PREFACE

The Lower Mississippi River Environmental Program (LMREP) is being conducted by the Mississippi River Commission (MRC), US Army Corps of Engineers. It is a comprehensive program of environmental studies of the leveed floodplain of the Lower Mississippi River and features of the main stem Mississippi River and Tributaries Project (MR&T). The purposes of the program are to develop environmental inventory data and environmental design considerations for the navigation and flood control features of the MR&T Project.

The Dike System Investigation (DSI) is one component of the LMREP. This report contains results of physical and hydrologic studies of dike systems, a feature of the DSI. Results of analyses of the dike systems located within the US Army Engineer District (USAED), Vicksburg, jurisdictional reach of the Lower Mississippi River are presented. Data on the water surface area, volume, water depth, relative exceedance frequency, and stage duration of aquatic habitat associated with dike systems are discussed, together with engineering data on each dike.

This report was prepared by Mr. Stephen P. Cobb, MRC, and Dr. Aubrey D. Magoun, Applied Research and Analysis, Inc., Tallulah, La. Hydrographic surveys were digitized, the area between each contour interval was computed for each dike system, and dike engineering data were compiled by the River Stabilization Branch, USAED, Vicksburg. Hydrologic analyses and advice pertaining to the interpretation of dike system physical/engineering data were provided by Mr. Malcolm L. Dove and Mr. Charles M. Elliott, Engineering Division, MRC, respectively.

The investigation was managed by the Environmental Analysis Branch, Planning Division, MRC, and was sponsored by the Engineering Division, MRC. Mr. Cobb was the program manager for the LMREP. The work was conducted under the direction of the President of the Mississippi River Commission, BG Thomas A. Sands, CE.

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LOWER MISSISSIPPI RIVER ENVIRONMENTAL PROGRAM

Physical and Hydrologic Characteristics of Aquatic Habitat Associated with Dike Systems in the Lower Mississippi River, River Mile 320 to 610, AHP

PART I: INTRODUCTION

Background

Area Investigated

1. The Mississippi River is the fourth largest drainage basin in the world (1,245,000 square miles), exceeded in size only by watersheds of the Amazon, Congo, and Nile Rivers. The river drains 41 percent of the contiguous 48 United States and a portion of Canada.

2. The Lower Mississippi River flows from the confluence of the Ohio and Middle Mississippi Rivers at Cairo, Illinois, to the Gulf of Mexico, a distance of approximately 975 river miles (RM). At Vicksburg, Miss. (RM 437), approximately midway along the Lower Mississippi River, the mean annual discharge of the river is 552,000 cubic feet per second (cfs); the mean monthly maximum and minimum flows are 948,000 cfs in April and 261,000 cfs in September, respectively. The maximum flow recorded at the Vicksburg gage was 1,806,000 cfs during the flood of 1927; the discharge during this flood has been estimated to have been 2,278,000 cfs if the main-line levees upstream of Vicksburg had not crevassed (Tuttle and Pinner, 1982). The difference in river stage between the average minimum discharge and the average maximum discharge is about 27 feet on the Vicksburg, Miss., gage although river stage may fluctuate more than 45 feet in stage in a particular year. Suspended sediment transported by the river averages 161 million tons per year (Keown et al., 1981).

3. Flooding along the river may occur during the fall, winter, and spring and varies considerably in time, stage, and duration from year to year. Highest stages are typically reached from March through May; peak flows occur in April on the average.

4. The approximately 2.5 million acres of leveed floodplain are composed of 81 percent land and 19 percent water, including abandoned channels, oxbow lakes, levee borrow pits, and the main river channel (Ryckman et al., 1975). The floodplain of the Lower Mississippi River is leveed along both banks. The main stem levees are continuous on the west bank except at the confluences of the St. Francis River and the Arkansas-White Rivers. Levee segments and bluffs alternate on the east bank. A system of dikes and revetments is being constructed throughout the river for navigation and flood control purposes.

5. The dike systems investigated are found in the central reach of the Lower Mississippi River between RM 320 and 610, Above Head of Passes (AHP). This reach encompasses the jurisdictional area of the US Army Engineer District (USAED), Vicksburg (Figure 1).

MR&T Project

6. Along the course of the Lower Mississippi River and on the associated floodplain, flooding has historically been a major deterrent to development. For example, destructive floods occurred in 1849, 1858, 1882, 1897, 1912, 1913, 1916, 1922, 1927, 1937, and 1973. The Mississippi River Commission (MRC) was established by Congress in 1879 to develop and carry out flood control and navigation measures for the Lower Mississippi River that would be financed by the Federal Government.

7. The devastating flood of 1927, the flood of record, destroyed many existing levees, flooded large areas of farmland and numerous municipalities, and caused loss of livestock and human life in the Lower Mississippi Valley. This flood motivated the Congress to pass the Flood Control Act of 1928, which authorized the Mississippi River and Tributaries (MR&T) Project. The MR&T Project is a comprehensive plan for flood control and navigation works on the main stem Lower Mississippi River and tributary streams and consists primarily of levee systems, channel improvement works, and floodways. The MRC is responsible for carrying out the project.

Lower Mississippi River
Environmental Program (LMREP)

8. The LMREP is being conducted by the MRC. This 7-year program has as objectives the development of baseline environmental resources data on the river and associated leveed floodplain and the formulation of

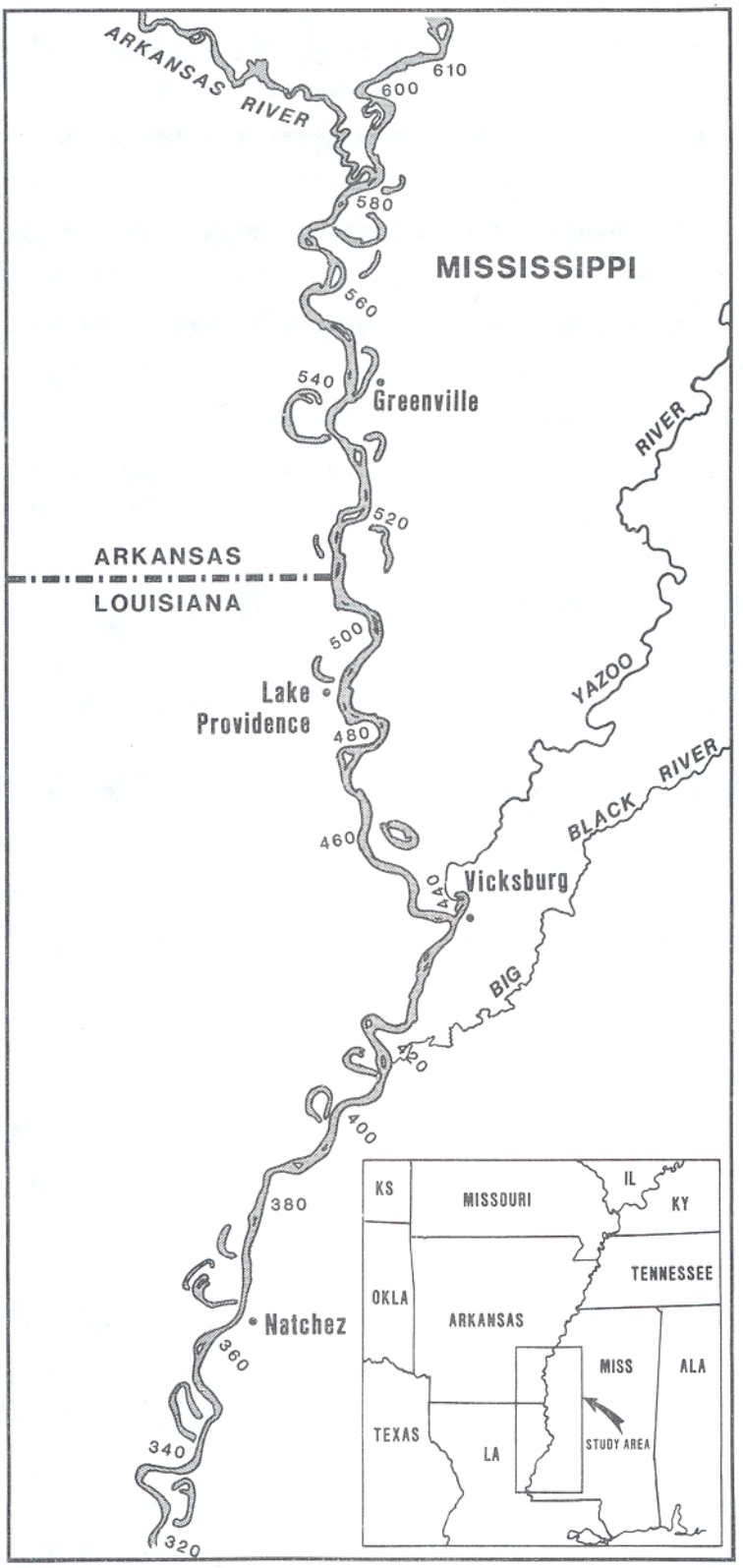

Figure 1. Map of the study area

environmental design considerations for channel training works (dikes and revetments) and the main stem levee system. The LMREP was initiated in fiscal year 1981 and is scheduled for completion in fiscal year 1987. Fishery and wildlife populations and habitat are the main focus of the LMREP. The LMREP is made up of five work units: levee borrow pit investigations, dike system investigations, revetment investigations, habitat inventories, and development of the Computerized Environmental Resources Data System (CERDS), a geographic information system containing environmental data.

Dike System Ecological Investigation

9. The ecological investigation of dike systems in the Lower Mississippi has two objectives:

a. To develop an understanding of the ecological characteristics and function of dike structures and systems in the riverine ecosystem of the Lower Mississippi River.

b. To formulate environmental design considerations for dike systems in the Lower Mississippi River.

10. The dike system investigation (DSI) consists of four major studies or tasks: a physical and hydrologic description of the habitat formed by dike systems, fishery and aquatic habitat studies, bird utilization studies, and development of environmental design considerations. The DSI is scheduled for completion in fiscal year 1987. This report contains results of physical and hydrologic studies of riverine habitat associated with dike systems in the Lower Mississippi River (RM 320 to 610, AHP) (Figure 1). A subsequent report will provide similar data for the northern reach of the river (RM 610 to 954.5, AHP).

Lower Mississippi River Dike Systems

11. Purpose. The navigation project for the Lower Mississippi River in the study reach (RM 320 to 610) is a minimum navigation channel 300 feet wide and 9 feet deep. Although main channel dimensions are significantly greater than those of the authorized navigation channel at most locations throughout the year, during low-flow conditions shallow crossings and other troublesome areas of the channel may require maintenance dredging to pass navigation traffic. Dike systems are constructed within the top banks of the river channel to contract the width and increase the depth of the main

channel at low flows, reduce divided flow conditions, adjust channel alignment, and increase channel stability (Mississippi River Commission, 1977). These actions are designed to produce a self-maintaining navigation channel, i.e., a main channel that would require little or no maintenance dredging. The master plan for the MR&T channel improvement feature presently calls for the construction of 296 miles of dike structures in the lower river AHP to accomplish project purposes; 206.5 miles of dikes had been constructed through fiscal year 1984 (Mississippi River Commission, 1985).

12. Narrowing of the main channel with dikes results in channel deepening as a result of bed material scouring that is caused by increased main channel discharges and velocities. Stabilization of the bank opposite a dike system with revetment prevents lateral channel migration and works in concert with the dikes to force deepening of the thalweg. Dike systems constructed on point bar landforms and in unstable straight reaches may function in this manner.

13. Dike systems are also constructed to concentrate flows in the main channel by eliminating or reducing divided channel configurations. Flows are concentrated into the main channel by closing point bar chute channels and secondary channels. This is done to produce a deeper low-water navigation channel by forcing greater flow into the main channel and causing degradation. Dike systems constructed to concentrate flows may be built to work in tandem with those designed to contract the main channel.

14. Theoretically, to have a stable main channel over time that is relatively free from significant meandering within the top banks and from formation and migration of middle bars, proper alignment of the channel and appropriate sinuosity and spacing of alternate channel pools and crossings are necessary. In straight reaches the main channel may be unstable due to an imbalance in these conditions, with resultant excessive bar formation, divided flows, and inadequate navigation channel depths at low stages. Dike systems are constructed in straight reaches to attempt to adjust channel alignment and sinuosity to decrease lateral channel migration, divided flows, and shoaling in crossings and to achieve a deeper, more stable low-water channel. Dike systems built on point bars may also be used to align and stabilize the thalweg.

15. In reality, dike systems are typically constructed at a specific site for multiple purposes. Hence, each dike system is unique in some ways depending on the problem to be corrected and ambient hydraulic and geomorphic conditions. For example, a dike system may be built to eliminate divided flow conditions and stabilize a point bar, or a single dike may be used to reduce flows in a secondary channel and stabilize channel alignment by preventing development of the secondary channel into the main channel.

16. General description. Dikes constructed in the Lower Mississippi River are large linear structures composed of limestone rock. Average dike length, excluding the bankhead section, is 2,068 feet. Dikes built since the 1960's are of three basic types: transverse, L-head, and vane. Some older pile dikes constructed of wooden materials have been stone filled and remain as functional structures (Figure 2). Dikes are typically constructed in a series called a dike system or field, designed to achieve particular purposes (Figure 3).

17. Dike system example. The design of individual dikes and dike systems is highly variable depending on site-specific geomorphic and hydraulic conditions. However, for illustrative purposes, a "typical" dike system is described in this section. The dike system described is Marshall Cutoff located at RM 447.6,R (AHP) approximately 10 RM upstream of Vicksburg, Miss. (Figure 4).

18. Marshall Cutoff dike system was constructed on a point bar. The reach of river at this location prior to dike construction had a receding right bank and increasing divided flow conditions. Navigation channel cross-sectional area was diminishing. The dike system was constructed to concentrate flow by preventing further development of divided flow to create a more efficient channel geometry (USAED, Vicksburg, 1983). In the generic terms used in this study to categorize purposes for constructing dike systems, Marshall Cutoff dikes were installed to control a crossing and stabilize a point bar. In conjunction with the Marshall Cutoff dike system, Forest Home Towhead dike system was constructed in 1980 on the opposite bank to further contract and deepen the thalweg and stabilize alignment. The effects of these dike systems have been to eliminate divided channel conditions by causing scour of the middle bar. The resulting single main

a. Transverse dike structures

Figure 2. Types of stone dikes present in the Lower Mississippi River, RM 320 to 610 (Sheet 1 of 3)

b. L-head dike structure

Figure 2. (Sheet 2 of 3)

c. Vane dike structures

Figure 2. (Sheet 3 of 3)

Figure 3. Aerial oblique view of Ben Lomond dike system, RM 485

Figure 4. Aerial obique view of Marshall Cutoff dike system, RM 447.6

channel is wider and shallower than the original main channel (Figure 5) but is more stable and has adequate depth for navigation.

19. The dike system consists of two transverse stone dikes constructed in 1978 which have a combined length of 4,720 feet (Figure 6). The bankhead sections of the two dikes are positioned 3,330 feet apart. Dike 1, the upstream dike, is located on the point bar just upriver of the apex of the bendway in the pool section of the channel. Dike 2 is located a short distance downstream of the apex of the bend. The dikes are normal to the radius of curvature of the bend. The longitudinal profile of the dike system is stepped up, i.e., the first dike has lower crown elevations than the second dike. At a water surface elevation 15 feet above the Low Water Reference Plane (LWRP), there were approximately 416 acres of slack water with a volume of 72,800 cubic yards and average depth of 17.6 feet within the dike system based on a 1981 hydrographic survey.

20. Dike 1 is 1,545 feet in length and has a crown elevation of +29.0 feet LWRP at the bank head sloping linearly to an elevation of 0 feet LWRP, 100 feet from the channelward terminus. The terminal 100 feet of dike has a 1V:10H downhill slope (Figure 7). The crown width of the main body of the dike is 5 feet and the cross section is trapezoidal.

21. Dike 2 is 3,175 feet long and has a crown elevation of +36 feet LWRP at the bank head sloping channelward to +27 feet LWRP in the first 300 feet of the structure. The dike for the next 1,560 feet has a flat profile with an elevation of +27 feet LWRP. At the end of the flat section, the dike crown slopes gently for the next 1,160 feet from +27 feet to +14 feet LWRP. The terminal 130-foot section of dike has a steep slope of 1V:10H. The first 730 feet of the dike beginning at the bank head has a crown width of 5 feet. Following a 170-foot transition section, the crown width of the middle section of the dike (1,475 feet) is 20 feet; the terminal 750 feet of the dike has a crown width of 5 feet. The main body cross section of the dike is trapezoidal (Figure 7).

22. Aquatic habitat associated with dike systems. The dike structures per se and the topographic features and fluvial landforms associated with dike systems constitute a distinct aquatic habitat type in the Lower Mississippi River ecosystem (Cobb and Clark, 1981; Mathis et al., 1981; Pennington et al., 1983; Nailon and Pennington, 1984). Dike system

Figure 5. Cross section of the Lower Mississippi River channel at Marshall Cutoff dike system. The cross section is located at RM 448, approximately one-fourth the distance downsteam between Dike 1 and Dike 2 (data taken from April 1977 and September 1982 hydrographic surveys)

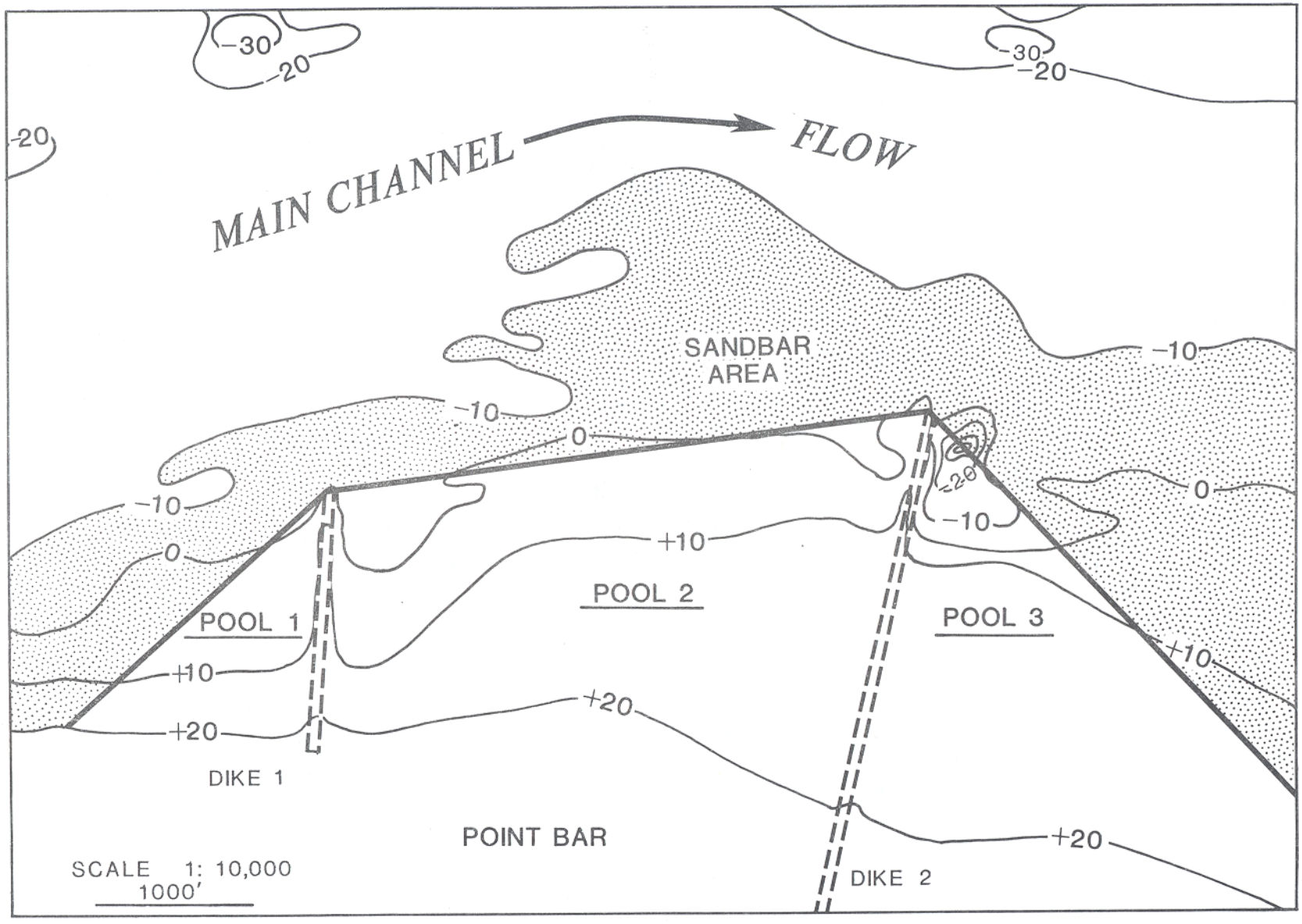

Figure 6. Schematic plan view of Marshall Cutoff dike system, RM 447.6

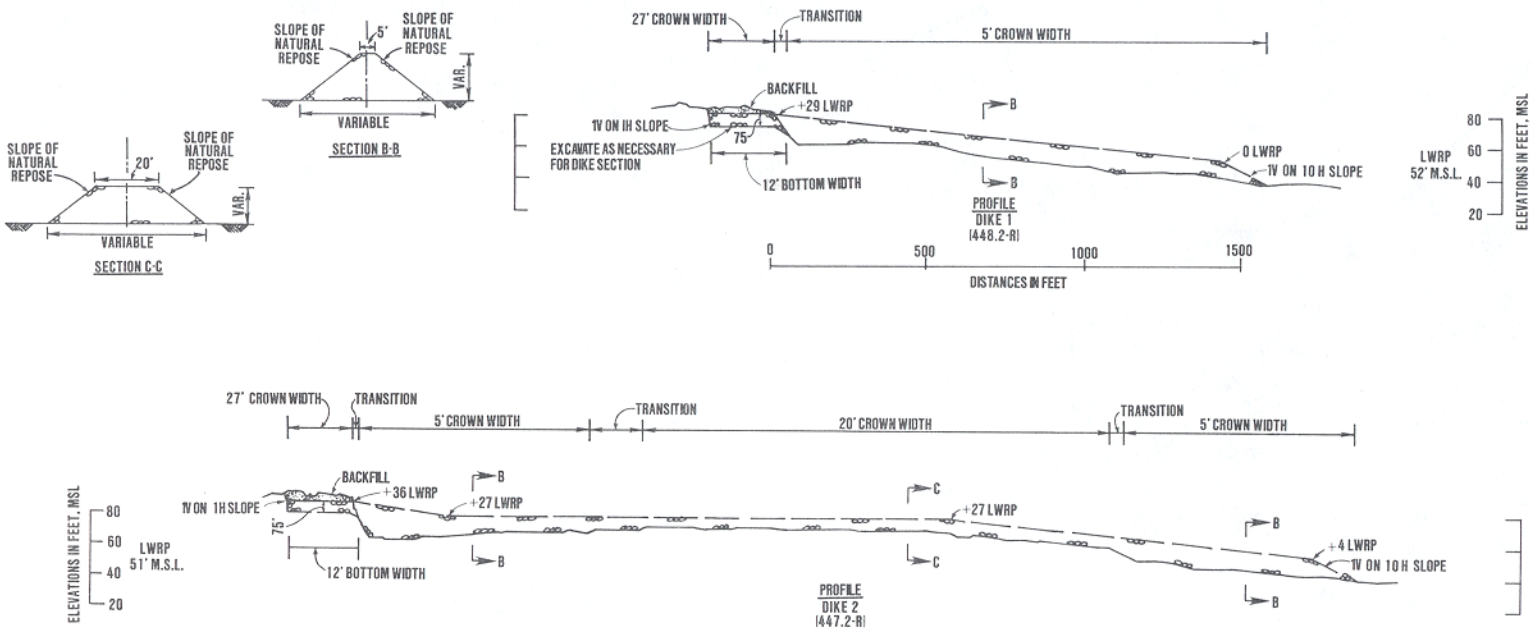

Figure 7. Engineering drawings of the Marshall Cutoff dikes

aquatic habitat can be divided into two areas: the area between adjacent dikes in a dike system, referred to as the pool area because of the physical characteristics of this habitat at low river stages, and the associated sandbars located between pool areas and the main channel (Figure 8). In a geomorphic sense the pool area may be a chute, secondary channel, or point bar that has been diked and is not analogous to a pool in the main channel. However, the term pool has been used extensively in referring to the water body occurring within a dike system and is retained for use in this report. These habitats are discrete at low river stages but are obscured at higher flows when essentially all areas within the top banks of the channel environment assume main-channel conditions. Some dike systems do not have well-developed sandbars (mainly those in straight reaches), while this fluvial landform is extensive in others (Figure 9).

23. The most distinctive and probably the most ecologically important component of dike system habitat is the pool area that is formed at river stages too low for significant amounts of water to flow over the dike structures and through the system. At relatively low river stages, i.e., <+10 to +15 feet LWRP, most dike systems contain pool areas between the constituent dikes, depending on the controlling elevation of the structures, the degree to which pool areas have been filled with bed material, the topography of the dike system, and other factors. Water is trapped or isolated in scour channels and plunge pools between the dikes and in chutes downstream of the last dike in a system (Figures 8 and 9).

24. Dike system pools are generally the only slack water or habitat of low current velocity present in the channel environment at low stages. In addition, dike system pool areas are about two-thirds the surface area of abandoned channel lakes that are confluent with the river channel during low flows (Cobb and Clark, 1981). Pool surface areas, volumes and depths vary widely among dike systems depending on many complex hydrologic and geomorphic factors.

25. Water contained in isolated or perched dike system pools rapidly clears as suspended sediments contained in the parent river water settle. The increased water transparency and euphotic zone, coupled with the high nutrient content of the parent river water, results in primary production of phytoplankton and benthic algae. Water temperatures increase above

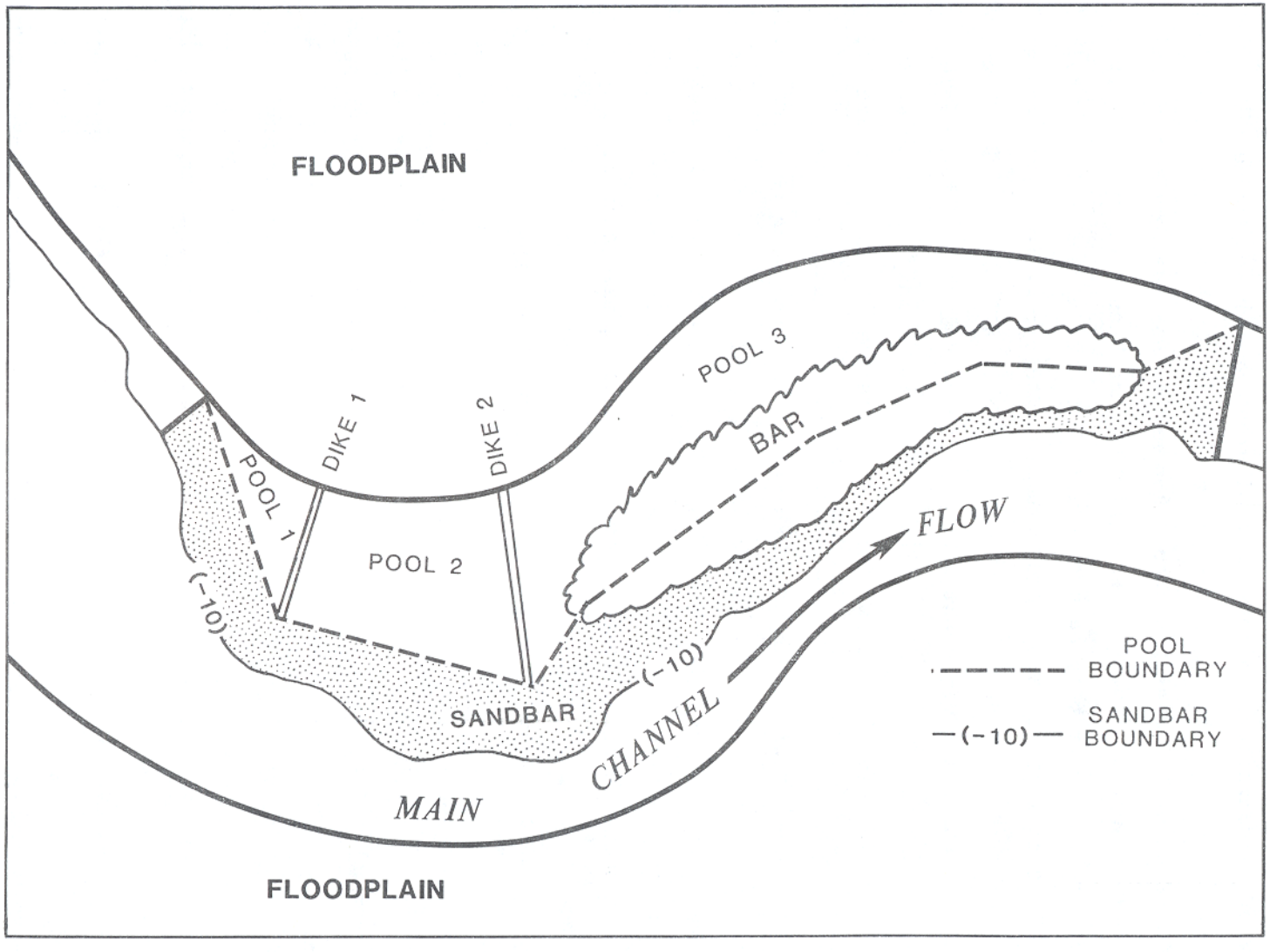

Figure 8. Schematic plan view of dike system pool and sandbar aquatic habitats. Scheme for the case where a middle bar and associated chute occur downstream of the last dike

(a) Cracraft Lower (RM 508.9) dike system

(b) Bondurant Towhead (RM 394.0) dike system

Figure 9. Aerial views of dike systems with and without well-developed middle bars

those of the river main channel due to solar warming, and water chemistry is altered as a result of photosynthetic activity (Sabol et al., 1984). Lateral influxes of ground water may also alter pool water chemistry and temperature. Suspended silts and clays settle on the pool bottom and benthic invertebrate production may be enhanced, especially in dike systems that contained only sand and gravel sediments under flowing water conditions.

26. Riverine fish assemblages inhabit the environments formed by dike systems at all river stages (Schramm and Pennington, 1981; Pennington et al., 1983; Nailon and Pennington, 1984). However, the pools contained in dike systems at low stages are probably important as nursery and feeding areas for numerous species during summer and fall months because of the scarcity of slack-water habitat during this period in the river channel area. Macrobenthic assemblages, distributed according to substrate type, are similar to those found in other riverine habitats. For example, macrobenthos found on soft silt-clay sediments in dike system pools is similar to that which occurs in floodplain lakes, and burrowing mayfly associations that occur on natural banks in dike fields under lotic conditions are typical of those found on natural banks bordering the main channel (Mathis et al., 1981).

27. Sandbar habitat associated with dike systems is very similar to natural sandbars in the river (Cobb and Clark, 1981) (Figures 8 and 9). This habitat at low stages has turbid main-channel water, low to moderate current velocities, and gently sloping bottom topography with depths ranging from zero at the shoreline to about 10 to 25 feet at the boundary with the main channel; bottom sediments are medium to coarse sands and gravel. Assemblages of minnows are probably the most characteristic ecological element of this habitat (Conner et al., 1983).

28. Dike structures per se (Figure 2) provide a unique habitat for aquatic organisms in the river channel, and a characteristic assemblage of macroinvertebrates are found here (Mathis et al., 1982). Stone aggregate comprising the dikes provides a large amount of surface area for colonization of epibenthic (encrusting) species of aquatic insect larvae such as caddisflies and midges. Abundance appears to be greatest on the upstream face of dike structures. These species attach to stone surfaces

and, by various mechanisms, filter the suspended particulate organic matter being transported by river waters flowing across the dikes. Other insect species in the assemblage prey on the filter feeders. Insects and other invertebrates produced on dike structures are a large potential food source for riverine fishes. Stone dikes are also a habitat and cover for river shrimp and fishes.

29. Because of the apparent ecological importance of the pools associated with dike systems at low-flow conditions and the value of the structures themselves as a habitat, it was decided to conduct studies to quantify the amount and physical and hydrologic characteristics of pool and sandbar habitat associated with dike structures in the Lower Mississippi River.

ART II: METHODS AND MATERIALS

Dike System Engineering Data

30. Basic engineering design data were collected for every functional dike and dike system that had been constructed in the Lower Mississippi River (AHP) as of 1980 within the USAED, Vicksburg, jurisdictional reach (RM 320 to 610). For each dike, data concerning construction, type, length, crown elevation, longitudinal slope, and location were tabulated or computed. These data were compiled by the River Stabilization Section of the USAED, Vicksburg (1983), from individual dike plans and specifications and other information.

31. Dikes were classified as transverse, L-head, vane, or stone-filled pile, and variations in these types were noted. Dikes that contained weirs or low points along the main body were also documented.

32. Lengths of the bank head, main body, and end slope sections of each dike were recorded. However, only the latter two dike sections were used in the analysis. Dike lengths in feet were measured from the juncture of the bank head and main body sections of the dike to the channelward end of the dikes for transverse, stone-filled pile, and L-head dikes; the total length of vane dikes was recorded.

33. Dike crown elevation was measured at four equally spaced points along the structure: the bank head (L0), one-fourth the length in a channelward direction (L25), one-half the length (midpoint) (L50), three-fourths the length (L75), and the channelward terminus of the dike (L100). Dike crown elevations are expressed in LWRP terms (see discussion in paragraph 35). The longitudinal slope of the crown profile of each dike was computed for the entire dike length (S4); a section one-fourth the length of the dike beginning at the bank head (S1); the central main body section of the dike (S2), i.e., the section between the L25 to L75 crown elevation points; and the terminal 25 percent of dike length, i.e., end slope section (S3). Slope was computed as the change in elevation of the dike over the specified section divided by the length of the section multiplied by 100. Thus, slopes are expressed as percents. A positive percent slope indicates that a structure slopes downward from the bank toward the channel; a negative slope denotes the reverse.

34. The location of each dike was specified as the river mile position of the bank head. River miles are measured as channel distance above the Head of Passes. The Head of Passes is the point of bifurcation of the main river channel into distributaries that form the birdfoot delta of the Mississippi River on the continental shelf of the Gulf of Mexico. An "R" or "L" after the river mile denotes the right or left descending bank of the river.

Hydrographic Survey Data

35. Hydrographic surveys of the study area are conducted at least every 2 years and are conducted, in many cases, at more frequent intervals. These working surveys consist of ranges oriented generally perpendicular across the channel and spaced at about 1,000-foot intervals. Soundings are taken every 50 to 200 feet along each range. Surveys are sometimes carried out at lower stages; consequently, full coverage of the area between the top banks of the river channel is not always obtained. Topographic data are contoured in 10-foot intervals in LWRP terms. The Low Water Reference Plane is the river water surface plane corresponding to a discharge that is exceeded 97 percent of the time based on a 20-year period of record (1954 to 1973). This stage is assigned a value of 0 feet, and stages above and below this elevation are referenced to this standard. Zero LWRP does not correspond to zero on the various Lower Mississippi River gages. The most current hydrographic survey map that contained complete areal coverage of each particular dike system was used for topographic analyses. Thus, the survey data used are not synoptic, but vary among dike systems from 1978 to 1981 (Table 1).

Physical Analyses

36. A dike system was divided into two sections for topographic analysis: pool area and sandbar area. The pool area was defined as the area circumscribed by the bank line, a line connecting the channelward tips of the dikes and traversing at a 45-degree angle from the tip of the upstream or first dike in the system to the bank. The pool downstream of the last dike in a system was defined in one of two ways depending on the

presence or absence of a sandbar and/or emergent island and associated chute downstream of the last dike. Where a sandbar extended downstream of the last dike within a system, a chute channel (pool) typically was found downstream of the last dike between the middle bar and the bank line. For this case the pool boundary line was drawn from the tip of the last dike to the upstream end of the sandbar and thence down the center line or crest of the bar to its downstream end; the line was then extended across the mouth of the chute or pool at its confluence with the main channel to complete the pool boundary (Figure 8). If no middle bar and associated chute channel were present downstream of the last dike, the downstream pool was defined the same way as the pool upriver of the first dike. The pool upstream of the first dike was termed pool 1, the pool between the first and second dikes was called pool 2, and so forth. The sandbar area associated with each dike system was defined as the bar area between the pool boundary and the -10-foot LWRP contour, the boundary of the main channel environment (Figure 8) (Cobb and Clark, 1981). The upstream and downstream boundaries of the sandbar area corresponded to the pool area boundaries, although it is recognized that the influence of the dike system on the associated sandbar may be more extensive.

37. Water surface area, volume, and depth for each dike system pool and sandbar area were simulated based on the assumption that at a specified river stage, all habitat areas at or below the elevation of that stage contained water. This method does not take into account small-scale topographic features which might result in the drainage of a pool into the river channel area, evaporation, especially in very small isolated pool areas, effects of ground-water input, and seepage. In addition, dike systems that contained a middle sandbar within the pool area often had pool waters that were on the channelward side of the bar, i.e., between the middle bar and the outer boundary of the pool area (the line connecting the dike ends). This section of the pool area generally had sandbar rather than pool characteristics. Thus, the simulation method used tended to overestimate the amount of lentic pool habitat and underestimate the amount of sandbar habitat in some dike systems.

38. In both the pool and sandbar areas of each dike system, the lengths of all contours from the +20-foot LWRP contour to the -40-foot LWRP contour were digitized using a polar compensating planimeter for each

individual pool and associated sandbar area in each dike system. The acreages contained between successive sets of contour intervals, e.g., between the +10 and +5-foot LWRP contours, were calculated using a computer program. The +15-foot LWRP elevation was selected as the upper boundary of the water surface of aquatic habitat associated with dike systems because, typically, above this river stage flowing water conditions became pronounced and the emphasis of the study was on quantifying pooled or slackwater conditions.

39. For each pool and sandbar area in each dike system, simulated water surface area, volume, and mean depth were computed for four target elevations or river stages: +15-foot LWRP, +10-foot LWRP, +5-foot LWRP, and 0-foot LWRP (Figures 8 and 10). Since the lowest possible contour was -40 feet LWRP, the maximum depth was assumed to be -50 feet. With this assumption, cumulative surface areas were obtained for each target river stage by summing the individual surface areas bounded between successive contour intervals at or below each target river stage. Simulated water volumes were calculated by multiplying the surface area contained between two successive contours by the midpoint of the water depth in the cross section bounded by the given contours, and summing over all relevant volumes for the target river stage. The sum, measured in units of acre-feet, was then converted to cubic yards. Total surface area, volume, and mean depth were computed by the following algorithm:

```
for j := 1 to 4 do

    begin
    TSA(j) := 0;
  Volume(j) := 0;
  for i := 1 to 10 do

  begin
     if i <= (6 +j) then TSA(j) := TSA(j) + acres(i);
     Volume(j) := Volume(j) + acres(i)*D(i,j);
  end;
  if TSA(j) > 0 then meandepth(j) := Volume(j)/TSA(j)
     else meandepth(j) := 0;
  Volume(j) := Volume(j)*43560.0/27.0;
end;
```

where j = target river stage (0, +5, +10, +15 feet LWRP)
i = contour interval
TSA = total surface area
D = average depth of contour interval

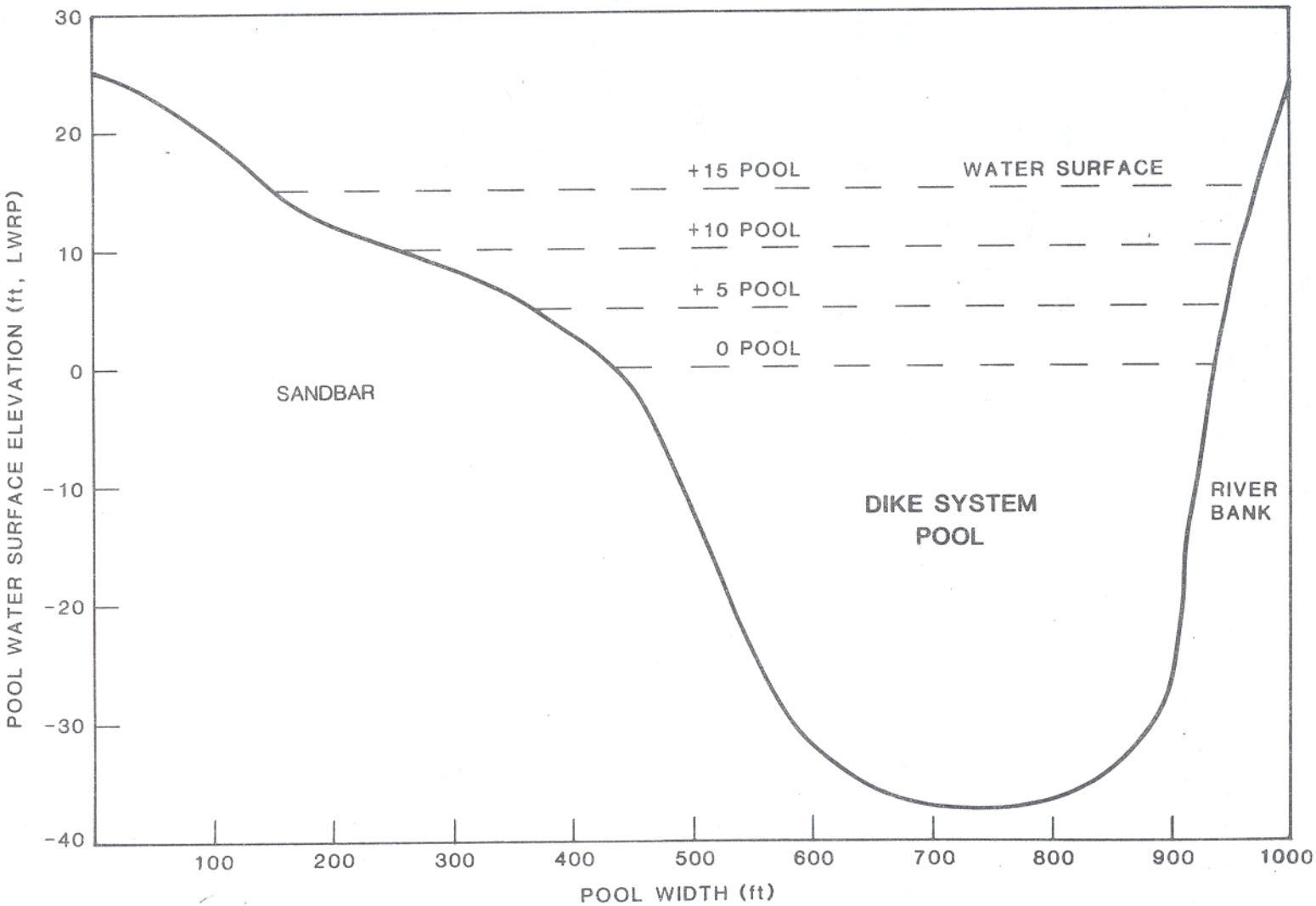

Figure 10. Schematic cross section of dike system pool area depicting the four simulated pools analyzed as defined by river stage in terms of the LWRP

Also for each of the four target river stages, the percent of the water surface area in each dike field pool and sandbar area contained between each set of successive contour intervals was computed by expressing each relevant water surface area as a percent of the total water surface area for the given river stage.

Hydrologic Analyses

40. Relative exceedance frequency and stage duration were computed for four target river stage elevations (0, +5, +10, and +15 feet LWRP) for the total year, a 6-month low-flow period (July through December), and a 6-month high-flow period (January through June). Data for these variables were calculated for the Natchez, Miss. (RM 362.4, AHP); Vicksburg, Miss. (RM 437.1, AHP); and Arkansas City, Ark. (RM 554.2, AHP) gaging stations for a 29-year period of record (1950 to 1979). The analysis consisted of counting the number of times per year and days per year river stage was equal to or greater than a given target LWRP elevation and averaging these values for the period of record. In addition, the average number of times per year and days per year river stage was less than or equal to a given target LWRP elevation was also calculated for the low-flow period. Average number of days per event per year was derived for a given target river stage by dividing the stage duration by the relative exceedance frequency for the given stage.

41. Interval stage duration, the average number of days each year that river stage was between two target elevations, was calculated for the low-flow period for the 0- to +5-foot, +5- to +10-foot, +10- to +15-foot, and 0- to +15-foot LWRP stages by subtracting the stage duration of the upper elevation boundary of the interval from that of the lower elevation boundary of the interval. Interval stage duration per event was obtained by dividing the interval stage duration by the relative exceedance frequency for the upper elevation boundary of the interval based on the less than or equal to frequency analysis plus the relative exceedance frequency of the lower elevation boundary of the interval based on the greater than or equal to frequency analysis. The sum of these latter two frequencies equals the number of times or events for which river stage was within the given stage interval.

42. Data from each gage were used to characterize the relative exceedance frequency and stage duration for the river reach one-fourth the distance upstream and downstream to the next gaging station; for the middle one-half of the distance between two gaging stations, data from the two gages were averaged. Weighted average exceedance frequency and stage duration values were computed to represent the entire 290-RM study reach by multiplying the respective values for each subreach by the percent of the total study reach represented by the subreach. The low- and high-flow period limits were established based on consideration of average monthly river stages for the Lower Mississippi River for the 34-year period of record (1944 to 1977) (Figure 11). Relative exceedance frequency data computed for this study using river stage data are not equivalent to exceedance frequency data based on river discharge adjuncted to fit a probability distribution as is used for hydraulic investigations.

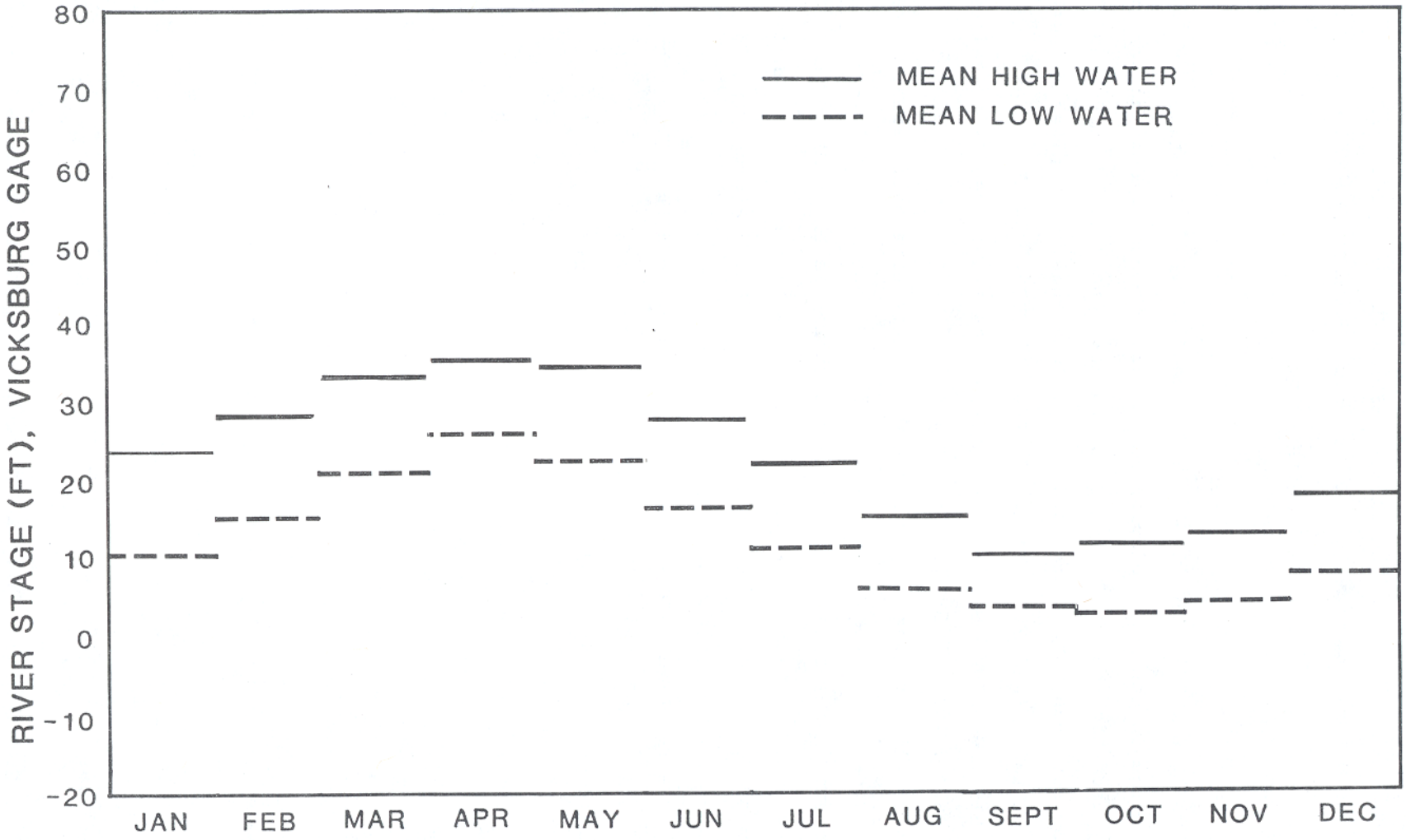

Figure 11. Average monthly high and low stages for the Lower Mississippi River at the Vicksburg, Miss., gage (RM 437.6, L). Data based on the 34-year period of record, 1944-1977

PART III: RESULTS

Dike Structures

Dike Types

43. From the 1880's until about 1960, wooden dikes of various designs were constructed in the Lower Mississippi River. Wooden pile dikes were the most widely used because of the degree of success encountered with this design. However, due to failures and high maintenance, pile dikes and other wooden structure designs were abandoned about 1960 for use above the Head of Passes and dikes constructed of stone aggregate came into use (Mississippi River Commission, 1977). However, several old pile dikes were reinforced with stone and are still present. Only stone dikes have been built since the 1960's and are of three basic types: transverse, L-head, and vane (Figure 2). Transverse dikes are linear structures that are anchored to the bank and extend toward the channel, generally perpendicular to the axis of flow or angled slightly up or down river. The L-head dike is basically a transverse dike with a section added at the channelward end that extends downstream at about a 90-degree angle relative to the axis of the transverse dike. Thus, the dike is L-shaped in plan view. The L-head section reduces scour around the end of the dike and functions in channel alignment. Vane dikes are unique in that they are not anchored to the bank but are built parallel or slightly oblique to the axis of flow near the border of the main channel. Weight distribution of the quarry-run stone aggregate used to construct all three dike types in the Lower Mississippi River is tabulated below.

Stone Weight (lb)	Cumulative Percent Finer
5,000	100
2,500	70-100
500	40-65
100	20-45
5	0-15
1	0-5

Dike Numbers and Engineering Features

44. General. As of 1981 there were 156 dikes in the USACED, Vicksburg, reach of the river with a combined main body length of 317,351 feet (60.1 miles). These dikes averaged 2,068 feet in length and ranged from 345 to 12,184 feet; median length was 1,747 feet. Transverse dikes comprised 76.9 percent of the existing dikes, while stone-pile, L-head, and vane dikes made up 9.6, 5.8, and 7.7 percent of the dikes, respectively (Tables 2 and 3). Appendix A contains engineering data on dike systems in the study area.

45. Transverse types. A total of 117 transverse dikes (three small transverse dikes were not included in this analysis) were present, with a total main body length of 234,086 feet (44.3 miles). Dike lengths ranged from 415 to 4,960 feet and averaged 2,001 feet; median dike length was 1,820 feet. Transverse dikes typically sloped downward from the bank head toward the channel; portions of some dikes sloped upward to cross bars between the secondary channels and the main channel. The average crown slope of transverse dikes was 0.76 percent for the central main body (S2), 0.86 percent for the terminal one-fourth or end slope section (S3), and 1.26 percent for the total main body length (S4). The transverse dike category includes six dikes that could be classified as weirs because the crown elevation at the midpoint of the main body is lower than the rest of the main body.

46. Crown elevation averaged +26.2 feet LWRP at the bank head (L0) and +15.9, +12.8, +10.1, and +7.0 feet LWRP at the L25, L50, L75, and L100 positions. A wide range in individual dike lengths, slopes, and crown elevations existed (Tables 2 and 3).

47. L-head type. Nine dikes were present which had an L-head design. These ranged in length from 1,020 to 12,184 feet and averaged 5,092 feet; median dike length was 4,788 feet. Average percent slope for this dike type was 0.96, 0.09, 0.28, and 0.36 for the S1, S2, S3, and S4 sections. Crown elevation averaged 25.4 feet at the bank head and 17.6, 14.4, 17.4, and 16.2 feet at the L25, L50, L75, and L100 positions (Tables 2 and 3).

48. Stone-filled pile dikes. The 15 stone-filled pile dikes totaled 22,956 feet in length and had an average dike length of 1,530 feet.

Lengths ranged from 345 to 2,670 feet; median length was 1,670 feet. Dike crown percent slope averaged 0.75, -0.28, -0.32, and -0.03 for the S1, S2, S3, and S4 sections. Thus, the main body of the average pile dike sloped upward toward the channel. This is mainly because pile dikes do not have a large bank head section that anchors them to the bank line as do transverse and L-head dikes and because stone-filled pile dikes often have weir-type sections that slope upward to tie into a middle bar. Average LWRP crown elevations were 9.4, 7.4, 8.3, 9.4, and 11.3 feet at the bank head, L25, L50, L75, and L100 positions (Tables 2 and 3).

49. Vane dikes. The 12 vane dikes in the study reach totaled 13,587 feet in length and ranged from 1,057 to 1,240 feet. Average and median lengths were 1,132 and 1,130 feet. The average vane dike sloped upward in a downstream direction at a slope of 0.04 percent (Tables 2 and 3). Thus, vane dikes are nearly flat in profile. The L50 crown elevation averaged 13.3 feet LWRP.

Dike Systems

Purpose and Profile

50. In the study reach, 46 nominal dike systems and 40 functional dike systems (i.e., some dike systems were combined where they are contiguous) were noted (Appendix A). The purpose for construction varied among the dike systems: 18 were single-purpose systems, and the remainder were multipurpose systems. Control of crossings was the most ubiquitous purpose. Five systems had control of crossings as a single purpose and 22 had this as one multiple purpose. Channel alignment in straight reaches was the next most common purpose for construction, followed by point bar stabilization and closure of point bar chutes and secondary channels. Longitudinal dike system profile was stepped down in 13 systems and stepped up in 14 of the systems. Profile was level in four systems and variable in 15 systems (Table 4). There was no pattern of association between dike system purpose and longitudinal profile.

Spatial Distribution

51. Dike systems were not evenly distributed along the river (Figure 12). Linear footage of dikes was concentrated between RM 383 and 398, RM 473 and 548, and RM 563 and 610. The greatest number of dikes (28)

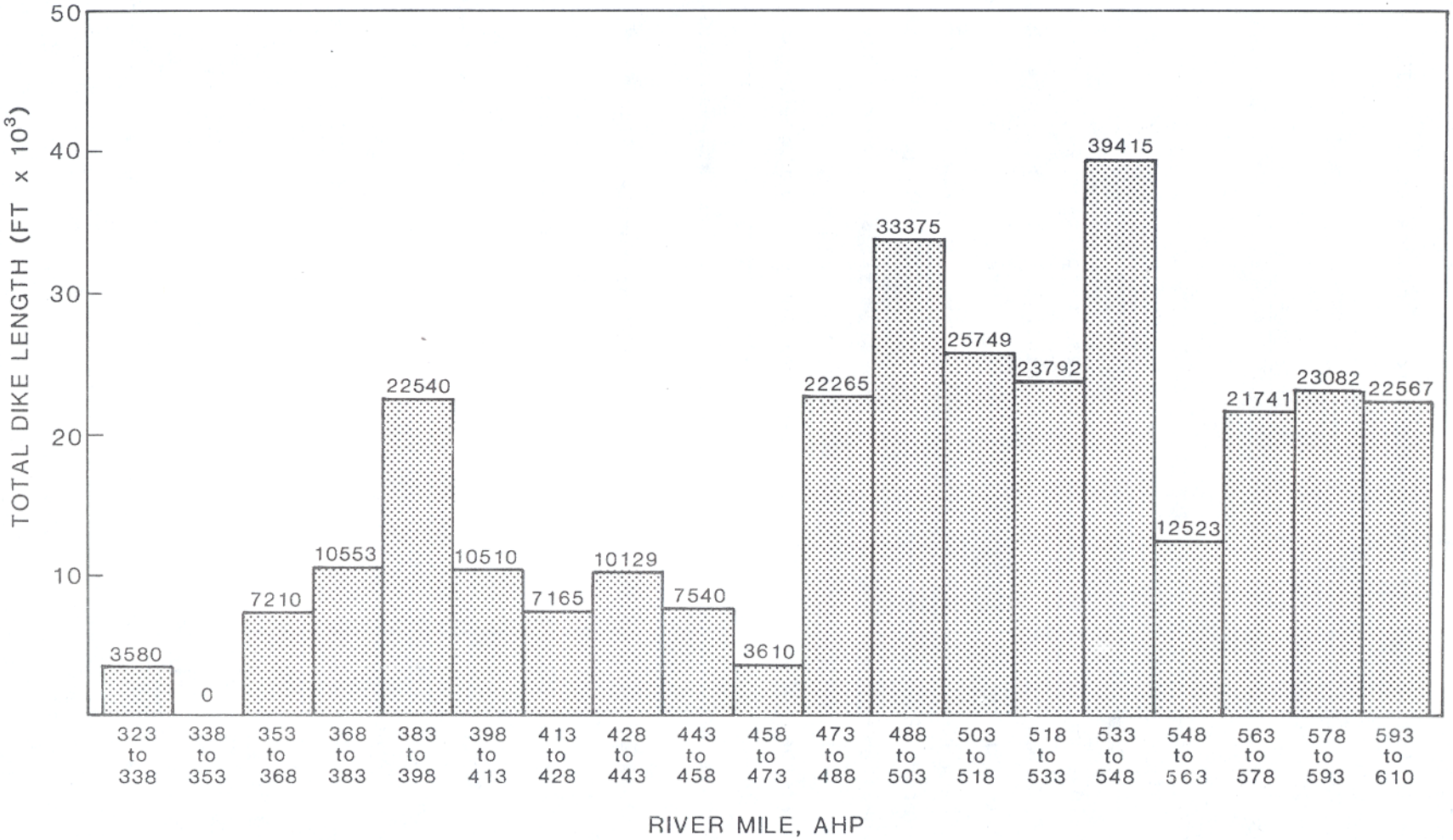

Figure 12. Spatial distribution of dike structures by river mile in the Lower Mississippi River, RM 320-610

was found in the reaches from RM 533 to 548 and RM 488 to 503. The 40-mile reach from RM 488 to 548 contained 42.5 percent of the dikes built in the USAED, Vicksburg, section of the river.

Dike System Aquatic Habitat

Pool Areas

52. Surface area. Aquatic habitat composed of pool areas in dike systems totaled 10,971, 15,863, 20,764, and 25,778 surface acres at the 0-, +5-, +10-, and +15-foot LWRP river stages, respectively (Figure 13; Appendix B). A stage-area curve for pool habitat in the study reach is presented in Figure 14. The average total pool area per dike system was 274, 397, 519, and 644 acres at the 0-, +5-, +10-, and +15-foot LWRP stages. Water surface area ranged from near zero at a 0-foot LWRP stage in the Terrene dike system (DS) to 1,636 acres at a +15-foot LWRP stage in the Seven Oaks/Island 86 DS. Pool surface area increased 45 percent from the 0- to the +5-foot LWRP stage, 31 percent from the +5- to the +10-foot stage, and 24 percent from the +10- to the +15-foot stage; an increase in area of 135 percent occurred between the 0- and +15-foot stages (Tables 5 and 6).

53. Volume. The volume of pool area habitat totaled 214×10^6, 322×10^6, 470×10^6, and 658×10^6 cubic yards (cu yd) at the 0-, +5-, +10-, and +15-foot LWRP stages, respectively (Tables 5 and 6; Figure 13). Volume ranged from near zero at Terrene DS at the 0-foot stage to 49.1×10^6 cu yd at the +15-foot stage in the Tarpley Cutoff/Leland Bar DS. Total pool water volume increased 50 percent from the 0- to the +5-foot stage, 46 percent from the +5- to the +10-foot stage, and 40 percent from the +10- to the +15-foot stage. An increase of 207 percent in pool water volume occurred between the 0- and +15-foot stages. Average water volumes per dike system were 5.3×10^6, 8.0×10^6, 11.7×10^6, and 16.4×10^6 cu yds for the 0-, +5-, +10-, and +15-foot stages, respectively (Appendix B).

54. Mean depth. Mean pool water depth was 11.0 feet at the 0-foot stage, 11.6 feet at the +5-foot stage, 13.3 feet at the +10-foot stage, and 15.4 feet at the +15-foot LWRP stage. Pool mean depth ranged from

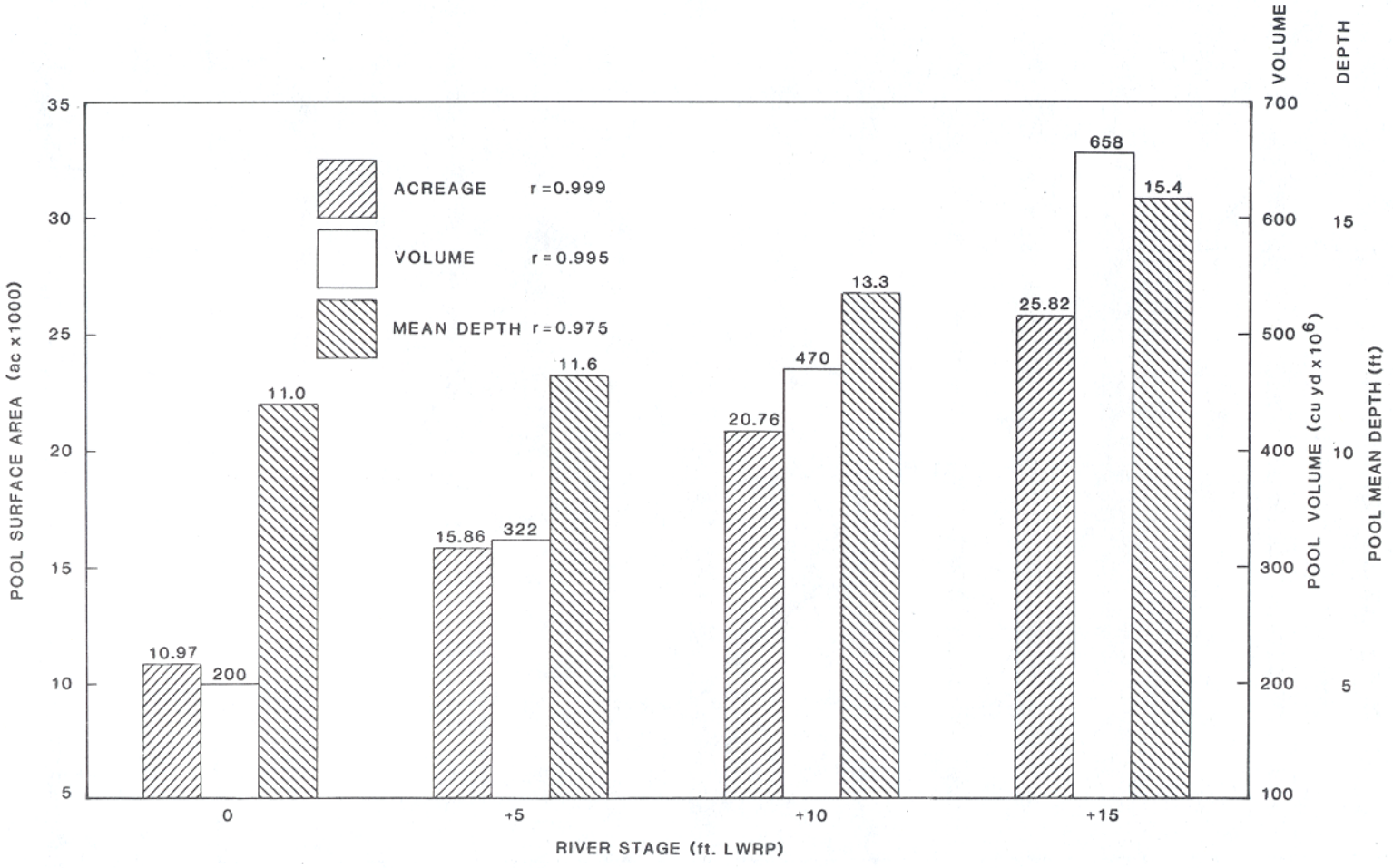

Figure 13. Total surface area, water volume, and mean depth of dike system pool aquatic habitat in the Lower Mississippi River, RM 320-610. Correlation coefficients (r) shown are for the relationship between river stage and aquatic habitat physical variables

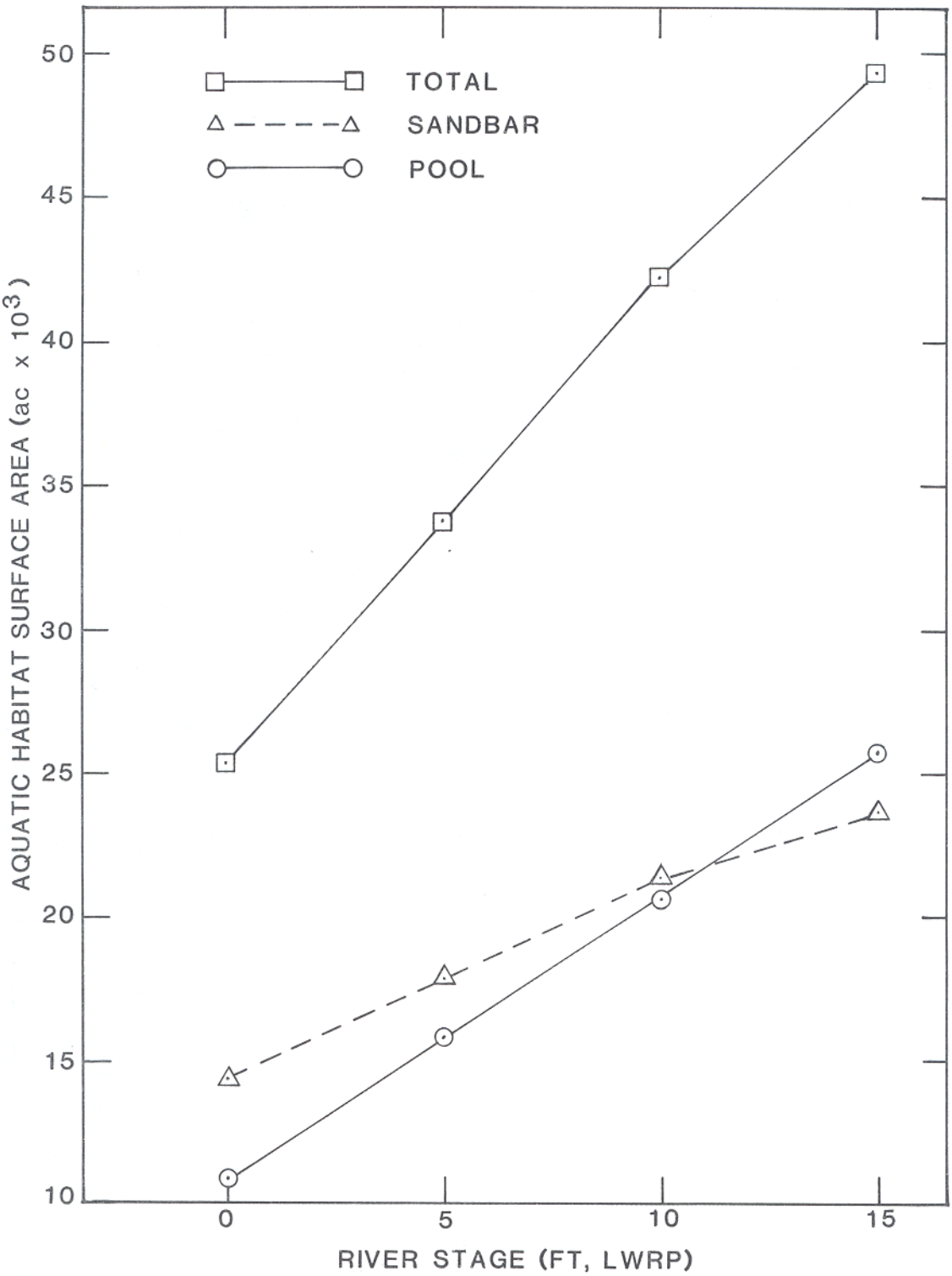

Figure 14. Total water surface area of dike system pool and sandbar habitat as a function of river stage in the Lower Mississippi River, RM 320-610

0 feet in Terrene DS at the 0-foot stage to 26.5 feet at the +15-foot stage in the Ashbrook/Miller Bend Right Bank DS (Tables 5 and 6; Figure 13) (Appendix B).

55. Spatial distribution. Dike system pool acreages and volumes were unevenly distributed spatially along the river. Pool surface area was not distributed linearly with river mile but was concentrated into four loci or modes of abundance. Five modes or reaches of concentration occurred: RM 354 to 369, RM 384 to 399, RM 473 to 489, RM 533 to 549, and RM 579 to 594 (Figure 15). For pool surface area and volume variables at the four river stages analyzed, the spatial distribution modes were the same except for pool volume at the 0-foot stage. The mode for this latter variable shifted upstream to the RM 518 to 533 reach.

Sandbar Areas

56. Surface area. The water surface areas of sandbars associated with dike systems totaled 14,404, 17,887, 21,372, and 23,599 acres for the four river stages evaluated (Tables 5 and 7; Figure 14) (Appendix B). Thus sandbar surface area increased 64 percent from the 0- to the +15-foot stage. Average dike system sandbar surface area was 360, 447, 534, and 590 acres, respectively, for the four river stages. The smallest sandbar area was 16 acres at Cottage Bend DS (RM 389.2) at the 0-foot stage; the largest was 2,775 acres at Leota DS (RM 515.4) at the +15-foot stage.

57. Volume. Total sandbar water volume was 253 x 10^6, 383 x 10^6, 544 x 10^6, and 723 x 10^6 cu yd at the four river stages (0-, +5-, +10-, and +15-foot LWRP). Average sandbar water volume per dike system for the four river stages evaluated was 6.3 x 10^6, 9.6 x 10^6, 13.6 x 10^6, and 18.1 x 10^6 cu yd, respectively. Sandbar volume ranged from 0.5 x 10^6 cu yd at the 0-foot stage for Cottage Bend DS (RM 389.2) and 68.5 x 10^6 cu yd at the +15-foot stage for Leota DS (RM 515.4). Sandbar water volume rose 51, 42, and 33 percent as river stage increased from 0 to +5 feet, +5 to +10 feet, and +10 to +15 feet, respectively. Volume increased 186 percent from the 0- to the +15-foot stage (Tables 5 and 7; Appendix B).

58. Mean depth. The mean depth of sandbar aquatic habitat averaged 9.7 feet at the 0-foot stage, 12.6 feet at the +5-foot stage, 15.5 feet at the +10-foot stage, and 18.9 feet at the +15-foot stage (Table 5). Mean depth ranged from 5.0 feet at the 0-foot stage in nine dike systems (Smith

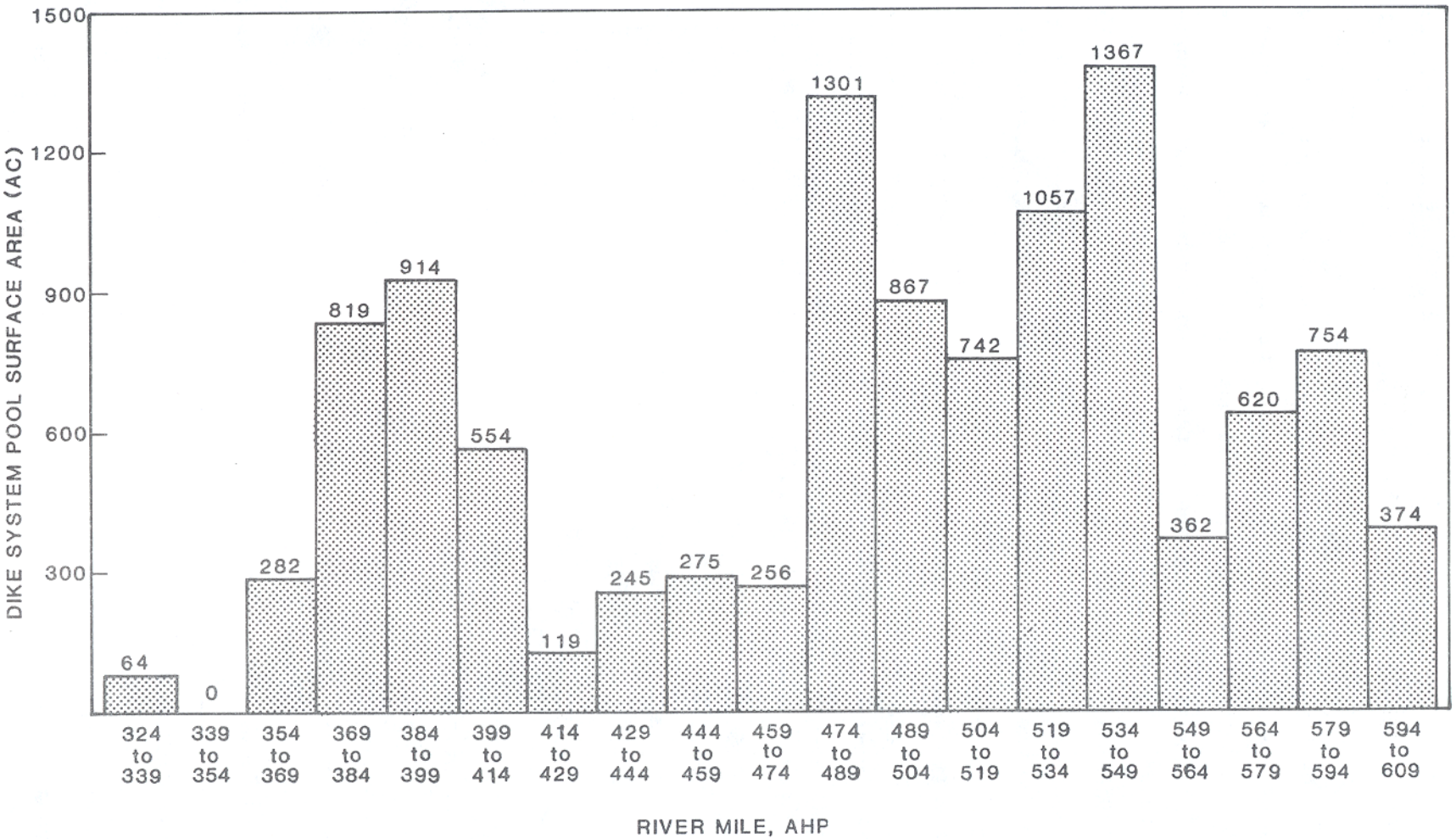

Figure 15. Spatial distribution of the surface area of dike system pool area aquatic habitat by river mile in the Lower Mississippi River, RM 320-610. (Data are for a river stage of 0 feet LWRP)

Point, RM 600.5; Montgomery Towhead/White River Landing, RM 592.5; Terrene, RM 590.1; Malone Field, RM 585.6; Catfish Point, RM 571; Chicot Landing, RM 565.5; Leota, RM 515.4; Corregidor, RM 505.8; and Willow Cutoff, RM 462.4) to 37.4 feet at the +15-foot stage for Carolina DS (RM 509.4) (Tables 5 and 7). Average mean depth increased 95 percent with a change in river stage from 0 to +15 feet LWRP (Appendix B).

59. Spatial distribution. Sandbar habitat associated with dike systems was not evenly distributed spatially along the river (Figure 16). Sandbar surface area had a peak abundance in the RM 504 to 519 reach. Four smaller modes of abundance were also present in the frequency distribution of sandbar habitat area, with the second largest mode in the reach from RM 534 to 549. The spatial distribution of sandbar water volumes exhibited five modes, with the largest mode in the reach from RM 534 to 549. The second largest mode was in the RM 504 to 519 reach, which became more pronounced with increasing river stage.

Total Dike System Aquatic Habitat

60. Surface area. The water surface area of combined pool and sandbar habitats associated with dike systems was 25,376, 33,750, 42,136, and 49,377 acres at the 0-, +5-, +10-, and +15-foot LWRP river stages (Figure 14). Total dike system habitat increased 95 percent from the 0- to the +15-foot river stage. Average total habitat per dike system ranged from 634 to 1,234 acres at the 0- and +15-foot stages (Table 5).

61. Volume. Total habitat water volume was 467 x 10^6, 1,705 x 10^6, 1,015 x 10^6, and 1,380 x 10^6 cu yd for the 0-, +5-, +10-, and +15-foot river stages; average total volume per dike system was 11.6 x 10^6, 17.6 x 10^6, 25.4 x 10^6, and 34.5 x 10^6 cu yd for the four stages (Table 5).

Hydrologic Characteristics

62. Total year. Weighted average relative exceedance frequency for the total year analysis was lowest for the 0-foot LWRP elevation, increased about 1.5 times over this value at the +5-foot stage, and was greatest at the +10-foot stage. The relative exceedance frequency for the +15-foot LWRP elevation was slightly less than that of the +10-foot stage (Table 8). Correspondingly, stage duration was greatest at the 0-foot stage. The 0-foot LWRP elevation was exceeded 348 days per year or 95.3 percent of the time on the average. Stage duration decreased with increased river stage to 182 days per year (49.9 percent of the time) for the +15-foot stage (Table 8).

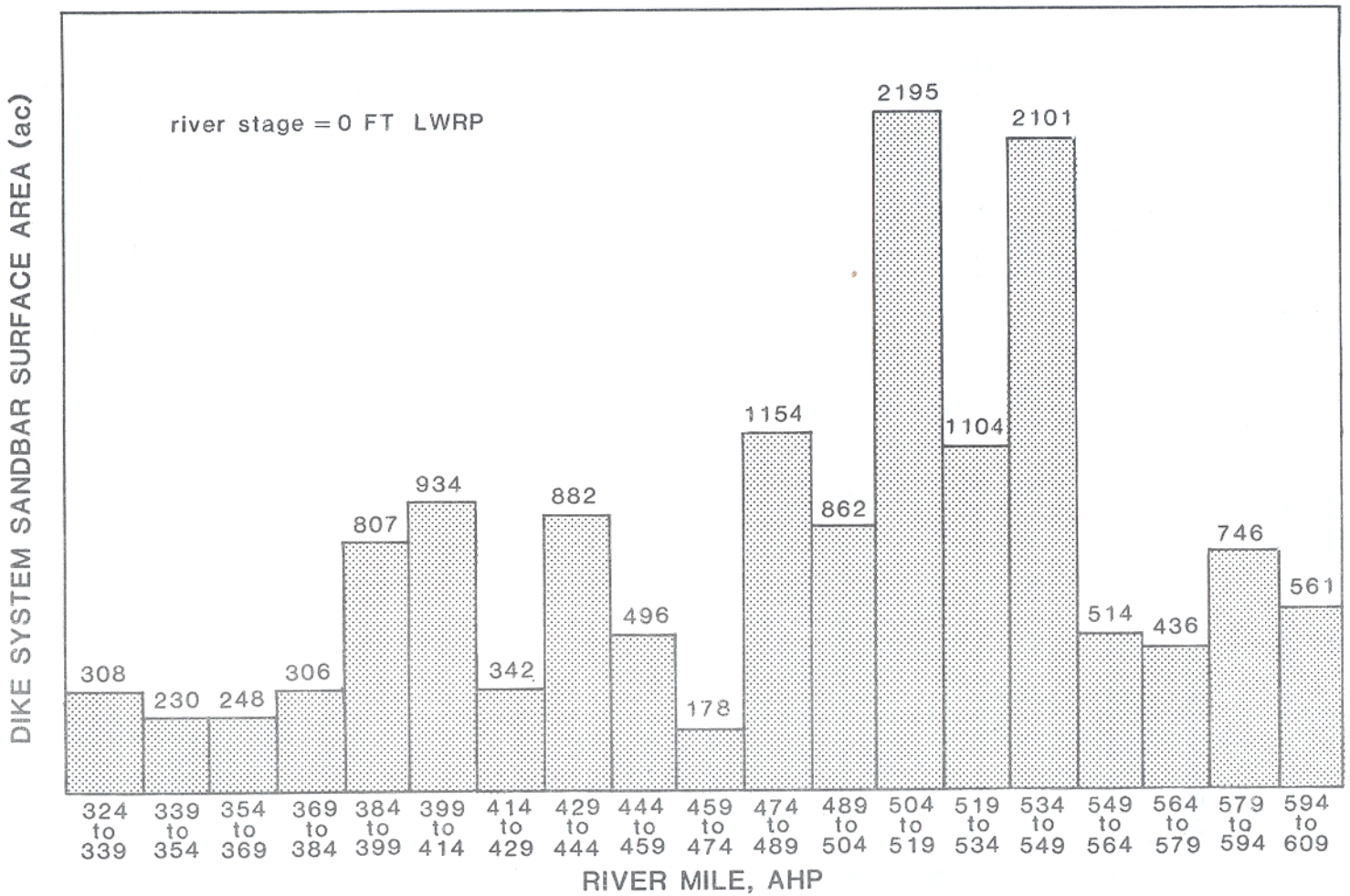

Figure 16. Spatial distribution of the water surface area of sandbar aquatic habitat associated with dike systems in the Lower Mississippi River, RM 320-610. (Data based on a river stage of 0 feet LWRP)

63. Low-flow period. Relative exceedance frequency during the low-flow period, expressed as the number of times stage was greater than or equal to the four target LWRP elevations, was lowest at the 0-foot LWRP stage (1.73 times), indicating that the river fluctuated relatively little about this elevation. The river exceeded the 0-foot elevation about 98 percent of the time on the average during the low-flow period (Figures 17 and 18; Table 9). River stage fluctuated about 1.5 times more on the average about the +5- and +10-foot LWRP elevation (2.82 and 2.75 times) than about the 0-foot stage. The +5- and +10-foot elevations were exceeded an average of 69.6 and 42.6 percent of the time. Relative exceedance frequency decreased to an average of 2.09 during the low-flow period for the +15-foot elevation; river stage was $\geq$+15 foot an average of 23.5 percent of the time.

64. During the low-flow period, weighted average relative exceedance frequency values based on the number of times per year stages were less than or equal to the four target LWRP elevations varied from 0.84 at the 0-foot LWRP elevation to 2.33 at the +10-foot elevation. Stage duration weighted averages ranged from 16 days for the 0-foot stage to 141 days for the +15-foot stage, i.e., stages were less than or equal to these elevations 8.5 and 76.7 percent of the time during the low-flow period (Table 10). Weighted average interval stage duration was greatest for the +5- to +10-foot interval and lowest for the +10- to +15-foot interval, but the variation between intervals was only 14 days. Interval stage duration per event decreased with increasing river stage based on weighted average data and ranged from 7 to 11 days at the four target stages (Table 10).

65. High-flow period. Weighted average values for relative exceedance frequency increased from 0.12 at the 0-foot LWRP to 1.61 times per year at the +15-foot elevation for the high-flow period based on the number of times and days river stages were less than or equal to the four target LWRP elevations (Table 11). River stage exceeded the 0-foot LWRP elevation 179 days per year or 99 percent of the time, while stages were $\geq$+15 feet LWRP 139 days (77 percent of the time). On the average, river stages did not fall below the 0-, +5-, and +10-foot LWRP elevations annually during the high-flow period. For example, on the Vicksburg gage, the 0-foot elevation was exceeded during the high-flow period on the average of only one time in about 12.5 years (Table 11). Thus, river stage on the Vicksburg gage fell below the 0-foot

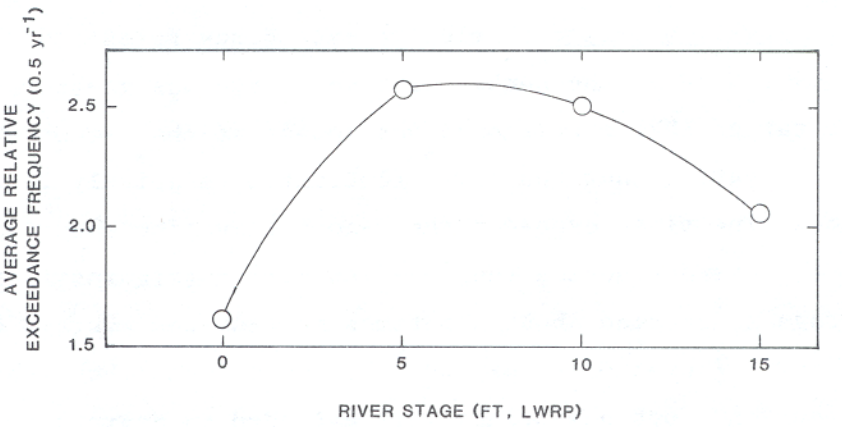

Figure 17. Average exceedance frequency for Low Water Reference Plane river stages corresponding to pool conditions in dike systems during the July to December low-flow period at the Vicksburg, Miss., gage (RM 437.6) on the Lower Mississippi River. (Data based on a 29-year period of gage records (1950-1979))

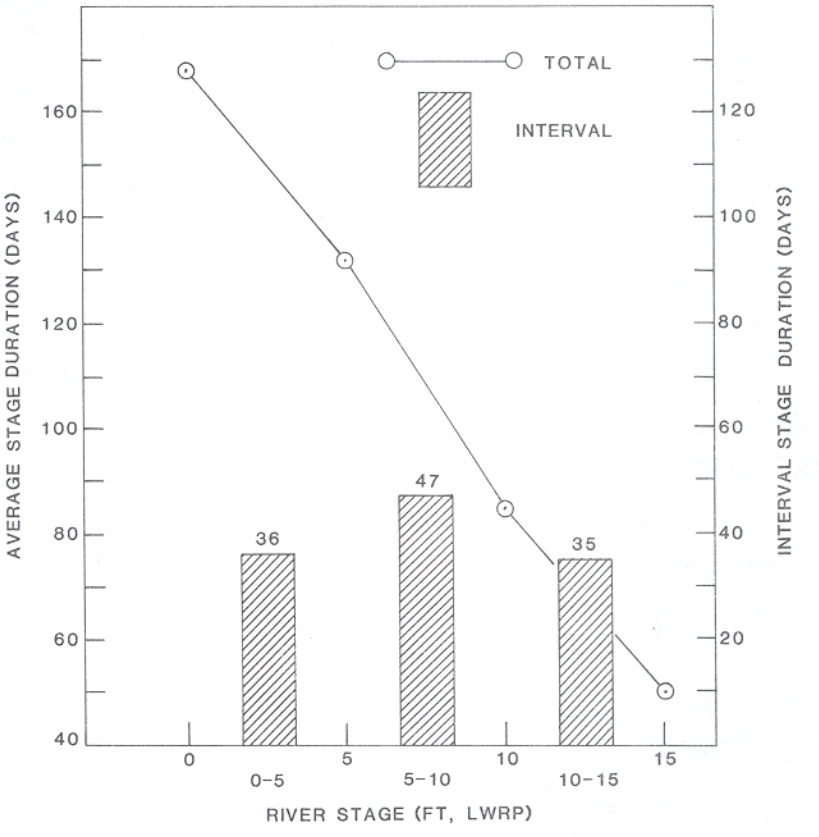

Figure 18. Average total and partial duration of exceedance for Low Water Reference Plane river stages corresponding to pooled conditions in dike systems during the July to December low-flow period at the Vicksburg, Miss., gage (RM 437.6) on the Lower Mississippi River. (Data based on a 29-year period of gage records (1950-1979))

LWRP elevation only two times during the 29-year period of gage records analyzed. The +15-foot LWRP elevation is exceeded an average of 1.61 times per year in the study reach; the average number of days per event or times that this river stage was equaled or exceeded was 86 days per year.

Relationships Among Pool Habitat Physical Variables

66. Dike system pool habitat has three principal and interrelated variables that describe the basic physical dimensions: depth, volume, and surface area. Each of these interrelated variables is a function of river stage.

67. Volume and surface area. Habitat volume and surface area were highly positively correlated for the 40 dike systems in the study reach at all four river stages investigated (Tables 12 and 13; Figure 19). Thus, total pool area and volume of a given dike system for a specific river stage can be estimated using the regression equations shown in Figure 19 for the dike systems used to compute the equations. Volume and surface area were positively correlated in Pool 2 of the dike systems (Table 12), but not to the degree for total pool area (Table 13).

68. Mean depth, surface area, and volume. Considering total dike systems, mean depth on the average increased with total pool surface area, but no statistically significant correlations were found between these variables (Table 13; Figure 20). However, a significant positive correlation was found between total pool mean depth and volume at all four river stages (Table 13; Figure 21).

69. For Pool 2 in the dike systems, there was a significant positive correlation between mean depth and surface area for the 0-foot LWRP stage (Table 12; Figure 22); however, at the three higher stages considered, a nonsignificant negative correlation was found. This indicated that on the average only a small portion of Pool 2 area contained relatively deep water and that, as river stage rose, the proportion of shallow water became greater as sandbar areas were inundated. A highly significant positive correlation was found between Pool 2 volumes and mean depths; r-values decreased with increasing river stage (Table 12; Figure 23). The higher proportion of shallow pool water at higher stages evidently is primarily responsible for this relationship.

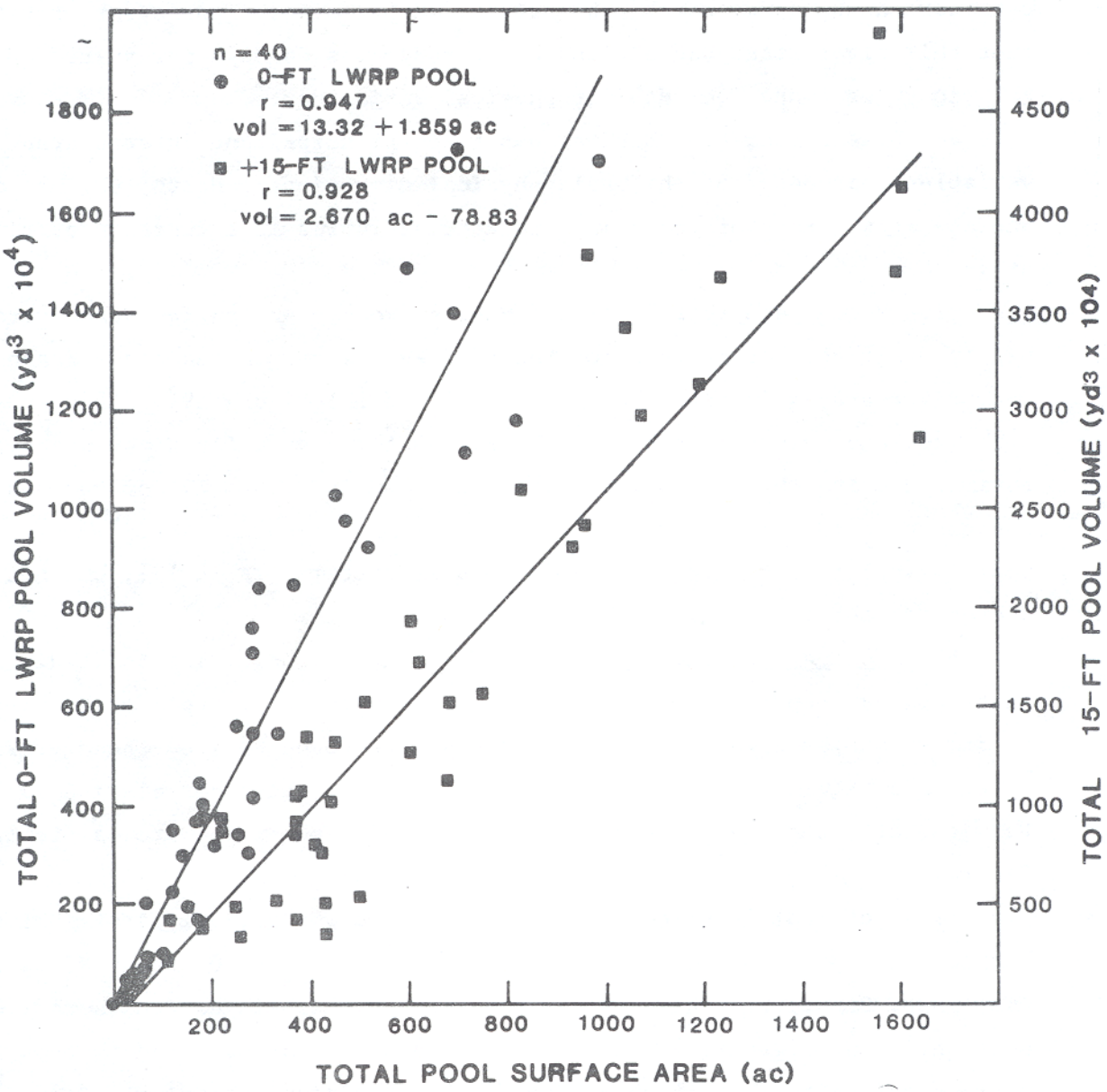

Figure 19. Relationship between dike system pool water surface plane area and volume at the 0- and +15-foot LWRP river stages for 40 dike systems in the Lower Mississippi River, RM 320-610

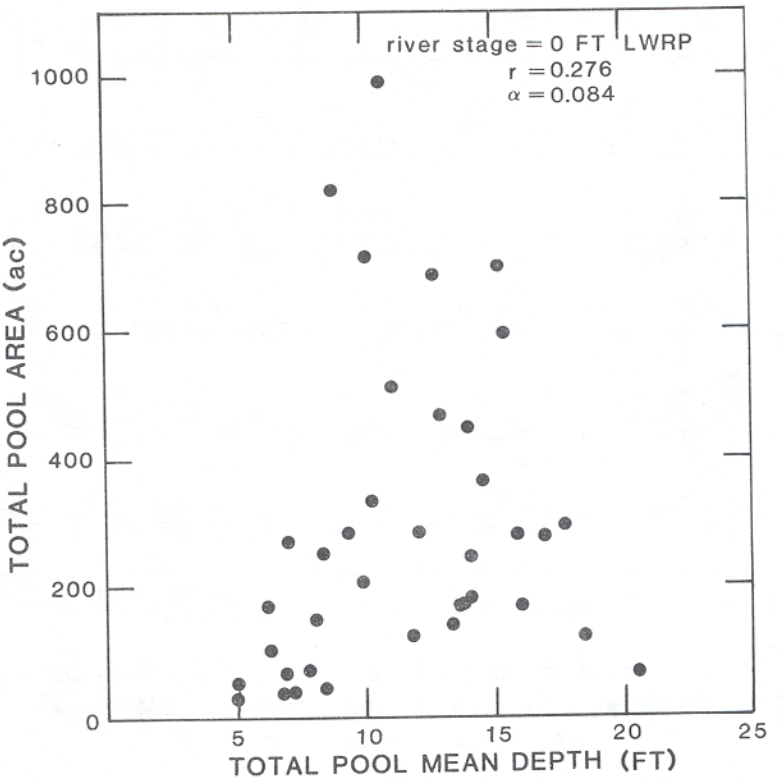

Figure 20. Relationship between total pool surface and mean depth at a river stage of 0 feet LWRP for dike systems in the Lower Mississippi River, RM 320-610

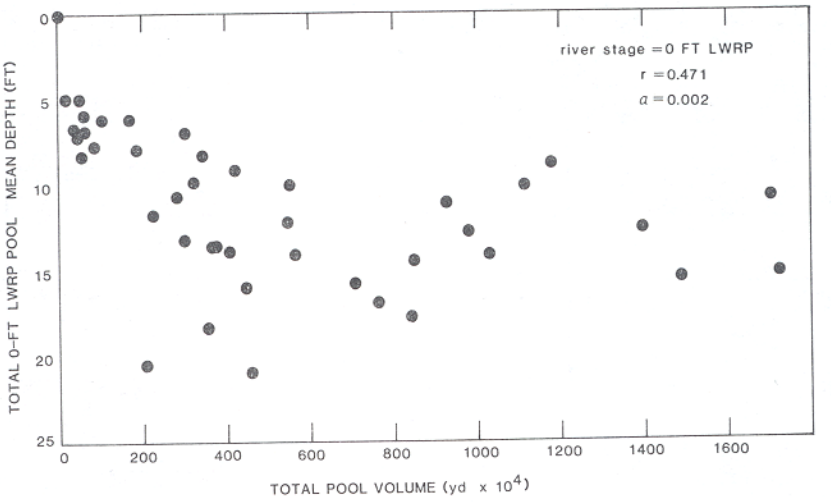

Figure 21. Relationship between volume and mean depth at a river stage of 0 feet LWRP for dike systems in the Lower Mississippi River, RM 320-610

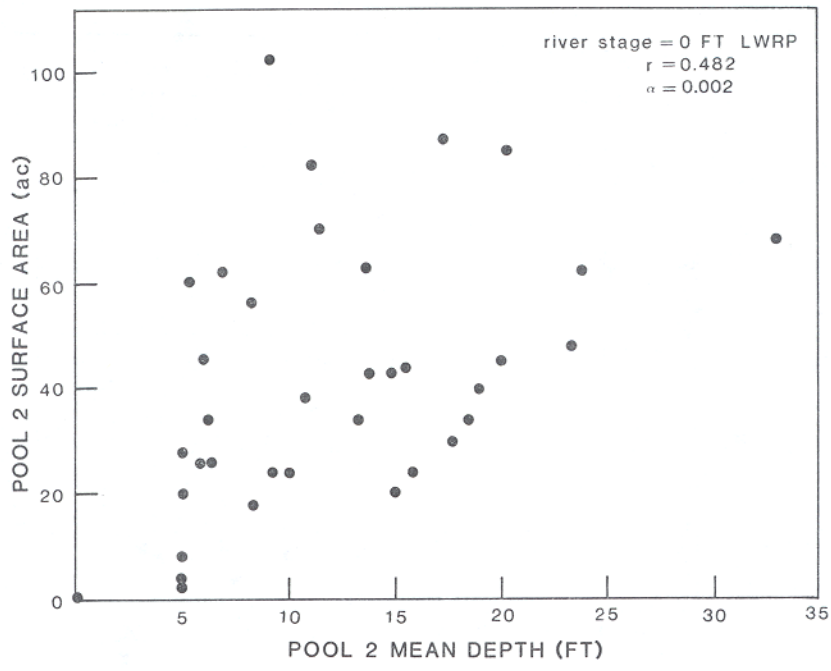

Figure 22. Relationship between Pool 2 surface area and mean depth at a river stage of 0 feet LWRP for dike systems in the Lower Mississippi River, RM 320-610

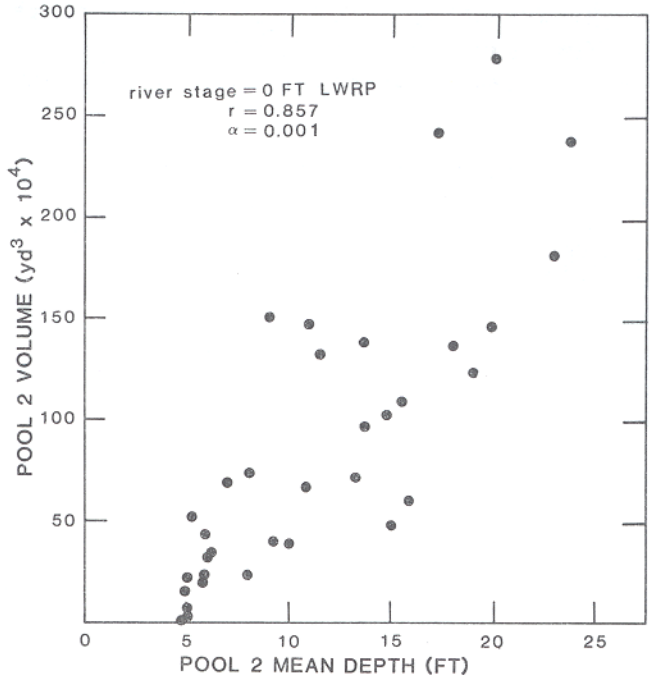

Figure 23. Relationship between Pool 2 volume and mean depth at a river stage of 0 feet LWRP for dike systems in the Lower Mississippi River, RM 320-610

70. Depth distribution. Depth distribution in dike system pools, i.e., the proportion of pool surface area having different depths, varied widely among dike systems (Table 6). For example, the proportion of pool area ≥10 feet in depth ranged from 0 percent in Smith Point and Terrene DS to 77 percent in Ashbrook/Miller Bend Right Bank DS at the 0-foot LWRP stage. The proportion of deep water increased in most dike systems with river stage, but decreased in others. The proportion of pool surface area ≥10 feet deep increased from 32 to 66 percent at Montgomery Towhead/White River Landing DS, while in Togo Island DS the percentage declined from 60 to 45 between the 0- and +15-foot LWRP stages. The correlation, for instance, between pool surface area and percent surface area with water ≥10 feet deep was positive at the +10-foot LWRP stage, but not statistically significant ($r = 0.289$). However, the correlation was significant ($r = 0.539$) between volume and percent surface ≥10 feet at this stage.

Associations Between Dike Engineering and Pool Habitat Characteristics

71. General. The relationship between engineering design parameters of dikes and aquatic habitat characteristics in dike systems is of particular interest in the LMREP. This is because a major objective of the study is to develop environmental design considerations. To obtain information on these relationships, correlation analyses of dike engineering and pool habitat characteristics for Pool 2 and the total dike system were performed. Pool 2 and Dike 1 correlation analyses were performed because this pool is confined between the first and second dikes in a dike system and its features should be controlled more directly by characteristics of Dike 1, i.e., variability should be less than that for a total dike system. The dike engineering parameters used were crown slope, crown elevation, and dike length. Pool habitat variables used were volume, surface area and mean depth. Correlations between these variables were performed for four river stages: 0-, +5-, +10-, and +15-feet LWRP. In the correlation analysis for the total dike system, total pool volume and surface area as well as mean depth and average dike slope, elevation, and length were used. For Pool 2 analyses, specific data for Pool 2 and Dike 1 were used. Only correlations that are statistically significant at the 5-percent level of probability or less are discussed.

72. Pool 2. Pool 2 surface area at the 0-foot stage was correlated negatively with the crown elevation of Dike 1 at the L50, L75, and L100 elevations (Figure 24); no correlation with bank head elevation was found. Surface area was positively related to total structure slope (S4) at the 0-foot stage (Figure 25). Therefore, on the average at the 0-foot stage, the lower the crown elevation of Dike 1 for the outer one-half of the structure and the steeper the crown slope, the larger the pool surface area. Surface area was not significantly correlated with dike elevations or slopes at the +5-, +10-, and +15-foot LWRP stages (Table 12).

73. Pool 2 volume at the 0- and +5-foot stages had a significant positive correlation with dike bank head elevation (Figure 26) and a significant negative correlation with the L50, L75, and L100 crown elevations (Figure 27). Also, at the +10- and +15-foot stages, volume was negatively correlated with the L75 and L100 crown elevations (Table 12). Thus, on the average, the higher the bank head elevation and the lower the crown elevation of the outer sections of the main body of dikes within a dike system, the greater pool volume. Crown elevation of the riverward one-fourth of the dike structure had the highest negative association with pool volume.

74. Pool 2 volume was also positively correlated with slope of the total dike structure (S4) (Figure 28), bank head slope (S1), and central main body (S2) at the 0- and +5-foot stages. Correlations were slightly stronger with crown slope S4 (Table 12). This indicated that as Dike 1 slope became steeper, Pool 2 volume became greater at the two lower river stages considered. Since dike crown elevations and the total slope and central body slopes are highly correlated, this result is expected. No significant correlations were found between dike slope and pool volume at the +10- and +15-foot LWRP river stages.

75. Pool 2 mean depth in dike systems was positively correlated with average dike bank head elevation at all four river stages (0, +5, +10, and +15 feet), indicating that the higher the bank head elevation the greater pool mean depth (Table 12). Mean depth had a significant negative correlation with Dike 1 main body crown (L75) and end slope elevation (L100) for all target stages except the 0-foot stage (Figure 29); a significant negative correlation was also found with L50 at the +15-foot stage (Table 12). Thus, lower main body and higher bank head crown elevations were associated with greater pool mean depths at the two intermediate river stages analyzed.

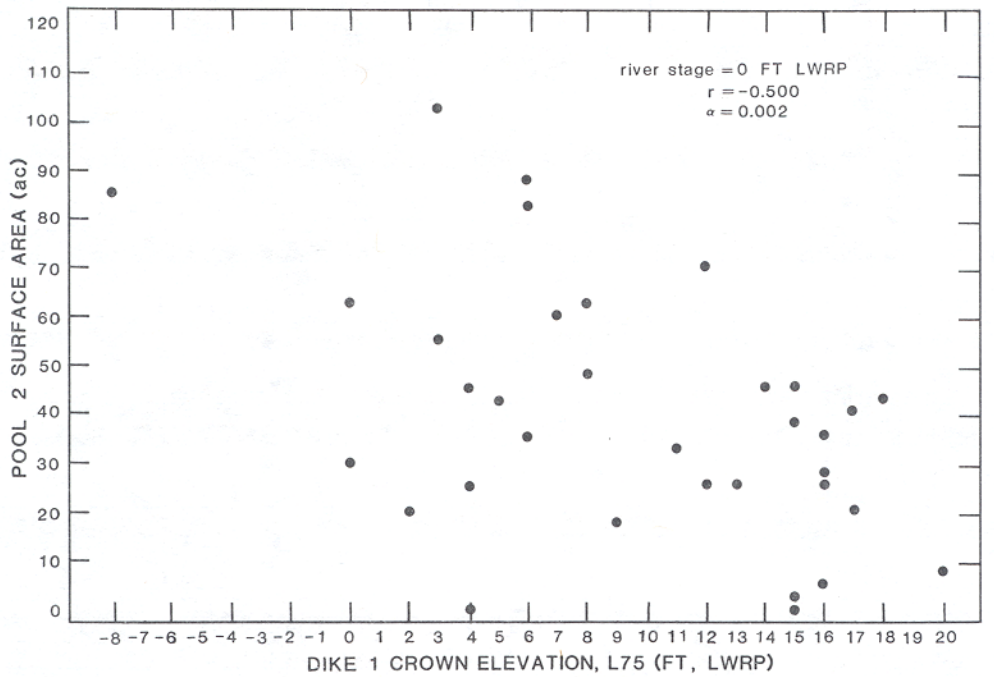

Figure 24. Relationship between Pool 2 surface area and Dike 1 main body crown elevation (L75) at a river stage of 0 feet LWRP for dike systems in the Lower Mississippi River, RM 320-610

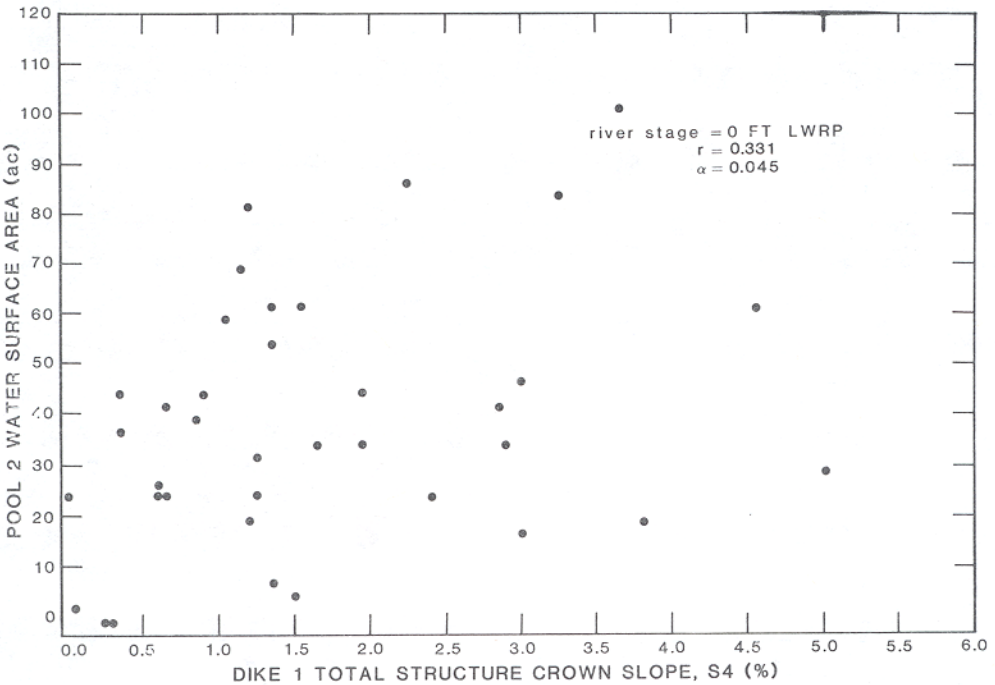

Figure 25. Relationship between Pool 2 surface area and Dike 1 total structure crown slope (S4) at a river stage of 0 feet LWRP for dike systems in the Lower Mississippi River, RM 320-610

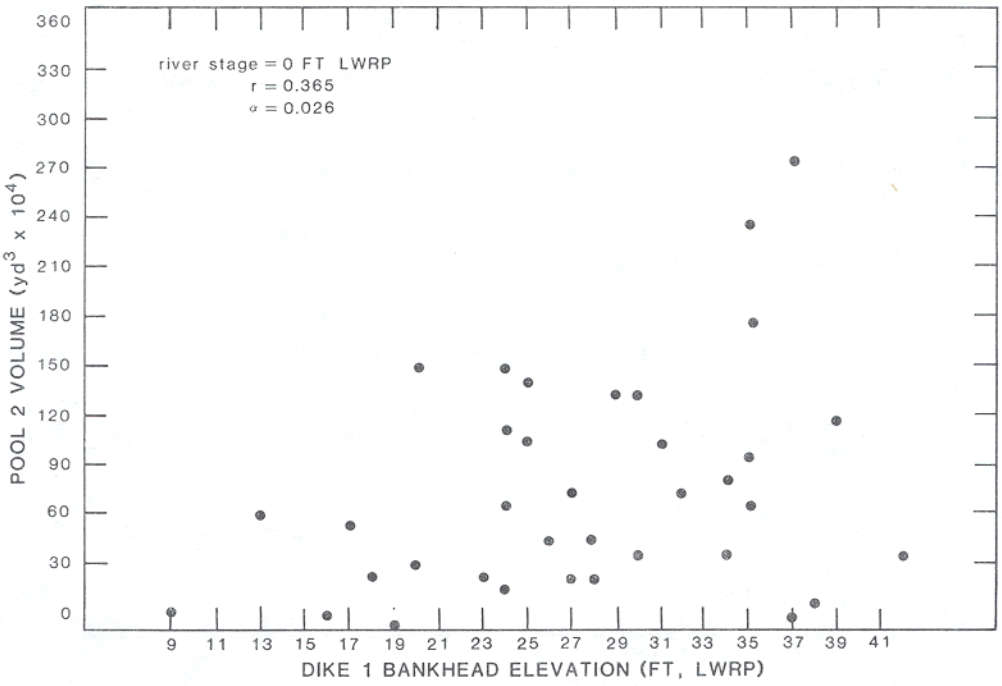

Figure 26. Relationship between Pool 2 volume and Dike 1 bank head crown elevation (L0) at a river stage of 0 feet LWRP for dike systems in the Lower Mississippi River, RM 320-610

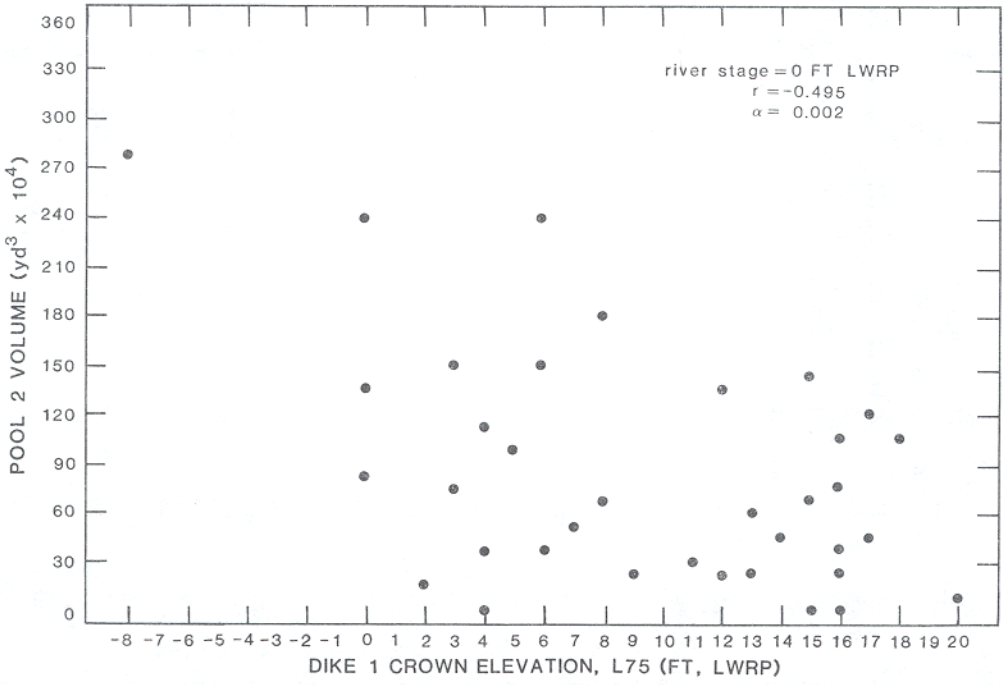

Figure 27. Relationship between Pool 2 volume and Dike 1 main body crown elevation (L75) at a river stage of 0 feet LWRP for dike systems in the Lower Mississippi River, RM 320-610

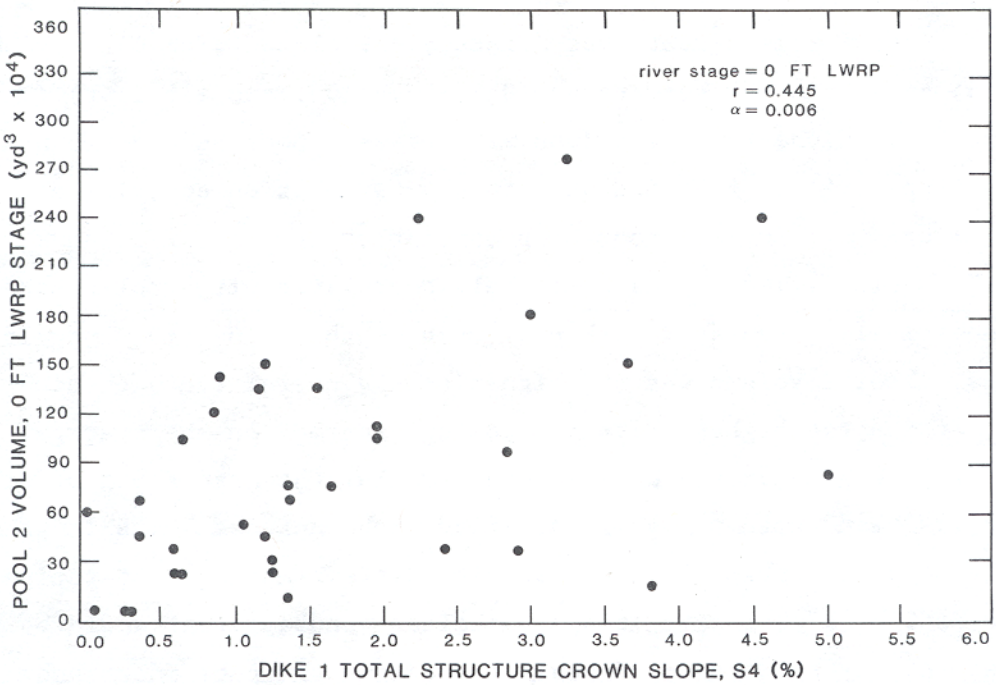

Figure 28. Relationship between Pool 2 volume and Dike 1 total structure crown slope (S4) at a river stage of 0 feet LWRP for dike systems in the Lower Mississippi River, RM 320-610

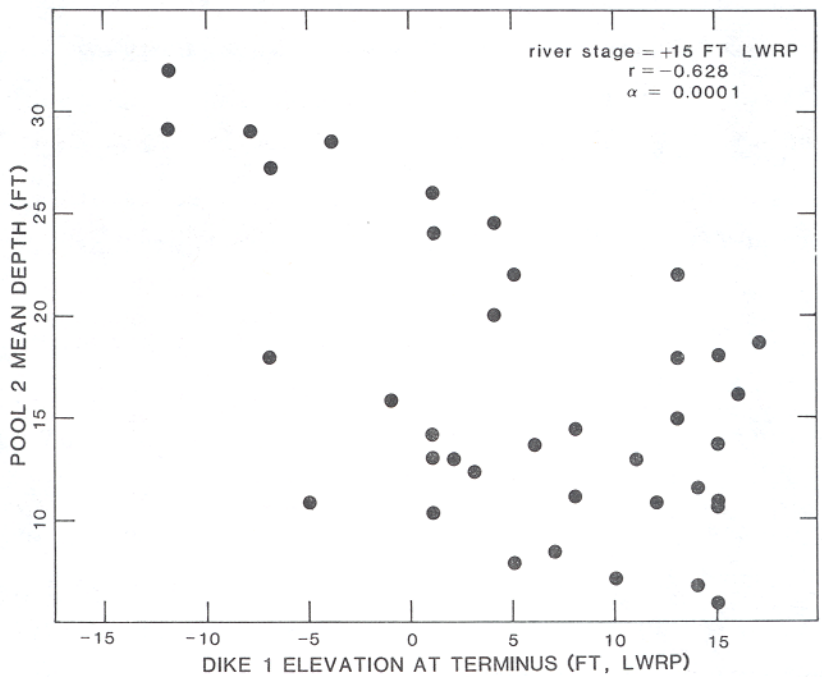

Figure 29. Relationship between Pool 2 mean depth and Dike 1 end slope elevation (L100) at a river stage of +15 feet LWRP for dike systems in the Lower Mississippi River, RM 320-610

76. Pool 2 mean depth was directly correlated with dike crown slopes (S1-S4) at all four river stages (0-, +5-, +10-, and +15-feet) (Table 12; Figure 30). Highest correlations were between pool mean depth and total crown slope (S4) of the dike structure. Correlation coefficients increased with river stage for all four slope variables.

77. Dike 1 length was positively correlated with Pool 2 surface area and negatively correlated with pool mean depth at the +10- and +15-foot stages. Pool 2 volume was not significantly correlated with dike length. Thus, at the two highest river stages considered, on the average, the longer the dike the greater the area and the smaller the mean depth of dike pool habitat. Mean depth probably decreased with increased dike length because middle bars are typically found in dike systems having comparatively long dikes and, at higher river stages, shallow sandbar areas would be inundated; therefore, the proportion of shallow water in the pool increased. However, when pool surface area and volume were converted to the proportion of the total area between the first two dikes, correlations with dike length were statistically significant with surface area for all four river stages and with volume at all stages but 0 feet LWRP. Also, a significant negative correlation was found between pool mean depth and Dike 1 length at the +15-foot stage. Correlation coefficients varied directly with river stage.

78. Total dike system. Total pool surface area at the +5-, +10-, and +15-foot LWRP stages had a significant negative correlation with mean bank head elevation (Figure 31) but not with crown elevations L25 through L100 (Table 13).

79. Mean central body dike slope (S2) was negatively correlated with total pool area at the +10- and +15-foot stages (Figure 32); at the latter stage, pool area was also negatively correlated with total dike structure slope (S4) (Table 13). Average bank head section slope (S1) was positively correlated to pool area at the +15-foot stage, but not at other stages (Table 13; Figure 33). No significant correlations were found between mean slope and total pool area at the 0- and +5-foot stages. It appears that at higher river stages, larger pool areas on the average were associated with dike systems comprised of dikes with relatively flat main body and total structure slopes and relatively steep bank head sections.

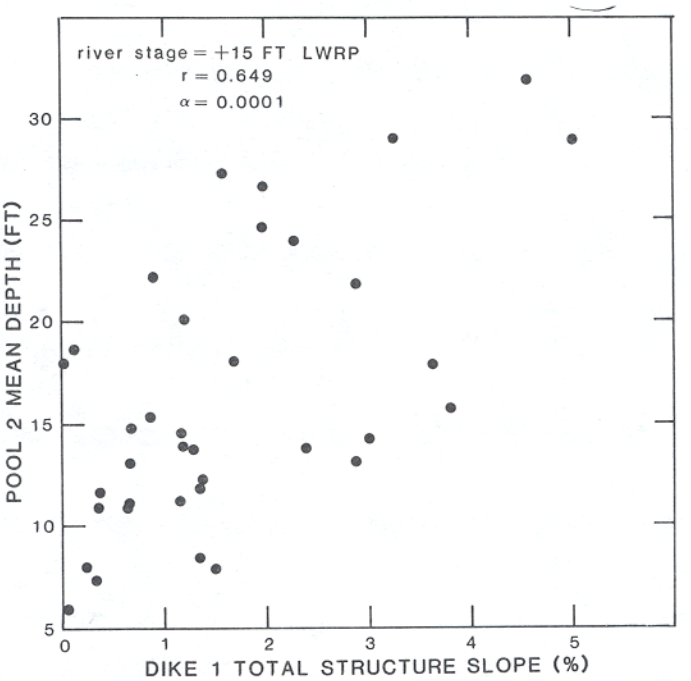

Figure 30. Relationship between Pool 2 mean depth and Dike 1 total structure crown slope (S4) at a river stage of +15 feet LWRP for dike systems in the Lower Mississippi River, RM 320-610

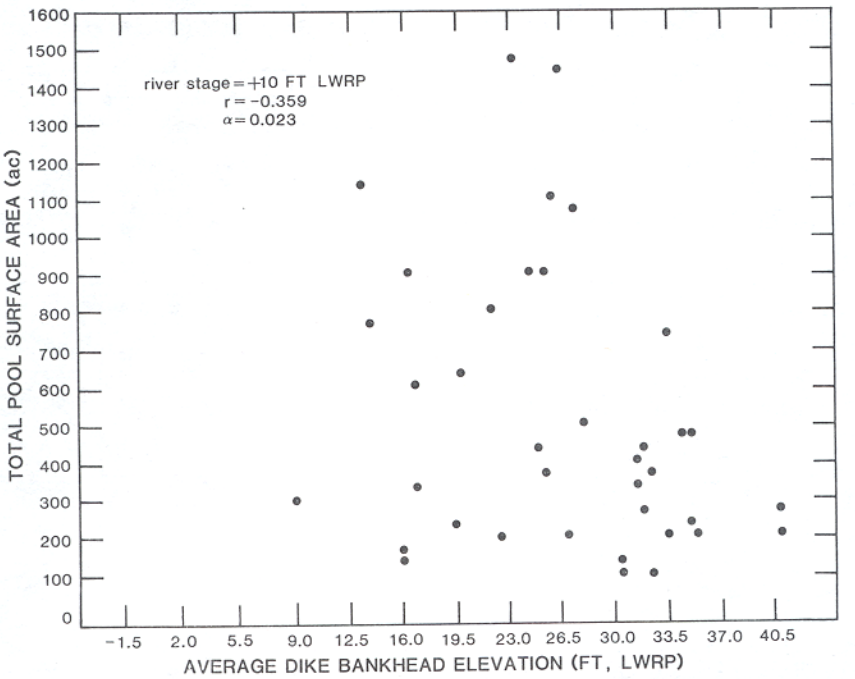

Figure 31. Relationship between total pool surface area and average bank head crown elevation (LO) at a river stage of +10 feet LWRP for dike systems in the Lower Mississippi River, RM 320-610

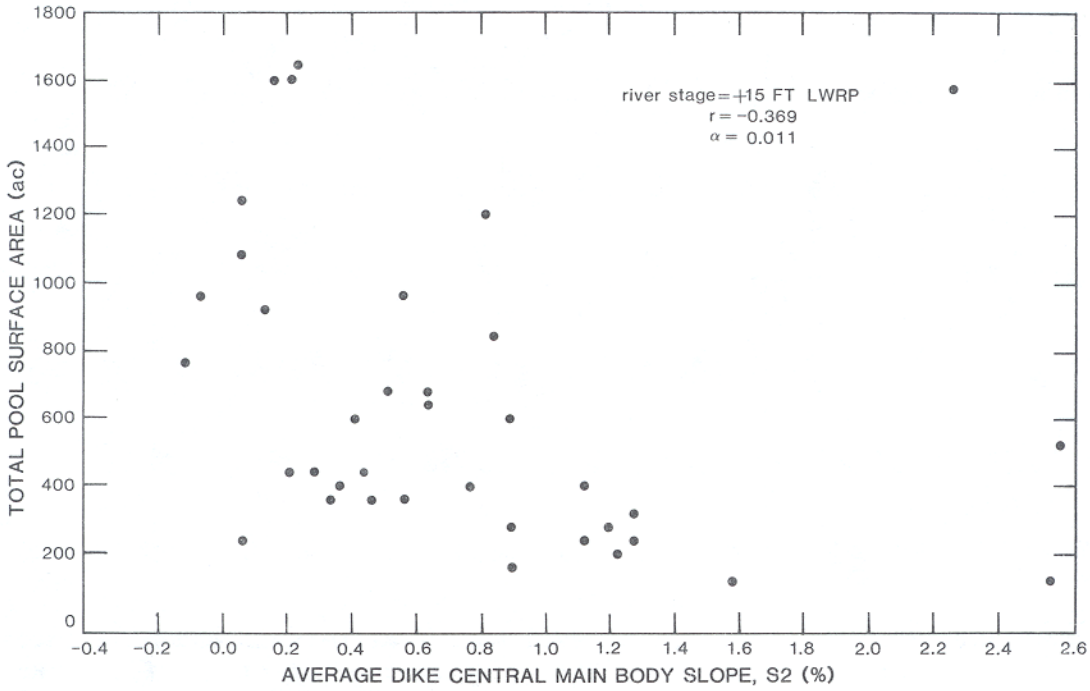

Figure 32. Relationship between total pool surface area and average dike main body crown slope (S2) at a river stage of +15 feet LWRP for dike systems in the Lower Mississippi River, RM 320-610

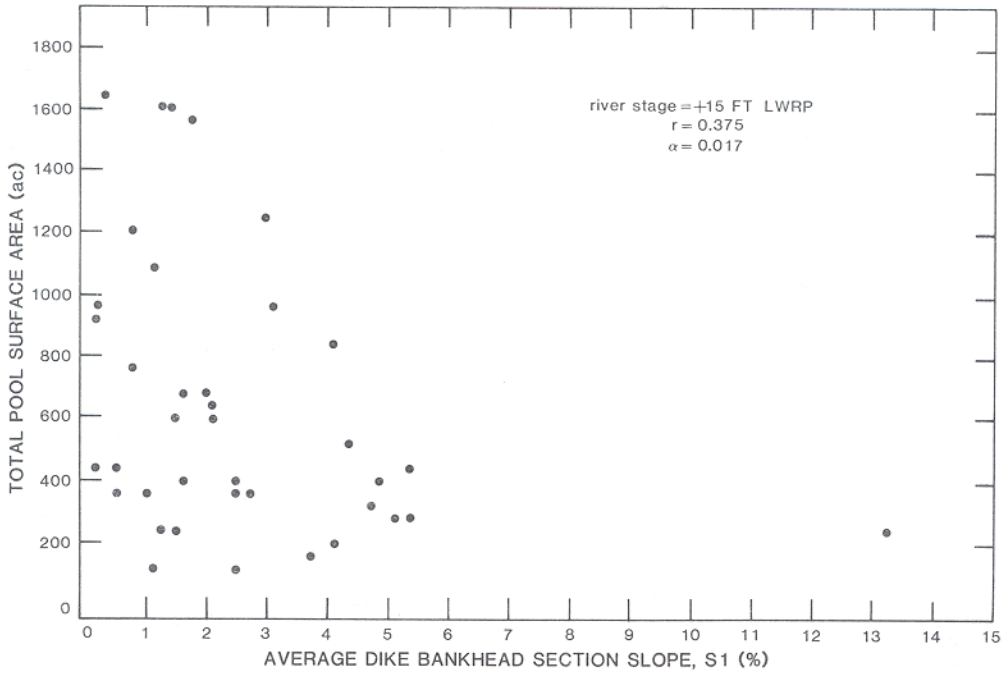

Figure 33. Relationship between total pool surface area and average bank head crown slope (S1) at a river stage of +15 feet LWRP for dike systems in the Lower Mississippi River, RM 320-610

80. Only one significant correlation was found between total pool volume and dike engineering design factors: volume was negatively correlated with bank head elevation at the +15-foot stage (Table 13; Figure 34).

81. Mean pool depth was significantly correlated indirectly with crown elevation L75 at the +5-, +10-, and +15-foot stages; significant negative correlations were also found with L25 at the +10- and +15-foot stages and with L100 at the +15-foot stage; r-values increased with stage (Table 13). This result indicated that dikes systems that had dikes with relatively low crown elevations had relatively deep pools. Average central body slope (S2) was positively associated with total pool mean depth at the +10- and +15-foot stages. A negative correlation was found between bank head section slope and pool mean depth at the +15-foot stage (Table 13). Thus, dike systems that had relatively steep dike crown slopes for the main body and relatively flat bank head section slopes also had greater mean pool depths at higher river stages. No significant correlations were found between pool volume, area, and mean depth and the total or average dike length in dike systems (Figure 35).

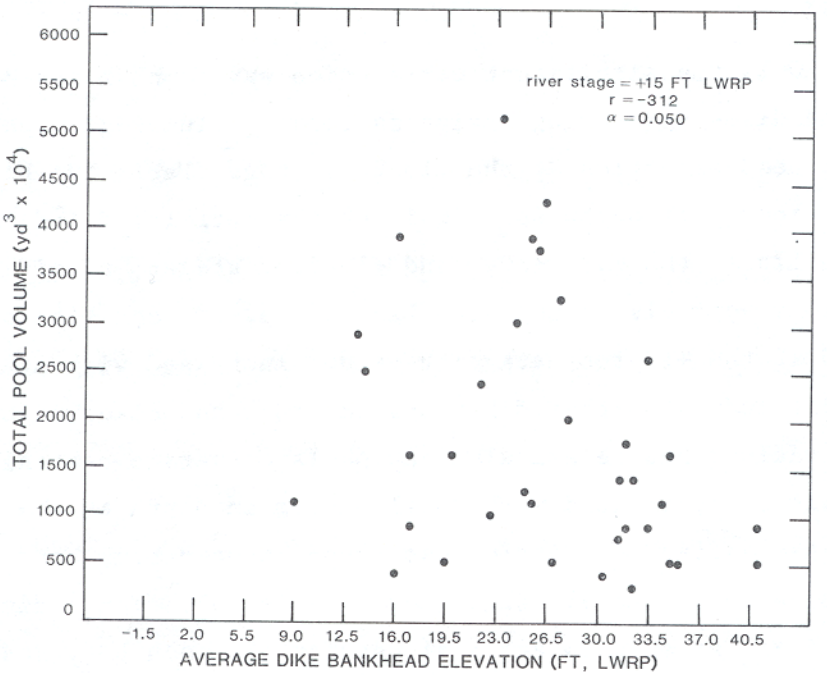

Figure 34. Relationship between total pool volume and average bank head crown elevation (LO) at a river stage of +15 feet LWRP for dike systems in the Lower Mississippi River, RM 320-610

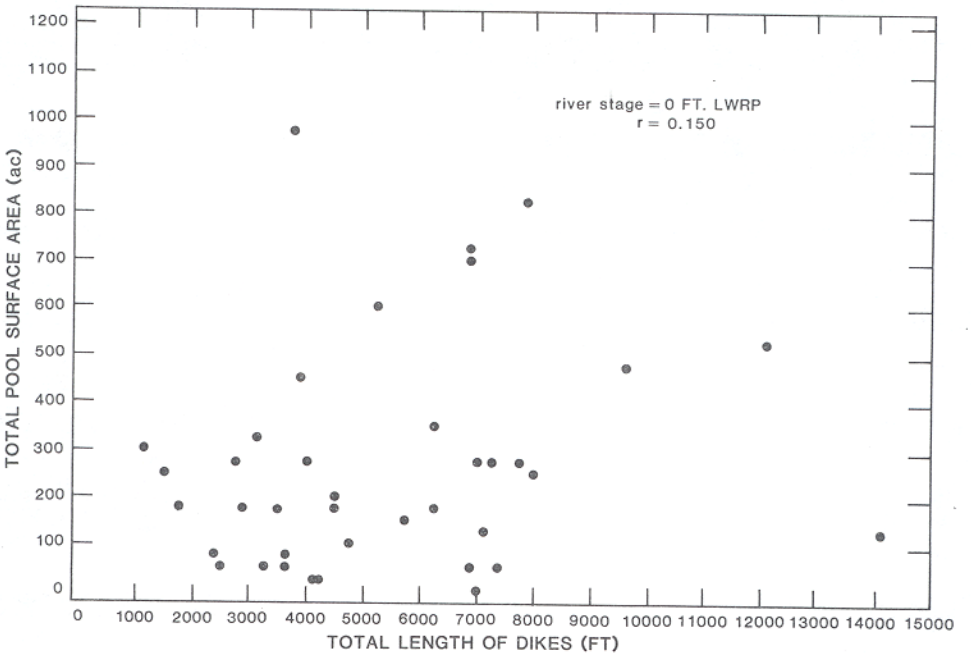

Figure 35. Relationship between total pool surface area and total length of dikes at a river stage of 0 feet LWRP for dike systems in the Lower Mississippi River, RM 320-610

PART IV: DISCUSSION

Comparison with Other Studies

82. Three previous studies of the amount of aquatic habitat or water surface area in the Lower Mississippi River have been conducted: Ryckman et al., 1975; Cobb and Clark, 1981; and Nunnally and Beverly, 1984. Variations among these and results of this study in habitat mapping methods and in aquatic habitat classifications make comparisons difficult. In the prior studies, water surface area was quantified using aerial photography taken at relatively low river stages. In this study, habitat areas were simulated using topographic and river stage data. Ryckman et al. (1975) did not distinguish aquatic habitat associated with dike systems and, therefore, this information cannot be used for comparison. The dike field habitat classification used in this study is a modification of the scheme used by Cobb and Clark (1981), but their study was confined to a 50-mile reach of the river. Also, the portion of the dike system habitat lying downstream of the last dike in a system used to close secondary channels was not included in the pool habitat area whereas this area was included in this study.

83. Nunnally and Beverly (1984) used a physical classification of "aquatic habitats" that corresponds somewhat to that of Cobb and Clark (1981) and the classification used for this study, but they did not distinguish sandbars and natural and revetted banks as habitat types. The ecological rationale for their "habitat types" was not defined. In addition, all fluvial landforms and geomorphic units, i.e., "habitats," in a reach defined as diked were classified as diked habitat. As a result, some abandoned channels and secondary channels that actually did not contain dikes were classified as diked habitat, e.g., Matthews Bend at RM 510, an abandoned channel type of floodplain lake. Also, several chutes and secondary channels were artificially divided into diked and undiked segments. The most recent of the two sets of photography used by Nunnally and Beverly in mapping water surface areas was 6 to 7 years older than the hydrographic surveys used in this study.

84. Nunnally and Beverly's (1984) habitat surface area data were based on 1976 aerial photography taken when the river stage was about +2.2 feet LWRP (+13.2 feet on the Greenville gage). They reported a total of 13,177 acres of diked aquatic habitat, including chutes, sloughs, secondary channels, and pools for the reach from RM 320 to 610, an average of 45.4 acres of habitat per river mile. Diked channel habitat of Nunnally and Beverly is not used in these comparisons because it is not habitat directly associated with dike systems. At the 0- and +5-foot LWRP stages, 10,972 acres (39.2 acres/RM) and 15,863 acres (56.6 acres/RM) of dike system pool habitat were found in this study, based on topographic surveys taken from 1978 to 1981. Thus, habitat acreage values taken at a stage of +2.2 feet LWRP developed by Nunnally and Beverly using aerial photography were intermediate between those simulated herein for the 0- and +5-foot stages using topographic data that were 5 to 7 years more recent. Nunnally and Beverly's habitat acreages were approximately 3.0 percent lower than would be found by using the simulation technique to estimate habitat surface area for a stage of +2.2 feet LWRP. While the widely different methods used in the two studies appear to have yielded generally comparable results in terms of water surface areas associated with dike systems, these similarities are largely coincidental. From an ecological viewpoint, results of the two studies are very dissimilar because of the lack of an ecological basis for aquatic habitat definitions presented by Nunnally and Beverly.

85. Cobb and Clark (1981) reported 311 acres of dike system pool habitat and 848 acres of dike system sandbar habitat in a 50-mile reach of the Lower Mississippi River from RM 480 to 530. These data equate to 6.2 acres of pool habitat per river mile and 17.0 acres of sandbar habitat per river mile. These acreages are much smaller for this reach than the values reported herein (63.5 acres/RM of pool habitat; 97.7 acres/RM of sandbar at the 0-foot LWRP stage). This wide discrepancy is largely a result of different definitions used for dike system pool and sandbar habitats in the two studies. In this study a dike system habitat definition was used that was more encompassing and included secondary channel areas closed at the upper end by a dike (or dikes) and a larger water area downstream and upstream of the first and last dikes in a system. Also, for some dike systems, the amount of pool area was overestimated by the simulation

technique because some sandbar areas were included in the defined pool area but effects of evaporation and drainage on pool size are not taken into account which might cause an underestimatation of some pool sizes (see paragraph 37). Cobb and Clark (1981) quantified only pool habitat contained between dikes and immediately downstream of the last dike in a system. For example, the large secondary channel at Kentucky Bend (RM 520) and most of the downstream pool in Cracraft lower dike system was not included as dike system habitat in their study. In addition, the closure of American Cutoff, a large secondary channel, by Refuge dike occurred after Cobb and Clark's study. This added 686 acres of pool habitat to the reach at the 0-foot LWRP stage.

86. Dike system pool habitat per river mile at the low-flow condition was different for the 50-mile study reach of Cobb and Clark (1981) (6.2 acres/RM) and the average diked pool habitat reported by Nunnally and Beverly (1984) (3.5 acres/RM). Some of this difference is attributable to the variation in methods used to spatially define habitats, as has been discussed, since the same aerial photography was used in the two studies. However, another cause of the difference in water surface areas is probably the fact that Nunnally and Beverly's average is for a 300-RM reach.

Variations in Dike System Habitat with River Stage

87. Pronounced variation in dike system pool and sandbar habitat with river stage and discharge was shown for the 6-month low-flow period considered (July through December). Dike system pool habitat in the 280-RM study reach increased 135 percent in surface area and 207 percent in volume from the 0- to the +15-foot LWRP stage; concomitant sandbar habitat increases were 64 and 186 percent. Mean depth averaged 1.4 times greater in pool habitat at the +15-foot LWRP river stage as compared to the 0-foot stage; mean depth of sandbar habitat averaged 1.9 times more at the +15-foot stage. Average total stage duration of dike system habitat was about four times greater at the 0-foot stage than at the +15-foot stage, while exceedance or stage frequency was about 50 percent greater at the latter stage.

88. In summary, dike system habitat during the low-flow period on the Lower Mississippi River increased in size and depth with river stage. Above a stage of +15 feet LWRP, flowing water conditions would generally become dominant in dike system pool areas, and main-channel conditions of strong currents, high turbulence, and deep water would be found in these areas as river stage increased. The change from a slack-water or low-discharge condition to a pronounced flowing water environment in dike system pools marks a fundamental change in ecological properties of the habitat associated with these structures. Sandbar habitat associated with dike systems does not typically achieve lentic conditions at low stages as do pool areas. However, current velocities and turbulence become significantly reduced from the conditions found in the main channel, and water depths are much less as river stage decreases. These changes are a direct function of river stage and discharge.

Hydrological and Ecological Relationships

Dike System Pool Habitat

89. From an ecological perspective it is important not only to measure the quantity (surface area, volume) of aquatic habitat associated with dike system pool habitat, but to quantify the availability and hydrologic stability of the habitat as a function of river stage and discharge during the low-flow period of the year. Habitat availability refers to the total number of days the habitat is present during the low-flow period and is measured by stage duration. Hydrologic stability of the habitat refers to the number of days the habitat is present each time it occurs as river stage fluctuates, i.e., each event, and is a function of relative exceedance frequency. For pool habitat area in dike systems, habitat availability and hydrologic stability are especially relevant considerations because this area constitutes most of the slack-water or low-current velocity habitat found between the top banks of the Lower Mississippi River during the low-flow period. Aquatic habitat availability and hydrologic stability are significant determinants of habitat quality in the pool area of dike systems because utilization of this habitat type by fishes as nursery and feeding areas and by other aquatic species during the summer and fall months is

affected by fluctuations and length of time various pool conditions exist. These considerations are not as pertinent to sandbar habitat associated with dike systems because flowing water conditions there prevail year round.

90. Ecologically, the most meaningful indicators of dike system pool habitat availability and hydrologic stability appear to be interval stage duration and interval stage duration per event, respectively (Table 10). Stage duration data, computed as the number of days stages are less than, as opposed to greater than, each target river stage, are the most appropriate measure in this context. Data computed using "greater than" values also include days during which river stage would be above the upper boundary of pool conditions (+15 feet LWRP) and pronounced flowing water conditions would exist.

91. Stage duration analyses show that river stage was $\leq$+15 feet LWRP an average of 141 days per year during the low-flow period or 77.2 percent of the time in the study reach. Stage duration decreased with river stage; stages were $\leq$0 feet LWRP only 16 days per year (8.5 percent of the time) on the average (Table 9). Interval stage duration data indicated that pool habitat in dike systems is available uniformly as river stage is varied in 5-foot intervals within the pool condition boundaries (0 and +15 feet LWRP) (Table 10).

92. Average stage duration per event values, however, reveal the pronounced hydrologic instability in physical characteristics of dike system pool habitat (Table 10). The average number of days per event that river stage was within each 5-foot LWRP interval for the pool condition (river stage $\leq$+15 LWRP) varied from 7 to 11 days; the number of events per year ranged from an average of 3.88 to 5.15 (Table 10). River stage was between 0 and +15 feet LWRP, i.e., within the range of pool habitat conditions, an average of 33 days per event per year. When these data are compared to the physical data for dike system pool habitat, it can be seen that large, short-term changes occur in the surface area, volume, and depth of this aquatic environment with relatively small (5-foot) changes in river stage. For example, the total surface area of dike system pool habitat in the study area was estimated at 15,863 to 20,754 acres when river stage was between +5 and +10 feet LWRP. Total pool habitat area would fluctuate in and out of this interval an average of 5.15 times per year (events) during the low-flow

period, an average of only 9 days of availability per event. In Marshall Cutoff DS, total pool surface area would range from 221 to 340 acres when river stage was between +5 and +10 feet LWRP and would fluctuate in and out of this range an average of 4.62 times per year or 10 days per event.

93. In summary, availability and hydrologic stability of pool habitat in dike systems are difficult to quantify and relate to the amount of habitat present because of fluctuating river stage. Total interval stage duration and interval stage duration per event appear to be the most pertinent measures of habitat availability and stability for dike system pool habitat because they can be most closely associated with habitat surface area, volume, and depth. These measures show that pool habitat in dike systems is unstable, with a given range of physical conditions existing for only a short period of time (<11 days) during the average low-flow period.

Dike Structure Habitat

94. No studies have been done to determine the actual surface area of dikes in the Lower Mississippi River, nor are "as built" cross-sectional data for these structures available. Therefore, only dike length data are available for quantifying the potential amount of this habitat type. Because, dike structures must be inundated to be available as aquatic habitat, the availability and hydrologic stability of the habitat depend on the frequency and duration of river stage fluctuations and the crown elevations of individual dikes.

95. An analysis of each dike in the study reach was conducted to determine the proportion of total dike length that would be inundated at a river stage of +15 feet LWRP (Table 14). Since this stage defines the upper boundary of the pool habitat in dike systems, river water would be flowing over all or some part of each dike when river stage was ≥+15 feet LWRP. It was determined that 172,400 linear feet (32.7 miles) of dike structures would be inundated at a river stage of +15 feet LWRP, 54.5 percent of the total amount of dikes (Table 14). These estimated quantities, however, are considered liberal since the proportion of individual dikes that have become covered by sediment deposits were not accounted for in the procedure. Stage duration and relative exceedance frequency data showed that, during the total year, the river stage was ≥+15 feet LWRP 182 days per year or 49.9 percent

of the time on the average and that the average number of days per event was 49 based on a weighted average relative exceedance frequency of 3.70 (Table 8).

96. During the low-flow period of July through December, however, river stage was ≥+15 feet LWRP 43 days per year (23.5 percent of the time) for an average of 21 days per event (Table 9). This indicates a relatively low habitat availability and stability for dike structures during the low-flow period on the average. For the high-flow period of January through June, however, dike structure habitat availability and stability increased greatly. River stage was ≥+15 feet LWRP an average of 131 days during this period (72 percent of the time), an average of 69 days per event (Table 11). Thus, during the high-flow period, 54.5 percent or more of the total amount of dike structures were available as aquatic habitat for fishes and for colonization and growth of epibenthic macroinvertebrate organisms on the stone aggregate comprising the structures.

97. There was a wide variation among dike systems in the proportion of total dike length in the system that would be inundated at a river stage of +15 feet LWRP. Proportions inundated ranged from 0 to 100 percent. For the Catfish Point, Island 84, Refuge, and Brown's Field dike systems the proportion inundated at stages ≥+15 feet LWRP was <10 percent, while >90 percent of the available dike structure would be submerged in the Montgomery Towhead, Leland Neck, Seven Oaks, and Baleshed Landing dike systems at this stage (Table 14).

Dike Engineering Design and Aquatic Habitat Characteristics

98. Relationships between basic dike design features such as crown elevation and slope and the dike length and associated aquatic habitat size and depth were explored using correlation analyses. These analyses revealed trends among the 46 dike systems studied but should not be used to infer cause-and-effect relationships because many confounding factors of the complex riverine environment obscure these relationships. Also, analyses of the total dike system and Pool 2 yielded conflicting results in some cases.

99. In general, dike systems that had steeper main body slopes and lower crown elevations had larger, deeper pools. This relationship was more pronounced at the +10- and +15-foot LWRP stages than at the 0- and +5-foot stages. Dike 1 length was positively correlated with Pool 1 surface area and volume, but not mean depth; similar correlations were not found when considerating total dike systems.

100. Significant correlation coefficients between dike engineering and habitat physical features were relatively low, i.e. <0.5, indicating that only a small amount (<25 percent) of the variation among dike systems in surface area, volume, and depth was accounted for by dike design features. The fluvial processes and landforms, channel morphology, and hydrology at the location of each dike system have a major influence on the relationship between dike structure design and pool habitat physical characteristics and confound the relationships between dike design and habitat features. The fact that dike system size (length and total area) was inconsistent with age (time of construction) or geomorphic location in the river also confound the relationships. For example, all dike systems the same size are not the same age nor are all dike systems located on a particular fluvial landform the same size and age.

101. Ambient water depths prior to dike system construction also contribute to the significant correlations between dike crown slopes and elevations and the habitat size and depth. If relatively deep water was present when the dike (or dikes) were constructed in a particular location (e.g., a chute), crown elevations for the structure would tend to be relatively low compared to the LWRP because of construction cost and other factors. The reverse situation might be found in the case of relatively shallow areas. This contributes to the observed association between relatively low structures and deeper water.

102. A significant positive correlation between dike length and water surface area and the indirect relationship found between structure length and pool mean depth would also obscure the association between crown elevations and slopes and pool habitat characteristics.

103. It appears that while relationships which are statistically significant occur between dike system design factors and aquatic habitat characteristics, these relationships must be viewed only as trends due to the interaction of the many factors involved.

Spatial Distribution of Dike System Aquatic Habitat

104. Dike system aquatic habitat is not distributed spatially in a uniform pattern with river mile in the study reach. The amount of dike system aquatic habitat is concentrated in reaches where dike structures are most numerous. Thus, there are four corresponding modes of abundance for dike linear footage and dike system pool habitat per river mile in the study reach (Figures 12 and 15). However, there was not a significant positive correlation between acreage of pool habitat and amount of dike structure. The largest amount of pool habitat and number of dike structures occurred between RM 474 and 564. This section of river contains the Mayersville-Fitler reach where the extensive Ajax Bar/Ben Lomond/Baleshed Landing dike systems were constructed to control navigation channel alignment and dimensions in a recalcitrant straight reach. The dike systems used to align the channel where Worthington and Sarah Cutoffs were made in the late 1930's and where the Island 86/Seven Oaks dike systems were installed to align the channel and close secondary channels at Kentucky Bend Bar (RM 520) are also found in this reach. A second straight reach (Yellow Bend-Greenville Bridge reach, RM 530 to 550) occurs in this section in which a large number of dikes have been built to control channel alignment and the navigation channel approach to the Greenville Bridge. The pool habitat size and dike length mode at RM 383 to 398 is associated with Bondurant Towhead, Brown's Field, Cottage Bend, and Spithead Towhead dike systems in the Grand Gulf-Kempe Bend reach. These structures were installed to control channel alignment at crossings and to reduce flow in secondary channels.

PART V: CONCLUSIONS

105. Pool areas found at lower river stages (≤15 feet LWRP) within dike systems constitute a significant amount of slack-water or low-velocity aquatic habitat within the top banks of the channel of the Lower Mississippi River in the study area in terms of both water surface area and volume. At a river stage of 0 feet LWRP, an estimated 10,971 surface acres of dike system pool habitat occurred with a volume of 214 x 10^6 cubic yards and a mean depth of 11.0 feet; at a stage of +15 feet LWRP, an estimated 25,778 surface acres of habitat with a volume of 657 x 10^6 cubic yards and a mean depth of 15.5 feet occurred in the study reach, based on analysis of 1979 to 1982 hydrographic survey data.

106. Dike system pools, when isolated from the channel, are limnologically similar in many characteristics to floodplain lakes but are hydrologically unstable or variable. Dike system pools are ephemeral in nature as a result of the frequent inundation by channel waters and the resultant change from slack water to strong flowing water conditions. Using the +15-foot LWRP river stage as the break between these two sets of general environmental conditions, this change occurs on the average of about twice annually during the 6-month low-flow period July through December, with stage being ≤+15 feet about 77 days per event. Dike system pool habitat instability is best illustrated by interval stage duration data, which show that river stage on the average is within the pool condition boundaries (0 to +15 feet LWRP) 33 days per event with 3.8 events occurring during the low-flow period. Interval stage duration for 5-foot stage intervals within the pool condition boundary ranged from 7 to 11 days. This extreme degree of habitat instability is in contrast to floodplain lakes, which typically remain lentic year round except during flood flows. Pronounced habitat instability should be considered when determining the ecological value of dike system habitat in the riverine environment.

107. Sandbars associated with dike systems in the study area are extensive. Sandbar habitat is distinct from pool habitat in dike systems because flowing water conditions similar to the main channel occur even during the annual low-flow period, although velocities and depths may be less than in the channel environment. Sandbars associated with dike systems are

probably indistinguishable from "natural" sandbars ecologically. At the +15-foot LWRP river stage, 23,599 surface acres of sandbar habitat having a volume of 723 x 10^6 cubic yards and a mean depth of 18.9 feet were present in the study area.

108. The average physical characteristics of dike system aquatic habitat change greatly with river stage during the 6-month low-flow period. For example, pool habitat was estimated to increased 135 percent in surface area and 207 percent in volume with a 15-foot rise in river stage from 0 to +15 feet LWRP.

109. Dike system aquatic habitat is not distributed equally along the lower river in the study area, but is concentrated in reaches where dike works are most numerous.

110. Dike system pool habitat surface area and volume are highly correlated, and one variable may be used to estimate the other using regression equations. Pool volume and surface area in dike systems, however, are not reliable estimators of pool mean depth and depth distribution.

111. The dike structures themselves comprise about 60 miles of stone aggregate that is available as habitat for aquatic species in the study reach. Studies have indicated that large quantities of epibenthic insect larvae encrust portions of the stone dikes during periods of inundation and that fishes and river shrimp inhabitat the structures. In the study reach at a river stage of +15 feet LWRP, about 54.5 percent or about 33 linear miles of dike structure are inundated by flowing water at a minimum during the January through June high-flow period. The amount of dike structure inundated during the low-flow period of summer and fall is comparatively small and is variable in occurrence, i.e., is unstable. Thus, it appears that the dike structures may be a significant source of secondary production of fish food organisms and are potential loci for conversion of suspended particulate organic matter to biomass within the riverine ecosystem.

112. Analyses of relationships between the basic dike engineering design features of crown elevation, crown slope, and dike length and dike system pool habitat revealed statistically significant trends, but were inconclusive. While several statistically significant correlations were found between dike system engineering design factors and aquatic habitat area, volume, and depth, these accounted for <25 percent of the variation

among dike systems in aquatic habitat characteristics. The interactions between many complex factors such as dike system age and size, geomorphic location, preconstruction conditions, and sediment transport processes tend to obscure relationships between design and habitat characteristics. It is concluded that studies of changes in hydrography of individual dike systems and associated channel and bar areas over time are needed to define effects of dike design on the amount and type of dike system aquatic habitat.

113. The simulation method used to quantify dike system aquatic habitat appears to produce reasonable results when compared to study results based on measurement of water surface areas from controlled aerial photography. The simulation procedure, however, has the advantages of allowing one to vary river stage and, in addition, to compute water volumes and depths, important factors for determining habitat quality for fishes and other organisms. Also, the simulation technique can be used to estimate the amount of dike structure that is inundated and available to epibenthic organisms and fish for colonization and cover, respectively. The procedure also can be used in conjunction with hydrologic analyses to quantify the availability and stability of dike system habitat. The method may overestimate actual water surface areas in some dike systems because effects of evaporation, seepage, and drainage of small water bodies due to small-scale topographic connections to the channel when pool areas are isolated from flow are not taken into account. Conversely, pool area size may be overestimated in dike systems where the dikes extend across to the channel side of a middle bar, causing sandbar area to be included in the pool area.

REFERENCES

Cobb, S. P., and J. R. Clark. 1981. "Aquatic Habitat Studies on the Lower Mississippi River, River Mile 480 to 530; Report 2, Aquatic Habitat Mapping," Miscellaneous Paper E-80-1, US Army Engineer Waterways Experiment Station, Vicksburg, Miss.

Conner, J. V., C. H. Pennington, and T. R. Bosley. 1983. "Larval Fish of Selected Aquatic Habitats on the Lower Mississippi River," Technical Report E-83-4, US Army Engineer Waterways Experiment Station, Vicksburg, Miss.

Keown, M. P., E. A. Dardeau, Jr., and E. M. Cousey. 1981. "Characterization of Suspended Sediment Regime and Bed-Material Gradation of the Mississippi Basin," Report 1, Volumes 1 and 2, Potamology Program, US Army Engineer Division, Lower Mississippi Valley, Vicksburg, Miss.

Mathis, D. B., C. R. Bingham, and L. G. Sanders. 1982. "Assessment of Implanted Substrate Samplers for Macroinvertebrates Inhabiting Stone Dikes of the Lower Mississippi River," Miscellaneous Paper E-82-1, US Army Engineer Waterways Experiment Station, Vicksburg, Miss.

Mathis, D. B., S. P. Cobb, L. G. Sanders, A. D. Magoun, and C. R. Bingham. 1981. "Aquatic Habitat Studies on the Lower Mississippi River, River Mile 480 to 530, Report 3, Benthic Macroinvertebrate Studies--Pilot Report," Miscellaneous Paper E-80-1, US Army Engineer Waterways Experiment Station, Vicksburg, Miss.

Mississippi River Commission. 1977. "Channel Improvement Features, Flood Control, Mississippi River and Tributaries Project," Vicksburg, Miss.

_____. 1985. "Annual Report of the Chief of Engineers on Civil Works Activities; Extract Report of the Lower Mississippi Valley Division and Mississippi River Commission for Fiscal Year 1984," Vicksburg, Miss.

Nailon, R. W. and C. H. Pennington. 1984. "Fish of Two Dike Pools in the Lower Mississippi River," Technical Report E-84-3, US Army Engineer Waterways Experiment Station, Vicksburg, Miss.

Nunnally, N. R., and L. Beverly. 1984. "Morphologic Effects of Lower Mississippi River Dike Fields," River Meandering, American Society of Civil Engineers, New York.

Pennington, C. H., J. A. Baker, and C. L. Bond. 1983. "Fishes of Selected Aquatic Habitats on the Lower Mississippi River," Technical Report E-83-2, US Army Engineer Waterways Experiment Station, Vicksburg, Miss.

Ryckman, Edgerley, Tomlinson and Associates. 1975. "Environmental Assessment of the Mississippi River and Tributaries Project, Cairo, Illinois, to Venice, Louisiana," US Army Engineer Division, Lower Mississippi Valley, Vicksburg, Miss.

Sabol, B. M., L. E. Winfield, and D. G. Toczydlowski. 1984. "Investigation of Water Quality and Plankton in Selected Aquatic Habitats on the Lower Mississippi River," Technical Report E-84-5, US Army Engineer Waterways Experiment Station, Vicksburg, Miss.

Schramm, H. L., and C. H. Pennington. 1981. "Aquatic Habitat Studies on the Lower Mississippi River, River Mile 480 to 530; Report 6, Larval Fish Studies--Pilot Report," Miscellaneous Paper E-80-1, US Army Engineer Waterways Experiment Station, Vicksburg, Miss.

Tuttle, J. R., and W. Pinner. 1982. "Analysis of Major Parameters Affecting the Behavior of the Mississippi River," Report 4, Potamology Program, US Army Engineer Division, Lower Mississippi Valley, Vicksburg, Miss.

US Army Engineer District, Vicksburg. 1983. "Channel Improvement Data Report, FY 1983," Vicksburg, Miss.

TABLE 1

Date of Hydrographic Surveys Used in Computing

Dike System Areas, Volumes, and Depths

RM 320-610, AHP

	Dike System Name	Date of Hydrographic Survey
1.	Island 70	24 May - 5 June 1979
2.	Smith Point	24 May - 5 June 1979
3.	Victoria Bend	24 May - 5 June 1979
4.	Montgomery Towhead	5-11 June 1979
5.	White River Landing	5-11 June 1979
6.	Terrene	5-11 June 1979
7.	Malone Field	5-11 June 1979
8.	Below Prentiss	18-23 May 1979
9.	Catfish Point	18-23 May 1979
10.	Chicot Landing	24 May - 6 June 1979
11.	Ashbrook Cutoff	4-13 April 1978
12.	Island 82-Miller Bend (Left)	4-13 April 1978
13.	Ashbrook-Miller Bend	4-13 April 1978
14.	Island 82-Miller Bend (Right)	4-13 April 1978
15.	Leland Neck	4-13 April 1978
16.	Tarpley Cutoff	4-13 April 1978
17.	Leland Bar	4-13 April 1978
18.	Island 84	4-13 April 1978
19.	Refuge	14-16 May 1980
20.	Walnut Point	14-16 May 1980
21.	Seven Oaks	14-16 May 1980
22.	Island 86	14-16 May 1980
23.	Leota	16 April - 5 May 1980
24.	Cracraft Lower	16 April - 5 May 1980
25.	Carolina	16 April - 5 May 1980
26.	Corregidor	16 April - 5 May 1980
27.	Wilson Point	16 April - 5 May 1980
28.	Baleshed Landing	28 March - 16 April 1980
29.	Ben Lomond	28 March - 16 April 1980
30.	Ajax Bar	28 March - 16 April 1980
31.	Lookout Point	30 April - 9 May 1980
32.	Willow Cutoff	June 1981
33.	Forest Home Towhead	June 1981
34.	Marshall Cutoff	23-30 April 1980
35.	Below Racetrack	11-23 April 1980
36.	Togo Island	11-23 April 1980
37.	Yucatan	11-23 April 1980
38.	Coffee Point	1-10 April 1980
39.	Bondurant Towhead	1-10 April 1980
40.	Cottage Bend	1-10 April 1980
41.	Brown's Field	1-10 April 1980
42.	Spithead Towhead	1-10 April 1980
43.	Waterproof	21 March - 1 April 1980
44.	Natchez Island	31 January - 7 February 1980
45.	Jackson Point	23-31 January 1980

TABLE 2

Engineering Design Features of Dike Types in the Lower Mississippi River, RM 320-610, AHP

Dike Type	Total Number	Total Length (mi)	Average Length (ft)	Average Dike Elevations (ft, LWRP)					Average Dike Slope (%)			
				Bank head (L0)	L25	L50	L75	L100	S1	S2	S3	S4
Transverse	117 1/	44.3	2,001	26.2	15.9	12.8	10.1	7.0	2.63	0.76	0.86	1.25
L-head	9	8.7	5,092	25.4	17.6	14.4	17.4	16.2	0.96	0.09	0.28	0.36
Vane	12	2.6	1,132	13.0	13.3	13.3	13.2	13.4	-0.12	0.03	-0.09	-0.04
Stone/pile	15	4.3	1,530	9.4	7.4	8.3	9.4	11.3	0.75	-0.28	-0.32	-0.03
Total	153	59.9	2,068	--	--	--	--	--	--	--	--	--

1/ Not included in these data is information on three transverse dikes: (1) a 1,285-foot extension to Dike No. 2 at Island 70 dike system, (2) a 475-foot low crown elevation dike on a revetment in Baleshed Landing dike system, and (3) a 875-foot low crown elevation dike on a revetment in Island 82 - Miller Bend, left bank dike system. Data on these dikes are shown in Appendix A.

TABLE 3

Engineering Design Features for Dike Systems in the

Lower Mississippi River, RM 320-610, AHP

Dike Name	Begin. RM	Number Dikes	Total Dike Length (ft)	Average Dike Length (ft)	Year of Constr.	Average Crown Elevation (ft, LWRP)					Average Crown Slope (%)			
						L0	L25	L50	L75	L100	S1	S2	S3	S4
Island 70	608.8	6	14,170	2,361.67	1961	32.167	18.167	11.000	7.167	9.333	2.529	1.124	0.232	1.136
Smith Pt.	600.5	3	6,907	2,302.33	1963	30.667	22.667	15.000	12.333	5.000	1.216	1.132	1.103	1.146
Victoria Bend	596.0	2	4,547	2,273.50	1978	25.500	11.000	7.500	5.500	4.000	2.769	0.474	0.362	1.020
Montg.Th./White R.Ldg.	592.5	5	7,553	1,510.60	1964	15.200	9.800	9.400	10.600	8.800	1.564	0.364	0.762	0.916
Terrene	590.1	3	6,945	2,315.00	1967	16.000	15.333	14.333	13.000	10.667	0.136	0.225	0.379	0.241
Malone Field	585.6	4	7,282	1,820.50	1968	22.000	17.500	16.875	15.000	14.250	0.867	0.293	0.207	0.417
Below Prentiss	580.4	3	6,995	2,331.67	1973	32.000	21.000	19.667	18.333	10.667	2.180	0.651	1.781	1.326
Catfish Pt.	571.0	2	4,290	2,145.00	1972	35.500	22.500	18.500	17.000	14.000	2.452	0.575	0.659	1.066
Chicot Ldg.	565.5	4	17,451	2,633.50	1967	25.500	18.000	15.500	15.000	13.500	1.194	0.230	0.223	0.469
Ashbr./Miller Bn./Is.82	549.2	10	17,348	2,094.33	1964	15.900	14.500	14.100	12.600	10.000	0.911	0.627	0.611	0.482
Ashbr./Miller Bn.(RB)	548.2	4	4,465	1,116.25	1965	22.250	10.750	7.000	4.000	0.500	4.132	1.217	1.250	1.954
Is.82/Miller Bend	545.2	4	5,765	1,441.25	1966	17.000	13.250	11.750	9.500	7.250	0.994	0.574	0.692	0.708
Leland Neck	541.2	3	3,675	1,225.00	1964	16.000	8.667	6.667	5.000	3.333	3.735	0.911	0.829	1.597
Tarp.Cut./Leland Bar	541.2	12	17,410	1,450.83	1969	18.750	16.250	14.833	11.083	9.083	0.696	0.823	0.733	0.767
Island 84	533.4	5	4,170	1,390.00	1965	32.667	29.667	25.333	20.667	15.000	1.085	1.571	1.925	1.538
Refuge/Walnut Pt.	528.3	3	9,668	3,222.66	1969	22.333	15.667	11.667	8.333	2.000	0.977	0.667	1.190	0.860
Seven Oaks/Is. 86	524.2	9	14,124	1,569.33	1961	17.000	14.777	12.444	12.111	11.667	0.320	0.186	0.242	0.232
Leota	515.4	3	7,345	2,448.33	1967	19.667	17.333	16.333	14.333	13.667	0.542	0.293	0.140	0.317
Cracraft Lower	510.4	3	9,614	3,204.67	1970	24.333	16.333	16.000	15.000	12.000	1.099	0.066	0.499	0.432
Carolina	509.4	2	2,490	1,245.00	1972	30.500	23.000	16.000	8.000	-2.500	2.491	2.544	3.361	2.735
Corregidor	505.8	2	6,300	3,150.00	1976	34.500	20.500	15.000	11.000	7.000	2.006	0.654	0.578	0.973
Wilson Pt.	500.6	2	3,512	1,756.00	1968	25.000	18.500	16.500	15.000	13.500	1.539	0.436	0.390	0.701
Baleshead Ldg.	494.6	5	6,860	1,715.00	1964	16.500	7.000	4.750	2.500	0.250	3.175	0.580	0.908	1.311
Ben Lomond	488.6	9	23,363	2,595.89	1967	16.555	13.333	12.444	12.000	11.222	0.333	0.060	0.019	0.118
Ajax Bar	484.4	7	19,925	2,846.43	1962	18.514	13.714	11.286	7.857	12.429	0.717	0.450	-0.634	0.246
Point Lookout	477.9	1	2,340	2,340.00	1973	27.000	18.000	12.000	3.000	-5.000	1.539	1.282	1.368	1.368
Willow Cutoff	462.4	2	3,610	1,805.00	1974	25.000	11.500	9.500	13.500	10.500	2.800	-0.125	0.785	0.835
Forest Home Th.	449.2	3	2,820	940.00	1980	33.667	2.667	2.333	2.333	0.333	13.303	0.072	0.903	3.588
Marshall Cutoff	448.2	2	4,720	2,360.00	1978	31.500	23.000	21.000	14.000	6.000	1.669	0.766	1.274	1.119
Below Racetrack	431.2	7	10,129	1,447.00	1962	25,286	8.714	4.714	9.143	6.714	5.029	0.004	0.747	1.447
Togo Island	416.1	3	7,165	2,388.33	1974	41.000	19.000	11.333	6.000	6.666	5.103	1.210	0.020	1.883
Yucatan	410.4	2	7,780	3,890.00	1970	20.000	13.000	18.000	16.000	12.500	0.779	-0.090	0.313	0.228
Coffee Point	405.0	2	2,730	1,365.00	1973	35.000	20.000	15.000	6.000	-1.500	4.371	2.565	2.683	3.046
Bondurant Towhead	394.8	2	3,925	1,962.50	1973	33.500	15.000	10.500	7.500	3.500	4.075	0.849	0.916	1.672
Cottage Bend	389.2	3	11,365	3,788.33	1974	26.667	17.667	18.333	19.333	15.000	2.047	0.217	0.377	0.713
Browns Field	388.2	1	4,050	4,050.00	1978	22.000	21.000	20.000	18.000	17.000	0.099	0.148	0.099	0.123
Spithead Towhead	386.3	2	3,200	1,600.00	1978	35.000	16.500	12.500	7.000	4.500	4.730	1.272	0.621	1.974
Waterproof	380.0	5	10,553	2,110.60	1963	20.000	9.000	10.600	9.600	4.800	1.834	0.052	0.708	0.662
Natchez Island	360.1	5	7,210	1,442.00	1972	31.400	11.800	11.400	8.800	4.800	5.377	0.440	1.138	1.848
Jackson Pt.	331.4	2	3,580	1,790.00	1979	41.000	18.500	14.500	12.000	7.000	5.317	0.889	1.166	2.065
		156	317,351											

TABLE 4

Purpose for Construction and Longitudinal Profile for Dike Systems in the Lower Mississippi River, RM 320-610, AHP

Purpose	Longitudinal Profile				
	Level	Stepped Down	Stepped Up	Variable	Total
Control a crossing	0	3	2	0	5
Close a secondary channel	1	0	0	1	2
Control a chute	0	1	0	1	2
Stabilize a point bar	0	0	3	1	4
Straight reach	0	2	1	2	5
Crossing & secondary channel	0	3	2	0	5
Crossing & chute	0	1	0	3	4
Crossing & point bar	2	1	3	0	6
Secondary channel & straight reach	0	0	0	3	3
Chute & straight reach	1	1	0	3	5
Crossing, chute & point bar	0	1	0	0	1
Crossing, secondary channel & straight reach	0	0	1	0	1
Secondary channel, chute & point bar	0	0	2	1	3
TOTAL	4	13	14	15	46

TABLE 5

Summary of Physical Characteristics of Dike Systems in the Lower Mississippi River, RM 320-610, AHP

Dike System Area	Surface Area (ac)				Volume (cu yd x 10^6)				Mean Depth (ft)		
	Total	Average	Median	Range	Total	Average	Median	Range	Average	Median	Range
Pool Area											
0-ft LWRP	10,972	274	191	0-985	214	5.3	3.8	0-17.2	11.0	10.9	0-20.5
+5-ft LWRP	15,863	397	303	61-1,229	322	8.0	5.9	0.3-26.0	11.6	11.5	2.5-20.5
+10-ft LWRP	20,754	519	391	86-1,473	471	11.8	8.2	1.2-36.9	13.4	12.7	5.0-22.9
+15-ft LWRP	25,778	644	443	107-1,636	657	16.4	12.1	2.1-49.1	15.5	15.6	5.1-26.5
Sandbar Area											
0-ft LWRP	14,404	360	280	16-1,526	253	6.3	3.0	0.5-25.7	9.7	6.3	5.0-28.3
+5-ft LWRP	17,887	447	368	23-2,113	383	9.6	6.5	0.6-33.3	12.6	9.6	6.7-31.8
+10-ft LWRP	21,372	534	460	30-2,700	544	13.6	9.5	0.9-46.4	15.5	12.9	8.9-34.6
+15-ft LWRP	23,599	590	546	32-2,775	723	18.1	13.3	1.1-68.5	18.9	16.7	10.9-37.4
Total Area											
0-ft LWRP	25,376	634	471	16-2,511	467	11.6	6.8	0.5-42.9	--	--	--
+5-ft LWRP	33,750	844	671	84-3,342	705	17.6	12.4	0.8-59.3	--	--	--
+10-ft LWRP	42,126	1,053	851	116-4,173	1,015	25.4	17.7	2.1-83.3	--	--	--
+15-ft LWRP	49,377	1,234	989	139-4,411	1,380	34.5	25.4	3.2-117.6	--	--	--

TABLE 6

Physical Characteristics of Pool Aquatic Habitat Associated with Dike Systems in the Lower Mississippi River, RM 320-610, AHP

Dike System Name (River Mile, AHP)	Total Water Surface Area (ac)				Total Water Volume (cu yd x 10^4)				Mean Depth (ft)				Percent Pool Surface Area ≥10 ft Deep			
	0 ft LWRP	+5 ft LWRP	+10 ft LWRP	+15 ft LWRP	0 ft LWRP	+5 ft LWRP	+10 ft LWRP	+15 ft LWRP	0 ft LWRP	+5 ft LWRP	+10 ft LWRP	+15 ft LWRP	0 ft LWRP	+5 ft LWRP	+10 ft LWRP	+15 ft LWRP
Island 70 (608.8)	120	192	264	413	226	352	536	809	11.7	11.4	12.6	12.1	40	44	45	46
Smith Pt. (600.5)	52	92	132	257	42	100	190	347	5.0	6.7	8.9	8.4	0	28	39	36
Victoria Bend (596.0)	202	286	370	378	321	518	783	1,084	9.9	11.2	13.1	17.8	48	52	55	76
Montgomery Th./White River Landing (592.5)	180	244	308	371	407	578	800	1,074	14.0	14.7	16.1	17.9	32	49	58	66
Terrene (590.1)	0	73	146	429	0	29	118	350	0	2.5	5.0	5.1	0	0	0	17
Malone Field (585.6)	295	398	501	605	845	1,124	1,478	1,933	17.7	17.5	18.4	19.8	61	60	59	66
Below Prentiss (580.4)	279	363	447	621	709	968	1,295	1,725	15.8	16.5	18.0	17.2	56	60	62	58
Catfish Pt.(571.0)	24	114	204	367	19	75	203	434	5.0	4.1	6.2	7.3	0	11	12	31
Chicot Ldg.(565.5)	596	755	914	1,589	1,487	2,032	2,706	3,715	15.5	16.7	18.3	14.5	55	61	65	48
Ashbrook/Miller Bend/ Is.62 (549.2)	362	558	754	957	847	1,218	1,747	2,437	14.5	13.5	14.4	15.8	60	52	48	58
Ashbrook/Miller Bend Right Bank (548.2)	174	190	206	217	450	597	757	927	16.0	19.5	22.8	26.5	77	81	84	88
Is.82/Miller Bend (545.2)	146	245	344	366	189	347	584	870	8.0	8.8	10.5	14.7	23	37	42	67
Leland Neck (541.2)	62	110	158	179	69	139	247	383	6.9	7.8	9.7	13.3	16	33	39	61
Tarp.Cut./Leland Bar(541.2)	985	1,229	1,473	1,555	1,704	2,597	3,687	4,909	10.7	13.1	15.5	19.6	38	55	67	79
Island 84 (533.4)	36	61	86	107	39	78	137	215	6.7	7.9	9.9	12.5	17	34	42	57
Refuge/Walnut Pt.(528.3)	686	790	854	1,077	1,396	1,991	2,670	3,465	12.6	15.6	18.5	19.9	46	64	77	73
Seven Oaks/Is. 86 (524.2)	335	736	1,137	1,636	551	983	1,738	2,857	10.2	8.3	9.5	10.8	39	32	29	45
Leota (515.4)	38	128	218	430	44	111	250	511	7.1	5.4	7.1	7.4	16	17	17	30
Cracraft Lower (510.4)	470	686	902	1,072	979	1,446	2,086	2,882	12.9	13.1	14.3	16.7	49	51	52	64
Carolina (509.4)	62	79	96	118	205	262	332	419	20.5	20.5	21.5	22.0	74	68	65	67
Corregidor (505.8)	172	317	462	678	171	368	682	1,142	6.2	7.2	9.2	10.4	10	30	37	47
Wilson Pt. (500.6)	169	302	435	607	372	562	859	1,279	13.6	11.5	12.2	13.1	36	38	39	50
Baleshed Ldg. (494.6)	698	806	914	959	1,725	2,331	3,025	3,780	15.3	17.9	20.5	24.4	56	68	76	84
Ben Lomond (488.6)	714	1,076	1,438	1,604	1,166	1,888	2,902	4,129	10.1	10.9	12.5	16.0	36	45	50	67
Ajax Bar (484.4)	515	799	1,083	1,187	925	1,455	2,214	3,130	11.1	11.3	12.7	16.3	41	45	48	67
Point Lookout (477.9)	72	131	190	251	90	172	302	480	7.8	8.1	9.8	11.8	28	35	38	52
Willow Cutoff (462.4)	256	423	590	680	342	616	1,024	1,537	8.3	9.0	10.8	14.0	27	38	43	62
Forest Home Towhead (449.2)	173	193	213	221	378	526	690	865	13.6	16.9	20.1	24.3	56	70	81	87
Marshall Cutoff (448.2)	102	221	340	416	102	232	458	763	6.2	6.5	8.4	11.4	10	25	30	53
Below Racetrack (431.2)	245	303	361	388	559	780	1,048	1,350	14.1	16.0	18.0	21.6	53	62	68	78
Togo Island (416.1)	119	166	213	283	354	469	622	822	18.4	17.5	18.1	18.0	60	57	56	59
Yucatan (410.4)	272	445	618	745	307	596	1,024	1,574	7.0	8.3	10.3	13.1	14	35	44	60
Coffee Point (405)	282	367	452	512	550	812	1,142	1,531	12.1	13.7	15.7	18.5	35	52	62	72
Bondurant Towhead (394.8)	453	587	721	825	1,030	1,450	1,977	2,601	14.1	15.3	17.0	19.5	61	62	63	71
Cottage Bend (389.2)	140	248	356	437	300	457	700	1,020	13.3	11.4	12.2	14.5	57	44	39	57
Browns Field (388.2)	279	533	787	930	761	1,088	1,621	2,313	16.9	12.7	12.8	15.4	57	41	35	57
Spithead Towhead (386.3)	42	145	248	335	56	132	290	526	8.3	5.6	7.3	9.7	29	19	17	43
Waterproof (380)	819	964	1,109	1,230	1,180	1,899	2,735	3,679	8.9	12.2	15.3	18.5	33	56	74	78
Natchez Island (360.1)	282	347	412	450	421	675	981	1,329	9.3	12.1	14.8	18.3	35	55	68	77
Jackson Pt. (331.4)	64	161	258	296	61	152	321	545	5.9	5.9	7.7	11.4	9	22	25	54

TABLE 7

Physical Characteristics of Sandbar Aquatic Habitat Associated with Dike Systems in the Lower Mississippi River, RM 320-610, AHP

Dike System Name (River Mile, AHP)	Total Water Surface Area (ac)				Total Water Volume (cu yd x 10^4)				Mean Depth (ft)				Percent Sandbar Surface Area ≥10 ft Deep			
	0 ft LWRP	+5 ft LWRP	+10 ft LWRP	+15 ft LWRP	0 ft LWRP	+5 ft LWRP	+10 ft LWRP	+15 ft LWRP	0 ft LWRP	+5 ft LWRP	+10 ft LWRP	+15 ft LWRP	0 ft LWRP	+5 ft LWRP	+10 ft LWRP	+15 ft LWRP
Island 70 (608.8)	353	430	507	642	695	1,010	1,388	1,852	12.2	14.6	17.0	17.9	26	52	70	67
Smith Pt. (600.5)	60	98	136	179	48	112	207	334	5.0	7.1	9.4	11.6	0	31	44	55
Victoria Bend (596.0)	148	149	150	150	136	255	376	497	5.7	10.6	15.5	20.5	5	52	99	99
Montgomery Th./White River Landing (592.5)	86	128	170	190	69	158	276	421	5.0	7.5	10.1	13.7	0	34	51	67
Terrene (590.1)	160	283	408	555	129	308	586	975	5.0	6.7	8.9	10.9	0	28	39	51
Malone Field (585.6)	100	143	196	223	81	179	312	476	5.0	7.7	10.4	13.2	0	35	51	64
Below Prentiss (580.4)	400	498	596	748	1,126	1,488	1,930	2,472	17.4	18.5	20.1	20.5	49	60	67	67
Catfish Pt.(571.0)	156	235	314	377	126	284	505	784	5.0	7.5	10.0	12.9	0	33	50	62
Chicot Ldg.(565.5)	280	367	454	532	226	487	818	1,216	5.0	8.2	11.2	14.2	0	38	62	69
Ashbrook/Miller Bend/ Is.82 (549.2)	514	528	542	551	1,741	2,161	2,593	3,033	21.0	25.4	29.6	34.1	85	90	95	96
Ashbrook/Miller Bend Right Bank (548.2)	418	419	420	420	1,021	1,359	1,697	2,036	15.1	20.1	25.0	30.0	96	98	100	100
Is.82/Miller Bend (545.2)	531	608	685	708	1,935	2,395	2,916	3,478	22.6	24.4	26.4	30.4	83	80	78	86
Leland Neck (541.2)	264	422	580	729	281	557	962	1,490	6.6	8.2	10.3	12.7	8	34	46	58
Tarp.Cut./Leland Bar(541.2)	888	1,017	1,146	1,178	2,565	3,334	4,206	5,143	17.9	20.3	22.7	27.1	59	69	77	86
Island 84 (533.4)	168	187	206	211	158	301	460	628	5.8	10.0	13.8	18.4	7	48	82	89
Refuge/Walnut Pt.(528.3)	400	482	564	632	329	685	1,107	1,589	5.1	8.8	12.2	15.6	1	42	71	76
Seven Oaks/Is. 86 (524.2)	536	690	844	961	445	940	1,558	2,286	5.1	8.4	11.4	14.7	1	39	64	72
Leota (515.4)	1,526	2,113	2,700	2,775	1,231	2,699	4,640	6,848	5.0	7.9	10.7	15.3	0	36	57	76
Cracraft Lower (510.4)	180	237	294	372	152	320	534	803	5.2	8.4	11.3	13.4	2	39	61	64
Carolina (509.4)	151	159	167	180	690	815	946	1,086	28.3	31.8	35.1	37.4	95	92	90	88
Corregidor (505.8)	338	554	770	892	273	632	1,166	1,837	5.0	7.1	9.4	12.8	0	31	44	62
Wilson Pt. (500.6)	251	342	433	540	211	451	764	1,156	5.2	8.2	10.9	13.3	2	37	58	63
Baleshed Ldg. (494.6)	611	680	749	772	2,306	2,827	3,403	4,017	23.4	25.8	28.2	32.3	75	79	82	88
Ben Lomond (488.6)	182	231	280	368	173	339	545	807	5.9	9.1	12.1	13.6	9	43	65	63
Ajax Bar (484.4)	712	822	932	962	774	1,393	2,101	2,864	6.7	10.5	14.0	18.5	16	50	76	85
Point Lookout (477.9)	260	360	460	516	420	670	1,000	1,394	10.0	11.5	13.5	16.7	50	54	57	70
Willow Cutoff (462.4)	178	258	338	365	144	319	560	843	5.0	7.7	10.3	14.3	0	34	53	71
Forest Home Towhead (449.2)	302	307	312	314	437	683	933	1,185	9.0	13.8	18.5	23.4	38	68	97	98
Marshall Cutoff (448.2)	194	223	252	257	163	331	523	728	5.2	9.2	12.9	17.6	2	44	77	87
Below Racetrack (431.2)	882	893	904	908	2,170	2,886	3,611	4,341	15.2	20.0	24.8	29.6	81	89	98	98
Togo Island (416.1)	342	458	574	661	460	783	1,199	1,697	8.3	10.6	12.9	15.9	22	45	60	69
Yucatan (410.4)	200	330	460	581	171	385	703	1,123	5.3	7.2	9.5	12.0	3	31	43	57
Coffee Point (405)	734	806	878	928	1,489	2,110	2,789	3,518	12.6	16.2	19.7	23.5	46	67	84	87
Bondurant Towhead (394.8)	511	567	623	691	1,290	1,725	2,205	2,735	15.6	18.9	21.9	24.5	70	77	82	82
Cottage Bend (389.2)	16	23	30	32	48	64	86	111	18.8	17.3	17.7	21.4	75	61	53	72
Browns Field (388.2)	280	327	374	399	236	480	763	1,075	5.2	9.1	12.6	16.7	2	44	75	82
Spithead Towhead (386.3)	306	501	696	743	386	711	1,194	1,774	7.8	8.8	10.6	14.8	23	38	44	67
Waterproof (380)	248	368	488	593	245	494	839	1,275	6.1	8.3	10.7	13.3	11	38	51	62
Natchez Island (360.1)	230	247	264	269	237	430	636	851	6.4	10.8	14.9	19.6	14	53	87	92
Jackson Pt. (331.4)	308	397	486	495	471	755	1,112	1,507	9.5	11.8	14.2	18.9	45	56	63	80

TABLE 8

Average Relative Exceedance Frequency and Stage Duration Data for River Stages Greater Than or Equal to 0, +5, +10, and +15 Feet LWRP for the Arkansas City, Ark.; Vicksburg, Miss.; and Natchez, Miss., Gaging Stations, Lower Mississippi River, for the Total Year

River Stage (ft, LWRP)	Relative Exceedance Frequency (yr^{-1})	Stage Duration		
		Days.yr^{-1}	(Percent)	Days.yr^{-1}.event^{-1}
Arkansas City gage (RM 554.2)				
≥ 0	2.03	352.7	(96.6)	173.7
≥+5	3.79	298.2	(81.7)	78.7
≥+10	4.00	230.0	(63.0)	57.5
≥+15	3.90	167.7	(45.9)	54.3
Vicksburg gage (RM 437.1)				
≥ 0	1.69	345.7	(94.7)	204.6
≥+5	3.14	303.8	(83.2)	96.7
≥+10	3.41	244.7	(67.0)	71.8
≥+15	3.55	193.2	(52.9)	54.4
Natchez gage (RM 362.4)				
≥ 0	1.76	341.1	(93.5)	193.8
≥+5	3.00	298.0	(81.6)	99.3
≥+10	3.66	239.6	(65.6)	65.5
≥+15	3.59	189.4	(51.9)	52.7
Weighted average				
≥ 0	1.85	348	(95.3)	188.1
≥+5	3.37	300	(82.2)	89.0
≥+10	3.71	238	(65.2)	64.1
≥+15	3.70	182	(49.9)	49.2

NOTE: Data based on daily gage readings, 1959-1970.

TABLE 9

Average Relative Exceedance Frequency and Stage Duration Data for River Stages Greater Than or Equal To 0, +5, +10, and +15 Feet LWRP, Arkansas City, Ark.; Vicksburg, Miss.; and Natchez, Miss., Gaging Stations, Lower Mississippi River for the Low-Flow Period July through December

River Stage (ft, LWRP)	Relative Exceedance Frequency (0.5 yr^{-1})	Stage Duration		
		Days 0.5 yr^{-1}	(Percent)	Days 0.5 yr^{-1}.event^{-1}
Arkansas City gage (RM 554.2)				
≥0	1.83	173.8	(94.5)[1/]	95.0
≥+5	3.17	126.4	(68.7)	39.9
≥+10	3.03	72.0	(39.1)	23.8
≥+15	2.00	36.1	(19.6)	18.1
Vicksburg gage (RM 437.1)				
≥0	1.62	167.1	(90.8)	103.1
≥+5	2.59	131.7	(71.6)	50.8
≥+10	2.52	84.6	(46.0)	33.6
≥+15	2.07	49.9	(27.1)	24.1
Natchez gage (RM 362.4)				
≥0	1.72	162.8	(88.5)	94.7
≥+5	2.55	125.5	(68.2)	49.2
≥+10	2.62	80.0	(43.5)	30.5
≥+15	2.28	45.8	(24.9)	20.1
Weighted average[2/]				
≥0	1.73	168.9	(91.8)	97.6
≥+5	2.82	128.1	(69.6)	45.4
≥+10	2.75	78.3	(42.6)	28.5
≥+15	2.09	43.3	(23.5)	20.7

NOTE: Data represent averages for the period 1950-1979.

1/ Percentage of 6-month low-flow period, July-December (184 days).
2/ Weighted averages of the data from the three gages based on proportion of river reach represented by each gage. Each gage represents one-fourth the distance upstream and downstream to the next gage; the middle one-half of the distance is represented by the average of the two gages.

TABLE 10

Average Relative Exceedance Frequency and Stage Duration for River Stages Less Than or Equal to 0, +5, +10, and +15 Feet LWRP, Arkansas City, Ark.; Vicksburg, Miss.; and Natchez, Miss., Gaging Stations, Lower Mississippi River for the Low-Flow Period July through December

River Stage (ft, LWRP)	Relative Exceedance Frequency (0.5 yr^{-1})	Stage Duration			River Stage Interval (ft, LWRP)	Internal Relative Frequency 1/ (events 0.5 yr^{-1})	Interval Duration		
		Days (0.5 yr^{-1})	Percent	Days (0.5 yr^{-1} .event^{-1})			Days (0.5 yr^{-1})	Percent	Days (0.5 yr^{-1} .event^{-1})
Arkansas City gage (RM 554.2)									
≤0	0.86	10.9	(5.9) 2/	12.7	0–5	4.21	48.0	(26.1) 1/	11.4
≤+5	2.38	58.9	(32.0)	24.7	5–10	5.89	53.5	(29.1)	9.1
≤+10	2.72	112.5	(61.1)	41.4	10–15	5.13	36.0	(19.6)	7.0
≤+15	2.10	148.5	(80.7)	70.7	0–15	3.93	137.6	(74.8)	35.0
Vicksburg gage (RM 437.1)									
≤0	0.83	17.2	(9.3)	20.7	0–5	3.62	35.8	(19.5)	10.0
≤+5	2.00	53.0	(28.8)	26.5	5–10	4.62	47.0	(25.5)	10.2
≤+10	2.03	100.1	(54.4)	49.3	10–15	4.49	34.6	(18.8)	7.7
≤+15	1.97	134.7	(73.2)	68.4	0–15	3.59	117.5	(63.9)	32.7
Natchez gage (RM 362.4)									
≤0	0.83	21.5	(11.7)	25.9	0–5	3.69	37.7	(20.5)	10.2
≤+5	1.97	59.1	(32.1)	30.0	5–10	4.65	44.9	(24.4)	10.0
≤+10	2.10	104.0	(56.5)	49.5	10–15	4.76	34.2	(18.6)	7.2
≤+15	2.14	138.2	(75.1)	64.6	0–15	3.86	116.7	(63.4)	30.2
Weighted average 3/									
≤0	0.84	15.7	(8.5)	18.7	0–5	3.88	41.3	(22.4)	10.6
≤+5	2.15	56.9	(30.9)	26.5	5–10	5.15	49.1	(26.7)	9.5
≤+10	2.33	108.2	(58.8)	46.4	10–15	4.82	35.1	(19.1)	7.3
≤+15	2.07	141.2	(76.7)	68.2	0–15	3.80	125.5	(68.2)	33.0

NOTE: Data represent averages for the period 1950–1979.

1/ Computed by adding the relative frequencies for stages ≤ to the upper boundary and ≥ the lower boundary of the interval.
2/ Percentage of 6-month low-flow period, July-December (184 days).
3/ Weighted averages of the data from the three gages based on proportion of river reach represented by each gage. Each gage represents one-fourth the distance upstream and downstream to the next gage; the middle one-half of the distance is represented by the average of the two gages.

TABLE 11

Average Relative Exceedance Frequency and Stage Duration Data for River Stages Greater Than or Equal to 0, +5, +10, and +15 Feet LWRP for the Arkansas City, Ark.; Vicksburg, Miss.; and Natchez, Miss., Gaging Stations, Lower Mississippi River, for the High-Flow Period of the Year, January through June

River Stage (ft, LWRP)	Relative Exceedance Frequency (0.5 yr^{-1})	Stage Duration		
		Days 0.5 yr^{-1}	(Percent)	Days 0.5 yr^{-1}.event^{-1}
Arkansas City gage (RM 554.2)				
≥0	0.20	179	(99)	-
≥+5	0.62	172	(95)	-
≥+10	0.97	158	(87)	-
≥+15	1.90	131	(72)	69
Vicksburg gage (RM 437.1)				
≥0	0.08	179	(99)	-
≥+5	0.55	172	(95)	-
≥+10	0.89	160	(88)	-
≥+15	1.48	143	(79)	97
Natchez gage (RM 362.4)				
≥0	0.04	178	(98)	-
≥+5	0.45	173	(96)	-
≥+10	1.04	160	(88)	154
≥+15	1.31	143	(79)	109
Weighted average				
≥0	0.12	179	(99)	-
≥+5	0.55	172	(95)	-
≥+10	0.96	160	(88)	-
≥+15	1.61	139	(77)	86

NOTE: Date based on daily gage readings, 1959-1970.

TABLE 12

Correlation Coefficients for Pool 2 Physical Variables
and Dike 1 Engineering Parameters for Dike Systems
of the Lower Mississippi River, RM 320-610, AHP

	AC0	AC5	AC10	AC15	VOL0	VOL5	VOL10	VOL15	D0	D5	D10	D15	L0	L25	L50	L75	L100	S1	S2	S3	S4
AC0[1]	1.000	0.737	0.541	0.440	0.768	0.881	0.926	0.878	0.482	0.490	0.475	0.556	0.220	-0.192	-0.379	-0.500	-0.498	0.252	0.308	0.214	0.331
AC5[2]		1.000	0.967	0.919	0.321	0.520	0.766	0.924	0.038	-0.030	-0.049	0.041	0.029	-0.077	-0.198	-0.203	-0.197	-0.060	0.008	-0.000	-0.029
AC10[3]			1.000	0.978	0.110	0.315	0.605	0.819	-0.135	-0.222	-0.240	-0.159	-0.045	-0.024	-0.106	-0.067	-0.061	-0.168	-0.104	-0.079	-0.159
AC15[4]				1.000	0.017	0.217	0.515	0.752	-0.202	-0.300	-0.318	-0.275	-0.075	0.038	-0.012	0.040	0.033	-0.262	-0.172	-0.120	-0.252
VOL0[5]					1.000	0.974	0.854	0.655	0.857	0.859	0.850	0.866	0.365	-0.126	-0.310	-0.495	-0.505	0.364	0.400	0.256	0.445
VOL5[6]						1.000	0.946	0.801	0.777	0.769	0.757	0.794	0.321	-0.142	-0.334	-0.496	-0.502	0.310	0.353	0.228	0.367
VOL10[7]							1.000	0.951	0.606	0.570	0.554	0.613	0.243	-0.118	-0.304	-0.423	-0.430	0.187	0.252	0.164	0.258
VOL15[8]								1.000	0.382	0.323	0.304	0.373	0.150	-0.080	-0.241	-0.309	-0.318	0.053	0.134	0.090	0.112
D0[9]									1.000	0.966	0.941	0.891	0.426	0.090	-0.057	-0.212	-0.300	0.325	0.346	0.311	0.415
D5[10]										1.000	0.995	0.545	0.361	-0.023	-0.186	-0.360	-0.432	0.398	0.435	0.376	0.513
D10[11]											1.000	0.964	0.339	-0.041	-0.217	-0.408	-0.485	0.410	0.479	0.413	0.549
D15[12]												1.000	0.350	-0.164	-0.379	-0.566	-0.628	0.529	0.533	0.458	0.650
L0[13]													1.000	0.385	0.116	-0.054	-0.231	0.586	0.350	0.306	0.551
L25[14]														1.000	0.835	0.560	0.174	-0.375	0.253	0.406	0.018
L50[15]															1.000	0.818	0.580	-0.589	-0.176	-0.010	-0.396
L75[16]																1.000	0.870	-0.548	-0.533	-0.279	-0.600
L100[17]																	1.000	-0.470	-0.730	-0.656	-0.747
S1[18]																		1.000	0.393	0.229	0.771
S2[19]																			1.000	0.847	0.874
S3[20]																				1.000	0.762
S4[21]																					1.000

Footnotes:

1 - AC0 = Total pool surface area, 0-ft LWRP stage
2 - AC5 = Total pool surface area, 5-ft LWRP stage
3 - AC10 = Total pool surface area, 10-ft LWRP stage
4 - AC15 = Total pool surface area, 15-ft LWRP stage
5 - VOL0 = Total pool volume, 0-ft LWRP stage
6 - VOL5 = Total pool volume, 5-ft LWRP stage
7 - VOL10 = Total pool volume, 10-ft LWRP stage
8 - VOL15 = Total pool volume, 15-ft LWRP stage
9 - D0 = Total pool mean depth, 0-ft LWRP stage
10 - D5 = Total pool mean depth, 5-ft LWRP stage
11 - D10 = Total pool mean depth, 10-ft LWRP stage
12 - D15 = Total pool mean depth, 15-ft LWRP stage
13 - L0 = Crown elevation, bank head
14 - L25 = Crown elevation, one-fourth dike length
15 - L50 = Crown elevation, one-half dike length
16 - L75 = Crown elevation, three-fourths dike length
17 - L100 = Crown elevation, channelward end of dike
18 - S1 = Bank head slope
19 - S2 = Central body slope
20 - S3 = End section slope
21 - S4 = Total structure slope

TABLE 13

Correlation Coefficients for Total Pool Physical Variables and Dike Engineering Parameters for Dike Systems of the Lower Mississippi River, RM 320-610, AHP

	AC0	AC5	AC10	AC15	VOL0	VOL5	VOL10	VOL15	D0	D5	D10	D15	L0	L25	L75	L100	S1	S2	S3	S4
AC0[1]	1.000	0.970	0.919	0.849	0.949	0.977	0.983	0.976	0.276	0.411	0.440	0.472	-0.269	-0.242	-0.164	-0.029	0.107	-0.172	-0.138	-0.104
AC5[2]		1.000	0.987	0.936	0.902	0.946	0.975	0.989	0.222	0.295	0.304	0.344	-0.330	-0.208	-0.095	-0.048	0.195	-0.269	-0.203	-0.189
AC10[3]			1.000	0.962	0.843	0.894	0.938	0.965	0.179	0.209	0.206	0.249	-0.359	-0.178	-0.047	0.096	0.246	-0.323	-0.239	-0.238
AC15[4]				1.000	0.798	0.844	0.890	0.929	0.144	0.147	0.139	0.104	-0.348	-0.106	-0.028	0.203	0.375	-0.396	-0.296	-0.311
VOL0[5]					1.000	0.993	0.976	0.952	0.471	0.573	0.587	0.559	-0.246	-0.218	-0.202	-0.012	0.160	-0.147	-0.142	-0.126
VOL5[6]						1.000	0.994	0.979	0.406	0.511	0.527	0.520	-0.267	-0.225	-0.183	-0.005	0.160	-0.173	-0.155	-0.136
VOL10[7]							1.000	0.995	0.356	0.446	0.458	0.462	-0.293	-0.217	-0.153	0.021	0.184	-0.213	-0.177	-0.161
VOL15[8]								1.000	0.309	0.383	0.391	0.396	-0.312	-0.201	-0.126	0.054	0.218	-0.253	-0.202	-0.191
D0[9]									1.000	0.918	0.854	0.738	-0.001	-0.107	-0.199	-0.104	0.005	0.136	0.061	0.045
D5[10]										1.000	0.989	0.906	-0.005	-0.255	-0.354	-0.246	-0.147	0.259	0.080	0.151
D10[11]											1.000	0.931	0.004	-0.301	-0.398	-0.287	-0.195	0.314	0.084	0.187
D15[12]												1.000	-0.053	-0.445	-0.441	-0.412	-0.339	0.413	0.084	0.236
L0[13]													1.000	0.522	0.196	-0.016	-0.116	0.559	0.490	0.276
L25[14]														1.000	0.787	0.496	0.251	-0.317	0.494	0.258
L75[15]															1.000	0.729	0.399	-0.444	0.175	0.165
L100[16]																1.000	0.837	-0.503	-0.367	-0.230
S1[17]																	1.000	-0.448	-0.552	-0.648
S2[18]																		1.000	0.242	0.267
S3[19]																			1.000	0.742
S4[20]																				1.000

Footnotes:

1 - AC0 = Total pool surface area, 0-ft LWRP stage
2 - AC5 = Total pool surface area, 5-ft LWRP stage
3 - AC10 = Total pool surface area, 10-ft LWRP stage
4 - AC15 = Total pool surface area, 15-ft LWRP stage
5 - VOL0 = Total pool volume, 0-ft LWRP stage
6 - VOL5 = Total pool volume, 5-ft LWRP stage
7 - VOL10 = Total pool volume, 10-ft LWRP stage
8 - VOL15 = Total pool volume, 15-ft LWRP stage
9 - D0 = Total pool mean depth, 0-ft LWRP stage
10 - D5 = Total pool mean depth, 5-ft LWRP stage
11 - D10 = Total pool mean depth, 10 ft. LWRP stage
12 - D15 = Total pool mean depth, 15 ft. LWRP stage
13 - L0 = Crown elevation, bank head
14 - L25 = Crown elevation, one-fourth dike length
15 - L75 = Crown elevation, three-fourths dike length
16 - L100 = Crown elevation, channelward end of dike
17 - S1 = Bank head slope
18 - S2 = Central body slope
19 - S3 = End section slope
20 - S4 = Total structure slope

TABLE 14

Proportion of Total Dike Length Inundated at a River Stage of +15 Feet LWRP in the Lower Mississippi River (RM 320-610, AHP)

Dike System	Total Length (ft)	Total Length Inundated (ft)	Percent Total Length Inundated
Island 70	14,170	5,183	36.7
Smith Point	6,907	1,754	25.4
Victoria Bend	4,547	3,681	80.9
Montgomery Towhead	5,693	5,293	93.0
White River Landing	1,860	1,230	66.1
Terrene	6,945	4,473	64.4
Malone Field	7,282	2,477	34.0
Below Prentiss	6,995	1,029	14.7
Catfish Point	4,290	379	8.8
Chicot Landing	17,451	7,193	41.2
Ashbrook Cutoff	8,058	4,906	60.9
Ashbrook-Miller Bend (LB)	3,980	2,371	59.6
Island 82-Miller Bend (LB)	5,310	3,553	66.9
Ashbrook-Miller Bend (RB)	4,465	3,752	84.0
Island 82-Miller Bend (RB)	5,765	4,894	84.9
Leland Neck	3,675	3,576	97.3
Tarpley Cutoff	3,715	1,601	43.1
Leland Bar	13,695	9,057	66.1
Island 84	4,170	386	9.3
Refuge	5,040	0	0
Walnut Point	4,628	3,258	70.4
Seven Oaks	7,666	7,666	100.0
Island 86	6,458	3,486	54.0
Leota	7,345	3,351	45.6
Cracraft Lower	9,614	4,286	44.6
Carolina	2,490	990	39.7
Wilson Point	3,512	878	25.0
Corregidor	6,300	3,186	50.6
Baleshed Landing	6,860	6,809	99.3
Ben Lomond	23,363	17,855	76.4
Ajax Bar	19,925	10,340	51.9
Point Lookout	2,340	1,521	65.0
Willow Cutoff	3,610	3,036	84.1
Marshall Cutoff	4,720	1,500	31.8
Forest Home Towhead	2,820	2,391	84.8
Below Racetrack	10,129	5,763	56.9
Togo Island	7,165	2,373	33.1
Yucatan	7,780	2,797	35.9
Coffee Point	2,730	1,555	57.0
Bondurant Towhead	3,925	2,943	75.0
Cottage Bend	11,365	2,343	20.6
Brown's Field	4,050	0	0
Spithead Towhead	3,200	2,077	64.9
Waterproof	10,553	8,442	80.0
Natchez Island	7,210	5,660	78.5
Jackson Point	3,580	1,106	
Total	317,351	172,400	

$$\text{Percent inundated} = \frac{172,400}{317,351} = 54.3 \text{ percent}$$

APPENDIX A: ENGINEERING FEATURES OF DIKE SYSTEMS IN THE LOWER MISSISSIPPI RIVER, RM 320-610, AHP

LOWER MISSISSIPPI RIVER ENVIRONMENTAL PROGRAM
DIKE SYSTEM ENGINEERING CHARACTERISTICS
ISLAND 70
CROSSING & CHUTE
VARIABLE
RIVER MILE: 608.8 - 606.9

DIKE SYSTEM RIVER MILE	LENGTH FEET	DATE BUILT	DIKE TYPE	DIKE LONGITUDNAL BANKHEAD (LWRP, FEET) 0%	25%	50%	75%	100%	SLOPE (PERCENT) 00-25	25-75	75-100	TOTAL
608.8	2740	JUL71	TRANSVERSE	39.0	20.0	19.0	17.0	16.0	2.77	0.22	0.15	0.84
608.5	1510	AUG61	TRANSVERSE	37.0	18.0	-5.0	-7.0	-8.0	5.03	3.31	0.26	2.98
608.1	2625	OCT61	TRANSVERSE	39.0	17.0	17.0	18.0	24.0	3.35	-0.08	-0.91	0.57
608.1	1285	AUG71	TRANSVERSE 1/	28.0	23.0	19.0	16.0	14.0	1.56	1.09	0.62	1.09
607.7	2890	OCT61	TRANSVERSE	17.0	15.0	2.0	-14.0	-4.0	0.28	2.01	-1.38	0.73
606.9	3120	AUG61	TRANSVERSE	33.0	16.0	14.0	13.0	14.0	2.18	0.19	-0.13	0.61

*** DIKE SYSTEM SUMMARY ***
NUMBER OF DIKES:6
TOTAL LENGTH(FEET):14170
AVERAGE LENGTH (FEET):2361.667
MAXIMUM LENGTH (FEET):3120
MINIMUM LENGTH (FEET):1285
STANDARD DEVIATION: 768.275

1/ Excluded from averages.

LOWER MISSISSIPPI RIVER ENVIRONMENTAL PROGRAM
DIKE SYSTEM ENGINEERING CHARACTERISTICS
SMITH POINT
POINT BAR
VARIABLE
RIVER MILE: 600.5 - 599.7

RIVER MILE	DIKE SYSTEM LENGTH FEET	DATE BUILT	DIKE TYPE	DIKE LONGITUDNAL BANKHEAD (LWRP, FEET) 0%	25%	50%	75%	100%	SLOPE (PERCENT) 00-25	25-75	75-100	TOTAL
600.5	2322	AUG63	TRANSVERSE	38.0	27.0	23.0	20.0	7.0	1.89	0.60	2.24	1.34
600.3	1215	AUG63	TRANSVERSE	16.0	15.0	2.0	2.0	2.0	0.33	2.14	0.00	1.15
599.7	3370	SEP63	TRANSVERSE	38.0	26.0	20.0	15.0	6.0	1.42	0.65	1.07	0.95

*** DIKE SYSTEM SUMMARY ***
NUMBER OF DIKES:3
TOTAL LENGTH(FEET):6907
AVERAGE LENGTH (FEET):2302.333
MAXIMUM LENGTH (FEET):3370
MINIMUM LENGTH (FEET):1215
STANDARD DEVIATION: 1077.635

LOWER MISSISSIPPI RIVER ENVIRONMENTAL PROGRAM
DIKE SYSTEM ENGINEERING CHARACTERISTICS
VICTORIA BEND
CROSSING & POINT BAR
STEPPED UP
RIVER MILE: 596.0 - 595.4

RIVER MILE	DIKE SYSTEM LENGTH FEET	DATE BUILT	DIKE TYPE	DIKE LONGITUDNAL BANKHEAD (LWRP, FEET) 0%	25%	50%	75%	100%	SLOPE (PERCENT) 00-25	25-75	75-100	TOTAL
596.0	1335	JUL78	TRANSVERSE	20.0	9.0	6.0	6.0	4.0	3.30	0.45	0.60	1.20
595.4	3212	JUL78	TRANSVERSE	31.0	13.0	9.0	5.0	4.0	2.24	0.50	0.12	0.84

*** DIKE SYSTEM SUMMARY ***
NUMBER OF DIKES:2
TOTAL LENGTH(FEET):4547
AVERAGE LENGTH (FEET):2273.5
MAXIMUM LENGTH (FEET):3212
MINIMUM LENGTH (FEET):1335
STANDARD DEVIATION: 1327.239

LOWER MISSISSIPPI RIVER ENVIRONMENTAL PROGRAM
DIKE SYSTEM ENGINEERING CHARACTERISTICS
MONTGOMERY TOWHEAD
CROSSING & CHUTE
VARIABLE
RIVER MILE: 592.5 - 591.9

RIVER MILE	DIKE SYSTEM LENGTH FEET	DATE BUILT	DIKE TYPE	DIKE LONGITUDNAL BANKHEAD (LWRP, FEET) 0%	25%	50%	75%	100%	SLOPE (PERCENT) 00-25	25-75	75-100	TOTAL
592.5	1700	DEC64	TRANSVERSE	9.0	7.0	7.0	4.0	5.0	0.47	0.35	-0.24	0.24
592.2	1860	OCT64	PILE/STONE FILLED	-1.0	0.0	5.0	13.0	5.0	-0.22	-1.40	1.72	-0.32
591.6	2133	NOV64	PILE/STONE FILLED	2.0	9.0	10.0	17.0	22.0	-1.31	-0.75	-0.94	-0.94

*** DIKE SYSTEM SUMMARY ***
NUMBER OF DIKES:3
TOTAL LENGTH(FEET):5693
AVERAGE LENGTH (FEET):1897.667
MAXIMUM LENGTH (FEET):2133
MINIMUM LENGTH (FEET):1700
STANDARD DEVIATION: 218.944

LOWER MISSISSIPPI RIVER ENVIRONMENTAL PROGRAM
DIKE SYSTEM ENGINEERING CHARACTERISTICS
WHITE RIVER LANDING
CROSSING
STEPPED DOWN
RIVER MILE: 591.2 - 590.7

RIVER MILE	DIKE SYSTEM LENGTH FEET	DATE BUILT	DIKE TYPE	DIKE LONGITUDNAL BANKHEAD (LWRP, FEET) 0%	25%	50%	75%	100%	SLOPE (PERCENT) 00-25	25-75	75-100	TOTAL
591.2	600	AUG72	TRANSVERSE	24.0	20.0	16.0	12.0	9.0	2.67	2.67	2.00	2.50
590.7	1260	SEP72	TRANSVERSE	42.0	13.0	9.0	7.0	3.0	9.21	0.95	1.27	3.10

*** DIKE SYSTEM SUMMARY ***
NUMBER OF DIKES:2
TOTAL LENGTH(FEET):1860
AVERAGE LENGTH (FEET):930
MAXIMUM LENGTH (FEET):1260
MINIMUM LENGTH (FEET):600
STANDARD DEVIATION: 466.690

LOWER MISSISSIPPI RIVER ENVIRONMENTAL PROGRAM
DIKE SYSTEM ENGINEERING CHARACTERISTICS
TERRENE
CROSSING & POINT BAR
STEPPED DOWN
RIVER MILE: 590.1 - 588.6

RIVER MILE	DIKE SYSTEM LENGTH FEET	DATE BUILT	DIKE TYPE	DIKE LONGITUDNAL BANKHEAD (LWRP, FEET) 0%	25%	50%	75%	100%	SLOPE (PERCENT) 00-25	25-75	75-100	TOTAL
590.1	1600	JUN67	TRANSVERSE	19.0	18.0	17.0	15.0	14.0	0.25	0.37	0.25	0.31
589.4	2545	JUL67	TRANSVERSE	17.0	16.0	15.0	14.0	12.0	0.16	0.16	0.31	0.20
588.6	2800	JUN67	TRANSVERSE	12.0	12.0	11.0	10.0	6.0	0.00	0.14	0.57	0.21

*** DIKE SYSTEM SUMMARY ***
NUMBER OF DIKES:3
TOTAL LENGTH(FEET):6945
AVERAGE LENGTH (FEET):2315
MAXIMUM LENGTH (FEET):2800
MINIMUM LENGTH (FEET):1600
STANDARD DEVIATION: 632.199

LOWER MISSISSIPPI RIVER ENVIRONMENTAL PROGRAM
DIKE SYSTEM ENGINEERING CHARACTERISTICS
MALONE FIELD
POINT BAR
STEPPED UP
RIVER MILE: 585.6 - 584.1

RIVER MILE	DIKE SYSTEM LENGTH FEET	DATE BUILT	DIKE TYPE	DIKE LONGITUDNAL BANKHEAD (LWRP, FEET) 0%	25%	50%	75%	100%	SLOPE (PERCENT) 00-25	25-75	75-100	TOTAL
585.6	1105	JUL68	TRANSVERSE	28.0	22.0	19.0	17.0	15.0	2.17	0.90	0.72	1.18
585.1	3700	AUG68	L-HEAD	35.0	23.0	21.0	18.0	17.0	1.30	0.27	0.11	0.49
584.6	1240	OCT68	VANE	12.0	12.0	12.0	12.0	12.0	0.00	0.00	0.00	0.00
584.1	1237	OCT68	VANE	13.0	13.0	13.0	13.0	13.0	0.00	0.00	0.00	0.00

*** DIKE SYSTEM SUMMARY ***
NUMBER OF DIKES:4
TOTAL LENGTH(FEET):7282
AVERAGE LENGTH (FEET):1820.5
MAXIMUM LENGTH (FEET):3700
MINIMUM LENGTH (FEET):1105
STANDARD DEVIATION: 1254.580

LOWER MISSISSIPPI RIVER ENVIRONMENTAL PROGRAM
DIKE SYSTEM ENGINEERING CHARACTERISTICS
BELOW PRENTISS
SECONDARY CHANNEL, CHUTE & POINT BAR
VARIABLE
RIVER MILE: 580.4 - 577.4

RIVER MILE	DIKE SYSTEM LENGTH FEET	DATE BUILT	DIKE TYPE	DIKE LONGITUDNAL BANKHEAD (LWRP, FEET) 0%	25%	50%	75%	100%	SLOPE (PERCENT) 00-25	25-75	75-100	TOTAL
580.4	1310	OCT73	TRANSVERSE	35.0	24.0	16.0	8.0	-4.0	3.36	2.44	3.66	2.98
579.8	2620	AUG73	TRANSVERSE	36.0	22.0	23.0	19.0	8.0	2.14	0.23	1.68	1.07
577.4	3065	JAN81	TRANSVERSE	25.0	17.0	20.0	28.0	28.0	1.04	-0.72	0.00	-0.10

*** DIKE SYSTEM SUMMARY ***
NUMBER OF DIKES:3
TOTAL LENGTH(FEET):6995
AVERAGE LENGTH (FEET):2331.667
MAXIMUM LENGTH (FEET):3065
MINIMUM LENGTH (FEET):1310
STANDARD DEVIATION: 912.337

LOWER MISSISSIPPI RIVER ENVIRONMENTAL PROGRAM
DIKE SYSTEM ENGINEERING CHARACTERISTICS
CATFISH POINT
SECONDARY CHANNEL, CHUTE & POINT BAR
STEPPED UP
RIVER MILE: 571.0 - 570.0

RIVER MILE	DIKE SYSTEM LENGTH FEET	DATE BUILT	DIKE TYPE	DIKE LONGITUDNAL BANKHEAD (LWRP, FEET) 0%	25%	50%	75%	100%	SLOPE (PERCENT) 00-25	25-75	75-100	TOTAL
571.0	1820	AUG72	TRANSVERSE	37.0	25.0	20.0	16.0	10.0	2.64	0.99	1.32	1.48
570.0	2470	SEP72	TRANSVERSE	34.0	20.0	17.0	18.0	18.0	2.27	0.16	0.00	0.65

*** DIKE SYSTEM SUMMARY ***
NUMBER OF DIKES:2
TOTAL LENGTH(FEET):4290
AVERAGE LENGTH (FEET):2145
MAXIMUM LENGTH (FEET):2470
MINIMUM LENGTH (FEET):1820
STANDARD DEVIATION: 459.619

LOWER MISSISSIPPI RIVER ENVIRONMENTAL PROGRAM
DIKE SYSTEM ENGINEERING CHARACTERISTICS
CHICOT LANDING
SECONDARY CHANNEL
VARIABLE
RIVER MILE: 565.5 - 563.4

RIVER MILE	DIKE SYSTEM LENGTH FEET	DATE BUILT	DIKE TYPE	DIKE LONGITUDNAL BANKHEAD (LWRP, FEET) 0%	25%	50%	75%	100%	SLOPE (PERCENT) 00-25	25-75	75-100	TOTAL
565.5	2407	DEC67	TRANSVERSE	30.0	19.0	17.0	16.0	15.0	1.83	0.25	0.17	0.62
564.8	2860	OCT67	TRANSVERSE	21.0	17.0	14.0	14.0	12.0	0.56	0.21	0.28	0.31
563.4	12E3	OCT67	L-HEAD	36.0	19.0	-14.0	19.0	37.0	0.56	0.00	-0.59	-0.01

*** DIKE SYSTEM SUMMARY ***
NUMBER OF DIKES:3
TOTAL LENGTH(FEET):17,451
AVERAGE LENGTH (FEET):5817
MAXIMUM LENGTH (FEET):12184
MINIMUM LENGTH (FEET):2407
STANDARD DEVIATION: 5518.634

LOWER MISSISSIPPI RIVER ENVIRONMENTAL PROGRAM
DIKE SYSTEM ENGINEERING CHARACTERISTICS
ASHBROOK CUTOFF
STRAIGHT CHANNEL & CHUTE
STEPPED UP
RIVER MILE: 549.2 - 548.4

RIVER MILE	DIKE SYSTEM LENGTH FEET	DATE BUILT	DIKE TYPE	DIKE LONGITUDNAL BANKHEAD (LWRP, FEET) 0%	25%	50%	75%	100%	SLOPE (PERCENT) 00-25	25-75	75-100	TOTAL
549.2	3100	SEP62	TRANSVERSE	16.0	15.0	15.0	15.0	15.0	0.13	0.00	0.00	0.03
549.0	1775	OCT62	PILE/STONE FILLED	16.0	16.0	16.0	16.0	16.0	0.00	0.00	0.00	0.00
548.6	2408	OCT62	TRANSVERSE	16.0	15.0	15.0	14.0	12.0	0.17	0.08	0.33	0.17
548.4	775	OCT62	TRANSVERSE	10.0	10.0	10.0	11.0	13.0	0.00	-0.26	-1.03	-0.39

*** DIKE SYSTEM SUMMARY ***
NUMBER OF DIKES:4
TOTAL LENGTH(FEET):8058
AVERAGE LENGTH (FEET):2014.5
MAXIMUM LENGTH (FEET):3100
MINIMUM LENGTH (FEET):775
STANDARD DEVIATION: 987.737

LOWER MISSISSIPPI RIVER ENVIRONMENTAL PROGRAM
DIKE SYSTEM ENGINEERING CHARACTERISTICS
ASHBROOK - MILLER BEND (LEFT BANK)
CHUTE & STRAIGHT CHANNEL
VARIABLE
RIVER MILE: 547.2 - 545.7

RIVER MILE	DIKE SYSTEM LENGTH FEET	DATE BUILT	DIKE TYPE	DIKE LONGITUDNAL BANKHEAD (LWRP, FEET) 0%	25%	50%	75%	100%	SLOPE (PERCENT) 00-25	25-75	75-100	TOTAL
547.2	1850	JUL65	TRANSVERSE	18.0	17.0	14.0	13.0	10.0	0.22	0.43	0.65	0.43
546.8	905	JUN65	TRANSVERSE	30.0	20.0	15.0	12.0	6.0	4.42	1.77	2.65	2.65
545.7	1225	AUG65	TRANSVERSE	18.0	14.0	12.0	8.0	6.0	1.31	0.98	0.65	0.98

*** DIKE SYSTEM SUMMARY ***
NUMBER OF DIKES:3
TOTAL LENGTH(FEET):3980
AVERAGE LENGTH (FEET):1326.667
MAXIMUM LENGTH (FEET):1850
MINIMUM LENGTH (FEET):905
STANDARD DEVIATION: 480.633

LOWER MISSISSIPPI RIVER ENVIRONMENTAL PROGRAM
DIKE SYSTEM ENGINEERING CHARACTERISTICS
ISLAND 82 - MILLER BEND (LEFT BANK)
CHUTE & STRAIGHT CHANNEL
VARIABLE
RIVER MILE: 545.9 - 543.9

RIVER MILE	DIKE SYSTEM LENGTH FEET	DATE BUILT	DIKE TYPE	DIKE LONGITUDNAL BANKHEAD (LWRP, FEET) 0%	25%	50%	75%	100%	SLOPE (PERCENT) 00-25	25-75	75-100	TOTAL
545.9	415	JUN66	TRANSVERSE	10.0	10.0	10.0	10.0	10.0	0.00	0.00	0.00	0.00
545.2	2685	JUL66	L-HEAD	10.0	16.0	24.0	20.0	9.0	-0.89	-0.30	1.64	0.04
544.6	1315	SEP66	TRANSVERSE	15.0	12.0	10.0	7.0	3.0	0.91	0.76	1.22	0.91
543.9	895	SEP66	TRANSVERSE 1/	10.0	5.0	-7.0	-12.0	-14.0	2.20	3.80	0.89	2.68

*** DIKE SYSTEM SUMMARY ***
NUMBER OF DIKES:4
TOTAL LENGTH(FEET):5310
AVERAGE LENGTH (FEET):1472
MAXIMUM LENGTH (FEET):2685
MINIMUM LENGTH (FEET):415
STANDARD DEVIATION: 1188.503

1/ Excluded from averages.

LOWER MISSISSIPPI RIVER ENVIRONMENTAL PROGRAM
DIKE SYSTEM ENGINEERING CHARACTERISTICS
ASHBROOK - MILLER BEND (RIGHT BANK)
STRAIGHT CHANNEL
VARIABLE
RIVER MILE: 548.2 - 546.5

RIVER MILE	DIKE SYSTEM LENGTH FEET	DATE BUILT	DIKE TYPE	DIKE LONGITUDNAL BANKHEAD (LWRP, FEET) 0%	25%	50%	75%	100%	SLOPE (PERCENT) 00-25	25-75	75-100	TOTAL
548.2	1170	SEP65	TRANSVERSE	24.0	12.0	8.0	4.0	1.0	4.10	1.37	1.03	1.97
547.6	1110	SEP65	TRANSVERSE	21.0	10.0	6.0	4.0	-2.0	3.96	1.08	2.16	2.07
547.0	1195	SEP65	TRANSVERSE	22.0	10.0	6.0	4.0	1.0	4.02	1.00	1.00	1.76
546.5	990	SEP65	TRANSVERSE	22.0	11.0	8.0	4.0	2.0	4.44	1.41	0.81	2.02

*** DIKE SYSTEM SUMMARY ***
NUMBER OF DIKES:4
TOTAL LENGTH(FEET):4465
AVERAGE LENGTH (FEET):1116.25
MAXIMUM LENGTH (FEET):1195
MINIMUM LENGTH (FEET):990
STANDARD DEVIATION: 91.413

LOWER MISSISSIPPI RIVER ENVIRONMENTAL PROGRAM
DIKE SYSTEM ENGINEERING CHARACTERISTICS
ISLAND 82 - MILLER BEND (RIGHT BANK)
STRAIGHT CHANNEL
STEPPED DOWN
RIVER MILE: 545.2 - 543.4

DIKE SYSTEM				DIKE LONGITUDNAL BANKHEAD (LWRP, FEET)					SLOPE (PERCENT)			
RIVER MILE	LENGTH FEET	DATE BUILT	DIKE TYPE	0%	25%	50%	75%	100%	00-25	25-75	75-100	TOTAL
545.2	1100	SEP66	TRANSVERSE	20.0	17.0	14.0	11.0	6.0	1.09	1.09	1.82	1.27
544.6	1840	DEC66	TRANSVERSE	22.0	14.0	14.0	12.0	10.0	1.74	0.22	0.43	0.65
543.9	1555	NOV66	TRANSVERSE	15.0	13.0	10.0	9.0	7.0	0.51	0.51	0.51	0.51
543.4	1270	NOV66	TRANSVERSE	11.0	9.0	9.0	6.0	6.0	0.63	0.47	0.00	0.39

*** DIKE SYSTEM SUMMARY ***
NUMBER OF DIKES:4
TOTAL LENGTH(FEET):5765
AVERAGE LENGTH (FEET):1441.25
MAXIMUM LENGTH (FEET):1840
MINIMUM LENGTH (FEET):1100
STANDARD DEVIATION: 325.432

LOWER MISSISSIPPI RIVER ENVIRONMENTAL PROGRAM
DIKE SYSTEM ENGINEERING CHARACTERISTICS
LELAND NECK
STRAIGHT CHANNEL
STEPPED UP
RIVER MILE: 541.2 - 540.3

DIKE SYSTEM RIVER MILE	LENGTH FEET	DATE BUILT	DIKE TYPE	DIKE LONGITUDNAL BANKHEAD (LWRP, FEET) 0%	25%	50%	75%	100%	SLOPE (PERCENT) 00-25	25-75	75-100	TOTAL
541.2	660	OCT64	TRANSVERSE	24.0	9.0	5.0	2.0	-1.0	9.09	2.12	1.82	3.79
540.8	1195	SEP64	TRANSVERSE	13.0	8.0	6.0	5.0	3.0	1.67	0.50	0.67	0.84
540.3	1820	JUN64	TRANSVERSE	11.0	9.0	9.0	8.0	8.0	0.44	0.11	0.00	0.16

*** DIKE SYSTEM SUMMARY ***
NUMBER OF DIKES:3
TOTAL LENGTH(FEET):3675
AVERAGE LENGTH (FEET):1225
MAXIMUM LENGTH (FEET):1820
MINIMUM LENGTH (FEET):660
STANDARD DEVIATION: 580.582

LOWER MISSISSIPPI RIVER ENVIRONMENTAL PROGRAM
DIKE SYSTEM ENGINEERING CHARACTERISTICS
TARPLEY CUTOFF
STRAIGHT CHANNEL
VARIABLE
RIVER MILE: 541.2 - 540.0

RIVER MILE	DIKE SYSTEM LENGTH FEET	DATE BUILT	DIKE TYPE	DIKE LONGITUDNAL BANKHEAD (LWRP, FEET) 0%	25%	50%	75%	100%	SLOPE (PERCENT) 00-25	25-75	75-100	TOTAL
541.2	855	AUG69	TRANSVERSE	24.0	18.0	10.0	3.0	-7.0	2.81	3.51	4.68	3.63
540.6	950	AUG69	TRANSVERSE	25.0	21.0	14.0	8.0	4.0	1.68	2.74	1.68	2.21
540.0	1910	DEC69	TRANSVERSE	21.0	18.0	23.0	13.0	11.0	0.63	0.52	0.42	0.52

*** DIKE SYSTEM SUMMARY ***
NUMBER OF DIKES:3
TOTAL LENGTH(FEET):3715
AVERAGE LENGTH (FEET):1238.333
MAXIMUM LENGTH (FEET):1910
MINIMUM LENGTH (FEET):855
STANDARD DEVIATION: 583.617

LOWER MISSISSIPPI RIVER ENVIRONMENTAL PROGRAM
DIKE SYSTEM ENGINEERING CHARACTERISTICS
LELAND BAR
CHUTE & STRAIGHT CHANNEL
VARIABLE
RIVER MILE: 539.4 - 535.4

DIKE SYSTEM RIVER MILE	LENGTH FEET	DATE BUILT	DIKE TYPE	DIKE LONGITUDNAL BANKHEAD (LWRP, FEET) 0%	25%	50%	75%	100%	SLOPE (PERCENT) 00-25	25-75	75-100	TOTAL
539.4	3120	JUL66	TRANSVERSE	14.0	13.0	14.0	1.0	1.0	0.13	0.77	0.00	0.42
538.4	2300	SEP66	TRANSVERSE	28.0	17.0	16.0	14.0	12.0	1.91	0.26	0.35	0.70
537.7	1480	NOV66	TRANSVERSE	20.0	17.0	14.0	10.0	8.0	0.81	0.95	0.54	0.81
537.0	1360	DEC66	TRANSVERSE	19.0	14.0	11.0	9.0	4.0	1.47	0.74	1.47	1.10
536.8	1065	NOV67	VANE	14.0	14.0	14.0	14.0	14.0	0.00	0.00	0.00	0.00
536.5	1063	NOV67	VANE	15.0	15.0	15.0	15.0	15.0	0.00	0.00	0.00	0.00
536.2	1057	NOV68	VANE	15.0	16.0	15.0	15.0	15.0	-0.38	0.19	0.00	0.00
535.8	1120	NOV68	VANE	15.0	16.0	17.0	16.0	16.0	-0.36	0.00	0.00	-0.09
535.4	1130	JAN69	VANE	15.0	16.0	15.0	15.0	16.0	-0.35	0.18	-0.35	-0.09

*** DIKE SYSTEM SUMMARY ***
NUMBER OF DIKES:9
TOTAL LENGTH(FEET):13695
AVERAGE LENGTH (FEET):1521.667
MAXIMUM LENGTH (FEET):3120
MINIMUM LENGTH (FEET):1057
STANDARD DEVIATION: 719.194

LOWER MISSISSIPPI RIVER ENVIRONMENTAL PROGRAM
DIKE SYSTEM ENGINEERING CHARACTERISTICS
ISLAND 84
POINT BAR
STEPPED UP
RIVER MILE: 533.4 - 531.9

DIKE SYSTEM RIVER MILE	LENGTH FEET	DATE BUILT	DIKE TYPE	DIKE LONGITUDNAL BANKHEAD (LWRP, FEET) 0%	25%	50%	75%	100%	SLOPE (PERCENT) 00-25	25-75	75-100	TOTAL
533.4	900	SEP65	TRANSVERSE	28.0	23.0	17.0	9.0	1.0	2.22	3.11	3.56	3.00
532.6	1550	SEP65	TRANSVERSE	35.0	31.0	27.0	24.0	19.0	1.03	0.90	1.29	1.03
531.9	1720	OCT65	TRANSVERSE	35.0	35.0	32.0	29.0	25.0	0.00	0.70	0.93	0.58

*** DIKE SYSTEM SUMMARY ***
NUMBER OF DIKES:3
TOTAL LENGTH(FEET):4170
AVERAGE LENGTH (FEET):1390
MAXIMUM LENGTH (FEET):1720
MINIMUM LENGTH (FEET):900
STANDARD DEVIATION: 432.782

LOWER MISSISSIPPI RIVER ENVIRONMENTAL PROGRAM
DIKE SYSTEM ENGINEERING CHARACTERISTICS
REFUGE
SECONDARY CHANNEL
LEVEL
RIVER MILE: 528.3 - 528.3

RIVER MILE	DIKE SYSTEM LENGTH FEET	DATE BUILT	DIKE TYPE	DIKE LONGITUDNAL BANKHEAD (LWRP, FEET) 0%	25%	50%	75%	100%	SLOPE (PERCENT) 00-25	25-75	75-100	TOTAL
528.3	5040	AUG79	L-HEAD	29.0	18.0	18.0	18.0	19.0	0.87	0.00	-0.08	0.20

*** DIKE SYSTEM SUMMARY ***
NUMBER OF DIKES:1
TOTAL LENGTH(FEET):5040
AVERAGE LENGTH (FEET):5040
MAXIMUM LENGTH (FEET):5040
MINIMUM LENGTH (FEET):5040
STANDARD DEVIATION: 0.000

LOWER MISSISSIPPI RIVER ENVIRONMENTAL PROGRAM
DIKE SYSTEM ENGINEERING CHARACTERISTICS
WALNUT POINT
CROSSING
STEPPED DOWN
RIVER MILE: 525.0 - 524.4

DIKE SYSTEM				DIKE LONGITUDNAL BANKHEAD (LWRP, FEET)					SLOPE (PERCENT)			
RIVER MILE	LENGTH FEET	DATE BUILT	DIKE TYPE	0%	25%	50%	75%	100%	00-25	25-75	75-100	TOTAL
525.0	2960	SEP69	TRANSVERSE	21.0	20.0	10.0	6.0	-5.0	0.14	0.95	1.49	0.88
524.4	1668	OCT69	TRANSVERSE	17.0	9.0	7.0	1.0	-8.0	1.92	0.96	2.16	1.50

*** DIKE SYSTEM SUMMARY ***
NUMBER OF DIKES:2
TOTAL LENGTH(FEET):4628
AVERAGE LENGTH (FEET):2314
MAXIMUM LENGTH (FEET):2960
MINIMUM LENGTH (FEET):1668
STANDARD DEVIATION: 913.582

LOWER MISSISSIPPI RIVER ENVIRONMENTAL PROGRAM
DIKE SYSTEM ENGINEERING CHARACTERISTICS
SEVEN OAKS
CROSSING & CHUTE
VARIABLE
RIVER MILE: 524.2 - 522.9

RIVER MILE	DIKE SYSTEM LENGTH FEET	DATE BUILT	DIKE TYPE	DIKE LONGITUDNAL BANKHEAD (LWRP, FEET) 0%	25%	50%	75%	100%	SLOPE (PERCENT) 00-25	25-75	75-100	TOTAL
524.2	345	SEP61	PILE/STONE FILLED	13.0	13.0	13.0	13.0	13.0	0.00	0.00	0.00	0.00
523.9	990	OCT61	PILE/STONE FILLED	13.0	13.0	13.0	13.0	13.0	0.00	0.00	0.00	0.00
523.9	965	OCT71	TRANSVERSE	13.0	12.0	11.0	11.0	7.0	0.41	0.21	1.66	0.62
523.5	1975	JUL62	PILE/STONE FILLED	13.0	13.0	13.0	13.0	13.0	0.00	0.00	0.00	0.00
523.4	2160	OCT71	TRANSVERSE	14.0	14.0	13.0	11.0	4.0	0.00	0.28	1.30	0.46
523.2	585	SEP62	PILE/STONE FILLED	14.0	14.0	14.0	14.0	14.0	0.00	0.00	0.00	0.00
522.9	646	SEP62	PILE/STONE FILLED	14.0	14.0	14.0	14.0	14.0	0.00	0.00	0.00	0.00

*** DIKE SYSTEM SUMMARY ***
NUMBER OF DIKES:7
TOTAL LENGTH(FEET):7666
AVERAGE LENGTH (FEET):1095.143
MAXIMUM LENGTH (FEET):2160
MINIMUM LENGTH (FEET):345
STANDARD DEVIATION: 702.466

LOWER MISSISSIPPI RIVER ENVIRONMENTAL PROGRAM
DIKE SYSTEM ENGINEERING CHARACTERISTICS
ISLAND 86
CHUTE
STEPPED DOWN
RIVER MILE: 520.6 - 519.8

RIVER MILE	DIKE SYSTEM LENGTH FEET	DATE BUILT	DIKE TYPE	DIKE LONGITUDNAL BANKHEAD (LWRP, FEET) 0%	25%	50%	75%	100%	SLOPE (PERCENT) 00-25	25-75	75-100	TOTAL
520.6	2888	AUG70	TRANSVERSE	29.0	16.0	13.0	12.0	12.0	1.80	0.28	0.00	0.59
519.8	3570	NOV70	TRANSVERSE	30.0	24.0	8.0	8.0	15.0	0.67	0.90	-0.78	0.42

*** DIKE SYSTEM SUMMARY ***
NUMBER OF DIKES:2
TOTAL LENGTH(FEET):6458
AVERAGE LENGTH (FEET):3229
MAXIMUM LENGTH (FEET):3570
MINIMUM LENGTH (FEET):2888
STANDARD DEVIATION: 482.247

LOWER MISSISSIPPI RIVER ENVIRONMENTAL PROGRAM
DIKE SYSTEM ENGINEERING CHARACTERISTICS
LEOTA
CROSSING, CHUTE & POINT BAR
STEPPED DOWN
RIVER MILE: 515.4 - 512.9

DIKE SYSTEM RIVER MILE	LENGTH FEET	DATE BUILT	DIKE TYPE	DIKE LONGITUDNAL BANKHEAD (LWRP, FEET) 0%	25%	50%	75%	100%	SLOPE (PERCENT) 00-25	25-75	75-100	TOTAL
515.4	1290	JUN67	TRANSVERSE	23.0	19.0	18.0	16.0	15.0	1.24	0.47	0.31	0.62
514.5	2380	AUG67	TRANSVERSE	19.0	18.0	17.0	15.0	15.0	0.17	0.25	0.00	0.17
512.9	3675	SEP67	TRANSVERSE	17.0	15.0	14.0	12.0	11.0	0.22	0.16	0.11	0.16

*** DIKE SYSTEM SUMMARY ***
NUMBER OF DIKES:3
TOTAL LENGTH(FEET):7345
AVERAGE LENGTH (FEET):2448.333
MAXIMUM LENGTH (FEET):3675
MINIMUM LENGTH (FEET):1290
STANDARD DEVIATION: 1193.967

LOWER MISSISSIPPI RIVER ENVIRONMENTAL PROGRAM
DIKE SYSTEM ENGINEERING CHARACTERISTICS
CRACRAFT LOWER
CROSSING & CHUTE
STEPPED DOWN
RIVER MILE: 510.4 - 508.9

RIVER MILE	DIKE SYSTEM LENGTH FEET	DATE BUILT	DIKE TYPE	DIKE LONGITUDNAL BANKHEAD (LWRP, FEET) 0%	25%	50%	75%	100%	SLOPE (PERCENT) 00-25	25-75	75-100	TOTAL
510.4	1854	SEP70	TRANSVERSE	25.0	18.0	18.0	18.0	13.0	1.51	0.00	1.08	0.65
509.7	3440	JUN70	TRANSVERSE	25.0	16.0	16.0	15.0	13.0	1.05	0.06	0.23	0.35
508.9	4320	JUN71	TRANSVERSE	23.0	15.0	14.0	12.0	10.0	0.74	0.14	0.19	0.30

*** DIKE SYSTEM SUMMARY ***
NUMBER OF DIKES:3
TOTAL LENGTH(FEET):9614
AVERAGE LENGTH (FEET):3204.667
MAXIMUM LENGTH (FEET):4320
MINIMUM LENGTH (FEET):1854
STANDARD DEVIATION: 1249.730

LOWER MISSISSIPPI RIVER ENVIRONMENTAL PROGRAM
DIKE SYSTEM ENGINEERING CHARACTERISTICS
CAROLINA
CROSSING
STEPPED DOWN
RIVER MILE: 509.4 - 509.0

RIVER MILE	DIKE SYSTEM LENGTH FEET	DATE BUILT	DIKE TYPE	DIKE LONGITUDNAL BANKHEAD (LWRP, FEET) 0%	25%	50%	75%	100%	SLOPE (PERCENT) 00-25	25-75	75-100	TOTAL
509.4	1380	SEP72	TRANSVERSE	31.0	25.0	22.0	16.0	4.0	1.74	1.30	3.48	1.96
509.0	1110	JUL74	TRANSVERSE	30.0	21.0	10.0	0.0	-9.0	3.24	3.78	3.24	3.51

*** DIKE SYSTEM SUMMARY ***
NUMBER OF DIKES:2
TOTAL LENGTH(FEET):2490
AVERAGE LENGTH (FEET):1245
MAXIMUM LENGTH (FEET):1380
MINIMUM LENGTH (FEET):1110
STANDARD DEVIATION: 190.919

LOWER MISSISSIPPI RIVER ENVIRONMENTAL PROGRAM
DIKE SYSTEM ENGINEERING CHARACTERISTICS
CORREGIDOR
POINT BAR
STEPPED UP
RIVER MILE: 505.8 - 504.9

RIVER MILE	DIKE SYSTEM LENGTH FEET	DATE BUILT	DIKE TYPE	DIKE LONGITUDNAL BANKHEAD (LWRP, FEET) 0%	25%	50%	75%	100%	SLOPE (PERCENT) 00-25	25-75	75-100	TOTAL
505.8	2345	DEC76	TRANSVERSE	35.0	18.0	14.0	8.0	3.0	2.90	0.85	0.85	1.36
504.9	3955	DEC76	TRANSVERSE	34.0	23.0	16.0	14.0	11.0	1.11	0.46	0.30	0.58

*** DIKE SYSTEM SUMMARY ***
NUMBER OF DIKES:2
TOTAL LENGTH(FEET):6300
AVERAGE LENGTH (FEET):3150
MAXIMUM LENGTH (FEET):3955
MINIMUM LENGTH (FEET):2345
STANDARD DEVIATION: 1138.442

LOWER MISSISSIPPI RIVER ENVIRONMENTAL PROGRAM
DIKE SYSTEM ENGINEERING CHARACTERISTICS
WILSON POINT
CROSSING & POINT BAR
LEVEL
RIVER MILE: 500.6 - 500.0

RIVER MILE	DIKE SYSTEM LENGTH FEET	DATE BUILT	DIKE TYPE	DIKE LONGITUDNAL BANKHEAD (LWRP, FEET) 0%	25%	50%	75%	100%	SLOPE (PERCENT) 00-25	25-75	75-100	TOTAL
500.6	1342	NOV68	TRANSVERSE	25.0	19.0	17.0	15.0	13.0	1.79	0.60	0.60	0.89
500.0	2170	DEC68	TRANSVERSE	25.0	18.0	16.0	15.0	14.0	1.29	0.28	0.18	0.51

*** DIKE SYSTEM SUMMARY ***
NUMBER OF DIKES:2
TOTAL LENGTH(FEET):3512
AVERAGE LENGTH (FEET):1756
MAXIMUM LENGTH (FEET):2170
MINIMUM LENGTH (FEET):1342
STANDARD DEVIATION: 585.484

LOWER MISSISSIPPI RIVER ENVIRONMENTAL PROGRAM
DIKE SYSTEM ENGINEERING CHARACTERISTICS
BALESHED LANDING
CROSSING, SECONDARY & STRAIGHT CHANNEL
STEPPED UP
RIVER MILE: 494.6 - 491.4

DIKE SYSTEM RIVER MILE	LENGTH FEET	DATE BUILT	DIKE TYPE	DIKE LONGITUDNAL BANKHEAD (LWRP, FEET) 0%	25%	50%	75%	100%	SLOPE (PERCENT) 00-25	25-75	75-100	TOTAL
494.6	475	JUN64	TRANSVERSE 1/	-6.0	-11.0	-20.0	-17.0	-17.0	4.21	2.53	0.00	2.32
493.9	820	JUN64	TRANSVERSE	14.0	-3.0	-6.0	-6.0	-12.0	8.29	0.73	2.93	3.17
493.1	1670	JUN64	TRANSVERSE	18.0	8.0	5.0	1.0	-3.0	2.40	0.84	0.96	1.26
492.4	2350	JUN64	TRANSVERSE	16.0	10.0	9.0	7.0	5.0	1.02	0.26	0.34	0.47
491.4	2020	JUN64	TRANSVERSE	18.0	13.0	11.0	8.0	11.0	0.99	0.50	-0.59	0.35

*** DIKE SYSTEM SUMMARY ***
NUMBER OF DIKES:5
TOTAL LENGTH(FEET):6860
AVERAGE LENGTH (FEET):1715
MAXIMUM LENGTH (FEET):2350
MINIMUM LENGTH (FEET):820
STANDARD DEVIATION: 658.103

1/ Not included in averages.

LOWER MISSISSIPPI RIVER ENVIRONMENTAL PROGRAM
DIKE SYSTEM ENGINEERING CHARACTERISTICS
BEN LOMOND
SECONDARY CHANNEL & STRAIGHT CHANNEL
VARIABLE
RIVER MILE: 488.6 - 485.3

RIVER MILE	DIKE SYSTEM LENGTH FEET	DATE BUILT	DIKE TYPE	DIKE LONGITUDNAL BANKHEAD (LWRP, FEET) 0%	25%	50%	75%	100%	SLOPE (PERCENT) 00-25	25-75	75-100	TOTAL
488.6	4135	SEP69	TRANSVERSE	26.0	20.0	16.0	14.0	12.0	0.58	0.29	0.19	0.34
487.8	6065	JUN68	L-HEAD	24.0	16.0	14.0	13.0	11.0	0.53	0.10	0.13	0.21
487.4	1155	NOV67	VANE	14.0	14.0	14.0	14.0	14.0	0.00	0.00	0.00	0.00
487.1	1100	DEC67	VANE	13.0	13.0	14.0	14.0	13.0	0.00	-0.18	0.36	0.00
486.6	1150	AUG70	VANE	13.0	13.0	13.0	13.0	13.0	0.00	0.00	0.00	0.00
486.3	4788	AUG71	L-HEAD	15.0	13.0	12.0	11.0	8.0	0.17	0.08	0.25	0.15
485.8	1140	OCT74	VANE	13.0	13.0	13.0	13.0	13.0	0.00	0.00	0.00	0.00
485.4	1130	OCT74	VANE	4.0	5.0	4.0	4.0	7.0	-0.35	0.18	-1.06	-0.27
485.3	2700	OCT77	TRANSVERSE	27.0	13.0	12.0	12.0	10.0	2.07	0.07	0.30	0.63

*** DIKE SYSTEM SUMMARY ***
NUMBER OF DIKES:9
TOTAL LENGTH(FEET):23363
AVERAGE LENGTH (FEET):2595.89
MAXIMUM LENGTH (FEET):6065
MINIMUM LENGTH (FEET):1100
STANDARD DEVIATION: 1933.024

LOWER MISSISSIPPI RIVER ENVIRONMENTAL PROGRAM
DIKE SYSTEM ENGINEERING CHARACTERISTICS
AJAX BAR
CHUTE
VARIABLE
RIVER MILE: 484.4 - 481.0

RIVER MILE	DIKE SYSTEM LENGTH FEET	DATE BUILT	DIKE TYPE	DIKE LONGITUDNAL BANKHEAD (LWRP, FEET) 0%	25%	50%	75%	100%	SLOPE (PERCENT) 00-25	25-75	75-100	TOTAL
484.4	1840	AUG68	TRANSVERSE	29.0	24.0	18.0	12.0	8.0	1.09	1.30	0.87	1.14
483.6	2905	SEP68	TRANSVERSE	37.0	30.0	12.0	3.0	-4.0	0.96	1.86	0.96	1.41
481.9	3290	AUG62	TRANSVERSE	16.0	11.0	15.0	18.0	37.0	0.61	-0.43	-2.31	-0.64
481.5	2575	NOV62	PILE/STONE FILLED	9.0	0.0	8.0	-5.0	17.0	1.40	0.39	-3.42	-0.31
482.6	4065	SEP68	TRANSVERSE	28.0	23.0	18.0	12.0	8.0	0.49	0.54	0.39	0.49
481.3	2580	DEC62	PILE/STONE FILLED	6.0	3.0	3.0	-2.0	4.0	0.47	0.39	-0.93	0.08
481.0	2670	SEP62	PILE/STONE FILLED	5.0	5.0	5.0	17.0	17.0	0.00	-0.90	0.00	-0.45

*** DIKE SYSTEM SUMMARY ***
NUMBER OF DIKES:7
TOTAL LENGTH(FEET):19925
AVERAGE LENGTH (FEET):2846.429
MAXIMUM LENGTH (FEET):4065
MINIMUM LENGTH (FEET):1840
STANDARD DEVIATION: 692.072

LOWER MISSISSIPPI RIVER ENVIRONMENTAL PROGRAM
DIKE SYSTEM ENGINEERING CHARACTERISTICS
POINT LOOKOUT
CROSSING & POINT BAR
LEVEL
RIVER MILE: 477.9 - 477.9

RIVER MILE	DIKE SYSTEM LENGTH FEET	DATE BUILT	DIKE TYPE	DIKE LONGITUDNAL BANKHEAD (LWRP, FEET) 0%	25%	50%	75%	100%	SLOPE (PERCENT) 00-25	25-75	75-100	TOTAL
477.9	2340	SEP73	TRANSVERSE	27.0	18.0	12.0	3.0	-5.0	1.54	1.28	1.37	1.37

*** DIKE SYSTEM SUMMARY ***
NUMBER OF DIKES:1
TOTAL LENGTH(FEET):2340
AVERAGE LENGTH (FEET):2340
MAXIMUM LENGTH (FEET):2340
MINIMUM LENGTH (FEET):2340
STANDARD DEVIATION: 0.000

LOWER MISSISSIPPI RIVER ENVIRONMENTAL PROGRAM
DIKE SYSTEM ENGINEERING CHARACTERISTICS
WILLOW CUTOFF
SECONDARY CHANNEL, CHUTE & POINT BAR
STEPPED UP
RIVER MILE: 462.4 - 460.2

RIVER MILE	DIKE SYSTEM LENGTH FEET	DATE BUILT	DIKE TYPE	DIKE LONGITUDNAL BANKHEAD (LWRP, FEET) 0%	25%	50%	75%	100%	SLOPE (PERCENT) 00-25	25-75	75-100	TOTAL
462.4	1525	AUG74	TRANSVERSE	17.0	11.0	7.0	7.0	1.0	1.57	0.52	1.57	1.05
460.2	2085	NOV80	WEIR	33.0	12.0	12.0	20.0	20.0	4.03	-0.77	0.00	0.62

*** DIKE SYSTEM SUMMARY ***
NUMBER OF DIKES:2
TOTAL LENGTH(FEET):3610
AVERAGE LENGTH (FEET):1805
MAXIMUM LENGTH (FEET):2085
MINIMUM LENGTH (FEET):1525
STANDARD DEVIATION: 395.980

LOWER MISSISSIPPI RIVER ENVIRONMENTAL PROGRAM
DIKE SYSTEM ENGINEERING CHARACTERISTICS
FOREST HOME TOWHEAD
CROSSING & SECONDARY CHANNEL
STEPPED DOWN
RIVER MILE: 449.2 - 448.1

RIVER MILE	DIKE SYSTEM LENGTH FEET	DATE BUILT	DIKE TYPE	DIKE LONGITUDNAL BANKHEAD (LWRP, FEET) 0%	25%	50%	75%	100%	SLOPE (PERCENT) 00-25	25-75	75-100	TOTAL
449.2	1045	AUG80	TRANSVERSE	35.0	5.0	5.0	5.0	5.0	11.48	0.00	0.00	2.87
448.6	925	SEP80	TRANSVERSE	36.0	4.0	4.0	3.0	0.0	13.84	0.22	1.30	3.89
448.1	850	SEP80	TRANSVERSE	30.0	-1.0	-2.0	-1.0	-4.0	14.59	0.00	1.41	4.00

*** DIKE SYSTEM SUMMARY ***
NUMBER OF DIKES:3
TOTAL LENGTH(FEET):2820
AVERAGE LENGTH (FEET):940
MAXIMUM LENGTH (FEET):1045
MINIMUM LENGTH (FEET):850
STANDARD DEVIATION: 98.362

LOWER MISSISSIPPI RIVER ENVIRONMENTAL PROGRAM
DIKE SYSTEM ENGINEERING CHARACTERISTICS
MARSHALL CUTOFF
CROSSING & POINT BAR
STEPPED UP
RIVER MILE: 448.2 - 447.2

RIVER MILE	DIKE SYSTEM LENGTH FEET	DATE BUILT	DIKE TYPE	DIKE LONGITUDNAL BANKHEAD (LWRP, FEET) 0%	25%	50%	75%	100%	SLOPE (PERCENT) 00-25	25-75	75-100	TOTAL
448.2	1545	MAY78	TRANSVERSE	27.0	18.0	15.0	12.0	8.0	2.33	0.78	1.04	1.23
447.2	3175	MAY78	TRANSVERSE	36.0	28.0	27.0	16.0	4.0	1.01	0.76	1.51	1.01

*** DIKE SYSTEM SUMMARY ***
NUMBER OF DIKES:2
TOTAL LENGTH(FEET):4720
AVERAGE LENGTH (FEET):2360
MAXIMUM LENGTH (FEET):3175
MINIMUM LENGTH (FEET):1545
STANDARD DEVIATION: 1152.584

LOWER MISSISSIPPI RIVER ENVIRONMENTAL PROGRAM
DIKE SYSTEM ENGINEERING CHARACTERISTICS
BELOW RACETRACK
SECONDARY CHANNEL & STRAIGHT CHANNEL
VARIABLE
RIVER MILE: 431.2 - 428.5

RIVER MILE	DIKE SYSTEM LENGTH FEET	DATE BUILT	DIKE TYPE	DIKE LONGITUDNAL BANKHEAD (LWRP, FEET) 0%	25%	50%	75%	100%	SLOPE (PERCENT) 00-25	25-75	75-100	TOTAL
431.2	920	OCT62	TRANSVERSE	34.0	15.0	2.0	0.0	-12.0	8.26	3.26	5.22	5.00
430.8	799	SEP62	PILE/STONE FILLED	7.0	-9.0	-10.0	-1.0	1.0	8.01	-2.00	-1.00	0.75
430.8	980	JUL71	TRANSVERSE	21.0	14.0	14.0	14.0	13.0	2.86	0.00	0.41	0.82
430.5	1360	SEP62	PILE/STONE FILLED	8.0	-2.0	-2.0	-3.0	-2.0	2.94	0.15	-0.29	0.74
430.0	2240	DEC62	TRANSVERSE	35.0	21.0	19.0	14.0	-3.0	2.50	0.62	3.04	1.70
429.3	2030	SEP81	TRANSVERSE	36.0	17.0	6.0	17.0	20.0	3.74	0.00	-0.59	0.79
428.5	1800	SEP81	TRANSVERSE	36.0	5.0	4.0	23.0	30.0	6.89	-2.00	-1.56	0.33

*** DIKE SYSTEM SUMMARY ***
NUMBER OF DIKES:7
TOTAL LENGTH(FEET):10129
AVERAGE LENGTH (FEET):1447
MAXIMUM LENGTH (FEET):2240
MINIMUM LENGTH (FEET):799
STANDARD DEVIATION: 579.747

LOWER MISSISSIPPI RIVER ENVIRONMENTAL PROGRAM
DIKE SYSTEM ENGINEERING CHARACTERISTICS
TOGO ISLAND
CROSSING & POINT BAR
STEPPED UP
RIVER MILE: 416.1 - 414.3

RIVER MILE	DIKE SYSTEM LENGTH FEET	DATE BUILT	DIKE TYPE	DIKE LONGITUDNAL BANKHEAD (LWRP, FEET) 0%	25%	50%	75%	100%	SLOPE (PERCENT) 00-25	25-75	75-100	TOTAL
416.1	1385	AUG74	TRANSVERSE	37.0	4.0	-2.0	-8.0	-8.0	9.53	1.73	0.00	3.25
415.5	2030	AUG74	TRANSVERSE	43.0	18.0	13.0	8.0	5.0	4.93	0.99	0.59	1.87
414.3	3750	NOV78	TRANSVERSE	43.0	35.0	23.0	18.0	23.0	0.85	0.91	-0.53	0.53

*** DIKE SYSTEM SUMMARY ***
NUMBER OF DIKES:3
TOTAL LENGTH(FEET):7165
AVERAGE LENGTH (FEET):2388.333
MAXIMUM LENGTH (FEET):3750
MINIMUM LENGTH (FEET):1385
STANDARD DEVIATION: 1222.542

LOWER MISSISSIPPI RIVER ENVIRONMENTAL PROGRAM
DIKE SYSTEM ENGINEERING CHARACTERISTICS
YUCATAN
CROSSING & SECONDARY CHANNEL
STEPPED DOWN
RIVER MILE: 410.4 - 409.8

DIKE SYSTEM RIVER MILE	LENGTH FEET	DATE BUILT	DIKE TYPE	DIKE LONGITUDNAL BANKHEAD (LWRP, FEET) 0%	25%	50%	75%	100%	SLOPE (PERCENT) 00-25	25-75	75-100	TOTAL
410.4	2820	AUG70	TRANSVERSE	24.0	17.0	15.0	15.0	14.0	0.99	0.14	0.14	0.35
409.8	4960	AUG70	TRANSVERSE	16.0	9.0	21.0	17.0	11.0	0.56	-0.32	0.48	0.10

*** DIKE SYSTEM SUMMARY ***
NUMBER OF DIKES:2
TOTAL LENGTH(FEET):7780
AVERAGE LENGTH (FEET):3890
MAXIMUM LENGTH (FEET):4960
MINIMUM LENGTH (FEET):2820
STANDARD DEVIATION: 1513.209

LOWER MISSISSIPPI RIVER ENVIRONMENTAL PROGRAM
DIKE SYSTEM ENGINEERING CHARACTERISTICS
COFFEE POINT
STRAIGHT CHANNEL
STEPPED DOWN
RIVER MILE: 405.0 - 404.4

RIVER MILE	DIKE SYSTEM LENGTH FEET	DATE BUILT	DIKE TYPE	DIKE LONGITUDNAL BANKHEAD (LWRP, FEET) 0%	25%	50%	75%	100%	SLOPE (PERCENT) 00-25	25-75	75-100	TOTAL
405.0	1030	AUG73	TRANSVERSE	35.0	24.0	16.0	0.0	-12.0	4.27	4.66	4.66	4.56
404.4	1700	OCT73	TRANSVERSE	35.0	16.0	14.0	12.0	9.0	4.47	0.47	0.71	1.53

*** DIKE SYSTEM SUMMARY ***
NUMBER OF DIKES:2
TOTAL LENGTH(FEET):2730
AVERAGE LENGTH (FEET):1365
MAXIMUM LENGTH (FEET):1700
MINIMUM LENGTH (FEET):1030
STANDARD DEVIATION: 473.762

LOWER MISSISSIPPI RIVER ENVIRONMENTAL PROGRAM
DIKE SYSTEM ENGINEERING CHARACTERISTICS
BONDURANT TOWHEAD
CROSSING & SECONDARY CHANNEL
STEPPED UP
RIVER MILE: 394.8 - 394.0

RIVER MILE	DIKE SYSTEM LENGTH FEET	DATE BUILT	DIKE TYPE	DIKE LONGITUDNAL BANKHEAD (LWRP, FEET) 0%	25%	50%	75%	100%	SLOPE (PERCENT) 00-25	25-75	75-100	TOTAL
394.8	1495	OCT73	TRANSVERSE	35.0	15.0	9.0	6.0	1.0	5.35	1.20	1.34	2.27
394.0	2430	OCT73	TRANSVERSE	32.0	15.0	12.0	9.0	6.0	2.80	0.49	0.49	1.07

*** DIKE SYSTEM SUMMARY ***
NUMBER OF DIKES:2
TOTAL LENGTH(FEET):3925
AVERAGE LENGTH (FEET):1962.5
MAXIMUM LENGTH (FEET):2430
MINIMUM LENGTH (FEET):1495
STANDARD DEVIATION: 661.145

LOWER MISSISSIPPI RIVER ENVIRONMENTAL PROGRAM
DIKE SYSTEM ENGINEERING CHARACTERISTICS
COTTAGE BEND
SECONDARY CHANNEL & STRAIGHT CHANNEL
VARIABLE
RIVER MILE: 389.2 - 388.2

DIKE SYSTEM RIVER MILE	LENGTH FEET	DATE BUILT	DIKE TYPE	DIKE LONGITUDNAL BANKHEAD (LWRP, FEET) 0%	25%	50%	75%	100%	SLOPE (PERCENT) 00-25	25-75	75-100	TOTAL
389.2	1020	SEP74	L-HEAD	32.0	20.0	18.0	16.0	15.0	4.71	0.78	0.39	1.67
388.8	3865	AUG74	L-HEAD	29.0	17.0	10.0	10.0	10.0	1.24	0.36	0.00	0.49
388.2	6480	AUG76	L-HEAD	19.0	16.0	27.0	32.0	20.0	0.19	-0.49	0.74	-0.02

CONNECT= 00:59:58 VIRTCPU= 000:08.88 TOTCPU= 000:28.91

*** DIKE SYSTEM SUMMARY ***
NUMBER OF DIKES:3
TOTAL LENGTH(FEET):11365
AVERAGE LENGTH (FEET):3788.333
MAXIMUM LENGTH (FEET):6480
MINIMUM LENGTH (FEET):1020
STANDARD DEVIATION: 2730.807

LOWER MISSISSIPPI RIVER ENVIRONMENTAL PROGRAM
DIKE SYSTEM ENGINEERING CHARACTERISTICS
BROWNS FIELD
CHUTE & STRAIGHT CHANNEL
LEVEL
RIVER MILE: 388.2 - 388.2

RIVER MILE	DIKE SYSTEM LENGTH FEET	DATE BUILT	DIKE TYPE	DIKE LONGITUDNAL BANKHEAD (LWRP, FEET) 0%	25%	50%	75%	100%	SLOPE (PERCENT) 00-25	25-75	75-100	TOTAL
388.2	4050	JUL78	TRANSVERSE	22.0	21.0	20.0	18.0	17.0	0.10	0.15	0.10	0.12

*** DIKE SYSTEM SUMMARY ***
NUMBER OF DIKES:1
TOTAL LENGTH(FEET):4050
AVERAGE LENGTH (FEET):4050
MAXIMUM LENGTH (FEET):4050
MINIMUM LENGTH (FEET):4050
STANDARD DEVIATION: 0.000

LOWER MISSISSIPPI RIVER ENVIRONMENTAL PROGRAM
DIKE SYSTEM ENGINEERING CHARACTERISTICS
SPITHEAD TOWHEAD
CROSSING
STEPPED UP
RIVER MILE: 386.3 - 385.7

RIVER MILE	DIKE SYSTEM LENGTH FEET	DATE BUILT	DIKE TYPE	DIKE LONGITUDNAL BANKHEAD (LWRP, FEET) 0%	25%	50%	75%	100%	SLOPE (PERCENT) 00-25	25-75	75-100	TOTAL
386.3	1340	AUG78	TRANSVERSE	34.0	16.0	11.0	4.0	2.0	5.37	1.79	0.60	2.39
385.7	1860	AUG78	TRANSVERSE	36.0	17.0	14.0	10.0	7.0	4.09	0.75	0.65	1.56

*** DIKE SYSTEM SUMMARY ***
NUMBER OF DIKES:2
TOTAL LENGTH(FEET):3200
AVERAGE LENGTH (FEET):1600
MAXIMUM LENGTH (FEET):1860
MINIMUM LENGTH (FEET):1340
STANDARD DEVIATION: 367.696

LOWER MISSISSIPPI RIVER ENVIRONMENTAL PROGRAM
DIKE SYSTEM ENGINEERING CHARACTERISTICS
WATERPROOF
CROSSING & SECONDARY CHANNEL
STEPPED UP
RIVER MILE: 380.0 - 378.4

RIVER MILE	DIKE SYSTEM LENGTH FEET	DATE BUILT	DIKE TYPE	DIKE LONGITUDNAL BANKHEAD (LWRP, FEET) 0%	25%	50%	75%	100%	SLOPE (PERCENT) 00-25	25-75	75-100	TOTAL
380.0	2360	AUG63	TRANSVERSE	30.0	12.0	11.0	0.0	-7.0	3.05	1.02	1.19	1.57
379.6	993	AUG63	PILE/STONE FILLED	11.0	11.0	11.0	11.0	11.0	0.00	0.00	0.00	0.00
379.2	2160	AUG63	TRANSVERSE	32.0	6.0	6.0	2.0	-3.0	4.81	0.37	0.93	1.62
378.8	1670	JAN64	PILE/STONE FILLED	11.0	11.0	11.0	11.0	11.0	0.00	0.00	0.00	0.00
378.4	3370	AUG63	TRANSVERSE	16.0	5.0	14.0	24.0	12.0	1.31	-1.13	1.42	0.12

*** DIKE SYSTEM SUMMARY ***
NUMBER OF DIKES:5
TOTAL LENGTH(FEET):10553
AVERAGE LENGTH (FEET):2110.6
MAXIMUM LENGTH (FEET):3370
MINIMUM LENGTH (FEET):993
STANDARD DEVIATION: 879.472

LOWER MISSISSIPPI RIVER ENVIRONMENTAL PROGRAM
DIKE SYSTEM ENGINEERING CHARACTERISTICS
NATCHEZ ISLAND
CROSSING & STRAIGHT CHANNEL
STEPPED DOWN
RIVER MILE: 360.1 - 357.7

DIKE SYSTEM RIVER MILE	LENGTH FEET	DATE BUILT	DIKE TYPE	DIKE LONGITUDNAL BANKHEAD (LWRP, FEET) 0%	25%	50%	75%	100%	SLOPE (PERCENT) 00-25	25-75	75-100	TOTAL
360.1	1080	JUL79	TRANSVERSE	18.0	14.0	14.0	13.0	11.0	1.48	0.19	0.74	0.65
359.3	1220	AUG72	TRANSVERSE	36.0	18.0	14.0	11.0	6.0	5.90	1.15	1.64	2.46
358.8	1500	AUG72	TRANSVERSE	35.0	10.0	16.0	10.0	8.0	6.67	0.00	0.53	1.80
358.1	1990	SEP72	TRANSVERSE	29.0	10.0	7.0	7.0	3.0	3.82	0.30	0.80	1.31
357.7	1420	MAR78	TRANSVERSE	39.0	7.0	6.0	3.0	-4.0	9.01	0.56	1.97	3.03

*** DIKE SYSTEM SUMMARY ***
NUMBER OF DIKES:5
TOTAL LENGTH(FEET):7210
AVERAGE LENGTH (FEET):1442
MAXIMUM LENGTH (FEET):1990
MINIMUM LENGTH (FEET):1080
STANDARD DEVIATION: 348.023

LOWER MISSISSIPPI RIVER ENVIRONMENTAL PROGRAM
DIKE SYSTEM ENGINEERING CHARACTERISTICS
JACKSON POINT
POINT BAR
STEPPED UP
RIVER MILE: 331.4 - 330.3

RIVER MILE	DIKE SYSTEM LENGTH FEET	DATE BUILT	DIKE TYPE	DIKE LONGITUDNAL BANKHEAD (LWRP, FEET) 0%	25%	50%	75%	100%	SLOPE (PERCENT) 00-25	25-75	75-100	TOTAL
331.4	1425	AUG79	TRANSVERSE	42.0	18.0	10.0	6.0	1.0	6.74	1.68	1.40	2.88
330.3	2155	AUG79	TRANSVERSE	40.0	19.0	19.0	18.0	13.0	3.90	0.09	0.93	1.25

*** DIKE SYSTEM SUMMARY ***
NUMBER OF DIKES:2
TOTAL LENGTH(FEET):3580
AVERAGE LENGTH (FEET):1790
MAXIMUM LENGTH (FEET):2155
MINIMUM LENGTH (FEET):1425
STANDARD DEVIATION: 516.188

APPENDIX B: PHYSICAL CHARACTERISTICS OF AQUATIC HABITAT ASSOCIATED WITH DIKE SYSTEMS IN THE LOWER MISSISSIPPI RIVER, RM 320-610, AHP

LOWER MISSISSIPPI RIVER ENVIRONMENTAL PROGRAM
DIKE SYSTEM PHYSICAL CHARACTERISTICS
DIKE FIELD NAME: ISLAND 70
RIVER MILE: 608.8

POOL	LWRP	TOTAL ACRES	PERCENT OF TOTAL WATER SURFACE ACRES <= 0	<=- 5	<=-10	<=-20	<=-30	<=-40	VOLUME (CU. YDS.)	DEPTH (FEET)
POOL TOTAL	<= 0	120	100	70	40	15	8	3	2.259E+06	11.7
POOL TOTAL	<= 5	192	100	63	44	17	7	4	3.517E+06	11.4
POOL TOTAL	<=10	264	100	73	45	18	7	4	5.356E+06	12.6
POOL TOTAL	<=15	413	100	64	46	20	8	3	8.087E+06	12.1
POOL:001	<= 0	28	100	75	50	0	0	0	4.517E+05	10.0
POOL:001	<= 5	34	100	82	62	21	0	0	7.018E+05	12.8
POOL:001	<=10	40	100	85	70	35	0	0	1.000E+06	15.5
POOL:001	<=15	52	100	77	65	40	13	0	1.371E+06	16.3
POOL:002	<= 0	40	100	85	70	40	20	10	1.226E+06	19.0
POOL:002	<= 5	58	100	69	59	38	21	10	1.621E+06	17.3
POOL:002	<=10	76	100	76	53	37	21	11	2.162E+06	17.6
POOL:002	<=15	121	100	63	48	28	18	10	2.956E+06	15.1
POOL:003	<= 0	26	100	54	8	0	0	0	2.420E+05	5.8
POOL:003	<= 5	54	100	48	26	2	0	0	5.647E+05	6.5
POOL:003	<=10	82	100	66	32	2	0	0	1.113E+06	8.4
POOL:003	<=15	112	100	73	48	13	1	0	1.896E+06	10.5
POOL:004	<= 0	6	100	67	33	33	33	0	1.452E+05	15.0
POOL:004	<= 5	15	100	40	27	13	13	7	2.299E+05	9.5
POOL:004	<=10	24	100	63	25	8	8	8	3.872E+05	10.0
POOL:004	<=15	57	100	42	26	7	4	4	7.139E+05	7.8
POOL:005	<= 0	20	100	55	10	0	0	0	1.936E+05	6.0
POOL:005	<= 5	31	100	65	35	3	0	0	3.993E+05	8.0
POOL:005	<=10	42	100	74	48	5	0	0	6.937E+05	10.2
POOL:005	<=15	71	100	59	44	15	1	0	1.149E+06	10.0
SANDBAR	<= 0	353	100	63	26	22	16	7	6.945E+06	12.2
SANDBAR	<= 5	430	100	82	52	20	16	10	1.010E+07	14.6
SANDBAR	<=10	507	100	85	70	18	16	11	1.388E+07	17.0
SANDBAR	<=15	642	100	79	67	35	13	11	1.852E+07	17.9

LOWER MISSISSIPPI RIVER ENVIRONMENTAL PROGRAM
DIKE SYSTEM PHYSICAL CHARACTERISTICS
DIKE FIELD NAME: SMITH POINT
RIVER MILE: 600.5

POOL	LWRP	TOTAL ACRES	PERCENT OF TOTAL WATER SURFACE ACRES <= 0	<=- 5	<=-10	<=-20	<=-30	<=-40	VOLUME (CU. YDS.)	DEPTH (FEET)
POOL TOTAL	<= 0	52	100	50	0	0	0	0	4.195E+05	5.0
POOL TOTAL	<= 5	92	100	57	28	0	0	0	1.000E+06	6.7
POOL TOTAL	<=10	132	100	70	39	0	0	0	1.904E+06	8.9
POOL TOTAL	<=15	257	100	51	36	10	0	0	3.473E+06	8.4
POOL:001	<= 0	30	100	50	0	0	0	0	2.420E+05	5.0
POOL:001	<= 5	41	100	73	37	0	0	0	5.284E+05	8.0
POOL:001	<=10	52	100	79	58	0	0	0	9.035E+05	10.8
POOL:001	<=15	67	100	78	61	22	0	0	1.383E+06	12.8
POOL:002	<= 0	8	100	50	0	0	0	0	6.453E+04	5.0
POOL:002	<= 5	26	100	31	15	0	0	0	2.017E+05	4.8
POOL:002	<=10	44	100	59	18	0	0	0	4.840E+05	6.8
POOL:002	<=15	71	100	62	37	6	0	0	9.478E+05	8.3
POOL:003	<= 0	14	100	50	0	0	0	0	1.129E+05	5.0
POOL:003	<= 5	25	100	56	28	0	0	0	2.702E+05	6.7
POOL:003	<=10	36	100	69	39	0	0	0	5.163E+05	8.9
POOL:003	<=15	119	100	30	21	6	0	0	1.141E+06	5.9
SANDBAR	<= 0	60	100	50	0	0	0	0	4.840E+05	5.0
SANDBAR	<= 5	98	100	61	31	0	0	0	1.121E+06	7.1
SANDBAR	<=10	136	100	72	44	0	0	0	2.065E+06	9.4
SANDBAR	<=15	179	100	76	55	17	0	0	3.336E+06	11.6

LOWER MISSISSIPPI RIVER ENVIRONMENTAL PROGRAM
DIKE SYSTEM PHYSICAL CHARACTERISTICS
DIKE FIELD NAME: VICTORIA BEND
RIVER MILE: 596.0

POOL	LWRP	TOTAL ACRES	PERCENT OF TOTAL WATER SURFACE ACRES <= 0	<=- 5	<=-10	<=-20	<=-30	<=-40	VOLUME (CU. YDS.)	DEPTH (FEET)
POOL TOTAL	<= 0	202	100	74	48	1	0	0	3.211E+06	9.9
POOL TOTAL	<= 5	286	100	71	52	17	0	0	5.179E+06	11.2
POOL TOTAL	<=10	370	100	77	55	26	1	0	7.825E+06	13.1
POOL TOTAL	<=15	378	100	98	76	39	13	0	1.084E+07	17.8
POOL:001	<= 0	46	100	87	74	0	0	0	9.196E+05	12.4
POOL:001	<= 5	48	100	96	83	35	0	0	1.299E+06	16.8
POOL:001	<=10	50	100	96	92	68	0	0	1.694E+06	21.0
POOL:001	<=15	52	100	96	92	77	33	0	2.105E+06	25.1
POOL:002	<= 0	82	100	80	61	0	0	0	1.468E+06	11.1
POOL:002	<= 5	104	100	79	63	24	0	0	2.218E+06	13.2
POOL:002	<=10	126	100	83	65	40	0	0	3.146E+06	15.5
POOL:002	<=15	129	100	98	81	51	19	0	4.174E+06	20.1
POOL:003	<= 0	74	100	58	16	3	0	0	8.228E+05	6.9
POOL:003	<= 5	134	100	55	32	5	1	0	1.662E+06	7.7
POOL:003	<=10	194	100	69	38	6	1	0	2.985E+06	9.5
POOL:003	<=15	197	100	98	68	22	4	1	4.562E+06	14.4
SANDBAR	<= 0	148	100	53	5	1	0	0	1.355E+06	5.7
SANDBAR	<= 5	149	100	99	52	3	1	0	2.553E+06	10.6
SANDBAR	<=10	150	100	99	99	5	1	0	3.759E+06	15.5
SANDBAR	<=15	150	100	100	99	52	3	1	4.969E+06	20.5

LOWER MISSISSIPPI RIVER ENVIRONMENTAL PROGRAM
DIKE SYSTEM PHYSICAL CHARACTERISTICS
DIKE FIELD NAME: MONTGOMERY TOWHEAD & WHITE RIVER LANDING
RIVER MILE: 592.5

POOL	LWRP	TOTAL ACRES	PERCENT OF TOTAL WATER SURFACE ACRES <= 0	<=- 5	<=-10	<=-20	<=-30	<=-40	VOLUME (CU. YDS.)	DEPTH (FEET)
POOL TOTAL	<= 0	180	100	66	32	23	20	14	4.066E+06	14.0
POOL TOTAL	<= 5	244	100	74	49	20	16	13	5.776E+06	14.7
POOL TOTAL	<=10	308	100	79	58	19	14	12	8.002E+06	16.1
POOL TOTAL	<=15	371	100	83	66	32	13	11	1.074E+07	17.9
POOL:001	<= 0	0	0	0	0	0	0	0	0.000E+00	0.0
POOL:001	<= 5	3	100	0	0	0	0	0	1.210E+04	2.5
POOL:001	<=10	6	100	50	0	0	0	0	4.840E+04	5.0
POOL:001	<=15	10	100	60	30	0	0	0	1.129E+05	7.0
POOL:002	<= 0	0	0	0	0	0	0	0	0.000E+00	0.0
POOL:002	<= 5	4	100	0	0	0	0	0	1.613E+04	2.5
POOL:002	<=10	8	100	50	0	0	0	0	6.453E+04	5.0
POOL:002	<=15	11	100	73	36	0	0	0	1.412E+05	8.0
POOL:003	<= 0	6	100	50	0	0	0	0	4.840E+04	5.0
POOL:003	<= 5	10	100	60	30	0	0	0	1.129E+05	7.0
POOL:003	<=10	14	100	71	43	0	0	0	2.097E+05	9.3
POOL:003	<=15	20	100	70	50	15	0	0	3.469E+05	10.8
POOL:004	<= 0	74	100	51	3	0	0	0	6.292E+05	5.3
POOL:004	<= 5	102	100	73	37	1	0	0	1.339E+06	8.1
POOL:004	<=10	130	100	78	57	2	0	0	2.275E+06	10.8
POOL:004	<=15	169	100	77	60	22	1	0	3.481E+06	12.8
POOL:005	<= 0	54	100	63	26	11	7	0	8.228E+05	9.4
POOL:005	<= 5	77	100	70	44	13	6	3	1.351E+06	10.9
POOL:005	<=10	100	100	77	54	14	6	4	2.065E+06	12.8
POOL:005	<=15	109	100	92	71	31	9	5	2.908E+06	16.5
POOL:006	<= 0	46	100	96	91	78	70	57	2.565E+06	34.6
POOL:006	<= 5	48	100	96	92	81	71	60	2.944E+06	38.0
POOL:006	<=10	50	100	96	92	84	72	64	3.340E+06	41.4
POOL:006	<=15	52	100	96	92	85	75	65	3.751E+06	44.7
SANDBAR	<= 0	86	100	50	0	0	0	0	6.937E+05	5.0
SANDBAR	<= 5	128	100	67	34	0	0	0	1.557E+06	7.5
SANDBAR	<=10	170	100	75	51	0	0	0	2.759E+06	10.1
SANDBAR	<=15	190	100	89	67	23	0	0	4.211E+06	13.7

LOWER MISSISSIPPI RIVER ENVIRONMENTAL PROGRAM
DIKE SYSTEM PHYSICAL CHARACTERISTICS
DIKE FIELD NAME: TERRENE
RIVER MILE: 590.1

POOL	LWRP	TOTAL ACRES	PERCENT OF TOTAL WATER SURFACE ACRES <= 0	<=- 5	<=-10	<=-20	<=-30	<=-40	VOLUME (CU. YDS.)	DEPTH (FEET)
POOL TOTAL	<= 0	0	0	0	0	0	0	0	0.000E+00	0.0
POOL TOTAL	<= 5	73	100	0	0	0	0	0	2.944E+05	2.5
POOL TOTAL	<=10	146	100	50	0	0	0	0	1.178E+06	5.0
POOL TOTAL	<=15	429	100	34	17	0	0	0	3.497E+06	5.1
POOL:001	<= 0	0	0	0	0	0	0	0	0.000E+00	0.0
POOL:001	<= 5	9	100	0	0	0	0	0	3.630E+04	2.5
POOL:001	<=10	18	100	50	0	0	0	0	1.452E+05	5.0
POOL:001	<=15	23	100	78	39	0	0	0	3.106E+05	8.4
POOL:002	<= 0	0	0	0	0	0	0	0	0.000E+00	0.0
POOL:002	<= 5	30	100	0	0	0	0	0	1.210E+05	2.5
POOL:002	<=10	60	100	50	0	0	0	0	4.840E+05	5.0
POOL:002	<=15	104	100	58	29	0	0	0	1.145E+06	6.8
POOL:003	<= 0	0	0	0	0	0	0	0	0.000E+00	0.0
POOL:003	<= 5	1	100	0	0	0	0	0	4.033E+03	2.5
POOL:003	<=10	2	100	50	0	0	0	0	1.613E+04	5.0
POOL:003	<=15	106	100	2	1	0	0	0	4.517E+05	2.6
POOL:004	<= 0	0	0	0	0	0	0	0	0.000E+00	0.0
POOL:004	<= 5	33	100	0	0	0	0	0	1.331E+05	2.5
POOL:004	<=10	66	100	50	0	0	0	0	5.324E+05	5.0
POOL:004	<=15	196	100	34	17	0	0	0	1.589E+06	5.0
SANDBAR	<= 0	160	100	50	0	0	0	0	1.291E+06	5.0
SANDBAR	<= 5	283	100	57	28	0	0	0	3.077E+06	6.7
SANDBAR	<=10	408	100	69	39	0	0	0	5.864E+06	8.9
SANDBAR	<=15	555	100	74	51	14	0	0	9.749E+06	10.9

LOWER MISSISSIPPI RIVER ENVIRONMENTAL PROGRAM
DIKE SYSTEM PHYSICAL CHARACTERISTICS
DIKE FIELD NAME: MALONE FIELD
RIVER MILE: 585.6

POOL	LWRP	TOTAL ACRES	PERCENT OF TOTAL WATER SURFACE ACRES <= 0	<=- 5	<=-10	<=-20	<=-30	<=-40	VOLUME (CU. YDS.)	DEPTH (FEET)
POOL TOTAL	<= 0	295	100	80	61	38	21	8	8.446E+06	17.7
POOL TOTAL	<= 5	398	100	74	60	37	22	11	1.124E+07	17.5
POOL TOTAL	<=10	501	100	79	59	36	23	12	1.487E+07	18.4
POOL TOTAL	<=15	605	100	83	66	39	24	14	1.933E+07	19.8
POOL:001	<= 0	0	0	0	0	0	0	0	0.000E+00	0.0
POOL:001	<= 5	4	100	0	0	0	0	0	1.613E+04	2.5
POOL:001	<=10	8	100	50	0	0	0	0	6.453E+04	5.0
POOL:001	<=15	10	100	80	40	0	0	0	1.371E+05	8.5
POOL:002	<= 0	20	100	70	40	30	20	10	4.840E+05	15.0
POOL:002	<= 5	34	100	59	41	21	15	9	7.018E+05	12.8
POOL:002	<=10	48	100	71	42	17	13	8	1.033E+06	13.3
POOL:002	<=15	68	100	71	50	21	10	7	1.500E+06	13.7
POOL:003	<= 0	275	100	81	62	39	21	8	7.962E+06	17.9
POOL:003	<= 5	360	100	76	62	39	23	11	1.052E+07	18.1
POOL:003	<=10	445	100	81	62	38	24	13	1.377E+07	19.2
POOL:003	<=15	527	100	84	68	42	26	16	1.769E+07	20.8
SANDBAR	<= 0	100	100	50	0	0	0	0	8.067E+05	5.0
SANDBAR	<= 5	143	100	70	35	0	0	0	1.787E+06	7.7
SANDBAR	<=10	186	100	77	54	0	0	0	3.114E+06	10.4
SANDBAR	<=15	223	100	83	64	22	0	0	4.763E+06	13.2

LOWER MISSISSIPPI RIVER ENVIRONMENTAL PROGRAM
DIKE SYSTEM PHYSICAL CHARACTERISTICS
DIKE FIELD NAME: BELOW PRENTISS
RIVER MILE: 580.4

POOL	LWRP	TOTAL ACRES	PERCENT OF TOTAL WATER SURFACE ACRES <= 0	<=- 5	<=-10	<=-20	<=-30	<=-40	VOLUME (CU. YDS.)	DEPTH (FEET)
POOL TOTAL	<= 0	279	100	78	56	35	16	1	7.091E+06	15.8
POOL TOTAL	<= 5	363	100	77	60	35	20	7	9.680E+06	16.5
POOL TOTAL	<=10	447	100	81	62	35	22	10	1.295E+07	18.0
POOL TOTAL	<=15	621	100	72	58	35	20	11	1.725E+07	17.2
POOL:001	<= 0	17	100	94	88	41	18	6	5.566E+05	20.3
POOL:001	<= 5	20	100	85	80	55	25	10	7.058E+05	21.9
POOL:001	<=10	23	100	87	74	65	30	13	8.793E+05	23.7
POOL:001	<=15	26	100	88	77	62	42	19	1.077E+06	25.7
POOL:002	<= 0	48	100	90	79	58	42	4	1.807E+06	23.3
POOL:002	<= 5	52	100	92	83	63	46	21	2.210E+06	26.3
POOL:002	<=10	56	100	93	86	68	50	36	2.646E+06	29.3
POOL:002	<=15	71	100	79	73	61	46	34	3.158E+06	27.6
POOL:003	<= 0	214	100	74	48	29	10	0	4.727E+06	13.7
POOL:003	<= 5	291	100	74	54	28	14	4	6.764E+06	14.4
POOL:003	<=10	368	100	79	58	28	17	6	9.422E+06	15.9
POOL:003	<=15	524	100	70	56	30	16	8	1.302E+07	15.4
SANDBAR	<= 0	400	100	74	49	39	25	11	1.126E+07	17.4
SANDBAR	<= 5	498	100	80	60	35	26	15	1.488E+07	18.5
SANDBAR	<=10	596	100	84	67	33	26	17	1.930E+07	20.1
SANDBAR	<=15	748	100	80	67	40	24	17	2.472E+07	20.5

LOWER MISSISSIPPI RIVER ENVIRONMENTAL PROGRAM
DIKE SYSTEM PHYSICAL CHARACTERISTICS
DIKE FIELD NAME: CATFISH POINT
RIVER MILE: 571.0

POOL	LWRP	TOTAL ACRES	PERCENT OF TOTAL WATER SURFACE ACRES <= 0	<=- 5	<=-10	<=-20	<=-30	<=-40	VOLUME (CU. YDS.)	DEPTH (FEET)
POOL TOTAL	<= 0	24	100	50	0	0	0	0	1.936E+05	5.0
POOL TOTAL	<= 5	114	100	21	11	0	0	0	7.502E+05	4.1
POOL TOTAL	<=10	204	100	56	12	0	0	0	2.033E+06	6.2
POOL TOTAL	<=15	367	100	56	31	3	0	0	4.336E+06	7.3
POOL:001	<= 0	0	0	0	0	0	0	0	0.000E+00	0.0
POOL:001	<= 5	7	100	0	0	0	0	0	2.823E+04	2.5
POOL:001	<=10	14	100	50	0	0	0	0	1.129E+05	5.0
POOL:001	<=15	17	100	82	41	0	0	0	2.380E+05	8.7
POOL:002	<= 0	4	100	50	0	0	0	0	3.227E+04	5.0
POOL:002	<= 5	24	100	17	8	0	0	0	1.452E+05	3.8
POOL:002	<=10	44	100	55	9	0	0	0	4.195E+05	5.9
POOL:002	<=15	80	100	55	30	2	0	0	9.196E+05	7.1
POOL:003	<= 0	20	100	50	0	0	0	0	1.613E+05	5.0
POOL:003	<= 5	83	100	24	12	0	0	0	5.768E+05	4.3
POOL:003	<=10	146	100	57	14	0	0	0	1.500E+06	6.4
POOL:003	<=15	270	100	54	31	4	0	0	3.178E+06	7.3
SANDBAR	<= 0	156	100	50	0	0	0	0	1.258E+06	5.0
SANDBAR	<= 5	235	100	66	33	0	0	0	2.835E+06	7.5
SANDBAR	<=10	314	100	75	50	0	0	0	5.050E+06	10.0
SANDBAR	<=15	377	100	83	62	21	0	0	7.837E+06	12.9

LOWER MISSISSIPPI RIVER ENVIRONMENTAL PROGRAM
DIKE SYSTEM PHYSICAL CHARACTERISTICS
DIKE FIELD NAME: CHICOT LANDING
RIVER MILE: 565.5

POOL	LWRP	TOTAL ACRES	PERCENT OF TOTAL WATER SURFACE ACRES <= 0	<=- 5	<=-10	<=-20	<=-30	<=-40	VOLUME (CU. YDS.)	DEPTH (FEET)
POOL TOTAL	<= 0	596	100	78	55	34	13	2	1.487E+07	15.5
POOL TOTAL	<= 5	755	100	79	61	35	19	6	2.032E+07	16.7
POOL TOTAL	<=10	914	100	83	65	36	22	9	2.706E+07	18.3
POOL TOTAL	<=15	1589	100	58	48	29	17	9	3.715E+07	14.5
POOL:001	<= 0	2	100	50	0	0	0	0	1.613E+04	5.0
POOL:001	<= 5	3	100	67	33	0	0	0	3.630E+04	7.5
POOL:001	<=10	4	100	75	50	0	0	0	6.453E+04	10.0
POOL:001	<=15	5	100	80	60	20	0	0	1.008E+05	12.5
POOL:002	<= 0	24	100	71	42	8	0	0	3.872E+05	10.0
POOL:002	<= 5	39	100	62	44	15	3	0	6.413E+05	10.2
POOL:002	<=10	54	100	72	44	19	4	0	1.016E+06	11.7
POOL:002	<=15	93	100	58	42	18	6	1	1.609E+06	10.7
POOL:003	<= 0	32	100	56	13	0	0	0	3.227E+05	6.3
POOL:003	<= 5	96	100	33	19	2	0	0	8.389E+05	5.4
POOL:003	<=10	160	100	60	20	2	0	0	1.871E+06	7.3
POOL:003	<=15	185	100	86	52	10	1	0	3.263E+06	10.9
POOL:004	<= 0	538	100	79	59	38	14	2	1.415E+07	16.3
POOL:004	<= 5	617	100	87	69	42	23	7	1.881E+07	18.9
POOL:004	<=10	696	100	89	77	45	29	11	2.410E+07	21.5
POOL:004	<=15	1306	100	53	47	33	20	11	3.218E+07	15.3
SANDBAR	<= 0	280	100	50	0	0	0	0	2.259E+06	5.0
SANDBAR	<= 5	367	100	76	38	0	0	0	4.868E+06	8.2
SANDBAR	<=10	454	100	81	62	0	0	0	8.180E+06	11.2
SANDBAR	<=15	532	100	85	69	26	0	0	1.216E+07	14.2

LOWER MISSISSIPPI RIVER ENVIRONMENTAL PROGRAM
DIKE SYSTEM PHYSICAL CHARACTERISTICS
DIKE FIELD NAME: ASHBROOK-MILLER BEND (LEFT BANK) & ISLAN
RIVER MILE: 549.2

POOL	LWRP	TOTAL ACRES	PERCENT OF TOTAL WATER SURFACE ACRES <= 0	<=- 5	<=-10	<=-20	<=-30	<=-40	VOLUME (CU. YDS.)	DEPTH (FEET)
POOL TOTAL	<= 0	362	100	80	60	26	7	2	8.470E+06	14.5
POOL TOTAL	<= 5	558	100	65	52	28	11	3	1.218E+07	13.5
POOL TOTAL	<=10	754	100	74	48	29	12	3	1.747E+07	14.4
POOL TOTAL	<=15	957	100	79	58	30	16	6	2.437E+07	15.8
POOL:001	<= 0	0	0	0	0	0	0	0	0.000E+00	0.0
POOL:001	<= 5	0	0	0	0	0	0	0	0.000E+00	0.0
POOL:001	<=10	0	0	0	0	0	0	0	0.000E+00	0.0
POOL:001	<=15	3	100	0	0	0	0	0	1.210E+04	2.5
POOL:002	<= 0	2	100	50	0	0	0	0	1.613E+04	5.0
POOL:002	<= 5	20	100	10	5	0	0	0	1.049E+05	3.3
POOL:002	<=10	38	100	53	5	0	0	0	3.388E+05	5.5
POOL:002	<=15	90	100	42	22	1	0	0	8.551E+05	5.9
POOL:003	<= 0	94	100	79	57	28	0	0	2.049E+06	13.5
POOL:003	<= 5	161	100	58	46	25	8	0	3.077E+06	11.8
POOL:003	<=10	228	100	71	41	24	11	0	4.646E+06	12.6
POOL:003	<=15	305	100	75	53	24	13	4	6.796E+06	13.8
POOL:004	<= 0	14	100	71	43	14	0	0	2.420E+05	10.7
POOL:004	<= 5	36	100	39	28	11	3	0	4.437E+05	7.6
POOL:004	<=10	58	100	62	24	10	3	0	8.228E+05	8.8
POOL:004	<=15	79	100	73	46	13	5	1	1.375E+06	10.8
POOL:005	<= 0	28	100	86	71	43	7	0	7.744E+05	17.1
POOL:005	<= 5	59	100	47	41	27	12	2	1.125E+06	11.8
POOL:005	<=10	90	100	66	31	22	13	2	1.726E+06	11.9
POOL:005	<=15	114	100	79	52	21	14	6	2.549E+06	13.9
POOL:006	<= 0	64	100	80	59	38	22	9	1.839E+06	17.8
POOL:006	<= 5	96	100	67	53	32	20	10	2.485E+06	16.0
POOL:006	<=10	128	100	75	50	30	19	11	3.388E+06	16.4
POOL:006	<=15	141	100	91	68	36	22	13	4.473E+06	19.7
POOL:007	<= 0	80	100	72	45	13	7	0	1.484E+06	11.5
POOL:007	<= 5	101	100	79	57	23	8	3	2.214E+06	13.6
POOL:007	<=10	122	100	83	66	30	8	5	3.114E+06	15.8
POOL:007	<=15	132	100	92	77	44	17	6	4.138E+06	19.4

LOWER MISSISSIPPI RIVER ENVIRONMENTAL PROGRAM
DIKE SYSTEM PHYSICAL CHARACTERISTICS
DIKE FIELD NAME: ASHBROOK-MILLER BEND (LEFT BANK) & ISLAN
RIVER MILE: 549.2

POOL	LWRP	TOTAL ACRES	PERCENT OF TOTAL WATER SURFACE ACRES <= 0	<=- 5	<=-10	<=-20	<=-30	<=-40	VOLUME (CU. YDS.)	DEPTH (FEET)
POOL:008	<= 0	72	100	90	81	22	6	0	1.839E+06	15.8
POOL:008	<= 5	75	100	96	87	49	13	3	2.432E+06	20.1
POOL:008	<=10	78	100	96	92	74	21	5	3.049E+06	24.2
POOL:008	<=15	80	100	97	94	81	46	13	3.686E+06	28.6
POOL:009	<= 0	8	100	88	75	50	0	0	2.259E+05	17.5
POOL:009	<= 5	10	100	80	70	50	20	0	2.985E+05	18.5
POOL:009	<=10	12	100	83	67	50	33	0	3.872E+05	20.0
POOL:009	<=15	13	100	92	77	54	38	15	4.880E+05	23.3
SANDBAR	<= 0	514	100	92	85	54	19	2	1.741E+07	21.0
SANDBAR	<= 5	528	100	97	90	67	35	10	2.161E+07	25.4
SANDBAR	<=10	542	100	97	95	80	51	18	2.593E+07	29.6
SANDBAR	<=15	551	100	98	96	86	65	34	3.033E+07	34.1

LOWER MISSISSIPPI RIVER ENVIRONMENTAL PROGRAM
DIKE SYSTEM PHYSICAL CHARACTERISTICS
DIKE FIELD NAME: ASHBROOK-MILLER BEND (RIGHT BANK)
RIVER MILE: 548.2

POOL	LWRP	TOTAL ACRES	PERCENT OF TOTAL WATER SURFACE ACRES <= 0	<=- 5	<=-10	<=-20	<=-30	<=-40	VOLUME (CU. YDS.)	DEPTH (FEET)
POOL TOTAL	<= 0	174	100	89	77	21	9	3	4.501E+06	16.0
POOL TOTAL	<= 5	190	100	92	81	45	14	6	5.969E+06	19.5
POOL TOTAL	<=10	206	100	92	84	65	17	8	7.567E+06	22.8
POOL TOTAL	<=15	217	100	95	88	71	39	12	9.273E+06	26.5
POOL:001	<= 0	6	100	67	33	0	0	0	8.067E+04	8.3
POOL:001	<= 5	8	100	75	50	13	0	0	1.371E+05	10.6
POOL:001	<=10	10	100	80	60	20	0	0	2.097E+05	13.0
POOL:001	<=15	11	100	91	73	36	9	0	2.944E+05	16.6
POOL:002	<= 0	44	100	93	86	14	5	0	1.097E+06	15.5
POOL:002	<= 5	47	100	94	87	47	9	2	1.464E+06	19.3
POOL:002	<=10	50	100	94	88	76	12	4	1.855E+06	23.0
POOL:002	<=15	54	100	93	87	76	41	7	2.275E+06	26.1
POOL:003	<= 0	51	100	88	76	29	22	10	1.541E+06	18.7
POOL:003	<= 5	59	100	86	76	46	22	14	1.984E+06	20.8
POOL:003	<=10	67	100	88	76	58	22	16	2.493E+06	23.1
POOL:003	<=15	70	100	96	84	64	39	19	3.045E+06	27.0
POOL:004	<= 0	62	100	87	74	13	0	0	1.371E+06	13.7
POOL:004	<= 5	64	100	97	84	42	6	0	1.880E+06	18.2
POOL:004	<=10	66	100	97	94	70	12	0	2.404E+06	22.6
POOL:004	<=15	68	100	97	94	79	40	6	2.944E+06	26.8
POOL:005	<= 0	11	100	91	82	64	27	9	4.114E+05	23.2
POOL:005	<= 5	12	100	92	83	67	42	17	5.042E+05	26.0
POOL:005	<=10	13	100	92	85	69	54	23	6.050E+05	28.8
POOL:005	<=15	14	100	93	86	71	57	36	7.139E+05	31.6
SANDBAR	<= 0	418	100	98	96	4	1	0	1.021E+07	15.1
SANDBAR	<= 5	419	100	100	98	50	3	1	1.359E+07	20.1
SANDBAR	<=10	420	100	100	100	95	4	1	1.697E+07	25.0
SANDBAR	<=15	420	100	100	100	97	50	3	2.036E+07	30.0

LOWER MISSISSIPPI RIVER ENVIRONMENTAL PROGRAM
DIKE SYSTEM PHYSICAL CHARACTERISTICS
DIKE FIELD NAME: ISLAND 82 - MILLER BEND (RIGHT BANK)
RIVER MILE: 545.2

POOL	LWRP	TOTAL ACRES	PERCENT OF TOTAL WATER SURFACE ACRES <= 0	<=- 5	<=-10	<=-20	<=-30	<=-40	VOLUME (CU. YDS.)	DEPTH (FEET)
POOL TOTAL	<= 0	146	100	62	23	5	1	0	1.888E+06	8.0
POOL TOTAL	<= 5	245	100	60	37	9	2	0	3.465E+06	8.8
POOL TOTAL	<=10	344	100	71	42	10	2	1	5.840E+06	10.5
POOL TOTAL	<=15	366	100	94	67	25	6	1	8.704E+06	14.7
POOL:001	<= 0	4	100	50	0	0	0	0	3.227E+04	5.0
POOL:001	<= 5	8	100	50	25	0	0	0	8.067E+04	6.3
POOL:001	<=10	12	100	67	33	0	0	0	1.613E+05	8.3
POOL:001	<=15	14	100	86	57	14	0	0	2.662E+05	11.8
POOL:002	<= 0	32	100	56	13	0	0	0	3.227E+05	6.3
POOL:002	<= 5	58	100	55	31	3	0	0	6.857E+05	7.3
POOL:002	<=10	84	100	69	38	5	0	0	1.258E+06	9.3
POOL:002	<=15	91	100	92	64	20	2	0	1.964E+06	13.4
POOL:003	<= 0	16	100	63	25	13	0	0	2.259E+05	8.8
POOL:003	<= 5	60	100	27	17	5	2	0	5.324E+05	5.5
POOL:003	<=10	104	100	58	15	4	2	0	1.194E+06	7.1
POOL:003	<=15	110	100	95	55	9	3	1	2.057E+06	11.6
POOL:004	<= 0	66	100	59	18	3	0	0	7.583E+05	7.1
POOL:004	<= 5	88	100	75	44	8	1	0	1.379E+06	9.7
POOL:004	<=10	110	100	80	60	11	2	0	2.178E+06	12.3
POOL:004	<=15	115	100	96	77	34	6	1	3.085E+06	16.6
POOL:005	<= 0	28	100	75	50	14	7	0	5.485E+05	12.1
POOL:005	<= 5	31	100	90	68	29	10	3	7.865E+05	15.7
POOL:005	<=10	34	100	91	82	41	12	6	1.049E+06	19.1
POOL:005	<=15	36	100	94	86	58	25	8	1.331E+06	22.9
SANDBAR	<= 0	531	100	92	83	67	22	3	1.935E+07	22.6
SANDBAR	<= 5	608	100	87	80	66	39	11	2.395E+07	24.4
SANDBAR	<=10	685	100	89	78	65	52	17	2.916E+07	26.4
SANDBAR	<=15	708	100	97	86	69	56	33	3.478E+07	30.4

LOWER MISSISSIPPI RIVER ENVIRONMENTAL PROGRAM
DIKE SYSTEM PHYSICAL CHARACTERISTICS
DIKE FIELD NAME: LELAND NECK
RIVER MILE: 541.2

POOL	LWRP	TOTAL ACRES	PERCENT OF TOTAL WATER SURFACE ACRES <= 0	<=- 5	<=-10	<=-20	<=-30	<=-40	VOLUME (CU. YDS.)	DEPTH (FEET)
POOL TOTAL	<= 0	62	100	58	16	3	0	0	6.937E+05	6.9
POOL TOTAL	<= 5	110	100	56	33	5	1	0	1.387E+06	7.8
POOL TOTAL	<=10	158	100	70	39	6	1	0	2.468E+06	9.7
POOL TOTAL	<=15	179	100	88	61	20	3	1	3.828E+06	13.3
POOL:001	<= 0	4	100	50	0	0	0	0	3.227E+04	5.0
POOL:001	<= 5	5	100	80	40	0	0	0	6.857E+04	8.5
POOL:001	<=10	6	100	83	67	0	0	0	1.129E+05	11.7
POOL:001	<=15	8	100	75	63	25	0	0	1.694E+05	13.1
POOL:002	<= 0	20	100	50	0	0	0	0	1.613E+05	5.0
POOL:002	<= 5	25	100	80	40	0	0	0	3.428E+05	8.5
POOL:002	<=10	30	100	83	67	0	0	0	5.647E+05	11.7
POOL:002	<=15	34	100	88	74	29	0	0	8.228E+05	15.0
POOL:003	<= 0	16	100	50	0	0	0	0	1.291E+05	5.0
POOL:003	<= 5	54	100	30	15	0	0	0	4.114E+05	4.7
POOL:003	<=10	92	100	59	17	0	0	0	1.000E+06	6.7
POOL:003	<=15	100	100	92	54	8	0	0	1.775E+06	11.0
POOL:004	<= 0	22	100	73	45	9	0	0	3.711E+05	10.5
POOL:004	<= 5	26	100	85	62	23	4	0	5.647E+05	13.5
POOL:004	<=10	30	100	87	73	33	7	0	7.905E+05	16.3
POOL:004	<=15	37	100	81	70	43	16	3	1.061E+06	17.8
SANDBAR	<= 0	264	100	54	8	5	2	1	2.807E+06	6.6
SANDBAR	<= 5	422	100	63	34	4	2	1	5.574E+06	8.2
SANDBAR	<=10	580	100	73	46	4	2	1	9.615E+06	10.3
SANDBAR	<=15	729	100	80	58	20	2	1	1.490E+07	12.7

LOWER MISSISSIPPI RIVER ENVIRONMENTAL PROGRAM
DIKE SYSTEM PHYSICAL CHARACTERISTICS
DIKE FIELD NAME: TARPLEY CUTOFF & LELAND BAR
RIVER MILE: 541.2

POOL	LWRP	TOTAL ACRES	PERCENT OF TOTAL WATER SURFACE ACRES <= 0	<=- 5	<=-10	<=-20	<=-30	<=-40	VOLUME (CU. YDS.)	DEPTH (FEET)
POOL TOTAL	<= 0	985	100	69	38	13	4	2	1.704E+07	10.7
POOL TOTAL	<= 5	1229	100	80	55	21	7	2	2.597E+07	13.1
POOL TOTAL	<=10	1473	100	83	67	25	9	3	3.687E+07	15.5
POOL TOTAL	<=15	1555	100	95	79	44	16	6	4.909E+07	19.6
POOL:001	<= 0	56	100	54	7	0	0	0	5.163E+05	5.7
POOL:001	<= 5	75	100	75	40	3	0	0	1.045E+06	8.6
POOL:001	<=10	94	100	80	60	4	0	0	1.726E+06	11.4
POOL:001	<=15	101	100	93	74	30	2	0	2.513E+06	15.4
POOL:002	<= 0	102	100	62	24	18	0	0	1.500E+06	9.1
POOL:002	<= 5	126	100	81	50	17	7	0	2.420E+06	11.9
POOL:002	<=10	150	100	84	68	16	12	0	3.533E+06	14.6
POOL:002	<=15	177	100	85	71	36	12	5	4.852E+06	17.0
POOL:003	<= 0	97	100	71	42	18	7	1	1.847E+06	11.8
POOL:003	<= 5	117	100	83	59	25	10	3	2.710E+06	14.4
POOL:003	<=10	137	100	85	71	30	12	5	3.735E+06	16.9
POOL:003	<=15	147	100	93	80	47	20	8	4.880E+06	20.6
POOL:004	<= 0	58	100	69	38	14	7	3	1.049E+06	11.2
POOL:004	<= 5	154	100	38	26	10	4	2	1.904E+06	7.7
POOL:004	<=10	250	100	62	23	9	3	2	3.533E+06	8.8
POOL:004	<=15	252	100	99	61	16	6	2	5.558E+06	13.7
POOL:005	<= 0	154	100	84	68	27	5	0	3.727E+06	15.0
POOL:005	<= 5	160	100	96	81	46	16	2	4.993E+06	19.3
POOL:005	<=10	166	100	96	93	63	25	5	6.308E+06	23.6
POOL:005	<=15	170	100	98	94	76	43	15	7.663E+06	27.9
POOL:006	<= 0	82	100	91	83	46	24	17	2.920E+06	22.1
POOL:006	<= 5	89	100	92	84	60	33	19	3.610E+06	25.1
POOL:006	<=10	96	100	93	85	71	40	21	4.356E+06	28.1
POOL:006	<=15	99	100	97	90	76	54	29	5.142E+06	32.2
POOL:007	<= 0	60	100	65	30	13	7	0	9.680E+05	10.0
POOL:007	<= 5	74	100	81	53	18	8	3	1.508E+06	12.6
POOL:007	<=10	88	100	84	68	20	9	5	2.162E+06	15.2
POOL:007	<=15	94	100	94	79	41	14	6	2.896E+06	19.1

LOWER MISSISSIPPI RIVER ENVIRONMENTAL PROGRAM
DIKE SYSTEM PHYSICAL CHARACTERISTICS
DIKE FIELD NAME: TARPLEY CUTOFF & LELAND BAR
RIVER MILE: 541.2

POOL	LWRP	TOTAL ACRES	PERCENT OF TOTAL WATER SURFACE ACRES <= 0	<=- 5	<=-10	<=-20	<=-30	<=-40	VOLUME (CU. YDS.)	DEPTH (FEET)
POOL:008	<= 0	376	100	62	24	0	0	0	4.517E+06	7.4
POOL:008	<= 5	434	100	87	54	11	0	0	7.784E+06	11.1
POOL:008	<=10	492	100	88	76	19	0	0	1.152E+07	14.5
POOL:008	<=15	515	100	96	84	45	9	0	1.558E+07	18.8
SANDBAR	<= 0	888	100	80	59	40	24	6	2.565E+07	17.9
SANDBAR	<= 5	1017	100	87	69	43	28	13	3.334E+07	20.3
SANDBAR	<=10	1146	100	89	77	46	31	19	4.206E+07	22.7
SANDBAR	<=15	1178	100	97	86	60	37	24	5.143E+07	27.1

LOWER MISSISSIPPI RIVER ENVIRONMENTAL PROGRAM
DIKE SYSTEM PHYSICAL CHARACTERISTICS
DIKE FIELD NAME: ISLAND 84
RIVER MILE: 533.4

POOL	LWRP	TOTAL ACRES	PERCENT OF TOTAL WATER SURFACE ACRES <= 0	<=- 5	<=-10	<=-20	<=-30	<=-40	VOLUME (CU. YDS.)	DEPTH (FEET)
POOL TOTAL	<= 0	36	100	58	17	0	0	0	3.872E+05	6.7
POOL TOTAL	<= 5	61	100	59	34	5	0	0	7.784E+05	7.9
POOL TOTAL	<=10	86	100	71	42	7	0	0	1.371E+06	9.9
POOL TOTAL	<=15	107	100	80	57	20	3	0	2.150E+06	12.5
POOL:001	<= 0	16	100	50	0	0	0	0	1.291E+05	5.0
POOL:001	<= 5	18	100	89	44	0	0	0	2.662E+05	9.2
POOL:001	<=10	20	100	90	80	0	0	0	4.195E+05	13.0
POOL:001	<=15	21	100	95	86	38	0	0	5.848E+05	17.3
POOL:002	<= 0	18	100	67	33	0	0	0	2.420E+05	8.3
POOL:002	<= 5	31	100	58	39	10	0	0	4.396E+05	8.8
POOL:002	<=10	44	100	70	41	14	0	0	7.421E+05	10.5
POOL:002	<=15	50	100	88	62	24	6	0	1.121E+06	13.9
POOL:003	<= 0	2	100	50	0	0	0	0	1.613E+04	5.0
POOL:003	<= 5	11	100	18	9	0	0	0	6.857E+04	3.9
POOL:003	<=10	20	100	55	10	0	0	0	1.936E+05	6.0
POOL:003	<=15	32	100	63	34	3	0	0	4.033E+05	7.8
POOL:004	<= 0	0	0	0	0	0	0	0	0.000E+00	0.0
POOL:004	<= 5	1	100	0	0	0	0	0	4.033E+03	2.5
POOL:004	<=10	2	100	50	0	0	0	0	1.613E+04	5.0
POOL:004	<=15	4	100	50	25	0	0	0	4.033E+04	6.3
SANDBAR	<= 0	168	100	54	7	1	0	0	1.581E+06	5.8
SANDBAR	<= 5	187	100	90	48	4	1	0	3.013E+06	10.0
SANDBAR	<=10	206	100	91	82	6	1	0	4.598E+06	13.8
SANDBAR	<=15	211	100	98	89	43	3	0	6.280E+06	18.4

LOWER MISSISSIPPI RIVER ENVIRONMENTAL PROGRAM
DIKE SYSTEM PHYSICAL CHARACTERISTICS
DIKE FIELD NAME: REFUGE & WALNUT POINT
RIVER MILE: 528.3

POOL	LWRP	TOTAL ACRES	PERCENT OF TOTAL WATER SURFACE ACRES <= 0	<=- 5	<=-10	<=-20	<=-30	<=-40	VOLUME (CU. YDS.)	DEPTH (FEET)
POOL TOTAL	<= 0	686	100	73	46	18	8	4	1.396E+07	12.6
POOL TOTAL	<= 5	790	100	87	64	28	11	5	1.991E+07	15.6
POOL TOTAL	<=10	894	100	88	77	36	14	6	2.670E+07	18.5
POOL TOTAL	<=15	1077	100	83	73	47	20	8	3.465E+07	19.9
POOL:001	<= 0	212	100	61	23	3	0	0	2.581E+06	7.5
POOL:001	<= 5	257	100	82	51	11	1	0	4.473E+06	10.8
POOL:001	<=10	302	100	85	70	16	2	0	6.728E+06	13.8
POOL:001	<=15	308	100	98	83	42	9	1	9.188E+06	18.5
POOL:002	<= 0	472	100	79	57	25	11	6	1.136E+07	14.9
POOL:002	<= 5	521	100	91	71	37	16	8	1.536E+07	18.3
POOL:002	<=10	570	100	91	83	47	20	9	1.976E+07	21.5
POOL:002	<=15	738	100	77	71	50	26	12	2.504E+07	21.0
POOL:003	<= 0	2	100	50	0	0	0	0	1.613E+04	5.0
POOL:003	<= 5	11	100	18	9	0	0	0	6.857E+04	3.9
POOL:003	<=10	20	100	55	10	0	0	0	1.936E+05	6.0
POOL:003	<=15	29	100	69	38	3	0	0	3.912E+05	8.4
POOL:004	<= 0	0	0	0	0	0	0	0	0.000E+00	0.0
POOL:004	<= 5	1	100	0	0	0	0	0	4.033E+03	2.5
POOL:004	<=10	2	100	50	0	0	0	0	1.613E+04	5.0
POOL:004	<=15	2	100	100	50	0	0	0	3.227E+04	10.0
SANDBAR	<= 0	400	100	50	1	0	0	0	3.291E+06	5.1
SANDBAR	<= 5	482	100	83	42	0	0	0	6.849E+06	8.8
SANDBAR	<=10	564	100	85	71	1	0	0	1.107E+07	12.2
SANDBAR	<=15	632	100	89	76	32	0	0	1.589E+07	15.6

LOWER MISSISSIPPI RIVER ENVIRONMENTAL PROGRAM
DIKE SYSTEM PHYSICAL CHARACTERISTICS
DIKE FIELD NAME: SEVEN OAKS & ISLAND 86
RIVER MILE: 524.2

POOL	LWRP	TOTAL ACRES	PERCENT OF TOTAL WATER SURFACE ACRES <= 0	<=- 5	<=-10	<=-20	<=-30	<=-40	VOLUME (CU. YDS.)	DEPTH (FEET)
POOL TOTAL	<= 0	335	100	69	39	11	2	0	5.510E+06	10.2
POOL TOTAL	<= 5	736	100	46	32	11	3	1	9.829E+06	8.3
POOL TOTAL	<=10	1137	100	65	29	11	3	1	1.738E+07	9.5
POOL TOTAL	<=15	1636	100	69	45	14	5	1	2.857E+07	10.8
POOL:001	<= 0	12	100	67	33	0	0	0	1.613E+05	8.3
POOL:001	<= 5	13	100	92	62	15	0	0	2.622E+05	12.5
POOL:001	<=10	14	100	93	86	29	0	0	3.711E+05	16.4
POOL:001	<=15	15	100	93	87	53	13	0	4.880E+05	20.2
POOL:002	<= 0	24	100	92	83	17	8	0	6.131E+05	15.8
POOL:002	<= 5	28	100	86	79	43	11	4	8.228E+05	18.2
POOL:002	<=10	32	100	88	75	63	13	6	1.065E+06	20.6
POOL:002	<=15	49	100	65	57	45	24	6	1.391E+06	17.6
POOL:003	<= 0	2	100	50	0	0	0	0	1.613E+04	5.0
POOL:003	<= 5	31	100	6	3	0	0	0	1.492E+05	3.0
POOL:003	<=10	60	100	52	3	0	0	0	5.163E+05	5.3
POOL:003	<=15	63	100	95	49	2	0	0	1.012E+06	10.0
POOL:004	<= 0	136	100	65	31	3	0	0	1.839E+06	8.4
POOL:004	<= 5	201	100	68	44	11	1	0	3.198E+06	9.9
POOL:004	<=10	266	100	76	51	16	2	0	5.082E+06	11.8
POOL:004	<=15	355	100	75	57	25	6	1	7.587E+06	13.2
POOL:005	<= 0	6	100	67	33	0	0	0	8.067E+04	8.3
POOL:005	<= 5	45	100	13	9	2	0	0	2.864E+05	3.9
POOL:005	<=10	84	100	54	7	2	0	0	8.067E+05	6.0
POOL:005	<=15	127	100	66	35	3	1	0	1.658E+06	8.1
POOL:006	<= 0	155	100	70	39	19	3	1	2.799E+06	11.2
POOL:006	<= 5	418	100	37	26	11	4	1	5.110E+06	7.6
POOL:006	<=10	681	100	61	23	9	4	1	9.543E+06	8.7
POOL:006	<=15	1027	100	66	41	11	4	2	1.643E+07	9.9
SANDBAR	<= 0	536	100	51	1	0	0	0	4.453E+06	5.1
SANDBAR	<= 5	690	100	78	39	1	0	0	9.398E+06	8.4
SANDBAR	<=10	844	100	82	64	1	0	0	1.558E+07	11.4
SANDBAR	<=15	961	100	88	72	28	0	0	2.286E+07	14.7

LOWER MISSISSIPPI RIVER ENVIRONMENTAL PROGRAM
DIKE SYSTEM PHYSICAL CHARACTERISTICS
DIKE FIELD NAME: LEOTA
RIVER MILE: 515.4

POOL	LWRP	TOTAL ACRES	PERCENT OF TOTAL WATER SURFACE ACRES <= 0	<=- 5	<=-10	<=-20	<=-30	<=-40	VOLUME (CU. YDS.)	DEPTH (FEET)
POOL TOTAL	<= 0	38	100	58	16	5	0	0	4.356E+05	7.1
POOL TOTAL	<= 5	128	100	30	17	3	1	0	1.105E+06	5.4
POOL TOTAL	<=10	218	100	59	17	3	1	0	2.501E+06	7.1
POOL TOTAL	<=15	430	100	51	30	5	1	0	5.114E+06	7.4
POOL:001	<= 0	10	100	80	60	20	0	0	2.097E+05	13.0
POOL:001	<= 5	14	100	71	57	29	7	0	3.065E+05	13.6
POOL:001	<=10	18	100	78	56	33	11	0	4.356E+05	15.0
POOL:001	<=15	21	100	86	67	38	19	5	5.929E+05	17.5
POOL:002	<= 0	28	100	50	0	0	0	0	2.259E+05	5.0
POOL:002	<= 5	43	100	65	33	0	0	0	5.122E+05	7.4
POOL:002	<=10	58	100	74	48	0	0	0	9.196E+05	9.8
POOL:002	<=15	91	100	64	47	15	0	0	1.521E+06	10.4
POOL:003	<= 0	0	0	0	0	0	0	0	0.000E+00	0.0
POOL:003	<= 5	41	100	0	0	0	0	0	1.654E+05	2.5
POOL:003	<=10	82	100	50	0	0	0	0	6.615E+05	5.0
POOL:003	<=15	134	100	61	31	0	0	0	1.533E+06	7.1
POOL:004	<= 0	0	0	0	0	0	0	0	0.000E+00	0.0
POOL:004	<= 5	30	100	0	0	0	0	0	1.210E+05	2.5
POOL:004	<=10	60	100	50	0	0	0	0	4.840E+05	5.0
POOL:004	<=15	184	100	33	16	0	0	0	1.468E+06	4.9
SANDBAR	<= 0	1526	100	50	0	0	0	0	1.231E+07	5.0
SANDBAR	<= 5	2113	100	72	36	0	0	0	2.699E+07	7.9
SANDBAR	<=10	2700	100	78	57	0	0	0	4.640E+07	10.7
SANDBAR	<=15	2775	100	97	76	27	0	0	6.848E+07	15.3

LOWER MISSISSIPPI RIVER ENVIRONMENTAL PROGRAM
DIKE SYSTEM PHYSICAL CHARACTERISTICS
DIKE FIELD NAME: CRACRAFT LOWER
RIVER MILE: 510.4

POOL	LWRP	TOTAL ACRES	PERCENT OF TOTAL WATER SURFACE ACRES <= 0	<=- 5	<=-10	<=-20	<=-30	<=-40	VOLUME (CU. YDS.)	DEPTH (FEET)
POOL TOTAL	<= 0	470	100	75	49	22	6	2	9.793E+06	12.9
POOL TOTAL	<= 5	686	100	69	51	24	10	3	1.446E+07	13.1
POOL TOTAL	<=10	902	100	76	52	26	12	3	2.086E+07	14.3
POOL TOTAL	<=15	1072	100	84	64	33	16	6	2.882E+07	16.7
POOL:001	<= 0	30	100	77	53	27	0	0	6.292E+05	13.0
POOL:001	<= 5	36	100	83	64	33	11	0	8.954E+05	15.4
POOL:001	<=10	42	100	86	71	38	19	0	1.210E+06	17.9
POOL:001	<=15	49	100	86	73	47	24	8	1.577E+06	19.9
POOL:002	<= 0	43	100	79	58	30	7	2	1.024E+06	14.8
POOL:002	<= 5	79	100	54	43	24	10	3	1.517E+06	11.9
POOL:002	<=10	115	100	69	37	22	11	3	2.299E+06	12.4
POOL:002	<=15	142	100	81	56	24	13	6	3.336E+06	14.6
POOL:003	<= 0	92	100	62	24	7	2	0	1.226E+06	8.3
POOL:003	<= 5	151	100	61	38	9	3	1	2.206E+06	9.1
POOL:003	<=10	210	100	72	44	10	3	1	3.662E+06	10.8
POOL:003	<=15	255	100	82	59	22	5	2	5.538E+06	13.5
POOL:004	<= 0	305	100	78	55	25	8	2	6.913E+06	14.0
POOL:004	<= 5	420	100	73	56	29	12	4	9.837E+06	14.5
POOL:004	<=10	535	100	79	57	32	14	4	1.369E+07	15.9
POOL:004	<=15	626	100	85	67	38	20	8	1.837E+07	18.2
SANDBAR	<= 0	180	100	51	2	0	0	0	1.517E+06	5.2
SANDBAR	<= 5	237	100	76	39	1	0	0	3.198E+06	8.4
SANDBAR	<=10	294	100	81	61	1	0	0	5.340E+06	11.3
SANDBAR	<=15	372	100	79	64	25	1	0	8.026E+06	13.4

LOWER MISSISSIPPI RIVER ENVIRONMENTAL PROGRAM
DIKE SYSTEM PHYSICAL CHARACTERISTICS
DIKE FIELD NAME: CAROLINA
RIVER MILE: 509.4

POOL	LWRP	TOTAL ACRES	PERCENT OF TOTAL WATER SURFACE ACRES <= 0	<=- 5	<=-10	<=-20	<=-30	<=-40	VOLUME (CU. YDS.)	DEPTH (FEET)
POOL TOTAL	<= 0	62	100	87	74	55	16	10	2.049E+06	20.5
POOL TOTAL	<= 5	79	100	78	68	51	28	10	2.618E+06	20.5
POOL TOTAL	<=10	96	100	82	65	48	35	10	3.323E+06	21.5
POOL TOTAL	<=15	118	100	81	67	46	34	19	4.187E+06	22.0
POOL:001	<= 0	0	0	0	0	0	0	0	0.000E+00	0.0
POOL:001	<= 5	4	100	0	0	0	0	0	1.613E+04	2.5
POOL:001	<=10	8	100	50	0	0	0	0	6.453E+04	5.0
POOL:001	<=15	8	100	100	50	0	0	0	1.291E+05	10.0
POOL:002	<= 0	34	100	88	76	53	6	0	1.016E+06	18.5
POOL:002	<= 5	43	100	79	70	51	23	2	1.327E+06	19.1
POOL:002	<=10	52	100	83	65	50	35	4	1.710E+06	20.4
POOL:002	<=15	57	100	91	75	53	39	18	2.150E+06	23.4
POOL:003	<= 0	28	100	86	71	57	29	21	1.033E+06	22.9
POOL:003	<= 5	32	100	88	75	56	38	22	1.275E+06	24.7
POOL:003	<=10	36	100	89	78	56	44	22	1.549E+06	26.7
POOL:003	<=15	53	100	68	60	45	34	23	1.908E+06	22.3
SANDBAR	<= 0	151	100	97	95	80	35	23	6.897E+06	28.3
SANDBAR	<= 5	159	100	95	92	83	55	28	8.147E+06	31.8
SANDBAR	<=10	167	100	95	90	86	72	32	9.462E+06	35.1
SANDBAR	<=15	180	100	93	88	82	73	48	1.086E+07	37.4

LOWER MISSISSIPPI RIVER ENVIRONMENTAL PROGRAM
DIKE SYSTEM PHYSICAL CHARACTERISTICS
DIKE FIELD NAME: CORREGIDOR
RIVER MILE: 505.8

POOL	LWRP	TOTAL ACRES	PERCENT OF TOTAL WATER SURFACE ACRES <= 0	<=- 5	<=-10	<=-20	<=-30	<=-40	VOLUME (CU. YDS.)	DEPTH (FEET)
POOL TOTAL	<= 0	172	100	55	10	1	0	0	1.710E+06	6.2
POOL TOTAL	<= 5	317	100	54	30	3	0	0	3.682E+06	7.2
POOL TOTAL	<=10	462	100	69	37	4	0	0	6.824E+06	9.2
POOL TOTAL	<=15	678	100	68	47	14	1	0	1.142E+07	10.4
POOL:001	<= 0	24	100	54	8	0	0	0	2.259E+05	5.8
POOL:001	<= 5	33	100	73	39	3	0	0	4.558E+05	8.6
POOL:001	<=10	42	100	79	57	5	0	0	7.583E+05	11.2
POOL:001	<=15	48	100	88	69	27	2	0	1.121E+06	14.5
POOL:002	<= 0	62	100	60	19	0	0	0	6.937E+05	6.9
POOL:002	<= 5	114	100	54	32	5	0	0	1.404E+06	7.6
POOL:002	<=10	166	100	69	37	7	0	0	2.533E+06	9.5
POOL:002	<=15	208	100	80	55	18	3	0	4.041E+06	12.0
POOL:003	<= 0	86	100	52	5	2	0	0	7.905E+05	5.7
POOL:003	<= 5	170	100	51	26	2	1	0	1.823E+06	6.6
POOL:003	<=10	254	100	67	34	2	1	0	3.533E+06	8.6
POOL:003	<=15	422	100	60	40	11	1	0	6.260E+06	9.2
SANDBAR	<= 0	338	100	50	0	0	0	0	2.727E+06	5.0
SANDBAR	<= 5	554	100	61	31	0	0	0	6.324E+06	7.1
SANDBAR	<=10	770	100	72	44	0	0	0	1.166E+07	9.4
SANDBAR	<=15	892	100	86	62	19	0	0	1.837E+07	12.8

LOWER MISSISSIPPI RIVER ENVIRONMENTAL PROGRAM
DIKE SYSTEM PHYSICAL CHARACTERISTICS
DIKE FIELD NAME: WILSON POINT
RIVER MILE: 500.6

POOL	LWRP	TOTAL ACRES	PERCENT OF TOTAL WATER SURFACE ACRES <= 0	<=- 5	<=-10	<=-20	<=-30	<=-40	VOLUME (CU. YDS.)	DEPTH (FEET)
POOL TOTAL	<= 0	169	100	68	36	24	16	10	3.719E+06	13.6
POOL TOTAL	<= 5	302	100	56	38	17	11	7	5.618E+06	11.5
POOL TOTAL	<=10	435	100	69	39	14	9	6	8.591E+06	12.2
POOL TOTAL	<=15	607	100	72	50	19	8	6	1.279E+07	13.1
POOL:001	<= 0	26	100	100	100	77	62	38	1.371E+06	32.7
POOL:001	<= 5	27	100	96	96	85	67	48	1.585E+06	36.4
POOL:001	<=10	28	100	96	93	93	71	57	1.807E+06	40.0
POOL:001	<=15	29	100	97	93	90	79	62	2.037E+06	43.5
POOL:002	<= 0	45	100	82	64	47	24	16	1.460E+06	20.1
POOL:002	<= 5	55	100	82	67	45	29	16	1.863E+06	21.0
POOL:002	<=10	65	100	85	69	45	32	17	2.347E+06	22.4
POOL:002	<=15	83	100	78	66	45	30	19	2.944E+06	22.0
POOL:003	<= 0	98	100	53	6	0	0	0	8.873E+05	5.6
POOL:003	<= 5	220	100	45	24	1	0	0	2.170E+06	6.1
POOL:003	<=10	342	100	64	29	2	0	0	4.437E+06	8.0
POOL:003	<=15	495	100	69	44	11	1	0	7.813E+06	9.8
SANDBAR	<= 0	251	100	51	2	0	0	0	2.122E+06	5.2
SANDBAR	<= 5	342	100	73	37	1	0	0	4.513E+06	8.2
SANDBAR	<=10	433	100	79	58	1	0	0	7.639E+06	10.9
SANDBAR	<=15	540	100	80	63	24	1	0	1.156E+07	13.3

LOWER MISSISSIPPI RIVER ENVIRONMENTAL PROGRAM
DIKE SYSTEM PHYSICAL CHARACTERISTICS
DIKE FIELD NAME: BALESHED LANDING
RIVER MILE: 494.6

POOL	LWRP	TOTAL ACRES	PERCENT OF TOTAL WATER SURFACE ACRES <= 0	<=- 5	<=-10	<=-20	<=-30	<=-40	VOLUME (CU. YDS.)	DEPTH (FEET)
POOL TOTAL	<= 0	698	100	78	56	28	13	7	1.725E+07	15.3
POOL TOTAL	<= 5	806	100	87	68	36	17	8	2.331E+07	17.9
POOL TOTAL	<=10	914	100	88	76	43	21	10	3.025E+07	20.5
POOL TOTAL	<=15	959	100	95	84	57	31	15	3.780E+07	24.4
POOL:001	<= 0	18	100	94	89	89	78	44	1.016E+06	35.0
POOL:001	<= 5	19	100	95	89	84	79	58	1.166E+06	38.0
POOL:001	<=10	20	100	95	90	80	80	70	1.323E+06	41.0
POOL:001	<=15	21	100	95	90	81	76	71	1.488E+06	43.9
POOL:002	<= 0	68	100	97	94	85	65	35	3.614E+06	32.9
POOL:002	<= 5	70	100	97	94	87	73	49	4.170E+06	36.9
POOL:002	<=10	72	100	97	94	89	81	61	4.743E+06	40.8
POOL:002	<=15	76	100	95	92	87	80	67	5.340E+06	43.6
POOL:003	<= 0	101	100	89	78	58	13	7	3.364E+06	20.6
POOL:003	<= 5	106	100	95	85	65	34	9	4.199E+06	24.6
POOL:003	<=10	111	100	95	91	71	53	12	5.074E+06	28.3
POOL:003	<=15	115	100	97	92	78	60	31	5.985E+06	32.3
POOL:004	<= 0	146	100	63	26	7	0	0	1.952E+06	8.3
POOL:004	<= 5	155	100	94	59	15	3	0	3.166E+06	12.7
POOL:004	<=10	164	100	95	89	23	6	0	4.453E+06	16.8
POOL:004	<=15	170	100	96	91	54	14	3	5.800E+06	21.1
POOL:005	<= 0	149	100	63	26	2	1	1	1.912E+06	8.0
POOL:005	<= 5	208	100	72	45	10	1	0	3.352E+06	10.0
POOL:005	<=10	267	100	78	56	15	1	0	5.268E+06	12.2
POOL:005	<=15	270	100	99	77	35	8	1	7.433E+06	17.1
POOL:006	<= 0	216	100	86	72	22	7	3	5.389E+06	15.5
POOL:006	<= 5	248	100	87	75	41	13	4	7.260E+06	18.1
POOL:006	<=10	280	100	89	77	56	17	6	9.390E+06	20.8
POOL:006	<=15	307	100	91	81	61	33	10	1.176E+07	23.7
SANDBAR	<= 0	611	100	88	75	67	27	16	2.306E+07	23.4
SANDBAR	<= 5	680	100	90	79	64	42	19	2.827E+07	25.8
SANDBAR	<=10	749	100	91	82	61	54	22	3.403E+07	28.2
SANDBAR	<=15	772	100	97	88	69	56	37	4.017E+07	32.3

LOWER MISSISSIPPI RIVER ENVIRONMENTAL PROGRAM
DIKE SYSTEM PHYSICAL CHARACTERISTICS
DIKE FIELD NAME: BEN LOMOND
RIVER MILE: 488.6

POOL	LWRP	TOTAL ACRES	PERCENT OF TOTAL WATER SURFACE ACRES <= 0	<=- 5	<=-10	<=-20	<=-30	<=-40	VOLUME (CU. YDS.)	DEPTH (FEET)
POOL TOTAL	<= 0	714	100	68	36	9	4	2	1.166E+07	10.1
POOL TOTAL	<= 5	1076	100	66	45	15	4	2	1.888E+07	10.9
POOL TOTAL	<=10	1438	100	75	50	18	5	2	2.902E+07	12.5
POOL TOTAL	<=15	1604	100	90	67	30	10	3	4.129E+07	16.0
POOL:001	<= 0	176	100	70	40	5	0	0	2.678E+06	9.4
POOL:001	<= 5	237	100	74	52	16	2	0	4.344E+06	11.4
POOL:001	<=10	298	100	80	59	23	3	0	6.502E+06	13.5
POOL:001	<=15	334	100	89	71	37	12	1	9.051E+06	16.8
POOL:002	<= 0	46	100	54	9	0	0	0	4.356E+05	5.9
POOL:002	<= 5	158	100	29	16	1	0	0	1.258E+06	4.9
POOL:002	<=10	270	100	59	17	1	0	0	2.985E+06	6.9
POOL:002	<=15	306	100	88	52	8	1	0	5.308E+06	10.8
POOL:003	<= 0	183	100	61	22	5	2	1	2.347E+06	8.0
POOL:003	<= 5	300	100	61	37	8	2	1	4.295E+06	8.9
POOL:003	<=10	417	100	72	44	10	2	1	7.187E+06	10.7
POOL:003	<=15	501	100	83	60	22	5	1	1.089E+07	13.5
POOL:004	<= 0	233	100	69	37	5	1	0	3.525E+06	9.4
POOL:004	<= 5	296	100	79	54	17	2	1	5.659E+06	11.8
POOL:004	<=10	359	100	82	65	24	3	1	8.301E+06	14.3
POOL:004	<=15	367	100	98	81	44	13	2	1.123E+07	19.0
POOL:005	<= 0	76	100	88	76	50	29	13	2.678E+06	21.8
POOL:005	<= 5	85	100	89	79	56	35	19	3.327E+06	24.3
POOL:005	<=10	94	100	90	81	62	40	23	4.049E+06	26.7
POOL:005	<=15	96	100	98	89	70	50	31	4.816E+06	31.1
SANDBAR	<= 0	182	100	54	9	0	0	0	1.726E+06	5.9
SANDBAR	<= 5	231	100	79	43	3	0	0	3.392E+06	9.1
SANDBAR	<=10	280	100	82	65	6	0	0	5.453E+06	12.1
SANDBAR	<=15	368	100	76	63	27	2	0	8.067E+06	13.6

LOWER MISSISSIPPI RIVER ENVIRONMENTAL PROGRAM
DIKE SYSTEM PHYSICAL CHARACTERISTICS
DIKE FIELD NAME: AJAX BAR
RIVER MILE: 484.4

POOL	LWRP	TOTAL ACRES	PERCENT OF TOTAL WATER SURFACE ACRES <= 0	<=- 5	<=-10	<=-20	<=-30	<=-40	VOLUME (CU. YDS.)	DEPTH (FEET)
POOL TOTAL	<= 0	515	100	70	41	16	4	1	9.252E+06	11.1
POOL TOTAL	<= 5	799	100	64	45	18	6	2	1.455E+07	11.3
POOL TOTAL	<=10	1083	100	74	48	19	7	2	2.214E+07	12.7
POOL TOTAL	<=15	1187	100	91	67	30	12	4	3.130E+07	16.3
POOL:001	<= 0	147	100	64	28	6	2	1	2.057E+06	8.7
POOL:001	<= 5	257	100	57	37	10	2	1	3.686E+06	8.9
POOL:001	<=10	367	100	70	40	11	2	1	6.203E+06	10.5
POOL:001	<=15	409	100	90	63	23	6	1	9.333E+06	14.1
POOL:002	<= 0	71	100	72	44	15	4	1	1.315E+06	11.5
POOL:002	<= 5	148	100	48	34	14	5	1	2.198E+06	9.2
POOL:002	<=10	225	100	66	32	14	5	1	3.703E+06	10.2
POOL:002	<=15	245	100	92	60	21	9	3	5.598E+06	14.2
POOL:003	<= 0	297	100	73	46	21	5	1	5.881E+06	12.3
POOL:003	<= 5	394	100	75	55	25	10	2	8.668E+06	13.6
POOL:003	<=10	491	100	80	60	28	12	3	1.224E+07	15.4
POOL:003	<=15	533	100	92	74	41	19	7	1.637E+07	19.0
SANDBAR	<= 0	712	100	58	16	1	0	0	7.744E+06	6.7
SANDBAR	<= 5	822	100	87	50	7	0	0	1.393E+07	10.5
SANDBAR	<=10	932	100	88	76	12	1	0	2.101E+07	14.0
SANDBAR	<=15	962	100	97	85	43	6	0	2.864E+07	18.5

LOWER MISSISSIPPI RIVER ENVIRONMENTAL PROGRAM
DIKE SYSTEM PHYSICAL CHARACTERISTICS
DIKE FIELD NAME: POINT LOOKOUT
RIVER MILE: 477.9

POOL	LWRP	TOTAL ACRES	PERCENT OF TOTAL WATER SURFACE ACRES <= 0	<=- 5	<=-10	<=-20	<=-30	<=-40	VOLUME (CU. YDS.)	DEPTH (FEET)
POOL TOTAL	<= 0	72	100	64	28	0	0	0	9.035E+05	7.8
POOL TOTAL	<= 5	131	100	55	35	8	0	0	1.722E+06	8.1
POOL TOTAL	<=10	190	100	69	38	11	0	0	3.017E+06	9.8
POOL TOTAL	<=15	251	100	76	52	18	4	0	4.796E+06	11.8
POOL:001	<= 0	16	100	56	13	0	0	0	1.613E+05	6.3
POOL:001	<= 5	26	100	62	35	4	0	0	3.307E+05	7.9
POOL:001	<=10	36	100	72	44	6	0	0	5.808E+05	10.0
POOL:001	<=15	40	100	90	65	22	2	0	8.873E+05	13.8
POOL:002	<= 0	56	100	66	32	0	0	0	7.421E+05	8.2
POOL:002	<= 5	105	100	53	35	9	0	0	1.391E+06	8.2
POOL:002	<=10	154	100	68	36	12	0	0	2.436E+06	9.8
POOL:002	<=15	211	100	73	50	18	4	0	3.908E+06	11.5
SANDBAR	<= 0	260	100	75	50	0	0	0	4.195E+06	10.0
SANDBAR	<= 5	360	100	72	54	18	0	0	6.695E+06	11.5
SANDBAR	<=10	460	100	78	57	28	0	0	1.000E+07	13.5
SANDBAR	<=15	516	100	89	70	38	13	0	1.394E+07	16.7

LOWER MISSISSIPPI RIVER ENVIRONMENTAL PROGRAM
DIKE SYSTEM PHYSICAL CHARACTERISTICS
DIKE FIELD NAME: WILLOW CUTOFF
RIVER MILE: 462.4

POOL	LWRP	TOTAL ACRES	PERCENT OF TOTAL WATER SURFACE ACRES <= 0	<=- 5	<=-10	<=-20	<=-30	<=-40	VOLUME (CU. YDS.)	DEPTH (FEET)
POOL TOTAL	<= 0	256	100	63	27	5	1	0	3.420E+06	8.3
POOL TOTAL	<= 5	423	100	61	38	10	2	0	6.159E+06	9.0
POOL TOTAL	<=10	590	100	72	43	12	2	0	1.024E+07	10.8
POOL TOTAL	<=15	680	100	87	62	24	6	1	1.537E+07	14.0
POOL:001	<= 0	10	100	50	0	0	0	0	8.067E+04	5.0
POOL:001	<= 5	15	100	67	33	0	0	0	1.815E+05	7.5
POOL:001	<=10	20	100	75	50	0	0	0	3.227E+05	10.0
POOL:001	<=15	22	100	91	68	23	0	0	4.921E+05	13.9
POOL:002	<= 0	60	100	52	3	0	0	0	5.163E+05	5.3
POOL:002	<= 5	190	100	32	16	1	0	0	1.525E+06	5.0
POOL:002	<=10	320	100	59	19	1	0	0	3.582E+06	6.9
POOL:002	<=15	396	100	81	48	8	0	0	6.469E+06	10.1
POOL:003	<= 0	186	100	68	35	8	1	0	2.823E+06	9.4
POOL:003	<= 5	218	100	85	58	18	4	0	4.453E+06	12.7
POOL:003	<=10	250	100	87	74	26	6	1	6.340E+06	15.7
POOL:003	<=15	262	100	95	83	48	15	3	8.405E+06	19.9
SANDBAR	<= 0	178	100	50	0	0	0	0	1.436E+06	5.0
SANDBAR	<= 5	258	100	69	34	0	0	0	3.194E+06	7.7
SANDBAR	<=10	338	100	76	53	0	0	0	5.598E+06	10.3
SANDBAR	<=15	365	100	93	71	24	0	0	8.434E+06	14.3

LOWER MISSISSIPPI RIVER ENVIRONMENTAL PROGRAM
DIKE SYSTEM PHYSICAL CHARACTERISTICS
DIKE FIELD NAME: FORREST HOME TOWHEAD
RIVER MILE: 449.2

POOL	LWRP	TOTAL ACRES	PERCENT OF TOTAL WATER SURFACE ACRES <= 0	<=- 5	<=-10	<=-20	<=-30	<=-40	VOLUME (CU. YDS.)	DEPTH (FEET)
POOL TOTAL	<= 0	173	100	78	56	24	5	1	3.783E+06	13.6
POOL TOTAL	<= 5	193	100	90	70	36	13	3	5.259E+06	16.9
POOL TOTAL	<=10	213	100	91	81	46	19	4	6.897E+06	20.1
POOL TOTAL	<=15	221	100	96	87	61	31	11	8.647E+06	24.3
POOL:001	<= 0	10	100	70	40	0	0	0	1.452E+05	9.0
POOL:001	<= 5	12	100	83	58	17	0	0	2.339E+05	12.1
POOL:001	<=10	14	100	86	71	29	0	0	3.388E+05	15.0
POOL:001	<=15	15	100	93	80	47	13	0	4.558E+05	18.8
POOL:002	<= 0	43	100	77	53	21	12	2	9.599E+05	13.8
POOL:002	<= 5	55	100	78	60	29	13	5	1.355E+06	15.3
POOL:002	<=10	67	100	82	64	34	13	7	1.847E+06	17.1
POOL:002	<=15	70	100	96	79	47	23	10	2.400E+06	21.3
POOL:003	<= 0	64	100	75	50	22	3	0	1.291E+06	12.5
POOL:003	<= 5	69	100	93	70	33	12	1	1.827E+06	16.4
POOL:003	<=10	74	100	93	86	43	19	3	2.404E+06	20.1
POOL:003	<=15	76	100	97	91	63	30	11	3.009E+06	24.5
POOL:004	<= 0	56	100	84	68	32	4	0	1.387E+06	15.4
POOL:004	<= 5	57	100	98	82	49	18	2	1.843E+06	20.0
POOL:004	<=10	58	100	98	97	66	31	3	2.307E+06	24.7
POOL:004	<=15	60	100	97	95	78	47	17	2.783E+06	28.8
SANDBAR	<= 0	302	100	69	38	2	0	0	4.372E+06	9.0
SANDBAR	<= 5	307	100	98	68	20	1	0	6.828E+06	13.8
SANDBAR	<=10	312	100	98	97	37	2	0	9.325E+06	18.5
SANDBAR	<=15	314	100	99	98	66	19	1	1.185E+07	23.4

LOWER MISSISSIPPI RIVER ENVIRONMENTAL PROGRAM
DIKE SYSTEM PHYSICAL CHARACTERISTICS
DIKE FIELD NAME: MARSHALL CUTOFF
RIVER MILE: 448.2

POOL	LWRP	TOTAL ACRES	PERCENT OF TOTAL WATER SURFACE ACRES <= 0	<=- 5	<=-10	<=-20	<=-30	<=-40	VOLUME (CU. YDS.)	DEPTH (FEET)
POOL TOTAL	<= 0	102	100	55	10	2	0	0	1.016E+06	6.2
POOL TOTAL	<= 5	221	100	46	25	3	0	0	2.319E+06	6.5
POOL TOTAL	<=10	340	100	65	30	3	1	0	4.582E+06	8.4
POOL TOTAL	<=15	416	100	82	53	13	1	0	7.631E+06	11.4
POOL:001	<= 0	4	100	50	0	0	0	0	3.227E+04	5.0
POOL:001	<= 5	13	100	31	15	0	0	0	1.008E+05	4.8
POOL:001	<=10	22	100	59	18	0	0	0	2.420E+05	6.8
POOL:001	<=15	26	100	85	50	8	0	0	4.356E+05	10.4
POOL:002	<= 0	26	100	54	8	0	0	0	2.420E+05	5.8
POOL:002	<= 5	50	100	52	28	2	0	0	5.485E+05	6.8
POOL:002	<=10	74	100	68	35	3	0	0	1.049E+06	8.8
POOL:002	<=15	100	100	74	50	14	1	0	1.750E+06	10.8
POOL:003	<= 0	72	100	56	11	3	0	0	7.421E+05	6.4
POOL:003	<= 5	158	100	46	25	3	1	0	1.670E+06	6.6
POOL:003	<=10	244	100	65	30	3	1	0	3.291E+06	8.4
POOL:003	<=15	290	100	84	54	14	2	0	5.445E+06	11.6
SANDBAR	<= 0	194	100	51	2	0	0	0	1.629E+06	5.2
SANDBAR	<= 5	223	100	87	44	1	0	0	3.311E+06	9.2
SANDBAR	<=10	252	100	88	77	2	0	0	5.227E+06	12.9
SANDBAR	<=15	257	100	98	87	39	1	0	7.280E+06	17.6

LOWER MISSISSIPPI RIVER ENVIRONMENTAL PROGRAM
DIKE SYSTEM PHYSICAL CHARACTERISTICS
DIKE FIELD NAME: RACETRACK
RIVER MILE: 431.2

POOL	LWRP	TOTAL ACRES	PERCENT OF TOTAL WATER SURFACE ACRES <= 0	<=- 5	<=-10	<=-20	<=-30	<=-40	VOLUME (CU. YDS.)	DEPTH (FEET)
POOL TOTAL	<= 0	245	100	77	53	27	9	3	5.590E+06	14.1
POOL TOTAL	<= 5	303	100	81	62	32	14	5	7.800E+06	16.0
POOL TOTAL	<=10	361	100	84	68	36	18	6	1.048E+07	18.0
POOL TOTAL	<=15	388	100	93	78	48	25	11	1.350E+07	21.6
POOL:001	<= 0	36	100	58	17	0	0	0	3.872E+05	6.7
POOL:001	<= 5	39	100	92	54	8	0	0	6.897E+05	11.0
POOL:001	<=10	42	100	93	86	14	0	0	1.016E+06	15.0
POOL:001	<=15	44	100	95	89	48	7	0	1.363E+06	19.2
POOL:002	<= 0	30	100	87	73	47	7	0	8.551E+05	17.7
POOL:002	<= 5	33	100	91	79	55	24	3	1.109E+06	20.8
POOL:002	<=10	36	100	92	83	61	39	6	1.387E+06	23.9
POOL:002	<=15	38	100	95	87	68	47	21	1.686E+06	27.5
POOL:003	<= 0	32	100	81	63	19	6	0	7.099E+05	13.8
POOL:003	<= 5	37	100	86	70	35	11	3	9.882E+05	16.6
POOL:003	<=10	42	100	88	76	48	14	5	1.307E+06	19.3
POOL:003	<=15	44	100	95	84	59	30	9	1.654E+06	23.3
POOL:004	<= 0	42	100	90	81	57	0	0	1.275E+06	18.8
POOL:004	<= 5	59	100	71	64	49	20	0	1.682E+06	17.7
POOL:004	<=10	76	100	78	55	45	32	0	2.226E+06	18.2
POOL:004	<=15	80	100	95	74	47	36	15	2.856E+06	22.1
POOL:005	<= 0	105	100	73	47	20	16	7	2.364E+06	14.0
POOL:005	<= 5	135	100	78	57	26	14	9	3.332E+06	15.3
POOL:005	<=10	165	100	82	64	30	13	10	4.542E+06	17.1
POOL:005	<=15	182	100	91	74	42	19	10	5.941E+06	20.2
SANDBAR	<= 0	882	100	90	81	21	1	0	2.170E+07	15.2
SANDBAR	<= 5	893	100	99	89	50	11	1	2.886E+07	20.0
SANDBAR	<=10	904	100	99	98	79	20	1	3.611E+07	24.8
SANDBAR	<=15	908	100	100	98	88	49	11	4.341E+07	29.6

LOWER MISSISSIPPI RIVER ENVIRONMENTAL PROGRAM
DIKE SYSTEM PHYSICAL CHARACTERISTICS
DIKE FIELD NAME: TOGO ISLAND
RIVER MILE: 416.1

POOL	LWRP	TOTAL ACRES	PERCENT OF TOTAL WATER SURFACE ACRES <= 0	<=- 5	<=-10	<=-20	<=-30	<=-40	VOLUME (CU. YDS.)	DEPTH (FEET)
POOL TOTAL	<= 0	119	100	80	60	39	21	14	3.541E+06	18.4
POOL TOTAL	<= 5	166	100	72	57	36	22	13	4.691E+06	17.5
POOL TOTAL	<=10	213	100	78	56	33	22	12	6.219E+06	18.1
POOL TOTAL	<=15	283	100	75	59	34	21	13	8.220E+06	18.0
POOL:001	<= 0	18	100	94	89	67	0	0	5.969E+05	20.6
POOL:001	<= 5	19	100	95	89	74	32	0	7.462E+05	24.3
POOL:001	<=10	20	100	95	90	80	60	0	9.035E+05	28.0
POOL:001	<=15	21	100	95	90	81	67	29	1.069E+06	31.5
POOL:002	<= 0	85	100	81	62	41	29	20	2.783E+06	20.3
POOL:002	<= 5	96	100	89	72	46	31	22	3.513E+06	22.7
POOL:002	<=10	107	100	90	79	50	33	23	4.332E+06	25.1
POOL:002	<=15	110	100	97	87	63	40	27	5.207E+06	29.3
POOL:003	<= 0	10	100	50	0	0	0	0	8.067E+04	5.0
POOL:003	<= 5	35	100	29	14	0	0	0	2.622E+05	4.6
POOL:003	<=10	60	100	58	17	0	0	0	6.453E+05	6.7
POOL:003	<=15	106	100	57	33	5	0	0	1.315E+06	7.7
POOL:004	<= 0	6	100	67	33	0	0	0	8.067E+04	8.3
POOL:004	<= 5	16	100	38	25	6	0	0	1.694E+05	6.6
POOL:004	<=10	26	100	62	23	8	0	0	3.388E+05	8.1
POOL:004	<=15	46	100	57	35	9	2	0	6.292E+05	8.5
SANDBAR	<= 0	342	100	61	22	12	0	0	4.598E+06	8.3
SANDBAR	<= 5	458	100	75	45	12	4	0	7.825E+06	10.6
SANDBAR	<=10	574	100	80	60	13	7	0	1.199E+07	12.9
SANDBAR	<=15	661	100	87	69	31	9	3	1.697E+07	15.9

LOWER MISSISSIPPI RIVER ENVIRONMENTAL PROGRAM
DIKE SYSTEM PHYSICAL CHARACTERISTICS
DIKE FIELD NAME: YUCATAN
RIVER MILE: 410.4

POOL	LWRP	TOTAL ACRES	PERCENT OF TOTAL WATER SURFACE ACRES <= 0	<=- 5	<=-10	<=-20	<=-30	<=-40	VOLUME (CU. YDS.)	DEPTH (FEET)
POOL TOTAL	<= 0	272	100	57	14	4	1	1	3.065E+06	7.0
POOL TOTAL	<= 5	445	100	61	35	5	2	1	5.957E+06	8.3
POOL TOTAL	<=10	618	100	72	44	6	2	1	1.024E+07	10.3
POOL TOTAL	<=15	745	100	83	60	21	3	1	1.574E+07	13.1
POOL:001	<= 0	60	100	50	0	0	0	0	4.840E+05	5.0
POOL:001	<= 5	65	100	92	46	0	0	0	9.882E+05	9.4
POOL:001	<=10	70	100	93	86	0	0	0	1.533E+06	13.6
POOL:001	<=15	74	100	95	88	41	0	0	2.113E+06	17.7
POOL:002	<= 0	38	100	63	26	16	11	5	6.615E+05	10.8
POOL:002	<= 5	105	100	36	23	8	5	3	1.238E+06	7.3
POOL:002	<=10	172	100	61	22	6	3	2	2.355E+06	8.5
POOL:002	<=15	211	100	82	50	11	4	2	3.900E+06	11.5
POOL:003	<= 0	174	100	58	16	2	0	0	1.920E+06	6.8
POOL:003	<= 5	275	100	63	37	6	1	0	3.731E+06	8.4
POOL:003	<=10	376	100	73	46	7	1	0	6.357E+06	10.5
POOL:003	<=15	460	100	82	60	22	3	0	9.728E+06	13.1
SANDBAR	<= 0	200	100	51	3	0	0	0	1.710E+06	5.3
SANDBAR	<= 5	330	100	61	31	1	0	0	3.848E+06	7.2
SANDBAR	<=10	460	100	72	43	1	0	0	7.034E+06	9.5
SANDBAR	<=15	581	100	79	57	18	1	0	1.123E+07	12.0

LOWER MISSISSIPPI RIVER ENVIRONMENTAL PROGRAM
DIKE SYSTEM PHYSICAL CHARACTERISTICS
DIKE FIELD NAME: COFFEE POINT
RIVER MILE: 405.0

POOL	LWRP	TOTAL ACRES	PERCENT OF TOTAL WATER SURFACE ACRES <= 0	<=- 5	<=-10	<=-20	<=-30	<=-40	VOLUME (CU. YDS.)	DEPTH (FEET)
POOL TOTAL	<= 0	282	100	67	35	22	9	5	5.501E+06	12.1
POOL TOTAL	<= 5	367	100	77	52	22	12	5	8.119E+06	13.7
POOL TOTAL	<=10	452	100	81	62	22	14	6	1.142E+07	15.7
POOL TOTAL	<=15	512	100	88	72	37	16	9	1.531E+07	18.5
POOL:001	<= 0	18	100	89	78	56	0	0	5.324E+05	18.3
POOL:001	<= 5	20	100	90	80	60	25	0	6.857E+05	21.3
POOL:001	<=10	22	100	91	82	64	45	0	8.551E+05	24.1
POOL:001	<=15	23	100	96	87	70	52	22	1.037E+06	27.9
POOL:002	<= 0	62	100	84	68	58	39	23	2.372E+06	23.7
POOL:002	<= 5	64	100	97	81	61	47	30	2.880E+06	27.9
POOL:002	<=10	66	100	97	94	64	55	36	3.404E+06	32.0
POOL:002	<=15	77	100	86	83	68	51	39	3.981E+06	32.0
POOL:003	<= 0	202	100	60	21	8	1	0	2.597E+06	8.0
POOL:003	<= 5	283	100	71	43	10	3	0	4.554E+06	10.0
POOL:003	<=10	364	100	78	55	12	4	1	7.163E+06	12.2
POOL:003	<=15	412	100	88	69	30	7	2	1.029E+07	15.5
SANDBAR	<= 0	734	100	73	46	23	6	1	1.489E+07	12.6
SANDBAR	<= 5	806	100	91	67	32	13	3	2.110E+07	16.2
SANDBAR	<=10	878	100	92	84	38	19	5	2.789E+07	19.7
SANDBAR	<=15	928	100	95	87	58	27	12	3.518E+07	23.5

LOWER MISSISSIPPI RIVER ENVIRONMENTAL PROGRAM
DIKE SYSTEM PHYSICAL CHARACTERISTICS
DIKE FIELD NAME: BONDURANT TOWHEAD
RIVER MILE: 394.8

POOL	LWRP	TOTAL ACRES	PERCENT OF TOTAL WATER SURFACE ACRES <= 0	<=- 5	<=-10	<=-20	<=-30	<=-40	VOLUME (CU. YDS.)	DEPTH (FEET)
POOL TOTAL	<= 0	453	100	81	61	23	5	2	1.030E+07	14.1
POOL TOTAL	<= 5	587	100	77	62	32	11	3	1.450E+07	15.3
POOL TOTAL	<=10	721	100	81	63	38	14	3	1.977E+07	17.0
POOL TOTAL	<=15	825	100	87	71	44	23	8	2.601E+07	19.5
POOL:001	<= 0	22	100	91	82	36	0	0	5.969E+05	16.8
POOL:001	<= 5	23	100	96	87	57	17	0	7.784E+05	21.0
POOL:001	<=10	24	100	96	92	75	33	0	9.680E+05	25.0
POOL:001	<=15	27	100	89	85	74	48	15	1.174E+06	26.9
POOL:002	<= 0	87	100	79	59	31	20	13	2.412E+06	17.2
POOL:002	<= 5	108	100	81	64	36	20	13	3.198E+06	18.4
POOL:002	<=10	129	100	84	67	40	21	13	4.154E+06	20.0
POOL:002	<=15	135	100	96	80	51	29	16	5.219E+06	24.0
POOL:003	<= 0	344	100	80	60	20	1	0	7.292E+06	13.1
POOL:003	<= 5	456	100	75	61	30	8	0	1.052E+07	14.3
POOL:003	<=10	568	100	80	61	37	12	1	1.465E+07	16.0
POOL:003	<=15	663	100	86	69	42	21	5	1.961E+07	18.3
SANDBAR	<= 0	511	100	85	70	33	2	1	1.290E+07	15.6
SANDBAR	<= 5	567	100	90	77	47	16	1	1.725E+07	18.9
SANDBAR	<=10	623	100	91	82	58	27	2	2.205E+07	21.9
SANDBAR	<=15	691	100	90	82	63	38	13	2.735E+07	24.5

LOWER MISSISSIPPI RIVER ENVIRONMENTAL PROGRAM
DIKE SYSTEM PHYSICAL CHARACTERISTICS
DIKE FIELD NAME: COTTAGE BEND
RIVER MILE: 389.2

POOL	LWRP	TOTAL ACRES	PERCENT OF TOTAL WATER SURFACE ACRES <= 0	<=- 5	<=-10	<=-20	<=-30	<=-40	VOLUME (CU. YDS.)	DEPTH (FEET)
POOL TOTAL	<= 0	140	100	79	57	23	3	0	3.001E+06	13.3
POOL TOTAL	<= 5	248	100	56	44	23	7	1	4.566E+06	11.4
POOL TOTAL	<=10	356	100	70	39	22	9	1	7.002E+06	12.2
POOL TOTAL	<=15	437	100	81	57	25	13	4	1.020E+07	14.5
POOL:001	<= 0	4	100	50	0	0	0	0	3.227E+04	5.0
POOL:001	<= 5	6	100	67	33	0	0	0	7.260E+04	7.5
POOL:001	<=10	8	100	75	50	0	0	0	1.291E+05	10.0
POOL:001	<=15	10	100	80	60	20	0	0	2.017E+05	12.5
POOL:002	<= 0	34	100	79	59	18	6	0	7.260E+05	13.2
POOL:002	<= 5	40	100	85	67	32	10	2	1.024E+06	15.9
POOL:002	<=10	46	100	87	74	43	13	4	1.371E+06	18.5
POOL:002	<=15	64	100	72	63	42	20	6	1.815E+06	17.6
POOL:003	<= 0	38	100	68	37	5	0	0	5.647E+05	9.2
POOL:003	<= 5	67	100	57	39	12	1	0	9.882E+05	9.1
POOL:003	<=10	96	100	70	40	15	2	0	1.646E+06	10.6
POOL:003	<=15	135	100	71	50	19	6	1	2.577E+06	11.8
POOL:004	<= 0	64	100	86	72	38	3	0	1.678E+06	16.3
POOL:004	<= 5	135	100	47	41	26	10	1	2.480E+06	11.4
POOL:004	<=10	206	100	66	31	22	12	1	3.856E+06	11.6
POOL:004	<=15	228	100	90	59	24	15	6	5.606E+06	15.2
SANDBAR	<= 0	16	100	88	75	63	0	0	4.840E+05	18.8
SANDBAR	<= 5	23	100	70	61	48	22	0	6.413E+05	17.3
SANDBAR	<=10	30	100	77	53	40	33	0	8.551E+05	17.7
SANDBAR	<=15	32	100	94	72	44	34	16	1.105E+06	21.4

LOWER MISSISSIPPI RIVER ENVIRONMENTAL PROGRAM
DIKE SYSTEM ENGINEERING CHARACTERISTICS
YUCATAN
CROSSING & SECONDARY CHANNEL
STEPPED DOWN
RIVER MILE: 410.4 - 409.8

DIKE SYSTEM RIVER MILE	LENGTH FEET	DATE BUILT	DIKE TYPE	DIKE LONGITUDNAL BANKHEAD (LWRP, FEET) 0%	25%	50%	75%	100%	SLOPE (PERCENT) 00-25	25-75	75-100	TOTAL
410.4	2820	AUG70	TRANSVERSE	24.0	17.0	15.0	15.0	14.0	0.99	0.14	0.14	0.35
409.8	4960	AUG70	TRANSVERSE	16.0	9.0	21.0	17.0	11.0	0.56	-0.32	0.48	0.10

*** DIKE SYSTEM SUMMARY ***
NUMBER OF DIKES:2
TOTAL LENGTH(FEET):7780
AVERAGE LENGTH (FEET):3890
MAXIMUM LENGTH (FEET):4960
MINIMUM LENGTH (FEET):2820
STANDARD DEVIATION: 1513.209

LOWER MISSISSIPPI RIVER ENVIRONMENTAL PROGRAM
DIKE SYSTEM PHYSICAL CHARACTERISTICS
DIKE FIELD NAME: SPITHEAD TOWHEAD
RIVER MILE: 386.3

POOL	LWRP	TOTAL ACRES	PERCENT OF TOTAL WATER SURFACE ACRES <= 0	<=- 5	<=-10	<=-20	<=-30	<=-40	VOLUME (CU. YDS.)	DEPTH (FEET)
POOL TOTAL	<= 0	42	100	64	29	5	0	0	5.647E+05	8.3
POOL TOTAL	<= 5	145	100	29	19	5	1	0	1.319E+06	5.6
POOL TOTAL	<=10	248	100	58	17	5	1	0	2.904E+06	7.3
POOL TOTAL	<=15	335	100	74	43	8	2	0	5.255E+06	9.7
POOL:001	<= 0	8	100	63	25	0	0	0	9.680E+04	7.5
POOL:001	<= 5	10	100	80	50	10	0	0	1.694E+05	10.5
POOL:001	<=10	12	100	83	67	17	0	0	2.581E+05	13.3
POOL:001	<=15	13	100	92	77	38	8	0	3.590E+05	17.1
POOL:002	<= 0	24	100	67	33	8	0	0	3.549E+05	9.2
POOL:002	<= 5	54	100	44	30	9	2	0	6.695E+05	7.7
POOL:002	<=10	84	100	64	29	10	2	0	1.226E+06	9.0
POOL:002	<=15	89	100	94	61	18	6	1	1.924E+06	13.4
POOL:003	<= 0	10	100	60	20	0	0	0	1.129E+05	7.0
POOL:003	<= 5	81	100	12	7	1	0	0	4.800E+05	3.7
POOL:003	<=10	152	100	53	7	1	0	0	1.420E+06	5.8
POOL:003	<=15	233	100	65	35	3	0	0	2.973E+06	7.9
SANDBAR	<= 0	306	100	61	23	5	0	0	3.856E+06	7.8
SANDBAR	<= 5	501	100	61	38	9	2	0	7.111E+06	8.8
SANDBAR	<=10	696	100	72	44	10	2	0	1.194E+07	10.6
SANDBAR	<=15	743	100	94	67	25	6	1	1.774E+07	14.8

LOWER MISSISSIPPI RIVER ENVIRONMENTAL PROGRAM
DIKE SYSTEM PHYSICAL CHARACTERISTICS
DIKE FIELD NAME: WATERPROOF
RIVER MILE: 380.0

POOL	LWRP	TOTAL ACRES	PERCENT OF TOTAL WATER SURFACE ACRES <= 0	<=- 5	<=-10	<=-20	<=-30	<=-40	VOLUME (CU. YDS.)	DEPTH (FEET)
POOL TOTAL	<= 0	819	100	66	33	5	1	0	1.180E+07	8.9
POOL TOTAL	<= 5	964	100	85	56	16	3	1	1.899E+07	12.2
POOL TOTAL	<=10	1109	100	87	74	24	4	1	2.735E+07	15.3
POOL TOTAL	<=15	1230	100	90	78	44	13	2	3.679E+07	18.5
POOL:001	<= 0	88	100	50	0	0	0	0	7.099E+05	5.0
POOL:001	<= 5	93	100	95	47	0	0	0	1.440E+06	9.6
POOL:001	<=10	98	100	95	90	0	0	0	2.210E+06	14.0
POOL:001	<=15	101	100	97	92	44	0	0	3.013E+06	18.5
POOL:002	<= 0	63	100	76	52	24	8	2	1.379E+06	13.6
POOL:002	<= 5	67	100	94	72	36	15	4	1.904E+06	17.6
POOL:002	<=10	71	100	94	89	46	21	7	2.460E+06	21.5
POOL:002	<=15	72	100	99	93	67	33	14	3.037E+06	26.1
POOL:003	<= 0	52	100	54	8	0	0	0	4.840E+05	5.8
POOL:003	<= 5	57	100	91	49	4	0	0	9.236E+05	10.0
POOL:003	<=10	62	100	92	84	6	0	0	1.404E+06	14.0
POOL:003	<=15	64	100	97	89	44	3	0	1.912E+06	18.5
POOL:004	<= 0	71	100	70	41	15	4	1	1.283E+06	11.2
POOL:004	<= 5	76	100	93	66	26	9	3	1.875E+06	15.3
POOL:004	<=10	81	100	94	88	36	14	4	2.509E+06	19.2
POOL:004	<=15	82	100	99	93	61	24	9	3.166E+06	23.9
POOL:005	<= 0	70	100	57	14	0	0	0	7.260E+05	6.4
POOL:005	<= 5	94	100	74	43	5	0	0	1.387E+06	9.1
POOL:005	<=10	118	100	80	59	8	0	0	2.243E+06	11.8
POOL:005	<=15	134	100	88	70	30	4	0	3.259E+06	15.1
POOL:006	<= 0	475	100	70	40	3	1	0	7.220E+06	9.4
POOL:006	<= 5	577	100	82	58	18	2	0	1.146E+07	12.3
POOL:006	<=10	679	100	85	70	28	2	0	1.653E+07	15.1
POOL:006	<=15	777	100	87	74	43	13	1	2.240E+07	17.9
SANDBAR	<= 0	248	100	56	11	0	0	0	2.452E+06	6.1
SANDBAR	<= 5	368	100	67	38	4	0	0	4.937E+06	8.3
SANDBAR	<=10	488	100	75	51	6	0	0	8.389E+06	10.7
SANDBAR	<=15	593	100	82	62	23	2	0	1.275E+07	13.3

LOWER MISSISSIPPI RIVER ENVIRONMENTAL PROGRAM
DIKE SYSTEM PHYSICAL CHARACTERISTICS
DIKE FIELD NAME: NATCHEZ ISLAND
RIVER MILE: 360.1

POOL	LWRP	TOTAL ACRES	PERCENT OF TOTAL WATER SURFACE ACRES <= 0	<=- 5	<=-10	<=-20	<=-30	<=-40	VOLUME (CU. YDS.)	DEPTH (FEET)
POOL TOTAL	<= 0	282	100	68	35	6	1	0	4.211E+06	9.3
POOL TOTAL	<= 5	347	100	81	55	17	3	0	6.748E+06	12.1
POOL TOTAL	<=10	412	100	84	68	24	4	0	9.809E+06	14.8
POOL TOTAL	<=15	450	100	92	77	42	13	2	1.329E+07	18.3
POOL:001	<= 0	8	100	50	0	0	0	0	6.453E+04	5.0
POOL:001	<= 5	11	100	73	36	0	0	0	1.412E+05	8.0
POOL:001	<=10	14	100	79	57	0	0	0	2.420E+05	10.7
POOL:001	<=15	15	100	93	73	27	0	0	3.590E+05	14.8
POOL:002	<= 0	24	100	54	8	0	0	0	2.259E+05	5.8
POOL:002	<= 5	55	100	44	24	2	0	0	5.445E+05	6.1
POOL:002	<=10	86	100	64	28	2	0	0	1.113E+06	8.0
POOL:002	<=15	88	100	98	63	15	1	0	1.815E+06	12.8
POOL:003	<= 0	34	100	62	24	6	0	0	4.356E+05	7.9
POOL:003	<= 5	42	100	81	50	12	2	0	7.421E+05	11.0
POOL:003	<=10	50	100	84	68	16	4	0	1.113E+06	13.8
POOL:003	<=15	64	100	78	66	33	8	2	1.573E+06	15.2
POOL:004	<= 0	72	100	61	22	0	0	0	8.389E+05	7.2
POOL:004	<= 5	86	100	84	51	9	0	0	1.476E+06	10.6
POOL:004	<=10	100	100	86	72	16	0	0	2.226E+06	13.8
POOL:004	<=15	117	100	85	74	38	7	0	3.102E+06	16.4
POOL:005	<= 0	88	100	70	41	5	0	0	1.355E+06	9.5
POOL:005	<= 5	91	100	97	68	22	2	0	2.077E+06	14.1
POOL:005	<=10	94	100	97	94	38	4	0	2.823E+06	18.6
POOL:005	<=15	95	100	99	96	65	21	2	3.586E+06	23.4
POOL:006	<= 0	56	100	84	68	21	4	0	1.291E+06	14.3
POOL:006	<= 5	62	100	90	76	40	11	2	1.767E+06	17.7
POOL:006	<=10	68	100	91	82	56	18	3	2.291E+06	20.9
POOL:006	<=15	71	100	96	87	66	35	10	2.852E+06	24.9
SANDBAR	<= 0	230	100	57	14	0	0	0	2.372E+06	6.4
SANDBAR	<= 5	247	100	93	53	6	0	0	4.295E+06	10.8
SANDBAR	<=10	264	100	94	87	12	0	0	6.357E+06	14.9
SANDBAR	<=15	269	100	98	92	49	6	0	8.506E+06	19.6

LOWER MISSISSIPPI RIVER ENVIRONMENTAL PROGRAM
DIKE SYSTEM PHYSICAL CHARACTERISTICS
DIKE FIELD NAME: JACKSON POINT
RIVER MILE: 331.4

POOL	LWRP	TOTAL ACRES	PERCENT OF TOTAL WATER SURFACE ACRES <= 0	<=- 5	<=-10	<=-20	<=-30	<=-40	VOLUME (CU. YDS.)	DEPTH (FEET)
POOL TOTAL	<= 0	64	100	55	9	0	0	0	6.131E+05	5.9
POOL TOTAL	<= 5	161	100	40	22	2	0	0	1.521E+06	5.9
POOL TOTAL	<=10	258	100	62	25	2	0	0	3.211E+06	7.7
POOL TOTAL	<=15	296	100	87	54	12	1	0	5.445E+06	11.4
POOL:001	<= 0	20	100	55	10	0	0	0	1.936E+05	6.0
POOL:001	<= 5	25	100	80	44	4	0	0	3.751E+05	9.3
POOL:001	<=10	30	100	83	67	7	0	0	5.969E+05	12.3
POOL:001	<=15	33	100	91	76	33	3	0	8.510E+05	16.0
POOL:002	<= 0	34	100	56	12	0	0	0	3.388E+05	6.2
POOL:002	<= 5	69	100	49	28	3	0	0	7.542E+05	6.8
POOL:002	<=10	104	100	66	33	4	0	0	1.452E+06	8.7
POOL:002	<=15	111	100	94	62	17	2	0	2.319E+06	13.0
POOL:003	<= 0	10	100	50	0	0	0	0	8.067E+04	5.0
POOL:003	<= 5	67	100	15	7	0	0	0	3.912E+05	3.6
POOL:003	<=10	124	100	54	8	0	0	0	1.162E+06	5.8
POOL:003	<=15	152	100	82	44	3	0	0	2.275E+06	9.3
SANDBAR	<= 0	308	100	72	45	0	0	0	4.711E+06	9.5
SANDBAR	<= 5	397	100	78	56	17	0	0	7.554E+06	11.8
SANDBAR	<=10	486	100	82	63	28	0	0	1.112E+07	14.2
SANDBAR	<=15	495	100	98	80	45	14	0	1.507E+07	18.9